UNIVERSITÀ
degli STUDI
di CATANIA

Dipartimento
di Fisica
e Astronomia
"Ettore Majorana"

PhD programme in physics

Claudio Ferrara

Experimental data of rare earth spectral lines of astrophysical interest

PhD thesis

Supervisor:
Prof. Francesco Leone

---

academic year 2021/2022

Contents

Introduction

Astrophysics is the branch of physics which studies the Universe through the observation and the study of celestial bodies. It developed as an "autonomous" science, detaching both from astronomy and basic physics, during the end of the XIX century and the whole XX century, making huge forward steps in the comprehension of stars, galaxies and the universe as a whole.

Nevertheless, astrophysics is in any case a very multidisciplinary topic which is, and it will always be, linked to the other fields of physics. Several discoveries have been made starting from some kind of astronomical observations. Many examples can be done, here three of them are reported: the laws of gravitation, which is one of the four fundamental interaction, has been discovered analyzing observations of the motion of solar system bodies; the discovery of helium and infrared radiation, which have been done observing the spectrum of the sunlight. There are also cases in which the understanding of astrophysical phenomena needs advances in the other field of physics, for example: a) the behaviour of matter in the interior of stars and the occurring of nuclear reactions has always needed (and still needs) advances in the field of nuclear physics; b) the structure of compact objects is currently explained through quantum behaviour of degenerate matter at extremes densities, which is studied in the field of structure of matter; c) the energy and composition of cosmic rays, and in general phenomena occurring in high energy astrophysical environment, are partly explained through high energy particle physics and the study of subnuclear interaction at extreme energy.

In order to extract physical information from astronomical observations, some starting knowledge of *what we are looking for* is needed in order to properly interpret data. This is true in particular when *spectroscopy* of astrophysical objects is performed, that is when light coming from such objects is analyzed as a function of its "color". Many of the radiation emitted (or absorbed) by celestial objects is due to emission of (or absorption by) molecules, atoms or ions.

Interpretation of astrophysical spectra then requires the ability to recognize spectral features. When detectives examine a crime scene, a series of fingerprints and organics samples are collected. Then laboratory analysis is able to attribute such fingerprints or samples to someone if they match with fingerprints or DNA data from an existent database of known people. More or less the same occurs when an unknown spectrum is analyzed for the first time: if transition wavelengths and intensities are known for a given atom or molecule, we will be able to recognize it in the spectrum and ensure its presence in the celestial object which is observed.

Therefore knowledge of atomic and molecular data, in particular for complex systems, such as many electron atoms or complex molecules, is necessary. In the following paragraphs examples of what the absence of reference atomic data means for the interpretation of the observations are shown, together with a reference to next generation observatories and their possible discoveries.

Interpretation of stellar spectra

Stellar spectra contain a huge amount of information about the physics of stars. Even from a first look a stellar spectrum is able to give immediate information about physical parameters of the star's atmosphere, chemical composition and line of sight component of velocity. This is possible mainly due to the observation and analysis of atomic (and sometimes molecular) features in the spectrum. In order to properly infer such information from spectral features, those have to be unambiguously associated to their elements or molecules. In absence of knowledge, interpretation of spectra becomes more and more difficult with increasing number of features.

Chemically peculiar stars

Since the XIX century stars have being classified through the characteristics of their spectra. The current *spectral classification scheme* used for the stars is the result of a work which lasted several decades and needed the analysis of thousands of stellar spectra. With the improvement of observational capabilities, spectra with better resolution of increasingly fainter stars have been available, and the classification of stellar sources through their spectra has become more and more detailed.

Abundance of single elements in stars can be measured with a certain degree of precision depending on the knowledge of spectral lines of that element. Apart from the fraction of hydrogen and helium, which are usually treated separately, abundances of elements with $z \geq 3$ (improperly indicated as *metals* in astrophysics) are usually reported as the logarithm of the fraction of elements with respect to the total $\log N/N_{tot}$. Normal stars generally have different overall quantities of metals, indicated as *metallicity*, while difference in abundances for different elements tend to be the same.

There exist stars for which spectral lines of certain elements are much stronger (or weaker) than the majority of stars. This means that the abundance of such elements significantly differs from that of normal stars. These stars with "anomalous" chemical composition are known as *chemically peculiar stars* (CP stars) and their classification is based upon the elements which have non-standard abundance [1].

With respect to the Sun, in CP stars (as a class) Helium can be under or over-abundant. Carbon, Nitrogen and Oxygen are underabundant of a factor 100. Iron-peak elements are overabundant of a factor 1000 and rare earths overcome the solar values up to 10^6. For these reasons, CP stars represent the most extreme challenge for spectral line identification.

The roAp star γ Equ

Gamma Equulei (here after γ Equ) may be taken as a prototype of chemically peculiar star. γ Equ is a *rapidly oscillating* (ro) chemically peculiar (p) A star in the constellation of Equuleus. roAp stars are a subclass of chemically peculiar stars whose atmospheres pulsate with periods in the 2-20

minutes range. The spectrum of the star is very "sharp-lined" suggesting that the rotational velocity of the star is very low.

First photometric detection of γ Equ oscillations has been made in the eighties, with the initial period estimation of 12.44 min [2]. Further spectroscopic observations showed radial velocity oscillations for single lines, establishing that photometric variation is due to pulsation of the atmosphere. Furthermore, it has been observed that radial velocity amplitude of oscillations is greater for rare earths spectral lines [3].

From 1950's to current days, Zeeman splitting and polarimetric measurements allowed to derive modulus and the line-of-sight component of magnetic field, yielding values of the order of kG. Such measurements show variations in time in agreement with a period of $\simeq$ 100 y: the last period estimation, carried out by [4], is 97 years.

The spectrum of γ Equ shows overabundance of heavy elements, in particular of rare earths as it is explained in [5]. Ryabchikova et al. in the same work showed that different abundance values for different ionization stages are required in order to reproduce the spectral lines of some of the elements. This fact, together with radial velocity oscillations of individual lines and unusual line shapes due to the magnetic field, makes the spectrum of γ Equ extremely difficult to interpret.

Line identification in chemically peculiar stars spectra such as γ Equ is reasonably good in the visible range. Figure 1 shows a comparison between high resolution ($\simeq$ 115000) spectra acquired with the *High Accuracy Radial velocity Planet Searcher in North hemisphere* (HARPS-N) at *Telescopio Nazionale Galileo* (TNG) [6] and a synthetic spectrum, calculated using the radiative transfer code *SYNTHE* [7]. The synthetic spectrum is calculated using $T_{eff} = 7700$ K, $\log g = 4.20$, $v_{turb} = 2$ km/s and $v \sin i = 2$ km/s. Abundance values are taken from [5] and spectral line data are taken from VALD database [8]. The comparison shows that almost all the lines are unambiguously identified. Line shapes are not perfectly reproduced due to presence of Zeeman magnetic splitting. Even if there are still some unidentified spectral lines, the knowledge of spectral lines and their $\log gf$ is quite complete in the visible range.

The situation is completely different for infrared lines. If the same synthetic spectrum is used to reproduce the infrared part of the observed spectrum of γ Equ, a very limited number of lines is identified. A compar-

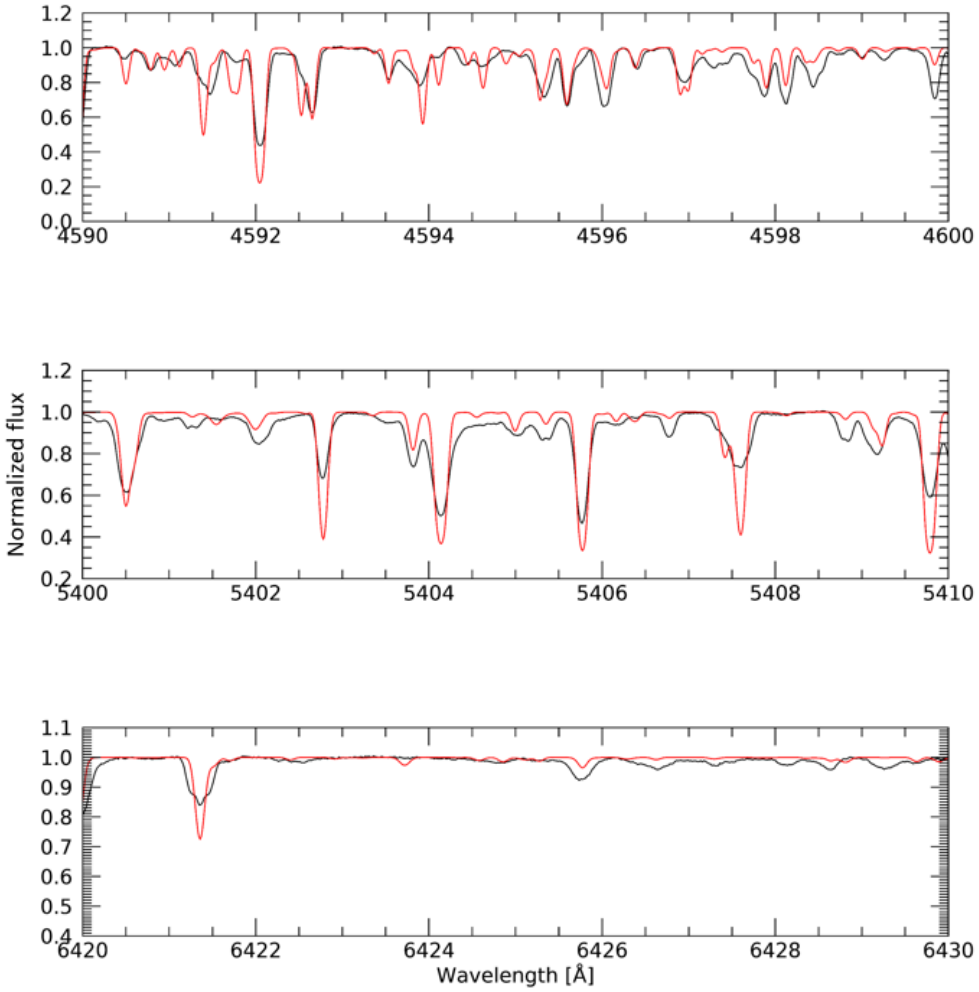


Figure 1: Comparison between HARPS-N visible spectrum (black) and synthetic spectrum (red) showed in three 10 Å portions.

ison between the same synthetic spectrum and a near infrared spectrum, acquired simultaneously with the GIANO-B spectrograph at TNG [9], is shown in Figure 2 [1]. Almost all the stellar features, which are easy to distinguish from telluric lines due to their larger width, are not present in the synthetic spectrum. **That is most of the NIR lines are not yet known and included in the atomic databases**. Even if observed lines are identified, the abundances used to reproduce such lines in the visible range do not allow us to do the same in the infrared. This could be partly explained with the hypothesis of abundance stratification for several elements, as it is pointed out by [10] to justify spectral anomalies in the visible range. Knowledge of transition wavelengths and strengths is essential to properly interpret the spectrum and quantify all the physical phenomena occurring in the atmosphere of γ Equ.

The spectra shown above are an example of the difficulty to reproduce infrared stellar spectra and, in turn, to use such spectra to infer physical quantities. The comparison between theoretical and observed spectra gives similar results if it is repeated for other CP stars we observed. Unidentified infrared lines are also largely present in spectra of normal stars.

Stellar spectroscopic observations with CAOS at OACT

The identification of a star as a CP star requires the determination of single elements abundances, which in turn requires high resolution spectroscopy of the star. One of the most comprehensive catalogues of CP stars is that edited by Renson in the 1970s titled *Catalogue of Ap, HgMn and Am stars*, with the most recent edition published in 2009 [11]. Since in this catalogue a lot of stars have been classified as CP stars through photometry, there are more than 2300 entries for which the peculiarity is doubtful.

A large observation program with the Catania Astrophysical Observatory Spectropolarimeter (CAOS) is currently ongoing with the aim of characterizing stars of Renson catalogue through high resolution spectroscopy. Aims are the research of possible binary systems and deter-

[1] Leone, F., Giarrusso, M., Ferrara, C., in preparation

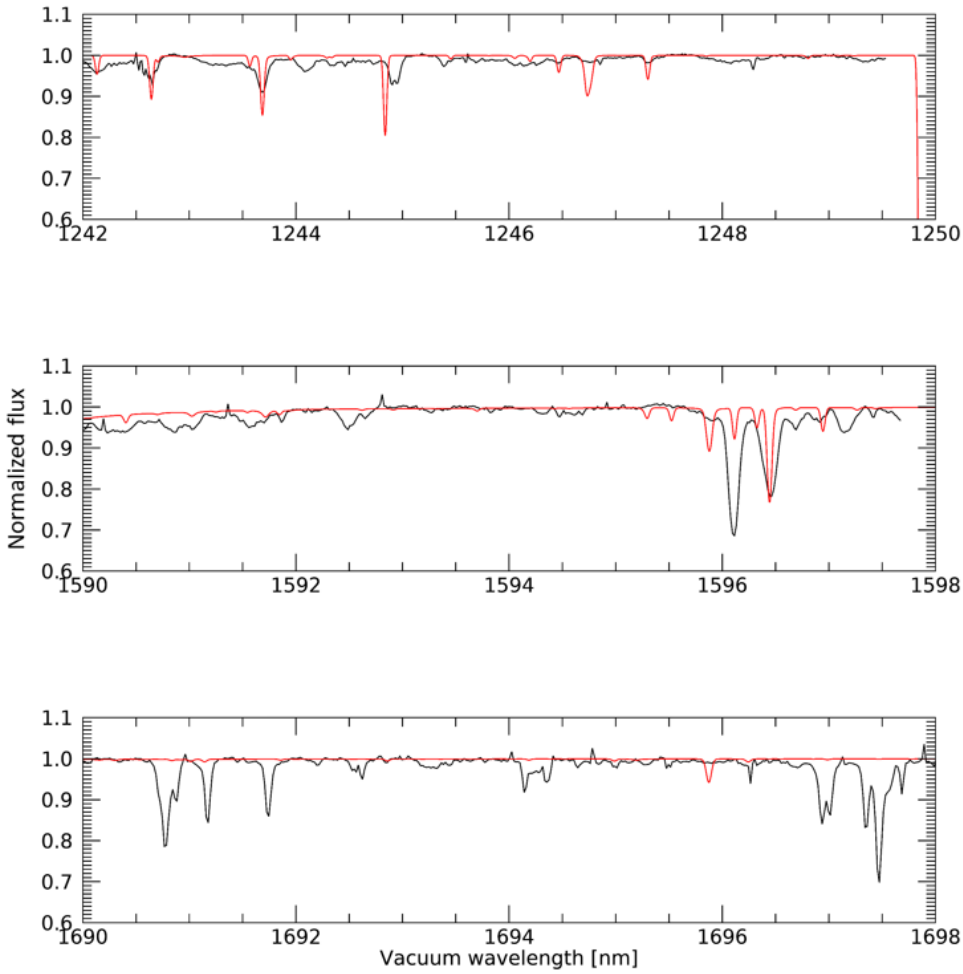


Figure 2: Comparison between GIANO-B near infrared spectrum (black) and synthetic spectrum (red) shown in three 8 nm portions.

mine atmospherical parameters and elemental abundances for these stars. High resolution spectra with high signal to noise ratio are acquired for the targets observable with CAOS at OACT. Such targets have a) declination $\delta \geq -20$ and b) magnitude m_V brighter than the limiting value for CAOS, which is about 10 depending on sky conditions. In the framework of this thesis work, the location of unknown spectral features has been added to the goals of the observational CAOS program.

During this observational campaign, time resolved high resolution spectroscopy of five single-lined binaries has been carried out [12]. The five targets observed in this study are HD 40788, HD 187959, HD 202431, HD 134793 and HD 189652. Orbital periods and relative parameters have been estimated from radial velocity time series fitting and abundance determination for several iron peak elements has been performed: two examples of fitted phase-folded radial velocity curves are reported in Figure 3, while Figure 4 shows examples of comparisons of the observed spectra with synthetic spectra. Details of the observations, data reduction and analysis procedures can be found in the paper [12]. This study has revealed that: one of these stars (HD 189652) is a normal star (in the sense that no chemical peculiarity has been observed); HD 40788 and HD 187959 are marginal Am stars; HD202431 is an Am star and HD 134793 is a SrEuCr Ap star. Table 2 of the paper reports abundances derived for the investigated stars. While abundances of iron peak elements have been derived for all the five targets, this is not the same for rare earths: Ce abundance for HD 134793 is missing, Nd and Gd abundances have been derived only for two of the five stars and La abundance only for HD 202431, which is the only "sharp-lined" target due to its low rotational velocity. Since it is also caused by the line broadening due to stellar rotation, which lets weakest lines disappear, the lack of identified lines in stellar spectra is the main reason for the missed abundance determination for rare earths.

The observational campaign has been also extended to active stars with high energy phenomena in their atmospheres. In the context of a spectroscopic survey of already known X-ray sources, six stellar systems have been characterized through high resolution spectroscopy. Collecting CAOS spectra for these double-lined stars during 7 years, radial velocity curves have been measured and orbital parameters have been derived.

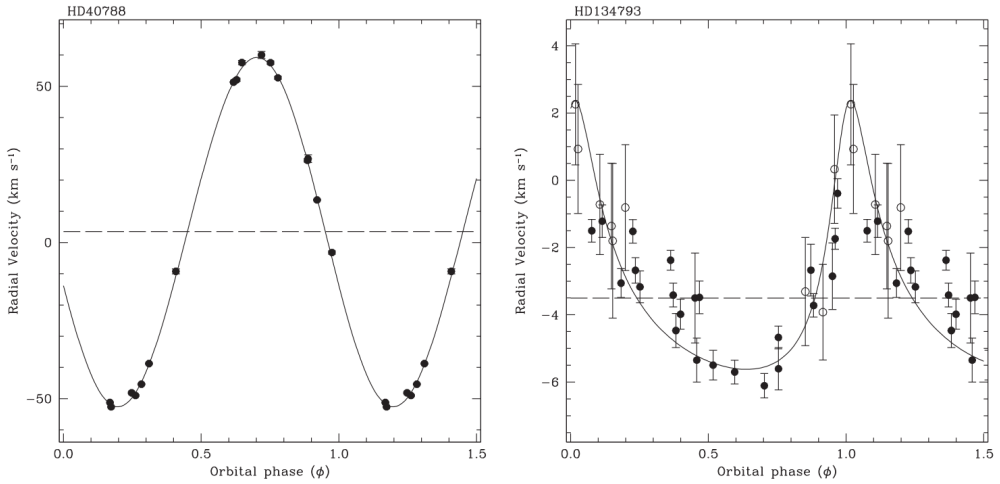


Figure 3: Phase-folded radial velocity curves for two of the five targets of the study (Figure adapted from [12]).

Once that atmospheric parameters have been derived, a template with the corresponding parameters has been subtracted from the spectra. This operation revealed the signature of atmospheric activity in these stars, which is chromospheric emission in the core of some lines: an example for the Hα is shown in Figure 5. Again, details can be found in the paper of the study [13].

The recurrent nova RS Ophiuchi

On August 9, 2021 the recurrent nova RS Ophiuchi (RS Oph) had one of its periodic outbursts. The magnitude of RS Oph increased up to 5 in V and exponentially decreased in the following days/weeks. Very High Energy gamma rays were detected immediately after the beginning of the outburst by the MAGIC cherenkov array and the gamma ray emission of RS Oph was also followed during the decay. Simultaneously to gamma ray observations, optical high resolution spectra were acquired with CAOS at OACT. The analysis of the Hα profiles in the spectra of RS Oph allowed us to derive the expansion velocity of the envelope ejected during the nova outburst, measuring value up to 4750 km/s. The analysis of the decay of gamma ray emission, combined with the ejecta parame-

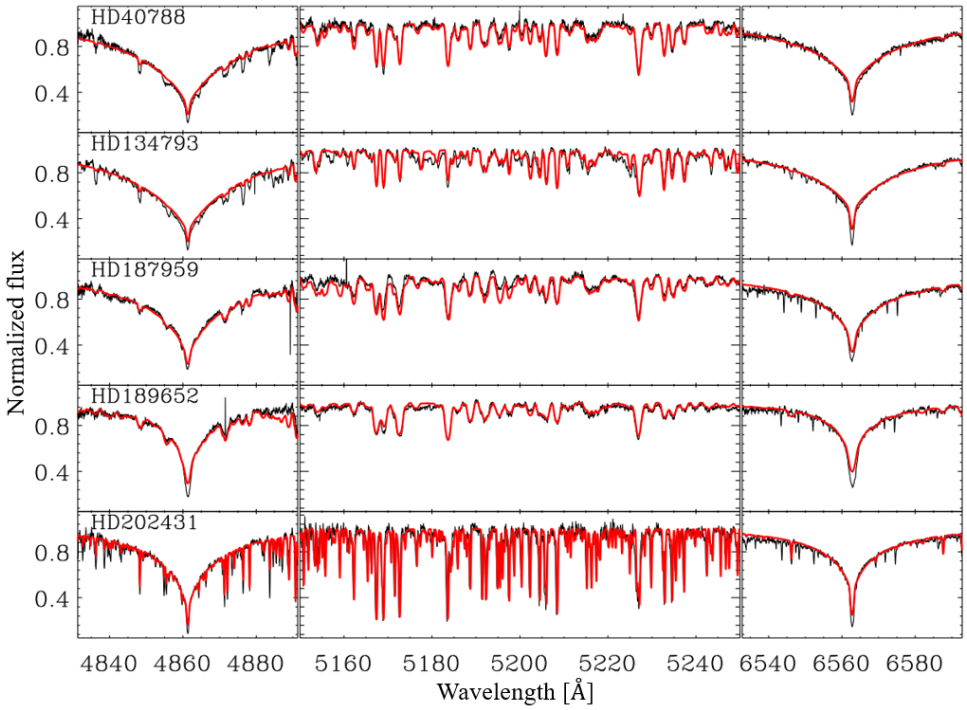


Figure 4: Observed (black) and synthetic (red) balmer lines (Hα and Hβ) and metal lines in a 100 Å portion of the spectrum for the five stars studied (Figure adapted from [12]).

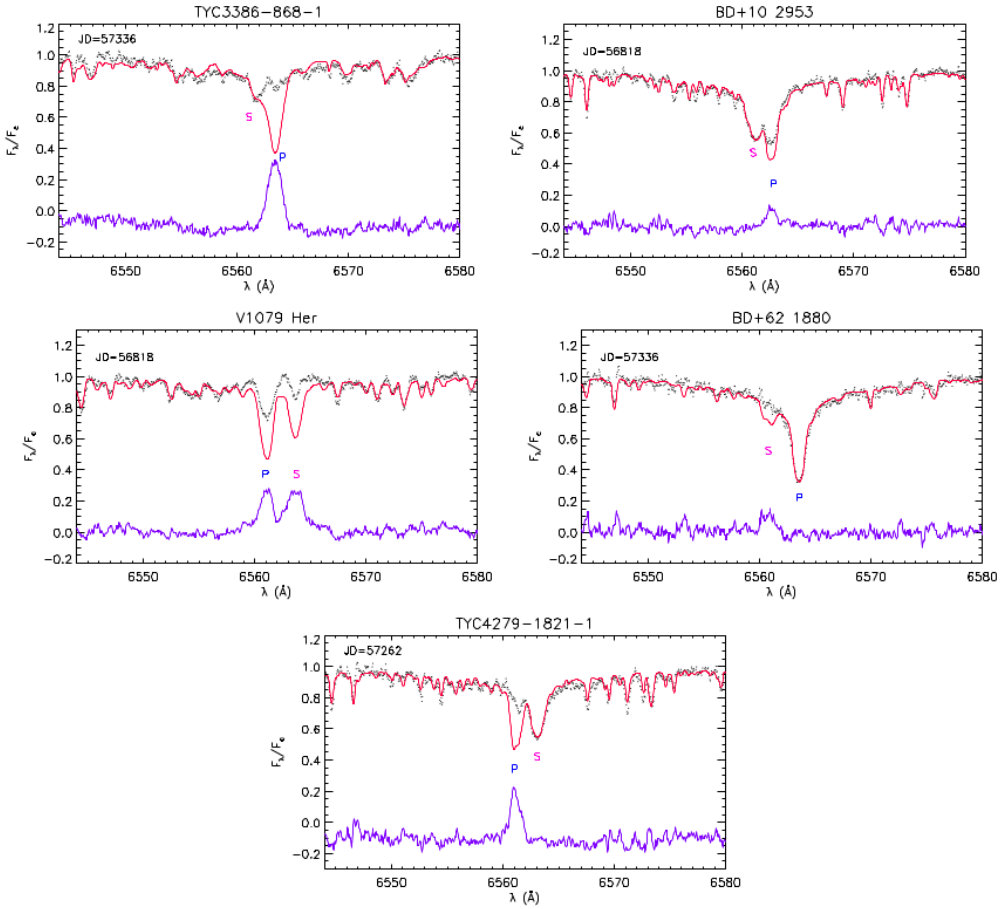


Figure 5: Observed spectrum (black) and template spectrum (red) and their difference (blue) for the Hα line for five of the six targets. In the difference spectrum the chromospheric emission for the two components is evident (Figure adapted from [13]).

ters derived from light curves and spectra, allowed to establish that the particles accelerated in the outburst are protons and they may represent a significant contribution to the galactic component of cosmic rays in the close neighbourhood of such objects.

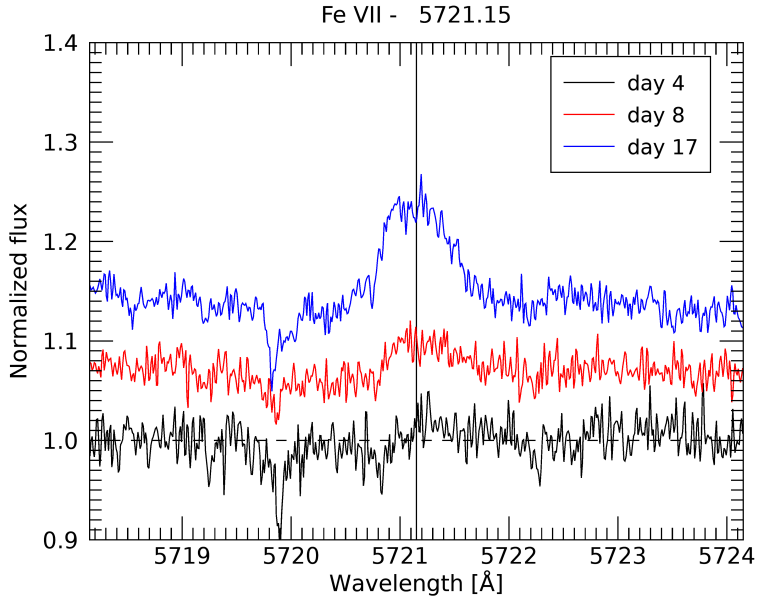
Understanding the RS Oph spectrum represents one of the most difficult challenges in this context. As a consequence of thermonuclear reactions on its surface and consequent high energy phenomena, spectral lines of uncommon elements (e.g. short-lived ^{7}Be as it is reported in [14]), particularly of highly ionisation stages, are expected to be identified [15].

High resolution spectra acquired with HARPS-N during the first month after the outburst reveal the presence of several emission lines. As it has been already observed in the previous outburst event [16], which occurred in 2006, Fe VII forbidden lines have been observed in emission with their intensity increasing with time after the outburst: two of these lines (5721.15 Å and 6086.92 Å) are shown in Figure 6 for three epochs after the outburst. Unlike these lines, several emission and absorption features in RS Oph spectra remain unidentified, highlighting the difficulty of interpretation for these spectra in high resolution.

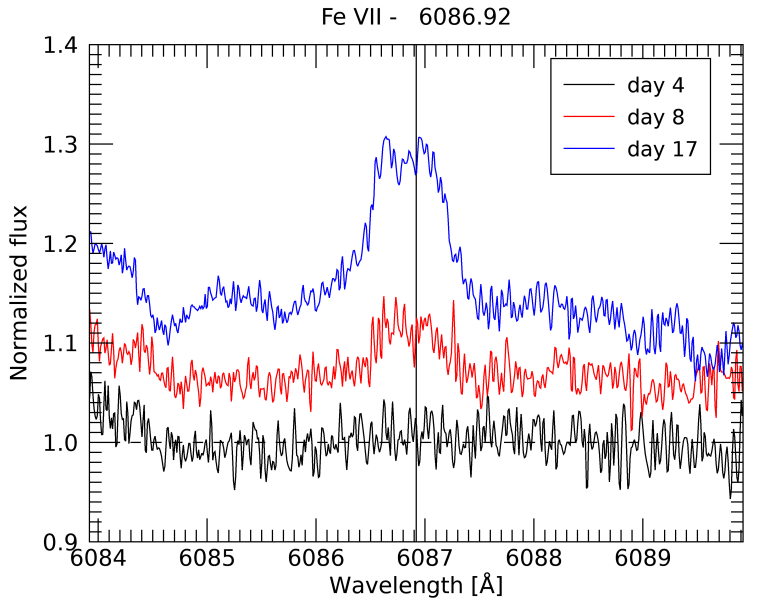
Kilonova light curve and spectral synthesis

On August 17, 2017 a gravitational wave signal has been detected by the *Advanced Laser Interferometer Gravitational-Wave Observatory* (LIGO) and (VIRGO) observatories [17]. This event has been catalogued as GW170817 and the analysis and interpretation of the GW signal showed that it was due to a merging event between two neutron stars. The GW170817 event is important because it was the first, and up to now unique, GW event for which an optical counterpart has been observed. The transient AT2017O has been detected by several observatories and it has been unambiguously associated to GW170817 [18]. Light curves and low resolution spectra have been acquired and they are in agreement with a *Kilonova* event. Signatures of r-process element have been found for the first time in the spectrum of AT2017O by Chornock et al. [19].

A kilonova is the electromagnetic radiation emitted by the radioactive material ejected by the merging of two neutron stars. An exhaustive re-



(a)



(b)

Figure 6: Fe VII 5721.15 (a) and 6086.92 (b) emission lines in HARPS-N spectra of RS Oph on day 4, 8 and 17 after the outburst.

view about the history and the basic physics of kilonovae has been made by Metzger [20]. The first hypothesis of emission from a neutron stars merger, together with the first toy model, has been made by Li [21]. In the following years, other numerical models have been developed and the first estimate of the luminosity scale of a kilonova has been done.

The problem of the interpretation of the low resolution spectra of AT2017O has been tackled in several works, such as [22] and [23], confirming that absorption features due to several heavy elements partly reproduce the observed spectra and light curves. Synthetic light curves and spectra of kilonovae are calculated using radiative transfer codes similar to those used for supernovae. Several studies about spectral synthesis of such events have established that the main source of opacity is the line blanketing due to heavy (r-process) elements transitions [24].

Therefore, a comprehensive knowledge of atomic transitions for heavy elements, which have complex atomic structure, is needed in order to obtain reliable results with spectral synthesis of kilonovae emission. Observation of other events like GW170817, and their proper interpretation, would be essential for the understanding of the r-process nucleosynthesis and the astrophysical environments in which it occurs.

The Extremely Large Telescope and its spectrographs

The current decade and the following ones will be characterized by the realization of the thirty meter class telescopes, which will be the biggest observatories ever built. Currently two main projects are under development: the *Thirty Meter Telescope* (TMT) and the *Extremely Large Telescope* (ELT), with the latter being already under construction. Such large telescopes will allow to carry out observations with limiting magnitudes and angular scales never seen before, therefore having the potential to achieve the most unexpected scientific results.

ELT is a telescope under construction by the *European Southern Observatory* (ESO) in the Atacama desert in Chile. The diameter of its primary mirror will be 39 m. Its first light is planned in 2027 and, when it will be completed, ELT will be the largest optical and infrared telescope in the

Table 1: ELT instruments with spectroscopic capabilities with their spectral range (in μm) and spectral resolution $R = \lambda/\Delta\lambda$. Superscript "2" indicates second generation instruments. Data are taken from [25] and the official ELT website [26]

Instrument	Spectral range [μm]	R
HARMONI	$0.47 \div 2.45$	$3500 \div 18000$
METIS	$3 \div 13$	$400 \div 100000^*$
ANDES[2]	$0.4 \div 1.8$	100000
MOSAIC[2]	$0.47 \div 1.8$	$5000 \div 20000$

world. Science goals of ELT span from solar system to cosmology and fundamental physics.

Several instruments for high resolution imaging and spectroscopy will be located at the two Naysmith foci of ELT. All the instruments but the imaging camera MICADO are expected to be spectrographs or at least to have spectroscopic capabilities [25]. Table 1 resumes spectral range and and resolution for such instruments: among these, HARMONI and METIS are expected to operate just after the technical first light of the telescope (1^{st} *generation instruments*), while ANDES and MOSAIC will be installed later (2^{nd} *generation instruments*). A brief outline of the instruments and their scientific goals is given in the following:

- *High Angular Resolution Monolithic Optical and Near-infrared Integral field spectrograph* (HARMONI): a "low-to-high" resolution spectrograph provided with an integral field unit, capable of acquiring spectra with 2D spatial resolution. The instrument will be devoted to the study of stellar population in other galaxies and the spectral characterization of giant exoplanets.

- *Mid-infrared ELT Imager and Spectrograph* (METIS) is both an imager and a spectrograph and it will work in the L, M and N bands in the mid infrared. Among the main science goals of METIS are of particular interest the spectroscopy of circumstellar disk for the study of planetary formation and the spectroscopy of brown dwars.

- *ArmazoNes high Dispersion Echelle Spectrograph* (ANDES): this will be

main instrument devoted to high resolution spectroscopy. ANDES will be a high resoluton echelle spectrograph covering the visible and near infrared range simultaneously at a resolution of 100000 for a single object. A high resolution and high coverage spectrograph attached to such a large telescope will be able to achieve many unprecedented results. Some examples are 1) the observation of high resolution spectra of the most ancient stars, population III stars; 2) detection of life-signatures in atmospheres of earth like planets; 3) direct spectroscopic observation of the acceleration of the expansion of the universe.

- MOSAIC will be a multi object spectrograph, operating in the VIS and NIR ranges. Similarly to HARMONI, MOSAIC will be dedicated to extragalactic astronomy, being capable to characterize the stellar population of the very first (and distant) galaxies and, at the same time, study the properties of the intergalactic medium at high spectral resolution.

Such collection of high resolution instruments, where the word "resolution" may be intended in a "wide" sense (spatial, temporal and spectral), will be able to produce a lot of spectra with several unknown features to decrypt. The huge amount of spectroscopic data that will be produced by ELT will require atomic and molecular data at an accuracy level much greater than the current one. One of the working group of the ELT consortium is completely devoted to increase knowledge of reference data, which are also necessary to properly wavelength-calibrate all the instruments.

The current knowledge of atomic data

In order to analyze the current status of knowledge of atomic parameters, some preliminary considerations must be done. Given an *atomic specie*, that is an atom in a given ionization stage, atomic data of astrophysical interest can be resumed in these main categories: a) energy level data; b) transition wavelengths; c) transition probabilities (or oscillator

strengths, depending on the formalism used); d) damping constants and other relevant parameters of a given transition.

In principle, all of these atomic data should be known for each elements in each of its ionization stages, which might be a lot for heavy elements. Regarding spectral lines, this may lie in the ultraviolet (UV), visible (VIS) or infrared range (IR) of the electromagnetic spectrum, suggesting that very different experimental techniques are necessary to measure lines across the whole spectrum. Therefore, an (ideal) complete knowledge of such data requires a huge effort both in theory and experiments, combining expertise from different subfields of physics.

At the date of this thesis, three main databases of atomic data are continuously updated with new data and are used by the astronomical community:

- The *Atomic Spectra Database* of the *National Institute for Standard and Technologies* (NIST-ASD) [27]. This is a database containing critically evaluated energy levels, transition wavelengths, transition probabilities and ionization energies for several elements. Data are almost exclusively from experiments and are updated year-by-year by NIST-ASD team.

- The *Vienna Atomic Line Database* (VALD) [8]. This database contains several entries, both theoretical and experimental, of spectral lines including energy level classification and line strengths, expressed as oscillator strengths. VALD includes also data from the *Database on Rare Earths At Mons University* (DREAM), a database of theoretical data (based on experimental lines and energy levels) increasing the number of known lines for rare earths.

- The database of atomic spectral lines compiled and maintained by Dr. Robert Kurucz [28]. This is currently the largest collection of data about spectral lines of astrophysical interest and such data are widely used as input for spectral synthesis and opacity calculation codes. The majority of transition wavelengths and line strengths are theoretical. The spectral line list is reasonably comprehensive for elements with $Z \lesssim 30$, while for higher Z much less lines are included.

Table 2: Overview of the current content of databases for rare earths lines: number of lines in the NIST database (N_{NIST}), the VALD database (N_{VALD}) and the Kurucz database (N_{Kur}) are reported for each element in the visible (4000 ÷ 9000 Å) and the NIR (9000 ÷ 25000 Å) range.

El	Z	Visible			Near infrared		
		N_{NIST}	N_{VALD}	N_{Kur}	N_{NIST}	N_{VALD}	N_{Kur}
La	57	496	489	1459	9	4	0
Ce	58	560	10520	1630	23	680	0
Pr	59	685	1169	513	19	291	0
Nd	60	460	1171	945	0	3	0
Pm	61	315	0	0	0	0	0
Sm	62	482	1213	1074	0	31	0
Eu	63	342	439	892	0	17	10
Gd	64	491	1017	866	5	18	1
Tb	65	363	148	42	0	7	0
Dy	66	325	939	512	0	240	0
Ho	67	320	234	74	0	6	0
Er	68	299	587	374	0	81	0
Tm	69	522	5577	271	0	193	0
Yb	70	177	2771	118	2	1173	0
Lu	71	134	128	82	0	9	3

An analysis of these three databases and the underlying studies about atomic data reveals that a) spectral lines wavelengths and strengths are reasonably known for neutrals or low ionization stages; b) lines are less known for elements with high Z; c) almost no lines are known for high ionization stages of high-Z elements. Spanning over the electromagnetic spectrum, we note that knowledge of spectral lines is good in the visible range, partly good in the UV and scarce in the infrared.

An example of comparison between current knowledge in the visible and infrared for rare earth elements is given in Table 2. Number of lines for rare earths (including all the ionization stages) is reported for each database for an "extended" visible range (4000-9000 Å) and the near infrared (9000-25000 Å). It is evident that almost no lines are known for

$\lambda > 9000$ Å for rare earths. Even if databases might not contain all information from all possible studies of measurement of atomic parameters, a bibliographic search in the literature reveals that very few studies have been carried out in the infrared for rare earth elements.

Outline of the thesis

In this thesis experiments to measure spectral line wavelengths and intensities for rare earths have been carried out. Two high resolution spectrographs, the *Catania Astrophysical Observatory Spectropolarimeter* (CAOS) at *Catania Astrophysical Observatory* and the *GIANO-B* spectrograph at *Telescopio Nazionale Galileo* have been adapted to acquire emission spectra from plasma sources and measure previously unknown spectral line wavelengths. Spectroscopy of hollow cathode lamps of high Z elements has been performed in the visible range with CAOS and the near infrared with GIANO-B. Spectral line lists have been derived from the spectra, and for spectral lines in the visible an estimation of the line strengths has been made. For some of the elements observed in the near infrared, the here compiled lists represent the first collection of spectral lines in the infrared.

The thesis is structured as follows: Chapter 1 contains an overview of the basic physical concepts of spectroscopy, with an introduction to the basic quantities and a brief overview of the instruments necessary to make spectroscopic measurements; Chapter 2 reports the results of the measurements performed in the visible with CAOS, with an exhaustive explanation of the data acquisition, data reduction and analysis processes; Chapter 3 reports the same for the measurements in the infrared with GIANO-B; finally, Chapter 4 contains the conclusive remarks and a highlight of the future perspectives in this research path.

Chapter 1

Tools for atomic spectroscopy

Atomic spectroscopy is the technique of analysis of light emitted, absorbed or scattered by atoms as a function of its frequency (or its wavelength, as we will see in the following). Spectroscopy is a powerful technique to study the properties of matter: in almost any case it is non-invasive and it allows to measure physical parameters, relative to the matter which interacts with light, with great precision.

In this chapter we will show the basic concepts to deal with optical spectroscopy. Section 1.1 is a short introduction about the basic physical quantities of optical spectroscopy. Section 1.2 explains atomic line emission mechanism and its main formulas, while Section 1.3 introduces the concept of line profile and gives an overview of line broadening mechanisms. Finally, in Section 1.4 the basic working principles of the instruments necessary to make spectroscopic measurements are reported.

1.1 The quantities of optical spectroscopy

The definition of spectrum used in our treatment refers, of course, to electromagnetic radiation and processes, therefore we define a spectrum, either theoretical or measured, as a quantity related to the energy emitted as (or absorbed) as electromagnetic radiation by a certain volume of matter as a function of its *wavelength* or *frequency*. In this section we follow the treatment of Carroll [29], which in turn follows the formalism of Mi-

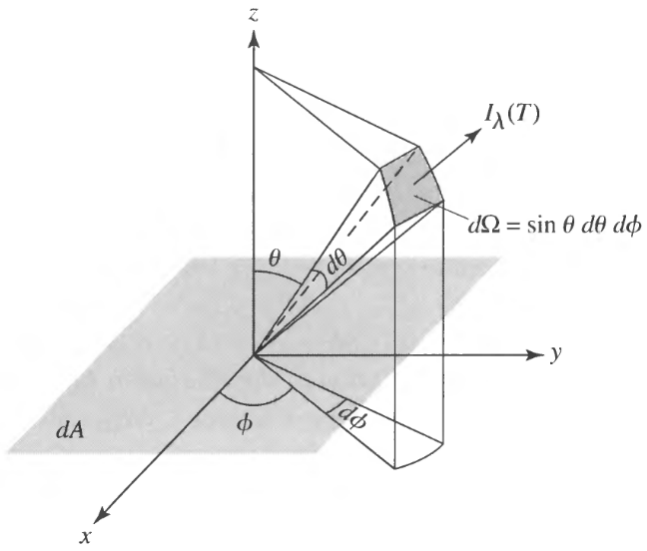


Figure 1.1: Geometry for the definition of specific intensity. The bunch of light rays, also defined *radiation pencil*, hits the elemental surface dA with an angle θ carrying the energy E_λ (Figure adapted from [29]).

halas [30]. Also Kunze [31] is followed for some definitions for the basic quantities.

The velocity of light c, the frequency ν and the wavelength λ are related through the well known relation (in vacuum)

$$\lambda_{vac} = \frac{c}{\nu}. \tag{1.1}$$

Very common units for wavelength are *nanometers* (1 nm = 10^{-9} m) and *angstroms* (1 Å= 10^{-10} m), with the latter, which is very widely used in astronomy and astrophysics, which will be the quantity used in this work. Frequencies are usually expressed in *Hertz* (1 Hz = s^{-1}). We will often speak about electromagnetic radiation in terms of *photons* of energy $E = h\nu$, being h the *Planck's constant*; the value of h depends on the unit used for the energy.

The starting point for our treatment is the definition of *specific intensity*. If we consider the geometry shown in Figure 1.1, where a bunch of photons with wavelength between λ and $\lambda + d\lambda$, passing through the

elemental surface dA and covering the solid angle $d\Omega$, carries the energy $E_\lambda = \partial E/\partial\lambda$ in an interval of time dt, we define the specific intensity as

$$I_\lambda = \frac{\partial I}{\partial \lambda} = \frac{E_\lambda d\lambda}{d\lambda dt dA \cos\theta d\Omega}. \tag{1.2}$$

I_λ is measured in $\mathrm{Wm^{-2}m^{-1}sr^{-1}}$, that is an energy per unit time, unit surface, unit wavelength and unit solid angle (not per unit volume!). The specific intensity is a *spectral quantity*, which yields the total quantity when integrated over a given wavelength interval (λ_1, λ_2). For example, for the I_λ we have

$$I(\lambda_1, \lambda_2) = \int_{\lambda_1}^{\lambda_2} I_\lambda(\lambda) d\lambda \tag{1.3}$$

which is an *integrated intensity* with respect to the wavelength interval (λ_1, λ_2).

In the most general case the specific intensity depends on the direction. The average of I_λ over the whole solid angle (that enclosed by a sphere) is known as the *mean intensity* and is given by

$$< I_\lambda >= \frac{1}{4\pi} \int I_\lambda d\lambda d\Omega \tag{1.4}$$

which is equal to I_λ if the radiation field is isotropic.

The *specific energy density* is defined considering an imaginary volume through which the radiation pencil carries its energy in the time interval dt. Such imaginary volume may be a trap, of arbitrary shape, with perfectly reflecting walls: the energy inside the trap is the same as what would be stored in the electromagnetic field at that location if the trap were removed. It can be demonstrated that the spectral energy per unit volume is given by the expression

$$u_\lambda d\lambda = \frac{1}{c} \int I_\lambda d\lambda d\Omega = \frac{4\pi}{c} < I_\lambda > d\lambda. \tag{1.5}$$

The integral of the Equation 1.5 over all the wavelength is the *total energy density* and it is measured in $\mathrm{J/m^{-3}}$.

A quantity which is important for the measurement of the radiation is the *specific radiative flux*. The specific radiative flux is the energy carried

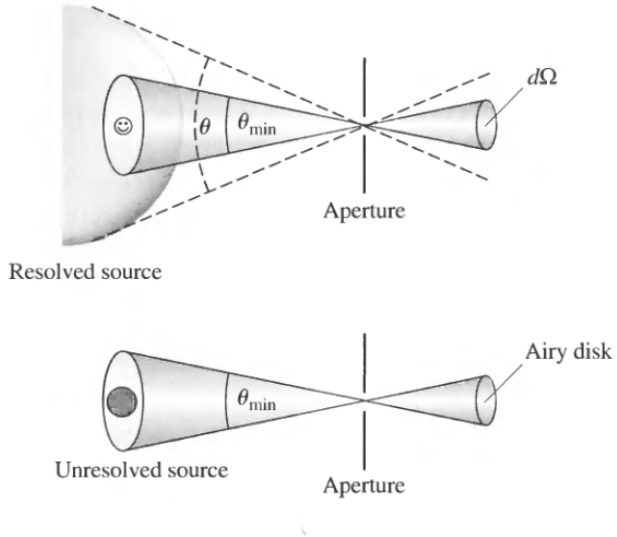


Figure 1.2: Observation of (a) resolved source; (b) unresolved source. In the (b) case, which is the case of stellar observation with a telescope, the ideal image of the point source is a diffraction 2D pattern called *Airy disk* (Figure adapted from [29]).

by the rays with wavelength between λ and $\lambda + d\lambda$ passing through the unit area projected on the z-axis and it is defined as

$$F_\lambda d\lambda = \int I_\lambda d\lambda \cos\theta d\Omega = \int_0^{2\pi} \int_0^{\pi} I_\lambda d\lambda \cos\theta \sin\theta d\theta d\phi. \qquad (1.6)$$

It is important to note that if the field is isotropic I_λ does not depend on θ and ϕ and therefore the integral over the spherical solid angle goes to zero (and so does the radiative flux).

The quantity which is actually measured by an instrument at the telescope focus depends on the kind of source we are observing. This concept is explained through Figure 1.2. By definition a source is spatially resolved, if its light comes from an angle larger than the telescope resolution. In this case (Figure 1.2 (a)) the measured quantity is the specific intensity, with the solid angle $d\Omega$ being θ_{min}. In the case of an unresolved source (Figure 1.2 (b)) the detected quantity is the radiative flux, because if the source is unresolved the whole surface will be covered by the mini-

mum solid angle defined by θ_{min}, and therefore the quantity observed by the detector is the integral over the surface shown to the observer, i. e. the radiative flux. An important consequence is that as the observer-source distance r increases, the energy falling in the "image" of the unresolved point source, which is called *Airy disk*, decreases as $1/r^2$. A rigorous explanation of this fact can be found in Mihalas [32].

Up to this moment we exposed the concept of specific intensity of electromagnetic radiation, and related quantities, without determining the processes which influence the amount of such quantity or its variation. In the following subsection, we carry out an overview of such processes introducing the concepts of emission and absorption of radiation

1.1.1 Emission and absorption processes

(Brief) review of light-matter interaction processes

In the physics literature the expression "radiation-matter interaction" groups all the processes of interaction between matter and radiation, with the latter word intended in a "broad" sense, that is both energetic particles and electromagnetic radiation interacting with any kind of matter. Here we are interested in the relevant processes for our purposes, which are those of optical (and infrared) radiation interacting with particles that are atoms or ions (plasma). In this context, we will focus on four main kind of processes:

- **Bound-bound transitions.** These are transitions between two states of an atom (or ion) for which the electron is still bound to the atom, which are known as *excitation* and *de-excitation*. If the transition is from a lower energy level to an upper one the atom is absorbing the photon energy and we have a *bound-bound absorption*; in the opposite case, if the electron goes from an upper lever to a lower level, we have a *bound-bound emission*. In both cases such processes are visible in the spectrum as a sharp feature at the wavelength which corresponds to the difference between the energy levels involved in the transition and therefore we call this kind of processes *line emission* or *absorption*. We will come back to these concepts in Section 1.2.

- **Bound-free and free-bound processes.** When an electron in an atom moves from a bound state to a free state, that is it breaks its bound with the atom and the atom becomes an ion (or, if it is already an ion, increases its ionization stage) we have a *ionization*. When the ionization occurs due to absorption of energy by a photon the process is called *photoionization*. The opposite process is the *recombination*. Radiation emission and absorption due to bound-free and free-bound processes are characterized by a wavelength/frequency threshold which is related to the bounding energy of the electron and the atom/ion.

- **Free-free processes.** This kind of process occurs when a free electron absorbs a photon and gains energy, increasing its kinetic energy. It can be demonstrated that, in order for the process to respect both conservation of energy and momentum, the electron must be in the vicinity of an ion to absorb the photon. The emission of a photon due to deceleration of a photon in the vicinity of an ion is a free-free emission process and it is known as *bremsstrahlung emission*.

- **Scattering.** We define scattering as a process for which the photon is absorbed and it is re-emitted with the same energy or a slightly different energy, possibly in a direction different from the direction of arrival resulting in an attenuation of the flux along the line of sight. One of the most relevant processes in dense plasma environments is the *electron scattering*, which is scattering of photons due to free electrons. Using a classical approximation, electron scattering, also known as *Thomson Scattering*, may be thought as an oscillation of the electron in the electromagnetic field of the wave, which causes the re-emission of the wave (and therefore the propagation of the photon) in a different direction. The scattering of a photon by an electron which is loosely bound to an atom is either known as *Compton scattering* or *Rayleigh scattering* depending on the wavelength of incoming radiation. Compton scattering occurs when the photon wavelength is much smaller than the characteristic dimension of the atom while Rayleigh scattering occurs in the opposite case. Cross section for Rayleigh scattering is proportional to $1/\lambda^4$

and therefore increases with decreasing wavelength of the scattered light. This $1/\lambda^4$ behaviour, as it is well known, is responsible for the blue color of the sky during daytime.

As it is explained above, all of these processes contribute both to emission (through the emission coefficient) and absorption (through the opacity).

The emission process

The *emission process* is the process of increase of specific intensity due to the addition of photons to the radiation beam. If a radiation pencil of wavelength λ is travelling for a distance ds in a gas of density ρ, the increase of specific intensity is

$$dI_\lambda = j_\lambda \rho ds. \tag{1.7}$$

The proportionality constant j_λ is the *emission coefficient*: in general it does depend on the wavelength and it is measured in m $s^{-3}sr^{-1}$. Explicit forms for the emission coefficient are given for a series of emission processes. The expression of j_λ for the process which is of major interest for this work, which is line emission, is given in Section 1.2.

The absorption process

When photons are removed from the radiation beam we talk about *absorption* or *scattering* depending on the process which subtracts the photons from the beam. If the photon is absorbed by a particle and then is re-emitted with the same energy (or a slightly different energy) we talk about photon scattering. Instead if the photon is absorbed and it is not re-emitted photon energy is absorbed by the particle and it may be transformed by kinetic energy of the gas through collisions: in this case the process is defined as absorption. In some of the treatments (such as Mihalas) scattering and absorption are grouped together using the term *extinction*. For the sake of simplicity, we will refer here to absorption including scattering processes.

It is an experimental evidence that the amount of absorption is proportional to the specific intensity I_λ. With the same notation of Equation

1.7, the variation dI_λ of specific intensity for a bunch of rays travelling for ds along the s direction is given by

$$dI_\lambda = -k_\lambda \rho I_\lambda ds. \tag{1.8}$$

The factor k_λ is known as *opacity*. It is measured in cm^2/g and it describes the absorption of radiation as a function of the wavelength. An overall expression for the opacity used in astrophysics is

$$k_\lambda = k_{\lambda,bb} + k_{\lambda,bf} + k_{\lambda,ff} + k_{es} + k_{H^-}. \tag{1.9}$$

which includes contributions from all the processes previously listed and described: $k_{\lambda,bb}$, $k_{\lambda,bf}$ and $k_{\lambda,ff}$ are the opacity contributions from bound-bound, bound-free and free-free processes respectively; k_{es} is the contribution due to electron scattering; k_{H^-} is the opacity contribution due to H^- ion, which is relevant in some stellar atmospheres (see [29] for details).

Thermodynamic equilibrium

A system is in thermodynamic equilibrium when it is thermal, mechanical and chemical equilibrium. The main property of a system in thermodynamic equilibrium is that all process are balanced by their inverses, which means that if a process $X \to Y$ has a rate R_{XY}, if $Y \to X$ is the inverse process, we must have $R_{XY} = R_{YX}$. In practice, an ideal example of a system in thermodynamic equilibrium is that of a cavity at a temperature T in which radiation and matter are in thermal equilibrium with the walls of the cavity. In the literature such system is usually indicated as *holraum* or, more simply, as a *blackbody*.

If a small hole through the walls of the holraum is made such that radiation can escape from the system, it has been demonstrated by Planck that the specific intensity inside the cavity, which can be observed through the hole, depends only on the temperature and the frequency of the radiation. The expression of the specific intensity $B(\lambda, T)$ inside the blackbody is given by

$$B_\lambda(\lambda, T) = \frac{2hc^2}{\lambda^5} \frac{1}{e^{hc/\lambda K_B T} - 1} \tag{1.10}$$

and it is commonly known as *Planck's law*. The wavelength at which the specific intensity is maximum is inversely proportional to the temperature according to the relation

$$\lambda_{max} T = 0.002897755 \text{ m} \cdot \text{K}. \tag{1.11}$$

Equation 1.11 is known as *Wien law* and it states that radiation due to hotter bodies/systems peaks at shorter wavelengths than radiation due to colder systems. Integrating Equation 1.10 over all the wavelengths we obtain the so called *Stefan-Boltzmann law* which is

$$L = A\sigma T^4 \tag{1.12}$$

where A is the area of the emitter, T its temperature and σ is the *Stefan-Boltzmann constant*, which has the value $5.67 \cdot 10^{-8}$ W/(m^{2}K^4).

1.1.2 The equation of radiative transfer

In the most general case, along the very small path ds both emission and absorption of radiation may occur. In this case, the specific intensity varies along ds according to

$$dI_\lambda = -k_\lambda \rho I_\lambda ds + j_\lambda \rho ds. \tag{1.13}$$

Dividing both members of Equation 1.13 by $-k_\lambda \rho ds$ we obtain

$$-\frac{1}{k_\lambda \rho}\frac{dI_\lambda}{ds} = I_\lambda - \frac{j_\lambda}{k_\lambda} \tag{1.14}$$

At this point we introduce the *source function*, given by the ratio of the emission and absorption coefficients

$$S_\lambda = \frac{j_\lambda}{k_\lambda} \tag{1.15}$$

Therefore, 1.14 becomes

$$-\frac{1}{k_\lambda \rho}\frac{dI_\lambda}{ds} = I_\lambda - S_\lambda \tag{1.16}$$

commonly known as *equation of radiative transfer*. Equation 1.16 describes the evolution of the radiation field I_λ travelling (in one dimension) through matter with characteristic j_λ and k_λ.

The solution of Equation 1.14 depends on the functions j_λ and k_λ. In most cases Equation 1.16 has no analytical solution, but there are cases, such as pure emission as we will see in Section 1.2, for which the solution is analytical and simple.

The pure absorption case and the optical depth

If we consider Equation 1.16 for $j_\lambda = 0$ it becomes

$$-\frac{1}{k_\lambda \rho}\frac{dI_\lambda}{ds} = I_\lambda \;\rightarrow\; \frac{dI_\lambda}{ds} = -I_\lambda k_\lambda \rho \tag{1.17}$$

The formal solution is easily found integrating between $s = 0$ and the position of the observer and is given by

$$I_\lambda = I_{\lambda,0} e^{-\int_0^s k_\lambda \rho ds}. \tag{1.18}$$

For the simple case in which k_λ does not depend on the position s, Equation 1.18 takes the form

$$I_\lambda = I_{\lambda,0} e^{-k_\lambda \rho S} \tag{1.19}$$

which tells us that specific intensity exponentially decreases as it moves towards the observer.

Because of Equation 1.18, propagation of the specific intensity strongly depends on the ability of matter to absorb radiation, a quantity which better represents the "transparency" of the matter to radiation would be useful to better describe radiative transfer. Such a quantity is commonly defined as *optical depth* (or *optical thickness*) and, at a given wavelength λ, is given by

$$d\tau_\lambda = -k_\lambda \rho ds \tag{1.20}$$

that is the opposite of the product of the infinitesimal distance coordinate ds and the *absorption coefficient*, defined as $k_\lambda \rho$.

Since $k_\lambda \rho$ has units m^{-1}, the optical depth is a dimensionless quantity. Note that: a) the optical depth depends on the wavelength of radiation; b) the optical depth is defined with opposite sign with respect to the linear

coordinate s, that is τ_λ decreases as s increases towards the observer. The difference in optical depth between $s = 0$ and the position of the observer is obtained (formally) integrating Equation 1.20 obtaining

$$\tau_{\lambda,s} - \tau_{\lambda,0} = -\int_0^s k_\lambda \rho ds. \tag{1.21}$$

As a first approximation for the stellar case, we can assume that light travels without absorption to the observer once that outermost layer are being passed. At this point s $\tau_\lambda = 0$ and the integral definition of optical depth becomes

$$\tau_{\lambda,0} = \int_0^s k_\lambda \rho ds \tag{1.22}$$

which yields for the pure absorption equation (dropping the subscript 0)

$$I_\lambda = I_{\lambda,0} e^{-\tau_\lambda \rho s}. \tag{1.23}$$

Equation 1.23 helps to understand the usefulness of the concept of optical depth: $\tau_\lambda = 1$ is the coordinate at which radiation is reduced by a factor e^{-1} due to absorption and scattering. For a radiation pencil travelling in a given volume of gas or plasma, such volume of matter is defined as *optically thin* if $\tau_\lambda << 1$ and *optically thick* in the opposite case $\tau_\lambda >> 1$.

Pure (optically thin) emission

Starting from Equation 1.13, if we suppose that there is no absorption and scattering, we can put $k_\lambda = 0$ obtaining the (simple) relation

$$\frac{dI_\lambda}{ds} = j_\lambda \rho \tag{1.24}$$

Therefore, at a given position s along the path followed by the radiation pencil, the value of the specific intensity only depends on the product of the emission coefficient times the density of the emitting matter. The expression of the emission coefficient of course depends on the process which is responsible for the emission of radiation. In Section 1.2 we will analyze the expression for j_λ in the case of atomic line emission.

1.2 Atomic spectroscopy

When an electron of an atom undergoes a transition between two bound states electromagnetic radiation is emitted at a very "precise" wavelength. If the level with greater energy is indicated as u and that with lower energy as l, a photon is emitted due to the transition and it has frequency

$$\nu_{ul} = \frac{E(u) - E(l)}{h}. \tag{1.25}$$

and (vacuum) wavelength $\lambda_{ul} = c/\nu_{ul}$. In the following subsections we will introduce the basic quantities of atomic emission and the expression for the atomic line emission coefficient will be given, which is linked to the quantity which is measured in the laboratory.

1.2.1 Two level system

The treatment of emission and absorption of photons for an ideal system made of only two levels has been developed by Einstein in 1916 [33, 34]. He stated that three process occur in a two level system in a radiation field I_λ: *spontaneous emission*, (induced) absorption and *induced* (or *stimulated*) *emission*.

Spontaneous emission is the emission of a photon due to decay of an atomic electron from an upper level u to a lower level l without any external influence. If we call $n_z(u)$ the number density of emitters of charge state z in the state u, the variation of $n_z(u)$ with respect to time due to spontaneous emission is given by

$$-\frac{dn_z(u)}{dt} = A_{ul} n_z(u) \tag{1.26}$$

therefore, it is proportional to $n_z(u)$ through the constant A_{ul}. The proportionality coefficient A_{ul} is usually known as *Einstein coefficient for spontaneous emission* and it depends exclusively on the states u and l and their wave functions. In principle the final state of the transition may be any of the lower energy states l. The inverse of the summation of all the A_{ul}, with u fixed and l being all the possible lower states is defined as *lifetime*

of the level u and is given by

$$\tau_u = \frac{1}{\sum_{l<u} A_{ul}} = \frac{1}{A_u}. \tag{1.27}$$

Decay to the lower level and emission of a photon may occur also due to the interaction of the system with another photon of the same energy: this process is known as stimulated emission and it has been theorized by Einstein. The decrease of $n_z(u)$ due to stimulated emission is

$$-\frac{dn_z(u)}{dt} = B_{ul} I_\lambda n_z(u) \tag{1.28}$$

where the coefficient B_{ul} is the *Einstein coefficient for stimulated emission*.

Finally, $n_z(u)$ increase due to absorption of photons which excite the electron from l to u. The rate equation for such process is

$$\frac{dn_z(l)}{dt} = B_{lu} I_\lambda n_z(l). \tag{1.29}$$

1.2.2 Level population in thermodynamic equilibrium

The occupation number n_l for a given level l in general is not known and must be derived solving a system of equations, usually called *rate equations*, which include all radiative and collisional processes that populate and depopulate the level l. The resolution of rate equations is in almost all cases numerical and it may be difficult if a lot of physical processes and level are involved. In some particular cases, such as thermodynamic equilibrium, statistical mechanics is useful to find useful analytical relations which give level populations for a given temperature and density.

For a gas in thermodynamic equilibrium with temperature T, the velocity distribution is the *Maxwell-Boltzmann distribution*. For a gas with total number density n made of particles of mass m the expression for the number of particles with velocity between v and $v + dv$ per unit volume, indicated by n_v, is

$$n_v dv = n \left(\frac{m}{2\pi k_B T} \right)^{3/2} e^{-mv^2/2k_B T} 4\pi v^2 dv. \tag{1.30}$$

with the most probable velocity being $v_{mp} = \sqrt{2kT/m}$. If we indicate as n_l and n_u the number density of particles in the levels l and u, the ratio between the two populations is given by the Boltzmann distribution

$$\frac{n_u}{n_l} = \frac{g_u}{g_l} e^{-\frac{E_u - E_l}{kT}} \tag{1.31}$$

where g_u and g_l are the multiplicity $(2J + 1)$ of the two levels u and l. Therefore, under the hypothesis of thermodynamic equilibrium, the relative level populations are known for a given temperature T if the energy E and the total angular momentum number J of the levels are known. The ratio between level population n_u and the total number density n can be obtained summing Equation 1.31 over all the levels l obtaining the relation

$$\frac{n_u}{n} = \frac{g_u}{U(T)} e^{-\frac{E_u - E_g}{kT}} \tag{1.32}$$

where E_g is the energy of the ground state g and $U(T)$ is the *partition function* of the system, which is defined by

$$U(T) = \sum_{i=g}^{\infty} g(i) e^{-\frac{E_i - E_g}{kT}}. \tag{1.33}$$

The reliability of the calculated partition function $U(T)$ depends of course on the knowledge of the energy levels E_i of the given ionization stage. If some of the energy level are not included in the summation of Equation 1.33, the value of $U(T)$ is underestimated and, in turn, the value of the ratio n_u/n is overestimated.

As we have shown above, the calculation of the number of ions n_u with energy E_u becomes very simple in a plasma in thermodynamic equilibrium. Even if such an equilibrium state is typical of ideal systems, or systems in extreme physical conditions, in the following we will see that, with further hypothesis, it can be applied also to systems which are not strictly in thermodynamic equilibrium.

Local thermodynamic equilibrium

Thermodynamic equilibrium is a condition that is quite difficult, if not impossible, to strictly reproduce in a laboratory environment. High temperature and density plasmas, such as those in the interior of stars, in

which matter and radiation are in equilibrium and the latter is not able to escape the plasma, are a good example of thermodynamic equilibrium. Such a high density environment is impossible to generate in the laboratory for a long time interval.

If we consider a plasma of sufficiently high density, so that collisions between particles are sufficiently frequent, such collisions may establish equilibrium between atoms and ions and the temperature is the parameter which determines the energy distribution of the particles. Since electron collisions are much more frequent than ion collisions, thermal equilibrium will be established by electrons, and the *electron temperature* would be the "main" temperature of the plasma. This kind of equilibrium is more likely to happen locally, which means in a small spatial region of the given plasma environment, and therefore such an equilibrium condition is defined as *Local Thermodynamic Equilibrium* (LTE).

LTE usually is not valid for all the transitions between all the pair of energy levels of a system. Griem demonstrated that a criterion to establish if LTE holds for a transition between two levels u and l is given by

$$n_e \geq 1.4 \times 10^{20} \left(E_u - E_l\right)^3 \left(kT_e\right)^{1/2} \tag{1.34}$$

where the electron density n_e is in m^{-3} and the energies, including kT_e, are expressed in eV [31].

Relations between Einstein coefficients

Thermodynamic equilibrium allows us to derive relations between the three Einstein coefficients defined in Equations 1.26, 1.28 and 1.29. Under the hypothesis of thermodynamic equilibrium the specific intensity is given by 1.10, the ratio between the level populations is given by Equation 1.31 and the rate of processes in opposite directions balance, that is the sum of Equations 1.26 and 1.28 must be equal to Equation 1.29. Substituting the equilibrium quantities in Equations 1.26-1.29 the two relations are derived:

$$g_u B_{ul} = g_l B_{lu} \tag{1.35}$$

$$A_{ul} = \frac{8\pi hc}{\lambda_{ul}^5} B_{ul}. \tag{1.36}$$

These relations become useful to define the strength of an absorption line as the oscillator strength, as we will see in the following.

The oscillator strength

For historical reasons, transition probabilities/line strengths in astrophysics are usually expressed in terms of the *oscillator strength*, which is a definition related to the classical treatment of absorption. In the classical description of absorption of electromagnetic radiation, a bound electron is treated like an oscillator with a characteristic frequency ω_0, which becomes a driven oscillator by an electric field of frequency ω. A detailed explanation of this classical picture can be found in the book of Mihalas [30].

It is useful to express the absorption transition probability as a dimensionless quantity f_{lu} defined by

$$f_{lu} = h\nu_{lu}\frac{4\epsilon_0 m_e}{e^2}B_{lu} \tag{1.37}$$

being ϵ_0 the dielectric constant in vacuum and being e and m_e the electron charge and mass respectively. Combining the two relations between Einstein coefficients (Equation 1.35 and 1.36) with Equation 1.37 and substituting numerical values we obtain

$$g_l f_{lu} = 1.4992 \cdot 10^{-16}\lambda_{ul}^2 g_u A_{ul} \tag{1.38}$$

where λ_{ul} is expressed in angstroms and A_{ul} is expressed in s^{-1}. Taking the logarithm of the product $g_l f_{lu}$ we obtain the standard definition of the $\log gf$ of an absorption spectral line, which is

$$\log\left(g_l f_{lu}\right) = \log\left(1.4992 \cdot 10^{-16}\lambda_{ul}^2 g_u A_{ul}\right). \tag{1.39}$$

Equation 1.39 is the standard form used to store line strengths in spectral lines databases used as input for astrophysical spectral synthesis codes. In Section 2.4 we will expose two methods to estimate $\log gf$ from measured line intensities.

1.2.3 Atomic line emission coefficient

Following the formalism of Kunze [31], in the case of atomic line emission in an optically thin gas, the expression for the emission coefficient is

$$\varepsilon_{ul} = \frac{h\nu_{ul}}{4\pi} A_{ul} n_{ul} \tag{1.40}$$

that is the emitted intensity by a spectral line is directly proportional to the population of the upper level u and the spontaneous emission coefficient A_{ul}. The frequency ν_{ul} is derived by the energy difference $E_u - E_l$ as defined in Equation 1.25. "Real" spectral lines are not infinitely sharp. The emission coefficient is shaped by a *profile function* $\mathcal{L}(\nu)$ and therefore is

$$\varepsilon_\nu = \frac{h\nu_{ul}}{4\pi} A_{ul} n_u \mathcal{L}(\nu). \tag{1.41}$$

The most used line profile functions, together with a brief explanation of the physical processes underlying them, are listed in the following section.

1.3 Spectral line profiles

Spectral lines measured in experiments, unlike ideal lines, have a finite width in wavelength. Therefore a line is well described by a *line profile function* $f(\lambda)$ and this function may be due to several *line broadening processes*, which are described in the following.

There are several analytical functions which can describe experimental line profiles. One of the most used profile functions is the *gaussian profile* defined as

$$f_G(\lambda) = A_0 e^{-0.5((\lambda - A_1)/A_2)^2}. \tag{1.42}$$

where we define A_0 as the *peak*, A_1 as the *center* and A_2 as the *sigma* of the gaussian. An important quantity of line profiles is the *Full Width at Half Maximum* (FWHM) which is the width of the profile measured at the 50% of its peak value. For gaussian profile, the FWHM is related to the sigma by

$$\Delta\lambda^G_{1/2} = 2\sqrt{2\log 2} A_2. \tag{1.43}$$

Another common line profile function is the *Lorentzian function*, defined as

$$f_L(\lambda) = \frac{A_0}{\left(\frac{\lambda - A_1}{A_2}\right)^2 + 1} \tag{1.44}$$

where A_2 is usually called the *gamma* of the lorentzian. For the lorentzian profile the FWHM is

$$\Delta\lambda^L_{1/2} = 2A_2 \tag{1.45}$$

These functions, which are usually fitted to experimentally measured profiles, are not normalized, that is they do not have unit area. The *normalized profile* as a function of frequency $\mathcal{L}(\omega)$ is commonly used in theoretical calculation and is defined as

$$\int_{line} \mathcal{L}(\omega) d\omega = 1 \tag{1.46}$$

and $f(\lambda)$ and $\mathcal{L}(\lambda)$ are linked by the relation

$$f(\lambda) = \frac{2\pi c}{\lambda^2}\mathcal{L}(\omega). \tag{1.47}$$

Imposing the normalization condition with Equation 1.46 the number of free parameters of profile function decreases by one. The peak is related to the width of the curve, having $A_0 = \left(A_2\sqrt{2\pi}\right)^{-1}$ for the gaussian and $A_0 = (\pi A_2)^{-1}$ for the lorentzian.

The convolution of a gaussian and lorentzian profiles gives the *Voigt profile*. Substituting the gaussian and lorentzian function in the definition of convolution we obtain the Voigt profile function:

$$V(x, a) = \frac{a}{\pi}\int_{-\infty}^{\infty} \frac{e^{-t^2}}{a^2 + (x - t)^2} dt \tag{1.48}$$

where the x and a parameter are defined as

$$x = \frac{\lambda - \lambda_0}{\Delta\lambda^G_{1/2}} 2\sqrt{\log 2} \tag{1.49}$$

$$a = \frac{\Delta\lambda^L_{1/2}}{\Delta\lambda^G_{1/2}}\sqrt{\log 2}. \tag{1.50}$$

We introduced these functions without doing any physical consideration about those. In the following, some of the main broadening mechanism are shortly reviewed and the link between such mechanisms and the functions introduced above will become more clear.

1.3.1 Natural broadening

The Heisenberg's uncertainty principles applies to decay of an atomic system from an energy state to another state. That is, if ΔE is the uncertainty on the energy level and Δt the time interval during which a measure of the energy of the level can be carried out, the relation $\Delta E \Delta t \geq \hbar$ holds. Therefore an energy level u has a "width" which is inversely proportional to its lifetime τ_u, as it is shown in Figure 1.3. Therefore, the decay between the two energy levels instead of a sharp line generates the emission of radiation at different wavelength near to the central wavelength λ_{ul}. It can be demonstrated that the resulting emission profile is a lorentzian and the FHWM of the profile is

$$\frac{\Delta\lambda_{1/2}}{\lambda_{ul}} = \frac{\lambda_{ul}}{2\pi c}\left[A_u + A_l\right] \tag{1.51}$$

with A_u and A_l being the inverse of the lifetimes of the two levels u and l. If we substitute numbers in Equation 1.51 for the Lyman-α line of hydrogen (1216 Å) we find a relative width of $\simeq 10^{-8}$, which, as we will see, is a very small quantity compared to other broadening effects.

1.3.2 Doppler broadening

Electromagnetic radiation from a source which is either approaching or moving away from the observer is detected with a "bluer" or "redder" wavelength respectively: this phenomenon is known as *Doppler effect* and it has a role also in spectral lines formation. Considering a gas or plasma in thermodynamic equilibrium, the velocity distribution of gas particles is the Boltzmann distribution and the mean velocity of particles is kT, as we have shown in Section 1.2.

The emitting particles which have a velocity component along the line of sight connecting the observer and the emitting volume will emit radiation at a (slightly) redshifted or blueshifted wavelength, producing a

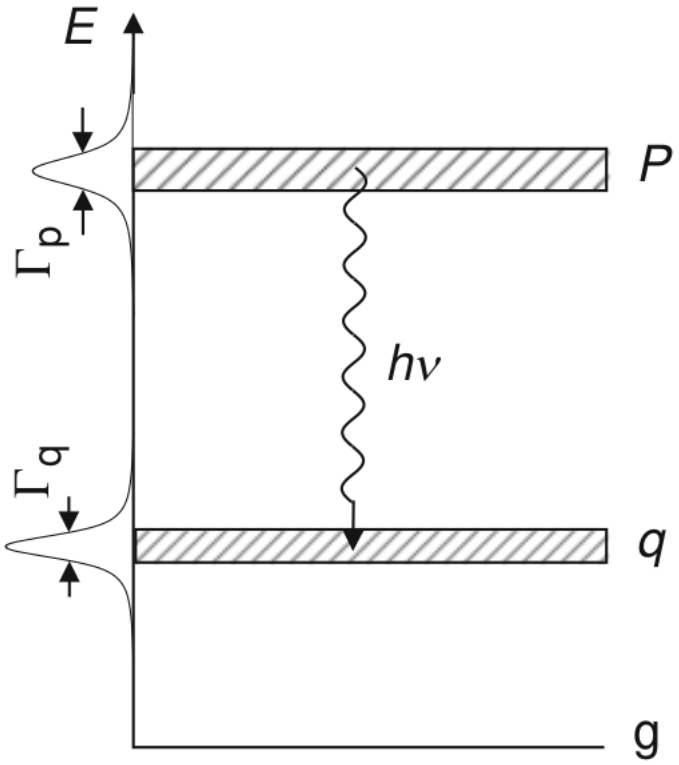


Figure 1.3: Natural broadening due to the width of energy levels (Figure adapted from [31]).

gaussian line profile. It can be shown that the FWHM of the profile is given by

$$\frac{\Delta\lambda_{1/2}^{G}}{\lambda_{ul}} = \sqrt{8\log\frac{kT_{ion}}{m_{ion}c^2}} \tag{1.52}$$

where T_{ion} and m_{ion} are the ion temperature and mass. For the hydrogen Hα line at $kT = 0.43$ eV (5000 K) we have relative broadening of $5 \cdot 10^{-5}$ ($\simeq 0.3$ Å), which is much larger than the natural with.

1.3.3 Stark broadening

Line broadening due to interaction with other atoms or ions in the gas (or plasma) is called *pressure broadening* when is caused by neutral particles (atoms or molecules), while is called *Stark broadening* when it is due to perturbation of the emitter by ions. Pressure broadening occurs only in neutral gas or weakly ionized plasmas and if present, its magnitude is negligible compared to Stark broadening.

The treatment of Stark broadening is complex because depends on the complex atomic structure of emitting (and interacting) atoms and this is particularly true for heavy elements with many electrons. A review of the various approaches and models has been made by Griem [35] and a bibliographic database of Stark broadening data (usefull parameters and tabulated widths) is currently maintained by NIST [36].

Even if the problem is complex, some general aspect can be highlighted. The magnitude of the broadening is generally proportional to the density, therefore this effect is relevant mainly in high density plasmas and the shape of the profiles is usually well reproduced by Lorentzian or Voigt profiles. For isolated lines of atoms or ions the Stark broadening is mainly due to electron impact and the interpretation of the line width is usually done starting from tabulated theoretical line widths. A compilation of such calculations has been made by Griem [35]; a FWHM can be then derived simply scaling with electron density, using the equation

$$\Delta\lambda_{1/2} \simeq 2 \times 10^{n} w_{tab} n_e \tag{1.53}$$

where the power of ten depends on the unit in which the tabulated halfwidth w, the electron density n_e and the FWHM are expressed.

1.3.4 Instrumental broadening

The instrument used to measure spectral lines is responsible for a further broadening process, the *instrumental broadening*. As we will see in the following section, it is related to the (finite) spectral resolution of the instrument and it is the smallest width which can be measured for a line using a spectrograph. This means that no broadening of lines lower than the instrumental width can be detected using that instrument.

1.4 The observed quantities

A spectrograph (or spectroscope, or spectrometer, depending on the context) is an instrument which is used to analyze the light as a function of its wavelength. There are a lot of types and different designs for spectrographs, often depending on the context in which they are used and the environments in which such instruments operate. Most of astronomical spectrographs transform the wavelength dependence of light intensity I_λ in a *spatial dependence* I_x, which is measured with several detectors placed in several positions. The relation $x = x(\lambda)$, once derived through the *wavelength calibration* as we will see in Section 2.3, allows the experimenter to convert the function I_x in the specific quantity I_λ.

While the wavelengths measured by a spectrograph are "absolute" measurements, in the sense that they are directly comparable with theoretical wavelengths, measured intensities are not immediately comparable with theoretical spectroscopic quantities unless the instrument is *absolutely calibrated*. Astronomical spectrographs, such as those used in this work, often are not absolutely calibrated, since those instruments extract the scientific information of interest from *relative* measurements. This means that, given a radiation flux F_λ, we measure only a quantity which is proportional to the emitted radiation flux, according to the relation

$$F_\lambda = \Phi I_\lambda \tag{1.54}$$

where I_λ is the observed spectrum (as indicated above). For simplicity, we decide to group in a constant Φ all the factors related to the particular experimental setup, such as the geometry and the solid angle covered by

the input window of the instruments. This concept will become more clear in Section 2.4 where the process of estimate of $\log gf$ for some of the observed lines in the visible is explained.

One of the most important quantities of a spectrograph is the *spectral resolution*, that is the ability of the instrument to separate two different wavelengths. Given two peaks for two different wavelengths, we impose that the two wavelengths are separated when the peak of one coincides with the first zero of the other (*Rayleigh resolution limit*). Therefore, for each dispersive element there is a minimum wavelength interval $\Delta\lambda$ for which two features with wavelength λ_1 and λ_2, with $\lambda_1 - \lambda_2 = \Delta\lambda$ can be separated.

For astronomical spectrographs, spectral resolution is usually expressed using the quantity R defined by

$$R = \frac{\lambda}{\Delta\lambda} \tag{1.55}$$

where λ is the measured wavelength and $\Delta\lambda$ is the minimum resolved wavelength interval as defined above. The advantage of defining spectral resolution R through Equation 1.55 is that a greater number express a greater ability to separate wavelength. Depending on the value of R we talk about low or high resolution spectrograph. From a historical point of view, starting from $R > 10000$ spectrographs have been usually defined as high resolution instruments, even if high resolution astronomical spectrographs mounted at large telescopes may achieve R values much higher than the limit expressed above.

Two main kinds of spectrographs there exist: refracting spectrographs and grating spectrographs. Both types of spectrographs are encountered in optical design of astronomical instruments, even if (reflective) grating spectrograph are the most suitable design for achieving high resolution in a wide wavelength range. An exhaustive review of the working principles of various kinds of spectrographs can be found in the book of Kitchin about astronomical instrumentation [37]. The two spectrographs used in this work are both *Echelle spectrographs*, which is an optical design used for a lot of high resolution astronomical spectrographs, because it guarantees a wide wavelength coverage in a single exposure. Again, details about the design of such instruments are contained in Kitchin [37] and

in the monograph of Eversberg about astronomical spectrographs [38]. Description of the spectrographs used in this work is given in Chapter 2 and 3 for CAOS and GIANO-B respectively.

In echelle spectrographs the "white" light entering the instruments is spread on a two-dimensional (x, y) plane, requiring a 2D array of detecting elements which is usually a CCD or CMOS. Therefore, the "image" acquired by the 2D detector, which may be expressed as a $I = I(x, y)$ function, is not a data product ready for the analysis. The analysis process necessary to derive the observed spectrum $I = I(\lambda)$ from the $I(x, y)$ matrix acquired by the 2D detector is usually called *data reduction*. The detailed steps of this process will be described in Section 2.3 of Chapter 2.

Chapter 2

Measurement of rare earth transitions in the visible with CAOS

The knowledge of atomic data and their validation is possible through plasma spectroscopy made in laboratory experiments under controlled conditions. This method is effectively the only way to measure atomic parameters. Its strength is due to the fact that it is not invasive (does not modify the physical condition of plasma) and it allows to perform simultaneously plasma diagnostics.

In this section results of high resolution spectroscopy measurements of hollow cathode lamps (HCLs) are reported. Data acquisition has been carried out in 2021 at Serra La Nave observatory at mount Etna, Catania, Italy. Detection of rare earths spectral lines in HCLs allowed to confirm previously measured atomic data, to identify lines deriving from atomic transitions between known energy levels and derive transition strength for a large number of spectral lines. Here reported results have been submitted to Monthly Notices of the Royal Astronomical Society and those have been positively reviewed by the referee and the editor of the journal [39].

The chapter is structured as follows: Section 2.1 describes the hollow cathode lamps and their working principles; Section 2.2 describes the experimental setup used for lamp spectroscopy, together with description

of the spectrograph and the procedures of spectra acquisition. Sections 2.3 and 2.4 show data reduction and analysis respectively. Finally, Section 2.5 reports the results.

2.1 The hollow cathode lamps

The light source used for the measurements of the atomic transition wavelengths are *Hollow Cathode Lamps* (HCLs). A hollow cathode lamp is a gas discharge continuous light source which produces a line emission spectrum, with the lines in the spectrum belonging mainly to the gas and the element of which the cathode is made of. The main reasons because hollow cathode lamps are used for this kind of work are:

- they emit a sharp-lined emission spectrum of a given element, with the possibility of get lamps of almost any chemical element;
- hollow cathode lamps are produced industrially and therefore their procurement is easy and their aging well known;
- they are easy to operate and implement in an experimental set-up for spectroscopy.

The main practical application of hollow cathode lamps is *atomic absorption spectroscopy* (AAS), a technique which allows to detect the presence of a chemical element in a sample. In AAS a small vapour of the sample is created and absorption of the hollow cathode lamp light is measured through a spectroscope: if the element searched is in the gas vaporized from the sample, the observed line emitted from the lamp will be absorbed by the gas.

Working principles of a hollow cathode lamp

Figure 2.1, taken from [40] as the hereafter explanation, shows the structure and the different parts of a hollow cathode lamp. The main constituting elements of a hollow cathode lamp are: the electrical circuit (anode and cathode); the fill gas; the getter; the glass bulb with its window.

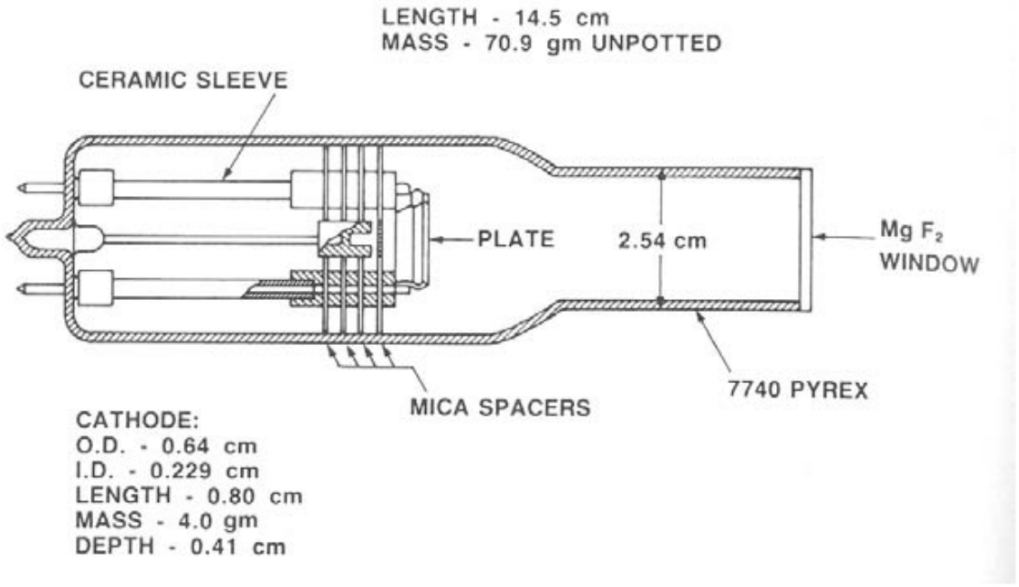


Figure 2.1: Schematic drawing of a hollow cathode lamp with characteristic dimensions. Window material can vary depending on applications and operating wavelength range (Figure adapted from [40]).

The bulb contains the filling gas, which is an inert gas such as Argon or Neon, at a defined pressure. Light is observed through a front window which is usually of a different glass from that forming the bulb. The window material depends on the wavelength at which light emitted by the lamp has to be observed: very common choices for window material are quartz for the UV - visible range and MgF_2 for the near infrared.

The lamp is supplied at a voltage of few hundred volts and an electrical discharge forms in the filling gas between the anode and the cathode. The ions of the filling gas generated by the discharge impact the cathode with kinetic energy much higher than the electronic work function of the cathode metal, which is generally of few eV. This generates the "emission" of the atoms from the cathode surface: this phenomenon is known as *sputtering*. The sputtered atoms become part of the plasma generated by the discharge and dissipate their high kinetic energy through collision with plasma atoms and ions. Such gas+metal plasma emits light under the form of sharp atomic and emission lines, which forms the line emission spectrum characteristic of hollow cathode lamps.

Since outgassing is unavoidable and contaminates the lamp with various impurities, a layer of reactive metal, called getter and usually made of barium or zirconium, is vaporized onto the inner wall of the glass tube. The getter chemically traps the contaminant introduced by outgassing and maintains the environment inside the bulb clear.

If the lamp spectrum is very "crowded" of narrow emission lines the lamp is suitable for the wavelength calibration of astronomical spectrographs. For low/medium resolution spectrographs, usually gas lines are sufficient to properly calibrate the instrument and therefore He-Ne-Ar or similar lamps are used. For high resolution echelle spectrographs much more lines are needed: Th-Ar or Th-Ne lamps have established as a standard for the calibration of echelle astronomical spectrographs in the visible range, while in the near infrared range Uranium lamps are generally employed.

The list of the elements investigated in this study, together with atomic number Z, supplier name and filling gas, is given in Table 2.1. All the lamps are filled with Ne but the Hafnium lamp, which is filled with Ar.

Table 2.1: Elements, atomic number Z, Noble Gas (N.G.) filling the HC lamp bulb, and Supplier: GS = Green Scientific, HR = Heraeus.

Element	Z	N.G.	Suppl.	Element	Z	N.G.	Suppl.
Cs	55	Ne	GS	Ho	67	Ne	HR
Ba	56	Ne	GS	Er	68	Ne	HR
Pr	59	Ne	HR	Tm	69	Ne	GS
Nd	60	Ne	GS	Yb	70	Ne	GS
Sm	62	Ne	GS	Lu	71	Ne	GS
Eu	63	Ne	GS	Hf	72	Ar	HR
Gd	64	Ne	GS	Re	75	Ne	GS
Tb	65	Ne	HR	Os	76	Ne	GS
Dy	66	Ne	GS	-	-	-	-

2.2 The experimental set-up

2.2.1 The Catania Astrophysical Observatory Spectropolarimeter

The *Catania Astrophysical Observatory Spectropolarimeter* (CAOS) is a high resolution echelle spectropolarimeter mounted at the cassegrain focus of the 91 cm telescope of Serra la Nave observatory at Mount Etna, in Catania [41]. The instrument has been designed to perform spectropolarimetry of astrophysical objects, mainly stellar objects, giving the full Stokes parameters in a series of exposures. CAOS can be used either in spectroscopic or polarimetric mode. For the spectroscopic measurements carried out in this thesis CAOS is used only in spectroscopic mode.

Details of the optical layout of the instrument and its specifications can be found in the instrument main paper [41]. Table 2.2 resumes the main features of the instrument. Spectral resolution can be varied regulating the width of the slit and goes from 45000 to about 60000, with this latter setting used for this work. The detector is a 2048x2048 Charge Coupled Device (CCD) model E2V42-40 with 13.5 μm square pixels: Its 27.6x27.6 mm image area guarantees full coverage of the spectrum up to 856 nm and 95 % coverage in the 856 - 1000 nm range due to incomplete order

Spectral resolution	45000 ÷ 60000
Spectral range [Å]	3700 ÷ 10000
Cross disperser	Prism
Detector	E2V42-40 2048 x 2048 CCD
Thermal stability [K]	0.01

Table 2.2: Main features of CAOS (data taken from [41]).

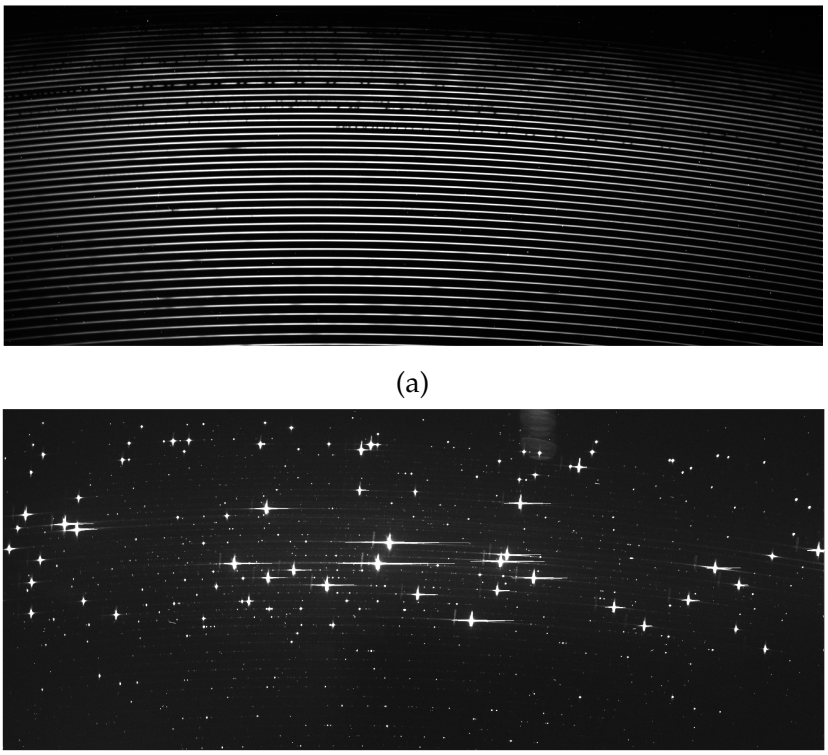
overlapping.

A portion of a typical raw CAOS science frame for a stellar source is shown in Figure 2.2 (a), while the analogue for a lamp spectrum in Figure 2.2 (b). In the stellar raw spectrum, the various orders of the echellogram are visible with their absorption lines (the dark grooves perpendicular to the order trajectory), while in the raw lamp spectrum emission features are clearly visible emerging from the background. In order to extract the 1D spectrum from the science frame, the *data reduction* process is performed on raw data: such process is described in Subsection 2.3.

2.2.2 Acquisition of hollow cathode lamp spectra

Since CAOS is a fiber-fed spectrograph, an opto-mechanical set-up has been designed to illuminate the optical fiber of CAOS with the lamp light maximizing the input into the instrument.

A scheme of the setup used for the acquisition is shown in Figure 2.3. The same optical fiber, which is drawn in orange in Figure 2.3, when connected in positions 1/2/3 allows to: (1) collect light from CAOS calibration unit, which contains the Thorium-Argon lamp for wavelength calibration and the halogen lamp for order tracing and flat fielding; (2) collect light from the rare earths HC lamp; (3) collect light from the flux calibrated lamp box. Light from rare earths HC lamps has been focused into the fiber input using a BK7 biconvex lens. The fiber was mounted on a x-y translation stage in order to position the fiber exactly on the focus of the lens, maximizing in this way the collected light. The orange fiber then brings light to the CAOS interface, which is attached at the cassegrain focus of the telescope. Here the fiber illuminates a 45° mirror



(a)

(b)

Figure 2.2: Chunk of CAOS raw spectrum for: (a) a stellar source; (b) a HC lamp. In long exposure times many neon spectral lines are saturated to extract the weakest features from readout noise.

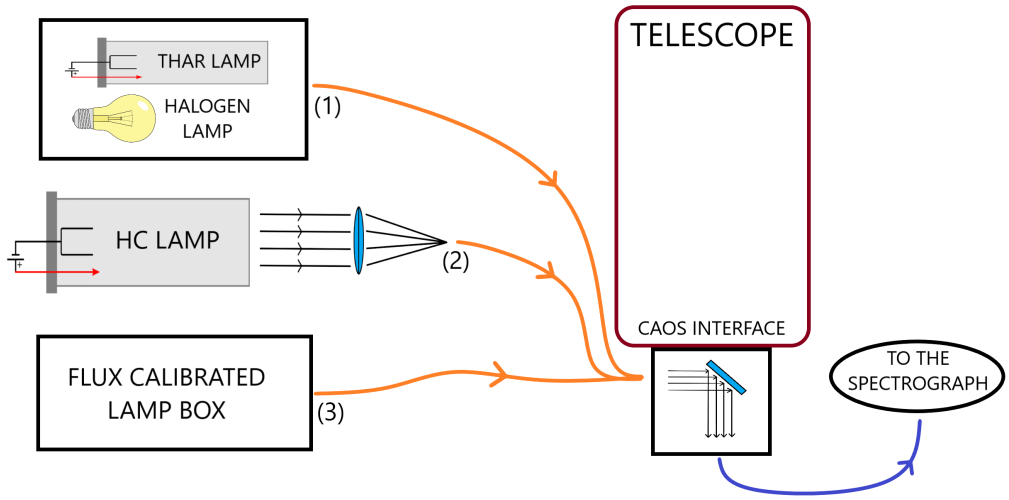


Figure 2.3: Schematic drawing of the experimental setup. When the orange fiber is in (1) it collects light from the CAOS calibration unit; when it is in (2) collects light from the HC lamp of the measured element; when it is in (3) is connected to the flux calibrated lamp box.

which reflects light to the main fiber of CAOS (blue fiber in Figure 2.3), which is usually illuminated by the star light collected by the telescope. Such fiber sends light to the spectrograph which is placed in another room. Since the opto-mechanical set-up used did not allowed a simple "plug-and-play" substitution of the lamps, a procedure of focusing has been carried out each time a new lamp was mounted. Such procedure consisted in: a) positioning and alignment of the lamp to the optical axis of the lens; b) positioning of the orange fiber core in the focus of the lens. In order to monitor the amount of light entering the orange fiber, images of the blue fibers illuminated by lamp's light have been acquired with the CAOS autoguiding camera. This camera acquires an image of the focus of the telescope, showing the amount of light actually reaching the blue fiber. Movements of the x-y position of the orange fiber have therefore been made trying to maximize the light flux measured by these images. In the case of saturation of autoguiding images, optimization has been made examining the flux of a Ne line using shortly exposed spectra.

Once that alignment procedures have been finished, for each lamp

Table 2.3: List of number of exposures n, exposure time t_{exp} and operating current i for each lamp.

El.	$n \times t_{\text{exp}}$ [s]	i [mA]	El.	$n \times t_{\text{exp}}$ [s]	i [mA]
Cs	3×600	6	Ho	1×600	15
Ba	3×600	6	Er	3×600	15
Pr	4×400	15	Tm	3×600	8
Nd	3×600	8	Yb	3×600	6
Sm	3×600	8	Lu	3×600	8
Eu	2×600	6	Hf	3×700	15
Gd	3×600	8	Re	3×600	6
Tb	3×600	15	Os	3×600	8
Dy	3×600	6	-	-	-

both a set of short exposure time and long exposure time spectra have been acquired. Preliminary extraction showed that short ($1 \div 60$ s) exposure times did not allow to extract signal of weak lines from readout noise: such lines were only visible in those with longer exposure time ($\simeq 600$ s). Table 2.3 lists the effectively used exposure times; total integration time has been acquired averaging n exposures in order to eliminate spikes due to the impact of cosmic rays in the CCD.

Each lamp has been supplied at its standard operating current with the Green Scientific G200 precision power supply. Operating current is that current value indicated by the manufacturer. Operating current value for each lamp is listed in Table 2.3.

2.3 Data reduction

Data reduction is the process which allows the experimenter to derive the final "analyzable" data, reflecting the physical quantity which has to be measured, from raw data. In the case of echelle spectroscopy, data reduction is necessary to derive the spectrum $I = I(\lambda)$ from raw image data. Therefore, for echelle data reduction a series of image analysis operations are performed to extract the spectrum from the echellogram maximizing the signal to noise ratio and the amount of information which

can be derived.

Several high-level programming languages, such as *Python* or *IDL* (provided by Harris Geospatial) allow to construct programs able to perform the operations necessary to reduce spectroscopic data. Data reduction for CAOS has been performed using the *Image Reduction and Analysis Facility* (IRAF) [42], a suite of programs for image and spectroscopic data analysis based on the C language. Despite the first version of IRAF has been developed at the end of 1980s, these programs still represent a very efficient and reliable solution to build up a data reduction environment, organizing the basics operations as blocks. IRAF programs are grouped in *tasks*, with each task that is capable of performing a given operation (or a set of operations). IRAF tasks are written and called through a dedicated language which is called *command language* (cl). We will refer to the whole program developed for data reduction as the *data reduction pipeline* (or simply pipeline), since it is designed to receive as input a raw image and give as output the reduced spectrum performing automatically a sequence of operations.

In the following the basic pipeline for the reduction of CAOS spectra is explained. The data reduction steps are explained one by one and intermediate data products are exposed and analyzed.

The standard pipeline for CAOS spectra

The type of images acquired during a typical session of stellar spectroscopy with CAOS are listed below:

- **BIAS frames.** Zero level BIAS frames are "zero seconds" exposures taken with the shutter closed in order to determine the readout noise level of the sensor. An average BIAS calculated averaging a certain number of BIAS frames ($\simeq 10$) will be subtracted to all raw images.

- **FLAT frames.** FLAT frames are spectra of a continuous source, in our case a halogen lamp, which are necessary to identify and trace the apertures and perform pixel-by-pixel efficiency correction for a single order. For the spectroscopy of rare earths lamps, a flux calibrated lamp has been used as FLAT.

- **THAR frames.** THAR (which is an abbreviation for THorium-ARgon) frames are the frames which allow to wavelength calibrate the spectra. The extracted apertures are initially in the form of intensity as a function of the pixel. Wavelength calibration allows to convert the pixel scale to a wavelength scale through a function which fits the position of known wavelength lines in the 2D non calibrated spectrum.

- **SCIENCE frames.** SCIENCE frames are the raw spectra which contain the information of the object that we want to analyze, which in the stellar case are continuous spectra with atomic absorption (and eventually emission) lines. In the case of lamp spectra, they are emission line spectra. Science frames are zero-level corrected, extracted and wavelength calibrated to derive the reduced spectrum.

It is important to note that the calibration frames listed above are essential to derive an accurate reduced spectrum. Therefore, a spectroscopy session using an echelle spectrograph must include the time necessary to acquire such calibration data. Such operation for echelle spectrographs mounted at astronomical telescopes are usually carried out during the initial (or final) part of the night of observation.

The standard CAOS pipeline is made of two main blocks: the *calibration block* and the *science block*. A schematic illustration of the whole process is shown in Figure 2.4, while the detailed description of the operations performed in each block is reported in the following.

The first block of operations takes as input the calibration frames and gives in output the calibration data which is necessary to reduce science spectra, which are apertures traces file and wavelength solution file. Calculation of calibration data may also be performed using already existing calibration data as reference. This is usually done if condition under which measurements are performed do not differ too much from conditions under which reference calibration data have been determined.

The science block, instead, takes in input the science frames and the calibration data and gives as output the science reduced spectra. Calibration data taken as input are those coming from the calibration block, which are calculated using calibration frame from the same dataset.

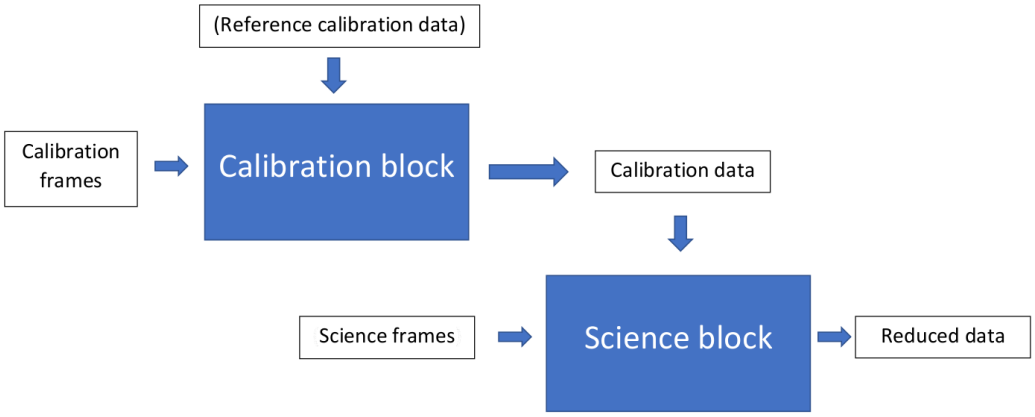


Figure 2.4: Flowchart reporting the two main blocks of the data reduction process. The calibration block can calculate calibration data either starting from current calibration frames or using past calibration data from preceding calibration frames.

The calibration block carries out the following operation on calibration frames (the relative IRAF tasks used are reported in parenthesis):

- mean BIAS calculation (*zerocombine*);
- zero level correction (*ccdproc*);
- mean FLAT calculation (*flatcombine*);
- mean THAR calculation (*flatcombine*);
- definition and tracing of apertures (*aptrace*);
- scattered light subtraction (*apscatter*);
- calculation of the wavelength solution (*ecidentify*/*ecreidentify*).

The main steps of the science block are listed below:

- zero level correction (*ccdproc*);
- scattered light subtraction (*apscatter*);

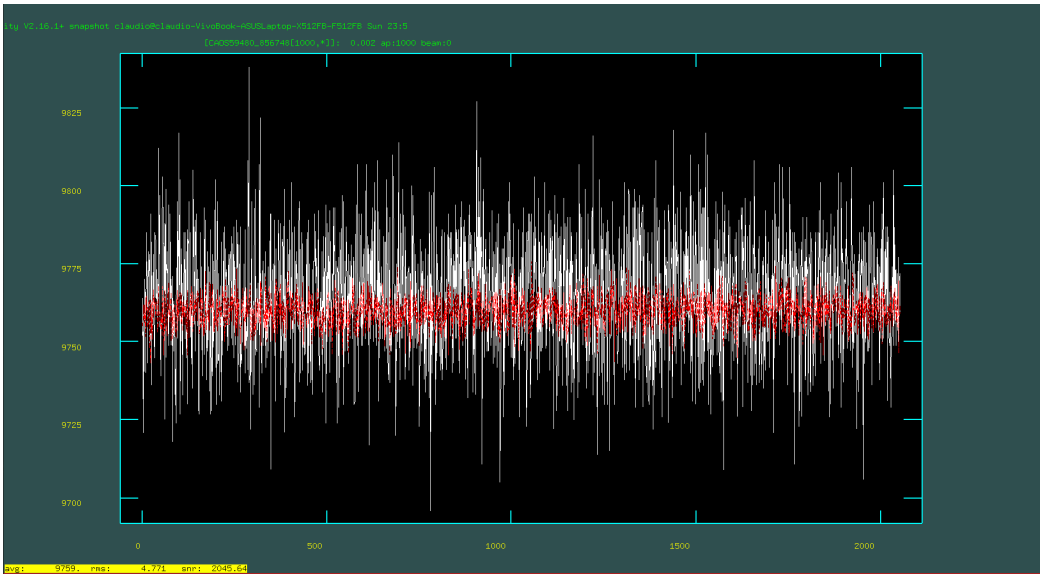


Figure 2.5: Comparison between a single bias exposure (white curve) and the average of $N = 14$ bias exposures (red curve).

- extraction of apertures (*apsum*);
- pixel to wavelength conversion (*refspectra-dispcor*);
- heliocentric velocity correction (*rvcorrect*, for stellar spectra only);
- division by flat spectrum (*sarith*).

In order to increase signal-to-noise ratio (SNR) of the exposures, for all the calibration frames a series of exposures is acquired. Then such exposures are averaged using the task *imcombine* with different parameters for different kind of calibrations. Usually a pixel-by-pixel rejection criterion and a scaling of images is employed when combining images for average. For example, the set of 14 BIAS frames is usually combined with *zerocombine*, which combines images calculating the average using the *minmax* rejection criterion, which reject pixels with the maximum and minimum value (if the number of combined images N is ≥ 3). Figure 2.5 shows the comparison between a single BIAS frame (in white) and the average BIAS frame (in red). The average bias has a SNR of 2045 which

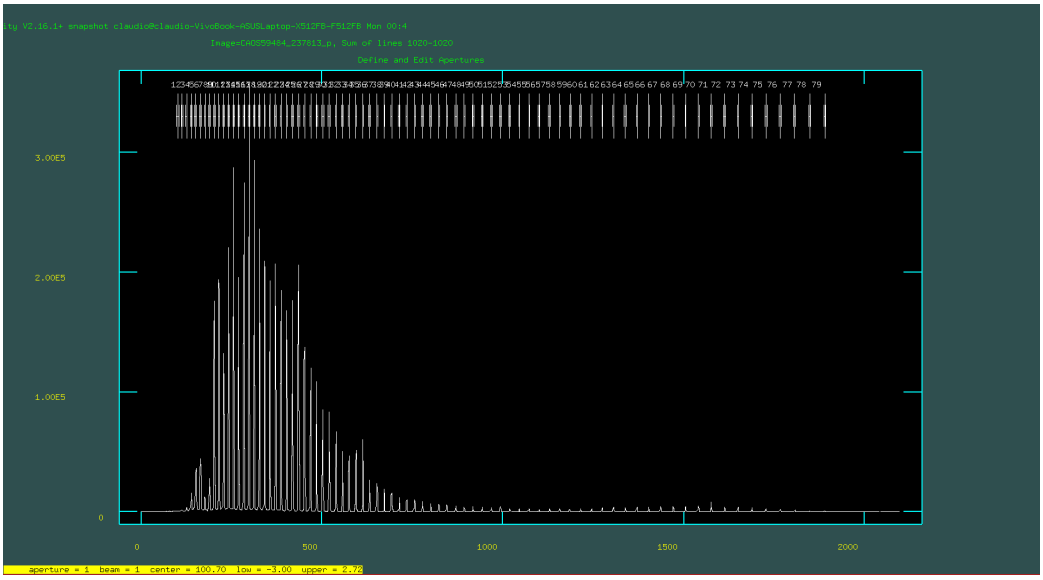
is 3.75 $\simeq \sqrt{14}$ times greater than the single bias SNR, showing that SNR scales roughly as $\sqrt{N}$, being N the number of exposures.

Figure 2.6a shows a 1D cut (perpendicular to the grating dispersion direction) of a flat frame. The position of the centers of the various apertures are marked interactively using the task *apsum*. The trajectory of the aperture is therefore reconstructed, again with the *apsum* task, to obtain a curve such as that shown in Figure 2.6b. The reconstructed trajectory is then fitted to obtain the analytical curve of the aperture over the frame, that is the (analytical) (x, y) position of the center of the aperture in the frame. Such position is then used to extract the spectrum signal for each order.

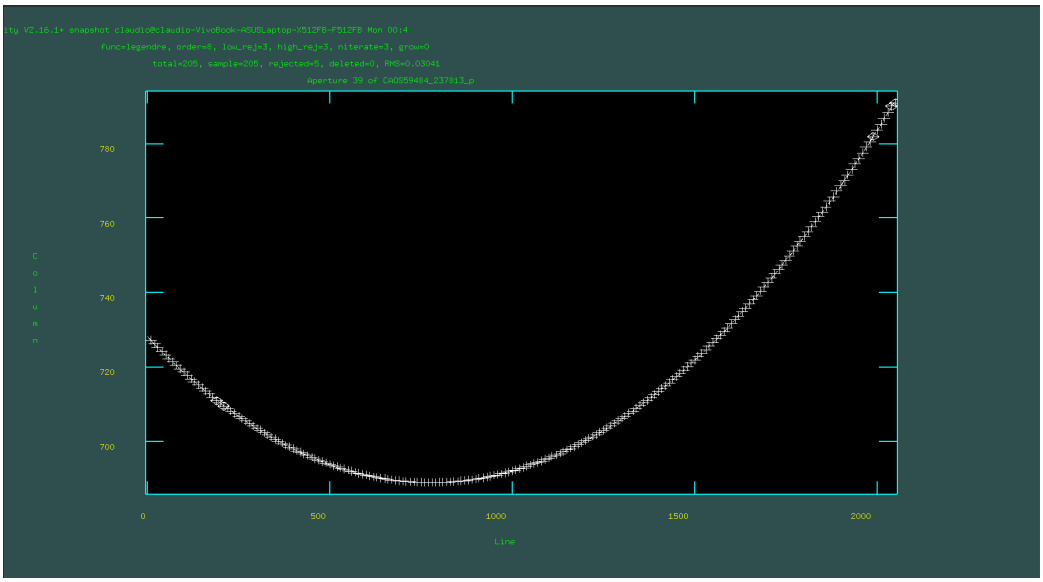
Before the extraction, the *scattered light subtraction* from the raw spectrum is performed. Scattered light, sometimes also indicated as *straylight*, is the light collected by the detector pixels which does not follow the optical path of the rays in the spectrograph. Scattered light signal is summed to the "actual" signal in the orders and therefore it has to be modeled and subtracted in order to derive the true signal for each order. The shape of the scattered light surface is fitted through 2D polynomials in the space between the orders as it is shown in Figure 2.7a. The fit is done using the task *apscatter* and the result of the subtraction is shown in Figure 2.7b.

The extraction of the spectrum is performed by the task *apsum*. After the tracing procedure described above, spectral signal is extracted "moving" the position of the aperture center along the trajectory and summing all pixels in an interval around the aperture center. Such interval can be either of fixed or variable size.

The extraction procedure return as output a 2D (n_{pix}, n_{ord}) array, where each order is in practice a 1D array of n_{pix} flux value. In order to assign a wavelength value to each pixel in each order, wavelength calibration has to be performed. This is done analyzing the extracted THAR frame. Since the THAR spectrum is made of several sharp Th and Ar emission lines with known wavelength, the *ecidentify* performs fit of the line peaks and assigns to each value of the line center in pixel (and order) its wavelength value. The result of such procedure is a set of points $\lambda_i = \lambda_i(x_i, y_i)$, where y is the order number and x is the pixel number along the order. These points are then fitted with a 2D polynomial, which usually is a Legendre or Chebyshev polynomial, in order to derive the analytical function

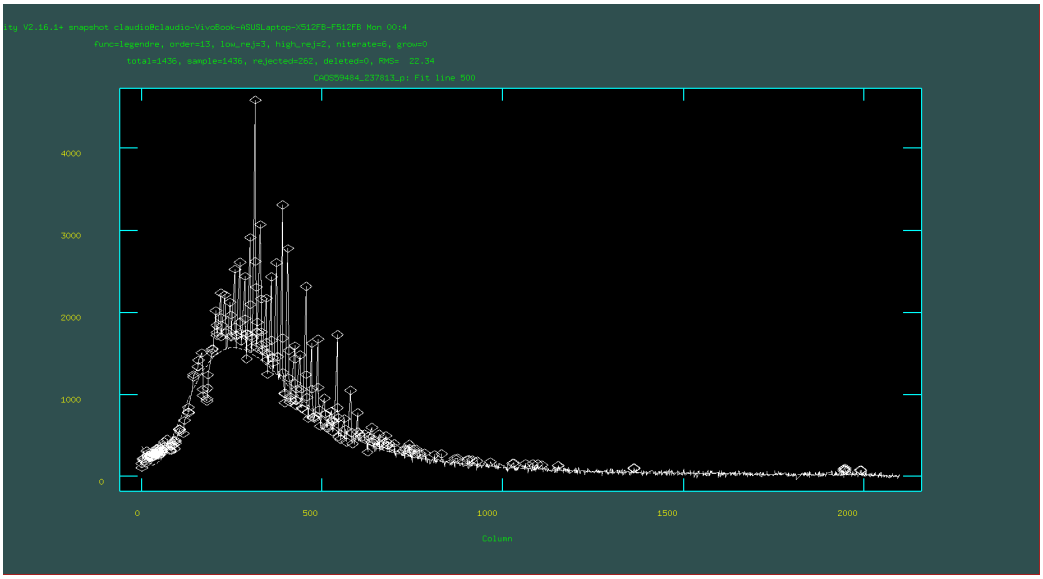


(a)

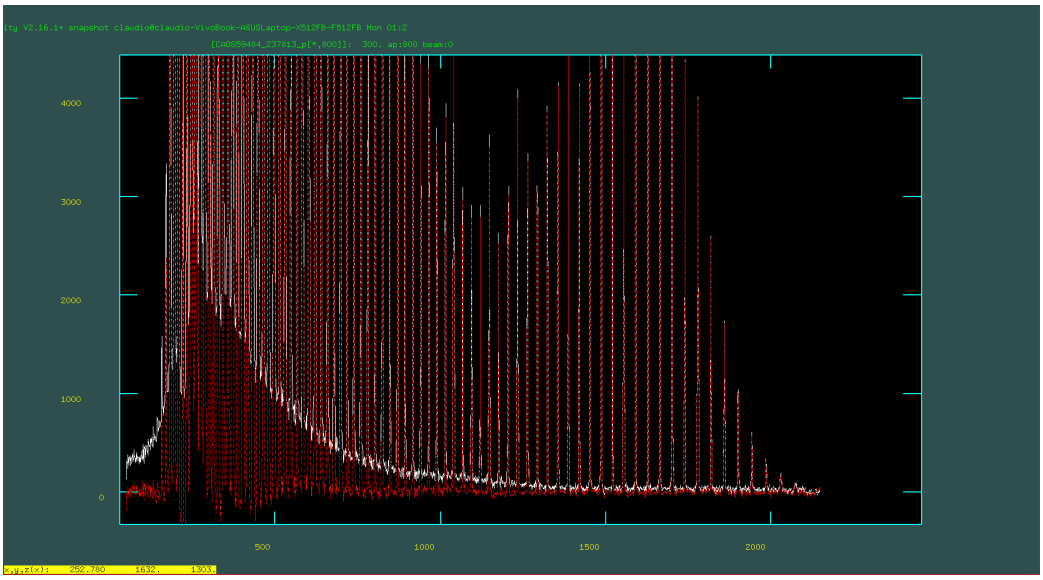


(b)

Figure 2.6: (a) cut of the flat frame along the cross-dispersion direction; (b) trajectory of one of the apertures across the detector fitted with an 8th order Legendre polynomial.



(a)



(b)

Figure 2.7: (a) fit of the scattered light along a line of the flat frame: note that pixels corresponding to apertures are not considered; (b) zero-level corrected flat frame (white curve) and zero-level and scattered light subtracted flat frame (red).

$\lambda = \lambda(x, y)$, which allows us to convert pixel and order values in wavelength values. Figure 2.8 shows the residual of the fit as a function of x for all the orders: typical values of the rms are of $10^{-3} \div 10^{-4}$ Å depending on the quality of the THAR frame and on the number of orders extracted. In our case, the rms resulting from the fit is $5 \cdot 10^{-3}$ Å: we will take this value as our uncertainty on observed wavelengths.

Since the task is not able to start this procedure from scratch, an interactive bootstrap is needed where the user inserts the correct wavelength values visually identifying spectral lines from orders in pixel using a spectral line atlas, which is usually typical of the lamp and the instrument. In any case, this operation has not to be carried out for each data reduction: the task *ecreidentify* is able to find the solution $\lambda = \lambda(x, y)$ starting from an existent solution, calculated for another spectrum of the same (n_{pix}, n_{ord}) dimension. The *ecreidentify* task is that usually called in the data reduction pipeline, even if periodically the reference solution (that made from scratch) is updated in order to keep track of eventual changes in the instrument. Once the solution is calculated for the given set of observations, it is applied to all the spectra using the tasks *refspectra* and *dispcor*.

An operation specific for the observation of stellar sources is the radial velocity correction. In order to correctly analyze stellar spectra the fact that the observer is moving due to the rotation of the earth, the motion of the earth along its orbit around the sun and the motion of the solar system in its orbit around the galaxy has to be taken into account. Therefore, spectra have to be corrected for the so called *heliocentric radial velocity* or *barycentric earth radial velocity*, depending on the reference frame chosen for the correction. Such wavelength and time correction is calculated using the task *rvcorrect* and applied with *dopcor*.

For standard CAOS spectroscopic data reduction, wavelength calibrated (and corrected) spectra $I_r(\lambda)$ are "flat-fielded" using the spectrum of a halogen lamp. Even if the source spectrum is not effectively constant with wavelength, it may be reasonably considered constant along one order ($\simeq$ 100 Å), since flux variation with wavelength due to the shape of the blaze function are much greater than those due to the spectral flux distribution of the source. Order by order division of the science spectrum by the flat spectrum, performed using the task *sarith*, then returns

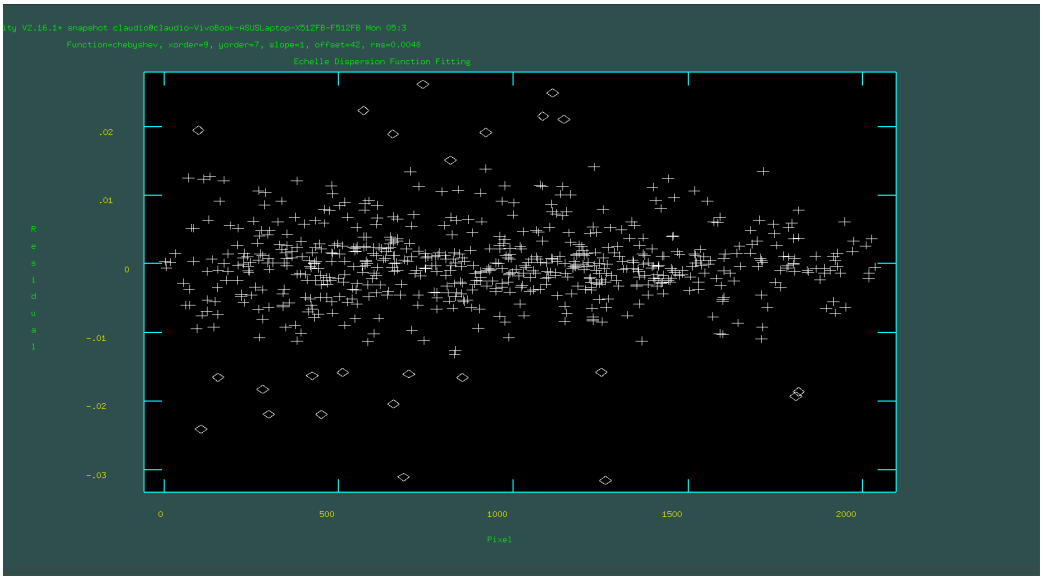


Figure 2.8: Residuals of the fitted $\lambda(x, y)$ function as a function of the x pixel value for all orders. The rms is $\simeq 5 \cdot 10^{-3}$

a divided spectrum which is "pixel to pixel corrected" for each order, but not order to order corrected. This is useful in order to properly measure and fit line profile shape functions.

For rare earths lamps spectroscopy flat correction has been performed using a flux calibrated lamp model Avantes AvaLight-DHc. The Avantes light source is made of two lamps, a deuterium lamp ($2000 \div 4000$ Å) and a halogen light source ($4000 \div 25000$ Å), providing a light source with well known ($< 2\%$) flux distribution in the $2000 \div 25000$ Å range. Therefore the spectrum $I(\lambda)$ corrected for the relative intensities is reconstructed using the relation

$$I(\lambda) = I_r(\lambda)/F_{av,o}(\lambda) \cdot F_{av,t}(\lambda) \tag{2.1}$$

where $F_{av,t}(\lambda)$ and $F_{av,o}(\lambda)$ are respectively the observed and the calibrated flux distribution of the Avantes light source. As it is shown in Figure 2.9, the observed spectrum of the Avantes light source (white curve) includes the modulation of the efficiency due to the spectrograph blaze function, with the shape of the orders evident all over the spectrum. Dividing the scientific spectrum by the observed Avantes spectrum

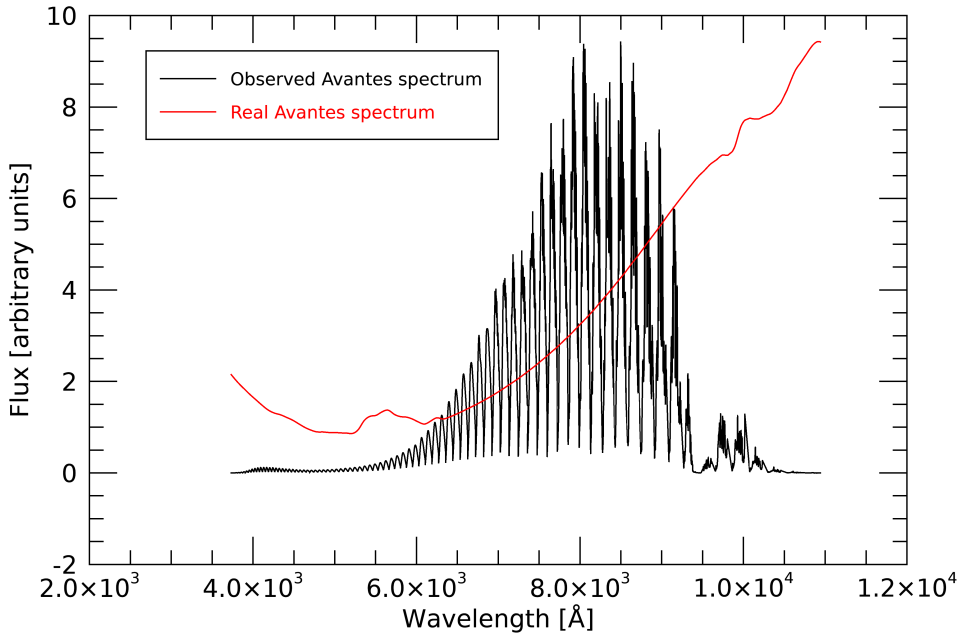


Figure 2.9: Observed spectrum of Avantes light source (black curve) and "real" spectral distribution of the same light source provided by the manufacturer (red).

and multiplying the result for the calibrated Avantes flux distribution, we obtain the corrected $I(\lambda)$ spectrum, which allows pixel-by-pixel and order-by-order comparison of spectral line fluxes.

2.4 The analysis of spectra

2.4.1 Identification of rare earths spectral lines

Examples of reduced spectra (Nd, Dy and Eu lamps) are shown in Figure 2.10. The spectra are substantially made, as expected, of several sharp emission lines, emitted by the atoms of the filling gas and the element constituting the cathode. The three panels show three different regions

in the blue and red parts of the spectrum. In the three portions of the spectrum, common Ne lines, which are present in all the three spectra, are evident.

The search of rare earths spectral lines has been done starting from known energy level of the given specie. This has been done mainly for two reasons:

1. a "blind" search of all the peaks in the spectrum would have been very difficult due to the complex overall structure of the spectrum;

2. with the experimental setup used in this work, distinguish between neutral and ion lines without having information about energy level is not possible.

Furthermore, only spectral lines belonging to the neutral or the first ion of the element have been searched. This choice has been made due to the established knowledge of HC lamps used for astronomical calibration, and the only presence neutral and singly ionized lines has been confirmed by preliminary inspection of the spectra.

The list of energy levels for each specie has been taken from NIST database. The choice of NIST database is mainly because a) it contains a significant number of energy level data for neutral and singly ionized elements also for heavy elements; b) lists of energy levels (and spectral lines) are compiled taking data from several works across years and, most importantly, they are critically evaluated.

Calculation of theoretical spectral lines has been performed writing a program in IDL which, taking as input the list of energy levels for a given specie, gives as output a list of theoretical wavelengths, usually called *Ritz wavelengths*, with energy level data for the two levels involved in the transition. For a set of n energy levels E_u with $u = 1, \dots n$, the program calculates all the Ritz wavelengths for the $n(n-1)/2$ transitions using the simple formula

$$\lambda_{ul,vac} = 10^8/(E_u - E_l) \tag{2.2}$$

where energy levels are expressed in cm^{-1} and the Ritz wavelengths are in angstroms. Once that all the transition have been calculated, the program excluded all the transition for which the *electric dipole selection rules*

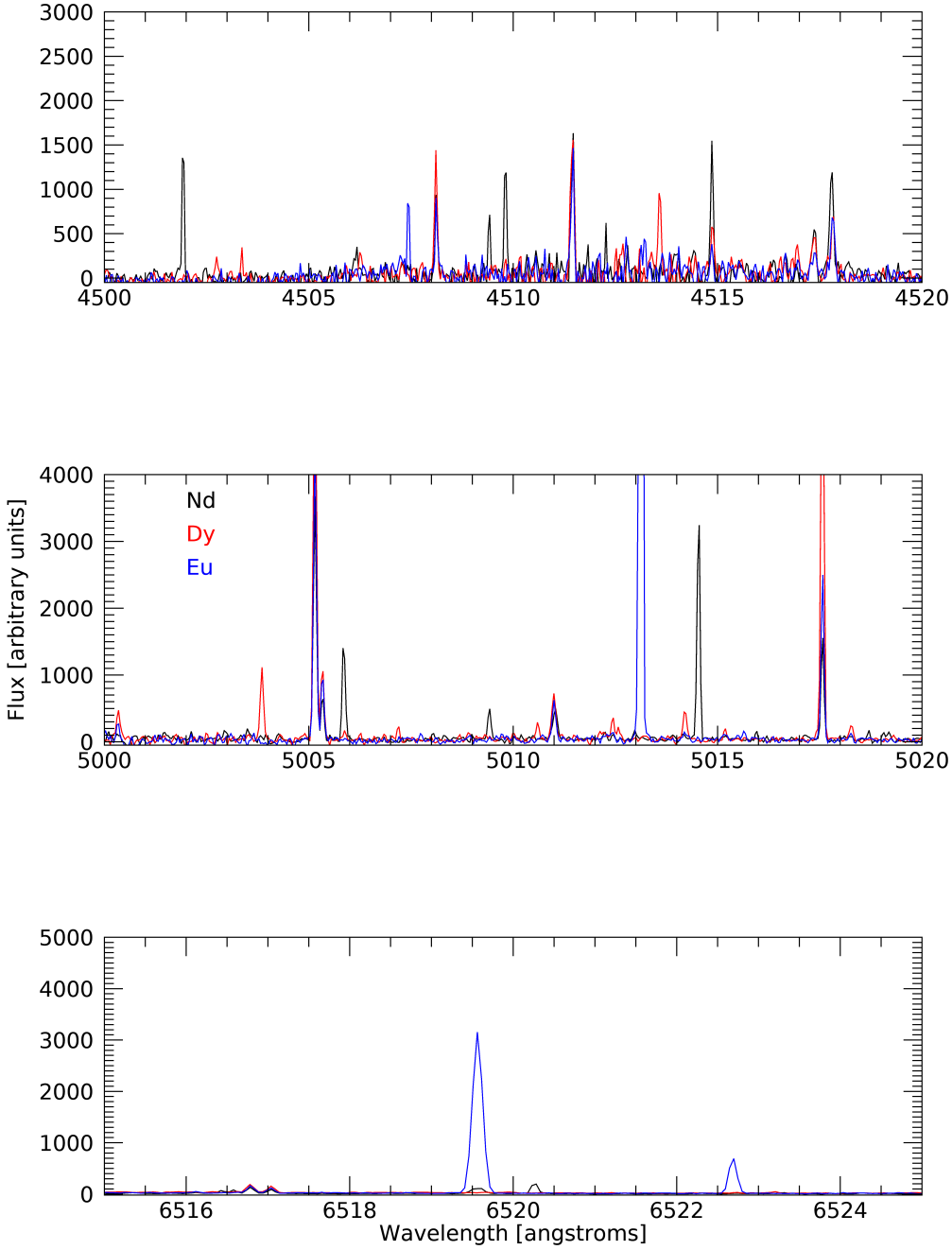


Figure 2.10: Three 10 Å portions of the spectra of Nd (black), Dy (red) and Eu (blue) lamps superimposed. Common Ne lines are clearly visible in the spectra.

were not fulfilled. Such selection rules are

$$\Delta J = 0, \pm 1 \tag{2.3}$$

$$\text{parity change} \tag{2.4}$$

Ritz wavelengths calculated in this way are in vacuum, therefore such wavelengths were converted to air wavelengths using the vacuum-to-air conversion formula derived by Ciddor [43], as coded in the *vactoair* IDL procedure.

Spectral line selection

Starting from the theoretical line list derived as described above, an "explorative" fit in the spectrum has been performed in the neighborhood of each line. The fitted region of the observed spectrum covers the interval $[\lambda_{ul,r} - 2\Delta\lambda_{1/2,caos}, \lambda_{ul,r} + 2\Delta\lambda_{1/2,caos}]$, where the width $\Delta\lambda_{1/2,caos}$ is derived from the nominal CAOS resolution as

$$\Delta\lambda_{1/2,caos} = \lambda_{ul,r}/R \text{ with } R = 60000. \tag{2.5}$$

The region has been fitted using the gaussian profile function written in Equation 1.42 modified with the addition of a background term A_3

$$f_G(\lambda) = A_0 e^{-0.5((\lambda - A_1)/A_2)^2} + A_3. \tag{2.6}$$

For each line the observed wavelength is the value of the centroid A_1, while the intensity is the analytical integral of the gaussian function, given by

$$I = A_0 A_2 \sqrt{2\pi}. \tag{2.7}$$

The uncertainty on the observed quantity is dominated by the rms of the residuals of wavelength solution, while the uncertainty on the intensity is derived through the standard error propagation formula [44], obtaining

$$\sigma_I = \sqrt{2\pi \left(A_2^2 \sigma_{A_0}^2 + A_0^2 \sigma_{A_2}^2 \right)} \tag{2.8}$$

All the fitted profiles are then stored for the selection of good profiles. The criteria chosen for the identification of a spectral feature as a "good" spectral line are the following:

- the subtraction of the fitted profile let the standard deviation of the fitted region decrease of a factor ≥ 3;
- the peak value is greater than the standard deviation of the background value of a factor 3;
- fitted features have widths consistent with the (instrumental) width of a spectral line (to reject spikes due to bad pixels or residual cosmic rays);
- the centroid A_1 discards more than the HWHM of the nominal CAOS resolution at the A_1 wavelength.
- the baseline A_3 of the line does not exceed a maximum value to reject lines located near saturated Ne lines;
- the intensity does not exceed a maximum value determined by the saturation threshold of the detector.

Since the number of theoretically derived Ritz wavelengths is high (> 10000), preliminary analysis of data showed that a theoretical line may have coincided with a well known Ne line. This of course would include wrongly identified features in our line lists. In order to exclude such lines, the process of line search and selection described above has been performed in five (randomly extracted) other lamps of other elements. If the feature appeared in at least two other lamps, it has been cautiously assumed that it is not due to the given rare earth and it has been excluded from the list.

2.4.2 Estimating transition probabilities

Equation 1.40 gives the expression of the emission coefficient for a spectral line as a function of the transition probability and population of the upper level involved in the transition. As we explained in Section 1.4, since absolute calibration is not a simple task for high resolution instruments, for most astronomical spectrographs the radiative flux is not measured in absolute units. On the other hand, relative flux is much more

simple to derive following for example the procedure described in the data reduction subsection.

Therefore, a "direct" derivation of the transition probability of a transition using Equation 1.40 is not possible in our case. However, if we know the value of A_{ul} for some of the measured lines, we will see in the following that at least an estimate of the transition probability of a line is possible even using line relative intensity.

The cascade method

Assuming that our measured intensity is simply proportional to ε_{ul} according to

$$\varepsilon_{ul} = \phi I_{ul} \tag{2.9}$$

solving Equation 1.40 for the transition probability A_{ul} we obtain

$$A_{ul} = \frac{4\pi}{hc}\frac{\phi}{n_u}\lambda_{ul} I_{ul} \tag{2.10}$$

if we measure the intensity $I_{ul'}$ for a transition $u \rightarrow l'$ for which we know the transition probability $A_{ul'}$, we can derive the ratio between ϕ and n_u, obtaining

$$\frac{A_{ul'}}{\lambda_{ul'} I_{ul'}} = \frac{4\pi}{hc}\frac{\phi}{n_u} = \delta_{ul'}. \tag{2.11}$$

Given an upper level u, Equation 2.11 is valid for any transition to any lower level l'. Therefore, for infinitely precise measurements, the quantity on the left-hand side of Equation 2.11 should be equal to the same number ($4\pi\phi/hcn_u$) for all the transitions from the level u, i.e. $\delta_{ul'} = \delta_u$. Of course this is not true for any real experiment, therefore the values of δ_{ul} will be different, with standard deviation that should be of the order of magnitude of the uncertainty propagated to δ_u. In this case, given N one may take the weighted average value as the "real" value of δ_u, given by

$$< \delta_u >= \frac{\sum_{i=1}^{N} w_i A_{ui}/\lambda_{ui} I_{ui}}{\sum_{i=1}^{N} w_i} \tag{2.12}$$

for all the N observed transition to the lower levels i, where the weights w_i are the inverse squared uncertainties on A_{ui}. Once that u is estimated

for the given upper level u, the transition probability of the new line $A_{ul'}$ can be derived by the expression

$$A_{ul} = \lambda_{ul} I_{ul} < \delta_u > . \tag{2.13}$$

We will refer to this method to estimate the transition probabilities as the *cascade method*. Note that, in order to estimate a transition probability A_{ul} using this method, the intensity $I_{ul'}$ for at least another transition $u \rightarrow l'$ starting from u with known $A_{ul'}$ has to be measured. This strongly limits the number of observed lines to which this method can be applied.

The Boltzmann plot method

Assuming that local thermodynamic equilibrium is valid for our plasma, ratios between level populations is governed by Equation 1.31. In particular, the ratio between the level population n_u and the total density N is given by

$$\frac{n_u}{N} = \frac{g_u}{U(T_e)} e^{-\frac{E_u}{k_B T_e}} \tag{2.14}$$

where the quantity $U(T_e)$ is the partition function of the given element in the given ionization state. Substituting Equation 2.14 in the expression for the emission coefficient for a given transition $u \rightarrow l$, we obtain the relation

$$\frac{\lambda_{ul} I_{ul}}{g_u A_{ul}} = \frac{hcN}{4\pi\phi U(T_e)} e^{-\frac{E_u}{k_B T_e}}. \tag{2.15}$$

which, taking the natural logarithms of both members, becomes

$$\log\left(\frac{\lambda_{ul} I_{ul}}{g_u A_{ul}}\right) = -\frac{E_u}{k_B T_e} + \log\left(\frac{hcN}{4\pi\phi U(T_e)}\right). \tag{2.16}$$

Equation 2.16 is the equation of a straight line $y = ax + b$, with variables $x = E_u$ and $y = \log\left(\frac{\lambda_{ul} I_{ul}}{g_u A_{ul}}\right)$ and coefficients $a = -1/k_B T_e$ and $b = \log\left(\frac{hcN}{4\pi\phi U(T_e)}\right)$. If the transitions $u \rightarrow l$ obey to LTE, (x, y) points for such transitions should lie on this straight line. This kind of representation in plasma diagnostics literature is called *Boltzmann plot*, and since the slope of the line is $-1/k_B T_e$, determination of the slope would allow us the estimation of the electron temperature of the plasma.

Following the same principle used for the cascade method, if we know transition probabilities $A_{u'l'}$ for a set of spectral lines, we can make the Boltzmann plot and fit the a and b coefficients from such lines. Once that we know a and b, if we have a given transition for which we want to derive A_{ul} we can do it solving Equation 2.16 with respect to A_{ul}, obtaining

$$A_{ul} = \frac{\lambda_{ul} I_{ul}}{g_u} e^{-(aE_u+b)} \tag{2.17}$$

We will refer to this method to determine the transition probabilities as the *Boltzmann plot method*.

The two methods for the estimate of line strength described above rely on a set of lines, which we will call hereafter *reference lines*, with already measured transition probability. Such set of lines have been composed verifying the presence of single lines by visual inspection of the spectra, in order to check that they were unblendend and with high signal-to-noise ratio. The reference lines have been taken from NIST-ASD when available, while values from single studies have been taken when such lines were not available in NIST-ASD. Table 2.4 lists all the references for these lines: for some of the species, indicated with "-" in the table, no estimation of $\log gf$ has been possible due to the lack of reliable reference lines.

2.5 Results

All the Boltzmann plots and the complete tables for all the elements are reported in the Appendix A.1 and A.2 rather than here for the ease of reading. Given a specie, that is an element in the neutral or singly-ionized stage, the result of the line identification and selection process is a table containing observed wavelength, relative intensity, Ritz wavelength, NIST energy level classification and estimated $\log gf$ when available. The columns of the tables contain the following quantities:

- λ_{Ritz} - Ritz wavelength of the observed transition in angstroms, as calculated by the program explained in Section 2.4;

Table 2.4: Transition probability references for available species (element + ion state).

El.	Ion	Reference	El.	Ion	Reference
Cs	I	-	Ho	I	[45]
	II	-		II	-
Ba	I	NIST-ASD	Er	I	NIST-ASD
	II	NIST-ASD		II	[46]
Pr	I	-	Tm	I	NIST-ASD
	II	NIST-ASD		II	NIST-ASD
Nd	I	NIST-ASD	Yb	I	-
	II	NIST-ASD		II	-
Sm	I	[47]	Lu	I	NIST-ASD
	II	[48]		II	-
Eu	I	NIST-ASD	Hf	I	NIST-ASD
	II	NIST-ASD		II	[49]
Gd	I	NIST-ASD	Re	I	-
	II	-		II	-
Tb	I	-	Os	I	-
	II	-		II	-
Dy	I	NIST-ASD			
	II	NIST-ASD			

- E_{up} - energy of the upper level in eV, with superscript ^{o} for levels with odd parity;
- J_{up} - J of the upper level;
- E_{low} - energy of the lower level in eV, with superscript ^{o} for levels with odd parity;
- J_{low} - J of the lower level;
- λ_o - measured wavelength in angstroms, eventually given with the flags: (b) - possible blend between multiple transitions; (c) - coincidence with a transition of the corresponding ionised (or neutral) state; (n) - reference line for the estimate of $\log gf$;
- I - relative intensity of the line, calculated using Equation 2.7;
- $\log gf$ estimated with Cascade method;
- $\log gf$ estimated with Boltzmann method;
- $\log gf$ for reference lines.

For species for which no $\log gf$ estimate has been possible, a table made only of columns 1-8 has been compiled.

In the following we report an example of the results obtained for one of the lamps, the Nd lamp.

The case of Nd

An example of the line list of Nd I is shown in Table 2.5, which is a sample made of the first 20 rows of the table, while distribution of spectral lines in wavelength and intensities for Nd I are reported in Figures 2.11a and 2.11b. As it is evident in the histogram of wavelengths, number of lines decreases with increasing wavelength, even if the lower efficiency of CAOS at longer wavelengths plays a role. Intensity distribution of our lines (Figure 2.11b) shows that the majority of lines are weak lines: the region showed in the plot, which is the intensity range 0-1000, which is much smaller than the max value of a non saturated line ($\simeq 10^6$) includes about the 96 % of the lines. This tells us that we managed to detect the weakest lines, optimizing the amount of light entering the spectrograph and employing a long exposure time for our spectra.

Table 2.5: Measured wavelengths (λ_o) and intensities of Nd I spectral lines. Energy level classification is reported as follow: λ_{ritz} - Ritz wavelength of the transition; E_{up} - energy of the upper level in eV; J_{up} - J of the upper level; E_{low} - energy of the lower level in eV; J_{low} - J of the lower level. Last three columns report $\log gf$ values of spectral lines: 1) estimated with cascade method (Casc.); 2) estimated with Boltzmann plot method (Boltz.); 3) NIST value for reference lines. A superscript to wavelengths indicates a blend (b), a coincidence with a transition of the corresponding ionised state (c) or the adopted literature $\log gf$ (n). In the Appendix A.2, the full table is reported.

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
3982.272	3.2523^o	4.0	0.1399	5.0	3982.277^c	43.6		-1.4	
3992.969	3.9427	7.0	0.8386^o	6.0	3992.983	32.4		-0.6	
4037.632	3.9084	7.0	0.8386^o	6.0	4037.643	34.7		-0.6	
4053.508	3.1976^o	4.0	0.1399	5.0	4053.513^c	36.5		-1.5	
4066.841	3.0477^o	5.0	0.0000	4.0	4066.854	32.2		-1.8	
4083.896	3.0350^o	4.0	0.0000	4.0	4083.904	146.1		-1.1	
4092.646	3.1684^o	5.0	0.1399	5.0	4092.650^c	30.8		-1.6	
4103.002	3.8595	5.0	0.8386^o	6.0	4103.010	17.8		-1.0	
4122.980	3.0062^o	4.0	0.0000	4.0	4122.979^c	38.0		-1.7	
4126.546	3.1435^o	6.0	0.1399	5.0	4126.551	23.4		-1.8	

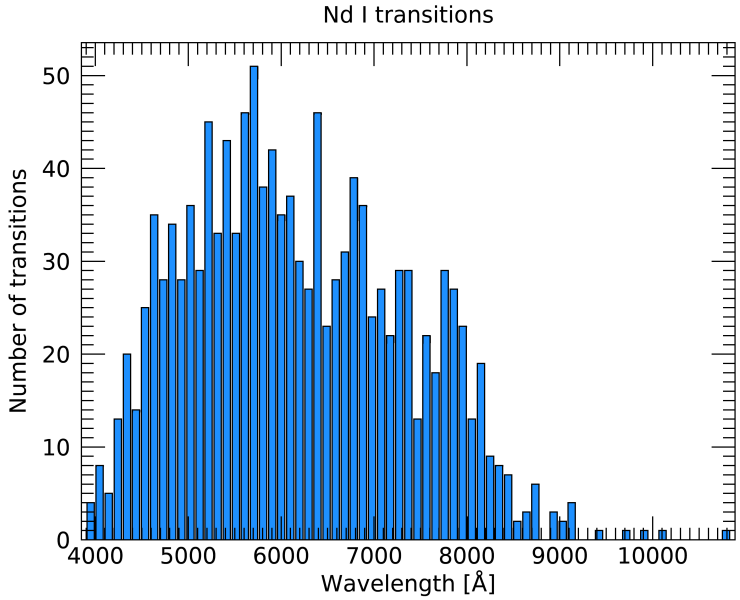
Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
4142.016	3.2858^o	5.0	0.2934	6.0	4141.995	10.9		-1.9	
4160.628	3.2724^o	7.0	0.2934	6.0	4160.618	13.6		-1.8	
4176.092	3.4245^o	7.0	0.4565	7.0	4176.094^c	13.6		-1.6	
4205.263	3.4039^o	6.0	0.4565	7.0	4205.263^{bc}	21.1		-1.4	
4205.272	3.5733^o	8.0	0.6259	8.0	4205.263^{bc}	19.1		-1.3	
4210.979	3.0833^o	5.0	0.1399	5.0	4210.986^c	106.1		-1.1	
4252.949	4.3229	3.0	1.4085^o	4.0	4252.967	20.2		-0.3	
4256.462	2.9120^o	3.0	0.0000	4.0	4256.467^c	452.3		-0.7	
4258.095	3.0507^o	4.0	0.1399	5.0	4258.100	79.0		-1.3	
4265.659	3.7443	5.0	0.8386^o	6.0	4265.675^b	38.9		-0.7	

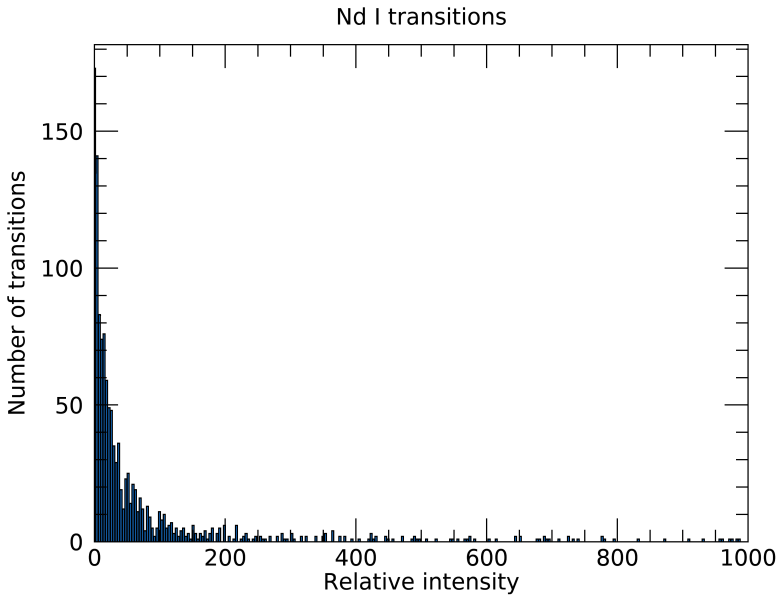
Figure 2.12 shows the quantity $(\lambda_o - \lambda_r)/\lambda_o$ as a function of the wavelength of the line λ_o for Nd I lines. For an echelle spectrograph, $\lambda_o - \lambda_r$ should increase with wavelength according to $R = \lambda/\Delta\lambda$, with R being the spectral resolution of the instrument. Therefore the scaled difference $(\lambda_r - \lambda_o)/\lambda_o$ should be roughly constant with wavelength, as it is evident from Figure 2.12. This confirms the fact that the wavelength calibration of the instruments been performed properly, with no residual instrumental trends as a function of the wavelength.

Finally, top panels of Figures 2.13 and 2.14 show the Boltzmann plot for Nd I and Nd II lines. For each lamp the electron temperature has been estimated using the specie (I or II) with the largest number of lines, so that the linear fit of Boltzmann plot gave a more reliable result. Then the Boltzmann plot of the other specie has been fitted constraining the slope to the already determined temperature. In this case, temperature has been determined using Nd II lines and then used to constrain the fit of Nd I lines. However, for most elements, determinations of the temperature from I and II lines yielded similar values.

Bottom panels of Figures 2.13 and 2.14 report the difference between the values of $\log gf$ for reference lines and these values recalculated with the Boltzmann plot method, giving an idea of how good the Boltzmann plot method is for the determination of the transition probabilities (and $\log gf$). Differences plotted in Figures 2.13 and 2.14 present zero average and standard deviation of $\simeq 0.1$ in $\log gf$. These discrepancies between reference and calculated values depends on the analyzed lamp but the



(a)



(b)

Figure 2.11: Observed wavelength histogram (a) and intensity histogram (b) for Nd I transition observed with CAOS in the visible.

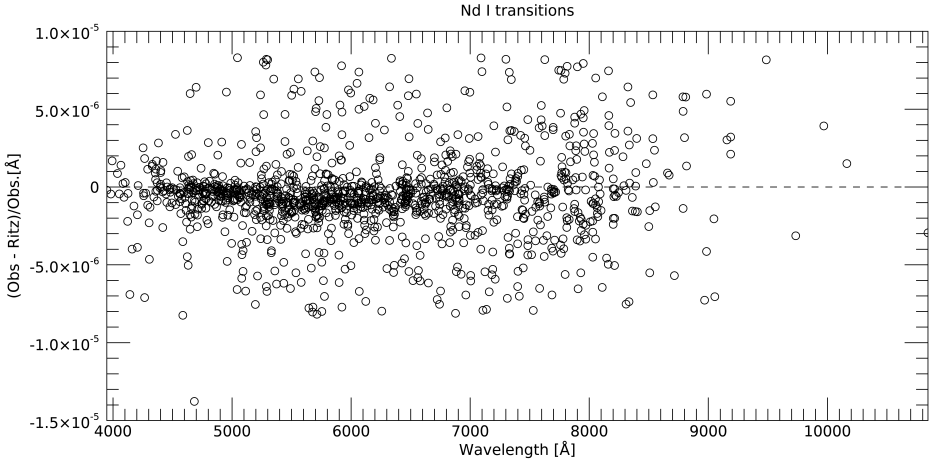


Figure 2.12: $(\lambda_o - \lambda_r)/\lambda_o$ as a function of λ_o for Nd I visible transitions. No systematic trends with wavelength are visible.

order of magnitude, except for some specific cases, is the same for all the lamps.

The overall results

Table 2.6 resumes the results in term of number of lines and transitions measured for each elements. N_{lines} is the total (I + II) number of observed lines for a given element. For each ionization stage N_{model} is the number of transitions, calculated starting from N_{levels} energy levels, which can be attributed to an observed line. Note that the sum of N_{model} I and N_{model} II is always greater than N_{lines} due to multiple transitions able to reproduce an observed line (lines with ^{b} and ^{c} flags in the tables).

The number of observed lines is in general large for almost all the elements and is significantly large for the rare earths: $N_{lines} > 1000$ for Nd, Sm, Tb and Er. Even if an estimate of the $\log gf$ has not been possible for all of these lines, this results confirm the power of a large scale approach using an astronomical echelle spectrograph, which is able to acquire the whole $3700 - 10000$ Å in a short time interval.

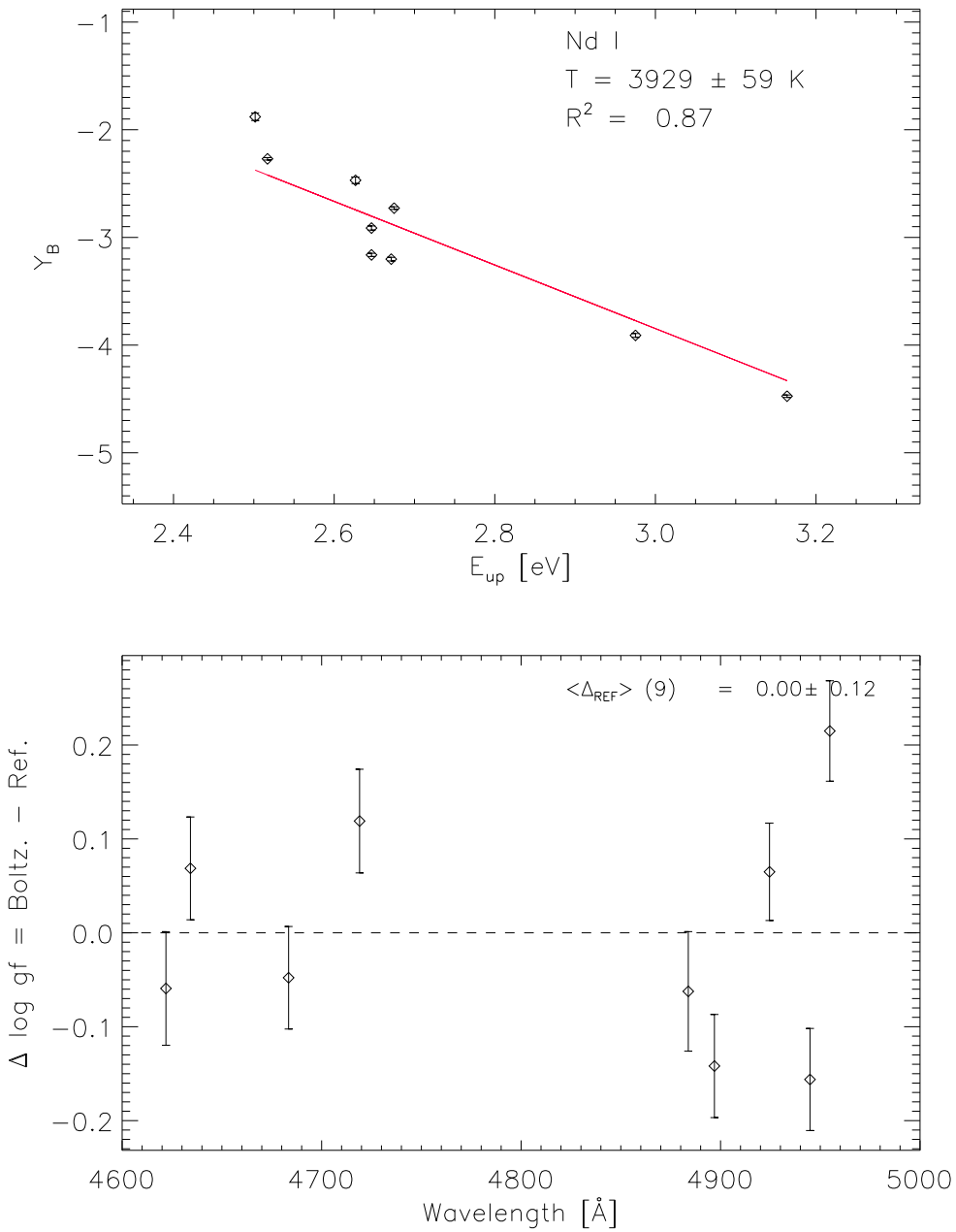


Figure 2.13: Boltzmann plot (top) and difference between "correct" and estimated values of $\log gf$ using Boltzmann method (bottom) for Nd I. In the Boltzmann plot $Y_B = \ln(\lambda I/gA)$.

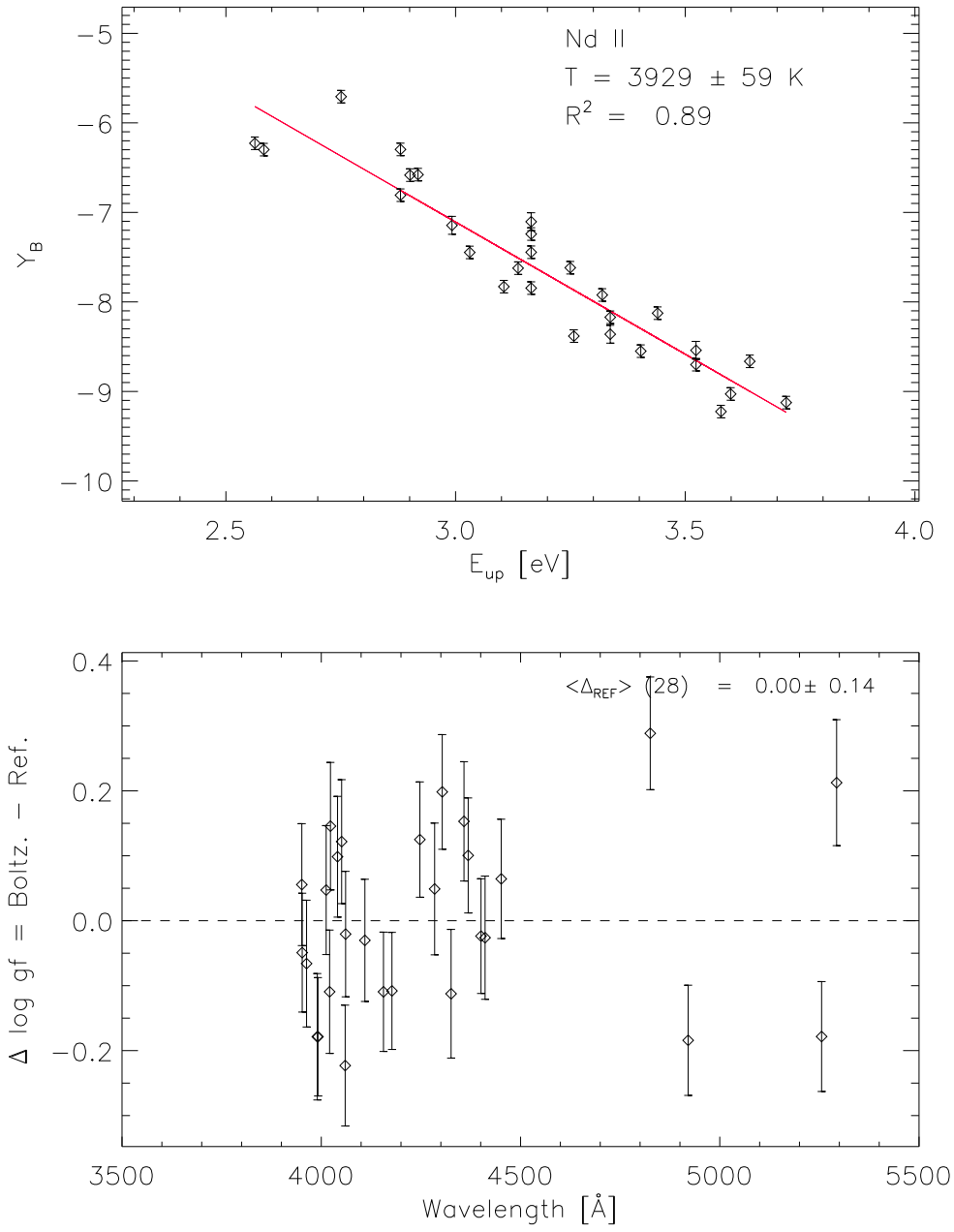


Figure 2.14: Same as Figure 2.13 but for Nd II.

Table 2.6: Overview of the results obtained in the visible: N_{lines} is the number of lines observed in each lamp, attributed either to a neutral or ionic transition. N_{model} is the number of lines corresponding to a predicted transition. Finally, N_{levels} is the number of energy levels used for the calculation of theoretical transitions.

El.	N_{lines}	Ion.	N_{model}	N_{levels}	El.	N_{lines}	Ion.	N_{model}	N_{levels}
Cs	82	I	51	162	Ho	373	I	372	224
		II	40	298			II	13	41
Ba	162	I	154	294	Er	1668	I	1711	670
		II	13	109			II	359	360
Pr	841	I	783	407	Tm	982	I	948	505
		II	157	191			II	258	361
Nd	1400	I	1277	708	Yb	574	I	325	202
		II	681	743			II	290	331
Sm	1563	I	1210	472	Lu	45	I	41	197
		II	589	376			II	6	36
Eu	476	I	478	381	Hf	818	I	713	322
		II	45	140			II	151	121
Gd	708	I	802	607	Re	88	I	91	280
		II	94	305			II	0	133
Tb	2047	I	2316	586	Os	339	I	367	255
		II	81	140			II	0	39
Dy	768	I	814	707					
		II	275	563					

Chapter 3

Measurement of rare earth transitions in the infrared with GIANO-B

In the introductory chapter we showed that very limited knowledge of spectral lines of heavy elements there exists, in particular in the infrared range. From the theoretical point of view, this is due to the complex "many-electron" structure of such elements which makes the calculus very computational power consuming. Regarding experiments, the lack of precise measurements is probably due to difficulty to combine large high resolution spectroscopic instruments to intense and stable plasma sources to be used in spectroscopy.

In this chapter the results of spectroscopy of five rare earths hollow cathode lamps using an high resolution astronomical infrared spectrograph are reported. High resolution lamp spectra have been acquired during a two months period spent in 2022 at *Telescopio Nazionale Galileo*, in La Palma, Canary Island, Spain.

For this "pilot" work, five rare earths (La, Pr, Nd, Eu and Dy) have been investigated in the infrared. The choice of these elements has been motivated by the observation of the pulsation of spectral lines of such elements in the atmospheres of roAp stars, as it is pointed out in the work of Ryabchikova et al. [50]. Since, as it is shown in the introductory chapter, the infrared spectra of such stars contain a lot of unidentified spectral

features, spectroscopy of such lamps has the potential of identifying some of these lines as rare earths spectral lines. As we will see in the following, compilation of spectral line lists containing wavelengths, (qualitative) intensity and energy level identification has been done.

Since the work reported in this chapter is almost analogous to that performed in the visible with CAOS, this chapter will contain several references to the previous Chapter 2. Of course differences between two cases will be highlighted and some of the descriptions and formulas will be repeated for ease of reading.

The chapter is structured as follows: Section 3.1 contains the explanation of the experimental set-up and the procedure of spectra acquisition; Section 3.2 describes the process of data reduction; Section 3.3 describes the process of data analysis, consisting of the line selection and fitting process; Section 3.4 reports the results of the measurements and contains an example of the obtained line lists.

3.1 The experimental set-up

3.1.1 The GIANO-B high resolution echelle spectrograph

GIANO-B is a high resolution near infrared echelle spectrograph mounted at the Naysmith B focus of *Telescopio Nazionale Galileo* (TNG) of *Istituto Nazionale di Astrofisica* (INAF), at the Roque de los Muchachos observatory in La Palma (Canary Islands, Spain) [9]. The main science goals of GIANO-B are: a) the search and characterization of exoplanets around very low mass stars; b) the study and characterization of cool stars and giant stars.

GIANO-B is a cross dispersed echelle spectrograph which operates in vacuum. Details of the optical layout and the functioning of the instrument can be found in the papers of the instruments [51, 9]. Table 3.1 resumes the main features of GIANO-B. The spectral range of GIANO-B is $940 \div 2450$ nm and the coverage is full without gaps up to $\simeq 1800$ nm, 80 % in the $1800 \div 2450$ nm interval. For stellar observations, the actual interval is limited by the atmospheric absorption to the Y (960-1080), J (1110-1330), H (1470-1790) and K (1990-2400) bands. The maximum

Spectral resolution	max $\simeq$ 50000
Spectral range [nm]	940 $\div$ 2450
Cross dispersers	Prism
Detector	HAWAII-2 2048x2048
Pixel size / scale	18 μm, 0.25" on sky
Resolution element	2 pix for 0.5" slit

Table 3.1: Main features of GIANO-B (adapted from TNG website [52]).

achievable resolution is $\simeq$ 50000 depending on the position of the line on the echellogram.

3.1.2 Acquisition of hollow cathode lamp spectra

The GIANO-B spectrograph, together with his pre-slit setup, has been designed and constructed at *INAF - Osservatorio di Arcetri* and then installed at TNG. The optical setup, necessary to feed the instrument with HC lamp light, has been made at *Fundacion Galileo Galilei - INAF* (INAF-FGG) optics lab and then coupled to the existing pre-slit at the Naysmith B focus of TNG. Light emitted by HC lamps has been injected in the spectrograph pre-slit setup using a 400 μm core low OH fiber. Figure 3.1 (adapted from [53]) is a scheme of the GIANO-B pre-slit area, while Figure 3.2 is a picture of the final opto-mechanical acquisition setup at the Naysmith B focus of TNG. The HC lamp is held by a micrometric moving stage which allowed two translation movements (in the plane perpendicular to the optical axis) and two tilting movements. An "image" of the emitting region of the HC Lamp has been focused on the fiber core with the aim of maximizing the light entering in the fiber. Such maximization process has been made substituting the fiber going into spectrograph with a fiber connected to a "real time" photometer in order to maximize the input in the fiber. Once found the optimal configuration, the GIANO-B fiber has been connected to the holder. Since the replacement of the lamp did not allow the positioning of the lamp exactly in the same place, fine adjustments for the alignment of the optical train have been repeated for each lamp.

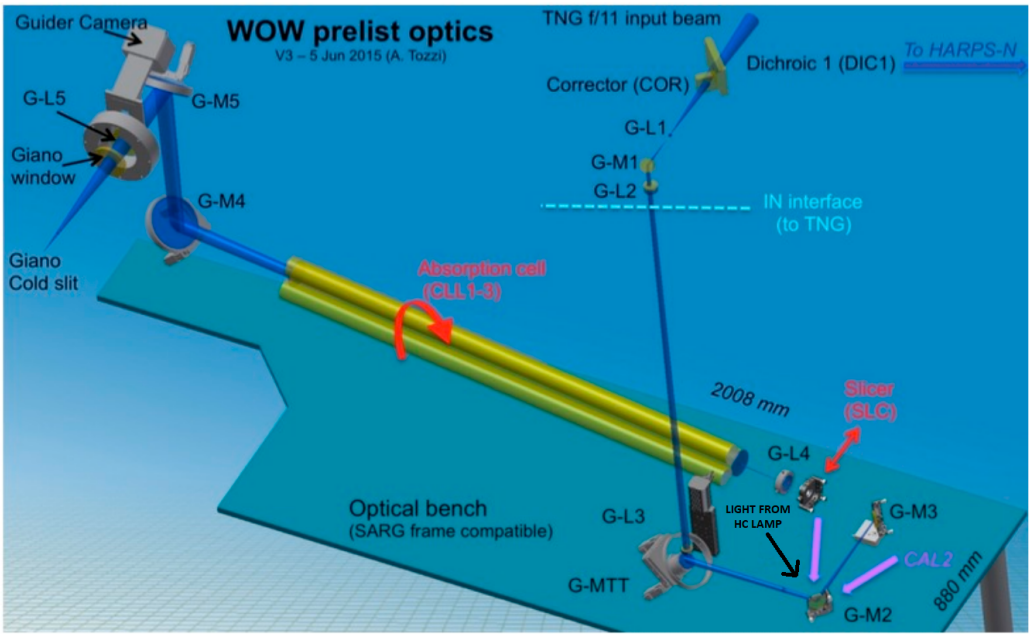


Figure 3.1: Preslit area of GIANO-B. Light from HC lamps is injected in the main optical path rotating the GM2 towards the fiber connected to the acquisition setup. The absorption cell is not present in the current GIANO-B preslit (Figure adapted from [53]).

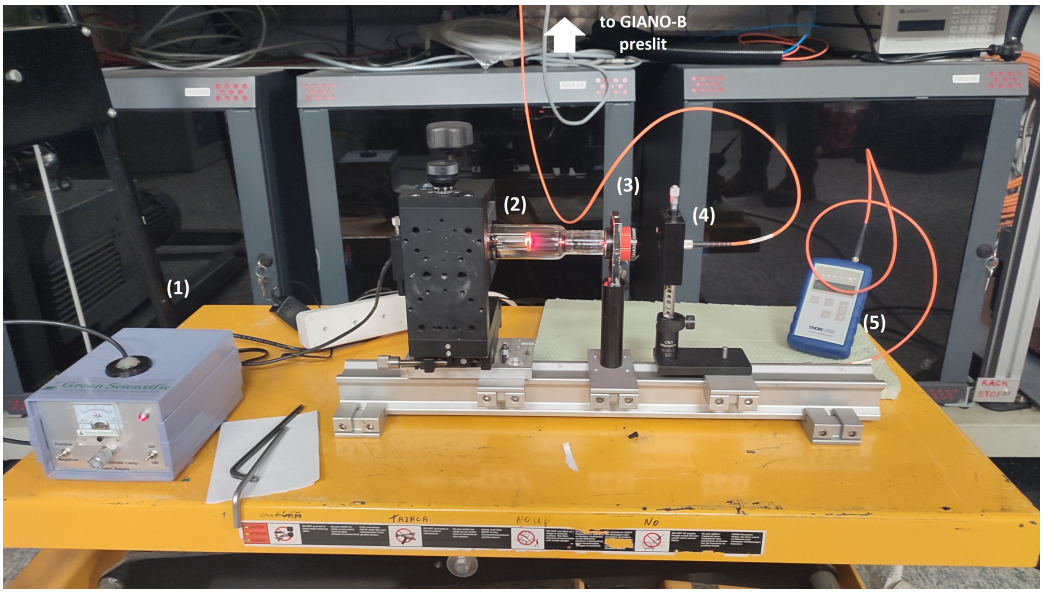


Figure 3.2: Picture of the acquisition setup at the Naysmith B focus of TNG. The light coming from the lamp (on the left) is focused on the fiber using an eyepiece. From left to right: 1) precision power supply; 2) hollow cathode lamp with its holder; 3) optical eyepiece; 4) low OH fiber (with its holder) going directly to GIANO-B preslit; 5) power meter to fine-adjust the optical alignments.

Table 3.2: Elements, atomic number Z and Supplier (GS = Green Scientific, HR = Heraeus) for each lamp.

Element	Z	Supplier
La	57	GS
Pr	59	HR
Nd	60	GS
Eu	63	GS
Dy	66	GS

The lamps investigated in this study are four of those investigated in the visible with CAOS and previously listed in Table 2.1 of Section 2.2 (Pr, Nd, Eu and Dy) with the addition of another lamp: La. Such lamps are listed again here in Table 3.2, together with Z number and supplier. All the lamps have Neon (Ne) as filling gas.

First lamp spectra have been acquired using a "test" setup consisting of two lens focusing the light on the fiber which sends light to the preslit. Preliminary analysis of such spectra revealed the presence of very few lines of the rare earth element, instead of the very numerous and intense lines of Ne. Preliminary search of element lines detected $\simeq$ 100 lines for the Nd spectrum and $<<$ 100 lines for the other spectra. Therefore, efforts in order to increase the signal in the spectra and reduced their noise have been made. Since the exposure time was already the maximum achievable with GIANO-B (600 s), optimization work focused on these three aspects:

- optimization of the optical set-up;
- improvement of the extraction procedure;
- variation of the lamps operating current.

The principal effect of varying lamp currents was the (roughly) linear increase of the flux emitted by the lamp. Therefore, since all standard operating currents were < 10 mA (except for Pr which has 15 mA), supplying lamps with a 20 mA current would have guaranteed us a gain in the observed flux of a factor > 2 for all the lamps except Pr. The effect of

improving the extraction procedure is to increase the signal-to-noise ratio of the spectra; the details of such improvement are shown in the next section. Finally, the optimization of the optical setup has been done substituting the two lens set-up with an eyepiece with a 28 mm focal length, as it is shown in Figure 3.2. This change allowed to better focus the light on the fiber and obtain a factor $\simeq 3$ improvement in the observed flux.

The final scientific spectra have been acquired with the following configuration: 3x600s exposure time, lamp + eyepiece set-up, 20 mA supply current. In addition to science frames, also dark frames with the same exposure time of science frame and an UNe lamp frame for the wavelength calibration have been acquired.

3.2 Data reduction

Data reduction has been carried out using the GIANO-B *Data Reduction Software* (DRS). The GIANO-B DRS is the official data reduction suite of GIANO-B, is completely web-based and, for stellar scientific observation, allows the observer to obtain extracted and wavelength calibrated spectra in real time. Details of the structure of the DRS and its usage can be found in [54]. In order to reduce our lamp spectra, the following reduction steps have been performed:

- dark frame subtraction;
- trace 2D geometry correction;
- spectra extraction;
- wavelength calibration.

The average of N dark frames is subtracted from each scientific frame in order to correct them from background. Since the traces of the orders follow a 2D trajectory in the detector, a "straightening" process is performed in order to obtain 1D traces from which the signal can be extracted. The details of the geometrical correction process can be found in [55].

The extraction of the spectra is usually performed defining a window, centered in the center of the aperture, in the 1D corrected trace and taking the sum of the pixel for each point along the trace. In our spectra this

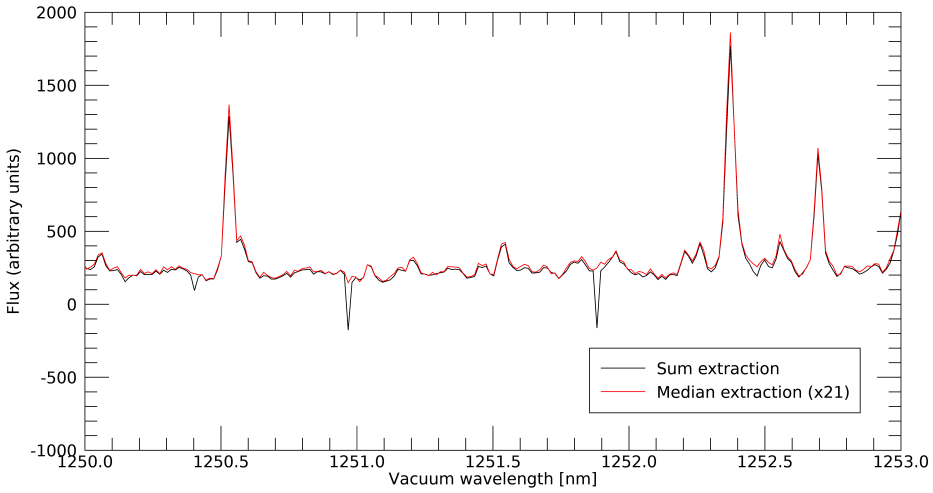


Figure 3.3: Comparison between the "sum extraction" (black) and the "median extraction" (red), multiplied by a proper factor, for a 3 nm spectral region at 1200 nm.

resulted in the presence of a lot of spurious features due to a) bad pixels in the detector, b) patterns of noise fluctuations. The impact of such features in the spectrum has been strongly reduced extracting spectra taking the median of the pixels in the window instead of the sum. Figure 3.3 shows the comparison of the spectra extracted in the two different ways explained above in a 3 nm portion. It is evident how the extraction using median improves the overall quality of the spectrum, almost cancelling the spikes and the features due to imperfections of the detector.

Wavelength calibration is made through a Uranium-Neon lamp spectrum. Starting from a set of known lines with known position in the spectrum, the DRS calculates a pixel-to-wavelength solution for the here acquired UNe frame and it is then adapted to all scientific spectra. Table 3.3 lists all the orders with central wavelength λ_c and rms of the fit of the wavelength solution for the center of the order in nm. Following the same method adopted for measurements in the visible with CAOS, we decided to take these values as the error on our measured wavelengths.

Table 3.3: Order number n_o, central wavelength λ_c and rms of the solution for all GIANO-B orders.

n_o	λ_c [nm]	rms [nm]	n_o	λ_c [nm]	rms [nm]
32	2396	0.0027	57	1344	0.0013
33	2324	0.0009	58	1321	0.0017
34	2255	0.0001	59	1298	0.0021
35	2191	0.0022	60	1277	0.0014
36	2130	0.0015	61	1256	0.0016
37	2072	0.0011	62	1236	0.0011
38	2018	0.0025	63	1216	0.0010
39	1966	0.0020	64	1197	0.0009
40	1917	0.0015	65	1178	0.0014
41	1870	0.0016	66	1160	0.0007
42	1825	0.0014	67	1143	0.0007
43	1783	0.0029	68	1126	0.0007
44	1742	0.0014	69	1110	0.0008
45	1703	0.0015	70	1094	0.0013
46	1666	0.0014	71	1078	0.0010
47	1631	0.0015	72	1063	0.0009
48	1597	0.0012	73	1049	0.0011
49	1564	0.0011	74	1035	0.0009
50	1533	0.0018	75	1021	0.0007
51	1503	0.0019	76	1007	0.0010
52	1474	0.0013	77	994	0.0009
53	1446	0.0012	78	981	0.0007
54	1419	0.0015	79	969	0.0009
55	1393	0.0010	80	957	0.0006
56	1368	0.0019	81	945	0.0005

3.3 Identification of rare earths spectral lines

Figure 3.4 shows three 5 nm portions of the acquired spectra of three lamps (Nd in black, Eu in red and La in blue). The common Ne lines are clearly visible in all the three spectra, while rare earth lines are easy to distinguish because they are present only in one of the three spectra.

As it has been done for the analysis of CAOS spectra in the visible, the search of rare earths spectral lines has been done starting from the energy levels list taken from the NIST ASD database. For each of the potential transitions satisfying the electric dipole selection rules, calculated using the program described in Chapter 2, a gaussian peak has been searched in the spectrum. In order to unambiguously identify a spectral lines, some aspects, like possible wrong identifications and signal-to-noise ratio of the peaks, must be taken into account.

Identification of common Ne lines

In the case of coincidence of a theoretical rare earth transition with a line emitted by filling gas atoms (in this case Ne), such gas line may be wrongly attributed to our rare earth element. In order to avoid such wrong identifications, a list of "common lines" between all the lamps has been made. This has been possible due to the fact that all the lamps have the same gas as filling gas.

The selection of common Ne lines has been made starting from the NIST ASD Ne I-II spectral line list for the wavelength range of GIANO-B. Taking as starting point such set of lines, the selection of further common Ne lines has been made extending the NIST list visually inspecting the superposition of all the five spectra and manually selecting the common features. A final "forbidden wavelengths" list of about 900 lines (including NIST Ne lines) has been compiled as the result of this procedure.

Estimation of the noise

In order to well define a spectral feature a comparison between the "magnitude" of the feature and the noise level of the spectrum must be done. We define the noise of the spectrum as the standard deviation of a region

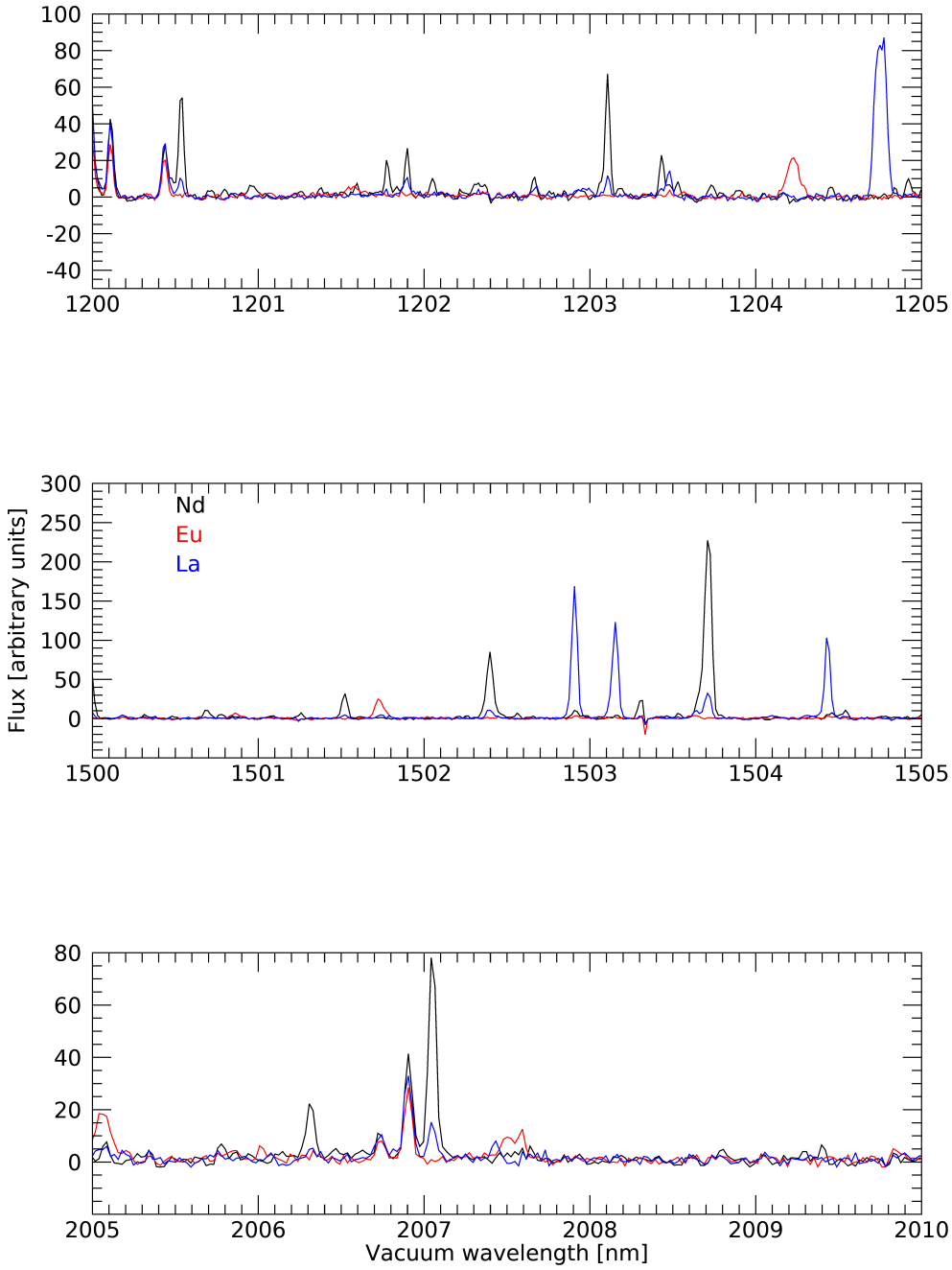


Figure 3.4: Three portions of the Nd, Eu and La spectra in the 1200, 1500 and 2000 nm regions. Common Ne lines are visible in all the spectra.

of the spectrum with no spectral lines. In order to avoid "by-eye" criteria for the selection of the background region, an automatic method has been used to estimate the noise value. For each order standard deviation has been calculated in a 400 pixel window moving along the order with 100 pixel steps. The minimum value of these standard deviations has been taken as the starting point for the estimation of the noise that order. Since the presence of many intense lines in a given order can make such estimate difficult for that order, standard deviation as a function of the order number has been plotted and an outlier-resistant polynomial fit has been performed to derive the noise across the entire detector, as it is shown in Figure 3.5. These 50 fitted values will be our noise levels for each order.

Line fit and selection

Given a theoretical Ritz wavelength λ_r, a short interval $[\lambda_r - d\lambda, \lambda_r + d\lambda]$ is cropped to perform an "explorative" gaussian fit. The half length of the region $d\lambda$ is chosen in such a way that, given theoretical gaussian profile of $R_{min} = \lambda_r/\Delta\lambda = 20000$, $d\lambda$ is 1.5 times the *Full Width at Tenth of Maximum* (FTWM) of this gaussian. Such a wide region to fit is chosen in order to have a reasonable number of points to fit.

Therefore, a gaussian fit is performed using the function

$$f(\lambda) = A_0 e^{-\frac{(\lambda - A_1)^2}{2A_2^2}} + A_3 \tag{3.1}$$

where A_0 is the *peak intensity* of the line, A_1 is the line center, A_2 is the sigma and A_3 is the background value. The value of A_1 is taken as our *measured wavelength* (or *observed wavelength*) for the given transition, while A_2 is considered as the (qualitative) intensity of the line.

Once determined the parameters of the fit, a line is considered a valid spectral line if satisfies the following criteria

1. $|\lambda_r - \lambda_o| < HWHM$, where $HWHM = FWHM/2$;
2. the measured resolution R_{meas} of the spectral line is $R_{min} < R_{meas} < R_{max}$, with $R_{min} = 20000$ and $R_{max} = 48000$;
3. the peak intensity is at least three times the noise level as defined above;

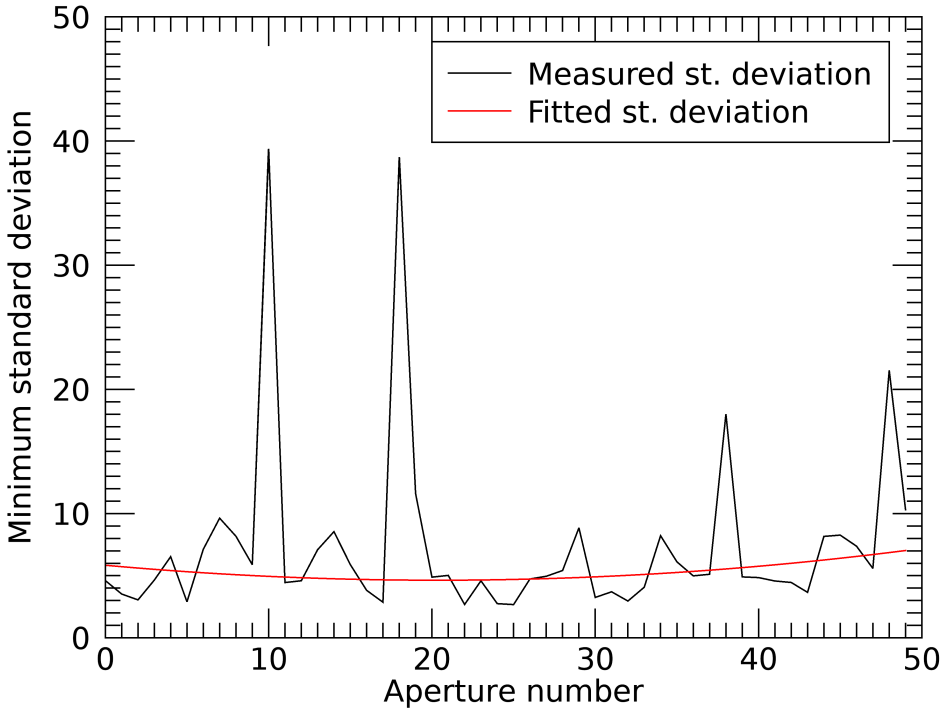


Figure 3.5: Standard deviation of a region without lines as a function of the aperture number. A fit of such curve has been made in order to "exclude" orders with a lot of lines, where estimation of the noise is difficult.

4. $|\lambda_o - \lambda_c| < HWHM$ for each λ_c belonging to the "common line list" described above.

The criterium number 2 is particularly important in order to exclude any possible residual defect of the detector from the line list, while condition 4 is necessary to exclude the cases of possible wrong identifications of spectral lines.

Each observed line which satisfies all the conditions 1-4 is then identified as a good, unambiguous rare earth line and stored in the corresponding line list.

3.4 Results

Using the same standard used for CAOS data, the line lists resulting from the search of I and II transitions in our spectra are stored in tables similar to those compiled for the visible lines. The complete tables for all the five elements are reported in the Appendix A.3. The content of the columns of the tables is explained in the following:

- λ_{Ritz} - Ritz wavelength in vacuum of the observed transition in nm, as calculated by the program explained in Section 2.4;
- E_{up} - energy of the upper level in eV, with superscript ^{o} for levels with odd parity;
- J_{up} - J of the upper level;
- E_{low} - energy of the lower level in eV, with superscript ^{o} for levels with odd parity;
- J_{low} - J of the lower level;
- λ_o - measured wavelength in vacuum in nm, eventually given with the flags: (b) - possible blend between multiple transitions; (c) - coincidence with a transition of the corresponding ionised (or neutral) state;
- σ_{λ_o} - uncertainty on measured wavelength in nm (wavelength-dependent);

- I - peak intensity, given by coefficient A_0 of the fitted line profile (Equation 3.1);

Following the same principle adopted for line lists in the visible, here we report again the case of Nd spectrum as an example of the obtained results.

The case of (infrared) Nd

A 20-row sample of the Nd I table is reported in Table 3.4, while histograms of wavelength and peak intensity for Nd I transition are shown in Figures 3.6a and 3.6b. Similarly to the Nd I visible spectrum, the number of transitions decreases with increasing wavelength, with a larger concentration of lines in the Y band region (900-1000 nm). The intensity histogram shows that, even in the infrared case, most of the transitions generate weak lines, with an inverse proportionality which is qualitatively visible.

Table 3.4: Measured wavelengths (λ_o), uncertainty on measured wavelengths (σ_{λ_o}) and peak intensities of Nd I infrared spectral lines. Energy level classification is reported as follow: λ_{Ritz} - Ritz wavelength of the transition; E_{up} - energy of the upper level in eV; J_{up} - J of the upper level; E_{low} - energy of the lower level in eV; J_{low} - J of the lower level. In the Appendix A.3, the full table is reported.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
940.6266	2.8816	6.0	1.5636^o	7.0	940.6311^b	0.0005	45.0
940.6354	2.4482^o	7.0	1.1301	6.0	940.6310^b	0.0005	45.4
940.6402	3.6339	5.0	2.3159^o	6.0	940.6310^b	0.0005	45.4
941.0539	1.7739^o	6.0	0.4565	7.0	941.0606^c	0.0005	1103.8
941.5312	3.2427^o	7.0	1.9259	8.0	941.5339	0.0005	30.4
942.4399	2.8791	6.0	1.5636^o	7.0	942.4460^c	0.0005	81.1
943.8157	3.0035	4.0	1.6899^o	3.0	943.8238^b	0.0005	49.9
943.8160	3.0472	5.0	1.7336^o	4.0	943.8238^b	0.0005	49.9
944.7517	2.6355	4.0	1.3232^o	4.0	944.7596	0.0005	29.3
945.4571	3.2678	5.0	1.9565^o	6.0	945.4668^c	0.0005	22.9
946.5743	2.7874^o	7.0	1.4776	7.0	946.5669^c	0.0005	26.4

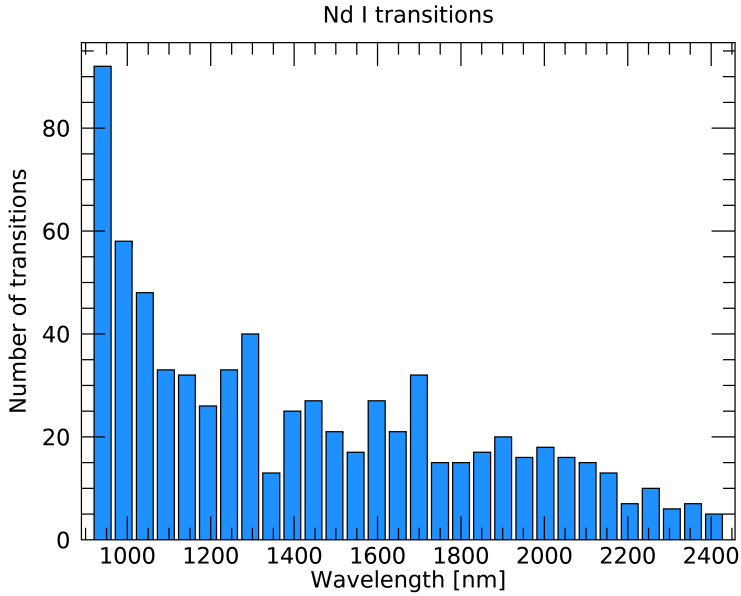
Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
946.9128	1.6027^o	7.0	0.2934	6.0	946.9222^{bc}	0.0005	796.0
946.9176	2.9453^o	6.0	1.6360	6.0	946.9222^{bc}	0.0005	795.0
947.0226	3.1028	7.0	1.7936^o	8.0	947.0276^b	0.0005	107.1
947.0248	3.5621	5.0	2.2530^o	6.0	947.0276^b	0.0005	107.1
947.2662	3.0002	5.0	1.6913^o	5.0	947.2733	0.0005	92.2
947.9007	2.9439^o	7.0	1.6360	6.0	947.9095^c	0.0005	22.6
948.1738	3.9123	5.0	2.6047^o	4.0	948.1772^c	0.0005	21.2
948.4591	2.9603^o	7.0	1.6531	8.0	948.4696^c	0.0005	74.0
948.7220	2.8404	3.0	1.5336^o	3.0	948.7272^c	0.0005	182.4

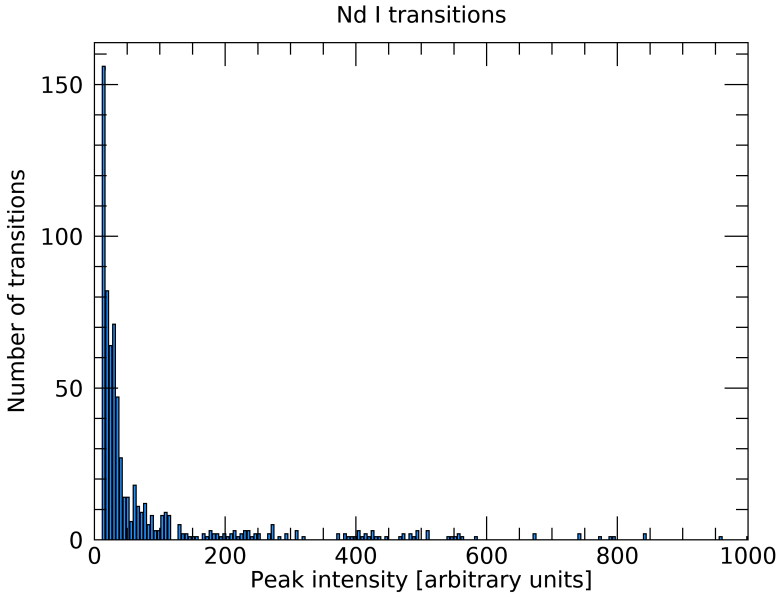
The $(\lambda_o - \lambda_r)/\lambda_r$ plot for lines observed with GIANO-B is reported in Figure 3.7. The difference between Ritz wavelengths and observed wavelengths as function of the wavelength shows no dependence on the wavelength. GIANO-B is an echelle spectrograph such as CAOS, so the behaviour of the instrument in measuring wavelengths is that expected and the wavelength calibration is good.

The overall results

An overview of the spectral lines measured with GIANO-B is given in Table 3.5. The format is the same used to report CAOS visible results: N_{lines} is the total (I + II) number of observed lines for a given element; for each ionization stage N_{model} lines is the number of transitions, calculated starting from N_{levels} energy levels, which can be attributed to an observed line. Also in the infrared spectra, for several observed lines different possible transition reproducing that line have been identified. For this reason the sum N_{model} I and N_{model} II is always greater than N_{lines} due to multiple transitions able to reproduce an observed line (lines with ^{b} and ^{c} flags in the tables). For each element a number of lines > 100 has been observed. This represents a great result considering the almost total lack of measurements of atomic spectral lines in the infrared range for rare earths, in particular using a "large scale" approach such as that used in this work.



(a)



(b)

Figure 3.6: Observed wavelength histogram (a) and peak intensity histogram (b) for Nd I transitions observed with GIANO-B in the near infrared.

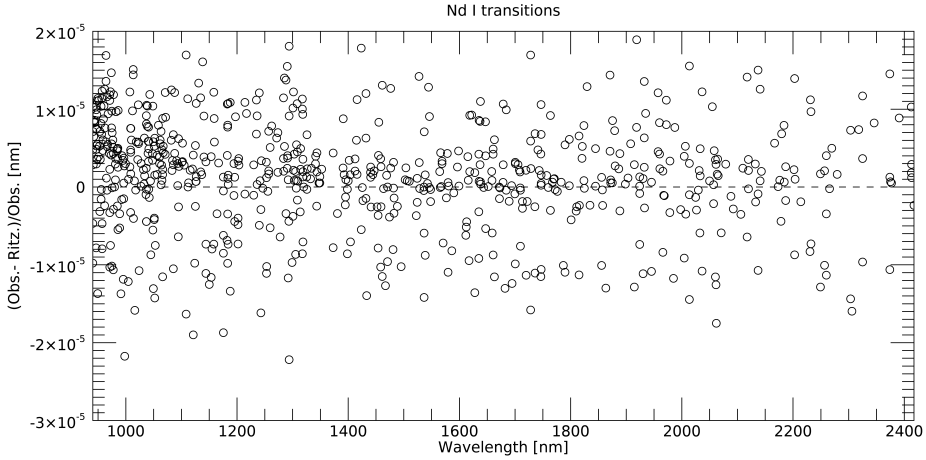


Figure 3.7: $(\lambda_o - \lambda_r)/\lambda_o$ as a function of λ_o for Nd I NIR transitions. Similarly to CAOS Nd spectrum, no systematic trends with wavelength are visible.

Table 3.5: Overview of the results obtained in the near-infrared: N_{lines} is the number of lines observed in each lamp, attributed either to a neutral or ionic transition. N_{model} is the number of lines corresponding to a predicted transition. Finally, N_{levels} is the number of energy levels used for the calculation of theoretical transitions.

El.	N_{lines}	Ion.	N_{model}	N_{levels}
La	139	I	152	301
		II	3	113
Pr	314	I	354	407
		II	42	191
Nd	650	I	725	708
		II	335	743
Eu	135	I	148	381
		II	15	140
Dy	636	I	862	707
		II	174	563

Chapter 4

Conclusions

In the context of this thesis, measurements of spectral lines of rare earths of astrophysical interest have been carried out. The aim of this work is to enlarge the available atomic databases used in astrophysics and eventually replace theoretical values with experimental ones.

Experimental wavelengths and relative intensities are provided for 17 elements, mostly rare earths, in the neutral and singly ionized states in the visible range (3700-10000 Å), while measured wavelengths and (qualitative) intensities for five rare earths are given in the near infrared (9000 - 25000 Å). For some elements, $\log gf$ of visible spectral lines have been estimated.

An overview of the potential impact of the here provided measurements is given in Tables 4.1 and 4.2. For each element the total number of observed lines (taking both lines attributed to I and II transitions) and the number of "new" lines are reported. These new lines are not present in any of the three main databases used as a reference in astronomical spectroscopy: the NIST database, the VALD database and the Kurucz database. For most elements, the number of new lines is of several hundreds. As to the infrared, the quasi-totality of lines would be a new entry in the databases.

Even if not all the parameters provided here are immediately ready to be used as an input for a spectral synthesis code, these data may still represent a relevant contribution to the current knowledge of atomic data Even at a first glance, is evident that the line parameters provided in this

Table 4.1: Comparison of the results in the visible with existing databases: N_{tot} is the total number of lines (I+II) found in a lamp; N_{new} is the number of lines which are not present in the databases (NIST+VALD+KURUCZ).

El.	N_{tot}	N_{new}	El.	N_{tot}	N_{new}
Cs	82	10	Ho	373	292
Ba	162	7	Er	1631	1277
Pr	833	648	Tm	950	396
Nd	1286	927	Yb	557	317
Sm	1526	813	Lu	45	14
Eu	474	213	Hf	816	131
Gd	698	267	Re	88	43
Tb	2041	1941	Os	339	134
Dy	726	356			

Table 4.2: Comparison of the results in the near-infrared with existing databases: N_{tot} is the total number of lines (I+II) found in a lamp; N_{new} is the number of lines which are not present in the databases (NIST+VALD+KURUCZ).

El.	N_{tot}	N_{new}
La	139	139
Pr	313	313
Nd	633	633
Eu	135	135
Dy	623	615

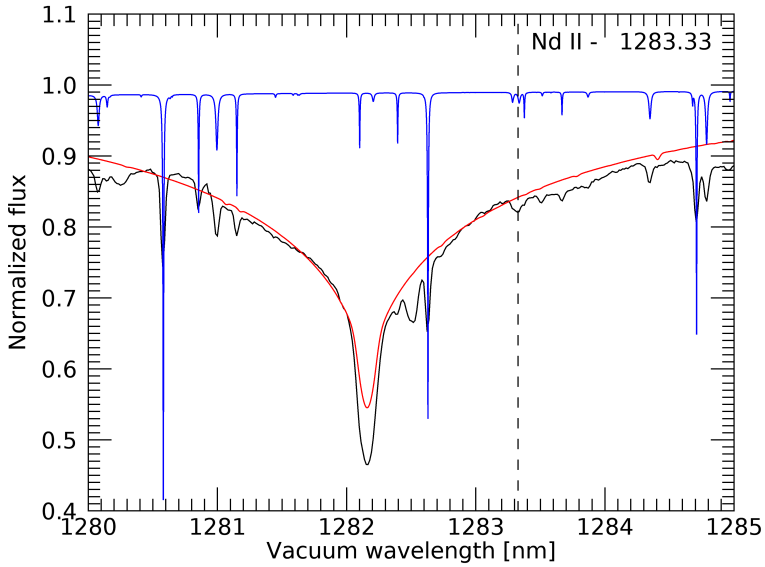
work would add a significant number of records to these three databases, increasing the number of atomic data available to the astronomical community.

Starting from these data, a systematic work of line identification in CP stars may be carried out, possibly improving the interpretation of such spectra and the quality of the parameters derived through spectral synthesis. If we come back to the near infrared spectrum of γ Equ with our new spectral line lists we find that some of these lines are now identified in the stellar spectrum. Figure 4.1 shows two examples of potential identification of two Nd II lines, with the GIANO-B spectrum plotted with the synthetic spectrum (calculated using γ Equ literature abundances, as it has been explained in the introduction) and a telluric reference spectrum. Even if we would need a new synthetic spectrum calculation including the new lines in order to establish that these two lines are actually Nd II lines, Figure 4.1 suggests that (at least part of) our lines can be probably found in stellar spectra, in particular in CP stars.

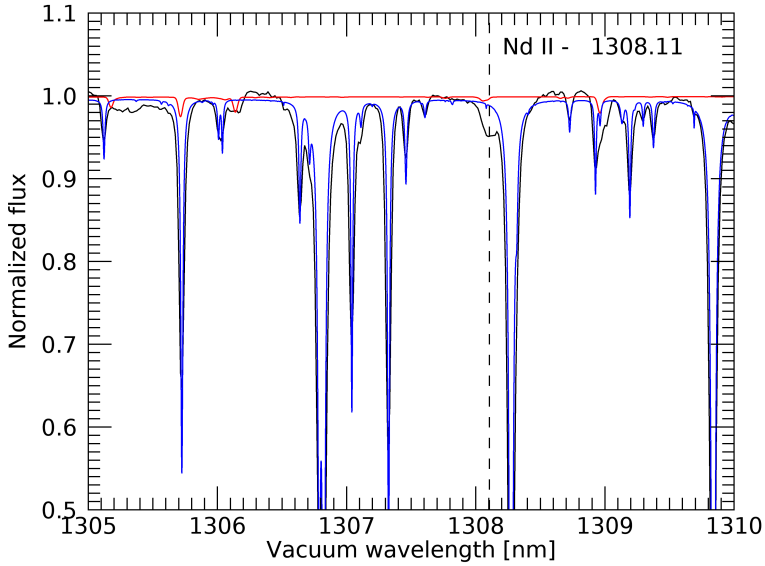
Furthermore, due to their large number of records, such lists can be used as input for opacity calculation codes. In fact, as it has been showed in the introductory chapter, opacity of kilonovae (and supernovae) is dominated by line blanketing, and in this case the quantity of spectral lines used as input data may be as important as the precision of the measurements.

Spectral wavelengths and intensities with no measured transition probability are in any case of interest, because such data can be compared with results obtained using atomic structure calculations, allowing atomic physicists to rule out models or confirm others. In addition, starting from relative intensities, derivation of $\log gf$ may be possible through more complex modelling of the level population in our plasmas, as it has been done in this work using the LTE hypothesis. This aspect, that is comparison with atomic structure model, has not been tackled here because it is not a straightforward task and this work concentrated on the measurement process, which alone requires a lot of effort and specific expertise. However, these data may represent a good starting point for the improvement of atomic structure models for atoms with many electrons, such as those treated in this work.

In principle here found spectral lines impact also on the characteriza-



(a)



(b)

Figure 4.1: Nd II 1283.33 (a) and 1308.11 (b) spectral lines in GIANO-B γ Equ spectra, together with synthetic spectrum (in red) and telluric reference spectrum (in blue).

tion of laboratory plasmas. In particular, passive spectroscopy of Tokamak-like devices can result in the identification of metal impurities also responsible of plasma cooling.

Future perspectives

Since in the last three decades technology has moved forward much faster than laboratory astrophysics experiments did, a lot of branches in the field of atomic parameters measurement are ready to be explored. Plasma devices are increasingly available in many kind of physics laboratories and this will probably result in an increasing number of atomic physics experiments with astrophysical applications.

One of the next goal of this kind of research activity is the extension of spectral lines measurements to the widest possible wavelength range. Near infrared line lists provided in this work represent a first step towards this goal, but most of the work still has to be done. Next generation spectrographs such as METIS@ELT will provide high resolution spectra of astrophysical sources in the mid infrared, therefore requiring extension to spectral lines databases also to this spectral region.

Increasing the number of known spectral lines in the ultraviolet is of particular interest for the next challenges in the interpretation of astrophysical spectra. A quick look in the NIST-ASD bibliographic database reveals that the knowledge of spectral lines of highly ionised atoms is mostly theoretical. These lines are likely to be present in the spectra of high energy plasmas, such as those of high energy astrophysical environments such as Active Galactic Nuclei and supernovae: the high resolution spectrum of the RS Oph nova shown in the introduction is an example of that. As another example, when it will be operative, ANDES@ELT will be able to observe very high redshift sources such as quasars at a resolution $\simeq 100000$. The very high redshift of these sources will cause the visible spectra to have ultraviolet lines redshifted to the visible, dramatically complicating the interpretation of such spectra if previous knowledge of these ultraviolet lines will not be available.

In order to tackle this problem, an ultraviolet echelle spectrograph has been designed and constructed at INAF-OACT with the aim of measur-

ing ultraviolet lines of high charge state ions [56]. The UV spectrograph has been designed to be portable so that it can be moved to various laboratories and adapted to several plasma devices. The availability of a such versatile high resolution spectrograph should facilitate a lot the UV spectroscopy of high temperature and density plasmas, allowing us to measure line wavelengths and intensities for a large number of elements in a high charge state.

These two research paths, i.e. extending spectroscopy to a) the infrared and ultraviolet ranges and b) to highly ionised species, represent the two most important paths which have to be followed in the field of measurement of atomic parameters of astrophysical interest. Achieving these goals will help to reach a comprehensive knowledge of atomic data for all the elements in the periodic table, which is in turn essential for the understanding of the Universe using the tools of physics and astrophysics.

Bibliography

[1] G. W. Preston, ARA&A**12**, 257 (1974).

[2] D. W. Kurtz, MNRAS**202**, 1 (1983).

[3] O. Kochukhov and T. Ryabchikova, A&A**374**, 615 (2001).

[4] V. D. Bychkov, L. V. Bychkova, and J. Madej, Monthly Notices of the Royal Astronomical Society **455**, 2567 (2015).

[5] T. A. Ryabchikova, S. J. Adelman, W. W. Weiss, and R. Kuschnig, A&A**322**, 234 (1997).

[6] Rosario Cosentino, Christophe Lovis, Francesco Pepe, Andrew Collier Cameron, David W. Latham, Emilio Molinari, Stephane Udry, Naidu Bezawada, Martin Black, Andy Born, Nicolas Buchschacher, Dave Charbonneau, Pedro Figueira, Michel Fleury, Alberto Galli, Angus Gallie, Xiaofeng Gao, Adriano Ghedina, Carlos Gonzalez, Manuel Gonzalez, Jose Guerra, David Henry, Keith Horne, Ian Hughes, Dennis Kelly, Marcello Lodi, David Lunney, Charles Maire, Michel Mayor, Giusi Micela, Mark P. Ordway, John Peacock, David Phillips, Giampaolo Piotto, Don Pollacco, Didier Queloz, Ken Rice, Carlos Riverol, Luis Riverol, Jose San Juan, Dimitar Sasselov, Damien Segransan, Alessandro Sozzetti, Danuta Sosnowska, Brian Stobie, Andrew Szentgyorgyi, Andy Vick, and Luc Weber, in *Ground-based and Airborne Instrumentation for Astronomy IV*, Vol. 8446 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*,

edited by Ian S. McLean, Suzanne K. Ramsay, and Hideki Takami (PUBLISHER, ADDRESS, 2012), p. 84461V.

[7] Robert L. Kurucz and Eugene H. Avrett, SAO Special Report **391**, (1981).

[8] N. E. Piskunov, F. Kupka, T. A. Ryabchikova, W. W. Weiss, and C. S. Jeffery, A&AS**112**, 525 (1995).

[9] E. Oliva, L. Origlia, C. Baffa, C. Biliotti, P. Bruno, F. D'Amato, C. Del Vecchio, G. Falcini, S. Gennari, F. Ghinassi, E. Giani, M. Gonzalez, F. Leone, M. Lolli, M. Lodi, R. Maiolino, F. Mannucci, G. Marcucci, I. Mochi, P. Montegriffo, E. Rossetti, S. Scuderi, and M. Sozzi, in *Ground-based and Airborne Instrumentation for Astronomy*, International Society for Optics and Photonics, edited by Ian S. McLean and Masanori Iye (SPIE, ADDRESS, 2006), Vol. 6269, p. 626919.

[10] T. Ryabchikova, N. Piskunov, O. Kochukhov, V. Tsymbal, P. Mittermayer, and W. W. Weiss, A&A**384**, 545 (2002).

[11] P. Renson and J. Manfroid, A&A**498**, 961 (2009).

[12] G. Catanzaro, C. Colombo, C. Ferrara, and M. Giarrusso, MNRAS**515**, 4350 (2022).

[13] A. Frasca, G. Catanzaro, I. Busà, P. Guillout, J. Alonso-Santiago, C. Ferrara, M. Giarrusso, M. Munari, and F. Leone, MNRAS**515**, 3716 (2022).

[14] P Molaro, L Izzo, P Selvelli, P Bonifacio, E Aydi, G Cescutti, E Guido, E J Harvey, M Hernanz, and M Della Valle, Monthly Notices of the Royal Astronomical Society **518**, 2614 (2022).

[15] G. Wallerstein and P. M. Garnavich, PASP**98**, 875 (1986).

[16] Iijima, T., A&A **505**, 287 (2009).

[17] B. P. et Al. Abbott, PhRvL**119**, 161101 (2017).

[18] S. J. Smartt, T. W. Chen, A. Jerkstrand, M. Coughlin, E. Kankare, S. A. Sim, M. Fraser, C. Inserra, K. Maguire, K. C. Chambers, M. E. Huber, T. Krühler, G. Leloudas, M. Magee, L. J. Shingles, K. W. Smith, D. R. Young, J. Tonry, R. Kotak, A. Gal-Yam, J. D. Lyman, D. S. Homan, C. Agliozzo, J. P. Anderson, C. R. Angus, C. Ashall, C. Barbarino, F. E. Bauer, M. Berton, M. T. Botticella, M. Bulla, J. Bulger, G. Cannizzaro, Z. Cano, R. Cartier, A. Cikota, P. Clark, A. De Cia, M. Della Valle, L. Denneau, M. Dennefeld, L. Dessart, G. Dimitriadis, N. Elias-Rosa, R. E. Firth, H. Flewelling, A. Flörs, A. Franckowiak, C. Frohmaier, L. Galbany, S. González-Gaitán, J. Greiner, M. Gromadzki, A. Nicuesa Guelbenzu, C. P. Gutiérrez, A. Hamanowicz, L. Hanlon, J. Harmanen, K. E. Heintz, A. Heinze, M. S. Hernandez, S. T. Hodgkin, I. M. Hook, L. Izzo, P. A. James, P. G. Jonker, W. E. Kerzendorf, S. Klose, Z. Kostrzewa-Rutkowska, M. Kowalski, M. Kromer, H. Kuncarayakti, A. Lawrence, T. B. Lowe, E. A. Magnier, I. Manulis, A. Martin-Carrillo, S. Mattila, O. McBrien, A. Müller, J. Nordin, D. O'Neill, F. Onori, J. T. Palmerio, A. Pastorello, F. Patat, G. Pignata, Ph. Podsiadlowski, M. L. Pumo, S. J. Prentice, A. Rau, A. Razza, A. Rest, T. Reynolds, R. Roy, A. J. Ruiter, K. A. Rybicki, L. Salmon, P. Schady, A. S. B. Schultz, T. Schweyer, I. R. Seitenzahl, M. Smith, J. Sollerman, B. Stalder, C. W. Stubbs, M. Sullivan, H. Szegedi, F. Taddia, S. Taubenberger, G. Terreran, B. van Soelen, J. Vos, R. J. Wainscoat, N. A. Walton, C. Waters, H. Weiland, M. Willman, P. Wiseman, D. E. Wright, Ł. Wyrzykowski, and O. Yaron, Nature**551**, 75 (2017).

[19] R. Chornock, E. Berger, D. Kasen, P. S. Cowperthwaite, M. Nicholl, V. A. Villar, K. D. Alexander, P. K. Blanchard, T. Eftekhari, W. Fong, R. Margutti, P. K. G. Williams, J. Annis, D. Brout, D. A. Brown, H. Y. Chen, M. R. Drout, B. Farr, R. J. Foley, J. A. Frieman, C. L. Fryer, K. Herner, D. E. Holz, R. Kessler, T. Matheson, B. D. Metzger, E. Quataert, A. Rest, M. Sako, D. M. Scolnic, N. Smith, and M. Soares-Santos, ApJL**848**, L19 (2017).

[20] Brian D. Metzger, Living Reviews in Relativity **23**, 1 (2019).

[21] Li-Xin Li and Bohdan Paczyński, The Astrophysical Journal **507**, L59 (1998).

[22] Nanae Domoto, Masaomi Tanaka, Shinya Wanajo, and Kyohei Kawaguchi, ApJ**913**, 26 (2021).

[23] J. H. Gillanders, S. J. Smartt, S. A. Sim, A. Bauswein, and S. Goriely, MNRAS**515**, 631 (2022).

[24] Masaomi Tanaka, Daiji Kato, Gediminas Gaigalas, and Kyohei Kawaguchi, MNRAS**496**, 1369 (2020).

[25] Suzanne Ramsay, Paola Amico, Naidu Bezawada, Michele Cirasuolo, Frédéric Derie, Sebastian Egner, Elizabeth George, Frédéric Gonté, Juan Carlos González Herrera, Peter Hammersley, Christoph Haupt, Jeroen Heijmans, Derek Ives, Gerd Jakob, Florian Kerber, Bertrand Koehler, Vincenzo Mainieri, Antonio Manescau, Sylvain Oberti, Paolo Padovani, Celine Peroux, Ralf Siebenmorgen, Roberto Tamai, and Joël. Vernet, in *Advances in Optical Astronomical Instrumentation 2019*, Vol. 11203 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, edited by Simon C. Ellis and Céline d'Orgeville (PUBLISHER, ADDRESS, 2020), p. 1120303.

[26] Official ELT website, `https://elt.eso.org/`, accessed: 2022-11-10.

[27] A. Kramida, Yu. Ralchenko, J. Reader, and NIST ASD Team, NIST Atomic Spectra Database (version 5.9), [Online], `https://physics.nist.gov/asd`, 2021.

[28] Robert L. Kurucz, Memorie della Societa Astronomica Italiana Supplementi **8**, 86 (2005).

[29] Bradley W. Carroll and Dale A. Ostlie, *An Introduction to Modern Astrophysics*, 2 ed. (Cambridge University Press, ADDRESS, 2017).

[30] Dimitri Mihalas, *Stellar Atmospheres* (W. H. Freeman and Company, San Francisco, 1970).

[31] Hans-Joachim Kunze, *Introduction to Plasma Spectroscopy* (Springer-Verlag, Berlin Heidelberg, 2009), Vol. 56.

[32] Ivan Hubeny and Dimitri Mihalas, *Theory of Stellar Atmospheres. An Introduction to Astrophysical Non-equilibrium Quantitative Spectroscopic Analysis* (PUBLISHER, ADDRESS, 2015).

[33] Albert Einstein, Deutsche Physikalische Gesellschaft **18**, 318 (1916).

[34] Albert Einstein, Phys. Z. **18**, 121 (1917).

[35] H. R. Griem, *Spectral line broadening by plasmas* (PUBLISHER, ADDRESS, 1974).

[36] NIST bibliographic database on line broadening, 10.18434/T4B59K, accessed: 2022-11-17.

[37] C. R. Kitchin, *Astrophysical Techniques* (PUBLISHER, ADDRESS, 2020).

[38] Thomas Eversberg and Klaus Vollmann, *Spectroscopic Instrumentation: Fundamentals and Guidelines for Astronomers* (PUBLISHER, ADDRESS, 2015).

[39] C. Ferrara, M. Giarrusso, and F. Leone, MNRAS**submitted**, (2022).

[40] F. Kerber, G. Nave, C. J. Sansonetti, P. Bristow, and M. R. Rosa, in *The Future of Photometric, Spectrophotometric and Polarimetric Standardization*, Vol. 364 of *Astronomical Society of the Pacific Conference Series*, edited by C. Sterken (PUBLISHER, ADDRESS, 2007), p. 461.

[41] F. Leone, G. Avila, G. Bellassai, P. Bruno, S. Catalano, R. Di Benedetto, A. Di Stefano, M. Gangi, M. Giarrusso, V. Greco, E. Martinetti, M. Miraglia, M. Munari, C. Pontoni, C. Scalia, S. Scuderi, and P. Spanó, AJ**151**, 116 (2016).

[42] Doug Tody, in *Instrumentation in astronomy VI*, Vol. 627 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, edited by David L. Crawford (PUBLISHER, ADDRESS, 1986), p. 733.

[43] Philip E. Ciddor, Appl. Opt. **35**, 1566 (1996).

[44] John Taylor, *Introduction to Error Analysis, the Study of Uncertainties in Physical Measurements, 2nd Edition* (PUBLISHER, ADDRESS, 1997).

[45] Gillian Nave, Journal of the Optical Society of America B Optical Physics **20**, 2193 (2003).

[46] J. E. Lawler, C. Sneden, J. J. Cowan, J. F. Wyart, I. I. Ivans, J. S. Sobeck, M. H. Stockett, and E. A. Den Hartog, ApJS**178**, 71 (2008).

[47] J. E. Lawler, A. J. Fittante, and E. A. Den Hartog, Journal of Physics B Atomic Molecular Physics **46**, 215004 (2013).

[48] J. E. Lawler, E. A. Den Hartog, C. Sneden, and J. J. Cowan, ApJS**162**, 227 (2006).

[49] J. E. Lawler, E. A. den Hartog, Z. E. Labby, C. Sneden, J. J. Cowan, and I. I. Ivans, ApJS**169**, 120 (2007).

[50] T. Ryabchikova, M. Sachkov, O. Kochukhov, and D. Lyashko, A&A**473**, 907 (2007).

[51] Ernesto Oliva, Livia Origlia, Roberto Maiolino, Sandro Gennari, Valdemaro Biliotti, Emanuel Rossetti, Carlo Baffa, F. Leone, Paolo Montegriffo, Marco Lolli, Francesco D'Amato, Pietro Bruno, Salvatore Scuderi, Francesca Ghinassi, Manuel Gonzalez, Marcello Lodi, Gilberto Falcini, Elisabetta Giani, Gianni Marcucci, and Mauro Sozzi, in *Ground-based Instrumentation for Astronomy*, Vol. 5492 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, edited by Alan F. M. Moorwood and Masanori Iye (PUBLISHER, ADDRESS, 2004), pp. 1274–1279.

[52] Official TNG website, `https://www.tng.iac.es/`, accessed: 2022-11-15.

[53] R. Claudi, S. Benatti, I. Carleo, A. Ghedina, E. Molinari, E. Oliva, A. Tozzi, A. Baruffolo, M. Cecconi, R. Cosentino, D. Fantinel, L. Fini, F. Ghinassi, M. Gonzalez, R. Gratton, J. Guerra, A. Harutyunyan, N. Hernandez, M. Iuzzolino, M. Lodi, L. Malavolta, J. Maldonado, G. Micela, N. Sanna, J. Sanjuan, S. Scuderi, A. Sozzetti, H. Pérez Ventura, H. Diaz Marcos, A. Galli, C. Gonzalez, L. Riverol, and C. Riverol, in *Ground-based and Airborne Instrumentation for Astronomy VI*, Vol. 9908 of *Society of Photo-Optical Instrumentation Engineers*

(SPIE) Conference Series, edited by Christopher J. Evans, Luc Simard, and Hideki Takami (PUBLISHER, ADDRESS, 2016), p. 99081A.

[54] Avet Harutyunyan, Monica Rainer, Nauzet Hernandez, Ernesto Oliva, Jose Guerra, Marcello Lodi, Jose San Juan, Andrea Bignamini, Adriano Ghedina, Francesca Ghinassi, Emilio Molinari, Serena Benatti, Ilaria Carleo, Riccardo Claudi, Giuseppina Micela, Andrea Tozzi, Carlo Baffa, Andrea Baruffolo, Valdemaro Biliotti, Nicolas Buchschacher, Massimo Cecconi, Rosario Cosentino, Gilberto Falcini, Daniela Fantinel, Luca Fini, Alberto Galli, Elisabetta Giani, Carlos Gonzalez, Esther Gonzalez-Alvarez, Manuel Gonzalez, Raffaele Gratton, Marcos Hernandez Diaz, Marcella Iuzzolino, Luca Malavolta, Jesus Maldonado, Livia Origlia, Ennio Poretti, Hector Perez Ventura, Alfio Puglisi, Carlos Riverol, Luis Riverol, Nicoletta Sanna, Salvatore Scuderi, Ulf Seeman, Alessandro Sozzetti, and Mauro Sozzi, in *Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation III*, Vol. 10706 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, edited by Ramón Navarro and Roland Geyl (PUBLISHER, ADDRESS, 2018), p. 1070642.

[55] E. Oliva, N. Sanna, M. Rainer, F. Massi, A. Tozzi, and L. Origlia, in *Ground-based and Airborne Instrumentation for Astronomy VII*, Vol. 10702 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, edited by Christopher J. Evans, Luc Simard, and Hideki Takami (PUBLISHER, ADDRESS, 2018), p. 1070274.

[56] Matteo Munari, Marina Giarrusso, Giovanni Catanzaro, Ricardo Zanmar Sanchez, Claudio Ferrara, Lorenzo Giustolisi, and Francesco Leone, in *Optical Instrument Science, Technology, and Applications II*, Vol. 11876 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, edited by Nils Haverkamp, Breann N. Sitarski, and Richard N. Youngworth (PUBLISHER, ADDRESS, 2021), p. 118760J.

Acknowledgements

The PhD fellowship has been funded by the Istituto Nazionale di Fisica Nucleare - Sezione di Catania.

I would like to thank my supervisor, Prof. Francesco Leone, for his patience, his infinite willingness and all the knowledge he gave me during these years.

I thank all the colleagues from the university and the Catania observatory for their support and for always stimulating me in doing science, helping me to face science problems from another perspective.

I thank Telescopio Nazionale Galileo (TNG) and its former director, Dr. Ennio Poretti, for making the measurements with GIANO-B possible and having funded this part of the PhD activity. I would also like to thank Adriano Ghedina, Massimo Cecconi and Avet Harutynyan for the time spent at TNG and for all the things I have learned during those two months.

Finally I thank my family, my friends and my girlfriend Costanza for their endless support.

Appendix A

Tables of spectral lines

A.1 CAOS Boltzmann plots

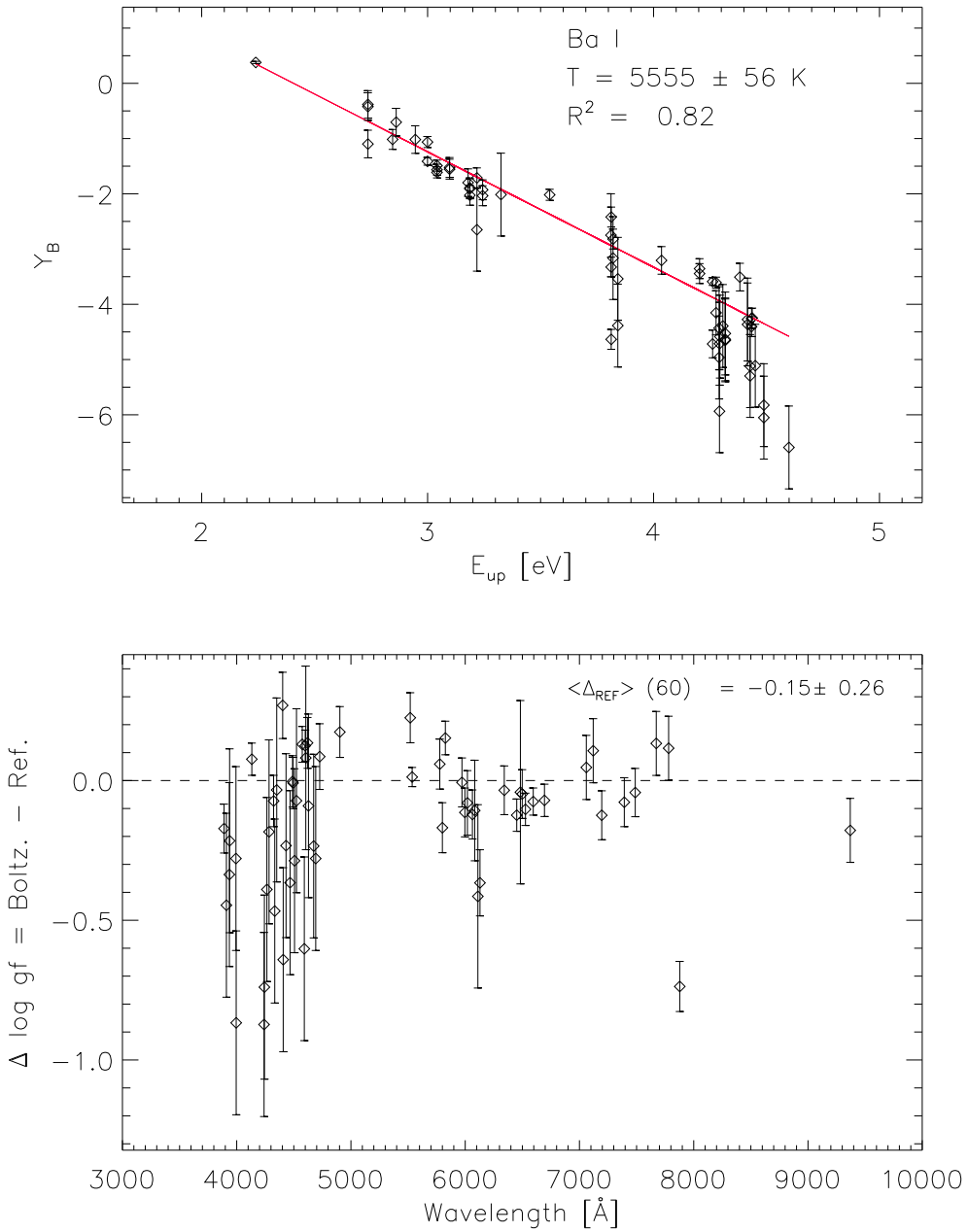


Figure A.1: Boltzmann plot (top) and difference between "correct" and estimated values of $\log gf$ using Boltzmann method (bottom) for Ba I. In the Boltzmann plot $Y_B = \ln\left(\frac{\lambda I}{gA}\right)$ and $x = E_{up}$.

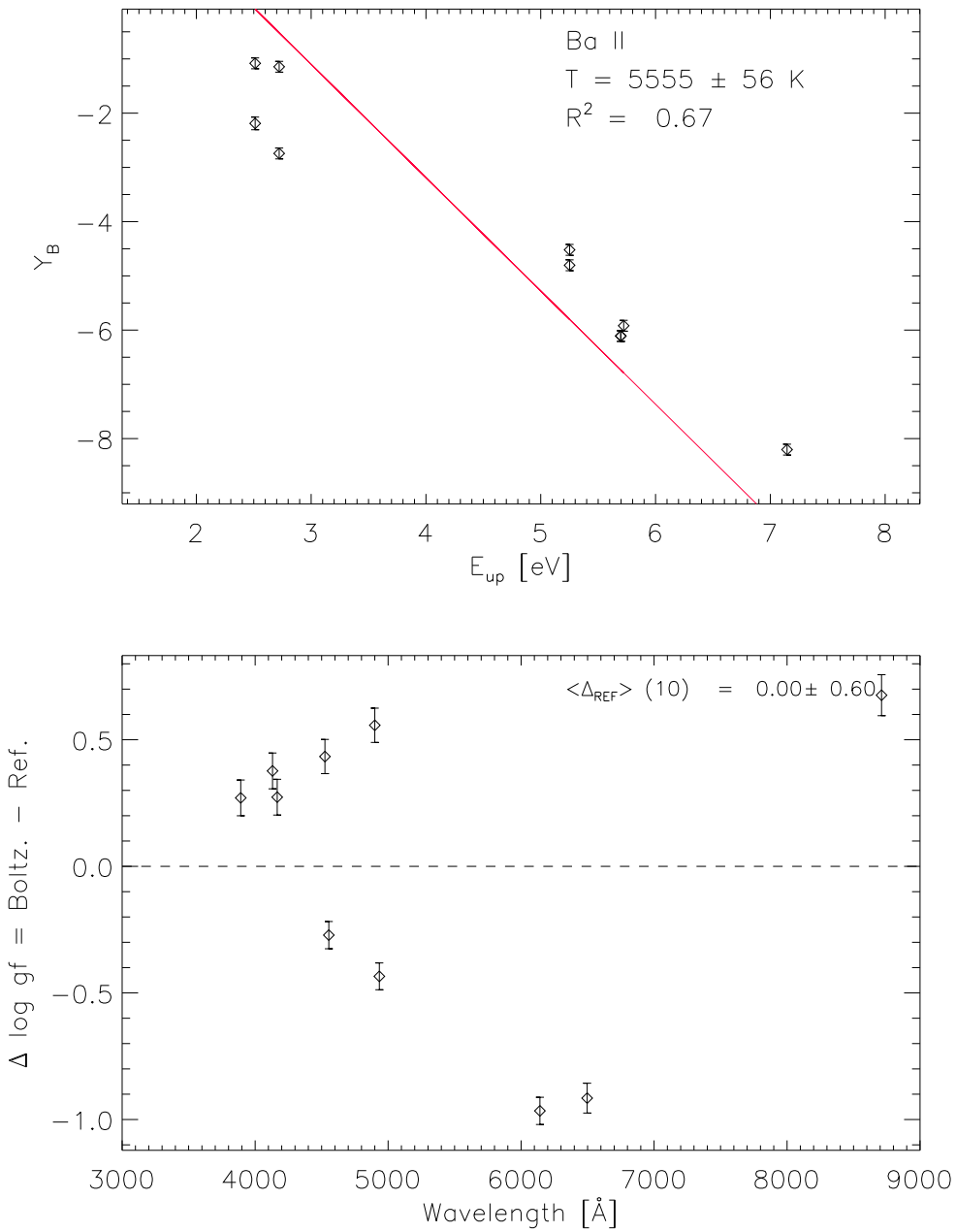


Figure A.2: Same as Figure A.1 but for Ba II.

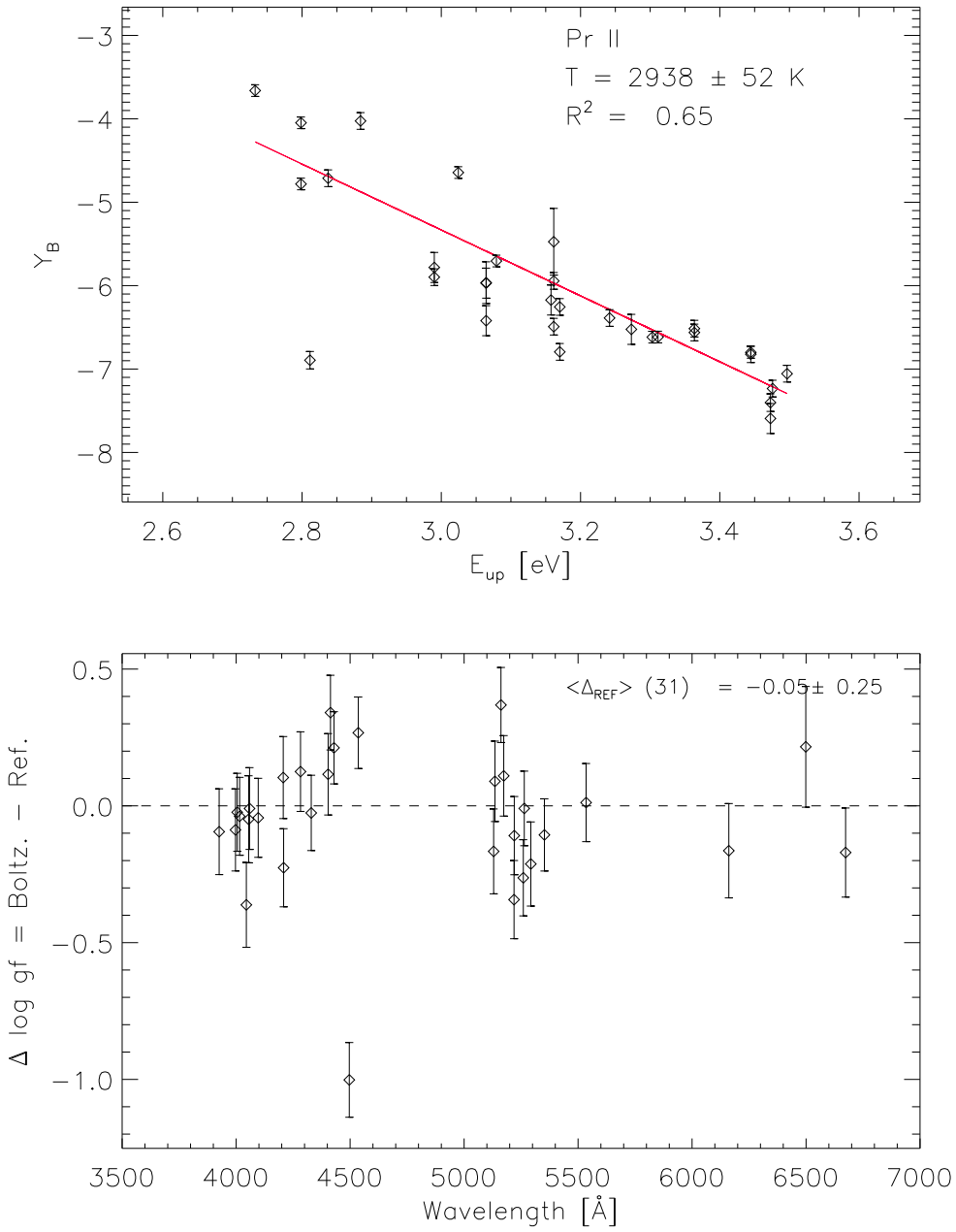


Figure A.3: Same as Figure A.1 but for Pr II.

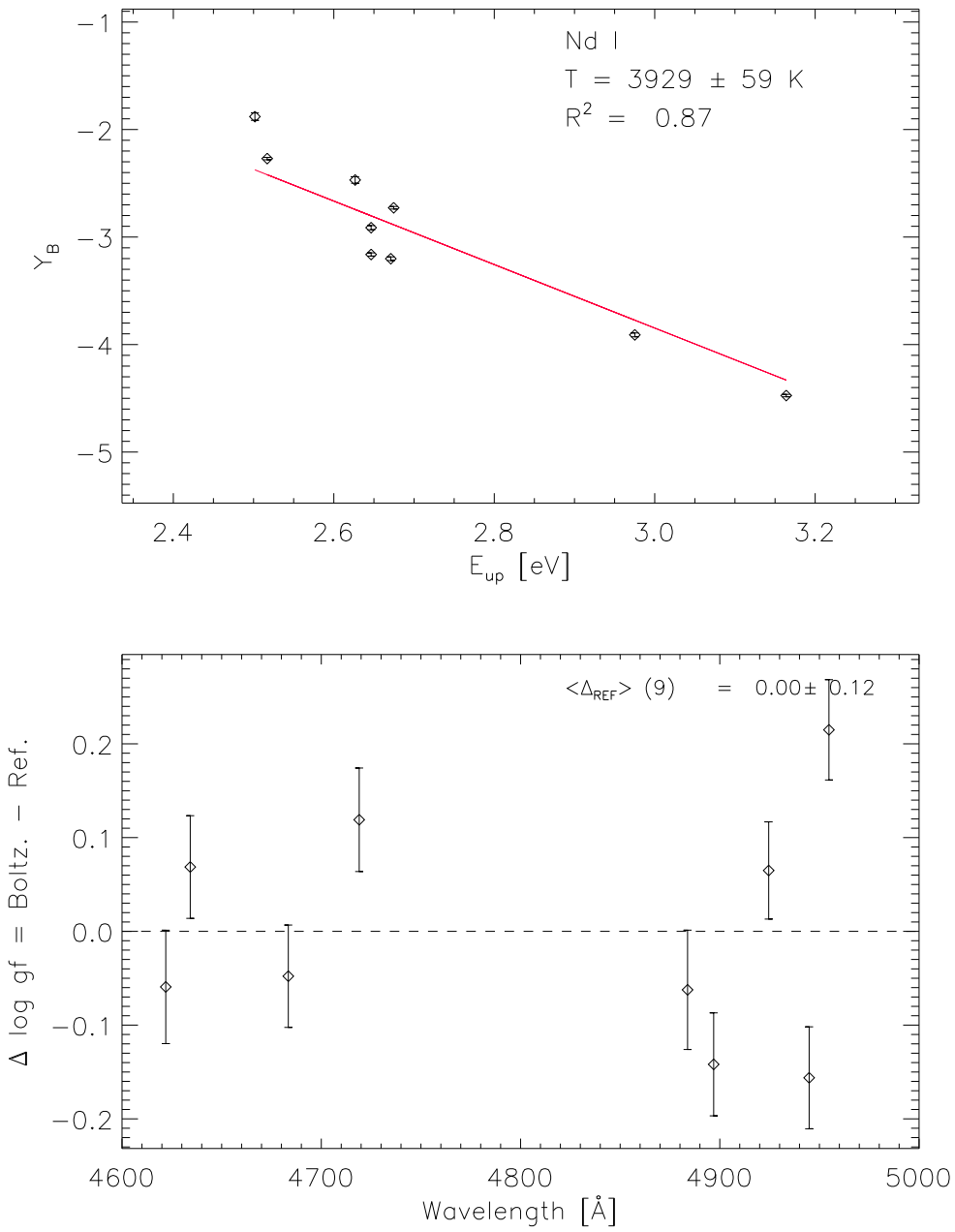


Figure A.4: Same as Figure A.1 but for Nd I.

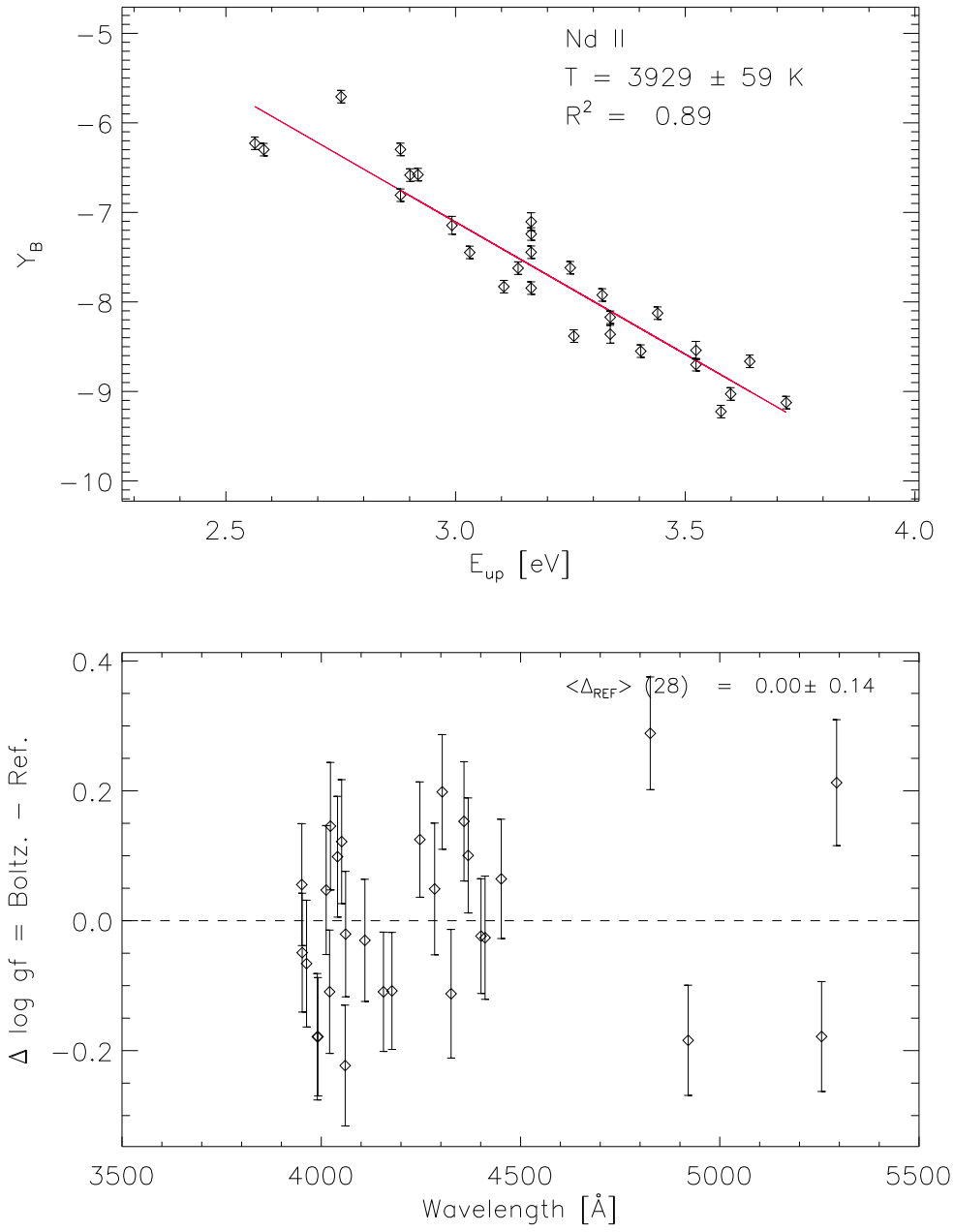


Figure A.5: Same as Figure A.1 but for Nd II.

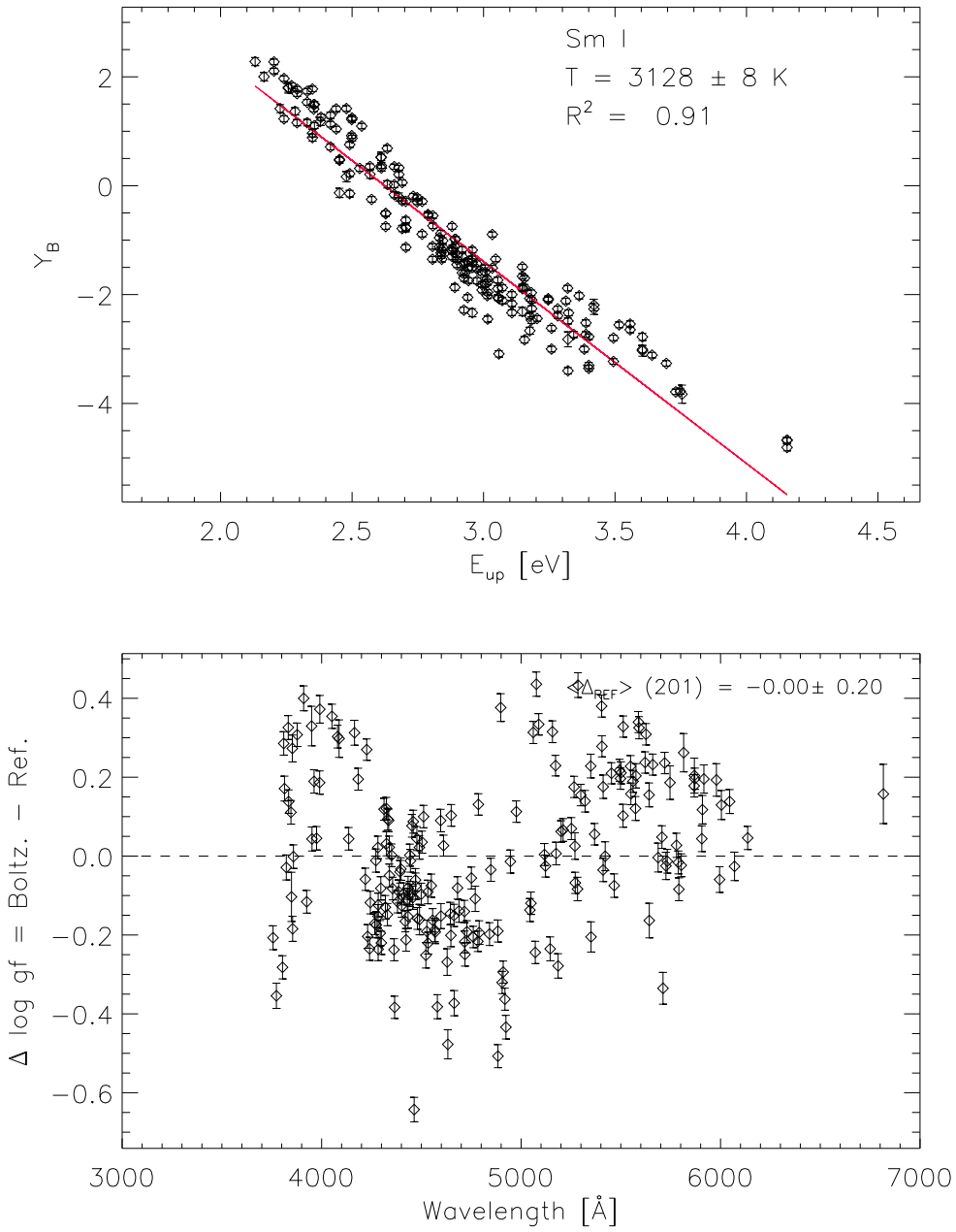


Figure A.6: Same as Figure A.1 but for Sm I.

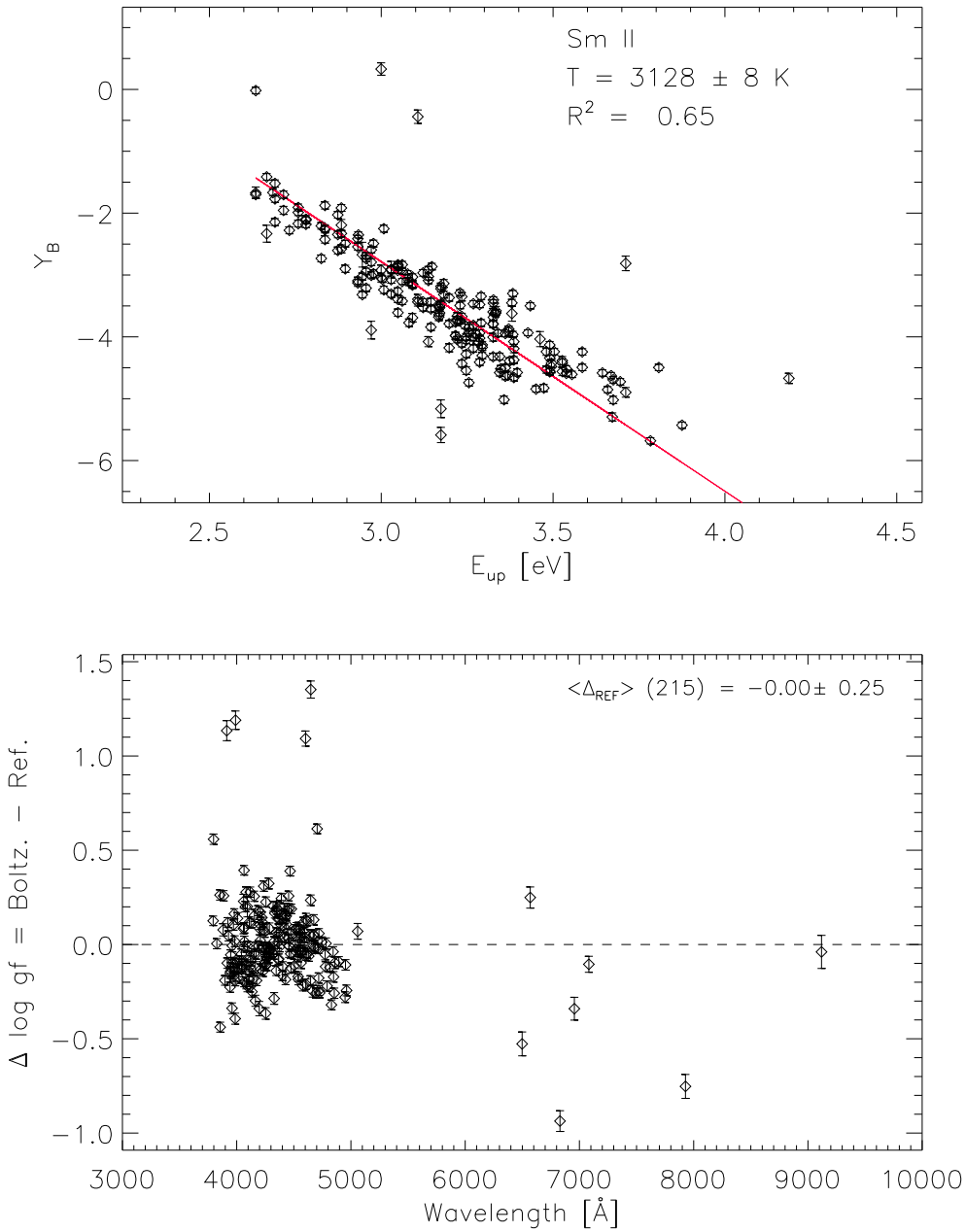


Figure A.7: Same as Figure A.1 but for Sm II.

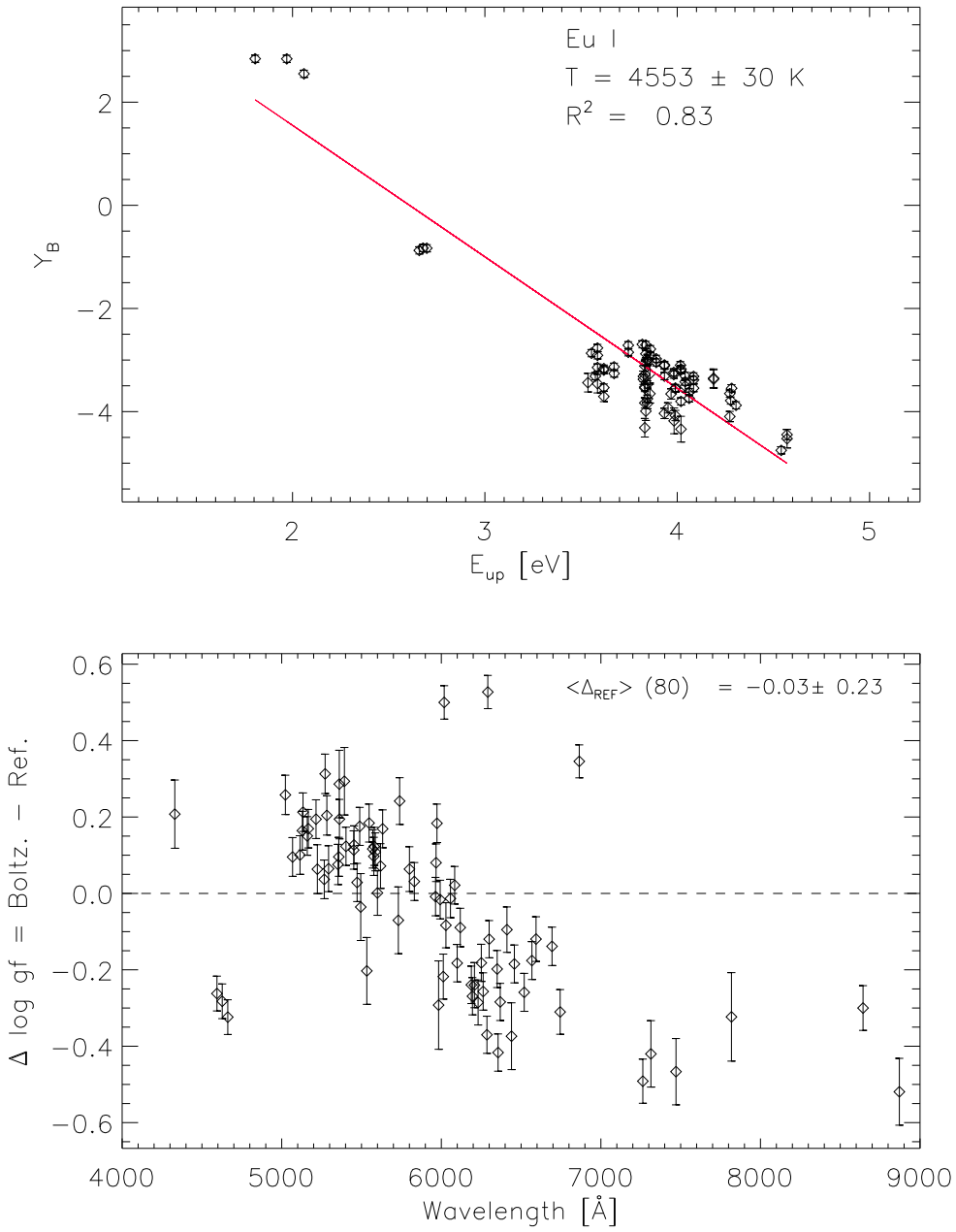


Figure A.8: Same as Figure A.1 but for Eu I.

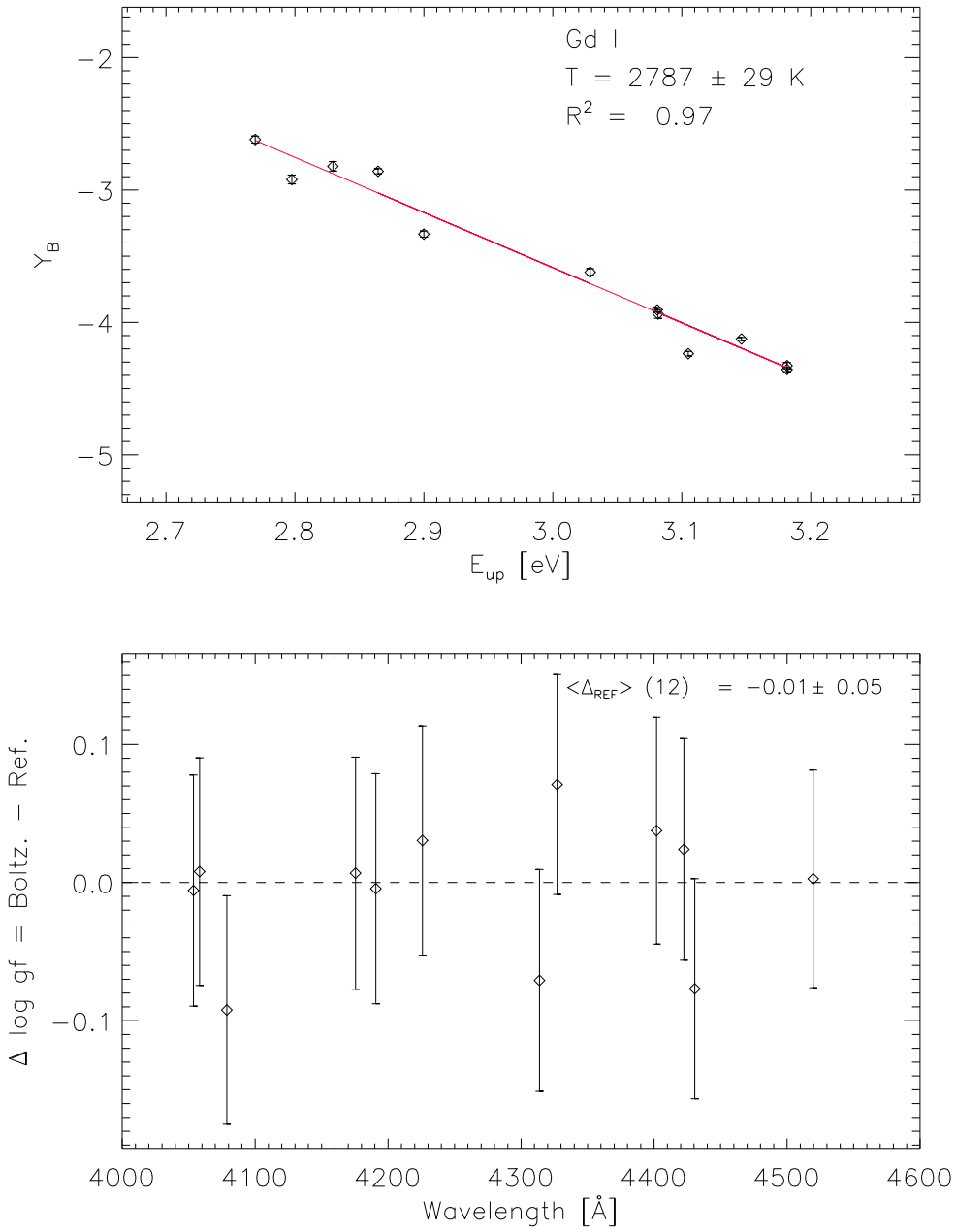


Figure A.9: Same as Figure A.1 but for Gd I.

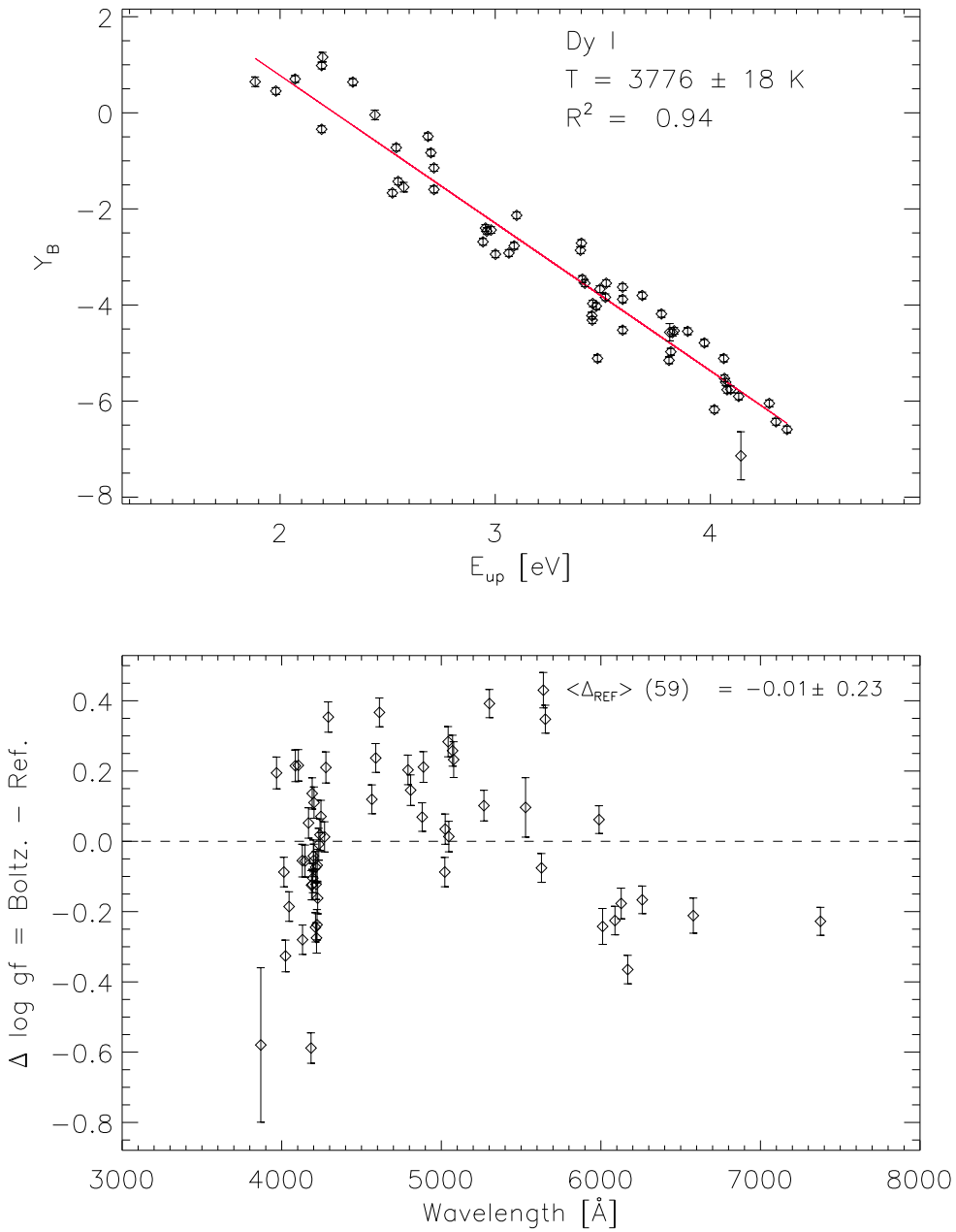


Figure A.10: Same as Figure A.1 but for Dy I.

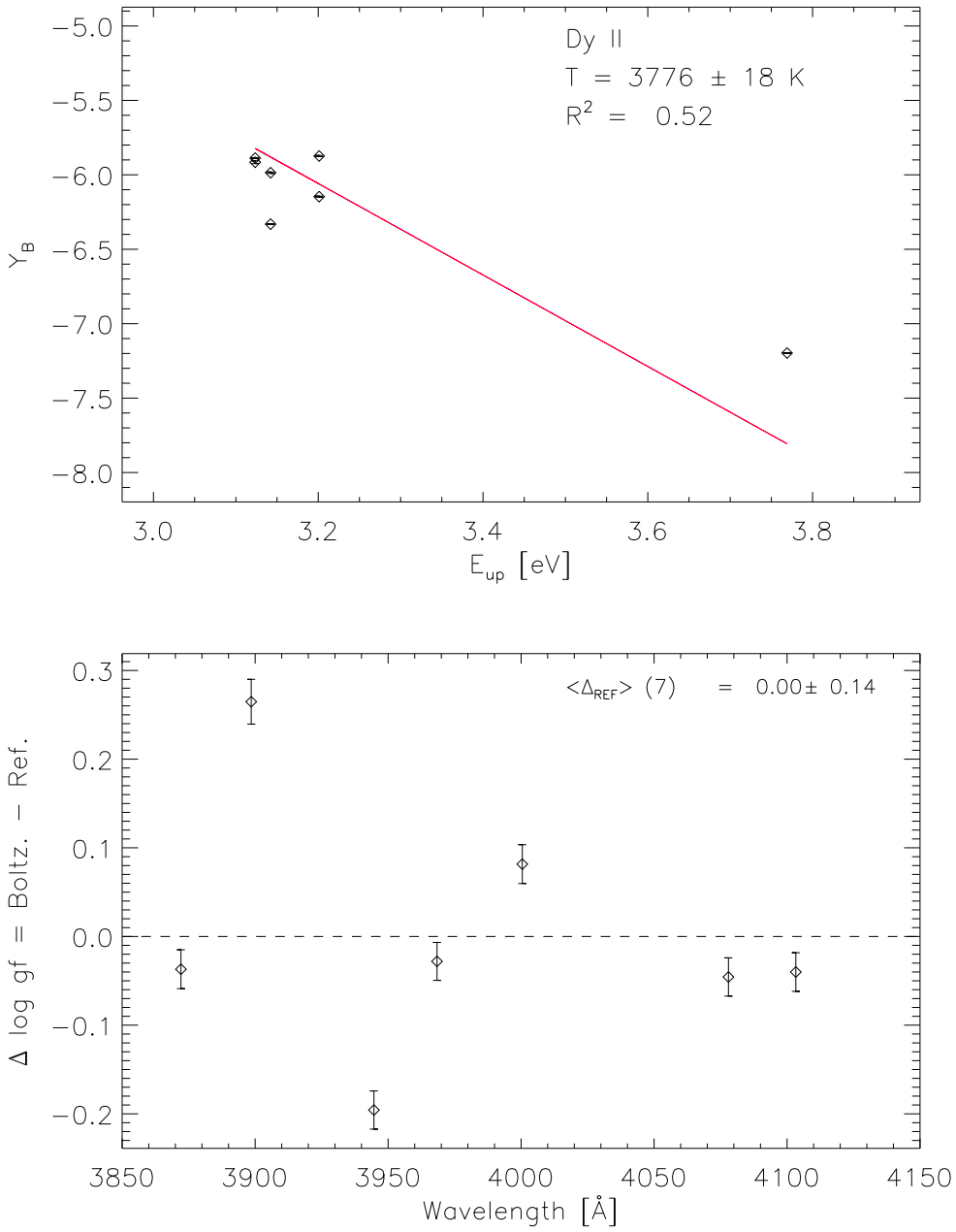


Figure A.11: Same as Figure A.1 but for Dy II.

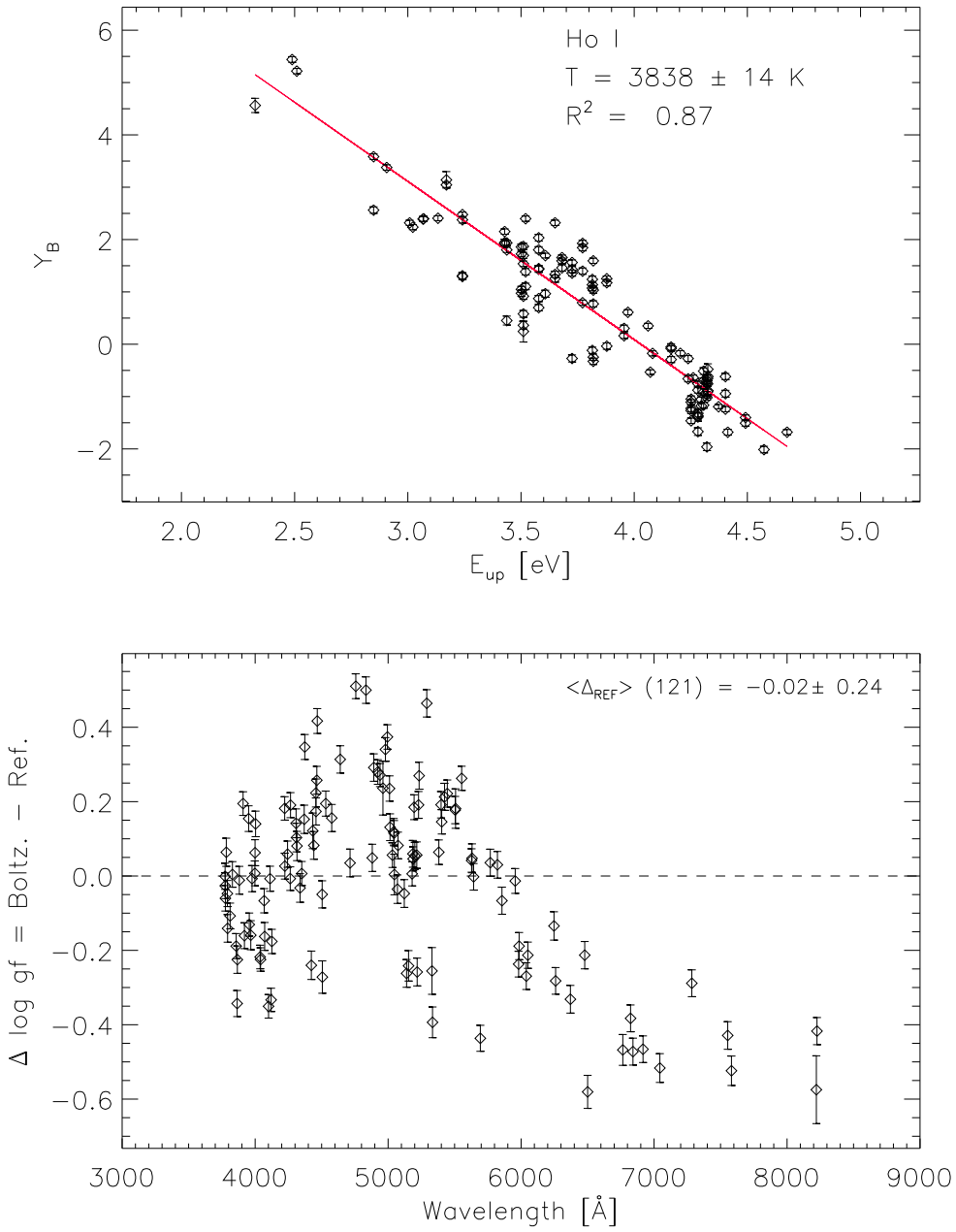


Figure A.12: Same as Figure A.1 but for Ho I.

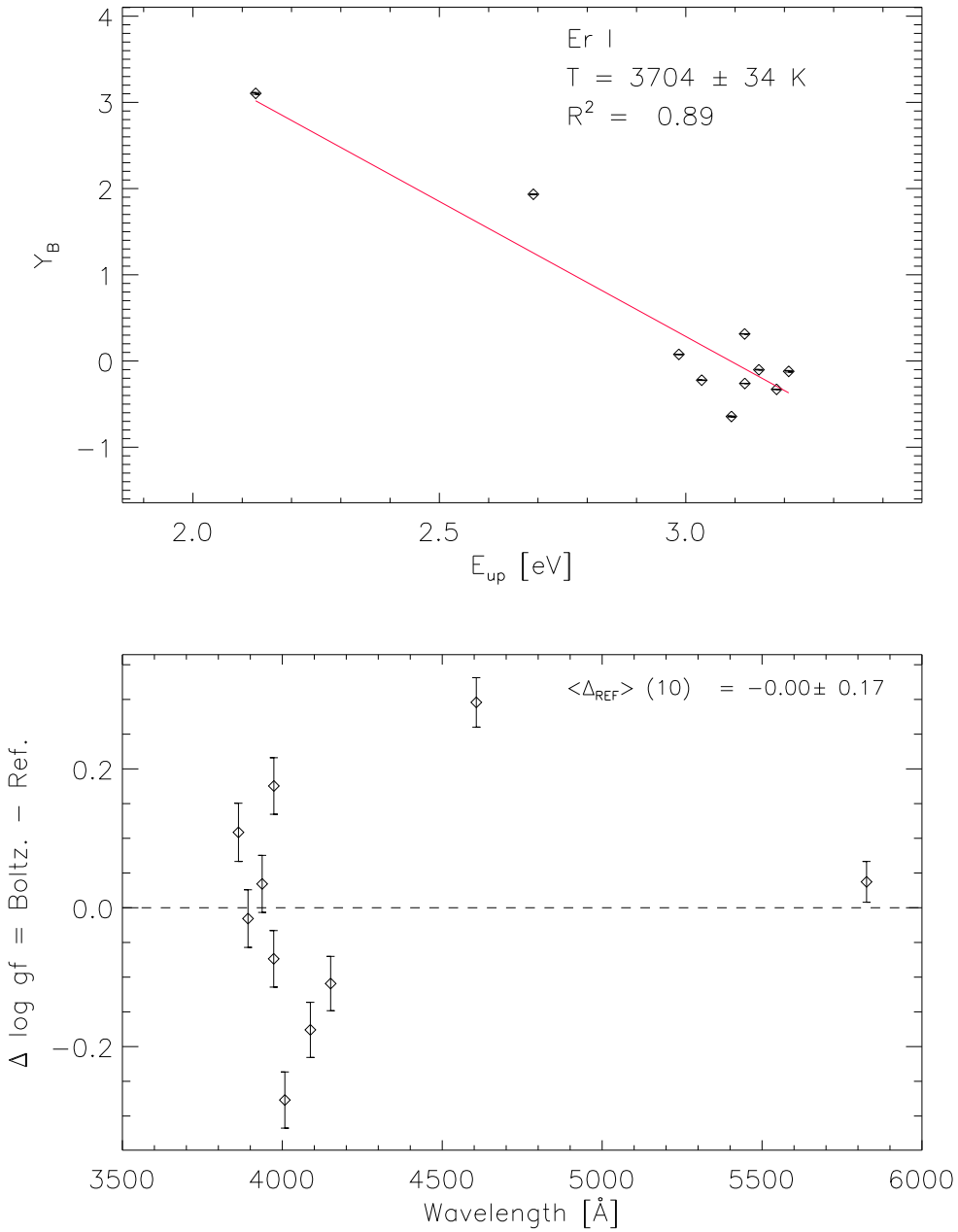


Figure A.13: Same as Figure A.1 but for Er I.

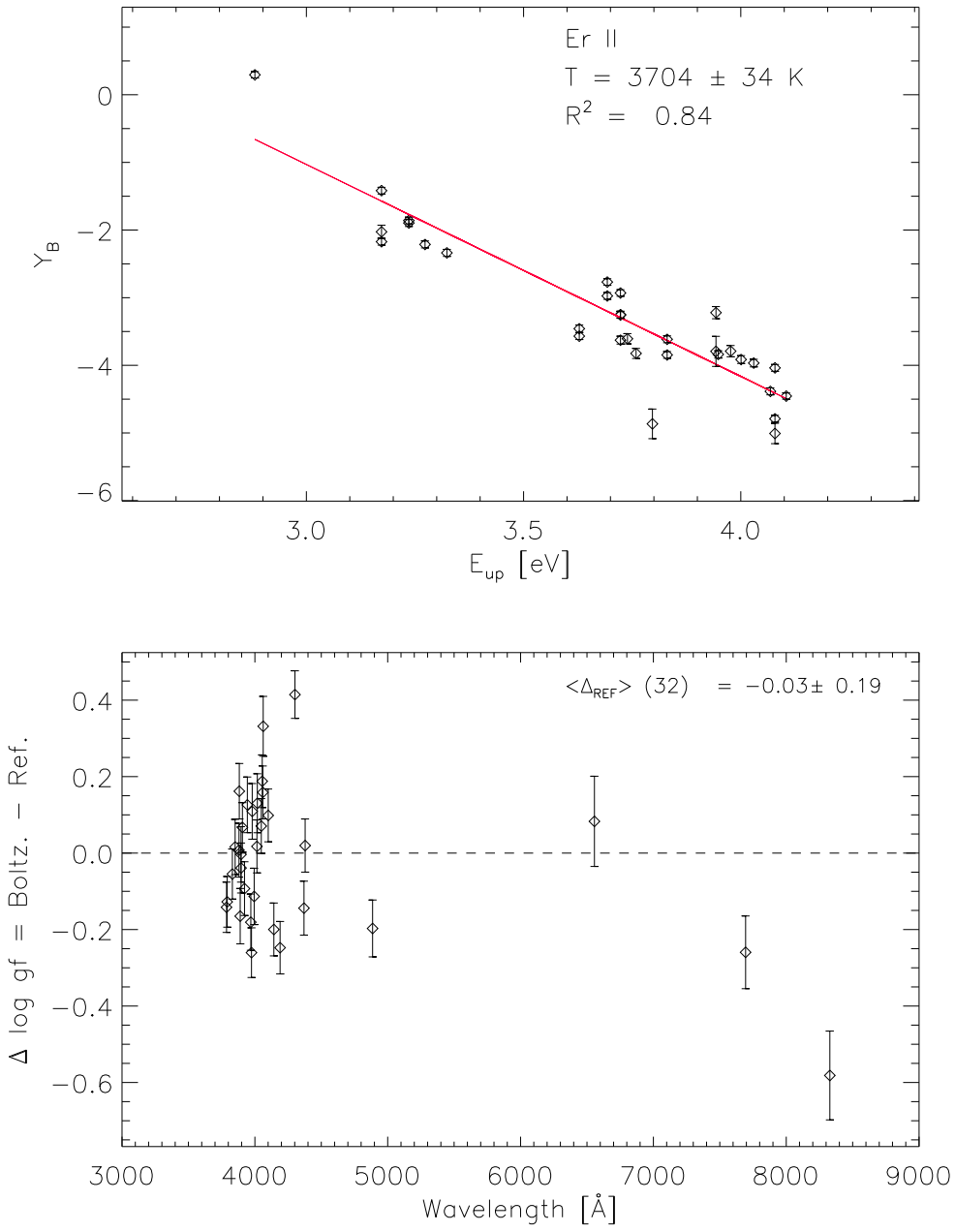


Figure A.14: Same as Figure A.1 but for Er II.

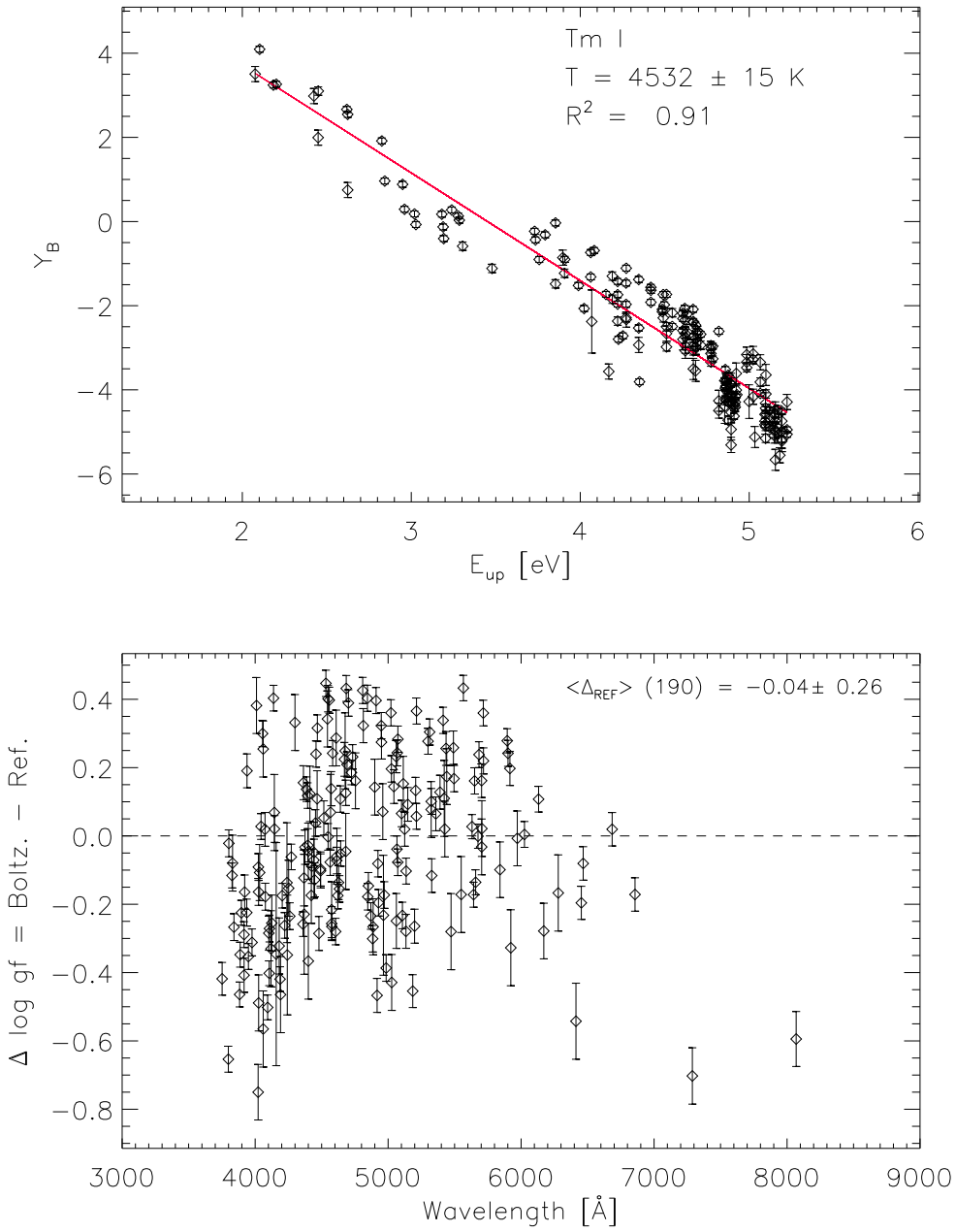


Figure A.15: Same as Figure A.1 but for Tm I.

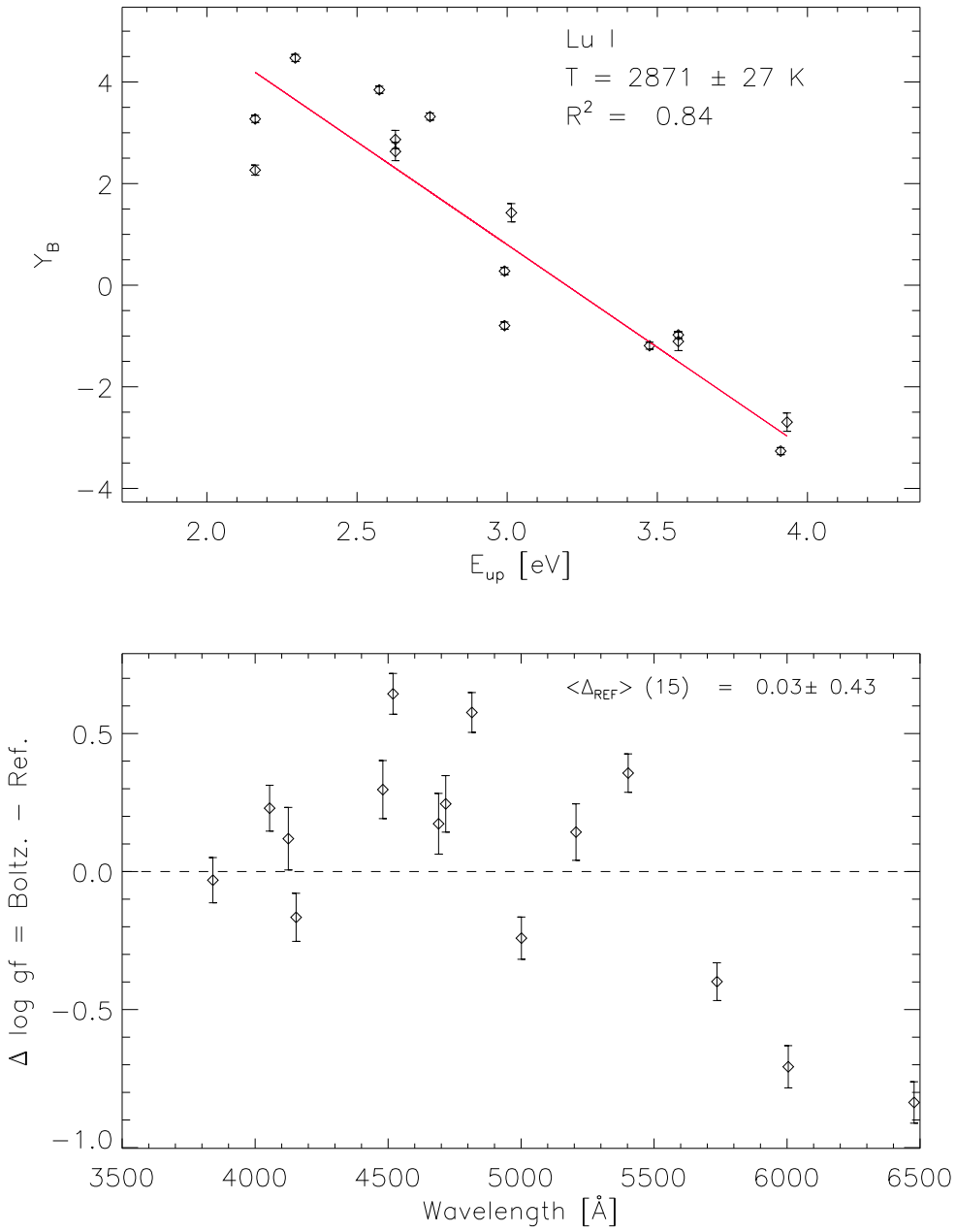


Figure A.16: Same as Figure A.1 but for Lu I.

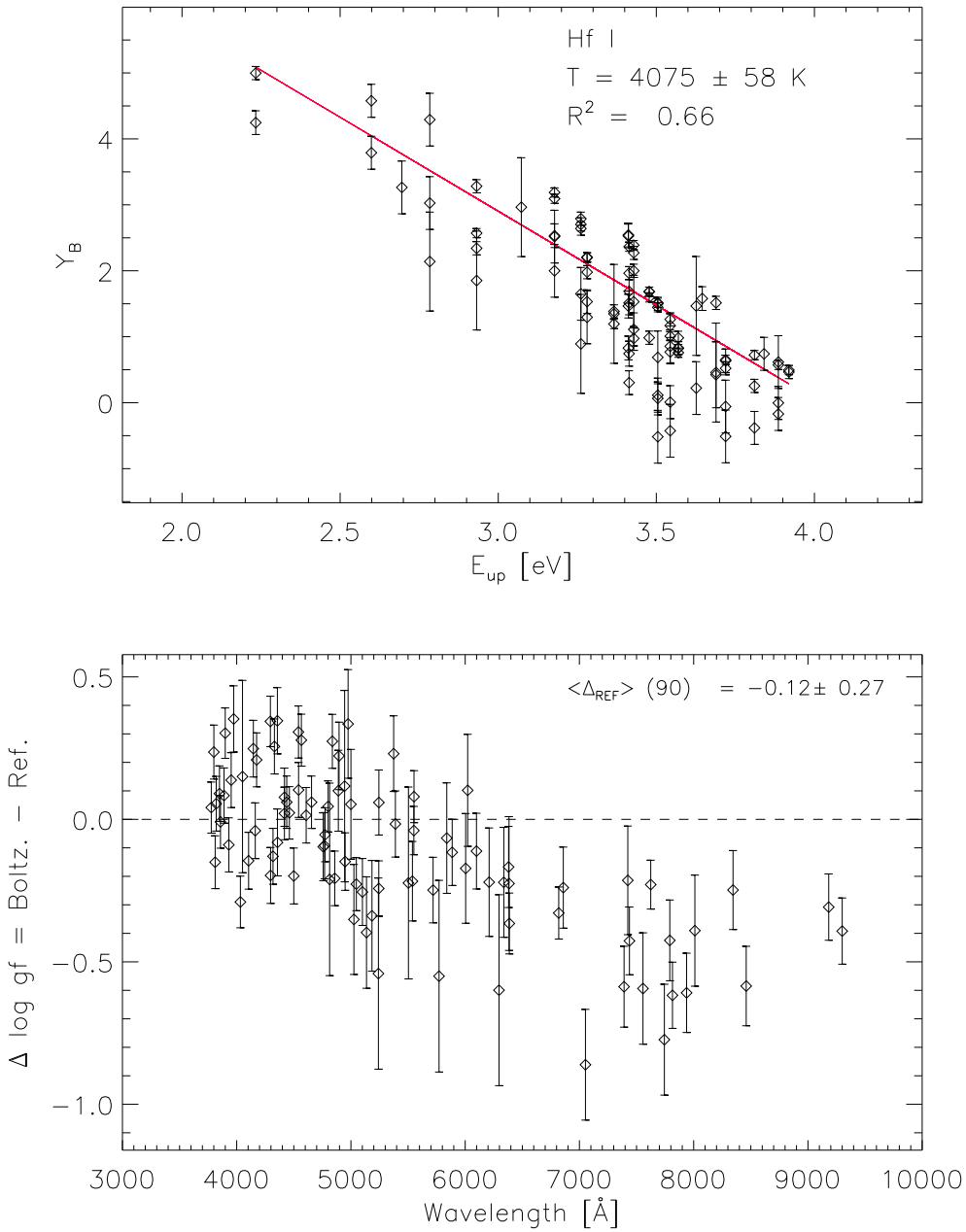


Figure A.17: Same as Figure A.1 but for Hf I.

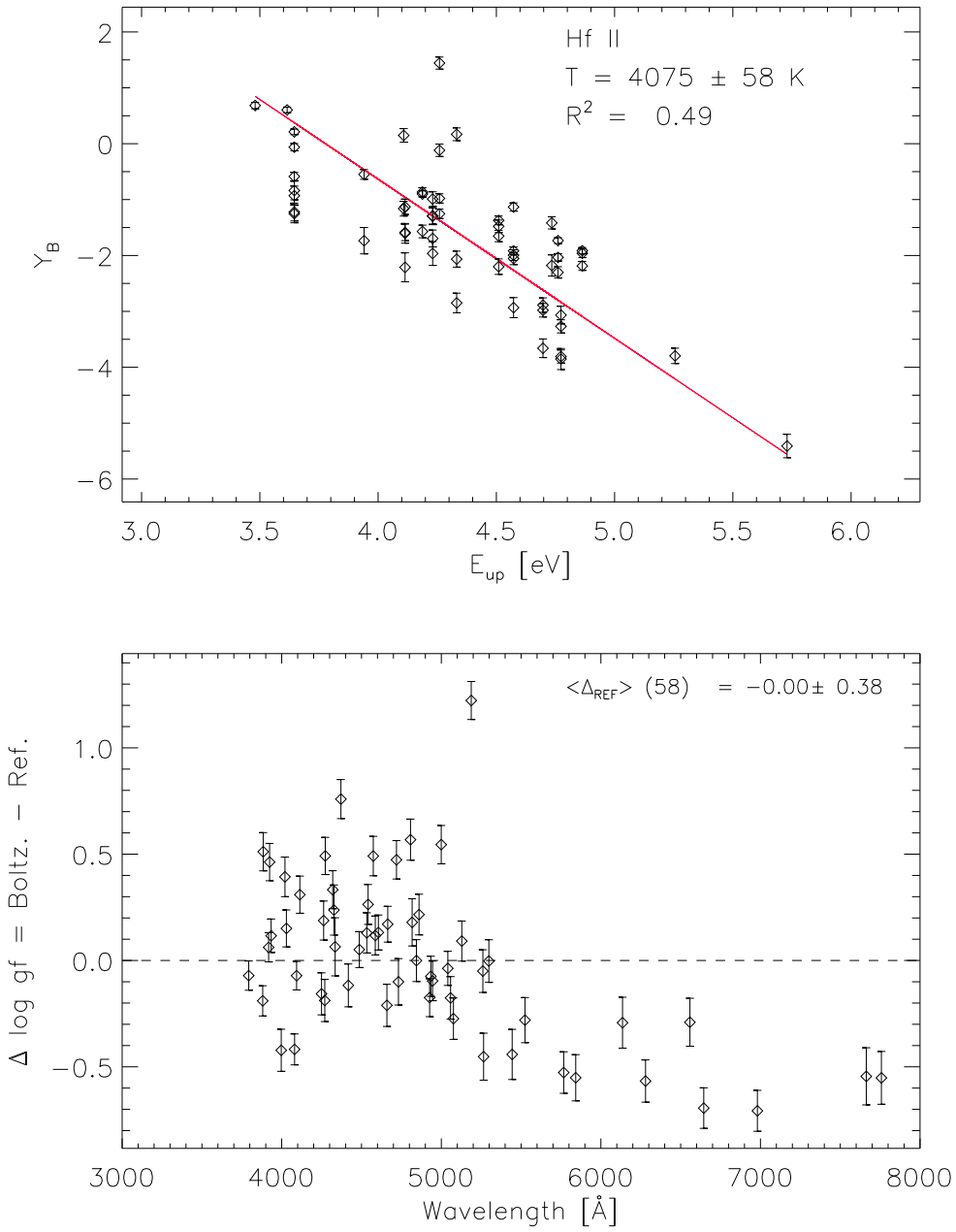


Figure A.18: Same as Figure A.1 but for Hf II.

A.2 CAOS visible lines

Table A.1: Measured wavelengths (λ_o) and intensities of Cs I spectral lines. Energy level classification is reported as follow: λ_{ritz} - Ritz wavelength of the transition; E_{up} - energy of the upper level in eV; J_{up} - J of the upper level; E_{low} - energy of the lower level in eV; J_{low} - J of the lower level. A superscript to observed wavelengths indicates a blend (b), a coincidence with a transition of the corresponding ionised state (c). In the machine readable table, full information about the energy levels is reported.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3876.146	3.1977^o	1.5	0.0000	0.5	3876.152	915.8
3888.611	3.1874^o	0.5	0.0000	0.5	3888.622	68.1
5083.954	3.8239	0.5	1.3859^o	0.5	5083.966	49.2
5143.260	3.8645	2.5	1.4546^o	1.5	5143.262	18.0
5256.567	3.7438	1.5	1.3859^o	0.5	5256.553^c	4.9
5413.621	3.7441	2.5	1.4546^o	1.5	5413.621	29.6
5465.944	3.6535	1.5	1.3859^o	0.5	5465.933	212.7
5502.885	3.7070	2.5	1.4546^o	1.5	5502.879	96.0
5503.856	3.7066	1.5	1.4546^o	1.5	5503.855	10.1
5568.410	3.6118	0.5	1.3859^o	0.5	5568.411	36.2
5573.677	3.6784	0.5	1.4546^o	1.5	5573.681	21.0
5635.213	3.6541	2.5	1.4546^o	1.5	5635.208	457.8
5636.691	3.6535	1.5	1.4546^o	1.5	5636.689	32.0
5664.018	3.5742	1.5	1.3859^o	0.5	5664.013	873.5
5745.723	3.6118	0.5	1.4546^o	1.5	5745.721	62.8
5838.834	3.5087	0.5	1.3859^o	0.5	5838.833	189.3
5845.141	3.5751	2.5	1.4546^o	1.5	5845.137	1439.3
5847.572	3.5742	1.5	1.4546^o	1.5	5847.569	157.4
6010.490	3.4481	1.5	1.3859^o	0.5	6010.489	3344.4
6028.052	3.8538^o	1.5	1.7976	1.5	6028.015	742.7
6034.089	3.5087	0.5	1.4546^o	1.5	6034.086	240.4
6288.579	3.7807^o	2.5	1.8097	2.5	6288.607^b	3.7
6288.588	3.7807^o	3.5	1.8097	2.5	6288.607^b	3.7
6326.200	3.7569^o	2.5	1.7976	1.5	6326.218	16.8
6354.554	3.3364	0.5	1.3859^o	0.5	6354.549	932.7
6365.508	3.7569^o	2.5	1.8097	2.5	6365.534^b	17.1
6365.520	3.7569^o	3.5	1.8097	2.5	6365.534^b	17.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6431.963	3.7247^o	2.5	1.7976	1.5	6431.974	28.5
6472.601	3.7247^o	2.5	1.8097	2.5	6472.625^b	67.0
6472.617	3.7247^o	3.5	1.8097	2.5	6472.625^b	66.7
6548.051	3.7026^o	1.5	1.8097	2.5	6548.071^c	1.5
6586.019	3.6796^o	2.5	1.7976	1.5	6586.026	167.6
6586.510	3.3364	0.5	1.4546^o	1.5	6586.509	1535.8
6628.657	3.6796^o	3.5	1.8097	2.5	6628.662	206.5
6723.290	3.2294	1.5	1.3859^o	0.5	6723.279	18176.0
6743.964	3.6476^o	1.5	1.8097	2.5	6743.975	3.8
6824.649	3.6138^o	2.5	1.7976	1.5	6824.651	550.7
6870.418	3.6138^o	2.5	1.8097	2.5	6870.460^b	1104.0
6870.453	3.6138^o	3.5	1.8097	2.5	6870.460^b	1087.9
7061.779	3.5649^o	1.5	1.8097	2.5	7061.778	21.1
7228.532	3.5123^o	2.5	1.7976	1.5	7228.534	2641.1
7279.899	3.5123^o	2.5	1.8097	2.5	7279.956^b	3887.9
7279.955	3.5123^o	3.5	1.8097	2.5	7279.956^b	3889.8
7583.772	3.4320^o	1.5	1.7976	1.5	7583.776	8.7
7608.903	3.0149	0.5	1.3859^o	0.5	7608.899	6870.9
7609.564	3.4265^o	0.5	1.7976	1.5	7609.562	56.1
7640.331	3.4320^o	1.5	1.8097	2.5	7640.336	138.8
7943.882	3.0149	0.5	1.4546^o	1.5	7943.896	12892.2
8015.726	3.3439^o	2.5	1.7976	1.5	8015.726	13421.9
8930.374	3.1977^o	1.5	1.8097	2.5	8930.385	726.9
9208.533	2.8006	1.5	1.4546^o	1.5	9208.536^c	24582.9

Table A.2: Measured wavelengths (λ_o) and intensities of Cs II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3891.609	22.7062^o	4.0	19.5213	3.0	3891.581	31.5
3959.505	16.5096	0.0	13.3793^o	1.0	3959.512	63.0
4039.856	18.9499^o	3.0	15.8818	2.0	4039.857	38.9
4213.142	18.9499^o	3.0	16.0080	3.0	4213.143	8.0
4264.702	18.9143^o	4.0	16.0080	3.0	4264.708	95.8
4288.375	19.0077^o	2.0	16.1174	1.0	4288.386	34.3
4363.299	19.0543^o	3.0	16.2136	2.0	4363.312	40.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4373.036	16.2136	2.0	13.3793[o]	1.0	4373.031	61.3
4501.552	16.5096	0.0	13.7562[o]	1.0	4501.552	416.1
4526.742	16.1174	1.0	13.3793[o]	1.0	4526.744	126.5
4538.966	18.9443[o]	2.0	16.2136	2.0	4538.978	28.3
4595.892	21.1975	2.0	18.5006[o]	2.0	4595.863	29.7
4763.636	17.7741	1.0	15.1722[o]	0.0	4763.656	24.9
4830.186	15.8818	2.0	13.3158[o]	2.0	4830.193	213.9
4870.039	17.7793	2.0	15.2342[o]	1.0	4870.041	60.3
4952.852	15.8818	2.0	13.3793[o]	1.0	4952.852	475.0
4972.596	18.5006[o]	2.0	16.0080	3.0	4972.599	42.2
5043.803	16.2136	2.0	13.7562[o]	1.0	5043.805	688.3
5249.385	16.1174	1.0	13.7562[o]	1.0	5249.383	114.7
5256.596	18.8676[o]	1.0	16.5096	0.0	5256.553[c]	4.9
5370.988	15.6870	1.0	13.3793[o]	1.0	5370.985	214.0
5419.673	18.5006[o]	2.0	16.2136	2.0	5419.704	12.0
5814.164	16.1174	1.0	13.9856[o]	2.0	5814.155	15.7
5831.140	15.8818	2.0	13.7562[o]	1.0	5831.139	225.2
5925.631	16.0080	3.0	13.9163[o]	4.0	5925.632	299.1
6174.477	22.7556[o]	4.0	20.7482	3.0	6174.484	220.1
6495.533	16.0080	3.0	14.0998[o]	3.0	6495.536	20.4
6548.062	22.5600	3.0	20.6671[o]	2.0	6548.071[c]	1.5
6646.566	17.7741	1.0	15.9093[o]	2.0	6646.577	5.6
6955.500	15.8818	2.0	14.0998[o]	3.0	6955.503	88.1
6979.668	16.1174	1.0	14.3416[o]	2.0	6979.674	26.0
7149.541	17.7793	2.0	16.0457[o]	3.0	7149.566	6.4
7182.585	21.9580	2.0	20.2324[o]	1.0	7182.610	6.1
7460.760	22.4280[o]	1.0	20.7667	1.0	7460.714	2.0
7879.807	22.7043[o]	2.0	21.1314	3.0	7879.763	3.2
7997.438	16.2136	2.0	14.6638[o]	3.0	7997.458	77.0
8047.127	15.8818	2.0	14.3416[o]	2.0	8047.141	13.5
8509.023	22.1646	2.0	20.7079[o]	3.0	8509.073	33.6
9208.548	22.3064	6.0	20.9604[o]	6.0	9208.536[b]	24509.4
9208.558	22.3064	5.0	20.9604[o]	6.0	9208.536[bc]	24509.4

Table A.3: Measured wavelengths (λ_o) and intensities of Ba I spectral lines. Energy level classification is reported as follow: λ_{ritz} - Ritz wavelength of the transition; E_{up} - energy of the upper level in eV; J_{up} - J of the upper level; E_{low} - energy of the lower level in eV; J_{low} - J of the lower level. Last three columns report $\log gf$ values of spectral lines: 1) estimated with cascade method (Casc.); 2) estimated with Boltzmann plot method (Boltz.); 3) NIST value for reference lines. A superscript to observed wavelengths indicates a blend (b), a coincidence with a transition of the corresponding ionised state (c) or the adopted literature $\log gf$ (n). In the machine readable table, full information about the energy levels is reported.

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
3889.326	3.1868^o	1.0	0.0000	0.0	3889.331^n	111.8		-2.3	-2.1
3892.655	4.5969^o	2.0	1.4128	2.0	3892.662	91.2		-1.1	
3909.909	4.2901^o	2.0	1.1200	1.0	3909.903^n	438.1		-0.7	-0.3
3935.717	4.2918^o	3.0	1.1425	2.0	3935.711^n	749.9		-0.5	-0.1
3937.868	4.2901^o	2.0	1.1425	2.0	3937.852^n	166.1		-1.1	-0.9
3993.399	4.2936^o	4.0	1.1898	3.0	3993.397^n	1264.3		-0.2	0.1
3995.655	4.2918^o	3.0	1.1898	3.0	3995.649^n	40.7		-1.7	-0.8
4084.867	4.7098	3.0	1.6756^o	2.0	4084.871	51.5		-1.2	
4132.427	2.9994^o	1.0	0.0000	0.0	4132.427^n	366.1		-1.9	-2.0
4179.349	4.6413	2.0	1.6756^o	2.0	4179.350	9.8		-1.9	
4223.963	4.4551	1.0	1.5208^o	0.0	4223.957	31.0		-1.6	
4239.555	4.5991	1.0	1.6756^o	2.0	4239.548^n	23.3		-1.6	-0.7
4242.605	4.4882	2.0	1.5667^o	1.0	4242.598^n	15.5		-1.9	-1.1
4254.348	5.1525	1.0	2.2391^o	1.0	4254.330	10.3		-1.4	
4264.417	4.4273	1.0	1.5208^o	0.0	4264.413^n	63.1		-1.3	-0.9
4283.097	4.3067^o	3.0	1.4128	2.0	4283.097^n	1293.6		-0.1	0.1
4291.157	4.4551	1.0	1.5667^o	1.0	4291.161	26.8		-1.6	
4323.003	4.4338	2.0	1.5667^o	1.0	4323.000^n	124.4		-1.0	-0.9
4332.915	4.4273	1.0	1.5667^o	1.0	4332.906^n	52.0		-1.4	-0.9
4350.325	4.4158	2.0	1.5667^o	1.0	4350.319^n	958.7		-0.1	-0.1
4402.538	4.3820	2.0	1.5667^o	1.0	4402.534^n	918.4		-0.1	-0.4
4406.832	4.4882	2.0	1.6756^o	2.0	4406.829^n	33.5		-1.5	-0.8
4431.894	4.3174	1.0	1.5208^o	0.0	4431.884^n	876.6		-0.2	0.0
4467.091	4.4502	3.0	1.6756^o	2.0	4467.086^n	62.3		-1.2	-0.9
4488.980	4.4367	3.0	1.6756^o	2.0	4488.977^n	623.7		-0.2	-0.2
4493.638	4.4338	2.0	1.6756^o	2.0	4493.632^n	315.4		-0.5	-0.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4505.924	4.3174	1.0	1.5667^o	1.0	4505.912^n	697.9		-0.3	0.0
4523.167	4.4158	2.0	1.6756^o	2.0	4523.156^n	1349.8		0.1	0.2
4573.853	4.2766	0.0	1.5667^o	1.0	4573.844^n	716.5		-0.3	-0.4
4591.824	3.8418^o	2.0	1.1425	2.0	4591.821^n	21.7		-2.2	-1.6
4599.717	4.2614	0.0	1.5667^o	1.0	4599.706^n	246.4		-0.8	-0.9
4604.983	3.8116^o	0.0	1.1200	1.0	4604.975^n	107.0		-1.5	-1.6
4619.920	4.2036	1.0	1.5208^o	0.0	4619.909^n	56.0		-1.5	-1.6
4628.331	3.8205^o	1.0	1.1425	2.0	4628.316^n	164.5		-1.3	-1.2
4673.619	3.8418^o	2.0	1.1898	3.0	4673.612^n	202.0		-1.2	-1.0
4691.614	4.3174	1.0	1.6756^o	2.0	4691.606^n	992.9		-0.1	0.2
4699.095	4.8768	2.0	2.2391^o	1.0	4699.092	87.4		-0.6	
4700.422	4.2036	1.0	1.5667^o	1.0	4700.421	158.6	-1.1	-1.0	
4724.713	4.1901	2.0	1.5667^o	1.0	4724.714	9.0		-2.2	
4726.434	4.0352^o	1.0	1.4128	2.0	4726.424^n	849.0		-0.4	-0.5
4877.647	4.7802	2.0	2.2391^o	1.0	4877.648	135.8		-0.5	
4902.848	4.2036	1.0	1.6756^o	2.0	4902.840^n	115.4		-1.1	-1.2
4947.312	4.7445	2.0	2.2391^o	1.0	4947.321	56.0		-0.9	
5159.876	4.6413	2.0	2.2391^o	1.0	5159.872	234.7		-0.3	
5168.690	5.1336	1.0	2.7356^o	2.0	5168.668	23.8		-0.8	
5253.803	4.5983	2.0	2.2391^o	1.0	5253.796	26.0		-1.3	
5305.701	4.5752	1.0	2.2391^o	1.0	5305.701	13.0		-1.6	
5365.055	5.0459	3.0	2.7356^o	2.0	5365.080	14.9		-1.1	
5407.778	5.1528	2.0	2.8608^o	2.0	5407.806	10.3		-1.1	
5447.130	5.1529^o	1.0	2.8775	0.0	5447.104	9.1		-1.2	
5519.044	3.8125	2.0	1.5667^o	1.0	5519.033^n	4590.9		0.3	0.1
5535.481	2.2391^o	1.0	0.0000	0.0	5535.463^n	94151.9		0.2	0.2
5535.869	3.8057	1.0	1.5667^o	1.0	5535.868	1613.8		-0.1	
5588.741	5.0953^o	1.0	2.8775	0.0	5588.750	35.3		-0.6	
5593.308	4.4551	1.0	2.2391^o	1.0	5593.291	15.5		-1.5	
5680.176	3.7488	2.0	1.5667^o	1.0	5680.175	138.4		-1.2	
5777.619	3.8209	3.0	1.6756^o	2.0	5777.604^n	5781.0		0.5	0.4
5784.043	4.3820	2.0	2.2391^o	1.0	5784.033	13.2	-1.9	-1.6	
5800.226	3.8125	2.0	1.6756^o	2.0	5800.212^n	743.2		-0.4	-0.2
5805.681	3.3247^o	3.0	1.1898	3.0	5805.679^b	990.1	-0.7	-0.7	
5805.715	5.0124^o	1.0	2.8775	0.0	5805.679^b	996.6		0.8	
5818.813	3.8057	1.0	1.6756^o	2.0	5818.812	37.1		-1.7	
5826.274	3.5402^o	1.0	1.4128	2.0	5826.261^n	3080.0		-0.0	-0.2
5870.495	5.1528	2.0	3.0414^o	2.0	5870.451	40.6		-0.4	
5907.637	3.2181^o	2.0	1.1200	1.0	5907.635	165.1	-1.5	-1.6	
5971.698	3.2181^o	2.0	1.1425	2.0	5971.684^n	2420.0		-0.4	-0.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5978.461	3.7488	2.0	1.6756^o	2.0	5978.459	20.8		-2.0	
5997.087	3.1868^o	1.0	1.1200	1.0	5997.074^n	2108.9		-0.5	-0.3
6019.469	3.1791^o	0.0	1.1200	1.0	6019.456^n	2228.1		-0.4	-0.4
6063.114	3.1868^o	1.0	1.1425	2.0	6063.104^n	4103.8		-0.2	-0.0
6083.394	4.2766	0.0	2.2391^o	1.0	6083.403^n	28.4		-1.3	-1.2
6110.783	3.2181^o	2.0	1.1898	3.0	6110.762^n	5779.1		0.0	0.4
6129.233	4.2614	0.0	2.2391^o	1.0	6129.214^n	8.7		-1.8	-1.5
6341.680	3.0970^o	3.0	1.1425	2.0	6341.666^n	2791.3		-0.3	-0.3
6448.475	5.1655^o	1.0	3.2434	1.0	6448.493	7.8		-1.0	
6450.851	3.0414^o	2.0	1.1200	1.0	6450.835^n	1700.3		-0.6	-0.5
6457.396	4.7802	2.0	2.8608^o	2.0	6457.391	3.5		-1.7	
6482.908	3.3247^o	3.0	1.4128	2.0	6482.898^n	6335.2		0.2	0.3
6498.760	3.0970^o	3.0	1.1898	3.0	6498.753^n	12295.0		0.3	0.4
6527.311	3.0414^o	2.0	1.1425	2.0	6527.299^n	5290.2		-0.1	0.0
6564.360	4.7332	4.0	2.8450^o	3.0	6564.359	4.8		-1.6	
6595.326	2.9994^o	1.0	1.1200	1.0	6595.315^n	4211.9		-0.2	-0.1
6654.114	4.5983	2.0	2.7356^o	2.0	6654.108	30.6		-0.9	
6693.842	3.0414^o	2.0	1.1898	3.0	6693.828^n	2457.6		-0.4	-0.3
6699.277	5.1749	3.0	3.3247^o	3.0	6699.324	5.2		-1.1	
6761.881	4.6781	4.0	2.8450^o	3.0	6761.901	2.7		-1.8	
6771.859	4.6911	2.0	2.8608^o	2.0	6771.859	16.1		-1.1	
6865.686	3.2181^o	2.0	1.4128	2.0	6865.685	198.1	-1.3	-1.3	
6867.905	4.6498	3.0	2.8450^o	3.0	6867.904	45.8		-0.6	
6893.429	5.0414^o	1.0	3.2434	1.0	6893.442^c	8.3		-1.0	
6961.485	4.6413	2.0	2.8608^o	2.0	6961.480	5.7		-1.5	
7059.943	2.9454^o	4.0	1.1898	3.0	7059.943^n	23022.1		0.6	0.5
7069.501	4.5983	2.0	2.8450^o	3.0	7069.498	4.1		-1.7	
7089.908	4.4838	3.0	2.7356^o	2.0	7089.908	35.4		-0.8	
7120.331	2.8608^o	2.0	1.1200	1.0	7120.316^n	3821.3		-0.3	-0.4
7153.623	4.6781	4.0	2.9454^o	4.0	7153.620	48.5		-0.5	
7195.229	3.2434	1.0	1.5208^o	0.0	7195.217^n	305.2		-1.0	-0.9
7208.255	4.4551	1.0	2.7356^o	2.0	7208.248	9.5		-1.4	
7213.599	2.8608^o	2.0	1.1425	2.0	7213.598	6.7	-3.1	-3.0	
7228.796	4.4502	3.0	2.7356^o	2.0	7228.791	199.9	0.3	-0.1	
7229.563	4.5752	1.0	2.8608^o	2.0	7229.551	3.6		-1.7	
7326.864	4.4273	1.0	2.7356^o	2.0	7326.870	5.6	-1.2	-1.6	
7339.438	4.6543^o	3.0	2.9655	2.0	7339.430	1.6		-2.0	
7375.501	4.5413	3.0	2.8608^o	2.0	7375.500	22.6		-0.9	
7392.406	3.2434	1.0	1.5667^o	1.0	7392.396^n	1063.2		-0.4	-0.4
7410.008	4.7141	1.0	3.0414^o	2.0	7410.002	6.7		-1.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7417.536	2.8608[o]	2.0	1.1898	3.0	7417.533	228.4	-1.5	-1.4	
7459.664	4.5066	4.0	2.8450[o]	3.0	7459.658	278.0		0.1	
7488.075	2.8450[o]	3.0	1.1898	3.0	7488.053[n]	2471.9		-0.4	-0.4
7513.455	4.6911	2.0	3.0414[o]	2.0	7513.467	2.0		-1.8	
7523.639	4.7445	2.0	3.0970[o]	3.0	7523.633	7.4		-1.2	
7528.179	4.3820	2.0	2.7356[o]	2.0	7528.176	6.6	-1.9	-1.6	
7575.302	4.7332	4.0	3.0970[o]	3.0	7575.298	1.8		-1.8	
7610.468	4.9460[o]	1.0	3.3174	0.0	7610.475[b]	92.9		0.1	
7610.478	3.0414[o]	2.0	1.4128	2.0	7610.475[b]	93.2	-1.5	-1.6	
7616.356	4.4882	2.0	2.8608[o]	2.0	7616.348	1.7	-1.4	-2.1	
7642.793	4.5672	5.0	2.9454[o]	4.0	7642.796	353.9		0.3	
7672.085	2.7356[o]	2.0	1.1200	1.0	7672.069[n]	6671.9		-0.0	-0.2
7706.568	4.6498	3.0	3.0414[o]	2.0	7706.560	37.2		-0.6	
7751.752	4.5983	2.0	2.9994[o]	1.0	7751.751	20.6		-0.9	
7766.661	4.5413	3.0	2.9454[o]	4.0	7766.662	6.1		-1.4	
7780.479	2.7356[o]	2.0	1.1425	2.0	7780.465[n]	3204.3		-0.3	-0.5
7798.161	4.4502	3.0	2.8608[o]	2.0	7798.156	6.4	-1.1	-1.5	
7801.352	4.4338	2.0	2.8450[o]	3.0	7801.348	3.3	-1.8	-1.8	
7839.570	4.6781	4.0	3.0970[o]	3.0	7839.573	49.9		-0.4	
7865.108	4.4367	3.0	2.8608[o]	2.0	7865.118	6.2	-1.5	-1.5	
7877.798	3.8125	2.0	2.2391[o]	1.0	7877.783[n]	9.9		-1.9	-1.1
7905.747	3.2434	1.0	1.6756[o]	2.0	7905.750	1100.6	-0.2	-0.3	
7911.330	1.5667[o]	1.0	0.0000	0.0	7911.331	3237.1		-1.4	
7934.509	4.7802	2.0	3.2181[o]	2.0	7934.508	1.8		-1.7	
7939.296	4.5066	4.0	2.9454[o]	4.0	7939.289	5.4		-1.5	
7957.373	4.7445	2.0	3.1868[o]	1.0	7957.368	3.1		-1.5	
7961.317	4.5983	2.0	3.0414[o]	2.0	7961.313	5.2		-1.4	
7970.660	4.4158	2.0	2.8608[o]	2.0	7970.673	3.5	-1.7	-1.8	
7982.440	4.6498	3.0	3.0970[o]	3.0	7982.407	5.2		-1.4	
8018.255	2.7356[o]	2.0	1.1898	3.0	8018.254	4.3	-3.3	-3.2	
8056.930	4.4838	3.0	2.9454[o]	4.0	8056.958	1.8		-2.0	
8115.344	4.7141	1.0	3.1868[o]	1.0	8115.332	3.8		-1.4	
8147.669	4.7081	2.0	3.1868[o]	1.0	8147.695[b]	11.8		-0.9	
8147.702	4.3820	2.0	2.8608[o]	2.0	8147.695[b]	11.6	-1.5	-1.2	
8158.000	4.5187	1.0	2.9994[o]	1.0	8157.993	3.3		-1.7	
8210.240	3.7488	2.0	2.2391[o]	1.0	8210.231	992.0		0.1	
8285.102	4.7141	1.0	3.2181[o]	2.0	8285.127	4.7		-1.3	
8325.230	4.4882	2.0	2.9994[o]	1.0	8325.244	12.4	-0.4	-1.1	
8514.262	4.4551	1.0	2.9994[o]	1.0	8514.255	13.6		-1.0	
8515.576	4.7802	2.0	3.3247[o]	3.0	8515.562[c]	3.5		-1.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8799.836	4.7332	4.0	3.3247^o	3.0	8799.857	42.5		-0.3	
8861.014	2.9655	2.0	1.5667^o	1.0	8861.006	232.3		-1.1	
8937.709	4.4838	3.0	3.0970^o	3.0	8937.689	5.3		-1.4	
9159.559	4.4502	3.0	3.0970^o	3.0	9159.570	4.6	-1.1	-1.4	
9215.260	4.1901	2.0	2.8450^o	3.0	9215.277	7.4		-1.4	
9307.979	4.0672	1.0	2.7356^o	2.0	9307.956	26.5		-1.0	
9324.387	4.1901	2.0	2.8608^o	2.0	9324.423	48.3		-0.6	
9370.120	2.7356^o	2.0	1.4128	2.0	9370.127^n	1352.1		-0.5	-0.3

Table A.4: Measured wavelengths (λ_o) and intensities of Ba II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3891.779	5.6969	1.5	2.5120^o	0.5	3891.776^n	494.5		0.6	0.3
4130.649	5.7223	2.5	2.7217^o	1.5	4130.648^n	850.7		0.9	0.5
4166.001	5.6969	1.5	2.7217^o	1.5	4166.000^n	75.9		-0.2	-0.4
4524.926	5.2512	0.5	2.5120^o	0.5	4524.918^n	240.1		0.0	-0.4
4554.033	2.7217^o	1.5	0.0000	0.5	4554.024^n	31041.9		-0.1	0.1
4899.927	5.2512	0.5	2.7217^o	1.5	4899.918^n	462.1		0.4	-0.1
4934.077	2.5120^o	0.5	0.0000	0.5	4934.067^n	13100.8		-0.6	-0.2
5521.735	9.8871	1.5	7.6424^o	1.5	5521.766	21.5			
6141.713	2.7217^o	1.5	0.7036	2.5	6141.721^n	1727.8		-1.0	-0.0
6496.898	2.5120^o	0.5	0.6043	1.5	6496.891^n	1069.0		-1.3	-0.4
6893.451	9.8068	2.5	8.0087^o	2.5	6893.442^c	8.4			
8515.526	9.8467	2.5	8.3912^o	1.5	8515.562^c	3.5			
8710.768	7.1452^o	3.5	5.7223	2.5	8710.783^n	19.8		1.5	0.9

Table A.5: Measured wavelengths (λ_o) and intensities of Pr I spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3924.485	3.9410^o	5.5	0.7827	5.5	3924.509^b	37.1
3924.498	3.1583	4.5	0.0000^o	4.5	3924.509^b	37.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3925.475	3.3281	5.5	0.1707^o	5.5	3925.457^c	109.5
3946.191	3.1409	5.5	0.0000^o	4.5	3946.207	60.1
4001.968	3.2678	5.5	0.1707^o	5.5	4001.964	13.9
4065.407	3.0488	5.5	0.0000^o	4.5	4065.417	23.8
4169.653	2.9726	4.5	0.0000^o	4.5	4169.668	93.2
4214.448	3.1117	5.5	0.1707^o	5.5	4214.460	39.0
4313.141	3.0444	6.5	0.1707^o	5.5	4313.154	16.4
4314.675	3.4222^o	5.5	0.5495	4.5	4314.665	37.1
4320.364	3.4184^o	5.5	0.5495	4.5	4320.356^c	43.1
4323.067	3.4704^o	6.5	0.6034	5.5	4323.066	47.8
4343.390	3.4032^o	5.5	0.5495	4.5	4343.375	50.1
4360.941	2.8422	4.5	0.0000^o	4.5	4360.949	23.8
4361.521	2.8418	4.5	0.0000^o	4.5	4361.523^c	21.7
4392.445	2.9925	5.5	0.1707^o	5.5	4392.462	17.1
4395.796	2.8197	5.5	0.0000^o	4.5	4395.781^c	63.0
4408.137	3.5337^o	4.5	0.7219	4.5	4408.147	62.9
4430.125	2.7978	3.5	0.0000^o	4.5	4430.125	311.7
4441.342	2.7907	4.5	0.0000^o	4.5	4441.334	16.7
4447.857	3.3362^o	4.5	0.5495	4.5	4447.858	65.5
4454.680	2.9531	4.5	0.1707^o	5.5	4454.684	63.5
4463.711	3.3263^o	4.5	0.5495	4.5	4463.709	87.4
4488.586	2.7614	3.5	0.0000^o	4.5	4488.593	549.1
4492.905	3.1117	5.5	0.3529^o	6.5	4492.917	229.8
4528.903	3.2800	6.5	0.5432^o	7.5	4528.912	83.1
4531.831	3.0880	5.5	0.3529^o	6.5	4531.856	30.8
4532.330	2.7347	3.5	0.0000^o	4.5	4532.337	582.9
4541.268	2.7293	3.5	0.0000^o	4.5	4541.268	1192.9
4552.829	3.3258^o	5.5	0.6034	5.5	4552.830	95.6
4565.001	3.3185^o	5.5	0.6034	5.5	4565.022	49.7
4566.847	3.3174^o	5.5	0.6034	5.5	4566.846	46.8
4569.373	3.2621^o	5.5	0.5495	4.5	4569.372	25.7
4569.615	3.2556	6.5	0.5432^o	7.5	4569.624	201.3
4570.342	3.0649	5.5	0.3529^o	6.5	4570.354	352.0
4572.127	2.8816	4.5	0.1707^o	5.5	4572.134	1037.5
4587.978	2.7015	3.5	0.0000^o	4.5	4587.976	59.8
4597.663	3.0488	5.5	0.3529^o	6.5	4597.670	27.7
4598.949	3.0480	5.5	0.3529^o	6.5	4598.950	352.2
4602.556	2.6930	3.5	0.0000^o	4.5	4602.559	213.7
4605.205	2.8621	6.5	0.1707^o	5.5	4605.229^b	71.7
4605.245	3.0444	6.5	0.3529^o	6.5	4605.228^b	43.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4617.721	2.6841	3.5	0.0000[o]	4.5	4617.721	740.8
4622.690	3.4032[o]	5.5	0.7219	4.5	4622.719[b]	64.0
4622.722	3.0342	7.5	0.3529[o]	6.5	4622.719[b]	66.6
4632.271	3.2791[o]	6.5	0.6034	5.5	4632.276[b]	1614.8
4632.275	3.2189	6.5	0.5432[o]	7.5	4632.276[b]	1614.8
4635.667	2.6738	3.5	0.0000[o]	4.5	4635.687	4528.9
4639.548	2.8422	4.5	0.1707[o]	5.5	4639.553	4862.5
4640.205	2.8418	4.5	0.1707[o]	5.5	4640.202	1752.0
4646.990	2.6672	3.5	0.0000[o]	4.5	4646.995	1461.2
4652.650	3.3859[o]	5.5	0.7219	4.5	4652.673[b]	74.4
4652.672	3.0169	5.5	0.3529[o]	6.5	4652.673[b]	75.6
4655.966	2.6621	5.5	0.0000[o]	4.5	4655.964	56.2
4658.361	3.0137	5.5	0.3529[o]	6.5	4658.359[c]	100.6
4658.728	3.2037	6.5	0.5432[o]	7.5	4658.734	605.8
4659.722	3.4924[o]	5.5	0.8324	5.5	4659.750	63.7
4670.544	3.0067	5.5	0.3529[o]	6.5	4670.548	441.2
4674.801	2.8220	4.5	0.1707[o]	5.5	4674.797	2523.7
4682.688	2.8176	6.5	0.1707[o]	5.5	4682.690	55.6
4689.559	2.8137	4.5	0.1707[o]	5.5	4689.556	809.2
4690.573	3.1920[o]	3.5	0.5495	4.5	4690.569	144.3
4697.128	3.1819	8.5	0.5432[o]	7.5	4697.148	111.1
4698.867	3.4924[o]	5.5	0.8546	5.5	4698.865	36.8
4699.577	3.1869[o]	4.5	0.5495	4.5	4699.573	188.7
4709.515	3.1750	6.5	0.5432[o]	7.5	4709.515	1960.9
4711.841	3.2339[o]	4.5	0.6034	5.5	4711.834	272.2
4714.145	3.1724	6.5	0.5432[o]	7.5	4714.150	1372.3
4729.127	3.2243[o]	4.5	0.6034	5.5	4729.123	95.9
4733.370	2.6186	5.5	0.0000[o]	4.5	4733.371	113.7
4733.737	3.1679[o]	5.5	0.5495	4.5	4733.744	374.7
4734.017	3.1614	6.5	0.5432[o]	7.5	4734.023	184.8
4740.961	2.7850	5.5	0.1707[o]	5.5	4740.965	108.0
4744.163	2.6126	3.5	0.0000[o]	4.5	4744.155	4061.0
4750.507	2.9621	6.5	0.3529[o]	6.5	4750.524	116.7
4751.624	2.7792	6.5	0.1707[o]	5.5	4751.628	63.4
4753.893	3.1568[o]	5.5	0.5495	4.5	4753.887	202.7
4764.442	2.6015	5.5	0.0000[o]	4.5	4764.443	208.1
4765.789	3.2041[o]	6.5	0.6034	5.5	4765.796	42.0
4773.435	2.5966	5.5	0.0000[o]	4.5	4773.438[b]	38.4
4773.455	3.3185[o]	5.5	0.7219	4.5	4773.438[b]	38.4
4774.529	2.5960	4.5	0.0000[o]	4.5	4774.538	191.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4775.414	3.1450^o	5.5	0.5495	4.5	4775.417	238.3
4788.282	2.5885	4.5	0.0000^o	4.5	4788.286	514.0
4791.952	3.1899^o	4.5	0.6034	5.5	4791.944	147.4
4795.241	3.1343^o	5.5	0.5495	4.5	4795.242	202.0
4795.826	3.4032^o	5.5	0.8187	6.5	4795.822	54.9
4797.529	3.1869^o	4.5	0.6034	5.5	4797.503	46.0
4807.227	3.3886^o	4.5	0.8103	3.5	4807.231	79.5
4808.168	2.5778	3.5	0.0000^o	4.5	4808.182	1612.3
4826.474	3.3508^o	4.5	0.7827	5.5	4826.480	29.8
4828.080	3.3859^o	5.5	0.8187	6.5	4828.064	231.7
4840.475	2.5606	3.5	0.0000^o	4.5	4840.478	496.9
4842.564	3.1027	8.5	0.5432^o	7.5	4842.580	130.1
4848.896	3.3886^o	4.5	0.8324	5.5	4848.875	34.1
4857.361	3.1012^o	3.5	0.5495	4.5	4857.357	722.0
4876.587	3.1450^o	5.5	0.6034	5.5	4876.576	68.6
4879.529	3.2621^o	5.5	0.7219	4.5	4879.536	106.8
4882.245	2.5387	4.5	0.0000^o	4.5	4882.242	1886.4
4884.459	2.5376	3.5	0.0000^o	4.5	4884.456	425.8
4889.660	3.1382^o	6.5	0.6034	5.5	4889.658^b	235.6
4889.662	3.9337^o	5.5	1.3989	5.5	4889.658^b	235.6
4896.505	3.3859^o	5.5	0.8546	5.5	4896.497	48.8
4897.265	3.1343^o	5.5	0.6034	5.5	4897.265	123.2
4903.342	2.6985	5.5	0.1707^o	5.5	4903.361	871.8
4909.835	3.4704^o	6.5	0.9460	6.5	4909.822	43.9
4911.419	3.5552^o	4.5	1.0316	4.5	4911.457	121.1
4921.756	3.3508^o	4.5	0.8324	5.5	4921.760	98.5
4924.600	2.6876	5.5	0.1707^o	5.5	4924.599	12430.9
4932.154	2.5130	3.5	0.0000^o	4.5	4932.158	989.5
4935.994	3.0542	7.5	0.5432^o	7.5	4936.003	3434.3
4938.425	2.5098	5.5	0.0000^o	4.5	4938.426	1445.9
4938.872	2.6803	6.5	0.1707^o	5.5	4938.888	1774.6
4939.740	2.8621	6.5	0.3529^o	6.5	4939.742	10643.7
4950.479	3.3362^o	4.5	0.8324	5.5	4950.466	47.2
4953.206	3.2243^o	4.5	0.7219	4.5	4953.213^c	33.4
4956.045	2.5009	5.5	0.0000^o	4.5	4956.057	2428.1
4960.262	2.4988	4.5	0.0000^o	4.5	4960.256	3944.8
4965.448	3.3508^o	4.5	0.8546	5.5	4965.450	78.3
4974.922	2.6621	5.5	0.1707^o	5.5	4974.919	4294.7
4975.749	3.0342	7.5	0.5432^o	7.5	4975.750	3299.6
4976.396	2.4907	5.5	0.0000^o	4.5	4976.391	7092.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5000.611	3.2006^o	4.5	0.7219	4.5	5000.609	171.8
5005.548	3.4222^o	5.5	0.9460	6.5	5005.544	169.1
5007.629	2.4752	4.5	0.0000^o	4.5	5007.628	1133.5
5013.207	3.4184^o	5.5	0.9460	6.5	5013.200	150.5
5014.685	3.3263^o	4.5	0.8546	5.5	5014.686	70.4
5015.709	3.3258^o	5.5	0.8546	5.5	5015.718	77.7
5019.739	2.8221	7.5	0.3529^o	6.5	5019.760	7497.3
5024.767	2.8197	5.5	0.3529^o	6.5	5024.762	17.6
5026.981	2.6363	6.5	0.1707^o	5.5	5026.963	12709.7
5028.295	3.1869^o	4.5	0.7219	4.5	5028.285	100.8
5028.999	2.8176	6.5	0.3529^o	6.5	5029.001	657.8
5031.016	2.4636	4.5	0.0000^o	4.5	5031.012	126.9
5040.193	3.1811^o	4.5	0.7219	4.5	5040.193	116.6
5042.176	3.5410	5.5	1.0828^o	6.5	5042.168	52.5
5044.236	3.4032^o	5.5	0.9460	6.5	5044.231^c	23.4
5045.522	2.9997	8.5	0.5432^o	7.5	5045.521	6312.3
5053.395	2.6234	6.5	0.1707^o	5.5	5053.398	7064.0
5062.111	2.4485	3.5	0.0000^o	4.5	5062.112	76.6
5063.395	2.6186	5.5	0.1707^o	5.5	5063.396	1500.5
5067.422	3.1679^o	5.5	0.7219	4.5	5067.407	123.7
5072.840	3.2621^o	5.5	0.8187	6.5	5072.845	45.5
5084.460	3.2480^o	2.5	0.8103	3.5	5084.450^c	219.2
5086.455	2.4368	3.5	0.0000^o	4.5	5086.452	149.6
5087.107	2.7894	7.5	0.3529^o	6.5	5087.121	6846.6
5090.526	3.1568^o	5.5	0.7219	4.5	5090.541	48.9
5096.272	2.7850	5.5	0.3529^o	6.5	5096.272	233.2
5098.967	2.6015	5.5	0.1707^o	5.5	5098.974	398.1
5103.444	3.2114^o	6.5	0.7827	5.5	5103.455	60.4
5107.608	3.4222^o	5.5	0.9955	4.5	5107.643	63.8
5108.595	2.7792	6.5	0.3529^o	6.5	5108.595	103.3
5109.269	2.5966	5.5	0.1707^o	5.5	5109.273	135.9
5113.183	2.9736^o	3.5	0.5495	4.5	5113.173	47.0
5115.211	3.1450^o	5.5	0.7219	4.5	5115.216^c	143.5
5118.815	3.2041^o	6.5	0.7827	5.5	5118.779	292.0
5120.577	3.0239^o	6.5	0.6034	5.5	5120.570^c	207.3
5124.109	2.9621	6.5	0.5432^o	7.5	5124.127	101.6
5129.178	2.9660^o	5.5	0.5495	4.5	5129.177	63.0
5133.424	2.4145	5.5	0.0000^o	4.5	5133.441	18457.7
5145.830	3.1306^o	5.5	0.7219	4.5	5145.838	28.3
5147.459	2.5786	6.5	0.1707^o	5.5	5147.467	1239.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5148.432	3.2621^o	5.5	0.8546	5.5	5148.434	49.0
5149.867	2.9500	8.5	0.5432^o	7.5	5149.883	1230.3
5165.105	2.5704	5.5	0.1707^o	5.5	5165.113	46.1
5170.528	2.9467^o	5.5	0.5495	4.5	5170.502	23.9
5177.367	2.7469	6.5	0.3529^o	6.5	5177.368^c	1202.2
5179.617	3.1757^o	6.5	0.7827	5.5	5179.620	45.5
5194.398	2.5568	6.5	0.1707^o	5.5	5194.415	6075.5
5194.924	2.5566	4.5	0.1707^o	5.5	5194.938	52.7
5196.069	3.2041^o	6.5	0.8187	6.5	5196.072	121.0
5196.588	3.1679^o	5.5	0.7827	5.5	5196.557	167.4
5201.755	3.4782	5.5	1.0954^o	5.5	5201.760	41.0
5212.468	2.9274^o	5.5	0.5495	4.5	5212.466	278.4
5217.019	3.4704^o	6.5	1.0946	5.5	5217.028	36.7
5242.583	3.1469^o	6.5	0.7827	5.5	5242.595	87.0
5246.079	2.9660^o	5.5	0.6034	5.5	5246.070	246.3
5246.856	3.1450^o	5.5	0.7827	5.5	5246.854	72.8
5249.842	2.9105^o	5.5	0.5495	4.5	5249.843	811.5
5258.732	3.1757^o	6.5	0.8187	6.5	5258.732	133.8
5262.200	2.9049^o	4.5	0.5495	4.5	5262.224	87.6
5283.023	3.1288^o	6.5	0.7827	5.5	5283.026	155.7
5289.343	2.9467^o	5.5	0.6034	5.5	5289.340	1418.5
5295.905	2.8899^o	5.5	0.5495	4.5	5295.910	505.1
5304.163	2.8863^o	4.5	0.5495	4.5	5304.167	237.3
5307.199	4.0547^o	4.5	1.7193	3.5	5307.204^b	26.9
5307.210	3.1679^o	5.5	0.8324	5.5	5307.204^b	27.0
5309.085	2.6876	5.5	0.3529^o	6.5	5309.079	22.4
5312.577	3.2791^o	6.5	0.9460	6.5	5312.563	63.0
5313.642	2.5033	4.5	0.1707^o	5.5	5313.650	142.8
5314.325	3.1869^o	4.5	0.8546	5.5	5314.295	98.9
5319.042	2.5009	5.5	0.1707^o	5.5	5319.042	49.9
5322.638	2.6816	7.5	0.3529^o	6.5	5322.638	844.6
5323.647	3.1469^o	6.5	0.8187	6.5	5323.654	82.2
5323.900	2.4988	4.5	0.1707^o	5.5	5323.898	23.9
5325.216	3.4222^o	5.5	1.0946	5.5	5325.224	63.3
5328.008	3.3281	5.5	1.0018^o	5.5	5328.041^b	581.2
5328.054	3.1450^o	5.5	0.8187	6.5	5328.041^b	579.8
5333.884	3.4184^o	5.5	1.0946	5.5	5333.884	52.9
5340.010	3.1757^o	6.5	0.8546	5.5	5340.008	215.8
5343.663	3.1382^o	6.5	0.8187	6.5	5343.664	180.8
5353.650	3.1255^o	4.5	0.8103	3.5	5353.660	72.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5358.988	2.8624^o	4.5	0.5495	4.5	5358.990	1145.4
5365.353	3.1288^o	6.5	0.8187	6.5	5365.357	144.5
5383.886	3.1568^o	5.5	0.8546	5.5	5383.882	39.3
5388.837	2.6530	7.5	0.3529^o	6.5	5388.818	421.0
5393.303	3.9410^o	5.5	1.6428	6.5	5393.258	56.1
5402.595	3.3258^o	5.5	1.0316	4.5	5402.574	382.0
5405.227	3.5838	7.5	1.2907^o	6.5	5405.232	127.4
5405.492	2.4636	4.5	0.1707^o	5.5	5405.489	150.9
5405.741	3.4924^o	5.5	1.1995	5.5	5405.772	112.0
5418.777	2.8369^o	5.5	0.5495	4.5	5418.772	321.0
5420.622	2.8899^o	5.5	0.6034	5.5	5420.627	37.9
5427.243	3.3666	5.5	1.0828^o	6.5	5427.247	350.4
5427.735	2.8331^o	5.5	0.5495	4.5	5427.737	137.8
5436.981	3.1343^o	5.5	0.8546	5.5	5437.015	122.4
5439.469	2.8282^o	5.5	0.5495	4.5	5439.466	121.7
5449.627	2.8176	6.5	0.5432^o	7.5	5449.623	51.9
5449.987	3.1288^o	6.5	0.8546	5.5	5449.985	31.9
5450.379	3.5968	6.5	1.3228^o	7.5	5450.393	31.9
5450.753	2.8773^o	5.5	0.6034	5.5	5450.755	222.5
5457.061	2.8145	8.5	0.5432^o	7.5	5457.063	473.2
5471.229	3.2673	6.5	1.0018^o	5.5	5471.264^b	112.9
5471.268	3.2114^o	6.5	0.9460	6.5	5471.264^b	114.6
5473.485	3.3362^o	4.5	1.0717	4.5	5473.469	37.2
5481.748	2.2611	5.5	0.0000^o	4.5	5481.765^b	1689.9
5481.754	3.5838	7.5	1.3228^o	7.5	5481.765^b	1689.9
5488.938	3.2041^o	6.5	0.9460	6.5	5488.936	368.1
5493.752	3.3508^o	4.5	1.0946	5.5	5493.773^b	49.7
5493.761	3.2006^o	4.5	0.9444	3.5	5493.773^b	52.3
5497.613	3.2480^o	2.5	0.9935	3.5	5497.608	451.4
5504.718	2.9736^o	3.5	0.7219	4.5	5504.718	210.2
5509.596	3.5337^o	4.5	1.2840	4.5	5509.627^b	226.2
5509.620	2.7992^o	5.5	0.5495	4.5	5509.627^b	228.9
5510.489	3.2722	4.5	1.0229^o	4.5	5510.443	17.6
5514.513	3.5410	5.5	1.2933^o	5.5	5514.530	74.1
5519.793	3.1899^o	4.5	0.9444	3.5	5519.791^c	40.7
5520.884	2.8484^o	6.5	0.6034	5.5	5520.930	56.2
5531.163	3.4369	6.5	1.1960^o	7.5	5531.149	690.2
5538.373	3.3207	5.5	1.0828^o	6.5	5538.374	559.4
5541.320	3.3859^o	5.5	1.1491	5.5	5541.326	45.2
5549.752	2.4040	6.5	0.1707^o	5.5	5549.773	340.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5556.896	3.2621^o	5.5	1.0316	4.5	5556.895	37.5
5560.067	2.5822	6.5	0.3529^o	6.5	5560.069	48.3
5569.019	2.5786	6.5	0.3529^o	6.5	5569.032	117.5
5575.451	3.0418^o	5.5	0.8187	6.5	5575.452	49.3
5578.808	2.8251^o	6.5	0.6034	5.5	5578.810	277.0
5615.289	2.8107^o	6.5	0.6034	5.5	5615.281	94.1
5619.961	2.9274^o	5.5	0.7219	4.5	5619.968	53.2
5624.001	2.5568	6.5	0.3529^o	6.5	5624.043	141.0
5645.687	2.7386	7.5	0.5432^o	7.5	5645.676	74.7
5650.260	3.2891	4.5	1.0954^o	5.5	5650.220	150.4
5650.630	3.0259^o	5.5	0.8324	5.5	5650.627	139.3
5653.903	3.1382^o	6.5	0.9460	6.5	5653.904	49.3
5663.432	2.9105^o	5.5	0.7219	4.5	5663.432	118.6
5664.073	3.1343^o	5.5	0.9460	6.5	5664.073	34.0
5666.221	3.4782	5.5	1.2907^o	6.5	5666.193	32.1
5672.957	3.4782	5.5	1.2933^o	5.5	5672.952	69.3
5678.190	3.1288^o	6.5	0.9460	6.5	5678.186	142.0
5687.380	2.1793	5.5	0.0000^o	4.5	5687.391	895.3
5695.471	2.9950^o	7.5	0.8187	6.5	5695.470	270.2
5704.385	3.9410^o	5.5	1.7682	4.5	5704.377	349.3
5708.297	3.0259^o	5.5	0.8546	5.5	5708.295	244.8
5708.626	2.9899^o	6.5	0.8187	6.5	5708.644	33.5
5713.533	3.3185^o	5.5	1.1491	5.5	5713.567	191.0
5722.265	2.1660	5.5	0.0000^o	4.5	5722.232	182.9
5724.972	3.2604	6.5	1.0954^o	5.5	5724.979	47.9
5729.546	2.9736^o	3.5	0.8103	3.5	5729.554	64.8
5743.704	2.1580	5.5	0.0000^o	4.5	5743.704	338.8
5744.915	2.9899^o	6.5	0.8324	5.5	5744.919	189.7
5746.533	2.5098	5.5	0.3529^o	6.5	5746.540	86.4
5750.652	3.1869^o	4.5	1.0316	4.5	5750.643	197.5
5751.850	2.7044^o	5.5	0.5495	4.5	5751.857	178.2
5758.493	3.1382^o	6.5	0.9858	6.5	5758.496	20.3
5772.491	3.9410^o	5.5	1.7938	4.5	5772.529	143.3
5779.272	2.9274^o	5.5	0.7827	5.5	5779.281	985.5
5792.278	2.3105	4.5	0.1707^o	5.5	5792.277	203.5
5805.952	3.5337^o	4.5	1.3989	5.5	5805.907	105.6
5807.210	3.4184^o	5.5	1.2840	4.5	5807.203	88.6
5819.135	3.1255^o	4.5	0.9955	4.5	5819.116	24.1
5824.662	2.9467^o	5.5	0.8187	6.5	5824.666	16.8
5832.192	3.1568^o	5.5	1.0316	4.5	5832.223	96.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5833.713	4.0547^o	4.5	1.9300	5.5	5833.744	63.8
5835.126	2.7275^o	6.5	0.6034	5.5	5835.117	1415.0
5836.632	3.2064	7.5	1.0828^o	6.5	5836.639	16.2
5837.222	2.8453^o	5.5	0.7219	4.5	5837.225	42.0
5841.017	3.4448	8.5	1.3228^o	7.5	5841.021	177.5
5843.486	3.3508^o	4.5	1.2297	3.5	5843.491	50.5
5855.468	3.2114^o	6.5	1.0946	5.5	5855.466	53.5
5857.112	3.3122	6.5	1.1960^o	7.5	5857.141	68.6
5858.629	3.4448	8.5	1.3291^o	8.5	5858.618	228.2
5860.532	2.8369^o	5.5	0.7219	4.5	5860.536	77.6
5867.511	2.6619^o	5.5	0.5495	4.5	5867.514	175.4
5874.720	2.6530	7.5	0.5432^o	7.5	5874.713^{bc}	208.5
5874.734	3.1117	5.5	1.0018^o	5.5	5874.713^{bc}	206.5
5875.711	3.2041^o	6.5	1.0946	5.5	5875.716	118.7
5878.102	3.3046	7.5	1.1960^o	7.5	5878.098	399.5
5879.077	3.2037	6.5	1.0954^o	5.5	5879.037	576.8
5884.742	2.8282^o	5.5	0.7219	4.5	5884.697	278.7
5886.156	3.4924^o	5.5	1.3867	4.5	5886.162	36.8
5897.719	3.4244	7.5	1.3228^o	7.5	5897.704	95.1
5915.958	3.0411^o	7.5	0.9460	6.5	5915.973	434.2
5917.313	2.9049^o	4.5	0.8103	3.5	5917.324	35.9
5920.762	2.9121^o	7.5	0.8187	6.5	5920.761	1266.8
5924.190	3.1750	6.5	1.0828^o	6.5	5924.182^c	126.0
5931.518	3.1724	6.5	1.0828^o	6.5	5931.516	49.4
5935.438	2.6916^o	6.5	0.6034	5.5	5935.435	422.8
5946.265	2.2551	4.5	0.1707^o	5.5	5946.272	183.8
5959.942	2.8624^o	4.5	0.7827	5.5	5959.942	29.5
5962.188	2.2496	5.5	0.1707^o	5.5	5962.168	413.3
5963.013	3.1614	6.5	1.0828^o	6.5	5963.014	363.0
5966.935	2.7992^o	5.5	0.7219	4.5	5966.952^c	42.3
5967.605	3.1724	6.5	1.0954^o	5.5	5967.601	12.3
5978.880	3.1559	6.5	1.0828^o	6.5	5978.877	126.3
5987.137	3.4262	5.5	1.3559^o	4.5	5987.145	183.5
5996.060	3.2678	5.5	1.2007^o	6.5	5996.061	156.8
5997.643	3.2673	6.5	1.2007^o	6.5	5997.689	147.6
5999.486	3.1614	6.5	1.0954^o	5.5	5999.490	73.4
6000.263	2.8484^o	6.5	0.7827	5.5	6000.267	69.7
6008.554	3.1583	4.5	1.0954^o	5.5	6008.550	247.7
6009.190	3.1343^o	5.5	1.0717	4.5	6009.236^b	55.0
6009.277	2.8453^o	5.5	0.7827	5.5	6009.236^b	53.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6011.217	3.9410^o	5.5	1.8791	6.5	6011.205	19.9
6012.287	2.4145	5.5	0.3529^o	6.5	6012.312	40.0
6013.774	3.1438	6.5	1.0828^o	6.5	6013.783	47.7
6022.465	2.6614^o	6.5	0.6034	5.5	6022.452	116.4
6024.149	2.8899^o	5.5	0.8324	5.5	6024.139	38.2
6039.981	2.8624^o	4.5	0.8103	3.5	6040.001	35.1
6048.356	3.4032^o	5.5	1.3539	4.5	6048.368	25.7
6049.257	2.9950^o	7.5	0.9460	6.5	6049.250	474.7
6050.831	3.3392	7.5	1.2907^o	6.5	6050.879^b	152.8
6050.871	3.1438	6.5	1.0954^o	5.5	6050.879^b	156.0
6052.388	2.4008	7.5	0.3529^o	6.5	6052.397	41.0
6057.361	3.0480	5.5	1.0018^o	5.5	6057.338	174.7
6059.553	3.1409	5.5	1.0954^o	5.5	6059.564	94.9
6065.144	3.1382^o	6.5	1.0946	5.5	6065.151	59.9
6069.744	3.0649	5.5	1.0229^o	4.5	6069.695	86.1
6082.710	3.1205	7.5	1.0828^o	6.5	6082.741	64.4
6087.325	3.2368	6.5	1.2007^o	6.5	6087.316	35.4
6089.505	2.5786	6.5	0.5432^o	7.5	6089.494	42.8
6108.549	2.3820	6.5	0.3529^o	6.5	6108.550	148.1
6109.097	2.6322^o	6.5	0.6034	5.5	6109.065	343.8
6110.285	3.0303	4.5	1.0018^o	5.5	6110.242	9.0
6111.940	2.8107^o	6.5	0.7827	5.5	6111.958	40.0
6113.551	3.3207	5.5	1.2933^o	5.5	6113.552	13.8
6122.165	3.3473	7.5	1.3228^o	7.5	6122.147	178.0
6127.073	2.0229	5.5	0.0000^o	4.5	6127.082	12.2
6139.419	3.3122	6.5	1.2933^o	5.5	6139.428	34.9
6147.452	3.1117	5.5	1.0954^o	5.5	6147.453	60.9
6148.235	2.8484^o	6.5	0.8324	5.5	6148.226^c	159.2
6153.132	2.8331^o	5.5	0.8187	6.5	6153.141	10.3
6165.415	3.2064	7.5	1.1960^o	7.5	6165.423	190.1
6168.215	2.8282^o	5.5	0.8187	6.5	6168.216	22.4
6170.633	2.1793	5.5	0.1707^o	5.5	6170.651	56.1
6177.637	2.8251^o	6.5	0.8187	6.5	6177.612	145.1
6181.358	3.0880	5.5	1.0828^o	6.5	6181.382	45.2
6187.962	3.2037	6.5	1.2007^o	6.5	6187.956	124.9
6189.586	2.5520^o	5.5	0.5495	4.5	6189.590	20.5
6198.843	2.1702	6.5	0.1707^o	5.5	6198.875	34.3
6201.285	1.9987	5.5	0.0000^o	4.5	6201.291	10.0
6202.724	2.8307^o	6.5	0.8324	5.5	6202.765	402.2
6210.596	3.2891	4.5	1.2933^o	5.5	6210.588^b	133.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6210.604	2.8282^o	5.5	0.8324	5.5	6210.588^b	133.7
6214.797	3.0259^o	5.5	1.0316	4.5	6214.778	56.3
6230.192	3.3122	6.5	1.3228^o	7.5	6230.152	35.9
6240.062	3.0691	7.5	1.0828^o	6.5	6240.064	39.9
6253.227	3.0649	5.5	1.0828^o	6.5	6253.233^c	35.5
6253.701	3.0774	5.5	1.0954^o	5.5	6253.719	74.0
6255.508	2.9274^o	5.5	0.9460	6.5	6255.501^b	20.1
6255.524	3.2791^o	6.5	1.2977	7.5	6255.501^b	20.5
6262.327	2.5288^o	4.5	0.5495	4.5	6262.336	187.2
6277.797	3.3263^o	4.5	1.3519	5.5	6277.840	38.8
6277.884	3.1750	6.5	1.2007^o	6.5	6277.838	35.9
6279.240	3.2673	6.5	1.2933^o	5.5	6279.237	38.8
6281.548	3.5852	6.5	1.6120^o	7.5	6281.550	36.1
6283.823	2.5156	6.5	0.5432^o	7.5	6283.816	55.9
6285.620	1.9719	5.5	0.0000^o	4.5	6285.623	62.0
6287.059	3.0542	7.5	1.0828^o	6.5	6287.040	77.2
6290.105	2.8251^o	6.5	0.8546	5.5	6290.097	84.6
6291.304	3.0418^o	5.5	1.0717	4.5	6291.312	81.3
6293.348	3.0649	5.5	1.0954^o	5.5	6293.369	70.4
6294.275	2.5187^o	5.5	0.5495	4.5	6294.302^b	35.3
6294.327	1.9692	5.5	0.0000^o	4.5	6294.301^b	34.0
6298.006	3.4244	7.5	1.4563^o	6.5	6297.996	114.4
6308.311	3.1382^o	6.5	1.1734	6.5	6308.312^b	47.0
6308.335	3.3207	5.5	1.3559^o	4.5	6308.312^b	48.0
6309.414	2.9105^o	5.5	0.9460	6.5	6309.411^b	44.7
6309.446	3.2936	8.5	1.3291^o	8.5	6309.411^b	45.5
6316.610	3.2556	6.5	1.2933^o	5.5	6316.625	70.3
6318.750	3.0444	6.5	1.0828^o	6.5	6318.751	58.8
6320.436	2.5106^o	5.5	0.5495	4.5	6320.424	64.3
6325.238	3.4244	7.5	1.4648^o	7.5	6325.221	10.6
6339.333	3.1559	6.5	1.2007^o	6.5	6339.363	32.2
6343.870	3.4124	8.5	1.4585^o	8.5	6343.904	203.6
6345.268	3.0488	5.5	1.0954^o	5.5	6345.271	6.1
6347.717	3.0480	5.5	1.0954^o	5.5	6347.709	102.5
6352.299	2.9467^o	5.5	0.9955	4.5	6352.315	29.1
6357.207	2.9726	4.5	1.0229^o	4.5	6357.181^c	318.4
6359.031	3.4262	10.5	1.4770^o	9.5	6358.981	614.1
6363.414	3.1438	6.5	1.1960^o	7.5	6363.408	31.9
6369.098	3.2368	6.5	1.2907^o	6.5	6369.091	29.2
6371.806	3.2744	7.5	1.3291^o	8.5	6371.852	32.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6373.289	2.7275^o	6.5	0.7827	5.5	6373.287	78.1
6376.065	2.8899^o	5.5	0.9460	6.5	6376.063	6.9
6377.610	3.2368	6.5	1.2933^o	5.5	6377.606	167.4
6377.944	3.1394	7.5	1.1960^o	7.5	6377.915	305.1
6378.575	3.1438	6.5	1.2007^o	6.5	6378.586	333.0
6388.223	3.1409	5.5	1.2007^o	6.5	6388.217^b	26.8
6388.227	3.2243^o	4.5	1.2840	4.5	6388.217^b	26.8
6408.378	3.0169	5.5	1.0828^o	6.5	6408.384	35.3
6415.419	3.2548	8.5	1.3228^o	7.5	6415.436	667.7
6419.175	3.0137	5.5	1.0828^o	6.5	6419.173	58.2
6419.616	2.5341^o	6.5	0.6034	5.5	6419.619^b	152.4
6419.621	3.3174^o	5.5	1.3867	4.5	6419.619^b	152.3
6435.572	3.0088	6.5	1.0828^o	6.5	6435.564	12.3
6437.466	2.5288^o	4.5	0.6034	5.5	6437.469	26.1
6450.180	3.4369	6.5	1.5153^o	6.5	6450.213	11.8
6459.036	2.4685^o	5.5	0.5495	4.5	6459.040	33.8
6461.114	2.5217^o	6.5	0.6034	5.5	6461.098	186.1
6463.333	3.3740	6.5	1.4563^o	6.5	6463.332	6.1
6468.309	3.2722	4.5	1.3559^o	4.5	6468.293	12.1
6470.235	3.2064	7.5	1.2907^o	6.5	6470.243	110.0
6478.075	3.0088	6.5	1.0954^o	5.5	6478.080	19.5
6485.993	3.1117	5.5	1.2007^o	6.5	6486.016	81.5
6490.916	2.0802	5.5	0.1707^o	5.5	6490.918	100.2
6491.759	3.0047	6.5	1.0954^o	5.5	6491.764	804.9
6493.492	2.7275^o	6.5	0.8187	6.5	6493.491	332.2
6494.888	2.9912	7.5	1.0828^o	6.5	6494.895	214.7
6497.109	3.3725	8.5	1.4648^o	7.5	6497.110	140.6
6500.725	3.1027	8.5	1.1960^o	7.5	6500.738	364.8
6504.066	3.1964	7.5	1.2907^o	6.5	6504.094	203.3
6515.240	2.8484^o	6.5	0.9460	6.5	6515.242	61.7
6517.142	2.9846	6.5	1.0828^o	6.5	6517.138	167.0
6524.454	3.1004	5.5	1.2007^o	6.5	6524.479	22.4
6525.868	2.8453^o	5.5	0.9460	6.5	6525.855	15.8
6548.850	3.0418^o	5.5	1.1491	5.5	6548.854	20.3
6549.515	2.9752	6.5	1.0828^o	6.5	6549.520^c	52.1
6553.301	2.7238^o	5.5	0.8324	5.5	6553.296	246.7
6555.016	2.8369^o	5.5	0.9460	6.5	6555.001	69.2
6560.733	2.9846	6.5	1.0954^o	5.5	6560.719	163.4
6568.130	2.8331^o	5.5	0.9460	6.5	6568.123	19.3
6576.460	2.8307^o	6.5	0.9460	6.5	6576.462	14.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6578.009	3.1750	6.5	1.2907^o	6.5	6578.004	61.9
6581.287	2.6052^o	5.5	0.7219	4.5	6581.305	58.5
6583.315	2.4259	7.5	0.5432^o	7.5	6583.322	54.7
6587.046	3.1724	6.5	1.2907^o	6.5	6587.055^b	19.0
6587.089	3.1750	6.5	1.2933^o	5.5	6587.055^b	20.7
6590.750	3.3392	7.5	1.4585^o	8.5	6590.715	17.6
6593.541	2.9752	6.5	1.0954^o	5.5	6593.558	21.6
6595.463	2.9621	6.5	1.0828^o	6.5	6595.478	88.4
6612.726	3.3392	7.5	1.4648^o	7.5	6612.707	17.4
6615.650	1.8735	5.5	0.0000^o	4.5	6615.650^{bc}	13.6
6615.650	3.3258^o	5.5	1.4522	4.5	6615.650^{bc}	13.6
6616.670	2.9560	7.5	1.0828^o	6.5	6616.664	1312.7
6625.910	3.1614	6.5	1.2907^o	6.5	6625.910	27.7
6630.990	2.7238^o	5.5	0.8546	5.5	6630.987	86.2
6637.788	3.1964	7.5	1.3291^o	8.5	6637.776	14.9
6645.505	3.1559	6.5	1.2907^o	6.5	6645.539^b	17.9
6645.514	2.4685^o	5.5	0.6034	5.5	6645.539^b	17.9
6646.217	3.1583	4.5	1.2933^o	5.5	6646.206	38.8
6647.118	2.8107^o	6.5	0.9460	6.5	6647.115	391.7
6662.787	2.8621	6.5	1.0018^o	5.5	6662.758	178.2
6664.440	2.0305	5.5	0.1707^o	5.5	6664.436	13.3
6670.211	3.0542	7.5	1.1960^o	7.5	6670.259^b	125.5
6670.256	2.6409^o	5.5	0.7827	5.5	6670.259^b	127.6
6672.175	2.4008	7.5	0.5432^o	7.5	6672.189	88.8
6688.419	2.7992^o	5.5	0.9460	6.5	6688.442	30.9
6690.124	3.1450^o	5.5	1.2923	6.5	6690.094^c	69.5
6695.250	3.3666	5.5	1.5153^o	6.5	6695.230	10.4
6697.995	3.0239^o	6.5	1.1734	6.5	6698.046^b	18.3
6698.031	3.1438	6.5	1.2933^o	5.5	6698.046^b	19.0
6699.238	3.0259^o	5.5	1.1758	5.5	6699.253^b	72.1
6699.252	3.1409	5.5	1.2907^o	6.5	6699.253^b	72.1
6700.491	2.7044^o	5.5	0.8546	5.5	6700.497	15.4
6701.547	2.6322^o	6.5	0.7827	5.5	6701.525	34.2
6708.670	3.1409	5.5	1.2933^o	5.5	6708.677	57.8
6709.228	3.3122	6.5	1.4648^o	7.5	6709.244	48.7
6714.753	3.1382^o	6.5	1.2923	6.5	6714.784^c	43.2
6722.501	2.3933^o	4.5	0.5495	4.5	6722.509	30.6
6727.640	2.8282^o	5.5	0.9858	6.5	6727.633	12.6
6733.314	3.1341	5.5	1.2933^o	5.5	6733.314^b	29.1
6733.354	2.9899^o	6.5	1.1491	5.5	6733.314^b	29.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6736.785	3.3046	7.5	1.4648^o	7.5	6736.795	131.7
6739.282	2.6494^o	2.5	0.8103	3.5	6739.304	827.6
6740.491	2.3820	6.5	0.5432^o	7.5	6740.491	11.7
6754.568	3.1869^o	4.5	1.3519	5.5	6754.577	29.2
6771.216	1.8305	4.5	0.0000^o	4.5	6771.235	175.5
6773.051	1.8300	5.5	0.0000^o	4.5	6773.043	38.6
6796.706	3.2800	6.5	1.4563^o	6.5	6796.724	14.5
6800.826	2.6052^o	5.5	0.7827	5.5	6800.868	13.4
6802.038	2.6409^o	5.5	0.8187	6.5	6802.045	31.8
6806.855	3.1117	5.5	1.2907^o	6.5	6806.867	14.2
6816.578	3.1117	5.5	1.2933^o	5.5	6816.597	29.1
6817.591	3.2744	7.5	1.4563^o	6.5	6817.619	47.4
6819.103	1.8176	5.5	0.0000^o	4.5	6819.054	43.5
6822.844	3.1394	7.5	1.3228^o	7.5	6822.850	107.1
6834.580	2.6322^o	6.5	0.8187	6.5	6834.582	99.0
6839.013	3.4244	7.5	1.6120^o	7.5	6839.007	19.3
6842.327	3.2678	5.5	1.4563^o	6.5	6842.336	10.0
6844.388	3.2673	6.5	1.4563^o	6.5	6844.391	78.8
6846.802	2.9049^o	4.5	1.0946	5.5	6846.803	36.8
6859.072	3.1004	5.5	1.2933^o	5.5	6859.056	30.6
6866.808	2.1580	5.5	0.3529^o	6.5	6866.807	526.6
6870.451	3.0047	6.5	1.2007^o	6.5	6870.465	81.1
6873.498	3.1899^o	4.5	1.3867	4.5	6873.481	6.4
6881.205	1.9719	5.5	0.1707^o	5.5	6881.219	726.7
6884.617	3.4124	8.5	1.6120^o	7.5	6884.670	45.9
6892.705	3.4448	8.5	1.6465^o	8.5	6892.720^b	98.8
6892.753	3.2791^o	6.5	1.4809	5.5	6892.721^b	70.8
6893.380	2.3476^o	5.5	0.5495	4.5	6893.393	109.3
6896.600	3.0880	5.5	1.2907^o	6.5	6896.609	6.4
6904.616	2.9912	7.5	1.1960^o	7.5	6904.670	19.1
6906.581	3.0880	5.5	1.2933^o	5.5	6906.601	17.2
6909.741	1.7938	4.5	0.0000^o	4.5	6909.754	228.0
6918.784	2.3948^o	6.5	0.6034	5.5	6918.775	542.0
6944.468	1.9555	6.5	0.1707^o	5.5	6944.515	24.0
6954.202	2.3318^o	5.5	0.5495	4.5	6954.193	299.0
6961.868	3.1343^o	5.5	1.3539	4.5	6961.920	20.2
6969.755	3.0691	7.5	1.2907^o	6.5	6969.767	18.0
6971.903	2.7238^o	5.5	0.9460	6.5	6971.892	23.2
6974.574	2.8599	5.5	1.0828^o	6.5	6974.576	29.8
6983.109	3.9410^o	5.5	2.1660	5.5	6983.153^b	15.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6983.182	2.7978	3.5	1.0229^o	4.5	6983.154^b	15.5
6984.558	2.9752	6.5	1.2007^o	6.5	6984.570	10.8
6986.184	3.0649	5.5	1.2907^o	6.5	6986.179	27.1
6988.586	3.1027	8.5	1.3291^o	8.5	6988.587^b	63.1
6988.591	3.1255^o	4.5	1.3519	5.5	6988.587^b	73.5
6990.546	1.9437	6.5	0.1707^o	5.5	6990.571	18.5
6991.543	2.6052^o	5.5	0.8324	5.5	6991.538	38.9
7004.348	1.7696	4.5	0.0000^o	4.5	7004.366^c	182.1
7009.509	3.0411^o	7.5	1.2729	6.5	7009.516	4.4
7009.922	1.7682	4.5	0.0000^o	4.5	7009.941	85.6
7040.381	3.3725	8.5	1.6120^o	7.5	7040.395	31.8
7042.410	2.9560	7.5	1.1960^o	7.5	7042.408^c	134.7
7047.066	1.7588	4.5	0.0000^o	4.5	7047.093	412.2
7048.776	2.7044^o	5.5	0.9460	6.5	7048.772	9.6
7053.246	3.0480	5.5	1.2907^o	6.5	7053.223	13.0
7062.704	1.9256	4.5	0.1707^o	5.5	7062.718^c	289.4
7066.578	2.9274^o	5.5	1.1734	6.5	7066.596	6.7
7068.067	3.0444	6.5	1.2907^o	6.5	7068.068	24.1
7070.491	3.4184^o	5.5	1.6654	4.5	7070.537^b	19.8
7070.521	1.7530	4.5	0.0000^o	4.5	7070.537^b	20.2
7072.617	3.2678	5.5	1.5153^o	6.5	7072.616	8.2
7074.043	2.1051	6.5	0.3529^o	6.5	7074.053	369.2
7077.063	2.5341^o	6.5	0.7827	5.5	7077.079	21.9
7079.950	2.8453^o	5.5	1.0946	5.5	7079.987^{bc}	290.1
7080.040	2.6052^o	5.5	0.8546	5.5	7079.987^{bc}	295.3
7087.615	3.0411^o	7.5	1.2923	6.5	7087.626^c	5.5
7090.445	3.1469^o	6.5	1.3989	5.5	7090.499	63.9
7093.775	1.9179	5.5	0.1707^o	5.5	7093.798^c	84.2
7095.714	2.0997	5.5	0.3529^o	6.5	7095.720	24.6
7096.656	2.4685^o	5.5	0.7219	4.5	7096.673	18.6
7097.331	2.8418	4.5	1.0954^o	5.5	7097.358^b	98.0
7097.356	2.2896	7.5	0.5432^o	7.5	7097.358^b	98.6
7098.762	2.5288^o	4.5	0.7827	5.5	7098.781	7.1
7106.195	2.3476^o	5.5	0.6034	5.5	7106.197	133.7
7114.549	2.8249	6.5	1.0828^o	6.5	7114.551^c	136.7
7129.720	2.8331^o	5.5	1.0946	5.5	7129.724	10.6
7137.080	2.5469^o	3.5	0.8103	3.5	7137.036	17.9
7143.077	1.9059	6.5	0.1707^o	5.5	7143.093	61.0
7152.609	2.0858	6.5	0.3529^o	6.5	7152.593	7.5
7153.791	1.7326	4.5	0.0000^o	4.5	7153.793^c	8.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7162.643	2.8251^o	6.5	1.0946	5.5	7162.661	60.9
7170.848	2.3318^o	5.5	0.6034	5.5	7170.833	21.7
7172.252	2.8773^o	5.5	1.1491	5.5	7172.257	32.3
7180.402	3.0169	5.5	1.2907^o	6.5	7180.410	14.0
7187.376	2.7474	3.5	1.0229^o	4.5	7187.324	5.9
7188.539	2.8197	5.5	1.0954^o	5.5	7188.586^b	12.2
7188.559	3.4924^o	5.5	1.7682	4.5	7188.586^b	12.2
7191.222	3.0169	5.5	1.2933^o	5.5	7191.250	8.3
7193.913	2.2661	7.5	0.5432^o	7.5	7193.929^b	6.0
7193.960	3.0137	5.5	1.2907^o	6.5	7193.928^b	6.5
7200.105	3.0774	5.5	1.3559^o	4.5	7200.130	7.8
7202.470	3.0142	5.5	1.2933^o	5.5	7202.483	7.3
7204.821	3.0137	5.5	1.2933^o	5.5	7204.813	8.8
7206.613	1.7199	5.5	0.0000^o	4.5	7206.638	180.6
7207.975	2.5520^o	5.5	0.8324	5.5	7207.966	19.4
7209.274	1.7193	3.5	0.0000^o	4.5	7209.296	197.6
7214.560	3.0088	6.5	1.2907^o	6.5	7214.561	40.6
7222.890	2.8107^o	6.5	1.0946	5.5	7222.899	59.0
7231.536	3.0047	6.5	1.2907^o	6.5	7231.530	130.0
7232.583	1.7137	4.5	0.0000^o	4.5	7232.584	61.6
7254.163	1.7086	3.5	0.0000^o	4.5	7254.173	52.0
7259.183	2.2570^o	5.5	0.5495	4.5	7259.219	270.8
7269.909	3.1819	8.5	1.4770^o	9.5	7269.901	11.6
7278.717	1.8735	5.5	0.1707^o	5.5	7278.727^c	170.6
7282.636	1.7020	5.5	0.0000^o	4.5	7282.648	14.5
7287.631	3.3473	7.5	1.6465^o	8.5	7287.598	50.3
7289.188	2.9912	7.5	1.2907^o	6.5	7289.190	105.4
7291.043	2.5187^o	5.5	0.8187	6.5	7291.058	9.5
7306.812	2.5288^o	4.5	0.8324	5.5	7306.807	74.6
7312.814	2.6409^o	5.5	0.9460	6.5	7312.808	7.4
7314.472	3.2114^o	6.5	1.5169	5.5	7314.446	8.6
7317.230	2.9846	6.5	1.2907^o	6.5	7317.232	56.9
7326.168	2.5106^o	5.5	0.8187	6.5	7326.157	17.7
7328.467	2.9846	6.5	1.2933^o	5.5	7328.477^c	46.8
7347.831	1.6868	4.5	0.0000^o	4.5	7347.862	26.8
7369.426	2.9752	6.5	1.2933^o	5.5	7369.437	10.2
7381.146	2.9726	4.5	1.2933^o	5.5	7381.157	15.7
7382.024	3.1438	6.5	1.4648^o	7.5	7382.035	9.9
7388.554	2.0305	5.5	0.3529^o	6.5	7388.572	12.3
7396.059	2.3978^o	4.5	0.7219	4.5	7396.083^c	9.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7396.880	3.3185^o	5.5	1.6428	6.5	7396.842	10.0
7401.584	3.1394	7.5	1.4648^o	7.5	7401.583^c	24.5
7403.525	2.5288^o	4.5	0.8546	5.5	7403.527	92.9
7427.651	2.9621	6.5	1.2933^o	5.5	7427.668^b	35.0
7427.711	3.3886^o	4.5	1.7199	5.5	7427.669^b	35.7
7442.570	1.6654	4.5	0.0000^o	4.5	7442.611	316.3
7448.053	3.1205	7.5	1.4563^o	6.5	7448.088	5.1
7454.529	2.6562^o	3.5	0.9935	3.5	7454.532	22.7
7458.311	2.0148	6.5	0.3529^o	6.5	7458.322	26.7
7459.869	2.8107^o	6.5	1.1491	5.5	7459.856	4.6
7466.449	2.6619	6.5	1.0018^o	5.5	7466.448	10.0
7467.960	2.9531	4.5	1.2933^o	5.5	7467.974	23.6
7470.047	2.6052^o	5.5	0.9460	6.5	7470.086^b	205.4
7470.053	2.8599	5.5	1.2007^o	6.5	7470.086^b	205.4
7484.846	2.6494^o	2.5	0.9935	3.5	7484.842^b	30.9
7484.880	2.5106^o	5.5	0.8546	5.5	7484.842^b	31.0
7491.302	2.9274^o	5.5	1.2729	6.5	7491.321	10.8
7495.570	2.2570^o	5.5	0.6034	5.5	7495.591	1167.4
7502.461	3.1450^o	5.5	1.4929	6.5	7502.460	6.2
7504.252	2.8251^o	6.5	1.1734	6.5	7504.302	16.1
7513.010	3.2548	8.5	1.6050^o	9.5	7513.046^b	74.3
7513.038	2.4685^o	5.5	0.8187	6.5	7513.046^b	73.4
7513.067	3.1306^o	5.5	1.4809	5.5	7513.046^b	76.6
7515.009	2.8251^o	6.5	1.1758	5.5	7515.041^b	5.4
7515.066	3.3362^o	4.5	1.6868	4.5	7515.041^b	5.7
7525.299	3.2936	8.5	1.6465^o	8.5	7525.299	29.8
7525.758	1.8176	5.5	0.1707^o	5.5	7525.776	22.3
7532.216	1.6456	4.5	0.0000^o	4.5	7532.232^c	9.4
7542.280	2.9274^o	5.5	1.2840	4.5	7542.316	7.3
7567.452	3.1027	8.5	1.4648^o	7.5	7567.493	909.8
7603.591	1.9831	7.5	0.3529^o	6.5	7603.546	12.7
7608.007	2.7238^o	5.5	1.0946	5.5	7608.014	9.1
7612.879	3.1382^o	6.5	1.5101	5.5	7612.933	2.5
7614.914	1.7984	5.5	0.1707^o	5.5	7614.936	70.8
7618.065	2.1702	6.5	0.5432^o	7.5	7618.070	47.7
7623.718	2.1690	8.5	0.5432^o	7.5	7623.746	50.9
7624.491	2.3476^o	5.5	0.7219	4.5	7624.519	7.6
7629.251	2.6562^o	3.5	1.0316	4.5	7629.263	38.1
7635.281	1.7940	6.5	0.1707^o	5.5	7635.306^c	6.3
7636.308	1.7938	4.5	0.1707^o	5.5	7636.331	16.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7656.490	3.4924^o	5.5	1.8735	5.5	7656.504	28.2
7659.887	2.9105^o	5.5	1.2923	6.5	7659.893	12.1
7661.384	2.1610	7.5	0.5432^o	7.5	7661.407	5.3
7669.101	1.6162	5.5	0.0000^o	4.5	7669.118	28.2
7671.508	2.6985	5.5	1.0828^o	6.5	7671.500	8.9
7685.349	3.0691	7.5	1.4563^o	6.5	7685.372	25.2
7698.968	2.3318^o	5.5	0.7219	4.5	7698.955	28.0
7710.285	3.0411^o	7.5	1.4336	6.5	7710.244	5.1
7717.642	2.5520^o	5.5	0.9460	6.5	7717.664	6.4
7756.762	3.0542	7.5	1.4563^o	6.5	7756.766	10.7
7758.345	2.8899^o	5.5	1.2923	6.5	7758.349	15.0
7758.809	3.3174^o	5.5	1.7199	5.5	7758.858^b	44.0
7758.833	2.6803	6.5	1.0828^o	6.5	7758.858^b	43.9
7758.851	1.7682	4.5	0.1707^o	5.5	7758.858^b	43.9
7761.170	2.1402	7.5	0.5432^o	7.5	7761.217	42.1
7764.027	2.9736^o	3.5	1.3771	2.5	7764.025	87.1
7783.170	2.5880^o	3.5	0.9955	4.5	7783.164	11.0
7791.517	1.9437	6.5	0.3529^o	6.5	7791.546^c	13.6
7793.692	3.0239^o	6.5	1.4336	6.5	7793.707	5.5
7798.111	3.0542	7.5	1.4648^o	7.5	7798.112	6.6
7804.662	2.5341^o	6.5	0.9460	6.5	7804.669	98.6
7807.697	2.3978^o	4.5	0.8103	3.5	7807.750	5.3
7809.253	1.7579	5.5	0.1707^o	5.5	7809.272	64.8
7820.169	4.0547^o	4.5	2.4697	5.5	7820.229^b	18.6
7820.218	2.8773^o	5.5	1.2923	6.5	7820.229^b	18.7
7829.913	2.3933^o	4.5	0.8103	3.5	7829.954	17.1
7843.379	1.5803	4.5	0.0000^o	4.5	7843.416	45.6
7859.133	1.9300	5.5	0.3529^o	6.5	7859.190	12.8
7865.038	1.7466	6.5	0.1707^o	5.5	7865.068	37.7
7876.191	2.6052^o	5.5	1.0316	4.5	7876.185	6.9
7881.084	2.5187^o	5.5	0.9460	6.5	7881.091	172.2
7897.745	3.3473	7.5	1.7779^o	8.5	7897.730	23.9
7898.880	2.8599	5.5	1.2907^o	6.5	7898.891	10.7
7901.921	3.2114^o	6.5	1.6428	6.5	7901.984	13.7
7911.977	2.8599	5.5	1.2933^o	5.5	7911.994	30.3
7918.212	2.3978^o	4.5	0.8324	5.5	7918.205	178.0
7920.709	2.3476^o	5.5	0.7827	5.5	7920.718	21.0
7922.096	3.4704^o	6.5	1.9059	6.5	7922.108^b	113.3
7922.140	2.5106^o	5.5	0.9460	6.5	7922.108^b	113.9
7928.926	2.5567^o	2.5	0.9935	3.5	7928.929	30.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7935.490	1.7326	4.5	0.1707^o	5.5	7935.515	27.0
7941.063	2.3933^o	4.5	0.8324	5.5	7941.066	531.0
7943.233	3.1724	6.5	1.6120^o	7.5	7943.187	7035.9
7962.948	2.9105^o	5.5	1.3539	4.5	7962.980^b	10.5
7962.967	2.5520^o	5.5	0.9955	4.5	7962.980^b	10.5
7963.608	2.5880^o	3.5	1.0316	4.5	7963.569	97.3
7978.753	2.5469^o	3.5	0.9935	3.5	7978.736	38.5
7981.480	1.9059	6.5	0.3529^o	6.5	7981.490	4.7
8000.540	1.7199	5.5	0.1707^o	5.5	8000.580	18.3
8001.116	2.3318^o	5.5	0.7827	5.5	8001.117	46.9
8015.775	2.7469	6.5	1.2007^o	6.5	8015.797^b	5.7
8015.781	2.6409^o	5.5	1.0946	5.5	8015.797^b	5.8
8031.914	2.3978^o	4.5	0.8546	5.5	8031.927	104.8
8032.527	3.0239^o	6.5	1.4809	5.5	8032.584^b	35.7
8032.559	1.7137	4.5	0.1707^o	5.5	8032.584^b	35.7
8055.426	2.3933^o	4.5	0.8546	5.5	8055.438	206.9
8073.256	2.5288^o	4.5	0.9935	3.5	8073.233	30.8
8074.535	2.2570^o	5.5	0.7219	4.5	8074.593	9.3
8078.893	2.8249	6.5	1.2907^o	6.5	8078.892	35.0
8085.133	2.8307^o	6.5	1.2977	7.5	8085.174	19.2
8093.793	2.8221	7.5	1.2907^o	6.5	8093.807	3.8
8114.948	3.1394	7.5	1.6120^o	7.5	8114.974	19.7
8118.560	3.4704^o	6.5	1.9437	6.5	8118.502	4348.7
8141.104	2.4685^o	5.5	0.9460	6.5	8141.120	242.0
8151.207	1.8735	5.5	0.3529^o	6.5	8151.171^c	20.3
8163.700	2.9049^o	4.5	1.3867	4.5	8163.757^b	33.5
8163.814	2.0614	6.5	0.5432^o	7.5	8163.755^b	28.1
8171.281	1.5169	5.5	0.0000^o	4.5	8171.324	12.0
8174.294	2.5880^o	3.5	1.0717	4.5	8174.289^b	30.6
8174.294	3.4222^o	5.5	1.9059	6.5	8174.289^b	30.6
8174.962	1.6868	4.5	0.1707^o	5.5	8175.009	11.0
8177.169	2.3345^o	6.5	0.8187	6.5	8177.190	64.7
8179.243	2.5469^o	3.5	1.0316	4.5	8179.250	37.3
8180.608	2.3476^o	5.5	0.8324	5.5	8180.626	63.3
8191.481	2.3318^o	5.5	0.8187	6.5	8191.489^{bc}	75.9
8191.494	2.9467^o	5.5	1.4336	6.5	8191.489^{bc}	75.9
8193.293	2.6619^o	5.5	1.1491	5.5	8193.295	4.6
8200.693	2.5132	5.5	1.0018^o	5.5	8200.711^b	6.5
8200.706	2.6848^o	7.5	1.1734	6.5	8200.711^b	6.5
8205.088	2.6052^o	5.5	1.0946	5.5	8205.109	15.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8213.386	2.9899^o	6.5	1.4809	5.5	8213.393^b	39.5
8213.393	2.3415^o	4.5	0.8324	5.5	8213.393^b	38.8
8213.433	3.0259^o	5.5	1.5169	5.5	8213.393^b	39.4
8238.504	1.8574	5.5	0.3529^o	6.5	8238.529	12.6
8245.598	3.5337^o	4.5	2.0305	5.5	8245.583	8.5
8308.700	2.6409^o	5.5	1.1491	5.5	8308.729	12.4
8311.670	2.9560	7.5	1.4648^o	7.5	8311.671	25.8
8326.963	3.3185^o	5.5	1.8300	5.5	8326.944	401.2
8335.795	2.3415^o	4.5	0.8546	5.5	8335.831^b	14.2
8335.885	3.3174^o	5.5	1.8305	4.5	8335.831^b	11.2
8341.700	2.8418	4.5	1.3559^o	4.5	8341.663	95.8
8345.669	2.9500	8.5	1.4648^o	7.5	8345.678^b	23.4
8345.718	2.9660^o	5.5	1.4809	5.5	8345.678^b	23.5
8363.130	1.8350	7.5	0.3529^o	6.5	8363.174	11.3
8369.971	1.4809	5.5	0.0000^o	4.5	8369.957	20.0
8383.693	2.8773^o	5.5	1.3989	5.5	8383.700	4.0
8392.364	2.9105^o	5.5	1.4336	6.5	8392.375	7.1
8395.980	2.8282^o	5.5	1.3519	5.5	8395.962	34.7
8403.842	1.6456	4.5	0.1707^o	5.5	8403.868	80.8
8483.277	3.3185^o	5.5	1.8574	5.5	8483.251	31.0
8520.723	2.7275^o	6.5	1.2729	6.5	8520.731	11.0
8528.319	2.3978^o	4.5	0.9444	3.5	8528.348	5.4
8534.995	1.4522	4.5	0.0000^o	4.5	8535.008^b	60.0
8534.995	3.3258^o	5.5	1.8735	5.5	8535.008^b	60.0
8554.832	2.3933^o	4.5	0.9444	3.5	8554.848	8.3
8591.326	3.2006^o	4.5	1.7579	5.5	8591.317	43416.5
8602.793	2.4636	4.5	1.0229^o	4.5	8602.730	5.4
8610.580	2.5341^o	6.5	1.0946	5.5	8610.593	6.5
8625.862	2.4685^o	5.5	1.0316	4.5	8625.849	101.9
8636.414	2.7275^o	6.5	1.2923	6.5	8636.415	12.6
8642.723	2.5288^o	4.5	1.0946	5.5	8642.765^c	9.5
8700.936	2.2570^o	5.5	0.8324	5.5	8700.970	80.7
8760.814	2.2472^o	4.5	0.8324	5.5	8760.833	44.7
8824.177	3.2621^o	5.5	1.8574	5.5	8824.216	8.6
8835.267	2.5520^o	5.5	1.1491	5.5	8835.265	13.6
8838.423	2.2570^o	5.5	0.8546	5.5	8838.462	38.7
8849.775	3.3185^o	5.5	1.9179	5.5	8849.832^b	7.7
8849.799	1.9437	6.5	0.5432^o	7.5	8849.832^b	7.7
8857.985	2.6916^o	6.5	1.2923	6.5	8858.041	5.3
8860.544	1.3989	5.5	0.0000^o	4.5	8860.532	35.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8873.592	2.4685^o	5.5	1.0717	4.5	8873.645	6.2
8935.359	2.6848^o	7.5	1.2977	7.5	8935.329	35.3
8936.701	2.6803	6.5	1.2933^o	5.5	8936.715	9.6
8938.563	1.3867	4.5	0.0000^o	4.5	8938.551	19.6
8943.777	2.3318^o	5.5	0.9460	6.5	8943.765	19.2
8983.559	2.4625	5.5	1.0828^o	6.5	8983.585	30.4
9021.923	2.4685^o	5.5	1.0946	5.5	9021.949	111.3
9030.357	2.5217^o	6.5	1.1491	5.5	9030.355	61.7
9088.654	2.6614^o	6.5	1.2977	7.5	9088.604	38.4
9109.980	2.3540^o	3.5	0.9935	3.5	9109.980^b	42.2
9110.005	3.0259^o	5.5	1.6654	4.5	9109.980^b	41.3
9125.106	2.5880^o	3.5	1.2297	3.5	9125.066	7.8
9154.661	1.3539	4.5	0.0000^o	4.5	9154.731	104.2
9167.043	2.3476^o	5.5	0.9955	4.5	9167.094	12.8
9188.013	1.7020	5.5	0.3529^o	6.5	9188.055	64.8
9192.845	2.5217^o	6.5	1.1734	6.5	9192.873	14.4
9547.339	3.2041^o	6.5	1.9059	6.5	9547.409	1280.4
9806.955	2.7792	6.5	1.5153^o	6.5	9807.020	29.3
9908.656	3.1568^o	5.5	1.9059	6.5	9908.596	33.0
10085.090	3.1469^o	6.5	1.9179	5.5	10085.040	57.9
10103.447	2.9467^o	5.5	1.7199	5.5	10103.502	86.9

Table A.6: Measured wavelengths (λ_o) and intensities of Pr II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	$\log gf$ Boltz.	$\log gf$ NIST-ASD
3815.870	3.3030	5.0	0.0548^o	5.0	3815.843	787.4	0.7	0.7	
3880.464	3.1941	3.0	0.0000^o	4.0	3880.486	120.9		-0.3	
3885.195	3.3947	5.0	0.2044^o	6.0	3885.175	66.9		-0.2	
3920.532	3.1615	5.0	0.0000^o	4.0	3920.540	402.4	0.2	0.2	
3925.466	3.1575	4.0	0.0000^o	4.0	3925.459^n	109.5		-0.4	-0.3
3927.463	3.3721	5.0	0.2162^o	5.0	3927.477	53.2		-0.4	
3962.450	3.3442	5.0	0.2162^o	5.0	3962.444	24.4		-0.7	
3982.052	3.5345	6.0	0.4219^o	6.0	3982.054	178.6		0.5	
3997.040	3.4727	7.0	0.3717^o	7.0	3997.055^n	39.1		-0.3	-0.2
4004.702	3.3112	5.0	0.2162^o	5.0	4004.696^n	78.3		-0.3	-0.2
4015.391	3.3030	5.0	0.2162^o	5.0	4015.388^n	60.1		-0.4	-0.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4038.455	3.0691	4.0	0.0000^o	4.0	4038.438	95.3		-0.6	
4044.813	3.0643	5.0	0.0000^o	4.0	4044.785^n	83.2		-0.7	-0.3
4054.860	3.2729	6.0	0.2162^o	5.0	4054.859^n	240.0		0.2	0.2
4058.800	3.4757	6.0	0.4219^o	6.0	4058.813^n	28.2		-0.4	-0.4
4062.805	3.4727	7.0	0.4219^o	6.0	4062.814^b	554.5	1.0	0.9	
4062.806	3.4225	6.0	0.3717^o	7.0	4062.814^b	645.7		0.9	
4083.341	3.2516	4.0	0.2162^o	5.0	4083.334	66.0		-0.4	
4096.820	3.2416	5.0	0.2162^o	5.0	4096.825^n	90.8		-0.3	-0.3
4107.507	4.1750^o	5.0	1.1575	4.0	4107.510	32.3		0.9	
4129.147	4.0406^o	5.0	1.0389	5.0	4129.164	39.0		0.7	
4130.771	3.4225	6.0	0.4219^o	6.0	4130.765	33.2		-0.4	
4141.224	3.5431	7.0	0.5501^o	8.0	4141.212^b	443.5		0.9	
4141.228	3.4757	6.0	0.4827^o	6.0	4141.212^b	443.5	0.8	0.8	
4169.446	3.3947	5.0	0.4219^o	6.0	4169.461	29.1		-0.5	
4174.907	4.1678^o	6.0	1.1990	6.0	4174.910	19.8		0.7	
4175.622	4.1258^o	5.0	1.1575	4.0	4175.638	10.8		0.3	
4206.719	3.4965	8.0	0.5501^o	8.0	4206.705^n	160.3		0.4	0.3
4208.313	3.1615	5.0	0.2162^o	5.0	4208.315^n	39.6		-0.8	-0.5
4216.179	3.4225	6.0	0.4827^o	6.0	4216.182	1036.1			
4282.452	3.4444	8.0	0.5501^o	8.0	4282.409^n	72.5		0.0	-0.1
4297.766	2.8840	5.0	0.0000^o	4.0	4297.750	288.9	-0.7	-0.3	
4307.907	4.3559^o	6.0	1.4787	5.0	4307.899	684.2			
4320.377	4.1258^o	5.0	1.2569	6.0	4320.356^c	32.1		0.8	
4329.416	3.0791	6.0	0.2162^o	5.0	4329.417^n	37.7		-0.9	-0.9
4338.700	3.2787	7.0	0.4219^o	6.0	4338.708	65.4		-0.3	
4351.842	3.0643	5.0	0.2162^o	5.0	4351.834	166.6	-0.0	-0.3	
4354.911	3.8241^o	5.0	0.9780	5.0	4354.909	44.8		0.5	
4361.547	4.1394^o	5.0	1.2976	5.0	4361.523^c	21.8		0.7	
4395.761	3.2416	5.0	0.4219^o	6.0	4395.781^c	92.2	-0.2	-0.2	
4403.595	3.4444	8.0	0.6297^o	7.0	4403.577^n	30.3		-0.3	-0.4
4406.633	2.8127	4.0	0.0000^o	4.0	4406.617	13.0		-1.8	
4413.769	3.0244	6.0	0.2162^o	5.0	4413.762^n	204.0		-0.2	-0.6
4429.126	2.7984	5.0	0.0000^o	4.0	4429.133^n	429.2		-0.3	-0.5
4470.369	4.1678^o	6.0	1.3952	7.0	4470.378	63.6			
4496.458	2.8113	5.0	0.0548^o	5.0	4496.386^n	32.2		-1.4	-0.4
4516.125	4.3667^o	5.0	1.6222	6.0	4516.109	74.1			
4522.701	4.1394^o	5.0	1.3989	6.0	4522.716^b	92.0			
4522.742	4.2192^o	6.0	1.4787	5.0	4522.716^b	99.3			
4535.923	2.7325	5.0	0.0000^o	4.0	4535.916^n	355.3		-0.4	-0.7
4553.497	4.2192^o	6.0	1.4972	6.0	4553.491	44.8			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4612.080	2.6874	5.0	0.0000^o	4.0	4612.063	39.6		-1.5	
4658.398	4.1394^o	5.0	1.4787	5.0	4658.359^c	101.2			
4742.336	4.4010^o	5.0	1.7874	6.0	4742.303	105.2			
4802.867	4.2192^o	6.0	1.6386	6.0	4802.880	50.6			
4855.297	4.1750^o	5.0	1.6222	6.0	4855.324	35.5			
4869.359	3.1752	6.0	0.6297^o	7.0	4869.330	208.2		0.2	
4874.998	2.9142	6.0	0.3717^o	7.0	4875.015	283.3		-0.1	
4925.624	2.7325	5.0	0.2162^o	5.0	4925.655^b	65.8	-1.3	-1.1	
4925.673	3.0244	6.0	0.5080^o	5.0	4925.655^b	65.8	-0.9	-0.6	
4953.214	4.1460^o	4.0	1.6436	3.0	4953.213^c	33.3			
4984.929	4.3667^o	5.0	1.8803	5.0	4984.904	79.0			
5044.213	2.9399	5.0	0.4827^o	6.0	5044.231^c	26.4		-1.1	
5084.429	2.8095	7.0	0.3717^o	7.0	5084.450^c	219.0		-0.4	
5110.371	2.9334	4.0	0.5080^o	5.0	5110.408	375.9		0.1	
5110.760	3.5727	9.0	1.1475^o	10.0	5110.778	53.0		0.3	
5115.179	3.4757	6.0	1.0526^o	5.0	5115.216^c	142.8	0.6	0.6	
5120.545	3.3428	6.0	0.9222^o	5.0	5120.570^c	204.4		0.5	
5129.533	3.0643	5.0	0.6480^o	6.0	5129.530^n	92.5		-0.3	-0.1
5135.140	3.3634	8.0	0.9497^o	8.0	5135.137^n	59.4		0.0	-0.1
5145.167	2.9170	4.0	0.5080^o	5.0	5145.133	191.7		-0.2	
5161.744	2.8840	5.0	0.4827^o	6.0	5161.723^n	163.6		-0.4	-0.7
5173.902	3.3634	8.0	0.9677^o	9.0	5173.901^n	160.5		0.5	0.4
5177.337	4.1678^o	6.0	1.7738	7.0	5177.368^c	1193.2			
5201.376	4.2192^o	6.0	1.8363	7.0	5201.339	37.9			
5219.045	3.1701	7.0	0.7952^o	7.0	5219.053^n	44.4		-0.4	-0.1
5220.108	3.1701	7.0	0.7957^o	8.0	5220.102^n	169.4		0.2	0.3
5227.158	2.4260	4.0	0.0548^o	5.0	5227.187	1087.5		-0.3	
5259.728	2.9899	6.0	0.6333^o	7.0	5259.728^n	141.7		-0.2	0.1
5263.874	2.8374	5.0	0.4827^o	6.0	5263.732^n	105.1		-0.6	-0.6
5280.838	3.5431	7.0	1.1960^o	6.0	5280.854	34.0		0.1	
5292.619	2.9899	6.0	0.6480^o	6.0	5292.626^n	70.4		-0.5	-0.3
5311.115	3.4444	8.0	1.1107^o	9.0	5311.076	35.0	-0.1	-0.0	
5321.069	2.8374	5.0	0.5080^o	5.0	5321.061	29.2	-1.1	-1.1	
5352.398	2.7984	5.0	0.4827^o	6.0	5352.410^n	67.2		-0.8	-0.7
5411.544	2.7984	5.0	0.5080^o	5.0	5411.560	64.5	-1.0	-0.8	
5434.480	3.3302	7.0	1.0495^o	6.0	5434.519	42.6		-0.1	
5435.098	2.3353	6.0	0.0548^o	5.0	5435.127	77.3		-1.6	
5482.998	2.4650	6.0	0.2044^o	6.0	5483.022	31.9		-1.7	
5485.860	2.8095	7.0	0.5501^o	8.0	5485.903	105.7		-0.6	
5501.452	3.1752	6.0	0.9222^o	5.0	5501.489	97.9		0.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5509.147	2.7325	5.0	0.4827^o	6.0	5509.150	91.9	-1.0	-0.8	
5511.628	2.4650	6.0	0.2162^o	5.0	5511.660	529.8		-0.5	
5519.823	4.1258^o	5.0	1.8803	5.0	5519.791^c	41.0			
5535.166	3.1615	5.0	0.9222^o	5.0	5535.167^n	18.2		-0.7	-0.8
5551.086	3.4929	7.0	1.2601^o	6.0	5551.070	89.3		0.5	
5565.559	3.2312	5.0	1.0042^o	4.0	5565.529	379.1		0.7	
5754.237	4.1678^o	6.0	2.0138	6.0	5754.261	56.2			
5823.722	2.3445	5.0	0.2162^o	5.0	5823.674	49.3		-1.6	
5847.054	3.2516	4.0	1.1318^o	4.0	5847.026	331.8		0.7	
5859.676	3.5345	6.0	1.4193^o	5.0	5859.662	36.2		0.3	
5873.851	3.2729	6.0	1.1628^o	5.0	5873.846	26.7	-0.3	-0.3	
5874.731	3.2416	5.0	1.1318^o	4.0	5874.713^c	208.5	0.6	0.5	
5924.218	3.4225	6.0	1.3303^o	6.0	5924.181^c	126.8		0.6	
5945.944	2.7325	5.0	0.6480^o	6.0	5945.933	70.5	-1.1	-0.8	
5966.914	3.4929	7.0	1.4157^o	7.0	5966.952^c	43.0		0.3	
5968.261	4.3667^o	5.0	2.2900	4.0	5968.289	379.1			
6006.331	3.7217	7.0	1.6581^o	8.0	6006.307	18.9		0.3	
6090.040	3.2312	5.0	1.1960^o	6.0	6090.014	88.4		0.2	
6148.243	3.4727	7.0	1.4567^o	6.0	6148.226^c	159.2	1.0	0.9	
6158.886	3.3428	6.0	1.3303^o	6.0	6158.877	79.5		0.3	
6161.179	3.0643	5.0	1.0526^o	5.0	6161.182^n	46.8		-0.4	-0.2
6165.891	2.9334	4.0	0.9232^o	4.0	6165.927	49.7		-0.6	
6253.231	3.4444	8.0	1.4623^o	7.0	6253.233^c	35.5	0.1	0.2	
6281.276	2.9334	4.0	0.9601^o	3.0	6281.277	72.2		-0.4	
6357.227	3.2040	5.0	1.2543^o	4.0	6357.181^c	317.2		0.8	
6389.570	3.1941	3.0	1.2543^o	4.0	6389.587	187.7		0.5	
6498.933	3.1615	5.0	1.2543^o	4.0	6498.925^n	6.4		-1.0	-1.2
6549.515	2.5404	7.0	0.6480^o	6.0	6549.520^c	52.1		-1.1	
6615.667	3.3302	7.0	1.4567^o	6.0	6615.650^c	13.6		-0.3	
6656.834	3.6852	8.0	1.8233^o	9.0	6656.827	12.1		0.2	
6673.408	3.4727	7.0	1.6154^o	8.0	6673.408^n	9.9		-0.2	-0.1
6690.129	4.4010^o	5.0	2.5483	6.0	6690.094^c	69.5			
6714.771	2.4939	6.0	0.6480^o	6.0	6714.784^c	41.5		-1.3	
6749.187	2.3445	5.0	0.5080^o	5.0	6749.215	143.9		-1.0	
6753.619	2.4650	6.0	0.6297^o	7.0	6753.615	15.5		-1.7	
6766.899	2.4650	6.0	0.6333^o	7.0	6766.908	20.4		-1.6	
6783.231	2.3353	6.0	0.5080^o	5.0	6783.200	14.3		-2.0	
7004.387	2.1915	5.0	0.4219^o	6.0	7004.366^c	181.6		-1.1	
7042.430	2.8095	7.0	1.0495^o	6.0	7042.408^c	134.7		-0.2	
7062.679	3.2729	6.0	1.5180^o	7.0	7062.718^c	281.4		1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
7079.980	4.0406^o	5.0	2.2900	4.0	7079.987^c	294.4			
7087.590	3.0791	6.0	1.3303^o	6.0	7087.626^c	5.4	-1.1	-1.1	
7093.806	3.2040	5.0	1.4567^o	6.0	7093.798^c	84.7		0.3	
7099.503	2.7984	5.0	1.0526^o	5.0	7099.561	26.6	-1.0	-0.9	
7114.570	3.1615	5.0	1.4193^o	5.0	7114.551^c	137.2	0.5	0.5	
7153.735	1.7874	6.0	0.0548^o	5.0	7153.793^c	7.3		-3.2	
7278.722	2.9629	7.0	1.2601^o	6.0	7278.727^c	170.6		0.2	
7328.451	2.8127	4.0	1.1214^o	3.0	7328.477^c	46.7		-0.6	
7396.038	1.8803	5.0	0.2044^o	6.0	7396.083^c	9.6		-2.8	
7401.552	2.8374	5.0	1.1628^o	5.0	7401.583^c	24.8	-0.8	-0.8	
7467.230	3.0244	6.0	1.3645^o	7.0	7467.197	17.1	-1.0	-0.6	
7514.512	2.4451	8.0	0.7957^o	8.0	7514.551	11.9		-1.8	
7532.205	4.1394^o	5.0	2.4939	6.0	7532.232^c	9.4			
7540.989	1.6436	3.0	0.0000^o	4.0	7541.013	3.8		-3.6	
7546.186	2.9728	6.0	1.3303^o	6.0	7546.213	31.8		-0.4	
7569.377	3.0770	7.0	1.4395^o	8.0	7569.323	15.0		-0.6	
7635.328	2.7861	6.0	1.1628^o	5.0	7635.306^c	6.5		-1.4	
7786.141	2.0138	6.0	0.4219^o	6.0	7786.180	25.1		-2.1	
7791.572	2.5404	7.0	0.9497^o	8.0	7791.546^c	13.4		-1.5	
8052.383	4.3559^o	6.0	2.8166	6.0	8052.344	15.2			
8151.107	2.9399	5.0	1.4193^o	5.0	8151.169^c	9.0		-0.9	
8160.862	4.2192^o	6.0	2.7004	6.0	8160.806	58.5			
8188.797	3.9396^o	4.0	2.4260	4.0	8188.780	52.6			
8191.434	2.9324	5.0	1.4193^o	5.0	8191.489^c	75.9		-0.0	
8224.238	2.8374	5.0	1.3303^o	6.0	8224.296	2.5	-1.6	-1.6	
8642.753	1.6386	6.0	0.2044^o	6.0	8642.765^c	9.5		-3.1	

Table A.7: Measured wavelengths (λ_o) and intensities of Nd I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
3948.142	3.2792^o	4.0	0.1399	5.0	3948.149	22.5		-1.7	
3982.272	3.2523^o	4.0	0.1399	5.0	3982.277^c	43.6		-1.4	
3992.969	3.9427	7.0	0.8386^o	6.0	3992.983	32.4		-0.6	
4037.632	3.9084	7.0	0.8386^o	6.0	4037.643	34.7		-0.6	
4053.508	3.1976^o	4.0	0.1399	5.0	4053.513^c	36.5		-1.5	
4066.841	3.0477^o	5.0	0.0000	4.0	4066.854	32.2		-1.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4083.896	3.0350^{o}	4.0	0.0000	4.0	4083.904	146.1		-1.1	
4092.646	3.1684^{o}	5.0	0.1399	5.0	4092.650^{c}	30.8		-1.6	
4103.002	3.8595	5.0	0.8386^{o}	6.0	4103.010	17.8		-1.0	
4122.980	3.0062^{o}	4.0	0.0000	4.0	4122.979^{c}	38.0		-1.7	
4126.546	3.1435^{o}	6.0	0.1399	5.0	4126.551	23.4		-1.8	
4142.016	3.2858^{o}	5.0	0.2934	6.0	4141.995	10.9		-1.9	
4160.628	3.2724^{o}	7.0	0.2934	6.0	4160.618	13.6		-1.8	
4176.092	3.4245^{o}	7.0	0.4565	7.0	4176.094^{c}	13.6		-1.6	
4205.263	3.4039^{o}	6.0	0.4565	7.0	4205.263^{bc}	21.1		-1.4	
4205.272	3.5733^{o}	8.0	0.6259	8.0	4205.263^{bc}	19.1		-1.3	
4210.979	3.0833^{o}	5.0	0.1399	5.0	4210.986^{c}	106.1		-1.1	
4252.949	4.3229	3.0	1.4085^{o}	4.0	4252.967	20.2		-0.3	
4256.462	2.9120^{o}	3.0	0.0000	4.0	4256.467^{c}	452.3		-0.7	
4258.095	3.0507^{o}	4.0	0.1399	5.0	4258.100	79.0		-1.3	
4265.659	3.7443	5.0	0.8386^{o}	6.0	4265.675^{b}	38.9		-0.7	
4265.700	3.9474	8.0	1.0417^{o}	7.0	4265.677^{b}	56.7		-0.3	
4275.171	3.1926^{o}	6.0	0.2934	6.0	4275.177^{c}	25.8		-1.6	
4291.470	3.1816^{o}	6.0	0.2934	6.0	4291.482^{b}	42.8		-1.4	
4291.480	3.5141^{o}	9.0	0.6259	8.0	4291.482^{b}	42.8		-1.0	
4303.580	3.1735^{o}	7.0	0.2934	6.0	4303.577^{c}	187.0		-0.8	
4305.805	2.8786^{o}	3.0	0.0000	4.0	4305.792	72.3		-1.5	
4311.245	3.1684^{o}	5.0	0.2934	6.0	4311.246	261.0		-0.6	
4324.155	3.0062^{o}	4.0	0.1399	5.0	4324.168^{c}	8.7		-2.3	
4329.909	2.8626^{o}	4.0	0.0000	4.0	4329.922	23.0		-2.1	
4331.169	3.3182^{o}	8.0	0.4565	7.0	4331.182	17.7		-1.6	
4343.486	2.8536^{o}	4.0	0.0000	4.0	4343.491^{c}	576.5		-0.7	
4355.474	3.3022^{o}	7.0	0.4565	7.0	4355.485	33.6		-1.3	
4357.558	2.9843^{o}	4.0	0.1399	5.0	4357.567^{c}	56.8		-1.5	
4359.885	2.8429^{o}	3.0	0.0000	4.0	4359.897^{b}	18.8		-2.2	
4359.891	3.2993^{o}	7.0	0.4565	7.0	4359.897^{b}	20.2		-1.5	
4364.613	3.4657^{o}	7.0	0.6259	8.0	4364.628	17.0		-1.4	
4370.736	2.9757^{o}	4.0	0.1399	5.0	4370.745	25.5		-1.9	
4371.607	2.9751^{o}	6.0	0.1399	5.0	4371.611	13.2	-2.1	-2.1	
4373.651	2.9738^{o}	6.0	0.1399	5.0	4373.658	15.4		-2.1	
4381.872	2.8286^{o}	5.0	0.0000	4.0	4381.891^{bc}	86.8		-1.5	
4381.927	2.8286^{o}	4.0	0.0000	4.0	4381.891^{bc}	83.8		-1.5	
4393.340	3.9123	5.0	1.0911^{o}	6.0	4393.347^{c}	19.6		-0.8	
4399.434	3.9084	7.0	1.0911^{o}	6.0	4399.442	32.1		-0.6	
4400.592	3.8595	5.0	1.0429^{o}	6.0	4400.604^{bc}	61.8		-0.3	
4400.592	2.9564^{o}	4.0	0.1399	5.0	4400.604^{bc}	61.8		-1.5	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
4401.536	3.2724^o	7.0	0.4565	7.0	4401.543	366.5		-0.3	
4402.462	3.1088^o	5.0	0.2934	6.0	4402.475^c	138.8		-0.9	
4417.381	2.8059^o	3.0	0.0000	4.0	4417.387	34.6		-1.9	
4418.123	2.9453^o	6.0	0.1399	5.0	4418.119^c	28.7		-1.8	
4420.097	3.0976^o	6.0	0.2934	6.0	4420.111^c	39.2		-1.5	
4428.989	3.4245^o	7.0	0.6259	8.0	4428.995^c	115.5		-0.6	
4444.981	2.7885^o	3.0	0.0000	4.0	4444.987	934.3		-0.5	
4448.890	2.7860^o	4.0	0.0000	4.0	4448.899	26.7		-2.1	
4452.013	3.4100^o	7.0	0.6259	8.0	4452.017^c	74.0		-0.8	
4456.128	2.9213^o	4.0	0.1399	5.0	4456.135	607.0		-0.5	
4475.824	3.0627^o	6.0	0.2934	6.0	4475.831	139.8		-1.0	
4477.870	3.3939^o	7.0	0.6259	8.0	4477.871	988.4		0.3	
4480.960	2.9059^o	4.0	0.1399	5.0	4480.967^c	1389.3		-0.2	
4481.885	2.9054^o	5.0	0.1399	5.0	4481.891	873.8		-0.4	
4494.756	2.7576^o	5.0	0.0000	4.0	4494.759	40.0		-1.9	
4497.366	2.7560^o	3.0	0.0000	4.0	4497.374^c	351.9		-1.0	
4498.734	2.7551^o	3.0	0.0000	4.0	4498.743	55.5		-1.8	
4509.811	3.2048^o	7.0	0.4565	7.0	4509.817	111.5		-0.9	
4527.239	3.3637^o	8.0	0.6259	8.0	4527.242	698.3		0.1	
4529.932	3.1926^o	6.0	0.4565	7.0	4529.938	912.2		0.0	
4543.297	3.5779	6.0	0.8498^o	5.0	4543.309	30.0		-1.0	
4548.236	3.1816^o	6.0	0.4565	7.0	4548.240	583.1		-0.2	
4559.656	3.0117^o	5.0	0.2934	6.0	4559.661^c	1610.6		0.0	
4560.411	2.8577^o	5.0	0.1399	5.0	4560.416^c	691.3		-0.5	
4561.840	3.1735^o	7.0	0.4565	7.0	4561.843	427.0		-0.3	
4562.330	2.8566^o	6.0	0.1399	5.0	4562.337^c	86.1		-1.4	
4567.338	2.8536^o	4.0	0.1399	5.0	4567.343^c	290.1		-0.9	
4569.686	3.5621	5.0	0.8498^o	5.0	4569.685	89.9		-0.5	
4577.164	3.5577	4.0	0.8498^o	5.0	4577.168^c	11.8		-1.4	
4581.188	3.1620^o	7.0	0.4565	7.0	4581.198	63.5		-1.2	
4586.620	3.1588^o	6.0	0.4565	7.0	4586.611^b	1368.8		0.2	
4586.642	4.2528	6.0	1.5505^o	6.0	4586.611^b	1390.3			
4594.665	2.6976^o	4.0	0.0000	4.0	4594.671^c	234.3		-1.2	
4598.417	3.1519^o	6.0	0.4565	7.0	4598.428	31.1		-1.5	
4603.809	3.3182^o	8.0	0.6259	8.0	4603.813	692.8		0.1	
4609.863	2.8286^o	4.0	0.1399	5.0	4609.865^c	1310.8		-0.3	
4613.834	3.1429^o	7.0	0.4565	7.0	4613.834^c	52.2		-1.3	
4618.054	3.5226	7.0	0.8386^o	6.0	4618.051	36.6		-0.9	
4621.932	2.9751^o	6.0	0.2934	6.0	4621.930^n	3157.6		0.3	0.4
4624.179	3.1369^o	6.0	0.4565	7.0	4624.204^b	648.3		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4624.217	2.9738^o	6.0	0.2934	6.0	4624.204^b	647.5		-0.4	
4626.483	2.8189^o	5.0	0.1399	5.0	4626.492	488.5		-0.7	
4631.280	3.3022^o	7.0	0.6259	8.0	4631.288	376.5		-0.2	
4631.595	3.5259	4.0	0.8498^o	5.0	4631.600^b	113.8		-0.4	
4631.616	3.7269^o	5.0	1.0508	5.0	4631.600^b	113.8		-0.2	
4634.210	2.6746^o	3.0	0.0000	4.0	4634.219^n	8295.3		0.3	0.3
4636.275	3.2993^o	7.0	0.6259	8.0	4636.281^c	85.3		-0.8	
4637.179	2.6729^o	5.0	0.0000	4.0	4637.187^c	320.7		-1.1	
4639.125	2.8116^o	4.0	0.1399	5.0	4639.133	1218.2		-0.3	
4644.963	2.9618^o	6.0	0.2934	6.0	4644.969	229.7		-0.8	
4647.899	3.1232^o	8.0	0.4565	7.0	4647.935^b	90.6		-1.0	
4647.940	4.0440	4.0	1.3773^o	5.0	4647.935^b	118.3		0.3	
4651.000	2.8048^o	4.0	0.1399	5.0	4651.008	317.5		-0.9	
4652.373	2.6642^o	4.0	0.0000	4.0	4652.382	1043.8		-0.6	
4654.708	2.8027^o	5.0	0.1399	5.0	4654.716	2036.1		-0.1	
4657.887	2.9544^o	5.0	0.2934	6.0	4657.885^c	31.3		-1.7	
4659.371	3.4988	5.0	0.8386^o	6.0	4659.372^c	96.1		-0.5	
4660.462	3.7013	6.0	1.0417^o	7.0	4660.478^c	33.3		-0.7	
4663.994	2.9509^o	5.0	0.2934	6.0	4663.997	117.0		-1.1	
4664.371	3.1138^o	6.0	0.4565	7.0	4664.373^c	88.2		-1.1	
4671.084	2.7933^o	5.0	0.1399	5.0	4671.093^c	572.8		-0.7	
4673.959	2.9453^o	6.0	0.2934	6.0	4673.964	309.8		-0.7	
4675.517	3.1074^o	7.0	0.4565	7.0	4675.525	384.0		-0.4	
4678.951	3.4988	5.0	0.8498^o	5.0	4678.952	59.9		-0.7	
4683.501	2.6464^o	6.0	0.0000	4.0	4683.437^n	7842.3		0.3	0.3
4684.032	2.7860^o	4.0	0.1399	5.0	4684.035	2004.4		-0.1	
4688.543	3.4822	5.0	0.8386^o	6.0	4688.542	157.8		-0.3	
4690.343	2.6426^o	4.0	0.0000	4.0	4690.345	1819.2		-0.3	
4692.974	3.0976^o	6.0	0.4565	7.0	4692.980^c	87.7		-1.1	
4696.434	3.0956^o	7.0	0.4565	7.0	4696.441	1491.0		0.2	
4698.266	2.7780^o	5.0	0.1399	5.0	4698.304^b	220.6		-1.1	
4698.296	3.2640^o	7.0	0.6259	8.0	4698.304^b	208.2		-0.5	
4706.623	3.0899^o	6.0	0.4565	7.0	4706.631^c	152.4		-0.8	
4708.369	3.4822	5.0	0.8498^o	5.0	4708.364	82.5		-0.6	
4709.541	2.6318^o	3.0	0.0000	4.0	4709.540	59.0		-1.8	
4710.927	3.8908	7.0	1.2597^o	8.0	4710.927^c	33.5		-0.5	
4713.044	2.9233^o	6.0	0.2934	6.0	4713.050	199.4		-0.9	
4719.027	2.6265^o	4.0	0.0000	4.0	4719.025^n	5325.9		0.1	-0.0
4721.231	2.7652^o	6.0	0.1399	5.0	4721.238	51.7		-1.7	
4726.552	2.9158^o	7.0	0.2934	6.0	4726.558	408.0		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4731.417	2.9131^o	6.0	0.2934	6.0	4731.425	49.7		-1.5	
4739.879	3.0714^o	8.0	0.4565	7.0	4739.892^c	76.5		-1.2	
4744.904	3.0687^o	6.0	0.4565	7.0	4744.905	80.9		-1.1	
4745.378	2.9054^o	5.0	0.2934	6.0	4745.380^c	63.0		-1.4	
4749.748	3.0660^o	7.0	0.4565	7.0	4749.750	1116.1		0.0	
4751.262	3.4473	7.0	0.8386^o	6.0	4751.267	33.9		-1.0	
4755.843	3.0627^o	6.0	0.4565	7.0	4755.851	559.5		-0.3	
4759.082	3.0609^o	8.0	0.4565	7.0	4759.088^c	180.0		-0.8	
4759.341	2.6043^o	5.0	0.0000	4.0	4759.346	281.9		-1.2	
4760.450	2.7435^o	5.0	0.1399	5.0	4760.453	247.1		-1.1	
4761.516	2.7429^o	6.0	0.1399	5.0	4761.519	26.6		-2.0	
4768.960	2.5990^o	5.0	0.0000	4.0	4768.967	61.4		-1.8	
4770.186	2.8918^o	6.0	0.2934	6.0	4770.195^c	971.6		-0.3	
4772.258	2.7371^o	4.0	0.1399	5.0	4772.263	366.9		-0.9	
4778.395	2.7337^o	6.0	0.1399	5.0	4778.400^c	288.4		-1.0	
4779.455	2.8867^o	6.0	0.2934	6.0	4779.460	2224.0		0.1	
4780.538	3.6435^o	6.0	1.0508	5.0	4780.541^b	52.0		-0.6	
4780.540	3.6345	6.0	1.0417^o	7.0	4780.541^b	52.0		-0.6	
4781.458	3.0487^o	6.0	0.4565	7.0	4781.467	116.5		-1.0	
4787.410	2.7289^o	4.0	0.1399	5.0	4787.416^c	124.2		-1.4	
4788.344	3.6302	6.0	1.0417^o	7.0	4788.342^c	39.8		-0.7	
4792.624	2.5862^o	4.0	0.0000	4.0	4792.631^c	139.1		-1.5	
4799.073	2.8761^o	5.0	0.2934	6.0	4799.069	39.7		-1.7	
4800.452	3.4317	6.0	0.8498^o	5.0	4800.474	34.9		-1.0	
4806.174	3.2048^o	7.0	0.6259	8.0	4806.177^c	47.6		-1.2	
4806.615	2.7185^o	4.0	0.1399	5.0	4806.622	741.1		-0.6	
4811.036	3.4261	6.0	0.8498^o	5.0	4811.045^c	53.5		-0.8	
4826.532	3.7697	6.0	1.2017^o	7.0	4826.534	40.8		-0.5	
4831.073	3.6567	5.0	1.0911^o	6.0	4831.079^c	88.7		-0.3	
4833.500	2.8577^o	5.0	0.2934	6.0	4833.504^c	107.6		-1.3	
4835.656	2.8566^o	6.0	0.2934	6.0	4835.660	715.8		-0.4	
4836.614	2.7025^o	6.0	0.1399	5.0	4836.621	1275.7		-0.4	
4845.904	2.6976^o	4.0	0.1399	5.0	4845.915	37.5		-1.9	
4853.316	2.6937^o	5.0	0.1399	5.0	4853.323^c	779.8		-0.6	
4853.722	3.8908	7.0	1.3371^o	8.0	4853.731	60.8		-0.2	
4854.211	2.5534^o	3.0	0.0000	4.0	4854.214	58.0		-1.9	
4855.306	2.6927^o	6.0	0.1399	5.0	4855.317^c	796.7		-0.6	
4869.268	3.0019^o	7.0	0.4565	7.0	4869.269^c	342.9		-0.6	
4871.425	3.5873	7.0	1.0429^o	6.0	4871.431^c	102.7		-0.3	
4874.356	3.6339	5.0	1.0911^o	6.0	4874.363	110.2		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4875.714	2.8355^{o}	6.0	0.2934	6.0	4875.721^{c}	182.9		-1.0	
4879.781	2.9965^{o}	8.0	0.4565	7.0	4879.788	734.6		-0.2	
4880.473	3.7994	9.0	1.2597^{o}	8.0	4880.490	70.2		-0.2	
4881.377	3.6302	6.0	1.0911^{o}	6.0	4881.381	31.8		-0.8	
4881.697	2.5390^{o}	4.0	0.0000	4.0	4881.702	194.4		-1.4	
4883.810	3.1638^{o}	9.0	0.6259	8.0	4883.809^{n}	3902.5		0.7	0.8
4887.325	3.1620^{o}	7.0	0.6259	8.0	4887.334	128.5		-0.8	
4891.054	2.9906^{o}	8.0	0.4565	7.0	4891.058^{c}	5054.8		0.6	
4893.219	2.6729^{o}	5.0	0.1399	5.0	4893.225^{c}	728.2		-0.6	
4896.927	2.6710^{o}	6.0	0.1399	5.0	4896.924^{n}	6374.8		0.3	0.4
4907.267	2.8192^{o}	6.0	0.2934	6.0	4907.273^{c}	285.7		-0.9	
4907.787	2.8189^{o}	5.0	0.2934	6.0	4907.794^{c}	291.4		-0.8	
4908.248	3.3750	4.0	0.8498^{o}	5.0	4908.252^{c}	20.3		-1.3	
4910.058	2.5243^{o}	4.0	0.0000	4.0	4910.063	1215.7		-0.6	
4913.396	3.5655	6.0	1.0429^{o}	6.0	4913.417	3452.5			
4916.428	3.1470^{o}	8.0	0.6259	8.0	4916.434^{c}	86.7		-1.0	
4920.042	3.7209	7.0	1.2017^{o}	7.0	4920.052^{b}	30.5		-0.7	
4920.055	3.5621	5.0	1.0429^{o}	6.0	4920.052^{b}	26.7		-0.9	
4921.142	2.9751^{o}	6.0	0.4565	7.0	4921.145^{c}	219.7	-0.7	-0.8	
4922.454	2.9744^{o}	7.0	0.4565	7.0	4922.461	441.5		-0.5	
4923.732	2.9738^{o}	6.0	0.4565	7.0	4923.730	26.9		-1.7	
4924.521	2.5169^{o}	5.0	0.0000	4.0	4924.519^{n}	20762.2		0.6	0.6
4926.704	3.3544	6.0	0.8386^{o}	6.0	4926.710^{c}	103.7		-0.6	
4940.334	3.3475	7.0	0.8386^{o}	6.0	4940.328	60.8		-0.8	
4944.826	2.6464^{o}	6.0	0.1399	5.0	4944.821^{n}	7457.2		0.3	0.5
4950.284	2.9603^{o}	7.0	0.4565	7.0	4950.289	319.0		-0.6	
4950.713	2.7970^{o}	6.0	0.2934	6.0	4950.716	354.5		-0.8	
4952.465	3.5535^{o}	5.0	1.0508	5.0	4952.503^{bc}	960.5		0.6	
4952.498	2.6426^{o}	6.0	0.1399	5.0	4952.503^{bc}	965.4		-0.5	
4954.777	2.5016^{o}	5.0	0.0000	4.0	4954.775^{n}	9828.8		0.3	0.1
4959.168	3.7591	8.0	1.2597^{o}	8.0	4959.151^{c}	64.3		-0.3	
4961.288	3.5894	6.0	1.0911^{o}	6.0	4961.295	46.0		-0.6	
4963.002	3.7378	5.0	1.2404^{o}	5.0	4963.008^{b}	72.2		-0.3	
4963.003	2.6373^{o}	5.0	0.1399	5.0	4963.008^{b}	72.1		-1.7	
4963.324	3.1232^{o}	8.0	0.6259	8.0	4963.328	1002.3		0.1	
4965.288	3.3349	7.0	0.8386^{o}	6.0	4965.286^{bc}	75.6		-0.8	
4965.323	3.9474	8.0	1.4512^{o}	8.0	4965.286^{bc}	73.5		0.0	
4966.736	3.3342	6.0	0.8386^{o}	6.0	4966.739^{c}	159.1		-0.4	
4969.739	2.7874^{o}	7.0	0.2934	6.0	4969.744^{c}	384.3		-0.8	
4975.484	3.1171^{o}	9.0	0.6259	8.0	4975.491	780.4		-0.0	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
4977.350	3.5813	5.0	1.0911^{o}	6.0	4977.357	70.9		-0.5	
4980.886	3.3271	7.0	0.8386^{o}	6.0	4980.887^{c}	181.6		-0.4	
4982.884	2.9439^{o}	7.0	0.4565	7.0	4982.891	357.4		-0.6	
4988.640	2.7780^{o}	5.0	0.2934	6.0	4988.648	549.8		-0.6	
4989.179	3.5261	8.0	1.0417^{o}	7.0	4989.184^{c}	68.4		-0.5	
4996.157	3.5226	7.0	1.0417^{o}	7.0	4996.146	103.3		-0.4	
5005.855	2.9325^{o}	8.0	0.4565	7.0	5005.861^{c}	125.2		-1.0	
5009.423	2.4743^{o}	4.0	0.0000	4.0	5009.425	42.8		-2.1	
5014.539	2.7652^{o}	6.0	0.2934	6.0	5014.543	263.6		-0.9	
5015.958	3.5621	5.0	1.0911^{o}	6.0	5015.955	9.9		-1.3	
5022.648	3.3064	6.0	0.8386^{o}	6.0	5022.651	114.1		-0.6	
5024.564	2.9233^{o}	6.0	0.4565	7.0	5024.573	36.6		-1.6	
5026.438	2.7593^{o}	5.0	0.2934	6.0	5026.442	134.0		-1.2	
5027.136	3.0915^{o}	9.0	0.6259	8.0	5027.145^{c}	730.7		-0.1	
5028.506	2.6047^{o}	4.0	0.1399	5.0	5028.512	27.1		-2.1	
5029.441	2.6043^{o}	5.0	0.1399	5.0	5029.447^{c}	985.8		-0.6	
5039.919	2.9158^{o}	7.0	0.4565	7.0	5039.926^{c}	121.8		-1.1	
5040.184	2.5990^{o}	5.0	0.1399	5.0	5040.190	989.6		-0.6	
5042.552	2.7514^{o}	5.0	0.2934	6.0	5042.558^{b}	21.1		-2.0	
5042.584	3.7445^{o}	4.0	1.2865	5.0	5042.558^{b}	20.9		-0.8	
5045.025	2.4568^{o}	5.0	0.0000	4.0	5045.028	64.6		-1.9	
5045.451	2.9131^{o}	6.0	0.4565	7.0	5045.456^{c}	69.1		-1.3	
5051.055	2.9103^{o}	8.0	0.4565	7.0	5051.064^{c}	453.8		-0.5	
5056.885	2.4510^{o}	4.0	0.0000	4.0	5056.889^{c}	1694.1		-0.5	
5058.805	2.7435^{o}	5.0	0.2934	6.0	5058.811	61.2		-1.6	
5060.009	2.7429^{o}	6.0	0.2934	6.0	5060.013	162.6		-1.2	
5068.353	3.0714^{o}	8.0	0.6259	8.0	5068.356	22.2		-1.6	
5071.857	2.5837^{o}	6.0	0.1399	5.0	5071.862^{c}	446.9		-0.9	
5073.456	3.7802	8.0	1.3371^{o}	8.0	5073.471^{c}	17.6		-0.8	
5073.873	3.4846	7.0	1.0417^{o}	7.0	5073.871	87.0		-0.5	
5074.507	2.4425^{o}	5.0	0.0000	4.0	5074.509	474.0		-1.1	
5079.058	3.7269^{o}	5.0	1.2865	5.0	5079.080^{bc}	220.0		0.2	
5079.075	2.7337^{o}	6.0	0.2934	6.0	5079.080^{bc}	219.7		-1.0	
5079.638	3.0660^{o}	7.0	0.6259	8.0	5079.644	38.2		-1.4	
5081.183	2.7327^{o}	7.0	0.2934	6.0	5081.171^{b}	154.9		-1.2	
5081.194	3.4822	5.0	1.0429^{o}	6.0	5081.171^{b}	154.9		-0.2	
5082.968	3.6805	8.0	1.2420^{o}	7.0	5082.953	28.3		-0.7	
5088.153	2.4360^{o}	5.0	0.0000	4.0	5088.147	17.1		-2.5	
5092.387	4.3229	3.0	1.8889^{o}	4.0	5092.367	62.5		0.5	
5093.129	3.4765	6.0	1.0429^{o}	6.0	5093.116	24.2		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5100.115	2.8867^o	6.0	0.4565	7.0	5100.122	25.1		-1.8	
5102.431	3.2678	5.0	0.8386^o	6.0	5102.430^c	48.7		-1.0	
5103.160	2.4288^o	4.0	0.0000	4.0	5103.166	1128.4		-0.7	
5111.949	3.5157	6.0	1.0911^o	6.0	5111.950	54.2		-0.6	
5114.555	3.5535^o	5.0	1.1301	6.0	5114.529	86.1		-0.4	
5115.747	2.7163^o	7.0	0.2934	6.0	5115.753^c	138.0		-1.3	
5117.661	3.7591	8.0	1.3371^o	8.0	5117.660^c	33.3		-0.5	
5121.630	3.4618	8.0	1.0417^o	7.0	5121.631^{bc}	40.3		-0.8	
5121.642	3.6621	8.0	1.2420^o	7.0	5121.631^{bc}	40.3		-0.6	
5125.921	3.2678	5.0	0.8498^o	5.0	5125.927^c	88.3		-0.7	
5139.989	3.2612	6.0	0.8498^o	5.0	5139.994^c	9.4		-1.7	
5140.497	3.6435^o	6.0	1.2323	7.0	5140.502	32.3		-0.7	
5147.914	3.4988	5.0	1.0911^o	6.0	5147.929	10.7		-1.4	
5149.547	2.5468^o	5.0	0.1399	5.0	5149.555^c	575.3		-0.8	
5153.436	3.5352^o	5.0	1.1301	6.0	5153.440	120.1		-0.3	
5163.804	2.6937^o	5.0	0.2934	6.0	5163.809	73.0		-1.5	
5166.057	2.6927^o	6.0	0.2934	6.0	5166.063^c	73.4		-1.5	
5168.327	3.4411	6.0	1.0429^o	6.0	5168.319^c	18.9		-1.2	
5173.965	4.1700	6.0	1.7744^o	5.0	5173.929	24.2		-0.1	
5178.743	2.5332^o	6.0	0.1399	5.0	5178.748^c	189.6		-1.3	
5187.039	2.6830^o	7.0	0.2934	6.0	5187.045^c	110.9		-1.4	
5189.679	3.2270	6.0	0.8386^o	6.0	5189.678	60.4		-0.9	
5195.582	3.5873	7.0	1.2017^o	7.0	5195.586	105.2		-0.2	
5195.968	3.4765	6.0	1.0911^o	6.0	5195.937	55.8		-0.6	
5198.053	2.5243^o	4.0	0.1399	5.0	5198.060	302.3		-1.1	
5198.425	3.4261	6.0	1.0417^o	7.0	5198.450^b	51.8		-0.7	
5198.451	3.6440	8.0	1.2597^o	8.0	5198.450^b	50.3		-0.5	
5199.722	2.3837^o	5.0	0.0000	4.0	5199.724	618.0		-1.0	
5200.970	3.4261	6.0	1.0429^o	6.0	5200.989^c	20.2		-1.2	
5203.404	4.0064^o	9.0	1.6243	10.0	5203.400	14.3		-0.6	
5204.373	2.3816^o	4.0	0.0000	4.0	5204.379	1257.2		-0.7	
5205.671	3.6407	9.0	1.2597^o	8.0	5205.695	46.1		-0.5	
5209.871	2.8355^o	6.0	0.4565	7.0	5209.878	59.2		-1.4	
5213.202	2.6710^o	6.0	0.2934	6.0	5213.207^c	172.9	-1.0	-1.2	
5213.981	3.2270	6.0	0.8498^o	5.0	5213.980^{bc}	44.0		-1.1	
5214.003	3.8661	4.0	1.4889^o	5.0	5213.980^{bc}	44.0		-0.2	
5230.199	3.7783	3.0	1.4085^o	4.0	5230.204	54.2		-0.3	
5236.696	3.4098	7.0	1.0429^o	6.0	5236.703^c	14.7		-1.3	
5238.978	3.7170^o	8.0	1.3511	8.0	5239.016^{bc}	24.1		-0.7	
5239.019	3.8435^o	6.0	1.4776	7.0	5239.016^{bc}	24.1		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5239.702	2.8220^o	7.0	0.4565	7.0	5239.722	61.2		-1.4	
5240.621	3.4913	5.0	1.1262^o	4.0	5240.611	32.6		-0.9	
5244.981	3.7405^o	5.0	1.3773	6.0	5244.984	7.5		-1.2	
5245.913	2.8192^o	6.0	0.4565	7.0	5245.924	16.6		-2.0	
5248.198	2.5016^o	5.0	0.1399	5.0	5248.208^b	16.3	-2.6	-2.4	
5248.249	3.6482^o	5.0	1.2865	5.0	5248.208^b	13.6		-1.0	
5249.281	2.6546^o	7.0	0.2934	6.0	5249.285	191.9		-1.2	
5250.011	3.6029	8.0	1.2420^o	7.0	5250.007	24.8		-0.8	
5260.858	3.4822	5.0	1.1262^o	4.0	5260.866	15.7		-1.2	
5263.969	3.6905^o	5.0	1.3359	6.0	5263.973	28.5		-0.6	
5264.204	2.4944^o	6.0	0.1399	5.0	5264.209	41.8		-2.0	
5265.724	3.8744^o	2.0	1.5206	3.0	5265.756	21.4		-0.5	
5266.627	3.1921	6.0	0.8386^o	6.0	5266.627^c	66.2		-0.9	
5267.414	3.4039^o	6.0	1.0508	5.0	5267.428^b	41.4		-0.9	
5267.427	3.3948	7.0	1.0417^o	7.0	5267.428^b	39.0		-0.9	
5270.041	3.3948	7.0	1.0429^o	6.0	5270.040	191.7		-0.2	
5276.229	2.6426^o	6.0	0.2934	6.0	5276.235^c	66.5		-1.6	
5276.882	3.5657^o	3.0	1.2168	4.0	5276.884^c	24.6		-0.9	
5284.333	2.4854^o	4.0	0.1399	5.0	5284.340	182.8		-1.4	
5286.291	3.4358	6.0	1.0911^o	6.0	5286.288^b	48.8		-0.7	
5286.326	3.9474	8.0	1.6027^o	7.0	5286.288^b	48.7		-0.1	
5286.725	3.1831	6.0	0.8386^o	6.0	5286.719	31.3		-1.3	
5288.142	3.4701	5.0	1.1262^o	4.0	5288.156^b	191.2		-0.1	
5288.155	2.6373^o	5.0	0.2934	6.0	5288.156^b	191.2		-1.2	
5288.183	3.5607^o	4.0	1.2168	4.0	5288.156^b	184.4		0.0	
5289.275	3.6805	8.0	1.3371^o	8.0	5289.276	13.4		-1.0	
5291.656	3.1921	6.0	0.8498^o	5.0	5291.659	537.8		-0.0	
5293.187	3.8193^o	8.0	1.4776	7.0	5293.159^c	45.9		-0.3	
5293.721	3.4715^o	5.0	1.1301	6.0	5293.723	38.0		-0.8	
5295.375	3.4317	6.0	1.0911^o	6.0	5295.364^c	54.2		-0.7	
5298.881	2.4790^o	6.0	0.1399	5.0	5298.887^c	221.4		-1.3	
5302.598	3.3883^o	4.0	1.0508	5.0	5302.602^c	108.7		-0.4	
5305.696	3.4623	5.0	1.1262^o	4.0	5305.693^c	21.4		-1.1	
5308.257	3.4261	6.0	1.0911^o	6.0	5308.259	125.1		-0.3	
5309.547	2.4743^o	4.0	0.1399	5.0	5309.557	9.9		-2.7	
5311.577	3.5755	8.0	1.2420^o	7.0	5311.577	42.7		-0.6	
5311.946	3.1831	6.0	0.8498^o	5.0	5311.948	36.4		-1.2	
5313.848	3.8661	4.0	1.5336^o	3.0	5313.847	22.5		-0.5	
5314.354	3.3752	7.0	1.0429^o	6.0	5314.355^c	43.0		-0.9	
5317.367	2.7874^o	7.0	0.4565	7.0	5317.374	68.2		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5319.820	3.9084	7.0	1.5785^o	7.0	5319.816^c	68.4		0.0	
5320.778	3.4206	6.0	1.0911^o	6.0	5320.780	126.2		-0.3	
5327.144	3.8095^o	8.0	1.4828	9.0	5327.150	24.2		-0.6	
5329.868	3.7994	9.0	1.4739^o	9.0	5329.876^{bc}	19.3		-0.7	
5329.892	3.8622	5.0	1.5367^o	5.0	5329.876^{bc}	18.4		-0.6	
5330.791	3.4162	7.0	1.0911^o	6.0	5330.776	23477.7			
5332.419	3.5261	8.0	1.2017^o	7.0	5332.427	83.9		-0.4	
5334.315	2.3236^o	4.0	0.0000	4.0	5334.322^c	288.9		-1.4	
5336.815	2.3225^o	5.0	0.0000	4.0	5336.825	234.9		-1.5	
5343.628	3.6707^o	7.0	1.3511	8.0	5343.625	53.5		-0.4	
5349.561	2.4568^o	5.0	0.1399	5.0	5349.567^c	692.2		-0.8	
5350.058	3.1554	5.0	0.8386^o	6.0	5350.102	22.8		-1.4	
5352.191	3.5755	8.0	1.2597^o	8.0	5352.174	8.3		-1.3	
5356.917	3.5154	7.0	1.2017^o	7.0	5356.918	65.1		-0.5	
5359.019	3.9372^o	9.0	1.6243	10.0	5359.010^c	26.3		-0.3	
5361.878	3.7944^o	8.0	1.4828	9.0	5361.880^c	61.3		-0.2	
5363.648	2.6043^o	5.0	0.2934	6.0	5363.659^c	94.3		-1.5	
5368.141	3.4000	6.0	1.0911^o	6.0	5368.156	12.8		-1.3	
5370.513	3.7591	8.0	1.4512^o	8.0	5370.519^c	13.5		-0.9	
5373.656	2.9325^o	8.0	0.6259	8.0	5373.660^b	41.1		-1.4	
5373.687	3.6603	6.0	1.3537^o	5.0	5373.660^b	40.8		-0.5	
5377.769	2.3048^o	3.0	0.0000	4.0	5377.775	691.7		-1.0	
5378.259	3.3475	7.0	1.0429^o	6.0	5378.263^c	54.5		-0.8	
5379.295	3.9285^o	9.0	1.6243	10.0	5379.302	28.8		-0.3	
5380.591	3.6407	9.0	1.3371^o	8.0	5380.603^c	52.3		-0.4	
5381.729	3.4332^o	5.0	1.1301	6.0	5381.734	58.3		-0.6	
5383.978	4.0756^o	10.0	1.7734	11.0	5383.983	28.5		-0.1	
5398.077	2.4360^o	5.0	0.1399	5.0	5398.080^c	177.3		-1.4	
5409.563	3.3342	6.0	1.0429^o	6.0	5409.553^c	25.4		-1.1	
5411.916	2.5837^o	6.0	0.2934	6.0	5411.925^c	164.6		-1.3	
5412.929	2.9158^o	7.0	0.6259	8.0	5412.934	34.7		-1.5	
5414.972	2.4288^o	4.0	0.1399	5.0	5414.984^c	84.1		-1.8	
5415.303	2.5822^o	5.0	0.2934	6.0	5415.301	247.4		-1.1	
5416.872	3.6655^o	6.0	1.3773	6.0	5416.874^c	50.9		-0.4	
5420.646	3.1252	6.0	0.8386^o	6.0	5420.646	156.9		-0.6	
5422.661	2.2857^o	4.0	0.0000	4.0	5422.659	70.2		-2.0	
5423.583	3.3271	7.0	1.0417^o	7.0	5423.584^c	57.1		-0.8	
5425.776	2.9103^o	8.0	0.6259	8.0	5425.779	15.7		-1.9	
5426.419	3.3752	7.0	1.0911^o	6.0	5426.420^c	15.9		-1.3	
5429.281	3.4846	7.0	1.2017^o	7.0	5429.282	54.6		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5430.732	3.4124^o	5.0	1.1301	6.0	5430.728^c	31.7		-0.9	
5434.426	3.7697	6.0	1.4889^o	5.0	5434.428^b	28.2		-0.5	
5434.447	3.6345	6.0	1.3537^o	5.0	5434.429^b	30.0		-0.7	
5434.455	3.4976^o	4.0	1.2168	4.0	5434.429^b	30.5		-0.8	
5436.791	3.6571^o	6.0	1.3773	6.0	5436.810	20.2		-0.8	
5442.295	3.5098^o	6.0	1.2323	7.0	5442.292^c	27.4		-0.9	
5444.534	3.6302	6.0	1.3537^o	5.0	5444.558^c	16.6		-0.9	
5444.879	3.8760^o	9.0	1.5997	8.0	5444.911^b	40.8		-0.2	
5444.912	4.0064^o	9.0	1.7300	9.0	5444.912^b	37.2		-0.1	
5449.264	3.5611^o	5.0	1.2865	5.0	5449.268^c	63.9		-0.4	
5452.083	2.5668^o	6.0	0.2934	6.0	5452.086	25.7		-2.1	
5458.014	3.8706^o	8.0	1.5997	8.0	5458.020^c	52.6		-0.1	
5461.624	3.8661	4.0	1.5967^o	4.0	5461.643^b	51.8		-0.1	
5461.649	2.2694^o	5.0	0.0000	4.0	5461.643^b	51.4		-2.2	
5467.491	3.5535^o	5.0	1.2865	5.0	5467.488	24.0		-0.9	
5469.392	3.6435^o	6.0	1.3773	6.0	5469.394^c	34.1		-0.6	
5470.394	3.6029	8.0	1.3371^o	8.0	5470.397	77.4		-0.3	
5474.277	3.1028	7.0	0.8386^o	6.0	5474.280	42.4		-1.2	
5476.220	3.3544	6.0	1.0911^o	6.0	5476.220^c	33.9		-1.0	
5477.995	2.2626^o	5.0	0.0000	4.0	5478.004^c	61.3		-2.1	
5478.585	3.4792^o	4.0	1.2168	4.0	5478.588	217.0		0.0	
5483.999	3.4618	8.0	1.2017^o	7.0	5484.008^c	32.6		-0.8	
5484.859	2.7163^o	7.0	0.4565	7.0	5484.871	34.1		-1.8	
5485.554	3.4999	4.0	1.2404^o	5.0	5485.552	18.4		-1.0	
5490.440	3.3083^o	4.0	1.0508	5.0	5490.459^b	25.0		-1.1	
5490.487	3.7443	5.0	1.4868^o	4.0	5490.459^b	23.6		-0.6	
5493.065	3.3475	7.0	1.0911^o	6.0	5493.071	43.2		-0.9	
5493.332	3.7209	7.0	1.4646^o	6.0	5493.335^c	77.5		-0.1	
5496.889	3.3056^o	4.0	1.0508	5.0	5496.887	33.1		-1.0	
5500.605	4.1045	9.0	1.8512^o	8.0	5500.644^b	16.4		-0.3	
5500.646	3.6618	5.0	1.4085^o	4.0	5500.644^b	16.6		-0.9	
5501.479	3.6302	6.0	1.3773^o	5.0	5501.478	158.9		0.1	
5504.304	3.0904	6.0	0.8386^o	6.0	5504.315^c	10.1		-1.8	
5507.198	2.3905^o	6.0	0.1399	5.0	5507.208^c	81.2		-1.8	
5511.945	3.5352^o	5.0	1.2865	5.0	5511.948^c	32.2		-0.7	
5513.230	3.6567	5.0	1.4085^o	4.0	5513.231^c	24.7		-0.7	
5514.750	3.2983^o	4.0	1.0508	5.0	5514.753^c	44.3		-0.9	
5515.668	3.7976	7.0	1.5505^o	6.0	5515.666^c	26.4		-0.5	
5516.285	3.4486	8.0	1.2017^o	7.0	5516.293	121.9		-0.3	
5518.387	2.7025^o	6.0	0.4565	7.0	5518.398	68.5		-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5519.296	3.2874	7.0	1.0417^o	7.0	5519.338^b	30.1		-1.1	
5519.337	3.4473	7.0	1.2017^o	7.0	5519.338^b	31.6		-0.9	
5525.724	3.3342	6.0	1.0911^o	6.0	5525.726^b	432.7		0.1	
5525.724	3.0817	7.0	0.8386^o	6.0	5525.726^b	432.7		-0.2	
5529.069	2.3816^o	4.0	0.1399	5.0	5529.065^c	526.8		-1.0	
5532.982	3.6175^o	6.0	1.3773	6.0	5532.974	24.9		-0.7	
5536.479	3.0774	7.0	0.8386^o	6.0	5536.455^c	28.9		-1.4	
5537.270	3.5755	8.0	1.3371^o	8.0	5537.279	51.5		-0.5	
5539.917	3.4542^o	4.0	1.2168	4.0	5539.908	12.8		-1.2	
5543.245	3.3271	7.0	1.0911^o	6.0	5543.252^c	256.3		-0.1	
5544.839	2.2354^o	5.0	0.0000	4.0	5544.848	123.8		-1.8	
5546.610	2.3745^o	6.0	0.1399	5.0	5546.616	80.0		-1.8	
5555.129	3.7140^o	9.0	1.4828	9.0	5555.143	14.9		-0.8	
5556.439	4.0208	2.0	1.7901^o	3.0	5556.485	10.4		-0.6	
5561.154	2.2288^o	3.0	0.0000	4.0	5561.163^c	2028.5		-0.6	
5564.606	3.4442^o	4.0	1.2168	4.0	5564.607^c	11.2		-1.3	
5575.500	3.2648	8.0	1.0417^o	7.0	5575.501^c	168.8		-0.3	
5576.693	3.7054^o	9.0	1.4828	9.0	5576.694^c	114.1		0.0	
5577.694	3.5733^o	8.0	1.3511	8.0	5577.695^b	110.1		-0.1	
5577.702	3.7170^o	8.0	1.4948	7.0	5577.694^b	106.5		0.0	
5580.503	4.2528	6.0	2.0317^o	7.0	5580.545^b	15.5		-0.1	
5580.572	3.6949	8.0	1.4739^o	9.0	5580.545^b	13.0		-0.9	
5587.610	3.8426^o	10.0	1.6243	10.0	5587.604^c	76.8		0.1	
5588.431	3.5691^o	8.0	1.3511	8.0	5588.431^c	43.2		-0.5	
5596.973	3.4162	7.0	1.2017^o	7.0	5596.976	17.4		-1.1	
5601.910	3.4449^o	7.0	1.2323	7.0	5601.909^c	244.8		0.1	
5603.194	3.5894	6.0	1.3773^o	5.0	5603.194	68.3		-0.3	
5605.756	3.6351^o	4.0	1.4241	4.0	5605.756^b	21.2		-0.8	
5605.762	3.4976^o	4.0	1.2865	5.0	5605.756^b	21.2		-0.9	
5612.077	3.0472	5.0	0.8386^o	6.0	5612.080^c	31.8		-1.3	
5613.165	3.4098	7.0	1.2017^o	7.0	5613.169^b	19.4		-1.1	
5613.165	2.5016^o	5.0	0.2934	6.0	5613.169^b	19.4	-2.5	-2.3	
5615.340	3.9807^o	11.0	1.7734	11.0	5615.340	71.3		0.2	
5616.218	3.4667	9.0	1.2597^o	8.0	5616.224^c	24.4		-0.9	
5617.943	3.6890^o	8.0	1.4828	9.0	5617.927^c	13.3		-0.9	
5618.663	3.3361^o	6.0	1.1301	6.0	5618.666^c	16.3		-1.3	
5619.570	2.2056^o	4.0	0.0000	4.0	5619.572	39.6		-2.3	
5620.526	2.2052^o	3.0	0.0000	4.0	5620.534^c	7138.2		-0.1	
5623.690	3.5813	5.0	1.3773^o	5.0	5623.689^c	27.8		-0.7	
5626.665	3.4197^o	3.0	1.2168	4.0	5626.668	24.4		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5628.602	3.4618	8.0	1.2597^o	8.0	5628.607^c	13.8		-1.2	
5631.479	2.4944^o	6.0	0.2934	6.0	5631.499^c	11.5		-2.5	
5636.258	3.4411	6.0	1.2420^o	7.0	5636.250	23.6		-1.0	
5639.535	3.3279^o	6.0	1.1301	6.0	5639.536	339.5		0.1	
5640.506	3.0472	5.0	0.8498^o	5.0	5640.508	44.5		-1.2	
5641.574	3.4567	9.0	1.2597^o	8.0	5641.570	16.6		-1.1	
5645.274	3.4124^o	5.0	1.2168	4.0	5645.237^c	8.9		-1.4	
5651.494	3.3948	7.0	1.2017^o	7.0	5651.500	48.8		-0.7	
5653.569	3.6662	10.0	1.4739^o	9.0	5653.571^c	128.9		0.1	
5663.237	2.1886^o	4.0	0.0000	4.0	5663.247^c	30.8		-2.4	
5665.266	3.6655^o	6.0	1.4776	7.0	5665.244^c	44.3		-0.4	
5669.753	2.6426^o	6.0	0.4565	7.0	5669.759	778.7		-0.5	
5672.732	3.4715^o	5.0	1.2865	5.0	5672.735	19.7		-1.0	
5674.787	3.4439	9.0	1.2597^o	8.0	5674.799	58.6		-0.6	
5675.957	3.8945^o	8.0	1.7108	7.0	5675.963^b	3451.7			
5675.959	2.3236^o	4.0	0.1399	5.0	5675.963^b	3451.7		-0.2	
5676.002	3.4702^o	4.0	1.2865	5.0	5675.963^b	3419.3			
5677.927	3.5367	5.0	1.3537^o	5.0	5677.951^{bc}	14.6		-1.0	
5677.951	3.6568	9.0	1.4739^o	9.0	5677.951^{bc}	14.7		-0.9	
5679.518	3.2253	6.0	1.0429^o	6.0	5679.481	15.2		-1.4	
5681.226	3.2325^o	5.0	1.0508	5.0	5681.226	134.2		-0.5	
5684.239	4.0003	4.0	1.8198^o	5.0	5684.232	12.6		-0.5	
5686.507	3.3098^o	6.0	1.1301	6.0	5686.510	37.2		-0.9	
5686.802	3.5655	6.0	1.3860^o	6.0	5686.807	20.6		-0.8	
5691.774	3.4100^o	7.0	1.2323	7.0	5691.776	26.7		-0.9	
5693.917	2.6333^o	7.0	0.4565	7.0	5693.918^c	26.7		-1.9	
5695.218	3.2271^o	5.0	1.0508	5.0	5695.218	114.8		-0.5	
5695.607	3.5535^o	5.0	1.3773	6.0	5695.621	25.8		-0.8	
5699.738	4.1378^o	10.0	1.9632	9.0	5699.737	18.0		-0.2	
5701.534	3.5098^o	6.0	1.3359	6.0	5701.569^b	52.6		-0.5	
5701.571	4.0064^o	9.0	1.8325	8.0	5701.569^b	52.1		0.1	
5702.484	3.3752	7.0	1.2017^o	7.0	5702.483	28.3		-1.0	
5704.550	3.5813	5.0	1.4085^o	4.0	5704.547^c	25.4		-0.7	
5706.170	3.5259	4.0	1.3537^o	5.0	5706.207^c	15.6		-1.0	
5707.803	3.4039^o	6.0	1.2323	7.0	5707.807^b	38.4		-0.8	
5707.809	3.3884^o	3.0	1.2168	4.0	5707.807^b	38.4		-0.8	
5710.339	3.7949^o	10.0	1.6243	10.0	5710.339	34.9		-0.3	
5712.947	2.3094^o	5.0	0.1399	5.0	5712.966^b	17.8		-2.5	
5713.005	3.6655^o	6.0	1.4959	5.0	5712.966^b	18.0		-0.8	
5713.840	3.2993^o	7.0	1.1301	6.0	5713.832	14.6		-1.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5714.800	3.5462^o	6.0	1.3773	6.0	5714.797	13.5		-1.1	
5717.665	3.4098	7.0	1.2420^o	7.0	5717.620	18.8		-1.1	
5723.987	3.7445^o	4.0	1.5791	3.0	5723.983	9.7		-0.9	
5727.876	3.0026	7.0	0.8386^o	6.0	5727.876^{bc}	173.3		-0.6	
5727.882	3.6587^o	6.0	1.4948	7.0	5727.876^{bc}	173.3		0.2	
5729.236	3.8661	4.0	1.7027^o	3.0	5729.275^{bc}	2917.9			
5729.272	2.4568^o	5.0	0.2934	6.0	5729.275^{bc}	2917.7		-0.1	
5730.372	3.5141^o	9.0	1.3511	8.0	5730.355^c	64.4		-0.4	
5731.154	3.3795^o	3.0	1.2168	4.0	5731.153	57.6		-0.6	
5734.223	3.0002	5.0	0.8386^o	6.0	5734.270^b	66.3		-1.1	
5734.274	2.7874^o	7.0	0.6259	8.0	5734.270^b	69.4		-1.3	
5738.885	3.8706^o	8.0	1.7108	7.0	5738.898	32.7		-0.2	
5740.828	3.4822	5.0	1.3232^o	4.0	5740.850	17.9		-1.0	
5746.877	3.2869^o	6.0	1.1301	6.0	5746.884	45.3		-0.9	
5749.183	3.2067^o	5.0	1.0508	5.0	5749.183	360.1		-0.1	
5749.652	3.2858^o	5.0	1.1301	6.0	5749.655^b	492.1		0.2	
5749.654	2.1557^o	5.0	0.0000	4.0	5749.655^b	492.1		-1.3	
5752.275	2.4482^o	7.0	0.2934	6.0	5752.282	33.6		-2.1	
5753.714	3.7785^o	10.0	1.6243	10.0	5753.714^{bc}	37.4		-0.3	
5753.735	3.6621	8.0	1.5079^o	9.0	5753.714^{bc}	41.9		-0.4	
5754.112	3.7192^o	3.0	1.5652	4.0	5754.074^c	27.9		-0.5	
5757.926	3.9261^o	11.0	1.7734	11.0	5757.925	15.3		-0.5	
5762.041	3.6339^o	9.0	1.4828	9.0	5762.042	100.7		-0.1	
5762.361	3.7525^o	7.0	1.6015	6.0	5762.363	27.3		-0.5	
5765.458	3.4363^o	4.0	1.2865	5.0	5765.458	29.1		-0.8	
5767.323	2.4425^o	5.0	0.2934	6.0	5767.326^b	61.4		-1.8	
5767.353	3.9427	7.0	1.7936^o	8.0	5767.326^b	61.7		0.1	
5772.151	2.1473^o	4.0	0.0000	4.0	5772.157^{bc}	365.2		-1.4	
5772.175	3.5577	4.0	1.4104^o	3.0	5772.157^{bc}	367.9		0.4	
5773.496	3.1976^o	4.0	1.0508	5.0	5773.498^c	12.6		-1.5	
5775.433	3.5101^o	3.0	1.3640	3.0	5775.456^c	25.9		-0.8	
5776.090	2.2857^o	4.0	0.1399	5.0	5776.097^b	653.4		-1.0	
5776.130	3.3475	7.0	1.2017^o	7.0	5776.097^b	653.9		0.4	
5776.534	3.3877	8.0	1.2420^o	7.0	5776.543^b	22.1		-1.0	
5776.539	3.8757^o	10.0	1.7300	9.0	5776.543^b	22.1		-0.4	
5781.207	2.9937	6.0	0.8498^o	5.0	5781.209	25.3		-1.5	
5784.956	2.4360^o	5.0	0.2934	6.0	5784.958	693.6		-0.7	
5788.192	3.1831	6.0	1.0417^o	7.0	5788.222^b	424.6		-0.0	
5788.217	2.7673^o	7.0	0.6259	8.0	5788.222^b	423.7		-0.5	
5788.932	3.7378	5.0	1.5967^o	4.0	5788.944	23.7		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5791.433	3.7037	8.0	1.5636^o	7.0	5791.431	17.8		-0.7	
5792.394	3.6175^o	6.0	1.4776	7.0	5792.406	15.0		-0.9	
5796.286	3.9123	5.0	1.7739^o	6.0	5796.321^{bc}	15.6		-0.5	
5796.320	3.2646	5.0	1.1262^o	4.0	5796.321^{bc}	13.6		-1.4	
5798.924	3.5014^o	4.0	1.3640	3.0	5798.927	11.4		-1.2	
5800.080	2.5934^o	6.0	0.4565	7.0	5800.087	209.9		-1.1	
5806.403	3.3750	4.0	1.2404^o	5.0	5806.416	12.2		-1.3	
5809.297	3.6435^o	6.0	1.5099	5.0	5809.287	32.9		-0.5	
5815.432	3.6949	8.0	1.5636^o	7.0	5815.428	68.6		-0.1	
5821.706	3.6029	8.0	1.4739^o	9.0	5821.709	10.2		-1.1	
5824.896	2.1279^o	5.0	0.0000	4.0	5824.899^c	74.2		-2.1	
5826.736	2.5837^o	6.0	0.4565	7.0	5826.743	474.6		-0.7	
5830.726	3.1765^o	4.0	1.0508	5.0	5830.730^{bc}	46.4		-1.0	
5830.743	3.3581^o	7.0	1.2323	7.0	5830.730^{bc}	46.4		-0.7	
5834.725	3.1751^o	6.0	1.0508	5.0	5834.718	12.8		-1.5	
5837.142	3.1652	8.0	1.0417^o	7.0	5837.144	49.4		-0.9	
5839.081	3.5873	7.0	1.4646^o	6.0	5839.097^{bc}	197.9		0.2	
5839.087	2.2626^o	6.0	0.1399	5.0	5839.097^{bc}	199.1		-1.5	
5841.900	3.4082^o	4.0	1.2865	5.0	5841.905^c	19.0		-1.1	
5844.636	3.3804	9.0	1.2597^o	8.0	5844.646^c	96.7		-0.4	
5845.921	3.6030^o	9.0	1.4828	9.0	5845.924	64.3		-0.3	
5847.593	3.4567	9.0	1.3371^o	8.0	5847.597	35.2		-0.7	
5858.891	3.4667^o	8.0	1.3511	8.0	5858.893^c	193.7		0.0	
5859.373	2.4088^o	6.0	0.2934	6.0	5859.376^c	57.8		-1.8	
5859.646	3.4792^o	4.0	1.3640	3.0	5859.646	14.1		-1.1	
5861.137	3.4787^o	4.0	1.3640	3.0	5861.147	13.6		-1.1	
5862.197	3.7140^o	9.0	1.5997	8.0	5862.204^c	9.8		-0.9	
5867.587	4.0756^o	10.0	1.9632	9.0	5867.583^c	29.4		-0.0	
5868.873	3.9807^o	11.0	1.8688	10.0	5868.873	71.5		0.3	
5869.624	2.1117^o	4.0	0.0000	4.0	5869.628	178.4		-1.7	
5871.010	3.5352^o	5.0	1.4241	4.0	5871.008^c	28.9		-0.7	
5873.324	2.5668^o	6.0	0.4565	7.0	5873.326	57.1		-1.6	
5883.284	3.4439	9.0	1.3371^o	8.0	5883.286^c	151.8		-0.1	
5886.216	3.7054^o	9.0	1.5997	8.0	5886.220	43.2		-0.3	
5887.874	2.1051^o	3.0	0.0000	4.0	5887.881^c	832.1		-1.1	
5890.441	3.1471	7.0	1.0429^o	6.0	5890.446^c	9.7		-1.7	
5895.562	3.2325^o	5.0	1.1301	6.0	5895.566	52.7		-0.8	
5896.662	3.6805	8.0	1.5785^o	7.0	5896.662^c	17.0		-0.7	
5897.507	3.5755	8.0	1.4739^o	9.0	5897.488	14.4		-0.9	
5899.162	3.1519^o	6.0	1.0508	5.0	5899.163	21.5		-1.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5899.436	3.7037	8.0	1.6027^{o}	7.0	5899.456^{bc}	107.8		0.1	
5899.455	3.1921	6.0	1.0911^{o}	6.0	5899.456^{bc}	110.5		-0.6	
5899.484	3.5655	6.0	1.4646^{o}	6.0	5899.456^{bc}	110.2		-0.1	
5901.592	2.2401^{o}	5.0	0.1399	5.0	5901.601^{c}	20.2		-2.5	
5906.389	3.6621	8.0	1.5636^{o}	7.0	5906.428	10062.0			
5914.392	3.5733^{o}	8.0	1.4776	7.0	5914.395	70.0		-0.3	
5914.672	3.3279^{o}	6.0	1.2323	7.0	5914.689^{c}	29.3		-1.0	
5918.889	4.3229	3.0	2.2288^{o}	3.0	5918.906	2962.3			
5919.792	3.4449^{o}	7.0	1.3511	8.0	5919.792^{c}	20.3		-1.0	
5922.741	3.4567^{o}	4.0	1.3640	3.0	5922.768^{bc}	106.6		-0.2	
5922.807	3.1435^{o}	6.0	1.0508	5.0	5922.768^{bc}	101.8		-0.6	
5927.955	3.6905^{o}	7.0	1.5997	8.0	5927.956	11.0		-0.9	
5928.916	3.5733^{o}	8.0	1.4828	9.0	5928.922^{bc}	16.2		-0.9	
5928.964	3.4765	6.0	1.3860^{o}	6.0	5928.922^{bc}	15.9		-1.0	
5931.408	3.7140^{o}	9.0	1.6243	10.0	5931.418	25.5		-0.5	
5934.890	3.7783	3.0	1.6899^{o}	3.0	5934.893^{b}	9.6		-0.9	
5934.891	2.0884^{o}	5.0	0.0000	4.0	5934.893^{b}	9.6		-3.0	
5935.464	3.3206^{o}	8.0	1.2323	7.0	5935.469^{b}	23.5		-1.1	
5935.515	3.8622	5.0	1.7739^{o}	6.0	5935.469^{b}	23.3		-0.4	
5939.733	3.7976	7.0	1.7109^{o}	7.0	5939.741^{b}	12.4		-0.7	
5939.748	3.9555^{o}	9.0	1.8688	10.0	5939.741^{b}	13.0		-0.5	
5941.373	3.3459	9.0	1.2597^{o}	8.0	5941.371^{c}	16.8		-1.2	
5948.645	3.7944^{o}	8.0	1.7108	7.0	5948.650	8.3		-0.9	
5949.109	3.1252	6.0	1.0417^{o}	7.0	5949.116^{b}	8.6		-1.7	
5949.159	3.6339	5.0	1.5505^{o}	6.0	5949.115^{b}	8.8		-1.1	
5949.617	3.2134^{o}	6.0	1.1301	6.0	5949.618	103.6		-0.5	
5950.378	2.9216	5.0	0.8386^{o}	6.0	5950.373	16.4		-1.7	
5961.145	3.2093^{o}	7.0	1.1301	6.0	5961.142	64.1		-0.8	
5961.666	3.4162	7.0	1.3371^{o}	8.0	5961.617	2757.5			
5963.243	3.5733^{o}	8.0	1.4948	7.0	5963.243^{c}	21.7		-0.8	
5966.694	3.5014^{o}	4.0	1.4241	4.0	5966.695^{c}	18.4		-0.9	
5968.250	2.5332^{o}	6.0	0.4565	7.0	5968.258	56.1		-1.7	
5972.483	3.5621	5.0	1.4868^{o}	4.0	5972.476^{bc}	17.4		-0.9	
5972.484	3.2015	3.0	1.1262^{o}	4.0	5972.476^{bc}	17.4		-1.3	
5977.437	3.6979^{o}	10.0	1.6243	10.0	5977.481	47.3		-0.3	
5978.812	3.1239^{o}	6.0	1.0508	5.0	5978.801	19.8		-1.4	
5987.881	3.6351^{o}	4.0	1.5652	4.0	5987.904	7249.5			
5988.795	3.4336^{o}	3.0	1.3640	3.0	5988.807^{c}	12.4		-1.2	
5990.222	3.6707^{o}	7.0	1.6015	6.0	5990.227	19.3		-0.7	
5994.752	3.4449^{o}	7.0	1.3773	6.0	5994.758	137.5		-0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5996.456	3.2993^o	7.0	1.2323	7.0	5996.458^c	105.1		-0.4	
5996.904	3.4206	6.0	1.3537^o	5.0	5996.948	12.0		-1.2	
5998.359	3.4749	3.0	1.4085^o	4.0	5998.336	8.5		-1.3	
5998.814	3.5761^o	5.0	1.5099	5.0	5998.819	13.0		-1.0	
6000.032	2.2056^o	4.0	0.1399	5.0	6000.038^{bc}	272.5		-1.4	
6000.036	3.4442^o	4.0	1.3785	3.0	6000.038^{bc}	272.5		0.2	
6005.471	3.7170^o	8.0	1.6531	8.0	6005.467^c	5.7		-1.1	
6006.396	3.1053	8.0	1.0417^o	7.0	6006.397	64.0		-0.9	
6007.648	3.2648	8.0	1.2017^o	7.0	6007.656	426.3		0.2	
6011.530	3.5446^o	8.0	1.4828	9.0	6011.535	14.2		-1.0	
6015.329	3.4245^o	3.0	1.3640	3.0	6015.330	17.8		-1.0	
6020.235	3.4100^o	7.0	1.3511	8.0	6020.235^c	24.8		-0.9	
6022.616	3.5226	7.0	1.4646^o	6.0	6022.623^b	21.2		-0.8	
6022.625	3.3939^o	7.0	1.3359	6.0	6022.623^b	19.6		-1.0	
6022.637	3.1088^o	5.0	1.0508	5.0	6022.623^b	19.6		-1.4	
6023.562	3.3948	7.0	1.3371^o	8.0	6023.563	24.3		-0.9	
6025.533	2.6830^o	7.0	0.6259	8.0	6025.537^c	44.1		-1.6	
6033.280	3.8278^o	11.0	1.7734	11.0	6033.281	57.9		0.0	
6044.465	3.3877	8.0	1.3371^o	8.0	6044.479	3.0		-1.8	
6049.793	3.4261	6.0	1.3773^o	5.0	6049.841^b	66.3		-0.4	
6049.838	2.1886^o	4.0	0.1399	5.0	6049.841^b	59.2		-2.1	
6050.463	3.7785^o	10.0	1.7300	9.0	6050.466	22.1		-0.5	
6053.774	3.4715^o	5.0	1.4241	4.0	6053.770^c	14.2		-1.1	
6054.488	3.4712^o	3.0	1.4241	4.0	6054.486^c	21.3		-0.9	
6056.992	2.8850	7.0	0.8386^o	6.0	6056.998^c	65.4		-1.1	
6058.291	3.5558^o	6.0	1.5099	5.0	6058.292	23.4		-0.7	
6061.030	3.1751^o	6.0	1.1301	6.0	6061.036	33.0		-1.1	
6066.012	3.6430^o	9.0	1.5997	8.0	6066.049^b	229.0		0.4	
6066.044	3.3804	9.0	1.3371^o	8.0	6066.049^b	232.8		0.1	
6066.062	3.4206	6.0	1.3773^o	5.0	6066.049^b	235.9		0.1	
6066.093	3.6676^o	10.0	1.6243	10.0	6066.049^b	234.5		0.4	
6066.940	2.8816	6.0	0.8386^o	6.0	6066.945	28.4		-1.5	
6068.766	3.8622	5.0	1.8198^o	5.0	6068.732	9.5		-0.7	
6082.041	2.4944^o	6.0	0.4565	7.0	6082.043	51.5		-1.7	
6083.142	3.4015^o	2.0	1.3640	3.0	6083.141^c	11.9		-1.2	
6083.458	3.6905^o	7.0	1.6531	8.0	6083.467	12.3		-0.8	
6084.599	3.3882^o	8.0	1.3511	8.0	6084.601	66.6		-0.5	
6086.930	3.5462^o	6.0	1.5099	5.0	6086.930^c	14.3		-0.9	
6087.920	3.6890^o	8.0	1.6531	8.0	6087.929^{bc}	36.3		-0.4	
6087.928	2.8857	4.0	0.8498^o	5.0	6087.929^{bc}	36.3		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6091.601	3.6707^o	7.0	1.6360	6.0	6091.611^c	11.4		-0.9	
6100.178	2.8816	6.0	0.8498^o	5.0	6100.177^c	16.0		-1.7	
6101.726	3.5141^o	9.0	1.4828	9.0	6101.728	71.0		-0.3	
6107.802	2.8791	6.0	0.8498^o	5.0	6107.798	14.4		-1.8	
6109.641	3.1588^o	6.0	1.1301	6.0	6109.681^b	75.1		-0.7	
6109.687	2.6546^o	7.0	0.6259	8.0	6109.681^b	78.5		-1.3	
6113.474	3.5374^o	5.0	1.5099	5.0	6113.467^c	9.0		-1.2	
6116.484	2.8651	6.0	0.8386^o	6.0	6116.474	12.9		-1.9	
6119.912	3.2270	6.0	1.2017^o	7.0	6119.917^{bc}	7.4		-1.6	
6119.915	3.5352^o	5.0	1.5099	5.0	6119.917^{bc}	7.4		-1.2	
6122.966	3.3883^o	4.0	1.3640	3.0	6122.969^{bc}	36.7		-0.7	
6123.006	3.9954	3.0	1.9712^o	3.0	6122.969^{bc}	36.7		0.0	
6125.285	2.8733	5.0	0.8498^o	5.0	6125.293^{bc}	10.2		-1.9	
6125.286	3.5101^o	3.0	1.4865	2.0	6125.293^{bc}	10.2		-1.1	
6126.183	3.3098^o	6.0	1.2865	5.0	6126.173^c	8.7		-1.5	
6130.591	3.1519^o	6.0	1.1301	6.0	6130.593	30.5		-1.1	
6135.906	3.4846	7.0	1.4646^o	6.0	6135.906	14.6		-1.0	
6148.559	2.1557^o	5.0	0.1399	5.0	6148.567	73.7		-2.0	
6149.259	3.2325^o	5.0	1.2168	4.0	6149.260	192.6		-0.2	
6150.268	2.8651	6.0	0.8498^o	5.0	6150.295	1689.8		0.3	
6155.046	3.4914^o	8.0	1.4776	7.0	6155.048^c	103.1		-0.1	
6156.891	4.0003	4.0	1.9872^o	5.0	6156.933^{bc}	39.1		0.1	
6156.927	2.6391^o	7.0	0.6259	8.0	6156.933^{bc}	38.9		-1.7	
6161.244	3.1028	7.0	1.0911^o	6.0	6161.247	97.7		-0.7	
6165.654	3.2271^o	5.0	1.2168	4.0	6165.654	86.2		-0.6	
6166.753	2.8597	5.0	0.8498^o	5.0	6166.747	16.7		-1.7	
6167.386	2.0097^o	4.0	0.0000	4.0	6167.392	13.6		-2.9	
6169.143	3.4332^o	5.0	1.4241	4.0	6169.145^c	12.5		-1.1	
6174.293	2.1473^o	4.0	0.1399	5.0	6174.302	51.8		-2.2	
6176.093	3.8757^o	10.0	1.8688	10.0	6176.092	22.4		-0.3	
6178.180	3.7170^o	8.0	1.7108	7.0	6178.185^c	15.4		-0.7	
6178.578	3.7795^o	12.0	1.7734	11.0	6178.580	132.6		0.3	
6184.910	3.7976	7.0	1.7936^o	8.0	6184.952^b	12.5		-0.7	
6184.948	2.0040^o	5.0	0.0000	4.0	6184.952^b	12.6		-3.0	
6186.965	3.6030^o	9.0	1.5997	8.0	6186.968^b	7.6		-1.1	
6187.018	4.2528	6.0	2.2495^o	7.0	6186.968^b	7.7		-0.3	
6191.634	3.7037	8.0	1.7019^o	8.0	6191.628^b	19.9		-0.6	
6191.638	3.3530^o	8.0	1.3511	8.0	6191.628^b	19.9		-1.0	
6195.096	3.3544	6.0	1.3537^o	5.0	6195.103	8.2		-1.4	
6197.699	3.5098^o	6.0	1.5099	5.0	6197.691	8.4		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6204.267	3.3349	7.0	1.3371^o	8.0	6204.300^b	3.5		-1.8	
6204.284	3.4623	5.0	1.4646^o	6.0	6204.300^b	3.5		-1.6	
6204.313	3.3750	4.0	1.3773^o	5.0	6204.299^b	3.2		-1.8	
6206.641	3.2835^o	5.0	1.2865	5.0	6206.637	9.0		-1.5	
6208.231	3.3324^o	7.0	1.3359	6.0	6208.233	133.1		-0.2	
6212.786	3.5965^o	7.0	1.6015	6.0	6212.798	13.8		-0.9	
6221.149	3.9555^o	9.0	1.9632	9.0	6221.141	13.7		-0.4	
6222.138	3.3279^o	6.0	1.3359	6.0	6222.140^c	33.6		-0.8	
6223.390	3.6160^o	11.0	1.6243	10.0	6223.388	188.7		0.3	
6226.491	3.0817	7.0	1.0911^o	6.0	6226.501	295.3		-0.2	
6227.201	3.1921	6.0	1.2017^o	7.0	6227.205	41.8		-0.9	
6236.570	3.5889^o	7.0	1.6015	6.0	6236.570	5.4		-1.3	
6237.337	1.9872^o	5.0	0.0000	4.0	6237.345	55.6		-2.3	
6238.438	3.8193^o	8.0	1.8325	8.0	6238.440	14.4		-0.6	
6240.149	3.0774	7.0	1.0911^o	6.0	6240.167^b	23.0		-1.3	
6240.162	3.9427	7.0	1.9565^o	6.0	6240.167^b	22.9		-0.2	
6240.214	2.8360	6.0	0.8498^o	5.0	6240.167^b	22.7		-1.6	
6241.484	3.7368^o	5.0	1.7509	5.0	6241.503	3.4		-1.3	
6244.073	3.4678^o	10.0	1.4828	9.0	6244.077	220.3		0.2	
6251.819	3.7560^o	10.0	1.7734	11.0	6251.826^c	15.0		-0.6	
6257.558	3.3581^o	7.0	1.3773	6.0	6257.510	84.9		-0.4	
6263.301	3.3429^o	4.0	1.3640	3.0	6263.304	15.1		-1.1	
6269.414	3.2093^o	7.0	1.2323	7.0	6269.414	32.9		-1.0	
6278.944	3.9372^o	9.0	1.9632	9.0	6278.947^b	9.2		-0.6	
6278.997	3.5655	6.0	1.5915^o	6.0	6278.947^b	8.9		-1.1	
6279.364	3.3098^o	6.0	1.3359	6.0	6279.394^b	13.8		-1.2	
6279.392	3.7949^o	10.0	1.8210	9.0	6279.394^b	12.8		-0.6	
6281.985	3.3504^o	7.0	1.3773	6.0	6281.987	106.1		-0.3	
6285.781	3.4667^o	8.0	1.4948	7.0	6285.783	128.9		-0.0	
6288.003	1.9712^o	3.0	0.0000	4.0	6288.007^c	147.5		-1.9	
6297.050	3.4511^o	10.0	1.4828	9.0	6297.054^{bc}	115.4		-0.1	
6297.060	3.2663^o	3.0	1.2980	2.0	6297.054^{bc}	115.4		-0.4	
6300.467	3.4449^o	7.0	1.4776	7.0	6300.441	64.4		-0.4	
6308.256	3.4608^o	6.0	1.4959	5.0	6308.256^c	68.6		-0.3	
6310.482	3.3153^o	9.0	1.3511	8.0	6310.484	393.6		0.2	
6321.219	3.0026	7.0	1.0417^o	7.0	6321.217	97.0		-0.8	
6322.823	3.4702^o	4.0	1.5099	5.0	6322.871^{bc}	25.7		-0.7	
6322.870	3.6903^o	9.0	1.7300	9.0	6322.871^{bc}	25.4		-0.5	
6322.886	3.1926^o	6.0	1.2323	7.0	6322.871^{bc}	25.3		-1.1	
6325.274	2.2530^o	6.0	0.2934	6.0	6325.280	23.9		-2.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6338.555	3.0062^o	4.0	1.0508	5.0	6338.559	15.8		-1.5	
6340.648	2.2482^o	5.0	0.2934	6.0	6340.647^c	14.2		-2.6	
6341.298	3.4505^o	6.0	1.4959	5.0	6341.296	15.0		-1.0	
6348.723	2.4088^o	6.0	0.4565	7.0	6348.728^c	39.4		-1.9	
6353.614	2.9937	6.0	1.0429^o	6.0	6353.610^c	12.8		-1.6	
6354.325	3.3279^o	6.0	1.3773	6.0	6354.316	6.2		-1.5	
6355.934	3.4449^o	7.0	1.4948	7.0	6355.932	24.8		-0.8	
6356.548	3.6030^o	9.0	1.6531	8.0	6356.544^b	26.9		-0.5	
6356.571	3.7697	6.0	1.8198^o	5.0	6356.544^b	26.1		-0.3	
6360.080	1.9488^o	4.0	0.0000	4.0	6360.077	51.1		-2.4	
6360.865	2.0884^o	5.0	0.1399	5.0	6360.862^c	13.8		-2.8	
6362.153	3.2993^o	7.0	1.3511	8.0	6362.128^c	3.8		-1.8	
6363.923	3.2835^o	5.0	1.3359	6.0	6363.920	14.2		-1.2	
6372.767	3.5446^o	8.0	1.5997	8.0	6372.767^c	21.1		-0.7	
6375.907	3.5683^o	9.0	1.6243	10.0	6375.914	23.4		-0.6	
6391.179	3.8908	7.0	1.9514^o	6.0	6391.221	37.4		-0.0	
6408.464	3.4846	7.0	1.5505^o	6.0	6408.501^b	65.0		-0.3	
6408.491	1.9341^o	4.0	0.0000	4.0	6408.501^b	66.2		-2.3	
6410.586	2.9843^o	4.0	1.0508	5.0	6410.596	23.9		-1.4	
6414.021	3.3098^o	6.0	1.3773	6.0	6414.026^b	32.7		-0.8	
6414.034	3.4976^o	4.0	1.5652	4.0	6414.026^b	32.7		-0.6	
6414.368	3.4100^o	7.0	1.4776	7.0	6414.368	18.5		-0.9	
6420.705	3.2663^o	5.0	1.3359	6.0	6420.708	26.9		-1.0	
6425.099	3.3064	6.0	1.3773^o	5.0	6425.107	5.8		-1.6	
6426.127	2.9717	6.0	1.0429^o	6.0	6426.129	7.1		-1.9	
6427.113	3.4937^o	5.0	1.5652	4.0	6427.090	4.1		-1.5	
6429.044	3.5418^o	5.0	1.6139	4.0	6429.030^c	4.1		-1.4	
6429.822	3.5539	5.0	1.6262^o	4.0	6429.838^b	27.9		-0.6	
6429.840	3.2648	8.0	1.3371^o	8.0	6429.838^b	27.4		-1.0	
6431.164	3.9224^o	11.0	1.9951	10.0	6431.172^c	16.0		-0.3	
6432.650	3.2134^o	6.0	1.2865	5.0	6432.653^c	101.6		-0.4	
6435.180	2.5520^o	7.0	0.6259	8.0	6435.189^c	7.6		-2.4	
6439.722	3.5244^o	8.0	1.5997	8.0	6439.725^c	7.2		-1.2	
6448.070	3.5014^o	4.0	1.5791	3.0	6448.048	3.1		-1.6	
6448.817	3.2993^o	7.0	1.3773	6.0	6448.817^c	7.6		-1.5	
6451.220	3.2724^o	7.0	1.3511	8.0	6451.222^b	34.0		-0.8	
6451.273	3.9123	5.0	1.9910^o	4.0	6451.222^b	34.1		-0.0	
6456.208	1.9198^o	3.0	0.0000	4.0	6456.210	118.8		-2.0	
6457.114	3.1519^o	6.0	1.2323	7.0	6457.114^c	45.8		-0.9	
6458.980	2.9698^o	4.0	1.0508	5.0	6458.985	17.3		-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6459.471	3.3429^o	4.0	1.4241	4.0	6459.455	6.1		-1.5	
6460.300	3.0487^o	6.0	1.1301	6.0	6460.306^b	7.2		-1.8	
6460.303	2.5445^o	9.0	0.6259	8.0	6460.306^b	7.6		-2.4	
6461.166	3.3960^o	6.0	1.4776	7.0	6461.168	15.4		-1.0	
6461.862	3.0482^o	5.0	1.1301	6.0	6461.871	9.6		-1.7	
6463.561	3.0477^o	5.0	1.1301	6.0	6463.567	52.5		-0.9	
6465.871	3.2809^o	3.0	1.3640	3.0	6465.874^c	9.7		-1.4	
6466.644	3.0078	7.0	1.0911^o	6.0	6466.655	4.0		-2.1	
6469.182	3.5691^o	8.0	1.6531	8.0	6469.183^c	2.3		-1.6	
6473.557	3.1470^o	8.0	1.2323	7.0	6473.560	16.5		-1.3	
6474.219	3.5141^o	9.0	1.5997	8.0	6474.230^c	19.7		-0.8	
6480.190	3.9123	5.0	1.9996^o	6.0	6480.235^{bc}	25.6		-0.1	
6480.222	3.5154	7.0	1.6027^o	7.0	6480.235^{bc}	25.7		-0.6	
6480.228	3.6890^o	8.0	1.7764	7.0	6480.235^{bc}	25.7		-0.4	
6481.605	2.2057^o	5.0	0.2934	6.0	6481.608^b	102.6		-1.7	
6481.607	3.4082^o	4.0	1.4959	5.0	6481.608^b	102.6		-0.2	
6484.363	3.0026	7.0	1.0911^o	6.0	6484.368	81.1		-0.8	
6485.636	3.4000	6.0	1.4889^o	5.0	6485.689^b	494.3		0.5	
6485.682	3.0412^o	7.0	1.1301	6.0	6485.689^b	497.9		0.0	
6485.716	3.1976^o	4.0	1.2865	5.0	6485.689^b	509.0		0.2	
6487.464	3.7976	7.0	1.8871^o	6.0	6487.493^{bc}	29.6		-0.2	
6487.486	3.3882^o	8.0	1.4776	7.0	6487.493^{bc}	29.3		-0.8	
6500.142	3.2427^o	7.0	1.3359	6.0	6500.146^c	99.9		-0.4	
6501.067	3.3804	9.0	1.4739^o	9.0	6501.073	18.0		-1.0	
6519.606	3.1028	7.0	1.2017^o	7.0	6519.574	27.4		-1.1	
6520.261	4.1125	7.0	2.2115^o	7.0	6520.268^{bc}	19.4		0.0	
6520.267	3.5369^o	7.0	1.6360	6.0	6520.268^{bc}	19.4		-0.7	
6537.376	3.7170^o	8.0	1.8210	9.0	6537.375	4.0		-1.2	
6541.653	3.3459	9.0	1.4512^o	8.0	6541.662	6.0		-1.5	
6543.110	3.6707^o	7.0	1.7764	7.0	6543.105^c	3.2		-1.3	
6543.632	3.6676^o	10.0	1.7734	11.0	6543.637^c	4.0		-1.2	
6544.375	3.4039^o	6.0	1.5099	5.0	6544.374	2.6		-1.8	
6547.702	3.3795^o	3.0	1.4865	2.0	6547.748^b	13.4		-1.1	
6547.752	3.7140^o	9.0	1.8210	9.0	6547.748^b	13.7		-0.7	
6552.014	3.4914^o	8.0	1.5997	8.0	6551.996	6.5		-1.3	
6552.576	3.2427^o	7.0	1.3511	8.0	6552.573	5.6		-1.6	
6555.833	3.4411	6.0	1.5505^o	6.0	6555.854^b	3.8		-1.6	
6555.846	3.0207^o	5.0	1.1301	6.0	6555.854^b	3.8		-2.1	
6560.031	3.7783	3.0	1.8889^o	4.0	6560.066^{bc}	2.8		-1.3	
6560.096	3.4261	6.0	1.5367^o	5.0	6560.066^{bc}	2.8		-1.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6565.452	3.2663^o	3.0	1.3785	3.0	6565.424	3.6		-1.8	
6577.731	3.7054^o	9.0	1.8210	9.0	6577.741	13.3		-0.7	
6579.631	3.5369^o	7.0	1.6531	8.0	6579.628^b	18.3		-0.7	
6579.650	3.4204	4.0	1.5367^o	5.0	6579.628^b	18.6		-0.9	
6579.661	3.4473	7.0	1.5636^o	7.0	6579.628^b	18.6		-0.9	
6589.208	3.1231	8.0	1.2420^o	7.0	6589.209	4.8		-1.9	
6589.631	3.3637^o	8.0	1.4828	9.0	6589.650^b	13.7		-1.1	
6589.642	3.8760^o	9.0	1.9951	10.0	6589.650^b	13.7		-0.4	
6590.950	3.8757^o	10.0	1.9951	10.0	6590.961	11.0		-0.5	
6592.709	3.0817	7.0	1.2017^o	7.0	6592.725^c	29.3		-1.1	
6593.684	3.4937^o	5.0	1.6139	4.0	6593.684	9.4		-1.1	
6601.751	3.2134^o	6.0	1.3359	6.0	6601.755	90.2		-0.5	
6612.011	3.0914^o	5.0	1.2168	4.0	6612.015	106.0		-0.6	
6614.241	3.0002	5.0	1.1262^o	4.0	6614.239	3.8		-2.1	
6615.947	3.2093^o	7.0	1.3359	6.0	6615.943	60.8		-0.6	
6618.520	3.3504^o	7.0	1.4776	7.0	6618.521	47.1		-0.6	
6619.365	2.9233^o	6.0	1.0508	5.0	6619.368^c	34.6		-1.3	
6624.309	3.9474	8.0	2.0763^o	7.0	6624.294^c	4.8		-0.8	
6625.347	3.2067^o	5.0	1.3359	6.0	6625.347^{bc}	14.7		-1.3	
6625.352	3.5621	5.0	1.6913^o	5.0	6625.347^{bc}	14.7		-0.8	
6628.685	2.0097^o	4.0	0.1399	5.0	6628.693^c	25.2		-2.6	
6630.130	2.9202^o	6.0	1.0508	5.0	6630.135	352.6		-0.2	
6635.195	3.6890^o	8.0	1.8210	9.0	6635.197	9.4		-0.8	
6647.288	3.5755	8.0	1.7109^o	7.0	6647.320^c	2.2		-1.6	
6648.977	2.0040^o	5.0	0.1399	5.0	6648.984^b	92.7		-2.0	
6649.017	2.7139	6.0	0.8498^o	5.0	6648.984^b	94.1		-1.1	
6650.303	3.7976	7.0	1.9339^o	6.0	6650.299^c	9.2		-0.7	
6655.664	2.9131^o	6.0	1.0508	5.0	6655.666^c	151.4		-0.6	
6660.152	3.5141^o	9.0	1.6531	8.0	6660.155	27.5		-0.6	
6664.700	1.9996^o	6.0	0.1399	5.0	6664.710	149.9		-1.8	
6670.374	3.1002	7.0	1.2420^o	7.0	6670.380^b	36.0		-1.0	
6670.376	3.3530^o	8.0	1.4948	7.0	6670.380^b	36.0		-0.7	
6695.566	1.9910^o	4.0	0.1399	5.0	6695.574^{bc}	37.8		-2.4	
6695.578	3.0680^o	5.0	1.2168	4.0	6695.574^{bc}	37.5		-1.0	
6699.184	3.7591	8.0	1.9089^o	7.0	6699.205^b	44.4		-0.1	
6699.197	2.1436^o	7.0	0.2934	6.0	6699.205^b	44.3		-2.1	
6699.582	3.0904	6.0	1.2404^o	5.0	6699.600	6.6		-1.7	
6709.052	3.8426^o	10.0	1.9951	10.0	6709.052	5.8		-0.8	
6709.560	1.9872^o	5.0	0.1399	5.0	6709.566	5.0		-3.3	
6712.270	3.6676^o	10.0	1.8210	9.0	6712.272^c	18.4		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6722.708	2.1371^o	6.0	0.2934	6.0	6722.720^b	50.4		-2.1	
6722.714	3.6949	8.0	1.8512^o	8.0	6722.720^b	50.4		-0.1	
6722.762	2.9738^o	6.0	1.1301	6.0	6722.720^b	51.8		-1.0	
6734.468	3.6603	6.0	1.8198^o	5.0	6734.465	5.7		-1.1	
6735.546	3.4317	6.0	1.5915^o	6.0	6735.532	3.7		-1.5	
6739.207	3.1751^o	6.0	1.3359	6.0	6739.210^c	8.5		-1.5	
6742.507	3.4914^o	8.0	1.6531	8.0	6742.508^{bc}	47.7		-0.4	
6742.552	4.0440	4.0	2.2057^o	5.0	6742.508^{bc}	50.2		0.4	
6743.531	3.3459	9.0	1.5079^o	9.0	6743.531	12.9		-1.1	
6745.186	3.3324^o	7.0	1.4948	7.0	6745.190^c	21.0		-0.9	
6748.398	2.4626^o	8.0	0.6259	8.0	6748.404^c	22.9		-2.0	
6750.754	3.2134^o	6.0	1.3773	6.0	6750.747	5.8		-1.6	
6751.050	3.5259	4.0	1.6899^o	3.0	6751.078^b	3.1		-1.5	
6751.115	2.8867^o	6.0	1.0508	5.0	6751.078^b	4.3		-2.2	
6754.005	1.8352^o	4.0	0.0000	4.0	6754.018	40.9		-2.5	
6762.995	2.9589	3.0	1.1262^o	4.0	6763.012^b	38.7		-1.1	
6763.030	3.8278^o	11.0	1.9951	10.0	6763.012^b	38.6		-0.0	
6763.801	3.3153^o	9.0	1.4828	9.0	6763.806	28.9		-0.8	
6769.766	3.0477^o	5.0	1.2168	4.0	6769.772	4.1		-2.0	
6770.976	2.2870^o	6.0	0.4565	7.0	6770.984^b	35.6		-2.0	
6770.988	2.9216	5.0	1.0911^o	6.0	6770.984^b	35.6		-1.2	
6781.906	3.4519^o	9.0	1.6243	10.0	6781.910	3.7		-1.5	
6784.688	1.9667^o	4.0	0.1399	5.0	6784.699	41.3		-2.4	
6788.792	3.3206^o	8.0	1.4948	7.0	6788.802	15.0		-1.1	
6790.324	2.8761^o	5.0	1.0508	5.0	6790.352	1.6		-2.6	
6792.298	3.4608^o	6.0	1.6360	6.0	6792.312^{bc}	27.6		-0.6	
6792.308	2.1182^o	6.0	0.2934	6.0	6792.312^{bc}	27.6		-2.3	
6792.361	3.4245^o	7.0	1.5997	8.0	6792.312^{bc}	27.6		-0.7	
6794.944	3.5577	4.0	1.7336^o	4.0	6794.965	2.0		-1.6	
6797.423	3.4594^o	5.0	1.6360	6.0	6797.420	1.5		-1.9	
6801.332	3.1735^o	8.0	1.3511	8.0	6801.335	34.6		-0.9	
6803.061	3.6430^o	9.0	1.8210	9.0	6803.065	29.3		-0.4	
6803.968	3.2993^o	7.0	1.4776	7.0	6804.011^c	6.0		-1.5	
6808.985	3.5539	5.0	1.7336^o	4.0	6808.993	4.6		-1.3	
6809.566	3.5965^o	7.0	1.7764	7.0	6809.570	2.6		-1.5	
6811.086	1.8198^o	5.0	0.0000	4.0	6811.105^{bc}	2.8		-3.7	
6811.161	3.7443	5.0	1.9245^o	5.0	6811.105^{bc}	2.5		-1.3	
6822.984	1.9565^o	6.0	0.1399	5.0	6822.988^c	41.0		-2.4	
6825.317	3.1519^o	6.0	1.3359	6.0	6825.326	17.1		-1.2	
6829.240	3.3098^o	6.0	1.4948	7.0	6829.245^b	4.5		-1.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6829.262	3.5894	6.0	1.7744^o	5.0	6829.245^b	4.7		-1.2	
6832.310	3.6339	5.0	1.8198^o	5.0	6832.333^b	2.3		-1.5	
6832.334	3.0449	2.0	1.2308^o	3.0	6832.333^b	2.4		-2.2	
6833.433	3.3098^o	6.0	1.4959	5.0	6833.421^c	2.8		-1.8	
6836.210	2.6517	6.0	0.8386^o	6.0	6836.223^c	2.2		-2.8	
6837.139	3.6339^o	9.0	1.8210	9.0	6837.129	6.0		-1.1	
6838.149	3.5889^o	7.0	1.7764	7.0	6838.171^b	1.8		-1.6	
6838.165	3.1765^o	4.0	1.3640	3.0	6838.171^b	1.8		-2.2	
6849.179	3.5432	5.0	1.7336^o	4.0	6849.199	7.8		-1.1	
6851.804	1.9488^o	4.0	0.1399	5.0	6851.813^b	103.5		-2.0	
6851.821	3.4449^o	7.0	1.6360	6.0	6851.813^b	100.9		-0.1	
6852.256	3.0412^o	7.0	1.2323	7.0	6852.257	56.0		-0.8	
6853.705	3.4100^o	7.0	1.6015	6.0	6853.704^b	5.7		-1.4	
6853.716	3.4000	6.0	1.5915^o	6.0	6853.704^b	5.7		-1.4	
6856.989	3.1435^o	6.0	1.3359	6.0	6856.994	66.6		-0.6	
6859.119	2.2635^o	7.0	0.4565	7.0	6859.133	6.7		-2.8	
6867.343	3.0914^o	5.0	1.2865	5.0	6867.352^c	7.0		-1.7	
6867.950	3.4999	4.0	1.6952^o	4.0	6867.947	7.6		-1.1	
6868.700	3.2993^o	7.0	1.4948	7.0	6868.705^b	10.2		-1.2	
6868.709	3.5154	7.0	1.7109^o	7.0	6868.705^b	10.0		-1.0	
6876.770	3.2983^o	4.0	1.4959	5.0	6876.773^b	7.4		-1.4	
6876.821	3.2762	8.0	1.4739^o	9.0	6876.773^b	7.2		-1.4	
6878.440	2.6517	6.0	0.8498^o	5.0	6878.448^c	25.6		-1.7	
6880.585	3.2973^o	5.0	1.4959	5.0	6880.607	2.4		-1.9	
6882.227	3.1369^o	6.0	1.3359	6.0	6882.229^c	2.7		-2.0	
6883.456	3.9123	5.0	2.1117^o	4.0	6883.426^c	2.8		-1.0	
6886.770	3.7949^o	10.0	1.9951	10.0	6886.778	17.4		-0.4	
6892.211	3.3083^o	4.0	1.5099	5.0	6892.212	2.0		-1.9	
6893.385	3.1765^o	4.0	1.3785	3.0	6893.358	1.3		-2.3	
6895.639	1.9373^o	5.0	0.1399	5.0	6895.644	18.1		-2.7	
6896.654	3.8735	7.0	2.0763^o	7.0	6896.684^b	14.7		-0.3	
6896.684	3.4999	4.0	1.7027^o	3.0	6896.684^b	14.8		-0.8	
6899.349	2.2530^o	6.0	0.4565	7.0	6899.344	3.9		-3.0	
6903.506	2.9216	5.0	1.1262^o	4.0	6903.516	9.1		-1.8	
6904.749	2.0885^o	7.0	0.2934	6.0	6904.754	67.6		-2.0	
6906.016	2.6334	7.0	0.8386^o	6.0	6906.020	62.9		-1.3	
6906.468	3.1586^o	4.0	1.3640	3.0	6906.471	5.0		-1.7	
6907.160	3.3960^o	6.0	1.6015	6.0	6907.149	4.8		-1.4	
6907.656	3.4082^o	4.0	1.6139	4.0	6907.656^c	2.3		-1.8	
6908.007	3.3939^o	7.0	1.5997	8.0	6908.017^b	8.1		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6908.016	3.8760^o	9.0	2.0818	9.0	6908.018^b	7.9		-0.6	
6908.023	1.9341^o	4.0	0.1399	5.0	6908.018^b	7.9		-3.1	
6908.907	1.9339^o	6.0	0.1399	5.0	6908.911	12.6		-2.9	
6909.377	2.8850	7.0	1.0911^o	6.0	6909.376^c	5.6		-2.0	
6923.852	1.7901^o	3.0	0.0000	4.0	6923.862^{bc}	305.5		-1.7	
6923.893	2.9202^o	6.0	1.1301	6.0	6923.862^{bc}	305.6		-0.2	
6939.831	3.4749	3.0	1.6888^o	2.0	6939.830	4.3		-1.4	
6940.905	2.6355	4.0	0.8498^o	5.0	6940.917	20.7		-1.8	
6945.008	1.9245^o	5.0	0.1399	5.0	6945.015^b	10.5		-3.0	
6945.032	3.1620^o	7.0	1.3773	6.0	6945.015^b	10.5		-1.4	
6949.957	3.7785^o	10.0	1.9951	10.0	6949.951	3.0		-1.2	
6952.013	2.0763^o	7.0	0.2934	6.0	6952.019	30.3		-2.3	
6954.988	3.0687^o	6.0	1.2865	5.0	6955.039	2.1		-2.2	
6957.523	3.1588^o	6.0	1.3773	6.0	6957.530^{bc}	1.8		-2.2	
6957.533	3.0680^o	5.0	1.2865	5.0	6957.530^{bc}	1.8		-2.3	
6963.303	3.5539	5.0	1.7739^o	6.0	6963.262^c	1.5		-1.7	
6964.510	3.4749	3.0	1.6952^o	4.0	6964.499^c	29.2		-0.6	
6967.660	3.7976	7.0	2.0188^o	7.0	6967.659^b	4.4		-1.0	
6967.669	3.2678	5.0	1.4889^o	5.0	6967.659^b	4.4		-1.6	
6977.158	3.4124^o	5.0	1.6360	6.0	6977.175	7.9		-1.2	
6984.704	3.1519^o	6.0	1.3773	6.0	6984.709	10.5		-1.4	
6985.220	1.7744^o	5.0	0.0000	4.0	6985.226	385.3		-1.6	
6986.742	3.4100^o	7.0	1.6360	6.0	6986.761	2.1		-1.8	
6990.113	3.6603	6.0	1.8871^o	6.0	6990.112	3.2		-1.3	
6992.191	3.0592^o	4.0	1.2865	5.0	6992.220^c	1.4		-2.4	
6995.182	2.2283^o	8.0	0.4565	7.0	6995.202^c	164.8		-1.4	
6997.305	3.4245^o	7.0	1.6531	8.0	6997.356^{bc}	2.3		-1.7	
6997.342	3.3349	7.0	1.5636^o	7.0	6997.356^{bc}	2.4		-1.8	
7001.150	3.2663^o	5.0	1.4959	5.0	7001.159^b	11.9		-1.2	
7001.173	3.4063^o	5.0	1.6360	6.0	7001.159^b	11.8		-1.0	
7001.618	2.8120	8.0	1.0417^o	7.0	7001.621^c	26.0		-1.4	
7004.194	3.0019^o	7.0	1.2323	7.0	7004.162	6.6		-1.8	
7004.817	3.7209	7.0	1.9514^o	6.0	7004.828^b	13.3		-0.6	
7004.863	2.9711	6.0	1.2017^o	7.0	7004.828^b	13.2		-1.5	
7009.771	3.1053	8.0	1.3371^o	8.0	7009.775	13.0		-1.4	
7040.267	3.5369^o	7.0	1.7764	7.0	7040.269^b	8.2		-1.0	
7040.284	3.0026	7.0	1.2420^o	7.0	7040.269^b	8.2		-1.7	
7042.300	3.3960^o	6.0	1.6360	6.0	7042.300	9.7		-1.1	
7054.948	3.4100^o	7.0	1.6531	8.0	7054.963	2.5		-1.7	
7055.448	2.3827^o	9.0	0.6259	8.0	7055.464	141.3		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7060.414	3.0914^{o}	5.0	1.3359	6.0	7060.415	16.7		-1.3	
7066.427	3.7697	6.0	2.0157^{o}	5.0	7066.457^{bc}	4.7		-0.9	
7066.447	3.0899^{o}	6.0	1.3359	6.0	7066.457^{bc}	5.0		-1.8	
7066.471	2.8048^{o}	4.0	1.0508	5.0	7066.457^{bc}	4.9		-2.2	
7069.166	2.9937	6.0	1.2404^{o}	5.0	7069.110	3.6		-2.1	
7081.226	3.1277^{o}	5.0	1.3773	6.0	7081.247^{c}	2.7		-2.0	
7086.460	1.8889^{o}	4.0	0.1399	5.0	7086.474	256.6		-1.6	
7088.042	3.0084	9.0	1.2597^{o}	8.0	7088.059^{b}	10.5		-1.6	
7088.042	3.0084	9.0	1.2597^{o}	8.0	7088.059^{b}	10.5		-1.6	
7088.456	3.3271	7.0	1.5785^{o}	7.0	7088.468	9.1		-1.2	
7088.902	3.0350^{o}	4.0	1.2865	5.0	7088.881	2.2		-2.2	
7091.183	3.2427^{o}	7.0	1.4948	7.0	7091.186	4.4		-1.6	
7093.892	1.8871^{o}	6.0	0.1399	5.0	7093.903	326.7		-1.5	
7103.210	2.8360	6.0	1.0911^{o}	6.0	7103.198	2.5		-2.4	
7105.024	3.0042	8.0	1.2597^{o}	8.0	7105.031^{bc}	3.5		-2.1	
7105.026	3.2310^{o}	3.0	1.4865	2.0	7105.031^{bc}	3.5		-1.8	
7106.817	2.2005^{o}	6.0	0.4565	7.0	7106.768^{c}	5.5		-2.9	
7110.912	3.1671^{o}	3.0	1.4241	4.0	7110.914^{c}	8.5		-1.5	
7123.787	3.3190^{o}	4.0	1.5791	3.0	7123.756	2.4		-1.8	
7132.261	3.4678^{o}	10.0	1.7300	9.0	7132.275^{c}	5.9		-1.2	
7136.932	3.4667^{o}	8.0	1.7300	9.0	7136.883^{c}	20.2		-0.7	
7148.088	1.8738^{o}	5.0	0.1399	5.0	7148.097	143.3		-1.9	
7149.726	1.7336^{o}	4.0	0.0000	4.0	7149.722	117.3		-2.1	
7153.090	3.0687^{o}	6.0	1.3359	6.0	7153.098	19.8		-1.2	
7154.536	3.5261	8.0	1.7936^{o}	8.0	7154.536^{c}	9.8		-0.9	
7155.573	3.2973^{o}	5.0	1.5652	4.0	7155.516	9.6		-1.2	
7157.559	3.2093^{o}	7.0	1.4776	7.0	7157.565^{b}	8.6		-1.4	
7157.571	3.2523^{o}	4.0	1.5206	3.0	7157.565^{b}	8.6		-1.3	
7159.816	3.2678	5.0	1.5367^{o}	5.0	7159.775	4.6		-1.6	
7182.442	3.2593	2.0	1.5336^{o}	3.0	7182.447^{b}	8.1		-1.3	
7182.481	3.1768	7.0	1.4512^{o}	8.0	7182.447^{b}	8.0		-1.5	
7183.360	3.4999	4.0	1.7744^{o}	5.0	7183.367	23.6		-0.6	
7183.874	2.0188^{o}	7.0	0.2934	6.0	7183.875	109.2		-1.8	
7184.464	3.0117^{o}	5.0	1.2865	5.0	7184.460^{c}	7.2		-1.7	
7185.180	3.8622	5.0	2.1371^{o}	6.0	7185.127	4.4		-0.8	
7189.464	3.0472	5.0	1.3232^{o}	4.0	7189.434^{c}	5.7		-1.8	
7189.936	3.2874	7.0	1.5636^{o}	7.0	7189.914	3.2		-1.7	
7194.140	1.7229^{o}	5.0	0.0000	4.0	7194.153	9.6		-3.2	
7196.828	2.0157^{o}	5.0	0.2934	6.0	7196.835	17.8		-2.6	
7198.505	4.1700	6.0	2.4482^{o}	7.0	7198.540^{bc}	4.5		-0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7198.549	4.1045	9.0	2.3827^{o}	9.0	7198.540^{bc}	4.4		-0.5	
7201.465	3.4511^{o}	10.0	1.7300	9.0	7201.464	3.5		-1.5	
7210.215	3.9474	8.0	2.2283^{o}	8.0	7210.180	3.4		-0.8	
7218.647	3.6430^{o}	9.0	1.9259	8.0	7218.652	4.0		-1.1	
7219.611	3.1028	7.0	1.3860^{o}	6.0	7219.618^{c}	3.8		-1.9	
7224.108	3.2809^{o}	3.0	1.5652	4.0	7224.101	2.2		-1.9	
7227.071	3.4914^{o}	8.0	1.7764	7.0	7227.071	2.4		-1.6	
7229.229	3.2093^{o}	7.0	1.4948	7.0	7229.233	11.5		-1.2	
7266.178	2.1623^{o}	8.0	0.4565	7.0	7266.176	52.2		-1.9	
7268.353	3.0412^{o}	7.0	1.3359	6.0	7268.361^{c}	13.6		-1.4	
7272.378	3.7697	6.0	2.0653^{o}	6.0	7272.394^{c}	2.1		-1.3	
7279.461	1.7027^{o}	3.0	0.0000	4.0	7279.459	127.8		-2.1	
7285.235	2.5400	5.0	0.8386^{o}	6.0	7285.244^{c}	31.7		-1.7	
7287.053	2.7427	6.0	1.0417^{o}	7.0	7287.058	4.3		-2.3	
7291.491	3.3530^{o}	8.0	1.6531	8.0	7291.493^{c}	5.5		-1.4	
7301.171	3.2612	6.0	1.5636^{o}	7.0	7301.177	5.7		-1.5	
7306.352	3.3324^{o}	7.0	1.6360	6.0	7306.354^{c}	2.7		-1.7	
7308.637	3.2874	7.0	1.5915^{o}	6.0	7308.683^{b}	6.3		-1.4	
7308.681	3.1735^{o}	8.0	1.4776	7.0	7308.683^{b}	5.7		-1.6	
7311.749	1.6952^{o}	4.0	0.0000	4.0	7311.755^{b}	82.0		-2.3	
7311.800	3.6903^{o}	9.0	1.9951	10.0	7311.755^{b}	82.8		0.2	
7313.784	1.8346^{o}	5.0	0.1399	5.0	7313.788^{c}	51.7		-2.3	
7316.765	3.6029	8.0	1.9089^{o}	7.0	7316.795^{c}	1.7		-1.6	
7317.952	2.3197^{o}	9.0	0.6259	8.0	7317.935^{c}	14.7		-2.3	
7320.725	3.5141^{o}	9.0	1.8210	9.0	7320.733	3.4		-1.4	
7322.680	3.1792^{o}	3.0	1.4865	2.0	7322.686	23.7		-1.0	
7328.456	3.5259	4.0	1.8346^{o}	5.0	7328.434^{b}	4.5		-1.2	
7328.458	3.1652	8.0	1.4739^{o}	9.0	7328.434^{b}	4.5		-1.7	
7330.651	3.1554	5.0	1.4646^{o}	6.0	7330.656^{c}	4.6		-1.7	
7332.741	3.4667^{o}	8.0	1.7764	7.0	7332.775^{bc}	2.8		-1.5	
7332.800	3.2270	6.0	1.5367^{o}	5.0	7332.775^{bc}	2.7		-1.8	
7333.215	2.5400	5.0	0.8498^{o}	5.0	7333.223	24.8		-1.8	
7334.542	1.6899^{o}	3.0	0.0000	4.0	7334.553	427.2		-1.6	
7346.315	3.7697	6.0	2.0825^{o}	6.0	7346.349^{b}	6.3		-0.8	
7346.335	3.2868^{o}	9.0	1.5997	8.0	7346.349^{b}	6.3		-1.4	
7363.256	2.8850	7.0	1.2017^{o}	7.0	7363.264	8.1		-1.8	
7369.833	3.9106	4.0	2.2288^{o}	3.0	7369.867^{c}	19.0		-0.1	
7378.128	1.8198^{o}	5.0	0.1399	5.0	7378.138	27.3		-2.6	
7381.547	3.1751^{o}	6.0	1.4959	5.0	7381.532	1.7		-2.1	
7383.425	3.1735^{o}	8.0	1.4948	7.0	7383.437	2.4		-1.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
7389.117	2.8791	6.0	1.2017^o	7.0	7389.127	2.5		-2.3	
7397.063	4.1700	6.0	2.4944^o	6.0	7397.056	2.9		-0.6	
7398.661	2.7182	5.0	1.0429^o	6.0	7398.641^b	2.9		-2.4	
7398.681	3.9106	4.0	2.2354^o	5.0	7398.641^b	3.1		-0.9	
7399.667	3.5621	5.0	1.8871^o	6.0	7399.679	2.9		-1.4	
7401.277	2.5133	6.0	0.8386^o	6.0	7401.291^b	80.2		-1.3	
7401.323	3.6618	5.0	1.9872^o	5.0	7401.291^b	82.7		0.2	
7412.411	2.7139	6.0	1.0417^o	7.0	7412.367^c	2.0		-2.6	
7424.869	3.1470^o	8.0	1.4776	7.0	7424.873	4.4		-1.7	
7430.079	3.4618	8.0	1.7936^o	8.0	7430.095	2.3		-1.6	
7433.220	3.3206^o	8.0	1.6531	8.0	7433.226	6.6		-1.3	
7435.230	3.2809^o	3.0	1.6139	4.0	7435.226	7.9		-1.3	
7442.349	3.0026	7.0	1.3371^o	8.0	7442.345	7.8		-1.6	
7445.477	3.4999	4.0	1.8352^o	4.0	7445.470^b	7.7		-1.0	
7445.501	2.8816^o	5.0	1.2168	4.0	7445.470^b	7.9		-1.8	
7450.802	2.5133	6.0	0.8498^o	5.0	7450.817	7.4		-2.3	
7451.361	2.8651	6.0	1.2017^o	7.0	7451.366^b	5.7		-2.0	
7451.373	3.2270	6.0	1.5636^o	7.0	7451.366^b	5.7		-1.5	
7456.868	3.3153^o	9.0	1.6531	8.0	7456.870	3.4		-1.6	
7457.905	3.2271^o	5.0	1.5652	4.0	7457.935	2.8		-1.8	
7458.754	2.1182^o	6.0	0.4565	7.0	7458.760^c	6.8		-2.8	
7463.729	3.6603	6.0	1.9996^o	6.0	7463.756^c	1.3		-1.6	
7464.286	3.7976	7.0	2.1371^o	6.0	7464.280	2.9		-1.0	
7483.942	3.4913	5.0	1.8352^o	4.0	7483.981^b	6.0		-1.1	
7484.003	3.5432	5.0	1.8871^o	6.0	7483.982^b	7.6		-1.0	
7484.008	3.9091	6.0	2.2530^o	6.0	7483.982^b	7.6		-0.5	
7484.979	3.1519^o	6.0	1.4959	5.0	7484.961	7.3		-1.5	
7502.021	3.1470^o	8.0	1.4948	7.0	7502.046	0.9		-2.4	
7507.778	3.2869^o	6.0	1.6360	6.0	7507.786^c	1.9		-1.9	
7515.487	3.1231	8.0	1.4739^o	9.0	7515.461	1.5		-2.2	
7518.957	3.2270	6.0	1.5785^o	7.0	7518.952	1.1		-2.2	
7529.991	4.2528	6.0	2.6068^o	7.0	7529.977^b	1.9		-0.6	
7530.029	2.8864	5.0	1.2404^o	5.0	7529.977^b	1.9		-2.4	
7545.941	3.6377^o	10.0	1.9951	10.0	7545.944	3.7		-1.1	
7548.992	4.1045	9.0	2.4626^o	8.0	7548.974	1.9		-0.8	
7549.440	3.7697	6.0	2.1279^o	5.0	7549.377	1.9		-1.3	
7550.818	3.6603	6.0	2.0188^o	7.0	7550.815	5.8		-0.9	
7567.881	3.8908	7.0	2.2530^o	6.0	7567.872	1.6		-1.2	
7578.562	3.5226	7.0	1.8871^o	6.0	7578.598^c	2.2		-1.5	
7579.074	3.7976	7.0	2.1623^o	8.0	7579.073	10.4		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7582.899	1.7744^o	5.0	0.1399	5.0	7582.899^b	10.0		-3.1	
7582.941	3.0449	2.0	1.4104^o	3.0	7582.899^b	10.0		-1.5	
7583.797	2.8360	6.0	1.2017^o	7.0	7583.795	7.2		-1.9	
7590.051	4.1045	9.0	2.4715^o	10.0	7590.071^b	7.4		-0.2	
7590.082	3.3349	7.0	1.7019^o	8.0	7590.071^b	7.3		-1.2	
7595.799	3.0091^o	7.0	1.3773	6.0	7595.839	15.2		-1.3	
7597.234	3.1053	8.0	1.4739^o	9.0	7597.281	10.7		-1.3	
7604.560	3.6339	5.0	2.0040^o	5.0	7604.597	8.1		-0.8	
7611.008	3.6603	6.0	2.0317^o	7.0	7611.032	6.7		-0.8	
7614.725	3.9474	8.0	2.3197^o	9.0	7614.707^c	8.8		-0.4	
7621.662	1.6262^o	4.0	0.0000	4.0	7621.664^b	76.0		-2.4	
7621.663	3.6302	6.0	2.0040^o	5.0	7621.664^b	75.8		0.2	
7621.691	3.0035	4.0	1.3773^o	5.0	7621.664^b	75.8		-0.6	
7626.289	3.6440	8.0	2.0188^o	7.0	7626.321^{bc}	8.9		-0.7	
7626.321	2.8850	7.0	1.2597^o	8.0	7626.321^{bc}	9.6		-1.7	
7643.807	3.2354^o	3.0	1.6139	4.0	7643.790	2.2		-1.9	
7650.768	3.5539	5.0	1.9339^o	6.0	7650.761	1.0		-1.8	
7651.780	2.0763^o	7.0	0.4565	7.0	7651.787	35.7		-2.1	
7677.314	3.3096	4.0	1.6952^o	4.0	7677.311	3.6		-1.5	
7681.558	3.1921	6.0	1.5785^o	7.0	7681.564^c	6.0		-1.5	
7682.330	2.8151	7.0	1.2017^o	7.0	7682.334	7.7		-1.8	
7682.816	3.5621	5.0	1.9488^o	4.0	7682.821^c	13.8		-0.6	
7684.887	3.1088^o	5.0	1.4959	5.0	7684.865	5.6		-1.6	
7686.812	3.4449^o	7.0	1.8325	8.0	7686.766	1.8		-1.7	
7695.208	3.5621	5.0	1.9514^o	6.0	7695.184	5.0		-1.1	
7696.888	3.3190^o	4.0	1.7087	3.0	7696.926^b	2.2		-1.7	
7696.890	2.8120	8.0	1.2017^o	7.0	7696.926^b	2.2		-2.4	
7701.550	3.5432	5.0	1.9339^o	6.0	7701.556^{bc}	3.0		-1.3	
7701.552	2.9453^o	6.0	1.3359	6.0	7701.556^{bc}	3.0		-2.1	
7704.258	2.6517	6.0	1.0429^o	6.0	7704.263	4.0		-2.3	
7705.631	2.8951^o	6.0	1.2865	5.0	7705.636^c	11.0		-1.6	
7708.974	3.2093^o	7.0	1.6015	6.0	7708.955	1.7		-2.0	
7718.105	3.5432	5.0	1.9373^o	5.0	7718.110^c	6.7		-1.0	
7758.969	3.5539	5.0	1.9565^o	6.0	7759.013^b	4.9		-1.1	
7759.035	3.1053	8.0	1.5079^o	9.0	7759.013^b	6.0		-1.6	
7762.741	1.5967^o	4.0	0.0000	4.0	7762.754	11.1		-3.2	
7764.398	3.1615^o	3.0	1.5652	4.0	7764.372	1.5		-2.1	
7767.827	2.8360	6.0	1.2404^o	5.0	7767.850	10.8		-1.7	
7768.658	3.3064	6.0	1.7109^o	7.0	7768.672^{bc}	6.6		-1.3	
7768.660	3.0914^o	5.0	1.4959	5.0	7768.672^{bc}	6.6		-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7771.280	3.6603	6.0	2.0653^o	6.0	7771.297	3.4		-1.1	
7777.152	1.7336^o	4.0	0.1399	5.0	7777.150	81.9		-2.2	
7780.033	3.0035	4.0	1.4104^o	3.0	7780.015^c	2.7		-2.0	
7785.738	3.6805	8.0	2.0885^o	7.0	7785.799^b	5.0		-0.9	
7785.823	2.7182	5.0	1.1262^o	4.0	7785.799^b	5.5		-2.1	
7787.319	2.6334	7.0	1.0417^o	7.0	7787.329^{bc}	32.9		-1.4	
7787.393	3.0002	5.0	1.4085^o	4.0	7787.329^{bc}	32.7		-1.0	
7793.033	2.6334	7.0	1.0429^o	6.0	7793.047	4.8		-2.3	
7797.283	3.2427^o	7.0	1.6531	8.0	7797.347^b	45.0		-0.5	
7797.383	2.8761^o	5.0	1.2865	5.0	7797.346^b	36.9		-1.1	
7802.050	3.0714^o	8.0	1.4828	9.0	7802.082	0.8		-2.5	
7804.207	3.3182^o	8.0	1.7300	9.0	7804.222^b	1.8		-1.8	
7804.210	3.5141^o	9.0	1.9259	8.0	7804.222^b	1.8		-1.6	
7811.203	3.5432	5.0	1.9565^o	6.0	7811.196^b	4.2		-1.2	
7811.208	3.3804	9.0	1.7936^o	8.0	7811.196^b	4.2		-1.4	
7814.368	3.7976	7.0	2.2115^o	7.0	7814.358	7.7		-0.6	
7817.217	3.2874	7.0	1.7019^o	8.0	7817.226	5.5		-1.4	
7823.232	2.9202^o	6.0	1.3359	6.0	7823.238^c	9.3		-1.6	
7829.732	1.7229^o	5.0	0.1399	5.0	7829.737	69.0		-2.3	
7831.657	3.0472	5.0	1.4646^o	6.0	7831.648	1.8		-2.2	
7832.986	3.1615^o	3.0	1.5791	3.0	7833.021	82.6		-0.3	
7836.892	3.3752	7.0	1.7936^o	8.0	7836.921	4.2		-1.4	
7842.604	1.8738^o	5.0	0.2934	6.0	7842.625	49.6		-2.2	
7862.137	2.7933^o	5.0	1.2168	4.0	7862.148	2.0		-2.4	
7872.023	2.9518	4.0	1.3773^o	5.0	7872.019^c	25.8		-1.1	
7877.647	3.4623	5.0	1.8889^o	4.0	7877.689^{bc}	3.6		-1.3	
7877.650	3.7013	6.0	2.1279^o	5.0	7877.689^{bc}	3.6		-1.0	
7877.691	3.6618	5.0	2.0884^o	5.0	7877.689^{bc}	3.6		-1.1	
7877.694	3.2093^o	7.0	1.6360	6.0	7877.689^{bc}	3.6		-1.6	
7885.888	3.6603	6.0	2.0885^o	7.0	7885.900^c	1.6		-1.4	
7886.576	2.7885^o	3.0	1.2168	4.0	7886.602^c	57.9		-1.0	
7889.817	4.1700	6.0	2.5990^o	5.0	7889.846^b	2.3		-0.6	
7889.840	3.0448	9.0	1.4739^o	9.0	7889.845^b	2.5		-2.0	
7894.743	2.8120	8.0	1.2420^o	7.0	7894.764	2.4		-2.3	
7898.231	3.7976	7.0	2.2283^o	8.0	7898.212	3.8		-0.9	
7906.031	3.4749	3.0	1.9071^o	2.0	7906.026^{bc}	7.4		-1.0	
7906.070	4.3229	3.0	2.7551^o	3.0	7906.026^{bc}	7.5		0.1	
7915.958	3.4999	4.0	1.9341^o	4.0	7915.948	3.3		-1.3	
7921.400	3.9474	8.0	2.3827^o	9.0	7921.379^c	1.1		-1.2	
7925.087	3.7697	6.0	2.2057^o	5.0	7925.080	36.7		0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7928.813	3.0592^o	4.0	1.4959	5.0	7928.857^{bc}	1.6		-2.2	
7928.893	4.1700	6.0	2.6068^o	7.0	7928.857^{bc}	1.6		-0.7	
7932.282	3.4999	4.0	1.9373^o	5.0	7932.273^b	2.2		-1.5	
7932.288	2.6927^o	6.0	1.1301	6.0	7932.273^b	2.2		-2.5	
7942.033	2.6517	6.0	1.0911^o	6.0	7942.046	3.2		-2.4	
7949.580	2.8824	3.0	1.3232^o	4.0	7949.622^c	3.2		-2.1	
7951.741	3.0687^o	6.0	1.5099	5.0	7951.776	0.6		-2.6	
7957.098	3.7013	6.0	2.1436^o	7.0	7957.145^b	1.3		-1.4	
7957.115	3.4822	5.0	1.9245^o	5.0	7957.145^b	1.2		-1.7	
7958.946	2.6484	5.0	1.0911^o	6.0	7958.930	175.0		-0.7	
7962.778	3.2593	2.0	1.7027^o	3.0	7962.803	1.6		-1.9	
7969.242	1.6952^o	4.0	0.1399	5.0	7969.247	2.9		-3.7	
7970.564	3.4749	3.0	1.9198^o	3.0	7970.545^c	2.3		-1.5	
7972.087	3.0507^o	4.0	1.4959	5.0	7972.074	1.6		-2.2	
8007.694	2.8850	7.0	1.3371^o	8.0	8007.683	58.9		-0.8	
8015.378	3.0412^o	7.0	1.4948	7.0	8015.378^c	3.2		-1.9	
8026.976	2.8039	7.0	1.2597^o	8.0	8027.005	1.4		-2.5	
8029.521	3.5432	5.0	1.9996^o	6.0	8029.520^{bc}	2.9		-1.3	
8029.531	3.1088^o	5.0	1.5652	4.0	8029.520^{bc}	2.9		-1.8	
8029.536	3.8595	5.0	2.3159^o	6.0	8029.520^{bc}	3.0		-0.9	
8029.549	3.3948	7.0	1.8512^o	8.0	8029.520^{bc}	3.0		-1.5	
8031.378	2.9518	4.0	1.4085^o	4.0	8031.391^c	6.3		-1.7	
8034.629	2.5934^o	6.0	1.0508	5.0	8034.628	5.5		-2.2	
8036.394	3.4988	5.0	1.9565^o	6.0	8036.429^{bc}	3.5		-1.2	
8036.405	2.6334	7.0	1.0911^o	6.0	8036.429^{bc}	3.5		-2.4	
8043.229	2.7427	6.0	1.2017^o	7.0	8043.250	184.2		-0.5	
8044.634	2.7576^o	5.0	1.2168	4.0	8044.647	6.0		-2.0	
8052.441	3.1028	7.0	1.5636^o	7.0	8052.443^b	3.6		-1.7	
8052.462	3.5432	5.0	2.0040^o	5.0	8052.443^b	3.8		-1.2	
8053.399	3.0350^o	4.0	1.4959	5.0	8053.397	5.5		-1.6	
8053.905	3.4261	6.0	1.8871^o	6.0	8053.968	0.9		-1.9	
8066.033	1.5367^o	5.0	0.0000	4.0	8066.029^c	2.9		-3.8	
8067.702	2.1623^o	8.0	0.6259	8.0	8067.695	2.8		-3.1	
8071.590	3.0002	5.0	1.4646^o	6.0	8071.582	52.3		-0.7	
8077.114	3.0084	9.0	1.4739^o	9.0	8077.122^b	16.7		-1.2	
8077.114	3.0084	9.0	1.4739^o	9.0	8077.122^b	16.7		-1.2	
8078.878	3.2678	5.0	1.7336^o	4.0	8078.877	3.7		-1.5	
8085.871	2.5837^o	6.0	1.0508	5.0	8085.882	3.2		-2.5	
8091.295	1.8253^o	7.0	0.2934	6.0	8091.299	28.2		-2.5	
8099.173	3.0042	8.0	1.4739^o	9.0	8099.169^b	67.9		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8099.231	2.9544^o	5.0	1.4241	4.0	8099.169^b	69.3		-0.6	
8108.791	3.5157	6.0	1.9872^o	5.0	8108.746^c	3.4		-1.2	
8110.176	3.2792^o	4.0	1.7509	5.0	8110.230^c	1.1		-2.0	
8145.388	3.1002	7.0	1.5785^o	7.0	8145.358	4.2		-1.7	
8159.453	4.2528	6.0	2.7337^o	6.0	8159.420	4.0		-0.2	
8164.248	2.8047^o	4.0	1.2865	5.0	8164.293^b	2.9		-2.2	
8164.254	3.0817	7.0	1.5636^o	7.0	8164.293^b	3.2		-1.8	
8166.604	2.8951^o	6.0	1.3773	6.0	8166.622	1.2		-2.5	
8169.066	2.8946	4.0	1.3773^o	5.0	8169.091^c	3.0		-2.1	
8201.061	2.8651	6.0	1.3537^o	5.0	8201.067^{bc}	8.4		-1.7	
8201.080	3.0449	2.0	1.5336^o	3.0	8201.067^{bc}	8.2		-1.4	
8201.625	3.1028	7.0	1.5915^o	6.0	8201.637^b	6.8		-1.4	
8201.646	3.0002	5.0	1.4889^o	5.0	8201.637^b	6.8		-1.6	
8206.476	3.0739	7.0	1.5636^o	7.0	8206.479	3.8		-1.7	
8212.253	3.1554	5.0	1.6461^o	6.0	8212.279^b	6.8		-1.4	
8212.273	2.6355	4.0	1.1262^o	4.0	8212.279^b	6.8		-2.0	
8212.313	4.2528	6.0	2.7435^o	5.0	8212.279^b	6.9		0.0	
8213.132	2.8864	5.0	1.3773^o	5.0	8213.124	20.3		-1.2	
8215.830	3.1002	7.0	1.5915^o	6.0	8215.866	1.6		-2.1	
8216.974	2.8857	4.0	1.3773^o	5.0	8216.977^c	19.3		-1.3	
8223.948	2.9717	6.0	1.4646^o	6.0	8223.961	2.2		-2.1	
8227.288	2.9711	6.0	1.4646^o	6.0	8227.290	10.5		-1.4	
8245.458	3.0817	7.0	1.5785^o	7.0	8245.462^c	2.8		-1.8	
8283.319	3.0042	8.0	1.5079^o	9.0	8283.342^c	6.8		-1.6	
8290.981	1.9514^o	6.0	0.4565	7.0	8290.990	16.7		-2.5	
8308.919	3.1277^o	5.0	1.6360	6.0	8308.925^{bc}	4.9		-1.5	
8308.978	3.4913	5.0	1.9996^o	6.0	8308.923^{bc}	3.4		-1.2	
8324.634	3.1976^o	4.0	1.7087	3.0	8324.695^{bc}	18.6		-0.9	
8324.657	1.4889^o	5.0	0.0000	4.0	8324.695^{bc}	18.6		-3.1	
8336.332	1.4868^o	4.0	0.0000	4.0	8336.362^c	72.3		-2.5	
8338.805	1.6262^o	4.0	0.1399	5.0	8338.815	62.6		-2.4	
8347.248	3.1868	8.0	1.7019^o	8.0	8347.301	4.8		-1.5	
8361.477	3.0739	7.0	1.5915^o	6.0	8361.478	3.9		-1.7	
8362.451	2.9711	6.0	1.4889^o	5.0	8362.445^c	5.2		-1.7	
8386.749	2.8864	5.0	1.4085^o	4.0	8386.743	9.7		-1.5	
8389.465	1.9339^o	6.0	0.4565	7.0	8389.472^c	23.0		-2.4	
8390.755	2.8857	4.0	1.4085^o	4.0	8390.771	5.9		-1.8	
8398.318	3.1868	8.0	1.7109^o	7.0	8398.352	2.4		-1.8	
8403.853	2.8120	8.0	1.3371^o	8.0	8403.847	12.8		-1.5	
8478.896	2.9697	8.0	1.5079^o	9.0	8478.916	3.7		-1.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8507.977	1.5967^o	4.0	0.1399	5.0	8507.971^b	4.8		-3.5	
8508.011	3.4519^o	9.0	1.9951	10.0	8507.972^b	5.0		-1.1	
8533.797	1.9089^o	7.0	0.4565	7.0	8533.855^{bc}	5.8		-3.0	
8533.821	3.1632^o	8.0	1.7108	7.0	8533.855^{bc}	4.4		-1.5	
8538.108	1.5915^o	6.0	0.1399	5.0	8538.118	27.3		-2.7	
8547.666	2.6517	6.0	1.2017^o	7.0	8547.694	4.3		-2.2	
8554.583	2.5400	5.0	1.0911^o	6.0	8554.579	28.3		-1.5	
8647.110	3.6339	5.0	2.2005^o	6.0	8647.045	13035.3			
8657.079	2.6334	7.0	1.2017^o	7.0	8657.095^c	28.6		-1.4	
8670.814	1.7229^o	5.0	0.2934	6.0	8670.828^c	67.0		-2.2	
8715.029	2.5133	6.0	1.0911^o	6.0	8714.986	18.4		-1.7	
8786.711	1.5505^o	6.0	0.1399	5.0	8786.770	59.5		-2.4	
8788.200	1.4104^o	3.0	0.0000	4.0	8788.250^b	110.6		-2.3	
8788.255	3.5577	4.0	2.1473^o	4.0	8788.250^b	111.5		0.4	
8799.785	1.4085^o	4.0	0.0000	4.0	8799.820^c	55.2		-2.6	
8810.234	3.0207^o	5.0	1.6139	4.0	8810.292^c	2.1		-2.0	
8816.753	2.0317^o	7.0	0.6259	8.0	8816.772	32.7		-2.0	
8873.668	1.5367^o	5.0	0.1399	5.0	8873.721	13.2		-3.1	
8968.611	3.4473	7.0	2.0653^o	6.0	8968.553	2.0		-1.4	
8984.599	2.9711	6.0	1.5915^o	6.0	8984.661^b	1.3		-2.2	
8984.692	3.0904	6.0	1.7109^o	7.0	8984.662^b	1.1		-2.1	
9046.878	1.8265^o	8.0	0.4565	7.0	9046.866	25.2		-2.4	
9054.379	3.9954	3.0	2.6265^o	4.0	9054.322^c	87.5		0.9	
9156.040	1.3537^o	5.0	0.0000	4.0	9156.076	38.1		-2.8	
9187.662	2.7731^o	5.0	1.4241	4.0	9187.721^b	16.2		-1.3	
9187.683	1.4889^o	5.0	0.1399	5.0	9187.721^b	16.2		-3.0	
9187.694	2.8857	4.0	1.5367^o	5.0	9187.721^b	16.2		-1.2	
9226.655	2.9965^o	8.0	1.6531	8.0	9226.585^c	2329.0			
9969.680	1.5367^o	5.0	0.2934	6.0	9969.726	192.0		-1.8	
10163.214	3.8622	5.0	2.6426^o	4.0	10163.236	134.0			
10844.640	3.3544	6.0	2.2115^o	7.0	10844.615^c	55293.6			

Table A.8: Measured wavelengths (λ_o) and intensities of Nd II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
3766.302	4.6475^o	5.5	1.3566	5.5	3766.272	2678.0			
3832.897	5.4466	4.5	2.2128^o	5.5	3832.879	224.8			
3858.303	4.4409^o	2.5	1.2285	3.5	3858.307^b	419.4			
3858.303	3.7626^o	6.5	0.5502	5.5	3858.307^b	419.4			
3909.230	4.9470	2.5	1.7764^o	3.5	3909.258	77.3			
3920.961	3.5413^o	6.5	0.3802	5.5	3920.959	62.4		0.5	
3924.494	5.2241	4.5	2.0658^o	3.5	3924.506	26.7			
3941.506	3.2083^o	4.5	0.0636	4.5	3941.519	123.2		0.4	
3945.406	5.5912	3.5	2.4497^o	4.5	3945.380	23.6			
3951.142	3.3192^o	5.5	0.1823	5.5	3951.145^n	43.3		0.1	0.0
3952.188	3.1361^o	3.5	0.0000	3.5	3952.189^n	21.3		-0.4	-0.4
3957.993	3.1952^o	4.5	0.0636	4.5	3958.006	30.4		-0.2	
3963.105	3.5989^o	8.5	0.4714	7.5	3963.100^n	21.7		0.2	0.2
3963.326	4.2080^o	1.5	1.0807	1.5	3963.356	44.7			
3978.706	4.8571^o	6.5	1.7419	5.5	3978.733	33.5			
3982.257	4.7302^o	4.5	1.6178	5.5	3982.277^c	43.6			
3988.802	3.4876^o	5.5	0.3802	5.5	3988.818	29.4		0.2	
3990.096	3.5777^o	7.5	0.4714	7.5	3990.093^n	14.1		-0.0	0.1
3991.741	3.1051^o	3.5	0.0000	3.5	3991.743^n	23.0		-0.4	-0.3
3994.455	4.5943	5.5	1.4913^o	6.5	3994.452^b	34.2			
3994.457	5.0148	1.5	1.9118^o	1.5	3994.452^b	34.2			
3994.471	5.1710	5.5	2.0681^o	5.5	3994.452^b	34.2			
3994.672	3.4233^o	7.5	0.3205	6.5	3994.655	41.6		0.2	
4012.243	3.7197^o	9.5	0.6305	8.5	4012.240^n	72.8		0.9	0.8
4020.864	3.4031^o	6.5	0.3205	6.5	4020.865^n	12.7		-0.3	-0.2
4023.004	3.6404^o	7.5	0.5595	6.5	4022.994^n	19.4		0.2	0.0
4040.792	3.2496^o	6.5	0.1823	5.5	4040.787^n	65.0		0.2	0.1
4051.141	3.4398^o	6.5	0.3802	5.5	4051.140^n	14.8		-0.2	-0.3
4053.523	4.1982^o	2.5	1.1404	3.5	4053.513^c	36.5			
4059.951	3.2575^o	5.5	0.2046	4.5	4059.957^n	7.0		-0.7	-0.5
4061.080	3.5234^o	8.5	0.4714	7.5	4061.084^n	59.0		0.5	0.6
4069.889	4.6400	4.5	1.5946^o	3.5	4069.877^b	13.8			
4069.890	4.5608^o	2.5	1.5153	3.5	4069.877^b	13.8			
4084.293	4.5260	6.5	1.4913^o	6.5	4084.259	31.0			
4086.774	4.9540	7.5	1.9211^o	6.5	4086.771^b	9.8			
4086.804	4.9144	8.5	1.8815^o	8.5	4086.771^b	11.5			
4088.613	4.1917^o	6.5	1.1602	5.5	4088.645	15.3		0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4092.633	4.3510^o	3.5	1.3225	3.5	4092.650^c	30.8			
4093.644	5.4700	4.5	2.4423^o	4.5	4093.638	12.8			
4109.448	3.3367^o	7.5	0.3205	6.5	4109.441^n	60.5		0.3	0.3
4110.472	3.0154^o	4.5	0.0000	3.5	4110.499	25.6		-0.5	
4122.978	4.6743	7.5	1.6681^o	7.5	4122.979^{bc}	38.0			
4123.000	4.7481^o	6.5	1.7419	5.5	4122.979^b	41.4			
4135.916	5.2019	4.5	2.2051^o	3.5	4135.938^b	16.3			
4135.927	4.5121^o	3.5	1.5153	3.5	4135.938^b	16.3			
4135.931	4.4959^o	3.5	1.4991	2.5	4135.938^b	16.3			
4137.949	5.2325	4.5	2.2371^o	4.5	4137.975^b	9.7			
4137.957	5.0492	4.5	2.0538^o	4.5	4137.975^b	9.9			
4144.543	3.1952^o	4.5	0.2046	4.5	4144.556	17.3		-0.4	
4156.078	3.1645^o	6.5	0.1823	5.5	4156.074^n	53.0		0.1	0.2
4164.850	2.9760^o	4.5	0.0000	3.5	4164.817	23.2		-0.5	
4175.249	4.7648	3.5	1.7962^o	2.5	4175.229	18.2			
4176.095	5.0148	1.5	2.0468^o	1.5	4176.094^c	13.6			
4177.320	3.0308^o	5.5	0.0636	4.5	4177.318^n	42.2		-0.2	-0.1
4198.146	4.4677^o	4.5	1.5153	3.5	4198.116	17.7			
4203.608	5.6601	7.5	2.7115^o	6.5	4203.602^b	13.2			
4203.628	4.6475^o	5.5	1.6990	4.5	4203.602^b	12.2			
4205.248	3.5069^o	5.5	0.5595	6.5	4205.263^{bc}	21.1		0.1	
4205.253	3.6278^o	7.5	0.6804	6.5	4205.263^b	21.1		0.3	
4205.577	3.5777^o	7.5	0.6305	8.5	4205.607^b	23.7	0.4	0.2	
4205.616	2.9472^o	4.5	0.0000	3.5	4205.608^b	18.6		-0.7	
4210.986	4.4587^o	2.5	1.5153	3.5	4210.986^c	106.1			
4232.374	2.9922^o	5.5	0.0636	4.5	4232.359	43.5	-0.2	-0.2	
4247.365	2.9182^o	4.5	0.0000	3.5	4247.367^n	74.3		-0.1	-0.2
4252.433	4.1612	6.5	1.2465^o	5.5	4252.441	14.6		0.8	
4256.440	5.4682	5.5	2.5562^o	5.5	4256.467^b	452.3			
4256.447	4.6598	6.5	1.7478^o	5.5	4256.467^{bc}	452.3			
4275.148	4.3510^o	3.5	1.4518	4.5	4275.177^b	26.1			
4275.172	4.1708^o	1.5	1.2716	0.5	4275.177^{bc}	25.8			
4284.509	3.5234^o	8.5	0.6305	8.5	4284.524^n	11.2		-0.1	-0.2
4303.571	2.8801^o	4.5	0.0000	3.5	4303.570^n	187.0		0.3	0.1
4314.506	2.8728^o	4.5	0.0000	3.5	4314.500	28.3		-0.5	
4324.151	3.8520^o	7.5	0.9857	6.5	4324.168^c	8.7		0.2	
4325.758	3.3367^o	7.5	0.4714	7.5	4325.762^n	18.3		-0.1	-0.0
4336.172	3.9988^o	4.5	1.1404	3.5	4336.178	22.9		0.8	
4343.481	4.4959^o	3.5	1.6423	4.5	4343.491^c	576.5			
4357.585	5.1200	2.5	2.2756^o	2.5	4357.567^c	57.6			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4358.161	3.1645^o	6.5	0.3205	6.5	4358.153^n	39.6		-0.0	-0.2
4368.631	2.9008^o	3.5	0.0636	4.5	4368.631^n	17.2		-0.7	-0.8
4381.927	4.5739	4.5	1.7453^o	3.5	4381.891^c	83.8			
4384.128	4.9113	9.5	2.0842^o	9.5	4384.107	36.3			
4393.329	4.1586^o	2.5	1.3374	2.5	4393.347^c	18.9		1.0	
4400.615	3.9071^o	3.5	1.0906	2.5	4400.604^c	62.4			
4400.821	2.8801^o	4.5	0.0636	4.5	4400.826^n	21.6		-0.6	-0.6
4402.465	4.0869^o	1.5	1.2716	0.5	4402.475^c	138.8			
4403.534	4.4149^o	7.5	1.6002	7.5	4403.518	124.1			
4404.007	4.9470	2.5	2.1326^o	3.5	4404.031^b	38.5			
4404.011	5.1491	4.5	2.3347^o	4.5	4404.031^b	38.5			
4411.050	2.9922^o	5.5	0.1823	5.5	4411.053^n	15.5		-0.6	-0.6
4412.256	2.8728^o	4.5	0.0636	4.5	4412.275	29.7		-0.5	
4418.129	4.8902	3.5	2.0848^o	4.5	4418.119^c	27.7			
4420.087	4.4009^o	2.5	1.5968	3.5	4420.111^{bc}	39.2			
4420.140	4.6520	8.5	1.8479^o	8.5	4420.112^b	32.0			
4429.023	4.4844^o	7.5	1.6859	6.5	4428.995^c	114.8			
4442.452	4.6032^o	5.5	1.8132	5.5	4442.489	33.9			
4451.563	3.1645^o	6.5	0.3802	5.5	4451.559^n	51.4		0.1	0.1
4451.979	2.7841^o	4.5	0.0000	3.5	4452.017^{bc}	73.5		-0.2	
4452.001	3.7697^o	7.5	0.9857	6.5	4452.017^b	74.0			
4452.611	4.3804^o	4.5	1.5968	3.5	4452.603	48.3			
4456.390	3.5234^o	8.5	0.7421	7.5	4456.426	41.4	0.5	0.5	
4479.356	4.1237^o	6.5	1.3566	5.5	4479.347	29.5			
4480.969	4.4149^o	7.5	1.6488	6.5	4480.967^c	1389.3			
4497.338	4.0200^o	7.5	1.2640	8.5	4497.374^c	351.3			
4499.296	3.5777^o	7.5	0.8229	7.5	4499.269	57.8	0.9	0.7	
4501.935	4.6743	7.5	1.9211^o	6.5	4501.935^b	103.7			
4501.966	4.6312^o	4.5	1.8781	5.5	4501.935^b	111.8			
4509.414	5.6601	7.5	2.9115^o	7.5	4509.419	41.3			
4521.235	3.6008^o	4.5	0.8594	5.5	4521.229	32.5		0.5	
4522.320	5.6122	5.5	2.8714^o	5.5	4522.305	27.8			
4522.683	4.3894^o	6.5	1.6488	6.5	4522.720^b	154.7			
4522.738	5.2241	4.5	2.4835^o	5.5	4522.720^b	158.4			
4530.948	4.7656	5.5	2.0301^o	4.5	4530.957	40.8			
4557.749	4.3196^o	7.5	1.6002	7.5	4557.767	82.9			
4559.628	5.2019	4.5	2.4835^o	5.5	4559.661^c	1599.3			
4560.445	4.8093^o	7.5	2.0914	7.5	4560.416^c	686.9			
4562.322	4.8209	4.5	2.1041^o	3.5	4562.337^c	86.3			
4567.339	3.0940^o	6.5	0.3802	5.5	4567.343^c	290.1		0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4577.144	4.1180^o	8.5	1.4101	7.5	4577.168^{bc}	11.4		0.7	
4577.187	5.5840	2.5	2.8761^o	3.5	4577.168^b	14.4			
4594.634	4.7648	3.5	2.0672^o	2.5	4594.671^c	233.2			
4606.735	5.6416	7.5	2.9510^o	6.5	4606.705	85.6			
4609.881	5.0253	8.5	2.3366^o	8.5	4609.865^c	1321.6			
4613.861	4.1777	5.5	1.4913^o	6.5	4613.834^c	46.7			
4621.186	3.4267^o	3.5	0.7445	4.5	4621.161	12.1		-0.1	
4623.804	4.6598	6.5	1.9792^o	7.5	4623.811^b	13.0			
4623.814	4.7656	5.5	2.0850^o	5.5	4623.811^b	12.8			
4636.268	4.8388	7.5	2.1654^o	6.5	4636.281^c	76.4			
4637.195	3.4958^o	6.5	0.8229	7.5	4637.187^c	320.7			
4641.067	4.0272^o	4.5	1.3566	5.5	4641.094^b	1582.9			
4641.077	5.4466	4.5	2.7759^o	3.5	4641.094^b	1582.9			
4641.094	4.0812^o	4.5	1.4106	3.5	4641.094^b	1585.6			
4657.186	4.3604^o	4.5	1.6990	4.5	4657.209	68.8			
4657.849	3.4031^o	6.5	0.7421	7.5	4657.886^{bc}	36.4	0.5	0.3	
4657.891	4.3033^o	3.5	1.6423	4.5	4657.885^b	29.8			
4659.366	5.4700	4.5	2.8099^o	4.5	4659.372^c	96.8			
4660.450	4.9470	2.5	2.2875^o	2.5	4660.478^b	34.7			
4660.484	4.1586^o	2.5	1.4991	2.5	4660.479^{bc}	22.7			
4664.384	4.0139^o	5.5	1.3566	5.5	4664.373^c	85.4			
4671.068	5.5840	2.5	2.9305^o	3.5	4671.093^c	542.2			
4692.951	3.8657^o	4.5	1.2246	4.5	4692.980^c	89.8			
4706.618	4.2312^o	5.5	1.5978	5.5	4706.631^b	152.4			
4706.623	3.7240^o	2.5	1.0906	2.5	4706.631^{bc}	152.4			
4708.895	4.7648	3.5	2.1326^o	3.5	4708.861	3578.1			
4710.491	3.9879^o	4.5	1.3566	5.5	4710.491	30.6			
4710.956	5.2409	3.5	2.6099^o	4.5	4710.927^c	30.9			
4723.416	5.0660	7.5	2.4419^o	7.5	4723.452	68.1			
4724.328	4.6252	3.5	2.0016^o	3.5	4724.359^b	14.7			
4724.357	3.3657^o	6.5	0.7421	7.5	4724.359^b	13.7		-0.1	
4729.348	3.6064^o	6.5	0.9857	6.5	4729.356	24.5		0.5	
4739.878	4.1303^o	3.5	1.5153	3.5	4739.892^{bc}	76.5			
4739.911	4.3008^o	6.5	1.6859	6.5	4739.891^b	63.8			
4745.360	2.9922^o	5.5	0.3802	5.5	4745.380^c	63.0	0.1	0.1	
4759.116	3.8039^o	3.5	1.1995	2.5	4759.088^c	170.5			
4767.851	5.3170	5.5	2.7174^o	4.5	4767.856	15.1			
4770.212	3.9482^o	3.5	1.3498	2.5	4770.195^c	973.7			
4778.385	3.3384^o	4.5	0.7445	4.5	4778.400^{bc}	288.4			
4778.385	5.3780	5.5	2.7841^o	4.5	4778.400^b	288.4			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4778.401	4.7691	7.5	2.1752^o	8.5	4778.400^b	288.4			
4781.044	3.5781^o	5.5	0.9857	6.5	4781.013	31.7		0.5	
4787.446	3.1485^o	6.5	0.5595	6.5	4787.415^c	138.6		0.6	
4788.322	3.6325^o	4.5	1.0440	4.5	4788.342^c	37.7		0.7	
4792.599	4.6400	4.5	2.0538^o	4.5	4792.631^c	147.6			
4794.664	4.3661	5.5	1.7810^o	5.5	4794.680^b	54.1			
4794.674	4.7979	4.5	2.2128^o	5.5	4794.680^b	54.1			
4798.021	3.7197^o	9.5	1.1364	9.5	4798.055	25.3	0.6	0.6	
4806.176	5.1710	5.5	2.5921^o	5.5	4806.177^c	49.4			
4811.052	3.5619^o	7.5	0.9857	6.5	4811.045^c	53.5		0.8	
4812.684	3.8039^o	3.5	1.2285	3.5	4812.670^b	50.5			
4812.686	4.1559^o	0.5	1.5805	1.5	4812.670^b	50.5			
4825.478	2.7508^o	4.5	0.1823	5.5	4825.493^n	74.3		-0.1	-0.4
4831.063	4.6697	4.5	2.1041^o	3.5	4831.079^{bc}	88.7			
4831.075	5.0492	4.5	2.4835^o	5.5	4831.079^b	88.7			
4833.483	5.4404	4.5	2.8761^o	3.5	4833.504^c	111.1			
4835.343	3.7879^o	3.5	1.2246	4.5	4835.325	37.7		0.9	
4853.361	4.6865	4.5	2.1326^o	3.5	4853.323^c	803.9			
4855.291	4.7656	5.5	2.2128^o	5.5	4855.317^c	819.0			
4859.026	2.8714^o	5.5	0.3205	6.5	4859.024	44.0		-0.2	
4863.571	4.2807^o	4.5	1.7322	4.5	4863.539	51.5			
4869.267	5.3296	5.5	2.7841^o	4.5	4869.269^b	342.9			
4869.305	4.2908	4.5	1.7453^o	3.5	4869.269^{bc}	340.1			
4871.409	4.0664^o	4.5	1.5220	5.5	4871.431^c	105.3			
4875.722	5.1819	4.5	2.6398^o	3.5	4875.721^c	183.1			
4891.039	3.5781^o	5.5	1.0440	4.5	4891.058^c	5032.3			
4893.222	3.2134^o	6.5	0.6804	6.5	4893.225^c	728.2			
4895.133	4.0225^o	5.5	1.4904	5.5	4895.137	37.8			
4907.297	4.3661	5.5	1.8403^o	4.5	4907.273^c	282.2			
4907.766	3.8071^o	7.5	1.2816	6.5	4907.794^{bc}	292.3			
4907.826	4.2986^o	7.5	1.7732	8.5	4907.794^b	292.0			
4908.229	5.4558	3.5	2.9305^o	3.5	4908.252^b	20.3			
4908.286	4.4017	6.5	1.8765^o	6.5	4908.252^{bc}	20.2			
4916.395	4.6252	3.5	2.1041^o	3.5	4916.434^c	88.4			
4920.685	2.5825^o	3.5	0.0636	4.5	4920.682^n	26.6		-0.8	-0.6
4921.152	3.8752^o	6.5	1.3566	5.5	4921.145^c	220.0			
4926.701	5.1493	1.5	2.6335^o	2.5	4926.710^c	103.7			
4943.899	2.7117^o	3.5	0.2046	4.5	4943.907	37.0		-0.5	
4944.854	5.6416	7.5	3.1350^o	8.5	4944.828^b	7457.2			
4944.862	5.3780	5.5	2.8714^o	5.5	4944.828^{bc}	7468.1			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4945.685	5.0660	7.5	2.5598^{o}	6.5	4945.649	37.4			
4952.484	4.3996	7.5	1.8969^{o}	6.5	4952.503^{c}	960.5			
4959.119	2.5630^{o}	4.5	0.0636	4.5	4959.151^{c}	63.7	-0.2	-0.4	
4965.284	4.5643	6.5	2.0681^{o}	5.5	4965.286^{c}	75.6			
4966.704	5.6601	7.5	3.1645^{o}	6.5	4966.739^{b}	167.6			
4966.711	3.7240^{o}	2.5	1.2285	3.5	4966.739^{bc}	160.7			
4966.734	3.8180^{o}	2.5	1.3225	3.5	4966.739^{b}	159.1			
4969.743	5.4700	4.5	2.9760^{o}	4.5	4969.744^{b}	384.8			
4969.747	4.0918^{o}	5.5	1.5978	5.5	4969.744^{bc}	384.8			
4980.872	4.8250	8.5	2.3366^{o}	8.5	4980.887^{c}	179.5			
4989.191	4.4919	5.5	2.0076^{o}	4.5	4989.184^{bc}	68.4			
4989.214	4.9026	3.5	2.4183^{o}	4.5	4989.184^{b}	66.1			
5005.887	5.4682	5.5	2.9922^{o}	5.5	5005.861^{c}	127.9			
5018.733	3.4026^{o}	3.5	0.9329	3.5	5018.705	12.8		-0.0	
5027.110	3.6901^{o}	5.5	1.2246	4.5	5027.145^{c}	730.7			
5029.459	5.4404	4.5	2.9760^{o}	4.5	5029.447^{c}	991.7			
5039.945	3.9497^{o}	6.5	1.4904	5.5	5039.926^{c}	120.2			
5045.495	3.5777^{o}	7.5	1.1211	7.5	5045.456^{c}	66.4		0.9	
5051.057	4.0506^{o}	4.5	1.5968	3.5	5051.064^{c}	453.8			
5056.892	5.2019	4.5	2.7508^{o}	4.5	5056.889^{c}	1694.1			
5064.755	3.3066^{o}	4.5	0.8594	5.5	5064.771	18.0		0.0	
5071.901	4.0616^{o}	5.5	1.6178	5.5	5071.862^{c}	446.1			
5073.511	3.6676^{o}	5.5	1.2246	4.5	5073.471^{c}	16.4		0.5	
5077.154	3.2642^{o}	6.5	0.8229	7.5	5077.131	29.8		0.2	
5079.066	3.5615^{o}	6.5	1.1211	7.5	5079.080^{bc}	219.7			
5079.091	5.2162	4.5	2.7759^{o}	3.5	5079.080^{b}	218.2			
5081.949	4.0812^{o}	4.5	1.6423	4.5	5081.925	41.8			
5092.794	2.8140^{o}	5.5	0.3802	5.5	5092.795	22.9		-0.5	
5102.389	3.1095^{o}	5.5	0.6804	6.5	5102.430^{c}	47.6		0.2	
5115.741	3.8334^{o}	3.5	1.4106	3.5	5115.753^{c}	138.0			
5117.683	3.7593^{o}	3.5	1.3374	2.5	5117.660^{c}	38.4		0.9	
5121.666	4.2155^{o}	6.5	1.7955	7.5	5121.631^{c}	40.2			
5123.778	2.7993^{o}	6.5	0.3802	5.5	5123.783	13.7		-0.7	
5125.909	3.4620^{o}	5.5	1.0440	4.5	5125.927^{c}	88.3		0.9	
5130.586	3.7197^{o}	9.5	1.3039	10.5	5130.580	23.9	0.6	0.7	
5139.964	5.4036	5.5	2.9922^{o}	5.5	5139.994^{c}	9.2			
5147.425	4.1917^{o}	6.5	1.7838	6.5	5147.386	146.8			
5149.298	3.8429^{o}	5.5	1.4358	6.5	5149.282	53.2			
5149.593	4.1777	5.5	1.7708^{o}	4.5	5149.554^{c}	567.3			
5155.746	4.7011	7.5	2.2970^{o}	7.5	5155.774^{b}	24.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5155.793	5.5840	2.5	3.1800^o	3.5	5155.774^b	22.5			
5163.467	3.4444^o	5.5	1.0440	4.5	5163.489	41.6		0.6	
5166.039	3.8978^o	5.5	1.4986	4.5	5166.063^c	76.1			
5168.282	3.6228^o	4.5	1.2246	4.5	5168.319^c	20.4		0.5	
5173.278	4.7656	5.5	2.3697^o	6.5	5173.303	42.8			
5178.757	4.6400	4.5	2.2466^o	3.5	5178.748^c	202.3			
5182.852	5.1423	4.5	2.7508^o	4.5	5182.891	23.6			
5187.074	5.3717	3.5	2.9822^o	4.5	5187.045^c	110.3			
5194.652	2.4497^o	4.5	0.0636	4.5	5194.657	46.2		-0.6	
5200.975	4.8250	8.5	2.4419^o	7.5	5200.989^c	20.2			
5213.175	2.5598^o	6.5	0.1823	5.5	5213.207^c	171.1		0.1	
5213.939	3.3629^o	6.5	0.9857	6.5	5213.981^c	42.2		0.5	
5226.242	4.0139^o	5.5	1.6423	4.5	5226.234^b	29.3			
5226.245	3.8936^o	6.5	1.5220	5.5	5226.234^b	29.3			
5236.735	4.9299	4.5	2.5630^o	4.5	5236.703^c	14.0			
5239.001	5.3575	3.5	2.9917^o	3.5	5239.016^c	24.6			
5249.570	5.6416	7.5	3.2805^o	6.5	5249.538^b	48.8			
5249.576	3.3367^o	7.5	0.9756	8.5	5249.538^b	48.8	0.6	0.5	
5255.506	2.5630^o	4.5	0.2046	4.5	5255.503^n	19.5		-0.8	-0.7
5266.648	5.2964	8.5	2.9430^o	7.5	5266.627^c	61.7			
5269.445	3.4926^o	4.5	1.1404	3.5	5269.428	64.8		0.9	
5273.427	3.0308^o	5.5	0.6804	6.5	5273.436	14.1	-0.3	-0.4	
5276.205	3.9469^o	4.5	1.5978	5.5	5276.235^c	64.2			
5276.869	3.2083^o	4.5	0.8594	5.5	5276.884^{bc}	23.3		0.1	
5276.898	5.1819	4.5	2.8330^o	3.5	5276.884^b	24.6			
5283.191	3.9949^o	7.5	1.6488	6.5	5283.226	605.1			
5284.086	5.6416	7.5	3.2959^o	8.5	5284.123	59.5			
5287.782	3.8344^o	4.5	1.4904	5.5	5287.812	23.4		0.9	
5293.163	3.1645^o	6.5	0.8229	7.5	5293.151^n	46.1		0.3	0.1
5295.322	4.6598	6.5	2.3191^o	5.5	5295.364^b	52.6			
5295.355	3.3846^o	3.5	1.0440	4.5	5295.364^{bc}	52.5		0.6	
5298.850	4.0250^o	7.5	1.6859	6.5	5298.887^c	227.9			
5300.552	4.1063^o	5.5	1.7679	6.5	5300.574	71.9			
5302.600	4.2155^o	6.5	1.8781	5.5	5302.602^c	108.7			
5302.959	4.8209	4.5	2.4835^o	5.5	5302.984^b	22.1			
5303.005	3.9551^o	5.5	1.6178	5.5	5302.985^b	18.5		0.9	
5305.164	3.2693^o	3.5	0.9329	3.5	5305.165	36.9		0.3	
5305.729	3.4267^o	3.5	1.0906	2.5	5305.693^c	17.6		0.2	
5314.382	4.6514	5.5	2.3191^o	5.5	5314.355^c	44.6			
5316.759	4.4017	6.5	2.0705^o	7.5	5316.801	62.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5319.814	2.8801^{o}	4.5	0.5502	5.5	5319.816^{c}	68.4	-0.0	0.1	
5329.890	5.3717	3.5	3.0462^{o}	4.5	5329.876^{c}	18.4			
5334.358	5.4036	5.5	3.0800^{o}	5.5	5334.322^{c}	242.8			
5349.557	4.7588	7.5	2.4419^{o}	7.5	5349.567^{c}	696.2			
5359.054	5.6785	7.5	3.3657^{o}	6.5	5359.010^{c}	17.8			
5361.467	2.9922^{o}	5.5	0.6804	6.5	5361.459	39.5	0.1	0.0	
5361.886	3.7683^{o}	3.5	1.4566	2.5	5361.880^{bc}	60.3			
5361.897	4.3661	5.5	2.0545^{o}	6.5	5361.880^{b}	60.3			
5362.870	3.9090^{o}	5.5	1.5978	5.5	5362.849	42.9			
5363.652	4.6697	4.5	2.3589^{o}	3.5	5363.659^{c}	94.3			
5370.536	2.8674^{o}	5.5	0.5595	6.5	5370.519^{c}	14.4		-0.6	
5378.296	4.6743	7.5	2.3697^{o}	6.5	5378.263^{c}	53.5			
5379.593	3.2369^{o}	4.5	0.9329	3.5	5379.604	22.0		0.1	
5380.647	5.3780	5.5	3.0744^{o}	4.5	5380.603^{c}	53.1			
5398.099	4.6658	5.5	2.3697^{o}	6.5	5398.079^{c}	174.9			
5405.136	3.9790^{o}	7.5	1.6859	6.5	5405.141	26.9			
5409.558	3.7903^{o}	3.5	1.4991	2.5	5409.553^{c}	24.6		0.9	
5411.954	4.0225^{o}	5.5	1.7322	4.5	5411.925^{c}	164.3			
5415.026	4.5399	5.5	2.2510^{o}	6.5	5414.984^{c}	84.7			
5416.374	3.1478^{o}	4.5	0.8594	5.5	5416.348	29.3		0.1	
5416.918	3.8883^{o}	7.5	1.6002	7.5	5416.874^{c}	51.2			
5418.188	4.1917^{o}	6.5	1.9041	7.5	5418.229	27.0			
5423.566	4.0272^{o}	4.5	1.7419	5.5	5423.584^{c}	58.4			
5426.385	4.0796^{o}	7.5	1.7955	7.5	5426.419^{c}	18.7			
5428.783	5.3575	3.5	3.0744^{o}	4.5	5428.799	24.3			
5430.706	4.1604^{o}	6.5	1.8781	5.5	5430.728^{c}	31.9			
5441.497	4.0616^{o}	5.5	1.7838	6.5	5441.529^{b}	55.1			
5441.540	3.9201^{o}	4.5	1.6423	4.5	5441.529^{b}	56.0			
5442.264	2.9578^{o}	5.5	0.6804	6.5	5442.292^{c}	26.8		-0.2	
5444.539	5.4404	4.5	3.1639^{o}	3.5	5444.558^{c}	16.6			
5449.223	3.5385^{o}	7.5	1.2640	8.5	5449.268^{c}	64.7		1.0	
5457.980	5.1423	4.5	2.8714^{o}	5.5	5458.020^{c}	53.2			
5469.367	3.6228^{o}	4.5	1.3566	5.5	5469.394^{c}	34.1		0.8	
5473.776	4.1612	6.5	1.8969^{o}	6.5	5473.754	28.0			
5476.188	4.5399	5.5	2.2766^{o}	5.5	5476.220^{c}	28.7			
5477.963	3.8594^{o}	3.5	1.5968	3.5	5478.004^{b}	61.3			
5477.967	3.6000^{o}	3.5	1.3374	2.5	5478.004^{b}	61.3			
5477.987	2.9430^{o}	7.5	0.6804	6.5	5478.004^{bc}	61.3		0.2	
5483.384	5.4682	5.5	3.2078^{o}	5.5	5483.357	27.1			
5484.014	3.9090^{o}	5.5	1.6488	6.5	5484.008^{c}	33.6			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5486.173	4.4919	5.5	2.2326^{o}	6.5	5486.147	11.0			
5487.422	5.2409	3.5	2.9822^{o}	4.5	5487.460	21.3			
5493.359	4.1604^{o}	6.5	1.9041	7.5	5493.335^{b}	78.7			
5493.376	3.8540^{o}	5.5	1.5978	5.5	5493.335^{bc}	79.2			
5499.490	4.6382	8.5	2.3844^{o}	7.5	5499.524	11.7			
5504.301	3.2274^{o}	7.5	0.9756	8.5	5504.315^{c}	10.1		-0.2	
5507.177	5.1491	4.5	2.8985^{o}	5.5	5507.207^{b}	88.3			
5507.253	4.9052	4.5	2.6546^{o}	3.5	5507.208^{bc}	80.6			
5510.121	3.8299^{o}	2.5	1.5805	1.5	5510.127^{b}	23.7		0.9	
5510.129	4.5260	6.5	2.2766^{o}	5.5	5510.127^{b}	23.6			
5511.956	4.1698	6.5	1.9211^{o}	6.5	5511.948^{c}	32.2			
5513.241	3.7774^{o}	6.5	1.5292	6.5	5513.231^{c}	26.4		0.9	
5514.740	4.6658	5.5	2.4183^{o}	4.5	5514.753^{bc}	46.1			
5514.789	5.5275	6.5	3.2799^{o}	5.5	5514.753^{b}	44.2			
5515.700	2.9917^{o}	3.5	0.7445	4.5	5515.666^{c}	27.8		-0.1	
5520.636	5.2599	2.5	3.0147^{o}	3.5	5520.606	28.5			
5529.029	3.3629^{o}	6.5	1.1211	7.5	5529.065^{c}	525.5			
5536.422	5.6785	7.5	3.4398^{o}	6.5	5536.455^{c}	26.0			
5543.274	3.2799^{o}	5.5	1.0440	4.5	5543.252^{c}	255.7			
5548.448	2.7841^{o}	4.5	0.5502	5.5	5548.480	13.6		-0.6	
5552.825	5.4404	4.5	3.2083^{o}	4.5	5552.858	32.0			
5561.146	3.5781^{o}	5.5	1.3493	4.5	5561.163^{c}	2028.5			
5564.603	4.5465	6.5	2.3191^{o}	5.5	5564.607^{c}	11.2			
5570.854	3.7697^{o}	7.5	1.5448	8.5	5570.832	13.5		0.6	
5571.821	4.5943	5.5	2.3697^{o}	6.5	5571.855	12.6			
5575.458	3.9090^{o}	5.5	1.6859	6.5	5575.501^{bc}	168.9			
5575.541	4.6658	5.5	2.4428^{o}	5.5	5575.501^{b}	170.5			
5576.435	2.6941^{o}	8.5	0.4714	7.5	5576.395	17.8		-0.6	
5576.724	4.7094	4.5	2.4869^{o}	4.5	5576.694^{c}	113.2			
5581.914	3.0434^{o}	7.5	0.8229	7.5	5581.958	21.3		-0.1	
5587.621	5.6416	7.5	3.4233^{o}	7.5	5587.604^{c}	76.8			
5588.444	4.6598	6.5	2.4419^{o}	7.5	5588.430^{c}	42.1			
5601.893	3.7574^{o}	7.5	1.5448	8.5	5601.909^{c}	242.5			
5606.685	5.4682	5.5	3.2575^{o}	5.5	5606.688	51.0			
5607.802	5.4700	4.5	3.2598^{o}	3.5	5607.847	16.8			
5612.100	3.8063^{o}	6.5	1.5978	5.5	5612.080^{c}	31.8			
5616.193	3.8071^{o}	7.5	1.6002	7.5	5616.224^{c}	27.4		1.0	
5617.962	5.5840	2.5	3.3777^{o}	3.5	5617.927^{c}	13.6			
5618.707	3.4876^{o}	5.5	1.2816	6.5	5618.666^{c}	15.5		0.3	
5620.558	3.8540^{o}	5.5	1.6488	6.5	5620.534^{bc}	7145.5			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5620.574	4.5399	5.5	2.3347^o	4.5	5620.534^b	7106.9			
5622.213	3.6404^o	7.5	1.4358	6.5	5622.251	20.9	0.5	0.7	
5623.693	5.4682	5.5	3.2642^o	6.5	5623.689^c	27.8			
5624.259	2.7540^o	5.5	0.5502	5.5	5624.220	17.5		-0.6	
5628.589	3.4267^o	3.5	1.2246	4.5	5628.607^c	13.8		0.2	
5631.487	3.4826^o	6.5	1.2816	6.5	5631.499^c	11.5		0.2	
5643.288	3.6064^o	6.5	1.4101	7.5	5643.257	15.2		0.5	
5645.237	3.3360^o	3.5	1.1404	3.5	5645.237^c	8.7		-0.1	
5653.540	3.7901^o	6.5	1.5978	5.5	5653.571^c	129.0			
5663.260	5.5912	3.5	3.4026^o	3.5	5663.247^c	30.8			
5665.241	3.9201^o	4.5	1.7322	4.5	5665.244^c	45.2			
5668.227	4.2908	4.5	2.1041^o	3.5	5668.213	22.1			
5677.955	4.5021	6.5	2.3191^o	5.5	5677.951^{bc}	14.7			
5677.955	4.6252	3.5	2.4423^o	4.5	5677.951^b	14.7			
5687.893	3.9523^o	7.5	1.7732	8.5	5687.851	8.6		0.7	
5688.518	3.1645^o	6.5	0.9857	6.5	5688.514^b	10.8	-0.3	-0.2	
5688.551	3.7756^o	3.5	1.5968	3.5	5688.514^b	10.8		0.6	
5692.060	5.6601	7.5	3.4826^o	6.5	5692.025	14.9			
5693.950	4.5465	6.5	2.3697^o	6.5	5693.918^c	25.9			
5704.548	4.4919	5.5	2.3191^o	5.5	5704.547^c	25.4			
5706.209	3.1051^o	3.5	0.9329	3.5	5706.207^c	15.9	0.0	-0.1	
5727.863	2.9085^o	5.5	0.7445	4.5	5727.876^c	173.3		0.7	
5729.232	5.3717	3.5	3.2083^o	4.5	5729.275^{bc}	2917.9			
5729.313	5.4700	4.5	3.3066^o	4.5	5729.275^b	2918.0			
5730.318	2.4835^o	5.5	0.3205	6.5	5730.355^c	59.5		-0.4	
5753.692	3.9497^o	6.5	1.7955	7.5	5753.714^c	37.4			
5754.086	4.0321^o	5.5	1.8781	5.5	5754.074^c	28.5			
5772.113	3.9605^o	4.5	1.8132	5.5	5772.157^b	370.2			
5772.185	3.2379^o	2.5	1.0906	2.5	5772.157^{bc}	365.5			
5773.508	5.0492	4.5	2.9023^o	4.5	5773.498^c	12.6			
5775.419	5.4036	5.5	3.2575^o	5.5	5775.456^c	25.9			
5777.743	5.4558	3.5	3.3105^o	3.5	5777.789	14.0			
5782.155	5.2325	4.5	3.0888^o	3.5	5782.108	10.3			
5783.560	3.1287^o	7.5	0.9857	6.5	5783.567^b	9.1		-0.3	
5783.593	4.3559	5.5	2.2128^o	5.5	5783.568^b	9.5			
5783.602	5.3717	3.5	3.2286^o	2.5	5783.567^b	9.1			
5790.037	5.0492	4.5	2.9085^o	5.5	5790.010	14.1			
5796.281	3.6676^o	5.5	1.5292	6.5	5796.321^c	15.6		0.6	
5820.177	5.6122	5.5	3.4826^o	6.5	5820.150	33873.6			
5823.742	5.1200	2.5	2.9917^o	3.5	5823.742	23.8			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5824.945	5.5912	3.5	3.4633^o	4.5	5824.899^c	70.4			
5830.748	3.8936^o	6.5	1.7679	6.5	5830.730^c	46.4			
5839.144	5.2241	4.5	3.1014^o	5.5	5839.097^c	204.3			
5841.859	5.4682	5.5	3.3465^o	5.5	5841.905^b	18.2			
5841.889	3.7395^o	5.5	1.6178	5.5	5841.905^{bc}	19.0		0.8	
5841.934	4.6382	8.5	2.5165^o	7.5	5841.905^b	18.1			
5844.676	4.0321^o	5.5	1.9115	6.5	5844.646^c	97.6			
5858.883	5.1491	4.5	3.0336^o	3.5	5858.893^c	193.0			
5859.403	4.1698	6.5	2.0545^o	6.5	5859.376^c	55.6			
5862.190	5.2409	3.5	3.1266^o	2.5	5862.204^c	9.8			
5862.496	5.6785	7.5	3.5643^o	8.5	5862.458	8.6			
5867.561	3.4617^o	4.5	1.3493	4.5	5867.583^c	29.5		0.6	
5870.960	5.2162	4.5	3.1051^o	3.5	5871.008^c	28.8			
5876.281	5.3170	5.5	3.2078^o	5.5	5876.309	90.9			
5883.245	3.6054^o	5.5	1.4986	4.5	5883.286^b	149.7			
5883.312	3.4633^o	4.5	1.3566	5.5	5883.286^{bc}	157.4			
5887.861	3.4617^o	4.5	1.3566	5.5	5887.881^c	843.7			
5890.461	3.4267^o	3.5	1.3225	3.5	5890.446^b	11.0		0.2	
5890.479	3.3858^o	6.5	1.2816	6.5	5890.446^{bc}	11.0		0.1	
5896.618	5.0492	4.5	2.9472^o	4.5	5896.662^{bc}	16.3			
5896.674	5.4404	4.5	3.3384^o	4.5	5896.662^b	17.0			
5899.484	5.3717	3.5	3.2707^o	4.5	5899.456^c	110.2			
5900.406	3.0336^o	3.5	0.9329	3.5	5900.441	39.2		0.2	
5901.561	5.6416	7.5	3.5413^o	6.5	5901.601^c	20.9			
5908.215	3.5085^o	4.5	1.4106	3.5	5908.175	12.5		0.3	
5914.687	3.8375^o	6.5	1.7419	5.5	5914.689^c	30.3			
5919.743	3.5456^o	5.5	1.4518	4.5	5919.792^c	20.9		0.6	
5922.789	4.9026	3.5	2.8099^o	4.5	5922.768^c	103.9			
5928.927	5.5275	6.5	3.4369^o	6.5	5928.922^c	16.2			
5941.399	3.8540^o	5.5	1.7679	6.5	5941.371^c	16.6		0.9	
5963.219	3.6963^o	6.5	1.6178	5.5	5963.243^c	21.9		0.8	
5966.738	5.6416	7.5	3.5643^o	8.5	5966.695^c	19.2			
5972.516	4.7088	2.5	2.6335^o	2.5	5972.476^c	17.0			
5981.997	5.3575	3.5	3.2855^o	4.5	5981.965	5.3			
5988.819	5.1710	5.5	3.1014^o	5.5	5988.807^c	12.5			
5996.461	3.8625^o	6.5	1.7955	7.5	5996.458^{bc}	105.1			
5996.468	5.0492	4.5	2.9822^o	4.5	5996.458^b	105.1			
6000.073	5.2019	4.5	3.1361^o	3.5	6000.038^c	290.4			
6001.989	3.7139^o	7.5	1.6488	6.5	6001.944	22.5		0.9	
6005.508	2.3844^o	7.5	0.3205	6.5	6005.467^c	6.2		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6020.208	5.3296	5.5	3.2707^o	4.5	6020.235^c	25.0			
6025.519	2.5284^o	6.5	0.4714	7.5	6025.537^c	43.5		-0.4	
6052.465	5.1710	5.5	3.1231^o	4.5	6052.428^b	10.8			
6052.475	3.6901^o	5.5	1.6423	4.5	6052.428^b	11.0		0.5	
6053.766	5.4036	5.5	3.3562^o	4.5	6053.770^c	13.1			
6054.459	3.1836^o	8.5	1.1364	9.5	6054.486^c	23.0		0.2	
6056.995	5.3170	5.5	3.2707^o	4.5	6056.998^c	65.4			
6065.176	3.4002^o	4.5	1.3566	5.5	6065.210	67.7		1.0	
6083.162	5.2662	2.5	3.2286^o	2.5	6083.141^c	11.1			
6086.951	5.2162	4.5	3.1800^o	3.5	6086.930^b	14.2			
6086.967	3.3179^o	5.5	1.2816	6.5	6086.930^{bc}	14.3		0.2	
6087.950	4.5643	6.5	2.5284^o	6.5	6087.929^c	36.9			
6091.580	3.4705^o	5.5	1.4358	6.5	6091.610^{bc}	12.0		0.3	
6091.587	3.6325^o	4.5	1.5978	5.5	6091.610^b	12.0		0.5	
6100.129	4.6865	4.5	2.6546^o	3.5	6100.177^c	16.2			
6113.470	2.7720^o	4.5	0.7445	4.5	6113.467^c	9.0		-0.7	
6119.921	5.4682	5.5	3.4429^o	5.5	6119.917^c	7.4			
6122.938	5.4404	4.5	3.4161^o	4.5	6122.969^b	36.5			
6122.977	3.8375^o	6.5	1.8132	5.5	6122.969^{bc}	36.5			
6125.251	3.5456^o	5.5	1.5220	5.5	6125.293^{bc}	8.3		0.2	
6125.264	5.4700	4.5	3.4465^o	5.5	6125.293^b	8.3			
6126.181	5.1710	5.5	3.1478^o	4.5	6126.173^c	8.7			
6155.047	5.4404	4.5	3.4267^o	3.5	6155.048^c	103.1			
6156.921	3.4237^o	2.5	1.4106	3.5	6156.933^c	39.0		0.8	
6169.112	4.1745	5.5	2.1654^o	6.5	6169.145^c	12.3			
6178.227	5.1423	4.5	3.1361^o	3.5	6178.185^c	15.7			
6222.163	4.7094	4.5	2.7174^o	4.5	6222.140^c	33.5			
6251.821	3.2642^o	6.5	1.2816	6.5	6251.827^c	14.7		0.2	
6279.694	3.4958^o	6.5	1.5220	5.5	6279.684	8.1		0.2	
6283.870	4.8733	4.5	2.9008^o	3.5	6283.911	14.5			
6288.038	3.8752^o	6.5	1.9041	7.5	6288.007^c	143.1			
6297.084	3.3176^o	4.5	1.3493	4.5	6297.054^c	120.0			
6308.287	4.8733	4.5	2.9085^o	5.5	6308.256^c	68.9			
6322.820	5.0492	4.5	3.0888^o	3.5	6322.871^c	25.7			
6340.644	5.2241	4.5	3.2693^o	3.5	6340.647^c	14.2			
6348.727	4.6697	4.5	2.7174^o	4.5	6348.728^c	39.4			
6353.613	5.1877	4.5	3.2369^o	4.5	6353.610^c	12.8			
6360.874	2.1308^o	5.5	0.1823	5.5	6360.862^{bc}	13.8		-1.3	
6360.914	5.4466	4.5	3.4980^o	3.5	6360.862^b	12.4			
6362.090	2.9922^o	5.5	1.0440	4.5	6362.128^c	5.7	-0.6	-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6372.754	5.1819	4.5	3.2369^o	4.5	6372.767^c	21.1			
6429.037	3.6601^o	4.5	1.7322	4.5	6429.030^c	4.1		0.2	
6431.147	4.8388	7.5	2.9115^o	7.5	6431.172^c	16.0			
6432.605	5.4682	5.5	3.5413^o	6.5	6432.653^c	101.5			
6435.177	3.2759^o	3.5	1.3498	2.5	6435.189^c	7.6		-0.1	
6439.734	5.0492	4.5	3.1244^o	5.5	6439.725^c	7.2			
6448.769	5.6122	5.5	3.6901^o	5.5	6448.817^c	7.3			
6457.094	3.4488^o	7.5	1.5292	6.5	6457.114^c	45.8		0.9	
6464.273	5.2241	4.5	3.3066^o	4.5	6464.279	4.4			
6465.891	3.5137^o	4.5	1.5968	3.5	6465.874^c	9.0		0.3	
6469.146	5.3780	5.5	3.4620^o	5.5	6469.183^b	2.3			
6469.232	3.6482^o	5.5	1.7322	4.5	6469.182^{bc}	1.9		-0.2	
6474.243	3.2369^o	4.5	1.3225	3.5	6474.230^c	19.7		0.3	
6480.195	3.4031^o	6.5	1.4904	5.5	6480.235^c	25.6	0.7	0.6	
6487.470	4.9540	7.5	3.0434^o	7.5	6487.493^b	29.6			
6487.513	4.6865	4.5	2.7759^o	3.5	6487.493^b	29.5			
6487.517	3.4398^o	6.5	1.5292	6.5	6487.493^{bc}	29.5	0.6	0.7	
6500.131	5.1710	5.5	3.2642^o	6.5	6500.146^c	99.9			
6517.094	3.6008^o	4.5	1.6990	4.5	6517.046	7.0		0.3	
6520.294	5.3170	5.5	3.4161^o	4.5	6520.268^c	19.5			
6543.136	5.4404	4.5	3.5461^o	4.5	6543.105^c	3.2			
6543.588	4.8372	8.5	2.9430^o	7.5	6543.637^c	3.8			
6560.040	5.2896	3.5	3.4002^o	4.5	6560.066^c	2.8			
6566.714	3.3779^o	5.5	1.4904	5.5	6566.664	2.9		-0.3	
6567.815	5.0356	7.5	3.1485^o	6.5	6567.863	1.9			
6592.739	5.0492	4.5	3.1691^o	5.5	6592.725^c	29.6			
6619.395	3.4702^o	4.5	1.5978	5.5	6619.368^{bc}	34.8		0.9	
6619.399	4.6865	4.5	2.8140^o	5.5	6619.368^b	34.8			
6624.316	5.3780	5.5	3.5069^o	5.5	6624.294^b	4.8			
6624.325	5.0356	7.5	3.1645^o	6.5	6624.294^{bc}	4.8			
6625.389	2.2510^o	6.5	0.3802	5.5	6625.347^c	15.0		-1.1	
6628.744	3.5688^o	4.5	1.6990	4.5	6628.693^c	25.2		0.9	
6647.348	3.5069^o	5.5	1.6423	4.5	6647.319^c	2.8		-0.2	
6648.632	3.4620^o	5.5	1.5978	5.5	6648.685	8.1		0.2	
6650.315	3.3858^o	6.5	1.5220	5.5	6650.299^c	9.2		0.2	
6655.681	4.5739	4.5	2.7117^o	3.5	6655.666^b	151.4			
6655.701	5.4036	5.5	3.5413^o	6.5	6655.666^b	151.6			
6655.719	2.1828^o	5.5	0.3205	6.5	6655.666^{bc}	152.0		-0.1	
6695.560	3.2078^o	5.5	1.3566	5.5	6695.574^{bc}	37.8		0.6	
6695.604	3.7626^o	6.5	1.9115	6.5	6695.574^b	37.6			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6712.314	5.4466	4.5	3.6000^o	3.5	6712.272^c	18.3			
6739.253	3.4369^o	6.5	1.5978	5.5	6739.210^c	9.0		0.3	
6742.480	5.2409	3.5	3.4026^o	3.5	6742.508^c	47.5			
6745.219	5.4700	4.5	3.6325^o	4.5	6745.190^c	21.5			
6748.353	4.6697	4.5	2.8330^o	3.5	6748.404^c	23.8			
6761.210	5.2599	2.5	3.4267^o	3.5	6761.174	4.2			
6792.303	4.9299	4.5	3.1051^o	3.5	6792.312^c	27.6			
6803.980	3.2575^o	5.5	1.4358	6.5	6804.011^c	6.0	0.1	-0.1	
6811.065	3.1691^o	5.5	1.3493	4.5	6811.105^b	3.0		-0.5	
6811.126	3.1014^o	5.5	1.2816	6.5	6811.105^{bc}	2.7		-0.7	
6823.042	4.5281	5.5	2.7115^o	6.5	6822.987^c	47.4			
6833.443	3.2496^o	6.5	1.4358	6.5	6833.421^c	2.8	-0.6	-0.5	
6836.250	5.1491	4.5	3.3360^o	3.5	6836.223^c	2.5			
6846.957	2.9008^o	3.5	1.0906	2.5	6846.946	2.8	-1.0	-0.9	
6867.343	4.5768	4.5	2.7720^o	4.5	6867.352^c	7.0			
6878.494	4.5739	4.5	2.7720^o	4.5	6878.448^c	26.1			
6882.195	4.7094	4.5	2.9085^o	5.5	6882.229^c	2.9			
6883.413	3.1231^o	4.5	1.3225	3.5	6883.426^c	2.5		-0.7	
6900.441	1.7962^o	2.5	0.0000	3.5	6900.446	4.2		-2.1	
6907.624	3.5781^o	5.5	1.7838	6.5	6907.656^c	2.3		-0.1	
6909.367	3.1432^o	5.5	1.3493	4.5	6909.376^c	5.6		-0.3	
6923.847	3.0147^o	3.5	1.2246	4.5	6923.862^{bc}	305.5			
6923.909	5.2019	4.5	3.4118^o	5.5	6923.862^b	305.6			
6957.537	3.5137^o	4.5	1.7322	4.5	6957.530^c	1.8		-0.3	
6963.243	4.6514	5.5	2.8714^o	5.5	6963.262^c	1.3			
6964.548	3.3764^o	4.5	1.5968	3.5	6964.499^c	29.0		0.7	
6965.849	5.1491	4.5	3.3698^o	4.5	6965.842^b	2.4			
6965.858	3.1167^o	3.5	1.3374	2.5	6965.842^b	2.4		-0.7	
6969.309	5.4036	5.5	3.6251^o	5.5	6969.352	1.3			
6992.181	4.6400	4.5	2.8674^o	5.5	6992.220^c	1.4			
6995.145	5.1819	4.5	3.4100^o	3.5	6995.202^{bc}	164.6			
6995.208	5.4682	5.5	3.6963^o	6.5	6995.202^b	164.4			
6997.364	4.6514	5.5	2.8801^o	4.5	6997.356^c	2.4			
7001.606	5.0395	2.5	3.2693^o	3.5	7001.621^c	26.1			
7066.421	4.8902	3.5	3.1361^o	3.5	7066.457^c	4.7			
7066.893	2.3844^o	7.5	0.6305	8.5	7066.932	4.8		-1.3	
7070.776	4.6514	5.5	2.8985^o	5.5	7070.828	2.6			
7081.259	4.5643	6.5	2.8140^o	5.5	7081.247^c	2.6			
7082.390	3.2491^o	3.5	1.4991	2.5	7082.415^b	4.2		-0.2	
7082.420	4.7011	7.5	2.9510^o	6.5	7082.415^b	4.0			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7101.566	1.7453^{o}	3.5	0.0000	3.5	7101.528	4.1		-2.2	
7105.003	3.4435^{o}	4.5	1.6990	4.5	7105.030^{c}	4.4		0.0	
7106.718	3.6555^{o}	5.5	1.9115	6.5	7106.768^{bc}	5.6		0.4	
7106.826	4.5281	5.5	2.7841^{o}	4.5	7106.768^{b}	5.6			
7110.903	5.0253	8.5	3.2822^{o}	7.5	7110.914^{b}	8.6			
7110.934	3.5385^{o}	7.5	1.7955	7.5	7110.914^{bc}	8.5		0.4	
7121.198	4.6835	7.5	2.9430^{o}	7.5	7121.248	1.3			
7128.233	3.2379^{o}	2.5	1.4991	2.5	7128.243	4.1		-0.3	
7129.372	5.2019	4.5	3.4633^{o}	4.5	7129.365	2.0			
7132.246	3.6493^{o}	6.5	1.9115	6.5	7132.275^{c}	5.9		0.4	
7136.894	3.6482^{o}	5.5	1.9115	6.5	7136.883^{c}	19.9		1.0	
7154.529	5.2409	3.5	3.5085^{o}	4.5	7154.536^{c}	9.9			
7184.403	4.9052	4.5	3.1800^{o}	3.5	7184.460^{c}	7.3			
7189.428	2.0446^{o}	5.5	0.3205	6.5	7189.434^{c}	5.7		-1.6	
7197.351	3.6963^{o}	6.5	1.9742	6.5	7197.400^{b}	2.4		0.1	
7197.447	4.9299	4.5	3.2078^{o}	5.5	7197.400^{b}	2.4			
7198.580	4.6400	4.5	2.9182^{o}	4.5	7198.540^{c}	4.4			
7199.008	1.7217^{o}	4.5	0.0000	3.5	7198.974	1.5		-2.6	
7219.593	4.6598	6.5	2.9430^{o}	7.5	7219.618^{c}	3.8			
7268.385	3.3912^{o}	5.5	1.6859	6.5	7268.361^{c}	13.3		0.5	
7272.387	3.1144^{o}	7.5	1.4101	7.5	7272.394^{bc}	2.1		-0.7	
7272.421	4.9540	7.5	3.2496^{o}	6.5	7272.394^{b}	2.1			
7285.278	2.9008^{o}	3.5	1.1995	2.5	7285.244^{c}	31.1	0.1	0.2	
7291.437	5.0492	4.5	3.3493^{o}	4.5	7291.493^{c}	5.4			
7296.580	4.2908	4.5	2.5921^{o}	5.5	7296.543	2.4		0.9	
7299.969	5.1423	4.5	3.4444^{o}	5.5	7299.983	2.4			
7306.375	4.8209	4.5	3.1244^{o}	5.5	7306.354^{c}	2.7			
7313.820	4.6252	3.5	2.9305^{o}	3.5	7313.788^{c}	51.9			
7316.815	2.1654^{o}	6.5	0.4714	7.5	7316.795^{c}	1.6		-2.0	
7317.900	3.3360^{o}	3.5	1.6423	4.5	7317.935^{bc}	14.0		0.4	
7317.993	4.6697	4.5	2.9760^{o}	4.5	7317.935^{b}	14.4			
7330.625	5.4682	5.5	3.7774^{o}	6.5	7330.656^{c}	4.6			
7332.730	4.8388	7.5	3.1485^{o}	6.5	7332.775^{c}	3.0			
7369.883	3.4140^{o}	4.5	1.7322	4.5	7369.866^{c}	20.6		0.7	
7412.390	5.4404	4.5	3.7683^{o}	3.5	7412.366^{c}	2.0			
7458.756	4.7979	4.5	3.1361^{o}	3.5	7458.760^{c}	6.8			
7463.773	3.4444^{o}	5.5	1.7838	6.5	7463.756^{c}	1.3		-0.4	
7507.763	4.9026	3.5	3.2517^{o}	4.5	7507.786^{c}	1.9			
7513.736	3.1014^{o}	5.5	1.4518	4.5	7513.750^{b}	3.1		-0.5	
7513.736	2.5825^{o}	3.5	0.9329	3.5	7513.750^{b}	3.1	-1.0	-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7517.380	3.4620^o	5.5	1.8132	5.5	7517.403	3.8		0.1	
7578.122	5.4700	4.5	3.8344^o	4.5	7578.063	1.5			
7578.584	2.7759^o	3.5	1.1404	3.5	7578.598^c	2.2		-1.0	
7600.846	5.4682	5.5	3.8375^o	6.5	7600.784	5.0			
7614.668	3.2082^o	2.5	1.5805	1.5	7614.707^c	8.3		0.1	
7624.168	4.7691	7.5	3.1434^o	7.5	7624.110	1.0			
7626.312	4.9052	4.5	3.2799^o	5.5	7626.321^c	9.6			
7670.934	4.8733	4.5	3.2575^o	5.5	7670.881	0.6			
7671.964	5.2019	4.5	3.5863^o	4.5	7671.974	3.8			
7673.648	4.3661	5.5	2.7508^o	4.5	7673.696	1.3		0.8	
7678.272	3.3562^o	4.5	1.7419	5.5	7678.280	1.3		-0.5	
7681.614	5.4558	3.5	3.8422^o	4.5	7681.564^c	6.2			
7682.762	4.5643	6.5	2.9510^o	6.5	7682.821^c	13.6			
7701.494	3.2517^o	4.5	1.6423	4.5	7701.556^c	3.0		-0.3	
7705.599	2.9578^o	5.5	1.3493	4.5	7705.636^{bc}	10.9		-0.1	
7705.686	5.5912	3.5	3.9827^o	3.5	7705.636^b	11.1			
7718.137	5.0395	2.5	3.4336^o	3.5	7718.110^c	6.2			
7747.889	5.5912	3.5	3.9915^o	2.5	7747.943^b	3.6			
7747.973	5.0631	3.5	3.4633^o	4.5	7747.943^b	3.2			
7768.619	5.6122	5.5	4.0167^o	6.5	7768.672^c	6.5			
7779.981	2.9305^o	3.5	1.3374	2.5	7780.014^c	2.4		-0.8	
7787.323	3.0275^o	6.5	1.4358	6.5	7787.329^c	32.9		0.5	
7799.620	4.8388	7.5	3.2496^o	6.5	7799.583	3.7			
7823.268	3.4958^o	6.5	1.9115	6.5	7823.238^c	8.9		0.5	
7872.033	3.0649^o	6.5	1.4904	5.5	7872.019^c	25.8		0.4	
7877.715	4.2908	4.5	2.7174^o	4.5	7877.689^c	4.5			
7882.964	4.7011	7.5	3.1287^o	7.5	7882.908	1.7			
7885.944	3.2707^o	4.5	1.6990	4.5	7885.900^c	1.6		-0.5	
7886.614	3.2575^o	5.5	1.6859	6.5	7886.602^c	57.9			
7900.385	2.9182^o	4.5	1.3493	4.5	7900.419^b	2.1	-1.0	-0.8	
7900.388	3.4233^o	7.5	1.8545	7.5	7900.419^b	2.1		-0.2	
7902.845	3.6278^o	7.5	2.0594	8.5	7902.816	1.0		-0.3	
7906.062	5.5840	2.5	4.0163^o	3.5	7906.026^c	7.5			
7916.996	1.7478^o	5.5	0.1823	5.5	7916.994^b	1.6		-2.4	
7917.032	5.2896	3.5	3.7240^o	2.5	7916.994^b	1.6			
7921.327	3.3779^o	5.5	1.8132	5.5	7921.379^{bc}	1.0		-0.5	
7921.352	3.6726^o	7.5	2.1079	7.5	7921.379^b	1.0		-0.2	
7928.819	3.3764^o	4.5	1.8132	5.5	7928.857^c	1.6		-0.3	
7949.660	2.9085^o	5.5	1.3493	4.5	7949.631^c	1.1		-1.1	
7970.601	5.2599	2.5	3.7048^o	2.5	7970.545^c	2.2			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8015.418	5.2019	4.5	3.6555^o	5.5	8015.379^c	2.4			
8029.533	3.2855^o	4.5	1.7419	5.5	8029.520^c	3.0		-0.2	
8031.407	4.5768	4.5	3.0336^o	3.5	8031.391^c	6.4			
8036.451	5.2325	4.5	3.6901^o	5.5	8036.429^c	3.8			
8040.505	3.2274^o	7.5	1.6859	6.5	8040.571	3.9		-0.1	
8051.271	3.5989^o	8.5	2.0594	8.5	8051.323^b	0.9	-0.2	-0.3	
8051.345	1.7217^o	4.5	0.1823	5.5	8051.323^b	0.9		-2.7	
8066.033	5.3575	3.5	3.8209^o	4.5	8066.029^c	2.9			
8108.781	1.9999^o	8.5	0.4714	7.5	8108.746^c	3.4		-1.8	
8110.251	4.6514	5.5	3.1231^o	4.5	8110.231^c	1.0			
8169.027	5.0815	7.5	3.5643^o	8.5	8169.091^c	3.0			
8180.397	5.1152	2.5	3.6000^o	3.5	8180.405	2.8			
8201.039	4.6598	6.5	3.1485^o	6.5	8201.067^c	8.4			
8217.035	3.3629^o	6.5	1.8545	7.5	8216.978^c	19.0		0.8	
8222.235	3.5989^o	8.5	2.0914	7.5	8222.285	3.1	0.3	0.3	
8245.411	4.6382	8.5	3.1350^o	8.5	8245.462^{bc}	2.6			
8245.437	4.8209	4.5	3.3176^o	4.5	8245.462^b	2.7			
8245.527	4.9299	4.5	3.4267^o	3.5	8245.462^b	2.9			
8283.300	3.4705^o	5.5	1.9742	6.5	8283.342^c	9.3		0.6	
8308.861	5.1819	4.5	3.6901^o	5.5	8308.923^b	5.3			
8308.886	2.9822^o	4.5	1.4904	5.5	8308.925^b	4.7		-0.3	
8308.921	2.9023^o	4.5	1.4106	3.5	8308.925^{bc}	4.9		-0.4	
8318.694	4.8902	3.5	3.4002^o	4.5	8318.638	9.3			
8324.654	4.7648	3.5	3.2759^o	3.5	8324.695^c	18.6			
8336.306	4.7691	7.5	3.2822^o	7.5	8336.362^c	72.0			
8350.601	4.5643	6.5	3.0800^o	5.5	8350.554	1.0			
8362.448	5.1423	4.5	3.6601^o	4.5	8362.445^c	5.2			
8365.758	4.5465	6.5	3.0649^o	6.5	8365.742	7656.0			
8376.416	3.3912^o	5.5	1.9115	6.5	8376.359	10422.6			
8389.410	4.6252	3.5	3.1478^o	4.5	8389.472^c	23.1			
8409.596	2.9305^o	3.5	1.4566	2.5	8409.559	5.0		-0.4	
8533.855	4.5768	4.5	3.1244^o	5.5	8533.855^c	4.4			
8622.498	5.3575	3.5	3.9201^o	4.5	8622.458	3.4			
8657.115	4.6400	4.5	3.2083^o	4.5	8657.095^c	29.4			
8670.882	4.6598	6.5	3.2303^o	7.5	8670.828^c	67.0			
8799.858	4.5677	4.5	3.1592^o	5.5	8799.820^c	55.2			
8810.326	4.8209	4.5	3.4140^o	4.5	8810.291^c	1.7			
8839.083	1.4023^o	4.5	0.0000	3.5	8839.053	2.6		-2.5	
9052.267	4.9052	4.5	3.5360^o	3.5	9052.256	6.8			
9054.296	4.5281	5.5	3.1592^o	5.5	9054.322^c	86.6			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
9226.566	3.4028^o	7.5	2.0594	8.5	9226.585^b	2329.7			
9226.647	2.9922^o	5.5	1.6488	6.5	9226.585^{bc}	2334.8			
9662.655	4.4419	4.5	3.1592^o	5.5	9662.714	45.2			
10844.578	4.6514	5.5	3.5085^o	4.5	10844.615^c	53396.8			

Table A.9: Measured wavelengths (λ_o) and intensities of Sm I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
3756.430	3.4002	3.0	0.1007	2.0	3756.428^n	1692.2		-0.6	-0.4
3773.339	3.3210	2.0	0.0363	1.0	3773.339^n	973.2		-1.0	-0.6
3793.978	3.6544^o	5.0	0.3875	5.0	3793.990^c	539.7		-0.7	
3803.941	3.2584	1.0	0.0000	0.0	3803.942^n	1059.2		-1.0	-0.8
3806.450	3.7547^o	5.0	0.4985	6.0	3806.479	505.0	-0.7	-0.6	
3809.957	3.6407	4.0	0.3875	5.0	3809.954^n	1460.9		-0.3	-0.6
3813.824	3.7484	5.0	0.4985	6.0	3813.824^n	1322.9		-0.1	-0.3
3822.961	3.3428	1.0	0.1007	2.0	3822.966^n	439.5		-1.3	-1.2
3826.239	3.5212^o	4.0	0.2818	4.0	3826.215^c	345.5		-1.1	
3832.805	3.5156	3.0	0.2818	4.0	3832.806^n	1871.9		-0.4	-0.7
3834.475	3.7309	6.0	0.4985	6.0	3834.473^n	4311.6		0.3	0.2
3846.282	3.3231	1.0	0.1007	2.0	3846.279^n	987.8		-0.9	-1.1
3848.782	3.3210	2.0	0.1007	2.0	3848.788^n	734.0		-1.1	-1.0
3853.296	3.6041	5.0	0.3875	5.0	3853.295^n	2670.3		-0.1	-0.3
3854.578	3.4002	3.0	0.1847	3.0	3854.577^n	1035.6		-0.8	-0.6
3858.504	3.3129^o	2.0	0.1007	2.0	3858.521^{bc}	1174.5	-1.1	-0.9	
3858.513	3.3969^o	2.0	0.1847	3.0	3858.521^{bc}	1225.7		-0.7	
3858.736	3.4939	4.0	0.2818	4.0	3858.739^n	2669.5		-0.2	-0.2
3860.133	3.5984^o	5.0	0.3875	5.0	3860.152	3302.5		0.0	
3877.467	3.6950	6.0	0.4985	6.0	3877.466^n	3091.3		0.2	-0.2
3883.989	3.5787^o	6.0	0.3875	5.0	3884.002^c	212.8		-1.2	
3886.036	3.6880^o	6.0	0.4985	6.0	3886.035	115.3		-1.3	
3891.959	3.2209^o	2.0	0.0363	1.0	3891.965	89.5		-2.1	
3909.947	3.5575	5.0	0.3875	5.0	3909.947^n	900.3		-0.6	-1.0
3924.680	3.3428^o	4.0	0.1847	3.0	3924.699	121.7	-1.3	-1.8	
3925.201	3.2584	1.0	0.1007	2.0	3925.202^n	3104.5		-0.5	-0.4
3926.325	3.4386^o	4.0	0.2818	4.0	3926.324	161.9		-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
3949.837	3.4198	4.0	0.2818	4.0	3949.837^n	478.7		-1.1	-1.4
3951.881	3.3210	2.0	0.1847	3.0	3951.882^n	4831.5		-0.2	-0.3
3960.510	3.2302^o	2.0	0.1007	2.0	3960.494	78.9		-2.2	
3962.130	3.3129	2.0	0.1847	3.0	3962.129^n	1457.0		-0.8	-0.9
3964.882	3.3108^o	3.0	0.1847	3.0	3964.876	264.9		-1.5	
3974.657	3.4002	3.0	0.2818	4.0	3974.652^n	5924.6		-0.0	-0.0
3978.244	3.3003^o	3.0	0.1847	3.0	3978.236	575.1		-1.2	
3990.012	3.4939	4.0	0.3875	5.0	3990.014^n	5933.0		0.2	-0.0
3991.008	3.6041	5.0	0.4985	6.0	3991.011^n	2074.5		-0.1	-0.5
3998.341	3.5984^o	5.0	0.4985	6.0	3998.356	2550.2		-0.0	
4051.811	3.5575	5.0	0.4985	6.0	4051.807^n	142.6		-1.3	-1.7
4054.506	3.4445^o	6.0	0.3875	5.0	4054.507^c	973.9		-0.7	
4062.319	3.4386^o	4.0	0.3875	5.0	4062.322	2802.6		-0.2	
4069.766	3.2302^o	2.0	0.1847	3.0	4069.737	64.5		-2.2	
4079.821	3.3198	5.0	0.2818	4.0	4079.813^n	1880.3		-0.6	-0.9
4087.495	3.4198	4.0	0.3875	5.0	4087.495^n	137.2		-1.6	-1.9
4092.045	3.3108^o	3.0	0.2818	4.0	4092.046	27.0		-2.5	
4101.306	3.0221^o	1.0	0.0000	0.0	4101.304	19.6		-3.1	
4106.280	3.3003^o	3.0	0.2818	4.0	4106.264	115.8		-1.8	
4125.233	3.2864^o	5.0	0.2818	4.0	4125.235	1585.0		-0.7	
4126.060	3.5025^o	7.0	0.4985	6.0	4126.065	420.0		-0.9	
4129.977	3.0374^o	2.0	0.0363	1.0	4129.997	117.6		-2.2	
4135.497	3.1818	4.0	0.1847	3.0	4135.496^n	794.9		-1.2	-1.2
4138.725	3.0955^o	3.0	0.1007	2.0	4138.727	469.4		-1.5	
4142.963	3.3792^o	5.0	0.3875	5.0	4142.959	49.3		-2.1	
4145.225	3.4886^o	7.0	0.4985	6.0	4145.240	4246.3		0.0	
4145.591	3.1745^o	3.0	0.1847	3.0	4145.583	60.8		-2.3	
4147.974	3.0888^o	2.0	0.1007	2.0	4147.967	151.9		-2.0	
4151.214	3.1705^o	4.0	0.1847	3.0	4151.198	507.8		-1.4	
4158.845	3.2621^o	5.0	0.2818	4.0	4158.848	51.7		-2.2	
4164.786	3.3635	6.0	0.3875	5.0	4164.788^n	172.0		-1.5	-1.9
4183.334	3.1475	4.0	0.1847	3.0	4183.325^n	6100.1		-0.3	-0.5
4194.836	3.4532^o	5.0	0.4985	6.0	4194.854	35.8		-2.1	
4207.259	3.4445^o	6.0	0.4985	6.0	4207.264	171.1		-1.4	
4218.632	3.4365^o	7.0	0.4985	6.0	4218.639	3089.8		-0.2	
4219.310	2.9739	2.0	0.0363	1.0	4219.305^n	1183.6		-1.3	-1.3
4226.175	3.0335	3.0	0.1007	2.0	4226.163^n	8722.0		-0.3	-0.6
4226.868	3.3198^o	5.0	0.3875	5.0	4226.845	147.8	-2.0	-1.7	
4230.721	2.9297	1.0	0.0000	0.0	4230.716^n	540.5		-1.7	-1.5
4240.444	3.1076	4.0	0.1847	3.0	4240.443^n	545.3		-1.4	-1.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
4244.246	2.9566	2.0	0.0363	1.0	4244.247^n	455.8		-1.7	-1.6
4248.401	3.3050^o	4.0	0.3875	5.0	4248.385	26.6		-2.4	
4258.182	3.0955^o	3.0	0.1847	3.0	4258.182	45.5		-2.5	
4266.310	3.0059	3.0	0.1007	2.0	4266.303^n	2179.0		-1.0	-0.8
4271.863	3.1833	5.0	0.2818	4.0	4271.858^n	2398.5		-0.7	-0.6
4274.029	3.1818	4.0	0.2818	4.0	4274.026^n	59.6		-2.3	-2.1
4277.396	2.9984^o	1.0	0.1007	2.0	4277.383	21.5		-3.0	
4282.199	3.2819	6.0	0.3875	5.0	4282.200^n	11252.0		0.2	0.2
4282.826	3.1758	5.0	0.2818	4.0	4282.827^n	7156.5		-0.2	-0.0
4283.494	2.9942	3.0	0.1007	2.0	4283.495^n	5031.1		-0.6	-0.4
4283.757	2.9297	1.0	0.0363	1.0	4283.757^n	707.9		-1.6	-1.5
4290.821	3.1705^o	4.0	0.2818	4.0	4290.813	81.5		-2.1	
4293.737	3.0713	4.0	0.1847	3.0	4293.732^n	292.9		-1.7	-1.5
4296.747	3.3831	7.0	0.4985	6.0	4296.741^n	20108.9		0.6	0.7
4299.142	2.9193	2.0	0.0363	1.0	4299.135^n	1736.9		-1.2	-1.0
4301.005	2.8818^o	1.0	0.0000	0.0	4301.006	40.5	-2.8	-2.9	
4302.584	3.3792^o	5.0	0.4985	6.0	4302.573	42.5		-2.1	
4312.851	3.1557	5.0	0.2818	4.0	4312.842^n	5839.9		-0.3	-0.4
4319.522	3.0541	4.0	0.1847	3.0	4319.519^n	8698.0		-0.3	-0.2
4324.458	3.1480	5.0	0.2818	4.0	4324.458^n	6788.1		-0.2	-0.4
4325.144	3.1475	4.0	0.2818	4.0	4325.146^n	565.6		-1.3	-1.4
4330.015	2.8988	2.0	0.0363	1.0	4330.013^n	12310.3		-0.4	-0.2
4331.444	3.0462	4.0	0.1847	3.0	4331.442^n	4528.6		-0.6	-0.7
4336.132	3.2459	6.0	0.3875	5.0	4336.126^n	17008.9		0.3	0.2
4338.963	2.9572	3.0	0.1007	2.0	4338.956^n	2836.0		-0.9	-0.9
4339.932	2.9566	2.0	0.1007	2.0	4339.926^n	864.3		-1.4	-1.4
4344.827	3.0374^o	2.0	0.1847	3.0	4344.819	131.6		-2.1	
4350.811	3.0335	3.0	0.1847	3.0	4350.807^n	1031.4		-1.2	-1.2
4355.831	2.8818	1.0	0.0363	1.0	4355.828^n	421.2		-1.9	-1.8
4357.899	3.2317^o	5.0	0.3875	5.0	4357.899	1279.9		-0.8	
4362.910	2.8409	1.0	0.0000	0.0	4362.909^n	9272.3		-0.6	-0.4
4365.957	2.9396	3.0	0.1007	2.0	4365.954^n	488.3		-1.7	-1.3
4378.258	4.1701^o	2.0	1.3391	1.0	4378.228^c	312.6		0.1	
4380.422	3.0142	4.0	0.1847	3.0	4380.414^n	6672.4		-0.4	-0.3
4381.262	2.9297^o	1.0	0.1007	2.0	4381.226	200.6	-1.9	-2.1	
4386.221	3.1076	4.0	0.2818	4.0	4386.213^n	2112.3		-0.8	-0.7
4393.360	3.0059	3.0	0.1847	3.0	4393.355^n	4803.6		-0.6	-0.6
4397.347	2.9193	2.0	0.1007	2.0	4397.341^n	6179.5		-0.6	-0.6
4401.164	3.2037	6.0	0.3875	5.0	4401.161^n	5955.5		-0.2	-0.1
4405.204	3.0955^o	3.0	0.2818	4.0	4405.207	68.9		-2.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
4411.585	2.9942	3.0	0.1847	3.0	4411.582^n	6585.9		-0.5	-0.4
4419.334	2.8409	1.0	0.0363	1.0	4419.329^n	13508.4		-0.4	-0.2
4423.382	2.8383	2.0	0.0363	1.0	4423.377^n	1555.2		-1.4	-1.1
4429.653	2.8988	2.0	0.1007	2.0	4429.646^n	12745.0		-0.3	-0.2
4433.072	2.8322	2.0	0.0363	1.0	4433.068^n	3372.8		-1.0	-0.9
4433.340	3.1833	5.0	0.3875	5.0	4433.335^n	552.4		-1.2	-1.2
4441.805	2.9751	4.0	0.1847	3.0	4441.800^n	13988.6		-0.2	-0.1
4442.274	2.8908	3.0	0.1007	2.0	4442.270^n	16516.7		-0.2	-0.2
4443.266	3.0713	4.0	0.2818	4.0	4443.263^n	917.7		-1.2	-1.1
4445.149	3.1758	5.0	0.3875	5.0	4445.147^n	16590.7		0.2	0.2
4445.835	3.2864^o	5.0	0.4985	6.0	4445.815^c	523.3		-1.1	
4452.951	3.2819	6.0	0.4985	6.0	4452.947^n	6686.9		0.0	-0.1
4456.674	2.8818	1.0	0.1007	2.0	4456.670^n	298.8		-2.0	-1.9
4459.290	2.8802	3.0	0.1007	2.0	4459.284^n	12561.9		-0.4	-0.5
4463.891	3.0585	5.0	0.2818	4.0	4463.884^n	194.1		-1.9	-1.2
4470.883	3.0541	4.0	0.2818	4.0	4470.875^n	20063.2		0.1	0.2
4471.472	2.9566	2.0	0.1847	3.0	4471.467^n	210.7		-2.0	-1.9
4477.501	3.1557	5.0	0.3875	5.0	4477.492^n	1569.8		-0.8	-0.9
4480.309	2.7665	1.0	0.0000	0.0	4480.304^n	7749.1		-0.8	-0.6
4490.013	3.1480	5.0	0.3875	5.0	4490.010^n	750.3		-1.1	-1.2
4490.753	3.1475	4.0	0.3875	5.0	4490.750^n	63.6		-2.2	-2.1
4499.104	2.9396	3.0	0.1847	3.0	4499.100^n	13153.5		-0.2	-0.1
4503.374	2.7886	2.0	0.0363	1.0	4503.368^n	13039.7		-0.5	-0.5
4504.306	3.0335^o	5.0	0.2818	4.0	4504.300	25.5	-2.8	-2.8	
4511.300	3.2459	6.0	0.4985	6.0	4511.295^n	5137.2		-0.1	-0.2
4522.535	2.9253	4.0	0.1847	3.0	4522.527^n	2338.7		-1.0	-0.8
4527.414	2.8383	2.0	0.1007	2.0	4527.408^n	1493.2		-1.3	-1.1
4532.445	2.9193	2.0	0.1847	3.0	4532.440^n	2157.6		-1.0	-1.0
4533.797	3.0156	5.0	0.2818	4.0	4533.794^n	5676.4		-0.5	-0.2
4534.865	3.2317^o	5.0	0.4985	6.0	4534.868	879.3		-0.9	
4550.034	3.0059	3.0	0.2818	4.0	4550.028^n	1295.5		-1.1	-1.0
4556.631	3.1076	4.0	0.3875	5.0	4556.632^n	723.9		-1.2	-1.0
4566.774	2.8988	2.0	0.1847	3.0	4566.768^n	2364.0		-1.0	-0.8
4569.585	2.9942	3.0	0.2818	4.0	4569.580^n	1262.2		-1.1	-1.0
4580.190	2.8908	3.0	0.1847	3.0	4580.185^n	248.0		-2.0	-1.6
4596.738	2.7327	0.0	0.0363	1.0	4596.732^n	17205.4		-0.4	-0.5
4598.281	2.8802	3.0	0.1847	3.0	4598.276^n	955.3		-1.4	-1.3
4611.249	2.7886	2.0	0.1007	2.0	4611.241^n	4076.3		-1.0	-1.0
4618.224	3.0713^o	4.0	0.3875	5.0	4618.196	193.9	-1.7	-1.8	
4622.467	4.3050^o	6.0	1.6236	6.0	4622.472	16.8		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [47]
4629.423	3.1758	5.0	0.4985	6.0	4629.418^{n}	511.5		-1.2	-1.0
4632.765	2.9572	3.0	0.2818	4.0	4632.758^{n}	43.4		-2.7	-2.2
4640.508	3.0585^{o}	5.0	0.3875	5.0	4640.508	65.6	-2.0	-2.3	
4645.397	2.7044	2.0	0.0363	1.0	4645.394^{n}	16181.4		-0.5	-0.3
4648.068	3.0541	4.0	0.3875	5.0	4648.063^{n}	3887.5		-0.5	-0.3
4649.481	2.7665	1.0	0.1007	2.0	4649.474^{n}	29472.0		-0.1	-0.2
4663.551	2.9396	3.0	0.2818	4.0	4663.546^{n}	9167.5		-0.3	-0.2
4664.523	3.1557	5.0	0.4985	6.0	4664.510^{n}	69.6		-2.1	-1.7
4681.558	2.8322	2.0	0.1847	3.0	4681.551^{n}	9603.8		-0.5	-0.4
4684.202	3.0335^{o}	5.0	0.3875	5.0	4684.210	81.6	-2.2	-2.2	
4688.731	2.9253	4.0	0.2818	4.0	4688.725^{n}	15016.8		-0.1	-0.0
4716.106	3.0156	5.0	0.3875	5.0	4716.099^{n}	18859.0		0.1	0.2
4717.077	2.6276	1.0	0.0000	0.0	4717.072^{n}	15080.9		-0.6	-0.4
4718.659	3.0142	4.0	0.3875	5.0	4718.654^{n}	1365.9		-1.0	-0.8
4728.428	2.8060	3.0	0.1847	3.0	4728.423^{n}	25007.1		-0.1	0.1
4729.771	4.2133^{o}	4.0	1.5927	3.0	4729.784^{c}	68.7		-0.4	
4750.731	2.8908	3.0	0.2818	4.0	4750.725^{n}	6853.8		-0.5	-0.5
4753.751	4.0799^{o}	3.0	1.4726	4.0	4753.749	80.8		-0.5	
4757.495	4.1483^{o}	4.0	1.5430	5.0	4757.499^{c}	33.8		-0.8	
4760.270	2.7044	2.0	0.1007	2.0	4760.264^{n}	30188.1		-0.2	0.0
4761.673	4.0172^{o}	2.0	1.4142	3.0	4761.659	24.9		-1.2	
4768.353	4.1423^{o}	4.0	1.5430	5.0	4768.367	92.6		-0.4	
4770.197	2.8802	3.0	0.2818	4.0	4770.192^{n}	2878.9		-0.9	-0.8
4781.462	4.3050^{o}	6.0	1.7128	7.0	4781.462^{c}	82.5		-0.2	
4783.103	2.6276	1.0	0.0363	1.0	4783.099^{n}	25251.7		-0.4	-0.2
4785.870	2.6905	3.0	0.1007	2.0	4785.864^{n}	31880.7		-0.2	-0.3
4789.965	2.9751	4.0	0.3875	5.0	4789.958^{n}	3568.5		-0.7	-0.5
4836.225	3.9322^{o}	2.0	1.3694	2.0	4836.235	23.9		-1.3	
4841.705	3.0585	5.0	0.4985	6.0	4841.699^{n}	27939.8		0.4	0.6
4844.523	4.1015^{o}	6.0	1.5430	5.0	4844.543^{c}	70.6		-0.5	
4848.329	2.8383	4.0	0.2818	4.0	4848.322^{n}	17212.2		-0.2	-0.2
4856.594	4.3612^{o}	9.0	1.8091	8.0	4856.566^{b}	104.9		0.1	
4856.604	4.1701^{o}	2.0	1.6180	2.0	4856.566^{b}	107.9		-0.2	
4879.715	3.9542^{o}	3.0	1.4142	3.0	4879.684	65.4		-0.8	
4883.774	2.5742	2.0	0.0363	1.0	4883.765^{n}	17049.2		-0.6	-0.4
4883.980	2.9253	4.0	0.3875	5.0	4883.974^{n}	14081.8		-0.1	0.4
4889.285	3.0335^{o}	5.0	0.4985	6.0	4889.288	71.9	-2.2	-2.2	
4897.817	4.1543	7.0	1.6236	6.0	4897.814^{n}	157.5		-0.1	-0.5
4903.922	4.0705^{o}	5.0	1.5430	5.0	4903.900	64.2		-0.6	
4904.976	2.6276	1.0	0.1007	2.0	4904.969^{n}	7804.8		-0.9	-0.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
4906.654	3.9987^o	3.0	1.4726	4.0	4906.676	80.4		-0.6	
4910.406	2.8060	3.0	0.2818	4.0	4910.399^n	19610.4		-0.2	0.1
4916.980	4.1387^o	2.0	1.6180	2.0	4916.966	48.5		-0.6	
4918.990	2.7044	2.0	0.1847	3.0	4918.984^n	12910.8		-0.5	-0.1
4919.923	3.9919^o	5.0	1.4726	4.0	4919.902	126.5		-0.4	
4921.570	4.1421^o	7.0	1.6236	6.0	4921.560	114.5		-0.2	
4924.054	3.0156	5.0	0.4985	6.0	4924.048^n	2795.9		-0.7	-0.2
4931.589	3.9859^o	4.0	1.4726	4.0	4931.580	35.2		-1.0	
4933.125	4.1701^o	2.0	1.6575	1.0	4933.105	39.2		-0.7	
4936.581	4.0538^o	6.0	1.5430	5.0	4936.580	576.9		0.3	
4946.330	2.6905	3.0	0.1847	3.0	4946.322^n	7833.3		-0.7	-0.7
4951.312	3.9175^o	3.0	1.4142	3.0	4951.297	326.2		-0.1	
4961.244	3.9709^o	5.0	1.4726	4.0	4961.226	309.4		-0.1	
4975.981	2.4909	1.0	0.0000	0.0	4975.973^n	23220.7		-0.6	-0.7
4983.406	4.0799^o	3.0	1.5927	3.0	4983.366	125.1		-0.3	
4986.836	3.9581^o	5.0	1.4726	4.0	4986.809	495.0		0.1	
4994.984	3.8956^o	4.0	1.4142	3.0	4994.974	267.0		-0.3	
5002.182	4.1015^o	6.0	1.6236	6.0	5002.181	110.6		-0.3	
5003.336	4.0039^o	2.0	1.5266	2.0	5003.376^b	152.7		-0.3	
5003.394	4.0952^o	1.0	1.6180	2.0	5003.376^b	135.0		-0.2	
5010.473	4.1423^o	4.0	1.6686	4.0	5010.483^b	49.0		-0.6	
5010.475	3.8129^o	1.0	1.3391	1.0	5010.483^b	49.0		-1.1	
5011.870	4.1701^o	2.0	1.6970	2.0	5011.837	45.8		-0.6	
5014.539	3.8859^o	3.0	1.4142	3.0	5014.502	86.5		-0.8	
5019.603	3.8834^o	4.0	1.4142	3.0	5019.576	44.0		-1.0	
5024.901	4.0096^o	5.0	1.5430	5.0	5024.899	19.6		-1.2	
5029.606	3.9369^o	5.0	1.4726	4.0	5029.584	165.2		-0.4	
5039.105	4.1387^o	2.0	1.6790	3.0	5039.102^b	256.9		0.1	
5039.136	4.0027^o	6.0	1.5430	5.0	5039.102^b	261.3		-0.1	
5041.687	4.2133^o	4.0	1.7549	4.0	5041.664	146.3		0.0	
5041.936	3.8725^o	4.0	1.4142	3.0	5041.924^c	326.7		-0.2	
5044.277	2.8447	6.0	0.3875	5.0	5044.272^n	17037.1		-0.1	0.0
5045.143	4.0747^o	1.0	1.6180	2.0	5045.147^c	137.3		-0.2	
5049.510	2.4909	1.0	0.0363	1.0	5049.501^n	2095.9		-1.6	-1.5
5051.192	3.8232^o	3.0	1.3694	2.0	5051.171^c	83.0		-0.9	
5054.062	4.2133^o	4.0	1.7609	5.0	5054.070	343.9		0.4	
5054.535	3.8664^o	3.0	1.4142	3.0	5054.506^c	184.3		-0.4	
5059.866	4.3612^o	9.0	1.9116	9.0	5059.847	2409.6			
5060.920	2.6338	4.0	0.1847	3.0	5060.911^n	6152.2		-0.9	-1.2
5061.367	3.9919^o	5.0	1.5430	5.0	5061.374	230.8		-0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5063.457	3.8172^{o}	3.0	1.3694	2.0	5063.446	227.9		-0.4	
5065.535	4.0705^{o}	5.0	1.6236	6.0	5065.501	128.2		-0.3	
5071.195	2.9426	7.0	0.4985	6.0	5071.184^{n}	16415.9		0.0	0.3
5072.456	3.8129^{o}	1.0	1.3694	2.0	5072.462^{bc}	528.8		-0.1	
5072.474	3.8129^{o}	3.0	1.3694	2.0	5072.462^{bc}	529.3		-0.1	
5073.715	3.9859^{o}	4.0	1.5430	5.0	5073.729	67.6		-0.7	
5076.683	4.1543	7.0	1.7128	7.0	5076.675^{n}	777.0		0.6	0.2
5079.838	3.9830^{o}	4.0	1.5430	5.0	5079.853	1799.7		0.7	
5085.430	4.2792^{o}	4.0	1.8419	5.0	5085.411	39.1		-0.4	
5086.139	3.8511^{o}	2.0	1.4142	3.0	5086.120	301.9		-0.2	
5088.314	2.5366	3.0	0.1007	2.0	5088.309^{n}	9130.1		-0.9	-1.2
5091.812	3.7734^{o}	2.0	1.3391	1.0	5091.818	341.0		-0.3	
5099.917	3.8446^{o}	4.0	1.4142	3.0	5099.931	65.5		-0.9	
5100.390	4.0538^{o}	6.0	1.6236	6.0	5100.386	1624.4		0.8	
5106.633	4.2388^{o}	3.0	1.8117	3.0	5106.671	235.0		0.3	
5113.324	3.7933^{o}	2.0	1.3694	2.0	5113.310	196.7		-0.5	
5117.164	2.7040	5.0	0.2818	4.0	5117.155^{n}	44570.2		0.1	0.1
5118.744	4.0450^{o}	5.0	1.6236	6.0	5118.769^{c}	61.0		-0.6	
5122.131	2.8073	6.0	0.3875	5.0	5122.125^{n}	21872.7		-0.1	-0.0
5123.715	4.1161^{o}	2.0	1.6970	2.0	5123.701	179.8		-0.0	
5130.289	3.8886^{o}	4.0	1.4726	4.0	5130.258^{c}	309.2		-0.2	
5132.212	3.9581^{o}	5.0	1.5430	5.0	5132.205^{c}	1022.5		0.5	
5135.502	4.1161^{o}	2.0	1.7026	1.0	5135.505	49.3		-0.6	
5135.876	3.8859^{o}	3.0	1.4726	4.0	5135.842	673.1		0.2	
5137.426	3.9556^{o}	4.0	1.5430	5.0	5137.419	199.2		-0.2	
5141.188	3.8834^{o}	4.0	1.4726	4.0	5141.165	44.4		-1.0	
5143.299	3.7490^{o}	1.0	1.3391	1.0	5143.293^{c}	1024.1		0.1	
5145.819	2.6905	3.0	0.2818	4.0	5145.814^{n}	749.5		-1.7	-1.5
5148.050	4.2133^{o}	4.0	1.8057	4.0	5148.063	157.0		0.1	
5150.482	4.0751^{o}	5.0	1.6686	4.0	5150.453^{c}	147.4		-0.2	
5152.609	4.1483^{o}	4.0	1.7428	3.0	5152.579	301.5		0.2	
5153.124	3.9483^{o}	6.0	1.5430	5.0	5153.111	24.6		-1.2	
5155.835	3.7734^{o}	2.0	1.3694	2.0	5155.861	1703.0		0.4	
5157.224	2.4396	2.0	0.0363	1.0	5157.221^{n}	9307.4		-1.0	-1.3
5157.923	3.8172^{o}	3.0	1.4142	3.0	5157.899	292.4		-0.3	
5160.929	4.2133^{o}	4.0	1.8117	3.0	5160.892	139.6		0.0	
5161.824	3.7706^{o}	1.0	1.3694	2.0	5161.800	150.8		-0.7	
5164.619	3.8725^{o}	4.0	1.4726	4.0	5164.615	489.2		0.0	
5167.281	3.8129^{o}	3.0	1.4142	3.0	5167.263	444.9		-0.1	
5168.346	4.0952^{o}	1.0	1.6970	2.0	5168.347^{bc}	1265.5		0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
5168.354	4.3098^{o}	8.0	1.9116	9.0	5168.347^{bc}	1265.5			
5172.731	2.6780	5.0	0.2818	4.0	5172.724^{n}	26018.4		-0.2	-0.4
5175.417	2.8934	7.0	0.4985	6.0	5175.410^{n}	22890.5		0.1	0.1
5177.522	3.9369^{o}	5.0	1.5430	5.0	5177.514	97.4		-0.6	
5179.196	3.9859^{o}	4.0	1.5927	3.0	5179.203	192.0		-0.2	
5185.530	2.4909	1.0	0.1007	2.0	5185.519^{n}	174.5		-2.7	-2.4
5194.724	4.0096^{o}	5.0	1.6236	6.0	5194.716	982.2		0.5	
5199.920	4.1953^{o}	3.0	1.8117	3.0	5199.898	31.7		-0.6	
5200.583	2.5680	4.0	0.1847	3.0	5200.573^{n}	69718.1		0.1	0.0
5201.444	3.9259^{o}	4.0	1.5430	5.0	5201.447	1123.7		0.5	
5209.939	4.0027^{o}	6.0	1.6236	6.0	5209.917^{c}	1550.9		0.7	
5210.743	2.6605	5.0	0.2818	4.0	5210.736^{n}	998.2		-1.6	-1.7
5211.751	4.1391^{o}	6.0	1.7609	5.0	5211.732	416.4		0.4	
5215.606	4.0450^{o}	5.0	1.6686	4.0	5215.607	271.3		0.1	
5216.425	3.9997^{o}	5.0	1.6236	6.0	5216.427	313.2		0.0	
5225.710	3.7860^{o}	2.0	1.4142	3.0	5225.707	142.0		-0.6	
5232.581	4.3050^{o}	6.0	1.9363	6.0	5232.582	111.2		0.1	
5238.102	3.8388^{o}	3.0	1.4726	4.0	5238.105	420.0		-0.1	
5238.539	3.7354^{o}	2.0	1.3694	2.0	5238.527	83.4		-1.0	
5244.538	3.7327^{o}	1.0	1.3694	2.0	5244.515	106.3		-0.9	
5245.600	3.9556^{o}	4.0	1.5927	3.0	5245.596	290.2		-0.1	
5248.417	3.9046^{o}	4.0	1.5430	5.0	5248.409	59.3		-0.8	
5251.911	2.7475	6.0	0.3875	5.0	5251.901^{n}	18227.9		-0.2	-0.3
5253.443	3.8859^{o}	3.0	1.5266	2.0	5253.433^{c}	200.1		-0.3	
5253.813	3.7734^{o}	2.0	1.4142	3.0	5253.795	441.9		-0.2	
5254.760	3.7281^{o}	1.0	1.3694	2.0	5254.744	70.8		-1.0	
5257.062	3.6968^{o}	1.0	1.3391	1.0	5257.104^{b}	245.0		-0.5	
5257.111	4.1387^{o}	2.0	1.7810	2.0	5257.104^{b}	244.7		0.2	
5264.414	4.2792^{o}	4.0	1.9248	3.0	5264.427	264.9		0.4	
5265.662	2.3539	1.0	0.0000	0.0	5265.656^{n}	2817.3		-1.6	-1.8
5269.955	2.6338	4.0	0.2818	4.0	5269.949^{n}	565.1		-1.9	-1.9
5271.398	2.4520	3.0	0.1007	2.0	5271.392^{n}	39417.1		-0.3	-0.3
5280.492	3.9709^{o}	5.0	1.6236	6.0	5280.495	239.3		-0.1	
5282.904	2.8447	6.0	0.4985	6.0	5282.896^{n}	14621.2		-0.1	-0.1
5285.174	4.1543	7.0	1.8091	8.0	5285.171^{n}	356.5		0.4	-0.1
5286.387	3.8172^{o}	3.0	1.4726	4.0	5286.348	128.5		-0.6	
5290.944	4.1483^{o}	4.0	1.8057	4.0	5290.951	78.0		-0.3	
5294.652	4.0538^{o}	6.0	1.7128	7.0	5294.649	566.0		0.4	
5295.841	3.8834^{o}	4.0	1.5430	5.0	5295.835	72.0		-0.8	
5299.190	2.4396	2.0	0.1007	2.0	5299.184^{n}	642.1		-2.1	-2.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
5303.165	4.0173[o]	1.0	1.6801	0.0	5303.204[b]	305.3		0.1	
5303.196	4.1701[o]	2.0	1.8329	2.0	5303.204[b]	299.5		0.3	
5306.627	4.0747[o]	1.0	1.7390	1.0	5306.650	136.3		-0.2	
5308.805	4.0033[o]	4.0	1.6686	4.0	5308.813[c]	133.8		-0.3	
5309.493	3.9581[o]	5.0	1.6236	6.0	5309.484	591.9		0.3	
5312.837	4.1421[o]	7.0	1.8091	8.0	5312.831	128.6		-0.1	
5318.051	4.1423[o]	4.0	1.8117	3.0	5318.038	444.4		0.4	
5320.591	2.6114	5.0	0.2818	4.0	5320.581[n]	16264.9		-0.5	-0.6
5327.270	4.0694[o]	3.0	1.7428	3.0	5327.248	74.4		-0.4	
5327.483	4.1322[o]	4.0	1.8057	4.0	5327.471	103.4		-0.2	
5332.080	3.8511[o]	2.0	1.5266	2.0	5332.076[c]	192.6		-0.4	
5348.732	3.9859[o]	4.0	1.6686	4.0	5348.734	1861.8		0.8	
5349.144	2.4178	3.0	0.1007	2.0	5349.143[n]	4908.6		-1.3	-1.5
5350.612	2.7040	5.0	0.3875	5.0	5350.604[n]	1938.4		-1.2	-1.0
5351.364	3.7888[o]	3.0	1.4726	4.0	5351.355[c]	150.2		-0.6	
5353.708	2.4998[o]	4.0	0.1847	3.0	5353.715	153.8	-2.9	-2.7	
5355.122	4.0694[o]	3.0	1.7549	4.0	5355.161	514.6		0.4	
5355.885	4.0751[o]	5.0	1.7609	5.0	5355.885	809.1		0.6	
5358.595	4.1830[o]	7.0	1.8700	6.0	5358.557	65.6		-0.3	
5366.583	4.0705[o]	5.0	1.7609	5.0	5366.550	123.2		-0.2	
5368.361	2.8073	6.0	0.4985	6.0	5368.351[n]	11589.0		-0.3	-0.3
5372.978	3.9859[o]	4.0	1.6790	3.0	5372.949[b]	70.0		-0.6	
5372.986	4.0039[o]	2.0	1.6970	2.0	5372.949[b]	70.0		-0.6	
5374.058	4.1483[o]	4.0	1.8419	5.0	5374.040[c]	147.5		-0.0	
5374.344	3.8493[o]	5.0	1.5430	5.0	5374.313[c]	100.1		-0.7	
5375.396	3.8324[o]	1.0	1.5266	2.0	5375.391	280.6		-0.2	
5385.949	4.0039[o]	2.0	1.7026	1.0	5385.970	130.9		-0.3	
5391.622	4.0799[o]	3.0	1.7810	2.0	5391.614	264.7		0.1	
5392.683	4.1483[o]	4.0	1.8499	3.0	5392.674	491.4		0.5	
5393.565	3.9781[o]	1.0	1.6801	0.0	5393.549	137.6		-0.3	
5394.499	4.0367[o]	2.0	1.7390	1.0	5394.477[c]	56.4		-0.6	
5395.527	4.1391[o]	6.0	1.8419	5.0	5395.492	31.8		-0.7	
5398.198	4.2208[o]	2.0	1.9248	3.0	5398.172[c]	37.3		-0.5	
5402.323	3.8871[o]	3.0	1.5927	3.0	5402.315	198.9		-0.3	
5403.702	2.4784	4.0	0.1847	3.0	5403.689[n]	23984.9		-0.5	-0.9
5405.233	2.3294	2.0	0.0363	1.0	5405.223[n]	32008.5		-0.6	-0.9
5408.827	3.8182[o]	2.0	1.5266	2.0	5408.814	92.3		-0.7	
5411.150	2.2906	1.0	0.0000	0.0	5411.143[n]	739.3		-2.3	-2.3
5411.395	2.6780	5.0	0.3875	5.0	5411.387[n]	5821.7		-0.8	-0.9
5415.953	4.2133[o]	4.0	1.9248	3.0	5415.973	517.4		0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5416.399	4.0694^o	3.0	1.7810	2.0	5416.368	448.5		0.4	
5419.074	2.7857^o	7.0	0.4985	6.0	5419.057	487.8		-1.7	
5421.565	2.5680	4.0	0.2818	4.0	5421.557^n	3538.9		-1.2	-1.2
5426.342	4.0450^o	5.0	1.7609	5.0	5426.371	184.3		-0.1	
5430.646	4.1322^o	4.0	1.8499	3.0	5430.624	343.4		0.3	
5436.333	4.1916^o	10.0	1.9116	9.0	5436.327^c	985.0		0.9	
5440.605	4.0172^o	2.0	1.7390	1.0	5440.639	259.2		0.0	
5442.486	4.3098^o	8.0	2.0324	7.0	5442.531^b	56.9		-0.1	
5442.560	3.6915^o	3.0	1.4142	3.0	5442.531^b	42.2		-1.3	
5445.958	4.0799^o	3.0	1.8040	2.0	5445.918	79.1		-0.4	
5446.851	3.9781^o	1.0	1.7026	1.0	5446.830^c	68.6		-0.6	
5448.950	3.9322^o	2.0	1.6575	1.0	5448.911	54.0		-0.8	
5449.577	4.0172^o	2.0	1.7428	3.0	5449.570	452.8		0.3	
5453.010	2.6605	5.0	0.3875	5.0	5453.003^n	30053.6		-0.1	-0.3
5453.953	4.3050^o	6.0	2.0324	7.0	5453.964	74.5		-0.0	
5461.551	4.0751^o	5.0	1.8057	4.0	5461.547	667.8		0.5	
5462.366	3.8871^o	3.0	1.6180	2.0	5462.326	258.8		-0.2	
5466.731	2.4520	3.0	0.1847	3.0	5466.719^n	14305.4		-0.7	-0.7
5468.015	3.7933^o	2.0	1.5266	2.0	5468.009	77.3		-0.8	
5469.254	4.1161^o	2.0	1.8499	3.0	5469.236	124.7		-0.1	
5475.278	4.0694^o	3.0	1.8057	4.0	5475.267	359.0		0.3	
5481.721	3.6304^o	3.0	1.3694	2.0	5481.682	35.2		-1.4	
5482.701	4.2388^o	3.0	1.9781	2.0	5482.708	49.9		-0.3	
5488.287	3.9159^o	1.0	1.6575	1.0	5488.252	271.9		-0.1	
5489.429	3.7305^o	5.0	1.4726	4.0	5489.392	146.2		-0.7	
5490.111	4.2208^o	2.0	1.9632	3.0	5490.090	224.8		0.3	
5493.711	2.3568	2.0	0.1007	2.0	5493.700^n	45791.1		-0.4	-0.6
5495.615	3.9579^o	0.0	1.7026	1.0	5495.603^c	144.8		-0.3	
5498.214	2.2906	1.0	0.0363	1.0	5498.205^n	17385.9		-0.9	-1.1
5500.896	2.3539	1.0	0.1007	2.0	5500.886^n	737.9		-2.2	-2.4
5501.749	2.6404^o	6.0	0.3875	5.0	5501.733	427.6		-1.9	
5508.476	4.2133^o	4.0	1.9632	3.0	5508.489	40.6		-0.4	
5510.799	3.7921^o	6.0	1.5430	5.0	5510.798	182.6		-0.5	
5511.092	2.7475	6.0	0.4985	6.0	5511.083^n	3517.0		-0.9	-1.0
5511.431	3.9175^o	3.0	1.6686	4.0	5511.392	271.1		-0.1	
5512.112	2.3493	3.0	0.1007	2.0	5512.098^n	19744.4		-0.7	-1.1
5512.941	3.9058^o	1.0	1.6575	1.0	5512.970	161.8		-0.3	
5513.227	3.9452^o	3.0	1.6970	2.0	5513.210^c	81.4		-0.6	
5514.322	4.2208^o	2.0	1.9731	1.0	5514.319	42.6		-0.4	
5518.318	3.8388^o	3.0	1.5927	3.0	5518.341^c	52.7		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5518.836	3.7889^o	5.0	1.5430	5.0	5518.870^b	249.6		-0.3	
5518.848	3.7889^o	6.0	1.5430	5.0	5518.870^b	249.6		-0.3	
5518.882	3.8695^o	5.0	1.6236	6.0	5518.870	269.8		-0.2	
5523.938	3.9987^o	3.0	1.7549	4.0	5523.928	57.7		-0.6	
5525.593	3.9859^o	4.0	1.7428	3.0	5525.583	585.1		0.4	
5535.497	3.9781^o	1.0	1.7390	1.0	5535.499	186.5		-0.1	
5537.168	3.8312^o	2.0	1.5927	3.0	5537.146^b	166.7		-0.4	
5537.177	3.9175^o	3.0	1.6790	3.0	5537.146^b	170.2		-0.3	
5538.342	3.9508^o	6.0	1.7128	7.0	5538.378	282.6		-0.0	
5543.582	3.9907^o	4.0	1.7549	4.0	5543.605	164.6		-0.2	
5548.947	2.2700	0.0	0.0363	1.0	5548.940^n	13379.7		-1.0	-1.3
5550.392	2.4178	3.0	0.1847	3.0	5550.383^n	22293.9		-0.6	-0.7
5561.388	2.3294	2.0	0.1007	2.0	5561.380^n	2294.9		-1.7	-1.9
5565.596	3.8956^o	4.0	1.6686	4.0	5565.605	105.9		-0.5	
5569.295	3.9046^o	4.0	1.6790	3.0	5569.277	238.8		-0.1	
5570.592	3.9859^o	4.0	1.7609	5.0	5570.603^b	304.8		0.1	
5570.645	4.0367^o	2.0	1.8117	3.0	5570.603^b	296.0		0.2	
5573.427	2.6114	5.0	0.3875	5.0	5573.417^n	3774.6		-1.0	-1.2
5574.904	2.2596^o	1.0	0.0363	1.0	5574.913	9792.8		-1.2	
5575.606	2.6105	6.0	0.3875	5.0	5575.595^n	592.3		-1.8	-2.0
5583.267	3.8886^o	4.0	1.6686	4.0	5583.295^b	233.3		-0.2	
5583.310	4.3612^o	9.0	2.1413	8.0	5583.294^b	225.9		0.6	
5585.135	4.1308^o	8.0	1.9116	9.0	5585.157	133.4		-0.0	
5586.180	3.8979^o	2.0	1.6790	3.0	5586.210	47.3		-0.9	
5587.507	3.7613^o	4.0	1.5430	5.0	5587.462^c	170.9		-0.5	
5588.199	2.4998	4.0	0.2818	4.0	5588.193^n	4640.7		-1.1	-1.5
5589.885	3.8859^o	3.0	1.6686	4.0	5589.913^b	267.4		-0.1	
5589.944	3.9301^o	8.0	1.7128	7.0	5589.913^b	296.3		-0.0	
5591.169	2.4986	5.0	0.2818	4.0	5591.160^n	1652.9		-1.6	-1.9
5595.382	3.7581^o	6.0	1.5430	5.0	5595.370	98.4		-0.8	
5599.588	3.6861^o	4.0	1.4726	4.0	5599.542^c	75.7		-1.0	
5603.637	3.8920^o	1.0	1.6801	0.0	5603.647^b	187.8		-0.3	
5603.690	4.0538^o	6.0	1.8419	5.0	5603.646^b	212.0		0.1	
5605.472	4.2388^o	3.0	2.0277	4.0	5605.459	130.5		0.1	
5610.049	3.6236^o	3.0	1.4142	3.0	5610.010	43.8		-1.3	
5612.994	3.5776^o	3.0	1.3694	2.0	5612.989^{bc}	131.9		-0.9	
5612.997	2.2082^o	0.0	0.0000	0.0	5612.989^{bc}	131.9		-3.1	
5615.084	3.6216^o	4.0	1.4142	3.0	5615.042	187.3		-0.7	
5617.753	3.9034^o	3.0	1.6970	2.0	5617.750	98.3		-0.5	
5620.912	4.0751^o	5.0	1.8700	6.0	5620.892	104.9		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5621.802	2.2410	2.0	0.0363	1.0	5621.790[n]	11338.1		-1.1	-1.4
5626.007	2.2031	1.0	0.0000	0.0	5625.999[n]	24362.7		-0.9	-1.2
5627.734	3.9452[o]	3.0	1.7428	3.0	5627.728	261.8		-0.0	
5630.063	3.7281[o]	1.0	1.5266	2.0	5630.066[c]	169.6		-0.6	
5631.795	3.8979[o]	2.0	1.6970	2.0	5631.795	95.5		-0.5	
5632.039	3.9556[o]	4.0	1.7549	4.0	5632.071	70.0		-0.6	
5632.379	3.7933[o]	2.0	1.5927	3.0	5632.362[b]	83.0		-0.8	
5632.398	3.6148[o]	2.0	1.4142	3.0	5632.362[b]	82.7		-1.1	
5633.585	3.6143[o]	4.0	1.4142	3.0	5633.544	205.2		-0.7	
5634.239	4.0039[o]	2.0	1.8040	2.0	5634.239	105.8		-0.3	
5639.907	4.0033[o]	4.0	1.8057	4.0	5639.918	70.2		-0.5	
5640.314	3.6701[o]	5.0	1.4726	4.0	5640.276	450.4		-0.2	
5641.615	2.3817	3.0	0.1847	3.0	5641.610[n]	371.0		-2.4	-2.5
5642.023	3.9096[o]	8.0	1.7128	7.0	5642.027	269.4		-0.1	
5642.680	2.4784	4.0	0.2818	4.0	5642.671[n]	218.3		-2.5	-2.3
5646.038	3.8979[o]	2.0	1.7026	1.0	5646.059	71.8		-0.7	
5647.483	2.3794[o]	4.0	0.1847	3.0	5647.492[b]	502.7	-2.4	-2.3	
5647.486	3.9556[o]	4.0	1.7609	5.0	5647.492[b]	502.7		0.3	
5649.596	3.5330[o]	2.0	1.3391	1.0	5649.603	60.2		-1.3	
5650.400	3.8511[o]	2.0	1.6575	1.0	5650.403	224.3		-0.2	
5651.685	3.9059[o]	6.0	1.7128	7.0	5651.690	73.8		-0.6	
5652.848	2.3773[o]	4.0	0.1847	3.0	5652.852	1749.2		-1.7	
5656.379	3.8149[o]	7.0	1.6236	6.0	5656.363	797.6		0.3	
5658.220	3.8706[o]	1.0	1.6801	0.0	5658.183[c]	69.8		-0.7	
5659.868	2.2906	1.0	0.1007	2.0	5659.859[n]	25272.5		-0.7	-0.9
5661.151	3.5588[o]	1.0	1.3694	2.0	5661.177[bc]	251.9		-0.7	
5661.177	3.8920[o]	1.0	1.7026	1.0	5661.177[bc]	252.5		-0.1	
5663.910	3.9975[o]	8.0	1.8091	8.0	5663.890	1091.2		0.7	
5672.397	4.1483[o]	4.0	1.9632	3.0	5672.366	65.6		-0.3	
5674.081	4.0173[o]	1.0	1.8329	2.0	5674.084	88.9		-0.4	
5674.393	4.0172[o]	2.0	1.8329	2.0	5674.398	54.6		-0.6	
5676.082	3.6562[o]	5.0	1.4726	4.0	5676.054	297.4		-0.4	
5678.725	2.2833[o]	2.0	0.1007	2.0	5678.728	235.8	-2.8	-2.7	
5680.875	3.6544[o]	5.0	1.4726	4.0	5680.833	199.5		-0.6	
5684.990	3.9859[o]	4.0	1.8057	4.0	5684.994	61.2		-0.6	
5686.969	2.6780	5.0	0.4985	6.0	5686.961[n]	1053.6		-1.5	-1.4
5692.017	3.8012[o]	6.0	1.6236	6.0	5692.030	520.8		0.1	
5692.679	3.9830[o]	4.0	1.8057	4.0	5692.664	105.5		-0.3	
5693.680	3.9159[o]	1.0	1.7390	1.0	5693.663	231.5		-0.1	
5699.618	3.5440[o]	3.0	1.3694	2.0	5699.617	349.7		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5700.261	3.9835^{o}	9.0	1.8091	8.0	5700.255	71.0		-0.5	
5701.135	3.5883^{o}	3.0	1.4142	3.0	5701.092	255.0		-0.6	
5702.257	3.8312^{o}	2.0	1.6575	1.0	5702.249^{bc}	54.5		-0.9	
5702.290	3.8706^{o}	1.0	1.6970	2.0	5702.249^{bc}	54.0		-0.8	
5703.484	3.9542^{o}	3.0	1.7810	2.0	5703.437^{c}	108.4		-0.4	
5706.199	2.3568	2.0	0.1847	3.0	5706.190^{n}	9670.9		-1.0	-1.0
5706.743	2.2082^{o}	0.0	0.0363	1.0	5706.748^{c}	3499.4		-1.7	
5707.248	2.2724^{o}	3.0	0.1007	2.0	5707.204^{c}	550.6		-2.4	
5709.738	3.7888^{o}	3.0	1.6180	2.0	5709.731	654.9		0.1	
5711.442	2.4520	3.0	0.2818	4.0	5711.438^{n}	633.8		-2.0	-1.7
5716.032	3.8485^{o}	1.0	1.6801	0.0	5716.017	77.8		-0.7	
5717.919	3.7107^{o}	6.0	1.5430	5.0	5717.914	1506.4		0.4	
5720.183	2.2031	1.0	0.0363	1.0	5720.178^{n}	5948.1		-1.5	-1.7
5720.838	3.7593^{o}	3.0	1.5927	3.0	5720.826	105.1		-0.7	
5721.388	3.7900^{o}	7.0	1.6236	6.0	5721.375	985.8		0.3	
5724.477	4.1015^{o}	6.0	1.9363	6.0	5724.485	189.0		0.1	
5726.053	2.3493	3.0	0.1847	3.0	5726.062^{n}	113.7		-2.9	-2.9
5727.294	3.9452^{o}	3.0	1.7810	2.0	5727.266^{c}	48.5		-0.7	
5728.521	3.5330^{o}	2.0	1.3694	2.0	5728.501	148.8		-0.9	
5729.313	3.5776^{o}	3.0	1.4142	3.0	5729.291	509.2		-0.3	
5730.137	3.5773^{o}	4.0	1.4142	3.0	5730.123	596.4		-0.2	
5732.948	2.6605	5.0	0.4985	6.0	5732.932^{n}	3990.8		-0.9	-0.9
5734.992	3.5004^{o}	1.0	1.3391	1.0	5734.982	435.3		-0.5	
5740.881	3.9139^{o}	5.0	1.7549	4.0	5740.855^{c}	314.4		0.0	
5745.493	3.5266^{o}	2.0	1.3694	2.0	5745.470	508.0		-0.4	
5746.485	2.2576	3.0	0.1007	2.0	5746.476^{n}	642.0		-2.3	-2.5
5750.698	3.8129^{o}	1.0	1.6575	1.0	5750.722	105.4		-0.6	
5751.334	3.8979^{o}	2.0	1.7428	3.0	5751.351	91.9		-0.5	
5756.410	3.4923^{o}	0.0	1.3391	1.0	5756.390^{c}	371.8		-0.6	
5757.345	3.8956^{o}	4.0	1.7428	3.0	5757.351	79.4		-0.6	
5757.959	3.7706^{o}	1.0	1.6180	2.0	5757.955^{b}	1071.5		0.3	
5757.975	3.6956^{o}	5.0	1.5430	5.0	5757.955^{b}	1071.5		0.2	
5763.473	3.5647^{o}	4.0	1.4142	3.0	5763.452	191.9		-0.7	
5765.916	3.5638^{o}	3.0	1.4142	3.0	5765.898^{c}	156.4		-0.8	
5768.085	3.9907^{o}	4.0	1.8419	5.0	5768.091^{b}	94.7		-0.4	
5768.125	3.9987^{o}	3.0	1.8499	3.0	5768.091^{b}	99.5		-0.3	
5768.807	3.9542^{o}	3.0	1.8057	4.0	5768.784^{b}	55.3		-0.7	
5768.817	3.8511^{o}	2.0	1.7026	1.0	5768.784^{b}	55.3		-0.8	
5773.775	3.8595^{o}	8.0	1.7128	7.0	5773.767^{c}	2737.6		0.9	
5774.038	3.5160^{o}	2.0	1.3694	2.0	5774.012	125.6		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5778.350	3.6880^{o}	6.0	1.5430	5.0	5778.331	1948.8		0.5	
5779.247	2.3294	2.0	0.1847	3.0	5779.239^{n}	4130.9		-1.4	-1.4
5783.542	3.6861^{o}	4.0	1.5430	5.0	5783.507	446.5		-0.2	
5784.683	3.7354^{o}	2.0	1.5927	3.0	5784.697	69.9		-0.9	
5787.188	3.6143^{o}	4.0	1.4726	4.0	5787.149	620.3		-0.1	
5787.559	3.6142^{o}	5.0	1.4726	4.0	5787.531	422.0		-0.3	
5788.389	2.5288	4.0	0.3875	5.0	5788.381^{n}	3119.5		-1.2	-1.2
5790.916	2.2410	2.0	0.1007	2.0	5790.905^{n}	421.9		-2.5	-2.4
5793.167	3.9452^{o}	3.0	1.8057	4.0	5793.189	68.5		-0.6	
5794.329	3.8182^{o}	2.0	1.6790	3.0	5794.322	36.0		-1.1	
5800.528	3.7604^{o}	7.0	1.6236	6.0	5800.497	1908.6		0.6	
5801.245	3.8156^{o}	4.0	1.6790	3.0	5801.223	546.1		0.1	
5802.823	2.4178	3.0	0.2818	4.0	5802.813^{n}	5364.8		-1.1	-1.1
5806.215	3.8956^{o}	4.0	1.7609	5.0	5806.248	23.4		-1.1	
5806.765	3.7581^{o}	6.0	1.6236	6.0	5806.744	406.7		-0.1	
5810.366	3.6762^{o}	4.0	1.5430	5.0	5810.346^{c}	55.7		-1.1	
5814.876	3.6041	5.0	1.4726	4.0	5814.860^{n}	1433.9		0.2	-0.1
5816.339	3.5004^{o}	1.0	1.3694	2.0	5816.328	390.6		-0.5	
5818.319	3.7539^{o}	7.0	1.6236	6.0	5818.296	436.1		-0.1	
5822.569	2.1650^{o}	2.0	0.0363	1.0	5822.605	482.8	-2.7	-2.6	
5823.980	3.6548^{o}	2.0	1.5266	2.0	5823.969	162.0		-0.7	
5827.599	3.9360^{o}	9.0	1.8091	8.0	5827.593	132.7		-0.3	
5830.491	3.5984^{o}	5.0	1.4726	4.0	5830.490	770.0		-0.1	
5833.386	3.9058^{o}	1.0	1.7810	2.0	5833.384^{bc}	96.3		-0.5	
5833.407	3.7484^{o}	5.0	1.6236	6.0	5833.384^{bc}	98.4	-0.9	-0.7	
5836.605	3.8664^{o}	3.0	1.7428	3.0	5836.580	144.6		-0.4	
5838.067	3.4622^{o}	0.0	1.3391	1.0	5838.037	28.7		-1.7	
5839.288	3.5952^{o}	3.0	1.4726	4.0	5839.241	49.2		-1.3	
5839.506	3.8834^{o}	4.0	1.7609	5.0	5839.544^{b}	148.1		-0.3	
5839.544	3.4919^{o}	3.0	1.3694	2.0	5839.544^{b}	145.2		-1.0	
5839.844	3.4616^{o}	2.0	1.3391	1.0	5839.858	508.3		-0.5	
5843.769	3.9301^{o}	8.0	1.8091	8.0	5843.753	440.5		0.2	
5844.849	4.1483^{o}	4.0	2.0277	4.0	5844.868	68.1		-0.2	
5845.837	3.9259^{o}	4.0	1.8057	4.0	5845.846^{c}	66.4		-0.6	
5857.122	3.9581^{o}	5.0	1.8419	5.0	5857.079	159.5		-0.2	
5860.453	3.5292^{o}	4.0	1.4142	3.0	5860.410	1350.8		0.1	
5860.765	2.5024^{o}	5.0	0.3875	5.0	5860.762	155.4		-2.5	
5861.404	3.8695^{o}	5.0	1.7549	4.0	5861.371	35.5		-1.0	
5864.499	3.9175^{o}	3.0	1.8040	2.0	5864.485^{c}	164.2		-0.2	
5867.428	3.5266^{o}	2.0	1.4142	3.0	5867.386	163.9		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
5867.777	2.4998	4.0	0.3875	5.0	5867.768[n]	5542.6		-1.0	-1.2
5868.611	2.6105	6.0	0.4985	6.0	5868.607[n]	4180.6		-0.9	-1.1
5870.298	3.6544[o]	5.0	1.5430	5.0	5870.316	109.5		-0.8	
5871.052	2.4986	5.0	0.3875	5.0	5871.043[n]	3849.7		-1.1	-1.3
5874.199	2.2107[o]	3.0	0.1007	2.0	5874.191[b]	4062.4		-1.6	
5874.227	3.5242[o]	4.0	1.4142	3.0	5874.191[b]	4061.4		0.5	
5875.079	3.7888[o]	3.0	1.6790	3.0	5875.077	200.9		-0.3	
5875.905	2.2941[o]	4.0	0.1847	3.0	5875.911[c]	1294.6		-1.9	
5886.097	3.9556[o]	4.0	1.8499	3.0	5886.065[c]	62.7		-0.6	
5888.253	3.5776[o]	3.0	1.4726	4.0	5888.235	105.8		-1.0	
5891.407	3.6304[o]	3.0	1.5266	2.0	5891.424	919.1		0.1	
5896.296	3.8149[o]	7.0	1.7128	7.0	5896.283[c]	440.8		0.0	
5896.835	3.8628[o]	4.0	1.7609	5.0	5896.812	80.0		-0.6	
5898.958	3.4705[o]	3.0	1.3694	2.0	5898.964	1620.4		0.1	
5899.752	3.9709[o]	5.0	1.8700	6.0	5899.758	49.2		-0.7	
5900.709	3.9096[o]	8.0	1.8091	8.0	5900.711	108.2		-0.4	
5905.575	3.6915[o]	3.0	1.5927	3.0	5905.584	39.8		-1.2	
5906.069	2.2833	2.0	0.1847	3.0	5906.064[n]	1860.2		-1.8	-1.8
5909.043	2.3794	4.0	0.2818	4.0	5909.038[n]	2676.5		-1.5	-1.6
5912.617	3.4354[o]	2.0	1.3391	1.0	5912.622	1022.5		-0.2	
5914.908	2.3773[o]	4.0	0.2818	4.0	5914.910	670.7		-2.1	
5916.371	2.1312	2.0	0.0363	1.0	5916.366[n]	4460.6		-1.7	-1.8
5921.000	3.6861[o]	4.0	1.5927	3.0	5920.990	1097.0		0.2	
5921.295	3.8060[o]	8.0	1.7128	7.0	5921.259	192.5		-0.3	
5923.319	3.9625[o]	7.0	1.8700	6.0	5923.316	1056.1		0.7	
5924.214	3.4616[o]	2.0	1.3694	2.0	5924.186	313.9		-0.7	
5924.674	3.7606[o]	5.0	1.6686	4.0	5924.647	609.7		0.1	
5925.882	3.8465[o]	5.0	1.7549	4.0	5925.928[b]	145.3		-0.4	
5925.952	3.4307[o]	2.0	1.3391	1.0	5925.927[b]	154.8		-1.0	
5927.871	2.4784[o]	4.0	0.3875	5.0	5927.870	428.5	-2.5	-2.1	
5932.148	3.7130[o]	7.0	1.6236	6.0	5932.151	618.1		0.0	
5935.100	3.8493[o]	5.0	1.7609	5.0	5935.093	97.1		-0.5	
5935.579	3.6148[o]	2.0	1.5266	2.0	5935.544	177.1		-0.7	
5936.918	2.2724[o]	3.0	0.1847	3.0	5936.885[c]	39.6		-3.5	
5938.844	3.7107[o]	6.0	1.6236	6.0	5938.838	640.7		0.1	
5942.314	3.9975[o]	8.0	1.9116	9.0	5942.299	623.4		0.5	
5942.985	3.8465[o]	5.0	1.7609	5.0	5942.982	261.4		-0.1	
5946.361	3.8453[o]	6.0	1.7609	5.0	5946.346	655.7		0.3	
5947.465	3.9259[o]	4.0	1.8419	5.0	5947.428	109.1		-0.4	
5949.117	3.6762[o]	4.0	1.5927	3.0	5949.112	244.3		-0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
5950.183	3.8871[o]	3.0	1.8040	2.0	5950.168	87.6		-0.5	
5953.280	3.6747[o]	2.0	1.5927	3.0	5953.286[c]	30.3		-1.3	
5956.799	3.9508[o]	6.0	1.8700	6.0	5956.751	382.8		0.2	
5958.191	3.8859[o]	3.0	1.8057	4.0	5958.204[b]	153.6		-0.3	
5958.198	3.7593[o]	3.0	1.6790	3.0	5958.204[b]	153.6		-0.5	
5960.080	3.4490[o]	3.0	1.3694	2.0	5960.094	739.9		-0.3	
5963.020	3.6216[o]	4.0	1.5430	5.0	5963.052[b]	45.0		-1.2	
5963.052	4.0033[o]	4.0	1.9248	3.0	5963.052[b]	43.9		-0.6	
5963.931	4.0173[o]	1.0	1.9390	1.0	5963.930[b]	232.2		0.1	
5963.970	3.9483[o]	6.0	1.8700	6.0	5963.930[b]	229.6		-0.0	
5966.971	3.7900[o]	7.0	1.7128	7.0	5966.957	117.0		-0.6	
5969.476	3.7734[o]	2.0	1.6970	2.0	5969.488[b]	404.3		-0.0	
5969.501	3.4155[o]	1.0	1.3391	1.0	5969.488[b]	414.1		-0.6	
5978.046	4.0096[o]	5.0	1.9363	6.0	5978.040	203.3		0.0	
5979.391	2.2576	3.0	0.1847	3.0	5979.379[n]	4060.3		-1.5	-1.7
5981.996	3.9139[o]	5.0	1.8419	5.0	5982.006	248.7		-0.0	
5983.653	3.5440[o]	3.0	1.4726	4.0	5983.623[b]	156.6		-0.8	
5983.653	3.6950[o]	6.0	1.6236	6.0	5983.623[b]	156.6	-0.9	-0.6	
5983.890	3.6143[o]	4.0	1.5430	5.0	5983.882	155.0		-0.7	
5984.287	3.6142[o]	5.0	1.5430	5.0	5984.292	771.1		-0.0	
5985.480	3.7734[o]	2.0	1.7026	1.0	5985.490	50.4		-0.9	
5986.143	3.7281[o]	1.0	1.6575	1.0	5986.141	30.8		-1.2	
5989.680	2.0693[o]	1.0	0.0000	0.0	5989.696	1823.9		-2.1	
5995.103	2.3493	3.0	0.2818	4.0	5995.091[n]	1212.4		-1.9	-1.8
5996.060	3.6851[o]	2.0	1.6180	2.0	5996.042	280.7		-0.3	
5996.909	3.8725[o]	4.0	1.8057	4.0	5996.934	77.4		-0.6	
5998.118	3.7350[o]	3.0	1.6686	4.0	5998.078	94.4		-0.7	
6001.985	3.5377[o]	5.0	1.4726	4.0	6001.945	568.3		-0.3	
6004.211	2.1650	2.0	0.1007	2.0	6004.203[n]	3208.7		-1.7	-1.9
6005.198	3.9059[o]	6.0	1.8419	5.0	6005.163	141.9		-0.3	
6009.866	3.8664[o]	3.0	1.8040	2.0	6009.896[b]	276.2		-0.0	
6009.898	3.6551[o]	4.0	1.5927	3.0	6009.896[b]	287.0		-0.4	
6010.805	3.6548[o]	2.0	1.5927	3.0	6010.793[c]	141.0		-0.7	
6011.271	3.7305[o]	5.0	1.6686	4.0	6011.231	216.2		-0.4	
6012.848	3.4307[o]	2.0	1.3694	2.0	6012.856	39.6		-1.6	
6016.803	3.8691[o]	7.0	1.8091	8.0	6016.800[c]	266.7		-0.1	
6019.187	4.0173[o]	1.0	1.9581	0.0	6019.179	168.0		-0.0	
6022.077	3.9830[o]	4.0	1.9248	3.0	6022.060	23.8		-0.9	
6027.167	2.4440[o]	6.0	0.3875	5.0	6027.166	1624.6		-1.6	
6027.468	2.2410[o]	2.0	0.1847	3.0	6027.516[b]	519.8	-2.6	-2.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
6027.483	3.7354^o	2.0	1.6790	3.0	6027.516^b	516.8		0.0	
6032.458	2.5531^o	6.0	0.4985	6.0	6032.456	113.6		-2.5	
6034.407	4.0172^o	2.0	1.9632	3.0	6034.390	9.6		-1.3	
6035.580	3.7506^o	3.0	1.6970	2.0	6035.548	150.9		-0.5	
6040.364	3.7490^o	1.0	1.6970	2.0	6040.328	17.9		-1.4	
6041.426	3.5242^o	4.0	1.4726	4.0	6041.388^c	729.0		-0.2	
6042.829	3.8628^o	4.0	1.8117	3.0	6042.816	157.7		-0.3	
6043.307	3.5776^o	3.0	1.5266	2.0	6043.329^c	84.6		-1.0	
6045.387	3.3894	2.0	1.3391	1.0	6045.379^n	739.3		-0.4	-0.5
6047.467	3.6732^o	7.0	1.6236	6.0	6047.470	83.6		-0.9	
6050.311	3.5212^o	4.0	1.4726	4.0	6050.284	63.0		-1.2	
6057.687	3.4155^o	1.0	1.3694	2.0	6057.675	211.8		-0.9	
6059.894	3.7581^o	6.0	1.7128	7.0	6059.872	161.1		-0.4	
6066.683	3.7979^o	5.0	1.7549	4.0	6066.652	48.4		-0.9	
6067.423	4.0705^o	5.0	2.0277	4.0	6067.398^c	163.3		0.1	
6070.073	2.2266	4.0	0.1847	3.0	6070.069^n	4093.3		-1.5	-1.5
6080.487	3.7512^o	6.0	1.7128	7.0	6080.481	58.1		-0.9	
6082.655	3.6304^o	3.0	1.5927	3.0	6082.672	523.1		-0.1	
6084.609	3.7979^o	5.0	1.7609	5.0	6084.609	51.6		-0.9	
6088.118	3.9059^o	6.0	1.8700	6.0	6088.096	128.3		-0.3	
6088.619	3.5787^o	6.0	1.5430	5.0	6088.622	384.0		-0.3	
6089.301	3.9987^o	3.0	1.9632	3.0	6089.298	62.8		-0.5	
6089.654	3.7962^o	4.0	1.7609	5.0	6089.648	157.4		-0.4	
6091.398	3.4490^o	3.0	1.4142	3.0	6091.389	688.8		-0.3	
6091.914	3.9709^o	5.0	1.9363	6.0	6091.950	104.1		-0.3	
6092.938	3.5773^o	4.0	1.5430	5.0	6092.926	124.7		-0.8	
6099.905	2.0682^o	2.0	0.0363	1.0	6099.906	1809.9		-2.1	
6101.957	3.7921^o	6.0	1.7609	5.0	6101.962	57.0		-0.8	
6103.395	3.6544^o	5.0	1.6236	6.0	6103.388	214.7		-0.5	
6104.420	3.4446^o	4.0	1.4142	3.0	6104.381	244.1		-0.8	
6105.359	3.7327^o	1.0	1.7026	1.0	6105.356	38.5		-1.1	
6112.971	3.8695^o	5.0	1.8419	5.0	6112.943	154.8		-0.3	
6122.747	3.9360^o	9.0	1.9116	9.0	6122.740^c	351.0		0.2	
6126.326	3.8651^o	6.0	1.8419	5.0	6126.315	330.7		0.1	
6127.017	3.6915^o	3.0	1.6686	4.0	6126.993	303.1		-0.3	
6130.643	3.5647^o	4.0	1.5430	5.0	6130.603	233.4		-0.6	
6131.158	3.6143^o	4.0	1.5927	3.0	6131.153	185.8		-0.6	
6132.181	3.4354^o	2.0	1.4142	3.0	6132.159	93.9		-1.2	
6133.196	3.8628^o	4.0	1.8419	5.0	6133.231^b	119.6		-0.4	
6133.230	3.5475^o	1.0	1.5266	2.0	6133.231^b	130.3		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
6135.858	3.3894	2.0	1.3694	2.0	6135.834[n]	413.8		-0.6	-0.7
6159.573	2.2941[o]	4.0	0.2818	4.0	6159.583	1580.2		-1.8	
6165.822	3.7711[o]	5.0	1.7609	5.0	6165.841	327.8		-0.1	
6173.083	3.7506[o]	3.0	1.7428	3.0	6173.119[b]	106.3		-0.6	
6173.163	3.6006[o]	2.0	1.5927	3.0	6173.119[b]	140.2		-0.7	
6173.899	3.6762[o]	4.0	1.6686	4.0	6173.949[b]	557.7		-0.0	
6173.948	3.5342[o]	3.0	1.5266	2.0	6173.949[b]	552.2		-0.2	
6174.451	2.5059[o]	7.0	0.4985	6.0	6174.471	1486.4		-1.5	
6177.439	3.5330[o]	2.0	1.5266	2.0	6177.457	174.7		-0.7	
6178.664	3.6851[o]	2.0	1.6790	3.0	6178.670	44.4		-1.1	
6179.409	3.8149[o]	7.0	1.8091	8.0	6179.403	375.7		0.0	
6192.680	3.6701[o]	5.0	1.6686	4.0	6192.635[c]	73.0		-0.9	
6194.391	2.3884[o]	5.0	0.3875	5.0	6194.402	1339.5		-1.7	
6195.205	3.6582[o]	2.0	1.6575	1.0	6195.190[c]	37.9		-1.2	
6196.576	3.7130[o]	7.0	1.7128	7.0	6196.572	70.7		-0.8	
6198.363	2.3872[o]	6.0	0.3875	5.0	6198.378	703.4		-2.0	
6200.112	3.8691[o]	7.0	1.8700	6.0	6200.075	69.9		-0.6	
6201.142	3.3681[o]	3.0	1.3694	2.0	6201.124	197.8		-1.0	
6202.570	3.8312[o]	2.0	1.8329	2.0	6202.554[c]	17.8		-1.3	
6203.882	3.7107[o]	6.0	1.7128	7.0	6203.869	309.5		-0.2	
6206.224	3.6762[o]	4.0	1.6790	3.0	6206.222	106.9		-0.7	
6207.130	3.6759[o]	3.0	1.6790	3.0	6207.114	282.0		-0.3	
6210.754	3.6747[o]	2.0	1.6790	3.0	6210.735	170.1		-0.5	
6222.533	2.3794[o]	4.0	0.3875	5.0	6222.547	392.4	-2.4	-2.2	
6223.653	3.6601[o]	4.0	1.6686	4.0	6223.628	105.0		-0.8	
6226.711	3.6142[o]	5.0	1.6236	6.0	6226.710	295.7		-0.4	
6229.047	2.3773[o]	4.0	0.3875	5.0	6229.052	106.8		-2.8	
6229.819	4.1308[o]	8.0	2.1413	8.0	6229.798	27.2		-0.6	
6231.672	3.8388[o]	3.0	1.8499	3.0	6231.691	37.8		-0.9	
6232.126	3.7245	2.0	1.7357[o]	1.0	6232.142	35.2		-1.1	
6232.678	3.8215[o]	2.0	1.8329	2.0	6232.662	75.3		-0.6	
6234.944	3.7690[o]	2.0	1.7810	2.0	6234.946	64.8		-0.8	
6236.270	3.7484[o]	5.0	1.7609	5.0	6236.234[c]	42.6	-1.2	-1.0	
6238.337	3.8569[o]	6.0	1.8700	6.0	6238.298	427.7		0.2	
6240.490	3.5292[o]	4.0	1.5430	5.0	6240.490	103.6		-1.0	
6242.388	2.1702[o]	4.0	0.1847	3.0	6242.403[b]	806.9		-2.3	
6242.392	3.6646[o]	4.0	1.6790	3.0	6242.403[b]	806.9		0.1	
6248.115	3.3979[o]	4.0	1.4142	3.0	6248.104	379.8		-0.6	
6251.687	3.6006[o]	2.0	1.6180	2.0	6251.661[c]	129.4		-0.8	
6256.111	3.5242[o]	4.0	1.5430	5.0	6256.114	105.6		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
6256.503	3.6601^o	4.0	1.6790	3.0	6256.543^{bc}	80.9		-0.9	
6256.565	3.9592^o	2.0	1.9781	2.0	6256.543^{bc}	86.1		-0.3	
6257.940	3.4532^o	5.0	1.4726	4.0	6257.919	163.8		-0.9	
6262.519	3.6582^o	2.0	1.6790	3.0	6262.522	70.5		-0.9	
6271.079	3.8465^o	5.0	1.8700	6.0	6271.043^c	95.3		-0.5	
6275.086	3.6880^o	6.0	1.7128	7.0	6275.077	118.6		-0.6	
6285.182	3.4446^o	4.0	1.4726	4.0	6285.147^b	112.3		-1.1	
6285.186	3.9997^o	5.0	2.0277	4.0	6285.147^b	112.3		-0.2	
6288.222	3.5638^o	3.0	1.5927	3.0	6288.249^c	20.0		-1.6	
6290.754	3.5883^o	3.0	1.6180	2.0	6290.740	64.4		-1.1	
6292.916	3.5126^o	5.0	1.5430	5.0	6292.940^b	414.8		-0.4	
6292.944	3.7305^o	5.0	1.7609	5.0	6292.940^b	414.1		-0.0	
6292.960	3.9059^o	6.0	1.9363	6.0	6292.940^b	416.2		0.3	
6295.948	2.0693^o	1.0	0.1007	2.0	6295.944	281.8		-2.9	
6301.865	3.7785^o	3.0	1.8117	3.0	6301.853^b	256.8		-0.2	
6301.869	3.5848^o	1.0	1.6180	2.0	6301.853^b	255.3		-0.5	
6310.290	3.9919^o	5.0	2.0277	4.0	6310.309	65.5		-0.4	
6311.549	3.8886^o	4.0	1.9248	3.0	6311.567^b	68.2		-0.6	
6311.605	3.8131	3.0	1.8493^o	3.0	6311.567^b	69.9		-0.7	
6317.831	1.9981^o	2.0	0.0363	1.0	6317.821^b	95.3		-3.5	
6317.839	3.6304^o	3.0	1.6686	4.0	6317.821^b	95.3		-0.8	
6322.514	3.6732^o	7.0	1.7128	7.0	6322.520	306.4		-0.2	
6338.007	3.7613^o	4.0	1.8057	4.0	6337.962	78.9		-0.7	
6338.899	3.7593^o	3.0	1.8040	2.0	6338.900	34.2		-1.1	
6339.747	3.5787^o	6.0	1.6236	6.0	6339.746	145.5		-0.7	
6343.327	3.7350^o	3.0	1.7810	2.0	6343.377^b	58.2		-0.9	
6343.424	3.3681^o	3.0	1.4142	3.0	6343.377^b	58.7		-1.5	
6345.912	3.7860^o	2.0	1.8329	2.0	6345.899^c	59.4		-0.8	
6346.508	3.4796^o	2.0	1.5266	2.0	6346.536^b	45.0		-1.4	
6346.537	3.6216^o	4.0	1.6686	4.0	6346.536^b	46.6		-1.1	
6355.401	3.7921^o	6.0	1.8419	5.0	6355.351	267.8		-0.1	
6363.151	3.8595^o	8.0	1.9116	9.0	6363.159^c	36.6		-0.9	
6367.403	2.1313^o	2.0	0.1847	3.0	6367.413	1744.4	-2.2	-2.0	
6371.014	2.4440^o	6.0	0.4985	6.0	6371.015^c	550.1		-2.0	
6373.492	2.3322^o	5.0	0.3875	5.0	6373.498	163.7		-2.7	
6378.107	3.6861^o	4.0	1.7428	3.0	6378.067	67.9		-0.9	
6411.411	3.8695^o	5.0	1.9363	6.0	6411.414	179.8		-0.1	
6424.233	3.7350^o	3.0	1.8057	4.0	6424.234	31.0		-1.1	
6425.905	2.2107^o	3.0	0.2818	4.0	6425.907	815.6		-2.2	
6426.644	3.7785^o	3.0	1.8499	3.0	6426.640^c	73.8		-0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
6428.955	3.9556^o	4.0	2.0277	4.0	6428.941^b	286.1		0.2	
6428.979	3.7979^o	5.0	1.8700	6.0	6428.941^b	287.3		-0.1	
6433.365	3.5952^o	3.0	1.6686	4.0	6433.312	34.9		-1.3	
6433.957	3.7593^o	3.0	1.8329	2.0	6433.958	147.5		-0.4	
6435.291	3.5440^o	3.0	1.6180	2.0	6435.301^c	302.1		-0.4	
6437.619	3.3979^o	4.0	1.4726	4.0	6437.617	211.4		-0.8	
6438.138	3.6861^o	4.0	1.7609	5.0	6438.139	16.0		-1.5	
6439.324	3.7305^o	5.0	1.8057	4.0	6439.317^c	48.3		-0.9	
6439.610	3.8979^o	2.0	1.9731	1.0	6439.640	11.9		-1.3	
6442.054	3.6789^o	4.0	1.7549	4.0	6442.070^c	586.1		0.1	
6447.567	3.4490^o	3.0	1.5266	2.0	6447.545^c	29.2		-1.6	
6448.054	3.5459^o	6.0	1.6236	6.0	6448.047	101.6		-0.9	
6450.450	3.6006^o	2.0	1.6790	3.0	6450.441	95.9		-0.8	
6459.311	3.8920^o	1.0	1.9731	1.0	6459.340^b	160.4		-0.1	
6459.357	3.7889^o	5.0	1.8700	6.0	6459.340^b	160.0		-0.3	
6459.374	3.7889^o	6.0	1.8700	6.0	6459.340^b	157.8		-0.3	
6461.127	3.9508^o	6.0	2.0324	7.0	6461.121	35.7		-0.7	
6463.069	3.6148^o	2.0	1.6970	2.0	6463.100^b	19.9		-1.5	
6463.136	3.6203^o	2.0	1.7026	1.0	6463.099^b	21.2		-1.5	
6463.144	3.7506^o	3.0	1.8329	2.0	6463.099^b	21.2		-1.3	
6464.407	3.6601^o	4.0	1.7428	3.0	6464.388	21.2		-1.4	
6468.330	3.5342^o	3.0	1.6180	2.0	6468.316	76.2		-1.0	
6471.629	3.6701^o	5.0	1.7549	4.0	6471.583^c	393.0		-0.1	
6479.238	3.8493^o	5.0	1.9363	6.0	6479.231	62.0		-0.6	
6483.394	3.2509^o	2.0	1.3391	1.0	6483.371	141.3		-1.2	
6492.033	3.6701^o	5.0	1.7609	5.0	6492.039^b	129.1		-0.6	
6492.050	2.0099^o	3.0	0.1007	2.0	6492.039^b	136.3		-3.2	
6492.050	3.5883^o	3.0	1.6790	3.0	6492.039^b	136.3		-0.7	
6494.517	3.2778^o	1.0	1.3694	2.0	6494.517	50.3		-1.6	
6500.987	2.2941^o	4.0	0.3875	5.0	6501.001	447.6		-2.3	
6514.658	3.3168^o	4.0	1.4142	3.0	6514.639^c	61.4		-1.5	
6516.157	3.7350^o	3.0	1.8329	2.0	6516.176	100.3		-0.6	
6526.081	3.6601^o	4.0	1.7609	5.0	6526.087	38.7		-1.1	
6528.011	2.1805^o	5.0	0.2818	4.0	6528.019	2653.1		-1.7	
6528.966	3.8232^o	3.0	1.9248	3.0	6528.970	69.1		-0.6	
6529.683	3.5773^o	4.0	1.6790	3.0	6529.691^b	438.1		-0.2	
6529.712	3.5952^o	3.0	1.6970	2.0	6529.691^b	445.8		-0.2	
6536.826	1.9324^o	0.0	0.0363	1.0	6536.826	632.9		-2.7	
6537.591	3.7016^o	4.0	1.8057	4.0	6537.597	42.0		-1.0	
6540.747	3.7378	2.0	1.8428^o	1.0	6540.716	28.1		-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
6544.948	1.9301^o	2.0	0.0363	1.0	6544.957	900.2		-2.5	
6549.472	3.8172^o	3.0	1.9248	3.0	6549.503	16.7		-1.2	
6551.807	2.0765^o	3.0	0.1847	3.0	6551.807	1702.6		-2.0	
6556.456	3.8131	3.0	1.9226^o	3.0	6556.450	37.2		-0.9	
6556.495	3.7604^o	7.0	1.8700	6.0	6556.450	37.9		-1.0	
6558.159	2.3884^o	5.0	0.4985	6.0	6558.184	130.8		-2.6	
6562.611	2.3872^o	6.0	0.4985	6.0	6562.635	307.2		-2.3	
6563.511	2.1702^o	4.0	0.2818	4.0	6563.525	1136.0		-2.0	
6566.356	2.2751^o	5.0	0.3875	5.0	6566.357	902.2		-2.0	
6567.521	3.2566^o	3.0	1.3694	2.0	6567.482	35.0		-1.8	
6573.001	3.4287^o	5.0	1.5430	5.0	6572.992^b	187.0		-0.8	
6573.005	3.5647^o	4.0	1.6790	3.0	6572.992^b	187.0		-0.6	
6579.234	3.7539^o	7.0	1.8700	6.0	6579.264^c	62.3		-0.8	
6580.512	2.0682^o	2.0	0.1847	3.0	6580.505	1086.8		-2.2	
6587.463	3.8131	3.0	1.9315^o	4.0	6587.484^c	132.2		-0.3	
6588.326	3.6203^o	2.0	1.7390	1.0	6588.359^b	188.3		-0.5	
6588.400	3.4992^o	3.0	1.6180	2.0	6588.359^b	192.9		-0.7	
6588.904	2.2686^o	6.0	0.3875	5.0	6588.901	4032.8		-1.3	
6590.133	3.6236^o	3.0	1.7428	3.0	6590.161^b	114.2		-0.7	
6590.203	3.2501^o	3.0	1.3694	2.0	6590.161^b	119.1		-1.3	
6593.028	3.9064	4.0	2.0264^o	5.0	6592.985	58.6		-0.5	
6603.514	4.0087	5.0	2.1317^o	6.0	6603.496	72.9		-0.3	
6612.560	3.6861^o	4.0	1.8117	3.0	6612.564	44.2		-1.0	
6613.006	3.8324^o	1.0	1.9581	0.0	6612.963	11.5		-1.4	
6616.731	3.6789^o	4.0	1.8057	4.0	6616.768	54.7		-0.9	
6626.916	3.3969^o	2.0	1.5266	2.0	6626.937^b	59.9		-1.3	
6626.938	3.8485^o	1.0	1.9781	2.0	6626.937^b	59.9		-0.6	
6627.799	4.1165	6.0	2.2464^o	7.0	6627.776^c	28.3		-0.5	
6638.022	3.6789^o	4.0	1.8117	3.0	6638.005	7.7		-1.8	
6643.893	3.5342^o	3.0	1.6686	4.0	6643.883	41.7		-1.3	
6648.095	3.6001	2.0	1.7357^o	1.0	6648.099	114.3		-0.7	
6661.327	3.6216^o	4.0	1.7609	5.0	6661.342	108.7		-0.7	
6686.307	3.7785^o	3.0	1.9248	3.0	6686.334^b	52.4		-0.8	
6686.343	3.7900^o	7.0	1.9363	6.0	6686.334^b	53.6		-0.7	
6688.835	3.8312^o	2.0	1.9781	2.0	6688.817	72.9		-0.5	
6696.864	3.6548^o	2.0	1.8040	2.0	6696.839	62.9		-0.9	
6700.990	3.8129^o	3.0	1.9632	3.0	6700.975	13.9		-1.3	
6703.609	4.0378	7.0	2.1888^o	6.0	6703.608	396.3		0.5	
6704.230	3.5593	1.0	1.7105^o	0.0	6704.221	128.4		-0.7	
6705.511	3.8215^o	2.0	1.9731	1.0	6705.545	29.2		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	$\log gf$ Boltz.	$\log gf$ [47]
6721.566	3.5126^o	5.0	1.6686	4.0	6721.587	64.3		-1.1	
6724.726	3.9334	6.0	2.0902^o	5.0	6724.709	434.1		0.4	
6725.875	1.8428^o	1.0	0.0000	0.0	6725.884^b	3556.5		-2.0	
6725.930	3.5004^o	1.0	1.6575	1.0	6725.884^b	3549.5		0.6	
6739.496	2.2266^o	4.0	0.3875	5.0	6739.523	21.5	-3.6	-3.6	
6743.633	3.4307^o	2.0	1.5927	3.0	6743.609^c	28.9		-1.6	
6746.700	3.5342^o	3.0	1.6970	2.0	6746.648	43.8		-1.2	
6748.344	3.2509^o	2.0	1.4142	3.0	6748.381^b	52.1		-1.6	
6748.376	3.8691^o	7.0	2.0324	7.0	6748.381^b	52.6		-0.6	
6754.851	3.8349	5.0	2.0000^o	4.0	6754.837	157.3		-0.2	
6757.084	3.7734^o	2.0	1.9390	1.0	6757.095^c	7.1		-1.6	
6758.358	3.6768	1.0	1.8428^o	1.0	6758.324	41.9		-1.0	
6759.231	3.6148^o	2.0	1.7810	2.0	6759.231^b	223.2		-0.4	
6759.249	3.8337	5.0	2.0000^o	4.0	6759.231^b	223.2		-0.0	
6759.254	2.3322^o	5.0	0.4985	6.0	6759.231^b	223.2		-2.5	
6761.690	3.5459^o	6.0	1.7128	7.0	6761.669	35.8		-1.3	
6771.345	3.5330^o	2.0	1.7026	1.0	6771.346^b	61.6		-1.1	
6771.363	3.1998^o	2.0	1.3694	2.0	6771.346^b	61.6		-1.6	
6775.310	1.9301^o	2.0	0.1007	2.0	6775.310	963.7		-2.5	
6779.164	1.8646^o	2.0	0.0363	1.0	6779.178	2467.3		-2.2	
6788.366	3.7506^o	3.0	1.9248	3.0	6788.353	5.2		-1.8	
6790.879	2.0099^o	3.0	0.1847	3.0	6790.879	1064.2		-2.3	
6796.821	3.5593	1.0	1.7357^o	1.0	6796.802	280.2		-0.4	
6799.581	3.7860^o	2.0	1.9632	3.0	6799.586	28.5		-1.0	
6801.330	3.5773^o	4.0	1.7549	4.0	6801.315	22.8		-1.4	
6802.959	1.9226^o	3.0	0.1007	2.0	6802.962	1466.6		-2.3	
6805.599	3.9625^o	7.0	2.1413	8.0	6805.567	31.7		-0.7	
6807.550	3.6036	2.0	1.7829^o	2.0	6807.498	125.1		-0.7	
6808.305	3.7431	4.0	1.9226^o	3.0	6808.287^c	321.9		-0.0	
6809.238	3.5004^o	1.0	1.6801	0.0	6809.226	30.7		-1.4	
6814.826	3.6304^o	3.0	1.8117	3.0	6814.855	54.0		-1.0	
6816.175	3.7547	5.0	1.9363	6.0	6816.183^n	126.1		-0.4	-0.6
6820.913	3.6001	2.0	1.7829^o	2.0	6820.891^c	244.2		-0.4	
6821.913	3.8446^o	4.0	2.0277	4.0	6821.894	115.5		-0.3	
6827.793	2.0000^o	4.0	0.1847	3.0	6827.806	978.3		-2.3	
6829.206	3.7512^o	6.0	1.9363	6.0	6829.193^b	54.9		-0.8	
6829.248	3.8131	3.0	1.9981^o	2.0	6829.193^b	56.4		-0.7	
6830.569	3.6639	3.0	1.8493^o	3.0	6830.516	360.4		-0.1	
6832.156	3.5952^o	3.0	1.7810	2.0	6832.111	16.8		-1.5	
6837.132	3.4919^o	3.0	1.6790	3.0	6837.164	108.1		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
6838.367	3.6544^o	5.0	1.8419	5.0	6838.316^c	268.9		-0.2	
6839.214	3.9064	4.0	2.0941^o	4.0	6839.228^b	472.3		0.4	
6839.228	2.0941^o	4.0	0.2818	4.0	6839.228^b	476.3		-2.5	
6841.746	3.7431	4.0	1.9315^o	4.0	6841.736	385.3		0.1	
6843.455	3.8388^o	3.0	2.0277	4.0	6843.508	5.9		-1.6	
6846.816	3.6601^o	4.0	1.8499	3.0	6846.840^b	34.7		-1.1	
6846.872	3.7350^o	3.0	1.9248	3.0	6846.840^b	34.3		-1.0	
6851.795	3.5638^o	3.0	1.7549	4.0	6851.793	13.7		-1.7	
6852.927	3.6143^o	4.0	1.8057	4.0	6852.907	17.1		-1.5	
6853.895	2.0902^o	5.0	0.2818	4.0	6853.918	1032.5		-2.2	
6858.126	3.8337	5.0	2.0264^o	5.0	6858.098^b	232.8		-0.0	
6858.136	3.4253^o	2.0	1.6180	2.0	6858.098^b	237.4		-0.6	
6860.927	1.8428^o	1.0	0.0363	1.0	6860.928	3810.6		-2.0	
6864.088	3.8739	2.0	2.0682^o	2.0	6864.057^c	14.7		-1.1	
6867.110	3.5177^o	8.0	1.7128	7.0	6867.101^c	280.1		-0.4	
6868.143	3.4622^o	0.0	1.6575	1.0	6868.126^c	17.3		-1.7	
6873.162	3.5004^o	1.0	1.6970	2.0	6873.115	42.4		-1.3	
6873.715	3.8131	3.0	2.0099^o	3.0	6873.686^c	87.8		-0.5	
6879.481	3.9334	6.0	2.1317^o	6.0	6879.488	271.7		0.2	
6880.850	2.1888^o	6.0	0.3875	5.0	6880.859	452.4		-2.4	
6883.446	3.6425^o	6.0	1.8419	5.0	6883.425	54.4		-0.9	
6888.820	3.6639	3.0	1.8646^o	2.0	6888.785	230.4		-0.3	
6895.491	3.4155^o	1.0	1.6180	2.0	6895.525	22.5		-1.7	
6903.176	3.8232^o	3.0	2.0277	4.0	6903.185	12.1		-1.3	
6905.589	3.4919^o	3.0	1.6970	2.0	6905.585	13.2		-1.8	
6906.219	3.9360^o	9.0	2.1413	8.0	6906.224	334.7		0.3	
6908.887	3.5330^o	2.0	1.7390	1.0	6908.931	7.3		-2.0	
6912.766	2.1805^o	5.0	0.3875	5.0	6912.781^c	197.4		-2.7	
6919.033	4.0378	7.0	2.2464^o	7.0	6919.024	82.5		-0.1	
6921.764	3.6236^o	3.0	1.8329	2.0	6921.757	18.3		-1.4	
6938.386	3.5292^o	4.0	1.7428	3.0	6938.353	18.2		-1.6	
6946.606	4.1165	6.0	2.3322^o	5.0	6946.582^b	22.6		-0.5	
6946.630	3.5883^o	3.0	1.8040	2.0	6946.582^b	21.1		-1.4	
6949.435	3.5952^o	3.0	1.8117	3.0	6949.441^c	50.1		-1.0	
6952.311	3.5377^o	5.0	1.7549	4.0	6952.343^c	23.8		-1.5	
6953.602	3.8149^o	7.0	2.0324	7.0	6953.607	84.8		-0.5	
6955.218	4.0087	5.0	2.2266^o	4.0	6955.185	95.4		-0.1	
6957.701	3.5242^o	4.0	1.7428	3.0	6957.660	26.1		-1.4	
6958.713	3.7593^o	3.0	1.9781	2.0	6958.728	10.6		-1.4	
6960.981	3.6304^o	3.0	1.8499	3.0	6960.989	23.1		-1.3	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I		$\log gf$	
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	[47]
6972.185	3.5588^o	1.0	1.7810	2.0	6972.135	24.3		-1.4	
6973.839	3.8050^o	5.0	2.0277	4.0	6973.841	27.6		-1.0	
6975.649	3.3198^o	5.0	1.5430	5.0	6975.610	32.6	-2.0	-1.7	
6975.990	3.7130^o	7.0	1.9363	6.0	6975.998	74.8		-0.7	
6977.563	3.5593	1.0	1.7829^o	2.0	6977.525	69.2		-0.9	
6985.251	3.7107^o	6.0	1.9363	6.0	6985.249	55.2		-0.8	
6985.705	3.5292^o	4.0	1.7549	4.0	6985.666	74.1		-1.0	
6988.396	3.8060^o	8.0	2.0324	7.0	6988.362	238.5		-0.0	
6990.101	3.4307^o	2.0	1.6575	1.0	6990.090^c	143.0		-0.8	
6992.869	3.7506^o	3.0	1.9781	2.0	6992.855	34.8		-0.9	
6995.413	3.7350^o	3.0	1.9632	3.0	6995.366	52.9		-0.8	
6996.975	3.3894^o	2.0	1.6180	2.0	6996.954^c	31.6	-1.7	-1.6	
7000.787	3.6203^o	2.0	1.8499	3.0	7000.780	28.5		-1.2	
7001.552	3.7979^o	5.0	2.0277	4.0	7001.550	14.7		-1.2	
7002.954	3.4490^o	3.0	1.6790	3.0	7003.012	19.8		-1.7	
7006.041	4.0378	7.0	2.2686^o	6.0	7006.053	31.0		-0.5	
7008.443	3.9064	4.0	2.1379^o	3.0	7008.402	54.8		-0.5	
7009.136	3.9096^o	8.0	2.1413	8.0	7009.148	34.1		-0.7	
7011.722	3.4253^o	2.0	1.6575	1.0	7011.728^b	15.4		-1.8	
7011.771	3.6006^o	2.0	1.8329	2.0	7011.728^b	15.1		-1.5	
7015.343	3.6915^o	3.0	1.9248	3.0	7015.371	36.8		-1.0	
7016.732	3.5475^o	1.0	1.7810	2.0	7016.709	61.7		-1.0	
7018.899	3.5776^o	3.0	1.8117	3.0	7018.917	40.4		-1.1	
7026.620	1.8646^o	2.0	0.1007	2.0	7026.618	3226.7		-2.0	
7039.236	3.6036	2.0	1.8428^o	1.0	7039.185^c	163.0		-0.5	
7046.480	3.4616^o	2.0	1.7026	1.0	7046.429	43.0		-1.3	
7053.525	3.6001	2.0	1.8428^o	1.0	7053.513	99.9		-0.7	
7054.969	3.7350^o	3.0	1.9781	2.0	7054.985^c	28.5		-1.0	
7056.537	3.4992^o	3.0	1.7428	3.0	7056.546^b	266.0		-0.4	
7056.552	3.3801^o	7.0	1.6236	6.0	7056.546^b	266.0		-0.6	
7067.392	3.6654^o	9.0	1.9116	9.0	7067.373	154.6		-0.4	
7069.301	3.4923^o	0.0	1.7390	1.0	7069.327	27.3		-1.4	
7071.066	3.9334	6.0	2.1805^o	5.0	7071.063	61.3		-0.4	
7074.654	3.5330^o	2.0	1.7810	2.0	7074.663	112.3		-0.8	
7075.651	3.6880^o	6.0	1.9363	6.0	7075.621	23.0		-1.2	
7079.489	3.6001	2.0	1.8493^o	3.0	7079.451	109.4		-0.7	
7088.278	1.8493^o	3.0	0.1007	2.0	7088.293	5308.2		-1.8	
7095.492	1.9315^o	4.0	0.1847	3.0	7095.495	5054.5		-1.7	
7096.323	1.7829^o	2.0	0.0363	1.0	7096.330	3738.5		-2.1	
7101.440	1.9301^o	2.0	0.1847	3.0	7101.449^b	385.9		-2.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
7101.485	3.5952^o	3.0	1.8499	3.0	7101.449^b	388.0		-0.1	
7103.574	3.8131	3.0	2.0682^o	2.0	7103.579	77.6		-0.5	
7104.513	2.0264^o	5.0	0.2818	4.0	7104.535^c	5403.5		-1.5	
7106.235	2.1317^o	6.0	0.3875	5.0	7106.235^{bc}	3164.6		-1.6	
7106.266	3.6142^o	5.0	1.8700	6.0	7106.235^{bc}	3161.7		0.8	
7110.562	3.7431	4.0	2.0000^o	4.0	7110.532	102.0		-0.5	
7114.499	1.8428^o	1.0	0.1007	2.0	7114.490	731.0		-2.7	
7115.962	3.6534^o	10.0	1.9116	9.0	7115.963	626.4		0.2	
7118.257	3.6639	3.0	1.9226^o	3.0	7118.214	148.2		-0.4	
7120.022	3.8349	5.0	2.0941^o	4.0	7120.040	50.1		-0.6	
7123.233	4.0087	5.0	2.2686^o	6.0	7123.213	34.2		-0.5	
7124.908	3.8337	5.0	2.0941^o	4.0	7124.897	30.1		-0.8	
7125.838	3.3969^o	2.0	1.6575	1.0	7125.838^b	92.7		-1.1	
7125.878	3.9542^o	3.0	2.2148	2.0	7125.838^b	73.9		-0.3	
7127.321	3.4939^o	4.0	1.7549	4.0	7127.377^{bc}	40.7	-1.4	-1.3	
7127.433	3.6036	2.0	1.8646^o	2.0	7127.377^{bc}	39.8		-1.1	
7131.821	1.9226^o	3.0	0.1847	3.0	7131.843	2735.0		-2.0	
7136.011	3.6732^o	7.0	1.9363	6.0	7136.018	263.3		-0.2	
7136.428	3.4796^o	2.0	1.7428	3.0	7136.405^b	194.2		-0.6	
7136.459	3.5787^o	6.0	1.8419	5.0	7136.405^b	189.5		-0.4	
7142.082	3.6001	2.0	1.8646^o	2.0	7142.063	100.6		-0.7	
7148.732	3.6701^o	5.0	1.9363	6.0	7148.741^b	38.9		-1.0	
7148.783	3.6639	3.0	1.9301^o	2.0	7148.741^b	38.6		-1.0	
7151.043	3.7431	4.0	2.0099^o	3.0	7151.025	57.3		-0.7	
7152.706	3.4354^o	2.0	1.7026	1.0	7152.740	36.6		-1.4	
7154.820	3.6639	3.0	1.9315^o	4.0	7154.784	229.6		-0.2	
7156.193	3.5377^o	5.0	1.8057	4.0	7156.189	82.1		-0.9	
7163.803	3.5342^o	3.0	1.8040	2.0	7163.788	23.2		-1.4	
7191.579	3.5292^o	4.0	1.8057	4.0	7191.580	42.5		-1.2	
7192.852	3.4622^o	0.0	1.7390	1.0	7192.855	13.8		-1.8	
7195.099	3.5266^o	2.0	1.8040	2.0	7195.096	5.1		-2.1	
7200.483	3.5330^o	2.0	1.8117	3.0	7200.520	7.9		-1.9	
7210.886	3.3979^o	4.0	1.6790	3.0	7210.941	298.1		-0.5	
7213.831	2.0000^o	4.0	0.2818	4.0	7213.844	1868.2		-2.0	
7220.067	3.7431	4.0	2.0264^o	5.0	7220.031	296.0		0.0	
7221.173	3.5593	1.0	1.8428^o	1.0	7221.135	78.7		-0.8	
7228.817	3.5475^o	1.0	1.8329	2.0	7228.871^b	66.8		-0.9	
7228.922	4.0087	5.0	2.2941^o	4.0	7228.871^b	67.4		-0.2	
7231.521	3.5638^o	3.0	1.8499	3.0	7231.537	5.7		-2.0	
7234.399	3.6537	0.0	1.9404^o	1.0	7234.370	84.2		-0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
7236.122	3.4155^o	1.0	1.7026	1.0	7236.114	11.8		-1.9	
7254.184	3.5177^o	8.0	1.8091	8.0	7254.176	29.2		-1.3	
7262.732	2.0941^o	4.0	0.3875	5.0	7262.746	138.4		-3.0	
7266.644	3.6304^o	3.0	1.9248	3.0	7266.684	4.1		-2.0	
7273.993	3.5459^o	6.0	1.8419	5.0	7273.934	197.2		-0.5	
7277.133	3.8349	5.0	2.1317^o	6.0	7277.136	160.1		-0.1	
7278.839	3.7305^o	5.0	2.0277	4.0	7278.846	29.1		-1.0	
7279.274	2.0902^o	5.0	0.3875	5.0	7279.302	2290.1		-1.7	
7282.238	3.8337	5.0	2.1317^o	6.0	7282.243	229.0		0.1	
7282.991	3.4446^o	4.0	1.7428	3.0	7282.970	44.8		-1.3	
7290.182	3.5093^o	9.0	1.8091	8.0	7290.240	536.2		-0.1	
7293.575	1.7357^o	1.0	0.0363	1.0	7293.562	7.9		-4.8	
7296.114	3.6236^o	3.0	1.9248	3.0	7296.121	23.8		-1.2	
7297.286	3.4796^o	2.0	1.7810	2.0	7297.226	6.4		-2.1	
7298.069	3.4532^o	5.0	1.7549	4.0	7298.034	196.8		-0.6	
7300.665	3.6759^o	3.0	1.9781	2.0	7300.663^c	29.4		-1.1	
7306.550	3.5004^o	1.0	1.8040	2.0	7306.581	22.7		-1.5	
7310.033	3.6203^o	2.0	1.9248	3.0	7310.089^c	39.1		-1.0	
7312.578	3.3129^o	2.0	1.6180	2.0	7312.544	20.9	-2.0	-1.8	
7314.018	3.5593	1.0	1.8646^o	2.0	7313.971	66.4		-0.9	
7315.206	3.3969^o	2.0	1.7026	1.0	7315.202	21.8		-1.6	
7316.298	3.3121^o	3.0	1.6180	2.0	7316.297^{bc}	97.1		-1.1	
7316.351	3.4490^o	3.0	1.7549	4.0	7316.297^{bc}	96.8		-0.9	
7318.590	3.4992^o	3.0	1.8057	4.0	7318.618	4.9		-2.1	
7329.810	3.9058^o	1.0	2.2148	2.0	7329.810	14.5		-1.0	
7332.649	2.1888^o	6.0	0.4985	6.0	7332.662	1304.3		-1.8	
7335.145	3.4446^o	4.0	1.7549	4.0	7335.096	98.5		-0.9	
7346.001	3.5292^o	4.0	1.8419	5.0	7345.941	10.2		-1.8	
7347.221	3.9334	6.0	2.2464^o	7.0	7347.229	312.0		0.4	
7364.123	3.1557^o	5.0	1.4726	4.0	7364.100	63.6	-1.6	-1.6	
7367.938	1.7829^o	2.0	0.1007	2.0	7367.926^b	31.5		-4.1	
7367.976	3.4939^o	4.0	1.8117	3.0	7367.926^b	33.1	-1.4	-1.3	
7368.905	2.1805^o	5.0	0.4985	6.0	7368.923	43.3		-3.3	
7369.839	3.8131	3.0	2.1313^o	2.0	7369.788	323.2		0.2	
7371.453	4.0378	7.0	2.3563^o	7.0	7371.455	113.4		0.1	
7375.075	3.7130^o	7.0	2.0324	7.0	7375.100	40.3		-0.9	
7378.020	1.8646^o	2.0	0.1847	3.0	7378.019	626.5		-2.6	
7378.668	3.9064	4.0	2.2266^o	4.0	7378.630	65.6		-0.3	
7385.427	3.7107^o	6.0	2.0324	7.0	7385.394	37.7		-0.9	
7389.002	3.6001	2.0	1.9226^o	3.0	7388.989	76.5		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[47]
7390.761	3.4198^o	4.0	1.7428	3.0	7390.702	4.9	-2.6	-2.2	
7398.939	3.8131	3.0	2.1379^o	3.0	7398.923	57.0		-0.5	
7403.295	1.7105^o	0.0	0.0363	1.0	7403.269	609.7		-2.9	
7405.038	3.4287^o	5.0	1.7549	4.0	7404.982	282.5		-0.5	
7410.720	4.1165	6.0	2.4440^o	6.0	7410.691^{bc}	52.2		-0.1	
7410.731	3.6116^o	1.0	1.9390	1.0	7410.691^{bc}	52.3		-0.9	
7417.043	3.3681^o	3.0	1.6970	2.0	7416.989	57.1		-1.3	
7418.754	3.5126^o	5.0	1.8419	5.0	7418.712	82.4		-0.9	
7419.894	3.5952^o	3.0	1.9248	3.0	7419.902	4.7		-2.0	
7421.899	3.6001	2.0	1.9301^o	2.0	7421.875	7.9		-1.7	
7423.701	3.7378	2.0	2.0682^o	2.0	7423.641	16.4		-1.2	
7431.157	3.6956^o	5.0	2.0277	4.0	7431.214^{bc}	8.5		-1.6	
7431.212	3.4490^o	3.0	1.7810	2.0	7431.214^{bc}	8.8		-1.9	
7431.234	3.4796^o	2.0	1.8117	3.0	7431.214^{bc}	8.8		-1.9	
7434.179	3.6304^o	3.0	1.9632	3.0	7434.153	26.1		-1.2	
7444.543	4.0378	7.0	2.3728^o	8.0	7444.539	431.7		0.7	
7445.374	3.8060^o	8.0	2.1413	8.0	7445.427^{bc}	86.9		-0.4	
7445.408	3.9334	6.0	2.2686^o	6.0	7445.427^{bc}	86.0		-0.2	
7446.029	1.8493^o	3.0	0.1847	3.0	7446.049	40.6		-3.8	
7449.236	3.2566^o	3.0	1.5927	3.0	7449.272^b	102.8		-1.2	
7449.236	3.6915^o	3.0	2.0277	4.0	7449.272^b	102.8		-0.5	
7449.330	3.6639	3.0	2.0000^o	4.0	7449.272^b	102.3		-0.5	
7449.891	3.3428^o	4.0	1.6790	3.0	7449.849	49.2	-0.9	-1.4	
7450.929	3.3211^o	2.0	1.6575	1.0	7450.957^b	17.9	-1.8	-1.8	
7450.934	3.5883^o	3.0	1.9248	3.0	7450.957^b	17.9		-1.4	
7450.979	3.8337	5.0	2.1702^o	4.0	7450.957^b	17.5		-1.0	
7452.012	3.8739	2.0	2.2107^o	3.0	7451.955	49.9		-0.5	
7470.762	3.3719^o	8.0	1.7128	7.0	7470.784	521.4		-0.3	
7474.409	3.9334	6.0	2.2751^o	5.0	7474.449	16.6		-0.9	
7479.476	3.0713^o	4.0	1.4142	3.0	7479.419	51.7	-1.6	-1.8	
7483.412	3.7245	2.0	2.0682^o	2.0	7483.454	8.1		-1.5	
7493.772	3.6639	3.0	2.0099^o	3.0	7493.731	21.6		-1.2	
7495.070	3.4577^o	1.0	1.8040	2.0	7495.060	23.6		-1.5	
7497.262	3.8337	5.0	2.1805^o	5.0	7497.253	52.7		-0.5	
7500.547	3.5773^o	4.0	1.9248	3.0	7500.603	19.5		-1.4	
7506.275	3.3198^o	5.0	1.6686	4.0	7506.329^b	17.8	-2.1	-1.8	
7506.337	3.6789^o	4.0	2.0277	4.0	7506.329^b	15.4		-1.3	
7509.122	4.0378	7.0	2.3872^o	6.0	7509.106	9.4		-0.9	
7513.321	1.9315^o	4.0	0.2818	4.0	7513.331	47.3		-3.6	
7516.360	3.7431	4.0	2.0941^o	4.0	7516.335	40.0		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[47]
7519.978	3.6759^o	3.0	2.0277	4.0	7519.977	6.3		-1.7	
7520.883	3.7245	2.0	2.0765^o	3.0	7520.879	117.0		-0.4	
7521.449	3.1745^o	3.0	1.5266	2.0	7521.409	16.8		-2.1	
7526.948	3.4796^o	2.0	1.8329	2.0	7526.888	13.4		-1.7	
7527.311	3.3894^o	2.0	1.7428	3.0	7527.354	18.4	-1.8	-1.7	
7529.703	3.8349	5.0	2.1888^o	6.0	7529.698	9.4		-1.3	
7531.354	3.5848^o	1.0	1.9390	1.0	7531.364^c	25.3		-1.2	
7546.522	3.6701^o	5.0	2.0277	4.0	7546.540^{bc}	124.8		-0.4	
7546.550	3.5787^o	6.0	1.9363	6.0	7546.540^{bc}	123.7		-0.6	
7547.718	3.3108^o	3.0	1.6686	4.0	7547.743^b	26.2		-1.7	
7547.724	3.6203^o	2.0	1.9781	2.0	7547.743^b	26.2		-1.2	
7554.066	1.9226^o	3.0	0.2818	4.0	7554.068	489.0		-2.6	
7561.968	3.5638^o	3.0	1.9248	3.0	7562.020	25.4		-1.3	
7562.609	2.0264^o	5.0	0.3875	5.0	7562.582	173.3		-2.9	
7563.879	3.2566^o	3.0	1.6180	2.0	7563.846	263.5		-0.7	
7580.805	1.7357^o	1.0	0.1007	2.0	7580.773	514.7		-2.9	
7588.165	3.6116^o	1.0	1.9781	2.0	7588.162	11.7		-1.5	
7589.155	2.1317^o	6.0	0.4985	6.0	7589.160	7.4		-4.1	
7590.002	3.3121^o	3.0	1.6790	3.0	7590.040	140.0		-0.9	
7590.458	3.2509^o	2.0	1.6180	2.0	7590.436	204.6		-0.9	
7592.568	3.6601^o	4.0	2.0277	4.0	7592.586^b	41.8		-0.9	
7592.608	3.5025^o	7.0	1.8700	6.0	7592.586^b	34.4		-1.2	
7598.009	3.9064	4.0	2.2751^o	5.0	7598.003	106.4		-0.1	
7607.746	3.5593	1.0	1.9301^o	2.0	7607.689	245.2		-0.3	
7615.993	3.6551^o	4.0	2.0277	4.0	7615.984^b	6.1		-1.7	
7615.993	3.4365^o	7.0	1.8091	8.0	7615.984^b	6.1		-2.1	
7619.308	3.6544^o	5.0	2.0277	4.0	7619.283	44.3		-0.9	
7625.782	3.3681^o	3.0	1.7428	3.0	7625.752	23.1		-1.6	
7639.611	3.6006^o	2.0	1.9781	2.0	7639.616	53.1		-0.9	
7643.910	4.0087	5.0	2.3872^o	6.0	7643.856	136.3		0.2	
7645.056	3.4253^o	2.0	1.8040	2.0	7645.037^c	43.3		-1.2	
7645.816	3.2447^o	7.0	1.6236	6.0	7645.812	435.8		-0.5	
7648.319	3.3231^o	1.0	1.7026	1.0	7648.297^c	9.8	-2.2	-2.1	
7655.500	3.4307^o	2.0	1.8117	3.0	7655.480	7.2		-2.0	
7661.202	4.1165	6.0	2.4986^o	5.0	7661.191	16.5		-0.5	
7668.213	3.8739	2.0	2.2576^o	3.0	7668.156	68.8		-0.3	
7677.688	3.8739	2.0	2.2596^o	1.0	7677.689^b	16.9		-0.9	
7677.694	3.5776^o	3.0	1.9632	3.0	7677.689^b	16.9		-1.4	
7679.174	3.5773^o	4.0	1.9632	3.0	7679.167	8.7		-1.7	
7682.981	3.3681^o	3.0	1.7549	4.0	7682.922	2.4		-2.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	$\log gf$ Boltz.	[47]
7685.981	3.7539^o	7.0	2.1413	8.0	7685.949	26.0		-0.9	
7686.602	2.0000^o	4.0	0.3875	5.0	7686.624	253.0		-2.8	
7695.690	4.1165	6.0	2.5059^o	7.0	7695.661	133.6		0.4	
7696.810	3.3129^o	2.0	1.7026	1.0	7696.765	9.5	-2.3	-2.1	
7700.516	3.5459^o	6.0	1.9363	6.0	7700.500	5.8		-1.9	
7705.293	3.6768	1.0	2.0682^o	2.0	7705.254	19.3		-1.2	
7705.947	3.5475^o	1.0	1.9390	1.0	7705.947	9.0		-1.7	
7706.553	3.8232^o	3.0	2.2148	2.0	7706.569^b	6.7		-1.4	
7706.582	3.8349	5.0	2.2266^o	4.0	7706.569^b	6.8		-1.4	
7707.420	3.4198^o	4.0	1.8117	3.0	7707.401	6.4	-2.4	-2.1	
7710.654	3.6768	1.0	2.0693^o	1.0	7710.614	47.3		-0.8	
7712.308	3.8337	5.0	2.2266^o	4.0	7712.299^c	9.5		-1.2	
7743.568	3.5638^o	3.0	1.9632	3.0	7743.547	30.3		-1.2	
7755.246	1.7829^o	2.0	0.1847	3.0	7755.239	207.4		-3.2	
7757.117	3.4307^o	2.0	1.8329	2.0	7757.079	29.0		-1.4	
7758.014	3.5093^o	9.0	1.9116	9.0	7758.078^c	59.3		-1.0	
7767.798	3.6639	3.0	2.0682^o	2.0	7767.764	32.8		-1.0	
7776.995	3.6036	2.0	2.0099^o	3.0	7776.931	132.7		-0.5	
7778.150	3.2621^o	5.0	1.6686	4.0	7778.093	44.5		-1.5	
7779.506	3.7245	2.0	2.1313^o	2.0	7779.482	9.9		-1.4	
7780.917	3.3969^o	2.0	1.8040	2.0	7780.922	1.9		-2.6	
7783.752	3.4253^o	2.0	1.8329	2.0	7783.723	34.1		-1.3	
7786.838	2.0902^o	5.0	0.4985	6.0	7786.874	115.5		-2.9	
7792.282	3.8739	2.0	2.2833^o	2.0	7792.218	30.7		-0.6	
7794.439	3.6001	2.0	2.0099^o	3.0	7794.412	270.7		-0.1	
7798.446	3.5475^o	1.0	1.9581	0.0	7798.396	43.0		-1.0	
7801.489	3.4386^o	4.0	1.8499	3.0	7801.485	573.5		-0.1	
7808.179	3.6639	3.0	2.0765^o	3.0	7808.125	32.0		-1.0	
7809.741	3.3681^o	3.0	1.7810	2.0	7809.698	12.5		-1.9	
7811.938	3.7245	2.0	2.1379^o	3.0	7811.929	15.7		-1.2	
7812.786	3.8131	3.0	2.2266^o	4.0	7812.770^c	46.9		-0.6	
7823.290	3.6537	0.0	2.0693^o	1.0	7823.244	40.2		-0.9	
7824.257	3.3231^o	1.0	1.7390	1.0	7824.299	2.1	-2.8	-2.7	
7835.541	3.1998^o	2.0	1.6180	2.0	7835.533	35.8		-1.7	
7835.989	3.1745^o	3.0	1.5927	3.0	7835.944	16.2		-2.0	
7856.101	3.1705^o	4.0	1.5927	3.0	7856.109	13.5		-2.1	
7859.442	3.9334	6.0	2.3563^o	7.0	7859.482	110.7		0.0	
7868.306	3.2778^o	1.0	1.7026	1.0	7868.275^c	7.4		-2.2	
7885.473	3.2509^o	2.0	1.6790	3.0	7885.463^c	11.2		-2.1	
7889.275	3.2501^o	3.0	1.6790	3.0	7889.291^c	28.8		-1.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	$\log gf$ Boltz.	[47]
7889.792	3.5342^o	3.0	1.9632	3.0	7889.726	12.2		-1.6	
7893.822	3.3129^o	2.0	1.7428	3.0	7893.764	5.7	-2.5	-2.3	
7895.930	3.6639	3.0	2.0941^o	4.0	7895.877	323.6		0.1	
7900.447	3.0955^o	3.0	1.5266	2.0	7900.446	18.2		-2.1	
7907.502	1.8493^o	3.0	0.2818	4.0	7907.525	58.5		-3.6	
7913.399	3.8349	5.0	2.2686^o	6.0	7913.411	79.3		-0.3	
7919.435	3.8337	5.0	2.2686^o	6.0	7919.439	124.8		-0.1	
7921.381	4.0087	5.0	2.4440^o	6.0	7921.338	33.7		-0.4	
7931.159	3.3719^o	8.0	1.8091	8.0	7931.174	155.1		-0.7	
7931.946	3.7431	4.0	2.1805^o	5.0	7931.906	271.6		0.1	
7932.739	3.3681^o	3.0	1.8057	4.0	7932.734	2.9		-2.5	
7935.610	3.3168^o	4.0	1.7549	4.0	7935.589	10.0		-2.0	
7940.413	3.0335^o	5.0	1.4726	4.0	7940.356	185.4	-1.2	-1.2	
7946.169	3.8349	5.0	2.2751^o	5.0	7946.161	28.2		-0.7	
7947.837	3.7245	2.0	2.1650^o	2.0	7947.780	6.6		-1.5	
7952.256	3.8337	5.0	2.2751^o	5.0	7952.245	36.5		-0.6	
7955.540	3.5212^o	4.0	1.9632	3.0	7955.561	21.4		-1.3	
7959.531	3.3121^o	3.0	1.7549	4.0	7959.475	7.8		-2.1	
7965.492	3.3979^o	4.0	1.8419	5.0	7965.480	5.7		-2.1	
7968.324	3.8131	3.0	2.2576^o	3.0	7968.314	63.2		-0.4	
8016.135	3.9334	6.0	2.3872^o	6.0	8016.108	91.0		-0.0	
8027.560	1.9315^o	4.0	0.3875	5.0	8027.569	12.6		-4.1	
8063.769	3.5647^o	4.0	2.0277	4.0	8063.768	4.8		-1.9	
8065.161	2.9510^o	4.0	1.4142	3.0	8065.188^b	206.4		-1.3	
8065.200	3.4616^o	2.0	1.9248	3.0	8065.188^b	212.4		-0.4	
8090.119	3.1557^o	5.0	1.6236	6.0	8090.075	4.9	-2.6	-2.6	
8097.241	3.6001	2.0	2.0693^o	1.0	8097.210	19.0		-1.2	
8102.380	3.8131	3.0	2.2833^o	2.0	8102.360	31.0		-0.7	
8105.914	3.9064	4.0	2.3773^o	4.0	8105.891	18.4		-0.8	
8116.154	3.6036	2.0	2.0765^o	3.0	8116.135	29.6		-1.0	
8146.570	2.8908^o	3.0	1.3694	2.0	8146.541	19.3	-2.3	-2.4	
8153.966	3.8739	2.0	2.3539^o	1.0	8153.920	19.1		-0.8	
8158.890	3.3231^o	1.0	1.8040	2.0	8158.904	13.2	-2.0	-1.8	
8165.361	3.9064	4.0	2.3884^o	5.0	8165.304	11.0		-1.0	
8169.838	3.8739	2.0	2.3568^o	2.0	8169.811	4.3		-1.4	
8187.657	3.7245	2.0	2.2107^o	3.0	8187.654	15.9		-1.1	
8203.984	2.8802^o	3.0	1.3694	2.0	8203.967^b	109.5	-1.6	-1.6	
8203.984	3.0374^o	2.0	1.5266	2.0	8203.967^b	109.5		-1.4	
8208.241	4.0087	5.0	2.4986^o	5.0	8208.199^c	77.9		0.0	
8218.612	3.2509^o	2.0	1.7428	3.0	8218.623^b	191.7		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	[47]
8218.687	3.1317^o	6.0	1.6236	6.0	8218.623^b	189.4		-1.0	
8227.432	3.5342^o	3.0	2.0277	4.0	8227.434	2.8		-2.2	
8234.941	2.9193^o	2.0	1.4142	3.0	8234.970	5.1	-2.8	-2.9	
8248.210	3.8349	5.0	2.3322^o	5.0	8248.211	15.2		-0.9	
8254.892	3.5292^o	4.0	2.0277	4.0	8254.862	7.3		-1.8	
8312.714	3.5593	1.0	2.0682^o	2.0	8312.665^c	15.9		-1.4	
8315.459	3.0335^o	5.0	1.5430	5.0	8315.481	85.9	-1.5	-1.5	
8383.721	2.9510^o	4.0	1.4726	4.0	8383.766^c	84.5		-1.6	
8395.070	3.4155^o	1.0	1.9390	1.0	8395.078	10.8		-1.7	
8437.590	2.8383^o	2.0	1.3694	2.0	8437.572	8.1	-2.9	-2.8	
8439.769	3.6768	1.0	2.2082^o	0.0	8439.713	9.0		-1.4	
8443.027	3.7431	4.0	2.2751^o	5.0	8442.975	3.1		-1.7	
8472.895	2.8322^o	2.0	1.3694	2.0	8472.854^c	19.9	-2.3	-2.4	
8476.774	3.6001	2.0	2.1379^o	3.0	8476.734	20.2		-1.2	
8511.872	3.4886^o	7.0	2.0324	7.0	8511.845^b	7.7		-1.8	
8511.901	3.8739	2.0	2.4178^o	3.0	8511.845^b	7.7		-1.1	
8623.831	3.6639	3.0	2.2266^o	4.0	8623.769	6.8		-1.5	
8641.535	3.8739	2.0	2.4396^o	2.0	8641.502^c	10.8		-1.0	
8791.044	3.0335^o	5.0	1.6236	6.0	8791.065	7.7	-2.5	-2.4	
8795.089	3.2209^o	2.0	1.8117	3.0	8795.051	40.0		-1.4	
8805.524	3.3807^o	1.0	1.9731	1.0	8805.580^b	4.5		-2.1	
8805.632	2.8802^o	3.0	1.4726	4.0	8805.579^b	5.5	-2.8	-2.8	
10564.467	3.8337	5.0	2.6605^o	5.0	10564.518	1480.5			

Table A.10: Measured wavelengths (λ_o) and intensities of Sm II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	[48]
3793.978	3.3708	3.5	0.1039	2.5	3793.983^n	539.7		-0.5	-0.7
3797.736	3.8075	5.5	0.5438	4.5	3797.729^n	751.4		0.3	-0.3
3826.207	3.7832	4.5	0.5438	4.5	3826.209^n	261.1		-0.2	-0.2
3848.814	3.4086^o	1.5	0.1882	0.5	3848.794^c	725.5		-0.3	
3851.880	3.4953^o	4.5	0.2775	4.5	3851.894	147.7	-1.0	-0.9	
3853.290	3.5951^o	4.5	0.3785	5.5	3853.301^c	2670.3		0.5	
3854.204	3.8751	5.5	0.6593	5.5	3854.196^n	704.4		0.4	0.1
3855.903	3.2549	0.5	0.0405	1.5	3855.901^n	121.4		-1.4	-0.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [48]
3858.522	4.6579^o	1.5	1.4456	2.5	3858.521^c	1225.7			
3871.784	3.3859^o	4.5	0.1846	3.5	3871.784	234.9	-0.8	-0.9	
3881.379	3.5267	3.5	0.3333	2.5	3881.387^n	129.3		-0.9	-1.0
3882.865	3.6259^o	3.5	0.4338	3.5	3882.858	134.6		-0.7	
3883.988	3.6250^o	2.5	0.4338	3.5	3884.002^c	212.8		-0.5	
3885.278	3.6749	6.5	0.4847	6.5	3885.284^n	1186.4		0.3	0.1
3890.078	3.3708^o	3.5	0.1846	3.5	3890.091	139.9	-1.2	-1.1	
3891.185	3.3735^o	0.5	0.1882	0.5	3891.181^b	132.6	-1.0	-1.1	
3891.205	4.3519^o	3.5	1.1667	2.5	3891.181^b	132.6		0.5	
3896.972	3.2211	2.5	0.0405	1.5	3896.965^n	423.7		-0.9	-0.7
3903.416	3.4528^o	4.5	0.2775	4.5	3903.415	359.0		-0.6	
3912.974	3.7113	5.5	0.5438	4.5	3912.980^n	235.7		-0.3	-1.5
3917.435	3.2679	2.5	0.1039	2.5	3917.435^n	200.6		-1.1	-1.0
3922.386	3.5384	5.5	0.3785	5.5	3922.392^n	666.1		-0.1	-0.3
3928.275	3.3399	3.5	0.1846	3.5	3928.278^n	605.3		-0.5	-0.5
3935.760	3.4267^o	5.5	0.2775	4.5	3935.764	113.9	-1.3	-1.1	
3941.876	3.1443	1.5	0.0000	0.5	3941.865^n	324.3		-1.1	-0.9
3943.237	3.2472	2.5	0.1039	2.5	3943.231^n	187.7		-1.2	-1.0
3946.514	3.3253	4.5	0.1846	3.5	3946.505^n	166.6		-1.1	-0.9
3947.832	3.4729	1.5	0.3333	2.5	3947.829^n	70.6		-1.2	-1.1
3948.114	3.2433	3.5	0.1039	2.5	3948.108^n	343.9		-0.9	-0.8
3958.705	3.4643^o	1.5	0.3333	2.5	3958.718	24.8		-1.7	
3959.525	3.2342	3.5	0.1039	2.5	3959.519^n	71.0		-1.6	-1.3
3961.808	3.6723	3.5	0.5438	4.5	3961.810^n	27.8		-1.3	-1.3
3962.978	3.5614^o	4.5	0.4338	3.5	3963.001^b	295.0		-0.4	
3963.006	3.4050^o	3.5	0.2775	4.5	3963.000^b	300.1		-0.7	
3963.017	3.1681^o	1.5	0.0405	1.5	3963.000^b	300.1	-1.0	-1.1	
3966.047	3.3735	0.5	0.2484	1.5	3966.039^n	166.9		-1.0	-0.9
3970.527	3.1216	1.5	0.0000	0.5	3970.517^n	317.2		-1.1	-1.0
3971.393	3.5548	2.5	0.4338	3.5	3971.387^n	491.9		-0.2	-0.3
3976.429	3.4504	1.5	0.3333	2.5	3976.423^n	217.2		-0.8	-0.6
3979.200	3.6586	3.5	0.5438	4.5	3979.193^n	279.1		-0.3	-0.5
3983.136	3.4902	5.5	0.3785	5.5	3983.135^n	272.9		-0.6	-0.6
3985.988	3.2978^o	1.5	0.1882	0.5	3985.992	39.6		-1.7	
3986.678	3.2936	4.5	0.1846	3.5	3986.681^n	229.0		-1.0	-0.9
3986.897	3.3572	2.5	0.2484	1.5	3986.903^n	27.0		-1.8	-1.4
3987.424	3.3859	4.5	0.2775	4.5	3987.430^n	73.8		-1.3	-1.1
3990.005	3.1064	1.5	0.0000	0.5	3990.014^n	5933.0		0.1	-1.1
3993.309	3.1443	1.5	0.0405	1.5	3993.303^n	354.7		-1.0	-0.9
3995.591	3.2867^o	3.5	0.1846	3.5	3995.574	22.6		-2.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [48]
4003.443	3.3443^o	2.5	0.2484	1.5	4003.458	48.2	-1.4	-1.6	
4007.476	3.5267	3.5	0.4338	3.5	4007.475^n	106.3		-0.9	-1.1
4019.976	3.2679	2.5	0.1846	3.5	4019.974^n	88.7		-1.4	-1.2
4023.222	3.1213	2.5	0.0405	1.5	4023.230^n	385.6		-1.0	-0.9
4035.104	3.4050^o	3.5	0.3333	2.5	4035.101	174.1		-0.9	
4037.105	3.3476^o	4.5	0.2775	4.5	4037.097	30.9	-1.6	-1.7	
4041.670	3.2549	0.5	0.1882	0.5	4041.659^n	221.6		-1.0	-1.0
4042.709	3.1064	1.5	0.0405	1.5	4042.708^n	334.4		-1.1	-1.0
4042.897	3.1697	3.5	0.1039	2.5	4042.893^n	523.5		-0.8	-0.7
4046.160	3.1672	2.5	0.1039	2.5	4046.152^n	137.1		-1.4	-1.3
4047.151	3.2472	2.5	0.1846	3.5	4047.143^n	222.0		-1.0	-0.9
4049.804	4.1366^o	4.5	1.0761	4.5	4049.806^b	112.6		0.1	
4049.812	3.0605^o	1.5	0.0000	0.5	4049.806^b	109.4		-1.7	
4054.539	4.2236^o	2.5	1.1667	2.5	4054.507^c	969.6			
4058.860	3.5384	5.5	0.4847	6.5	4058.867^n	140.5		-0.8	-0.9
4061.047	3.7113	5.5	0.6593	5.5	4061.040^n	33.8		-1.1	-1.3
4063.536	3.0907	2.5	0.0405	1.5	4063.530^n	680.8		-0.8	-0.8
4064.311	3.2342	3.5	0.1846	3.5	4064.308^n	86.5		-1.5	-1.3
4064.554	3.3828	2.5	0.3333	2.5	4064.564^n	779.0		-0.3	-0.7
4066.730	3.3253	4.5	0.2775	4.5	4066.721^n	406.5		-0.7	-0.7
4067.378	3.1512^o	2.5	0.1039	2.5	4067.384	29.7		-2.1	
4068.324	3.4804	3.5	0.4338	3.5	4068.314^n	186.3		-0.7	-0.8
4075.829	3.5848	4.5	0.5438	4.5	4075.825^n	411.5		-0.2	-0.4
4076.590	3.4743^o	4.5	0.4338	3.5	4076.610	92.4		-1.1	
4080.546	3.3708^o	3.5	0.3333	2.5	4080.538	95.2	-1.3	-1.2	
4081.953	3.2211^o	2.5	0.1846	3.5	4081.934	56.5	-1.6	-1.7	
4082.594	3.6952	4.5	0.6593	5.5	4082.584^n	165.0		-0.4	-0.7
4083.576	3.2836	1.5	0.2484	1.5	4083.562^n	99.2		-1.3	-1.2
4084.372	3.3680	2.5	0.3333	2.5	4084.372^n	44.3		-1.5	-1.3
4092.253	3.0288	1.5	0.0000	0.5	4092.250^n	719.5		-0.9	-0.9
4093.037	3.4620	2.5	0.4338	3.5	4093.045^n	23.3		-1.7	-1.9
4094.028	3.3608	3.5	0.3333	2.5	4094.026^n	66.5		-1.4	-1.2
4104.119	3.0605^o	1.5	0.0405	1.5	4104.107	56.8		-1.9	
4106.611	3.5620^o	3.5	0.5438	4.5	4106.584	39.3		-1.3	
4108.310	3.3954	4.5	0.3785	5.5	4108.308^n	34.8		-1.6	-1.5
4109.391	3.2936	4.5	0.2775	4.5	4109.392^n	119.8		-1.2	-1.0
4110.184	3.6749	6.5	0.6593	5.5	4110.180^n	67.1		-0.9	-1.0
4113.898	3.1975	3.5	0.1846	3.5	4113.891^n	182.7		-1.2	-1.1
4116.441	3.3443	2.5	0.3333	2.5	4116.440^n	51.2		-1.5	-1.3
4118.547	3.6687	4.5	0.6593	5.5	4118.543^n	791.3		0.2	-0.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[48]
4121.345	3.3859	4.5	0.3785	5.5	4121.345^n	144.5		-1.0	-0.9
4122.494	3.2549	0.5	0.2484	1.5	4122.486^n	105.5		-1.3	-1.2
4123.946	3.4902	5.5	0.4847	6.5	4123.946^n	250.0		-0.6	-0.7
4129.220	3.2500^o	2.5	0.2484	1.5	4129.227	117.1		-1.3	
4133.169	3.2472	2.5	0.2484	1.5	4133.170^n	28.4		-1.9	-1.7
4135.142	3.6567^o	5.5	0.6593	5.5	4135.146	100.0		-0.7	
4147.712	3.0288	1.5	0.0405	1.5	4147.705^n	139.0		-1.6	-1.4
4149.830	3.0907	2.5	0.1039	2.5	4149.820^n	496.1		-0.9	-0.9
4152.203	3.1697	3.5	0.1846	3.5	4152.194^n	526.0		-0.8	-0.7
4153.325	3.6435	4.5	0.6593	5.5	4153.322^n	236.0		-0.3	-0.6
4155.208	3.5267	3.5	0.5438	4.5	4155.207^n	216.0		-0.6	-0.7
4156.257	3.4160^o	3.5	0.4338	3.5	4156.238	44.8		-1.4	
4163.140	2.9772	1.5	0.0000	0.5	4163.130^n	116.2		-1.7	-1.6
4163.714	3.0807	2.5	0.1039	2.5	4163.713^n	38.1		-2.0	-1.7
4169.473	3.2211	2.5	0.2484	1.5	4169.476^n	389.7		-0.8	-0.8
4171.562	3.4050^o	3.5	0.4338	3.5	4171.569	131.9		-1.0	
4174.441	3.3476	4.5	0.3785	5.5	4174.427^n	54.2		-1.5	-1.3
4178.000	3.5104^o	4.5	0.5438	4.5	4178.018^b	183.1		-0.7	
4178.030	3.1512^o	2.5	0.1846	3.5	4178.018^b	183.1		-1.2	
4181.100	3.8490^o	2.5	0.8846	1.5	4181.101^b	238.7		-0.0	
4181.104	3.2978^o	1.5	0.3333	2.5	4181.101^b	238.7		-0.9	
4183.767	3.0030^o	0.5	0.0405	1.5	4183.758	362.7	-1.1	-1.2	
4188.128	3.5032	3.5	0.5438	4.5	4188.119^n	476.4		-0.3	-0.4
4188.575	2.9996^o	2.5	0.0405	1.5	4188.575	44.4	-3.4	-2.1	
4189.992	4.2204^o	4.5	1.2622	3.5	4190.012	39.4		-0.2	
4191.926	3.2342	3.5	0.2775	4.5	4191.921^n	209.3		-1.0	-1.0
4192.155	3.1412^o	4.5	0.1846	3.5	4192.153^b	86.2		-1.6	
4192.164	3.0605^o	1.5	0.1039	2.5	4192.153^b	86.2		-1.7	
4197.864	3.1372	3.5	0.1846	3.5	4197.859^n	15.8		-2.3	-2.0
4199.451	3.4953	4.5	0.5438	4.5	4199.450^n	94.7		-1.0	-1.1
4203.046	3.3828	2.5	0.4338	3.5	4203.045^n	535.4		-0.4	-0.5
4204.801	3.3262^o	5.5	0.3785	5.5	4204.825	9.7	-2.4	-2.2	
4205.369	4.0234^o	3.5	1.0761	4.5	4205.364	22.3		-0.7	
4206.124	3.3253	4.5	0.3785	5.5	4206.124^n	462.7		-0.6	-0.7
4206.618	3.4902	5.5	0.5438	4.5	4206.615^n	140.4		-0.8	-0.8
4210.339	3.0478	2.5	0.1039	2.5	4210.334^n	375.5		-1.1	-1.0
4220.148	3.3708^o	3.5	0.4338	3.5	4220.146	79.7	-1.4	-1.2	
4220.661	3.4804	3.5	0.5438	4.5	4220.646^n	459.0		-0.3	-0.4
4223.708	3.2679	2.5	0.3333	2.5	4223.704^n	104.4		-1.3	-1.3
4224.240	3.3680^o	2.5	0.4338	3.5	4224.244	26.3	-1.5	-1.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	log gf Boltz.	[48]
4225.324	3.1216	1.5	0.1882	0.5	4225.323[n]	1097.5		-0.5	-0.6
4229.713	2.9709	1.5	0.0405	1.5	4229.696[n]	590.3		-1.0	-0.9
4234.570	3.3608	3.5	0.4338	3.5	4234.568[n]	391.1		-0.6	-0.6
4236.736	3.5848	4.5	0.6593	5.5	4236.734[n]	776.9		0.1	-0.2
4237.657	3.0288	1.5	0.1039	2.5	4237.652[n]	456.5		-1.0	-1.0
4244.696	3.1975	3.5	0.2775	4.5	4244.698[n]	468.1		-0.7	-0.8
4245.167	3.1681	1.5	0.2484	1.5	4245.174[n]	76.6		-1.6	-1.5
4247.389	3.1064	1.5	0.1882	0.5	4247.391[n]	32.3		-2.0	-2.0
4249.523	4.0834[o]	2.5	1.1667	2.5	4249.540[b]	95.7		-0.0	
4249.536	3.2500[o]	2.5	0.3333	2.5	4249.540[b]	96.7		-1.3	
4251.777	3.2936	4.5	0.3785	5.5	4251.783[n]	109.0		-1.2	-1.1
4253.718	3.2472	2.5	0.3333	2.5	4253.712[n]	16.6		-2.1	-1.7
4256.391	3.2905	6.5	0.3785	5.5	4256.389[n]	2147.2		0.1	-0.2
4258.552	3.3443	2.5	0.4338	3.5	4258.557[n]	81.7		-1.3	-1.1
4262.669	3.2862	5.5	0.3785	5.5	4262.670[n]	500.0		-0.6	-0.5
4265.077	3.0907	2.5	0.1846	3.5	4265.063[n]	327.5		-1.1	-1.0
4266.334	4.1674[o]	4.5	1.2622	3.5	4266.309[c]	2179.0			
4279.667	3.1736	4.5	0.2775	4.5	4279.671[n]	802.5		-0.5	-0.5
4279.944	3.1443	1.5	0.2484	1.5	4279.940[n]	274.7		-1.0	-1.0
4280.321	2.9996	2.5	0.1039	2.5	4280.326[n]	83.8		-1.8	-1.7
4280.785	3.3801	7.5	0.4847	6.5	4280.779[n]	3105.1		0.4	0.1
4281.009	2.8953	0.5	0.0000	0.5	4281.001[n]	433.0		-1.3	-1.2
4285.488	3.1697	3.5	0.2775	4.5	4285.490[n]	362.0		-0.9	-0.9
4286.648	3.3253	4.5	0.4338	3.5	4286.641[n]	205.4		-0.9	-1.0
4292.180	3.2211	2.5	0.3333	2.5	4292.175[n]	265.2		-0.9	-0.9
4295.708	3.3192[o]	3.5	0.4338	3.5	4295.711	26.1		-1.8	
4309.006	3.0611	3.5	0.1846	3.5	4309.003[n]	674.4		-0.8	-0.7
4318.927	3.1473	5.5	0.2775	4.5	4318.932[n]	2677.5		-0.0	-0.2
4323.290	2.9709	1.5	0.1039	2.5	4323.278[n]	600.9		-1.0	-0.9
4327.514	3.1975	3.5	0.3333	2.5	4327.513[n]	21.8		-2.0	-1.8
4329.019	3.0478	2.5	0.1846	3.5	4329.011[n]	1370.1		-0.5	-0.5
4334.144	3.1372	3.5	0.2775	4.5	4334.142[n]	1404.5		-0.3	-0.5
4345.852	2.9560	2.5	0.1039	2.5	4345.845[n]	378.8		-1.2	-1.1
4347.795	3.2293	4.5	0.3785	5.5	4347.792[n]	930.2		-0.4	-0.4
4350.470	3.3337	7.5	0.4847	6.5	4350.451[n]	574.7		-0.4	-0.6
4352.095	3.3327	5.5	0.4847	6.5	4352.091[n]	547.3		-0.4	-0.6
4360.716	3.0907	2.5	0.2484	1.5	4360.711[n]	524.4		-0.8	-0.9
4361.072	3.3859	4.5	0.5438	4.5	4361.070[n]	101.9		-1.1	-1.1
4362.029	3.3262	5.5	0.4847	6.5	4362.035[n]	684.3		-0.3	-0.5
4363.445	3.0288	1.5	0.1882	0.5	4363.447[n]	182.8		-1.4	-1.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [48]
4368.023	3.2161	6.5	0.3785	5.5	4368.030^n	220.8		-1.0	-0.9
4370.471	3.4953	4.5	0.6593	5.5	4370.476^n	23.1		-1.5	-1.6
4373.458	3.2679	2.5	0.4338	3.5	4373.455^n	338.7		-0.7	-0.9
4374.975	2.8736	1.5	0.0405	1.5	4374.968^n	323.3		-1.4	-1.4
4378.235	3.4902	5.5	0.6593	5.5	4378.222^n	312.6		-0.4	-0.6
4384.296	3.3708	3.5	0.5438	4.5	4384.287^n	150.1		-0.9	-1.0
4390.855	3.0075	4.5	0.1846	3.5	4390.854^n	2973.9		-0.2	-0.4
4399.864	3.3608	3.5	0.5438	4.5	4399.856^n	25.2		-1.7	-1.5
4403.366	3.0030	0.5	0.1882	0.5	4403.359^n	319.4		-1.2	-1.1
4407.486	3.0605^o	1.5	0.2484	1.5	4407.481	20.6		-2.3	
4417.575	3.2905	6.5	0.4847	6.5	4417.574^n	239.1		-0.8	-0.9
4420.524	3.1372	3.5	0.3333	2.5	4420.522^n	1301.7		-0.3	-0.4
4421.126	3.1820	6.5	0.3785	5.5	4421.128^n	1086.3		-0.3	-0.5
4424.337	3.2862	5.5	0.4847	6.5	4424.341^n	3284.0		0.3	0.1
4425.983	3.2342^o	3.5	0.4338	3.5	4425.979	62.9	-1.5	-1.5	
4427.580	3.0478	2.5	0.2484	1.5	4427.576^n	131.9		-1.5	-1.3
4433.890	3.2293	4.5	0.4338	3.5	4433.880^n	1858.3		-0.0	-0.2
4434.318	3.1736	4.5	0.3785	5.5	4434.319^n	2674.9		0.0	-0.1
4444.270	3.3327	5.5	0.5438	4.5	4444.260^n	702.2		-0.3	-0.5
4445.839	3.1213^o	2.5	0.3333	2.5	4445.815^c	522.9	-0.7	-0.8	
4452.722	3.0611	3.5	0.2775	4.5	4452.721^n	1538.8		-0.4	-0.4
4452.928	4.2768^o	4.5	1.4934	4.5	4452.952	6046.4			
4454.629	3.3262	5.5	0.5438	4.5	4454.626^n	1577.6		0.1	-0.2
4456.114	3.3253	4.5	0.5438	4.5	4456.104^n	51.9		-1.4	-1.4
4457.801	3.0288	1.5	0.2484	1.5	4457.793^n	21.9		-2.3	-2.3
4458.509	2.8839	3.5	0.1039	2.5	4458.511^n	2403.5		-0.5	-0.7
4467.341	3.4338	6.5	0.6593	5.5	4467.333^n	3222.6		0.5	0.2
4469.648	3.1064^o	1.5	0.3333	2.5	4469.640	96.4	-2.6	-1.5	
4472.409	2.9560	2.5	0.1846	3.5	4472.402^n	521.3		-1.0	-1.0
4473.012	3.0484	5.5	0.2775	4.5	4473.006^n	978.3		-0.6	-0.7
4475.166	2.8736	1.5	0.1039	2.5	4475.159^n	81.3		-2.0	-1.8
4478.661	3.4268	6.5	0.6593	5.5	4478.650^n	635.8		-0.2	-0.4
4482.595	3.8411^o	5.5	1.0761	4.5	4482.608	37.8		-0.7	
4485.543	3.6478^o	0.5	0.8846	1.5	4485.522	23.5		-1.2	
4490.365	4.2768^o	4.5	1.5166	3.5	4490.344	13.8		-0.5	
4499.475	3.0030^o	0.5	0.2484	1.5	4499.473	628.2	-0.7	-0.9	
4501.372	3.0869^o	3.5	0.3333	2.5	4501.363	33.0		-2.0	
4505.037	2.9996	2.5	0.2484	1.5	4505.037^n	132.3		-1.5	-1.4
4511.830	2.9318	4.5	0.1846	3.5	4511.824^n	868.9		-0.8	-0.8
4515.099	2.9334	0.5	0.1882	0.5	4515.085^n	922.5		-0.8	-0.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [48]
4519.630	3.2862	5.5	0.5438	4.5	4519.625[n]	627.1		-0.4	-0.4
4523.909	3.1736	4.5	0.4338	3.5	4523.907[n]	1162.3		-0.3	-0.4
4536.512	2.8361	3.5	0.1039	2.5	4536.508[n]	400.2		-1.3	-1.3
4537.941	3.2161	6.5	0.4847	6.5	4537.945[n]	444.4		-0.6	-0.5
4538.557	3.2747	5.5	0.5438	4.5	4538.545[n]	79.9		-1.3	-1.2
4540.177	3.0075	4.5	0.2775	4.5	4540.182[n]	145.0		-1.5	-1.3
4542.048	2.9772	1.5	0.2484	1.5	4542.043[n]	532.6		-1.0	-1.0
4543.943	3.0611	3.5	0.3333	2.5	4543.939[n]	1347.3		-0.4	-0.5
4544.833	3.0605[o]	1.5	0.3333	2.5	4544.823	60.1		-1.8	
4545.798	3.3859	4.5	0.6593	5.5	4545.797[n]	23.5		-1.6	-1.7
4549.696	3.8003[o]	4.5	1.0761	4.5	4549.705	61.3		-0.6	
4552.661	2.9709	1.5	0.2484	1.5	4552.650[n]	794.7		-0.8	-0.8
4554.436	2.8254	3.5	0.1039	2.5	4554.431[n]	433.4		-1.3	-1.3
4560.416	2.7584	2.5	0.0405	1.5	4560.416[n]	558.7		-1.3	-1.2
4564.072	2.7157	1.5	0.0000	0.5	4564.057[n]	134.0		-2.0	-1.9
4566.202	3.0478	2.5	0.3333	2.5	4566.195[n]	1024.0		-0.5	-0.6
4577.688	2.9560	2.5	0.2484	1.5	4577.687[n]	1053.1		-0.7	-0.7
4578.017	3.1412[o]	4.5	0.4338	3.5	4578.020	53.3		-1.7	
4578.704	2.8953	0.5	0.1882	0.5	4578.697[n]	45.9		-2.1	-1.9
4584.826	3.1372	3.5	0.4338	3.5	4584.828[n]	753.8		-0.5	-0.6
4589.408	3.8669[o]	4.5	1.1662	5.5	4589.412	35.2		-0.7	
4591.813	2.8839	3.5	0.1846	3.5	4591.817[n]	509.2		-1.1	-1.1
4593.535	3.0767	5.5	0.3785	5.5	4593.537[n]	514.2		-0.8	-0.8
4595.283	3.1820	6.5	0.4847	6.5	4595.284[n]	795.2		-0.4	-0.5
4598.316	4.1583[o]	2.5	1.4628	2.5	4598.282[c]	932.1			
4603.112	4.1860	7.5	1.4934	8.5	4603.101[n]	117.2		0.4	-0.7
4604.174	2.7325	2.5	0.0405	1.5	4604.163[n]	284.6		-1.6	-1.4
4606.510	2.6907	1.5	0.0000	0.5	4606.505[n]	638.9		-1.3	-1.3
4606.877	3.2342	3.5	0.5438	4.5	4606.876[n]	78.6		-1.4	-1.5
4607.877	3.9757[o]	0.5	1.2859	0.5	4607.845	34.7		-0.5	
4611.710	3.5723[o]	1.5	0.8846	1.5	4611.677	324.4		-0.2	
4613.504	3.0199[o]	3.5	0.3333	2.5	4613.499[b]	52.4		-1.9	
4613.504	3.7627[o]	3.5	1.0761	4.5	4613.499[b]	52.4		-0.7	
4615.444	3.2293	4.5	0.5438	4.5	4615.430[n]	322.9		-0.7	-0.7
4615.683	2.8736	1.5	0.1882	0.5	4615.680[n]	1277.2		-0.7	-0.8
4630.205	2.7808	2.5	0.1039	2.5	4630.201[n]	281.4		-1.5	-1.5
4630.968	4.3632[o]	5.5	1.6867	6.5	4630.962	417.5			
4636.267	3.3327[o]	5.5	0.6593	5.5	4636.260	65.8	-1.4	-1.3	
4642.228	3.0484	5.5	0.3785	5.5	4642.228[n]	1334.6		-0.4	-0.5
4646.677	2.9449	4.5	0.2775	4.5	4646.678[n]	299.0		-1.2	-1.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[48]
4647.541	3.3262	5.5	0.6593	5.5	4647.540^{n}	230.7		-0.7	-1.0
4648.101	4.2768^{o}	4.5	1.6102	3.5	4648.069^{c}	3881.8			
4648.631	2.9996	2.5	0.3333	2.5	4648.646^{n}	410.9		-1.0	-2.4
4655.114	3.1473^{o}	5.5	0.4847	6.5	4655.129	161.2	-1.4	-1.2	
4664.505	4.4072^{o}	5.5	1.7500	4.5	4664.516^{c}	71.5		0.5	
4665.119	3.0907	2.5	0.4338	3.5	4665.111^{n}	61.6		-1.7	-1.4
4669.386	2.7584	2.5	0.1039	2.5	4669.387^{n}	2421.6		-0.6	-0.6
4669.641	2.9318	4.5	0.2775	4.5	4669.638^{n}	1742.9		-0.5	-0.5
4674.593	2.8361	3.5	0.1846	3.5	4674.588^{n}	2752.6		-0.4	-0.6
4676.902	2.6907	1.5	0.0405	1.5	4676.903^{n}	1924.7		-0.8	-0.9
4682.673	3.0807	2.5	0.4338	3.5	4682.680^{n}	79.5		-1.6	-1.6
4686.699	3.9927^{o}	3.5	1.3481	2.5	4686.696	47.0		-0.3	
4687.189	2.6849	0.5	0.0405	1.5	4687.176^{n}	869.7		-1.2	-1.1
4689.557	2.8914^{o}	2.5	0.2484	1.5	4689.583	65.0		-2.0	
4693.628	2.8254	3.5	0.1846	3.5	4693.625^{n}	138.6		-1.7	-1.5
4699.356	2.9709^{o}	1.5	0.3333	2.5	4699.346	117.5	-1.5	-1.6	
4700.032	4.0999^{o}	1.5	1.4628	2.5	4700.043	20.3		-0.5	
4704.400	2.6347	0.5	0.0000	0.5	4704.391^{n}	8602.6		-0.3	-0.9
4706.530	4.1269^{o}	5.5	1.4934	4.5	4706.537	60.9		0.0	
4713.067	3.1736	4.5	0.5438	4.5	4713.062^{n}	312.0		-0.8	-0.8
4717.727	3.0611	3.5	0.4338	3.5	4717.727^{n}	257.6		-1.1	-0.9
4718.339	3.2862	5.5	0.6593	5.5	4718.340^{n}	117.9		-1.1	-0.8
4719.841	2.6666	1.5	0.0405	1.5	4719.840^{n}	888.5		-1.2	-1.2
4720.128	3.1697^{o}	3.5	0.5438	4.5	4720.121	35.2	-1.7	-1.8	
4726.026	2.9560	2.5	0.3333	2.5	4726.020^{n}	143.1		-1.5	-1.2
4726.515	3.9265^{o}	2.5	1.3041	1.5	4726.500	20.6		-0.8	
4729.755	4.0834^{o}	2.5	1.4628	2.5	4729.784^{c}	70.5		0.0	
4741.726	3.0478^{o}	2.5	0.4338	3.5	4741.731	66.9	-1.7	-1.7	
4745.681	2.7157	1.5	0.1039	2.5	4745.670^{n}	1323.6		-0.9	-0.9
4755.370	2.8839^{o}	3.5	0.2775	4.5	4755.366	80.2	-2.0	-1.9	
4757.526	3.8675^{o}	2.5	1.2622	3.5	4757.499^{c}	35.0		-0.6	
4766.159	2.7045^{o}	2.5	0.1039	2.5	4766.189	58.8		-2.3	
4774.139	2.7808	2.5	0.1846	3.5	4774.127^{n}	185.5		-1.7	-1.6
4777.840	2.6347	0.5	0.0405	1.5	4777.835^{n}	420.6		-1.5	-1.4
4781.460	4.3519^{o}	3.5	1.7597	2.5	4781.462^{b}	82.5		0.5	
4781.476	4.2618^{o}	4.5	1.6696	5.5	4781.462^{bc}	82.5		0.4	
4781.828	3.0767	5.5	0.4847	6.5	4781.824^{n}	98.0		-1.5	-1.5
4791.580	2.6907	1.5	0.1039	2.5	4791.585^{n}	255.1		-1.7	-1.4
4803.421	3.6440^{o}	2.5	1.0636	1.5	4803.406	175.8		-0.3	
4808.973	3.8396^{o}	4.5	1.2622	3.5	4808.982^{b}	112.5		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [48]
4808.985	4.1695[o]	3.5	1.5921	4.5	4808.982[b]	112.5		0.4	
4814.079	4.1327[o]	3.5	1.5580	2.5	4814.093	65.6		0.1	
4814.337	3.9226[o]	1.5	1.3481	2.5	4814.350	44.4		-0.4	
4815.805	2.7584	2.5	0.1846	3.5	4815.801[n]	1024.8		-0.9	-0.8
4825.545	3.7348[o]	6.5	1.1662	5.5	4825.527[b]	19.2		-1.1	
4825.566	4.3283[o]	1.5	1.7597	2.5	4825.527[b]	19.5		-0.1	
4829.557	2.9449	4.5	0.3785	5.5	4829.564[n]	113.3		-1.6	-1.3
4831.179	3.9136[o]	3.5	1.3481	2.5	4831.181	96.1		-0.1	
4834.618	3.0484[o]	5.5	0.4847	6.5	4834.636[b]	44.6	-1.9	-1.8	
4834.646	3.9334[o]	2.5	1.3697	1.5	4834.636[b]	44.4		-0.4	
4836.660	2.6666[o]	1.5	0.1039	2.5	4836.669	51.2	-2.4	-2.4	
4844.209	2.8361	3.5	0.2775	4.5	4844.207[n]	786.8		-0.9	-0.9
4844.549	3.8207[o]	3.5	1.2622	3.5	4844.543[c]	76.5		-0.4	
4847.763	3.2161	6.5	0.6593	5.5	4847.752[n]	142.1		-1.1	-0.9
4854.368	2.9318	4.5	0.3785	5.5	4854.367[n]	144.5		-1.5	-1.2
4859.557	2.8839	3.5	0.3333	2.5	4859.564[n]	135.0		-1.6	-1.5
4890.325	4.0511[o]	2.5	1.5166	3.5	4890.319	187.9		0.4	
4893.336	3.0767[o]	5.5	0.5438	4.5	4893.315	159.3	-1.2	-1.2	
4894.292	2.7808	2.5	0.2484	1.5	4894.299[n]	76.1		-2.0	-1.9
4896.399	3.4643[o]	1.5	0.9329	2.5	4896.381	334.1		-0.3	
4907.082	4.2721[o]	6.5	1.7462	6.5	4907.076	47.7		0.2	
4920.392	3.5951[o]	4.5	1.0761	4.5	4920.405	53.6		-0.9	
4930.947	3.9265[o]	2.5	1.4128	3.5	4930.959	25.9		-0.6	
4938.091	2.7584[o]	2.5	0.2484	1.5	4938.104	115.6	-1.8	-1.9	
4948.631	3.0484	5.5	0.5438	4.5	4948.622[n]	168.1		-1.2	-0.9
4952.370	2.8361	3.5	0.3333	2.5	4952.370[n]	269.8		-1.4	-1.3
4955.942	3.8490[o]	2.5	1.3481	2.5	4955.958	102.5		-0.2	
4958.439	3.8586[o]	5.5	1.3589	4.5	4958.429	246.4		0.2	
4961.941	2.9318	4.5	0.4338	3.5	4961.937[n]	200.1		-1.3	-1.1
4964.566	2.6849[o]	0.5	0.1882	0.5	4964.566	60.1	-2.2	-2.3	
4972.527	4.2007[o]	3.5	1.7081	3.5	4972.490	98.7		0.4	
4978.353	3.7938[o]	0.5	1.3041	1.5	4978.319	61.0		-0.5	
5028.427	3.7508[o]	0.5	1.2859	0.5	5028.437[b]	199.4		-0.0	
5028.450	3.9583[o]	7.5	1.4934	8.5	5028.437[b]	237.4		0.4	
5029.854	3.5403[o]	5.5	1.0761	4.5	5029.826	165.9		-0.4	
5039.466	4.2781[o]	3.5	1.8185	3.5	5039.451	229.1		0.9	
5041.286	4.0167[o]	2.5	1.5580	2.5	5041.271	89.0		0.1	
5041.957	4.2768[o]	4.5	1.8185	3.5	5041.924[c]	321.9			
5045.188	3.5203[o]	2.5	1.0636	1.5	5045.147[c]	109.1		-0.6	
5051.199	4.0118[o]	1.5	1.5580	2.5	5051.171[c]	83.0		0.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[48]
5054.514	3.4497^o	4.5	0.9976	3.5	5054.506^c	183.9		-0.5	
5058.850	2.8839	3.5	0.4338	3.5	5058.830^n	36.5		-2.1	-2.2
5066.379	2.6347^o	0.5	0.1882	0.5	5066.370	60.8	-2.8	-2.3	
5069.473	3.7113^o	5.5	1.2664	6.5	5069.467	320.2	-0.9	0.2	
5071.787	3.7297^o	1.5	1.2859	0.5	5071.810	125.9		-0.2	
5072.423	4.3334^o	4.5	1.8898	4.5	5072.462^c	528.5			
5076.686	3.8003^o	4.5	1.3589	4.5	5076.681^c	777.0		0.7	
5087.622	3.8490^o	2.5	1.4128	3.5	5087.593	53.5		-0.4	
5110.559	3.8872^o	4.5	1.4619	5.5	5110.521	184.2		0.2	
5112.284	3.8701^o	3.5	1.4456	2.5	5112.307^b	106.1		-0.1	
5112.294	3.3091^o	0.5	0.8846	1.5	5112.307^b	106.1		-1.0	
5118.802	3.9148^o	5.5	1.4934	4.5	5118.769^c	63.4		-0.2	
5130.234	3.9740^o	1.5	1.5580	2.5	5130.258^c	307.8		0.6	
5132.222	4.3049^o	4.5	1.8898	4.5	5132.205^c	1022.5			
5136.312	4.0234^o	3.5	1.6102	3.5	5136.297	65.8		-0.0	
5137.904	4.4057^o	0.5	1.9933	1.5	5137.944	78.5		0.7	
5143.267	3.9265^o	2.5	1.5166	3.5	5143.293^c	1023.9			
5150.437	3.6687^o	4.5	1.2622	3.5	5150.453^c	147.5	-0.5	-0.2	
5168.317	3.4743^o	4.5	1.0761	4.5	5168.347^c	1337.3		0.4	
5169.587	3.8910^o	7.5	1.4934	8.5	5169.578	187.6		0.2	
5181.448	3.8377^o	3.5	1.4456	2.5	5181.435	132.3		0.0	
5183.149	3.7744^o	2.5	1.3830	1.5	5183.127	99.5		-0.2	
5183.560	3.8040^o	4.5	1.4128	3.5	5183.587	209.5		0.1	
5186.825	3.8025^o	2.5	1.4128	3.5	5186.820	173.0		0.1	
5190.102	3.5548^o	2.5	1.1667	2.5	5190.094	33.7	-1.1	-1.0	
5202.323	3.9682^o	4.5	1.5857	5.5	5202.341	268.5		0.5	
5204.273	3.7297^o	1.5	1.3481	2.5	5204.274	60.2		-0.5	
5209.939	3.9647^o	5.5	1.5857	5.5	5209.917^c	1550.9			
5223.902	4.1227^o	4.5	1.7500	4.5	5223.910^b	67.0		0.2	
5223.916	3.6768^o	1.5	1.3041	1.5	5223.910^b	67.3		-0.5	
5253.445	3.7348^o	6.5	1.3755	7.5	5253.433^c	200.8		0.0	
5258.699	4.6479^o	0.5	2.2909	1.5	5258.676	134.0			
5272.850	3.2836^o	1.5	0.9329	2.5	5272.880^b	15.9	-1.7	-1.8	
5272.905	3.4267^o	5.5	1.0761	4.5	5272.880^b	16.1	-1.8	-1.6	
5275.513	3.7623^o	4.5	1.4128	3.5	5275.553	44.9		-0.6	
5308.848	3.7178^o	2.5	1.3830	1.5	5308.813^c	128.6		-0.2	
5310.156	4.0422^o	2.5	1.7081	3.5	5310.197	100.1		0.2	
5332.078	2.7584^o	2.5	0.4338	3.5	5332.076^c	192.6	-1.5	-1.5	
5351.386	4.0029^o	6.5	1.6867	6.5	5351.355^c	148.3		0.4	
5366.958	3.8675^o	2.5	1.5580	2.5	5366.968	62.0		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	[48]
5374.055	3.7192^o	4.5	1.4128	3.5	5374.040^c	147.5		-0.1	
5374.306	3.4729^o	1.5	1.1667	2.5	5374.313^c	104.7	-0.5	-0.6	
5378.710	3.3680^o	2.5	1.0636	1.5	5378.740	53.1	-0.9	-1.1	
5381.058	3.9136^o	3.5	1.6102	3.5	5381.051	177.5		0.3	
5386.425	4.2721^o	6.5	1.9710	5.5	5386.454	51.2		0.3	
5394.476	3.4643^o	1.5	1.1667	2.5	5394.477^c	50.1		-1.0	
5398.181	3.2936^o	4.5	0.9976	3.5	5398.172^c	37.3	-1.2	-1.4	
5409.195	4.3283^o	1.5	2.0368	2.5	5409.167	36.8		0.3	
5409.482	4.4057^o	0.5	2.1144	0.5	5409.485	72.5		0.7	
5411.423	4.0405^o	5.5	1.7500	4.5	5411.393^c	5819.6			
5432.106	3.7751^o	4.5	1.4934	4.5	5432.114	41.1		-0.5	
5435.509	3.5425^o	2.5	1.2622	3.5	5435.492	50.7		-0.8	
5436.286	4.4767^o	4.5	2.1967	4.5	5436.327^c	931.3			
5446.869	3.6344^o	5.5	1.3589	4.5	5446.830^c	72.0		-0.5	
5463.196	4.0285^o	1.5	1.7597	2.5	5463.165	161.0		0.5	
5472.691	4.0834^o	2.5	1.8185	3.5	5472.659	272.6		0.8	
5478.560	4.2334^o	6.5	1.9710	5.5	5478.563	219.6		0.9	
5482.111	3.6440^o	2.5	1.3830	1.5	5482.153	257.1		0.1	
5495.618	3.6250^o	2.5	1.3697	1.5	5495.603^c	144.8		-0.2	
5496.800	4.0146^o	3.5	1.7597	2.5	5496.814	179.0		0.5	
5513.245	3.8584^o	4.5	1.6102	3.5	5513.210^c	80.5		-0.1	
5518.352	3.7627^o	3.5	1.5166	3.5	5518.342^c	50.4		-0.5	
5530.325	4.2781^o	3.5	2.0368	2.5	5530.355	36.1		0.2	
5573.928	4.0422^o	2.5	1.8185	3.5	5573.917	82.0		0.2	
5587.451	3.1512^o	2.5	0.9329	2.5	5587.463^c	172.1		-0.9	
5591.151	3.7334^o	3.5	1.5166	3.5	5591.166^c	1647.6			
5592.950	3.3828^o	2.5	1.1667	2.5	5592.962	38.4	-1.5	-1.2	
5599.588	3.8831^o	4.5	1.6696	5.5	5599.542^c	75.7		-0.1	
5612.962	3.8003^o	4.5	1.5921	4.5	5612.989^c	118.7		-0.0	
5630.038	3.7872^o	6.5	1.5857	5.5	5630.066^c	167.1		0.1	
5636.708	3.7570^o	2.5	1.5580	2.5	5636.716	52.3		-0.4	
5658.188	3.4528^o	4.5	1.2622	3.5	5658.183^c	69.7		-0.8	
5661.164	3.7751^o	4.5	1.5857	5.5	5661.177^c	251.9		0.3	
5694.608	3.8847^o	2.5	1.7081	3.5	5694.597	125.6		0.2	
5702.231	3.9334^o	2.5	1.7597	2.5	5702.249^c	56.3		-0.1	
5702.703	3.1064^o	1.5	0.9329	2.5	5702.736	36.1	-2.7	-1.6	
5703.438	3.3399^o	3.5	1.1667	2.5	5703.437^c	94.7	-0.9	-0.8	
5706.189	3.1697^o	3.5	0.9976	3.5	5706.196^c	9669.5	1.0	0.9	
5706.730	4.2319^o	5.5	2.0600	6.5	5706.748^c	3499.4			
5707.228	3.5548^o	2.5	1.3830	1.5	5707.204^c	550.6	0.2	0.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[48]
5712.538	4.2781^o	3.5	2.1083	3.5	5712.517	41.6		0.3	
5727.310	3.7744^o	2.5	1.6102	3.5	5727.266^c	48.5		-0.4	
5740.854	3.3253^o	4.5	1.1662	5.5	5740.855^c	317.8	-0.4	-0.3	
5741.164	3.8285^o	6.5	1.6696	5.5	5741.169	119.4		0.1	
5744.998	3.2211^o	2.5	1.0636	1.5	5745.032	150.6	-0.7	-0.8	
5756.410	3.2293^o	4.5	1.0761	4.5	5756.390^c	371.8	-0.5	-0.4	
5765.853	3.9682^o	4.5	1.8185	3.5	5765.898^c	150.4		0.4	
5773.748	3.7324^o	4.5	1.5857	5.5	5773.767^{bc}	2738.4			
5773.781	3.7570^o	2.5	1.6102	3.5	5773.767^b	2737.6			
5788.387	3.7334^o	3.5	1.5921	4.5	5788.387^c	3119.8			
5810.318	3.3954^o	4.5	1.2622	3.5	5810.346^c	55.4	-0.8	-0.9	
5833.427	4.0146^o	3.5	1.8898	4.5	5833.384^c	96.4		0.3	
5845.823	4.0101^o	3.5	1.8898	4.5	5845.846^c	66.4		0.1	
5863.866	3.3801^o	7.5	1.2664	6.5	5863.859	23.5	-1.6	-1.3	
5864.533	3.7831^o	5.5	1.6696	5.5	5864.485^c	156.1	0.2	0.1	
5867.738	3.8586^o	5.5	1.7462	6.5	5867.774^c	5542.6			
5875.950	4.2238^o	1.5	2.1144	0.5	5875.911^c	1385.8			
5886.038	3.3680^o	2.5	1.2622	3.5	5886.065^c	64.4	-0.7	-0.9	
5896.237	4.0731^o	6.5	1.9710	5.5	5896.283^c	449.0			
5906.113	3.3608^o	3.5	1.2622	3.5	5906.070^c	1611.3	0.5	0.5	
5909.062	3.1736^o	4.5	1.0761	4.5	5909.044^c	2676.8	0.4	0.4	
5916.067	3.9136^o	3.5	1.8185	3.5	5916.036	83.0		0.1	
5916.361	3.3572^o	2.5	1.2622	3.5	5916.372^c	4407.4		0.9	
5922.835	3.7623^o	4.5	1.6696	5.5	5922.796	61.9		-0.3	
5931.543	3.8396^o	4.5	1.7500	4.5	5931.540	93.4		0.0	
5933.909	4.1971^o	4.5	2.1083	3.5	5933.946	42.3		0.3	
5936.932	3.8377^o	3.5	1.7500	4.5	5936.885^c	40.3		-0.3	
5953.273	4.0530^o	5.5	1.9710	5.5	5953.286^c	30.3		-0.1	
6010.830	3.6723^o	3.5	1.6102	3.5	6010.793^c	139.7	-0.0	-0.0	
6016.792	4.0310^o	5.5	1.9710	5.5	6016.800^c	267.3		0.8	
6023.132	3.6435^o	4.5	1.5857	5.5	6023.178	52.7	-0.8	-0.5	
6041.357	4.4117^o	2.5	2.3600	2.5	6041.388^c	727.3			
6043.329	4.2072^o	7.5	2.1563	7.5	6043.329^c	84.6		0.6	
6045.427	3.1139^o	0.5	1.0636	1.5	6045.386^c	738.3		-0.2	
6067.445	3.1064^o	1.5	1.0636	1.5	6067.398^c	163.6	-2.0	-0.9	
6114.676	3.3859^o	4.5	1.3589	4.5	6114.721	86.8	-0.7	-0.7	
6117.962	3.5425^o	2.5	1.5166	3.5	6118.008	1465.7		0.8	
6122.717	4.1327^o	3.5	2.1083	3.5	6122.740^c	350.0			
6124.892	3.6339^o	3.5	1.6102	3.5	6124.917	34.6		-0.7	
6156.921	3.3828^o	2.5	1.3697	1.5	6156.901^b	37.5	-1.4	-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	[48]
6156.952	4.0731^o	6.5	2.0600	6.5	6156.901^b	37.4		0.1	
6187.950	3.1697^o	3.5	1.1667	2.5	6187.950	36.4	-1.3	-1.4	
6191.211	3.3608^o	3.5	1.3589	4.5	6191.238	151.3	-0.4	-0.5	
6192.642	3.4643^o	1.5	1.4628	2.5	6192.635^c	77.7		-0.6	
6195.205	3.0767^o	5.5	1.0761	4.5	6195.190^c	37.9	-1.6	-1.5	
6202.508	3.3680^o	2.5	1.3697	1.5	6202.554^c	16.9	-1.2	-1.4	
6206.829	3.0605^o	1.5	1.0636	1.5	6206.835	373.5		-0.6	
6236.189	3.3572^o	2.5	1.3697	1.5	6236.235^c	45.4	-0.6	-1.0	
6242.029	3.3553^o	1.5	1.3697	1.5	6241.989	30.9		-1.2	
6251.675	3.3954^o	4.5	1.4128	3.5	6251.661^c	129.4	-0.3	-0.5	
6256.522	3.2433^o	3.5	1.2622	3.5	6256.543^b	89.5	-0.8	-0.9	
6256.589	3.1473^o	5.5	1.1662	5.5	6256.543^{bc}	86.1	-1.3	-1.1	
6271.059	3.5867^o	2.5	1.6102	3.5	6271.043^c	95.9		-0.3	
6288.234	3.3192^o	3.5	1.3481	2.5	6288.249^c	19.0		-1.4	
6289.321	4.1674^o	4.5	2.1967	4.5	6289.365	22.1		0.0	
6321.735	3.6687^o	4.5	1.7081	3.5	6321.713	47.4	-0.7	-0.5	
6345.900	3.4160^o	3.5	1.4628	2.5	6345.899^c	59.4		-0.8	
6357.227	3.2978^o	1.5	1.3481	2.5	6357.177	47.5		-1.0	
6363.167	3.8377^o	3.5	1.8898	4.5	6363.159^c	37.2		-0.3	
6368.433	4.2781^o	3.5	2.3318	3.5	6368.399	65.3		0.7	
6371.067	3.4620^o	2.5	1.5166	3.5	6371.015^c	553.8	0.1	0.3	
6374.609	3.3572^o	2.5	1.4128	3.5	6374.617	35.4	-0.7	-1.1	
6426.628	3.6749^o	6.5	1.7462	6.5	6426.640^c	74.1	-0.4	-0.2	
6431.006	3.2862^o	5.5	1.3589	4.5	6431.054	18.7	-1.5	-1.5	
6435.299	3.3091^o	0.5	1.3830	1.5	6435.301^c	301.2		-0.2	
6439.278	3.9617^o	1.5	2.0368	2.5	6439.317^c	47.6		0.0	
6442.067	3.3859^o	4.5	1.4619	5.5	6442.070^c	586.1	0.2	0.2	
6447.522	3.3680^o	2.5	1.4456	2.5	6447.545^{bc}	24.6	-1.0	-1.2	
6447.530	3.4804^o	3.5	1.5580	2.5	6447.545^b	27.6	-1.1	-1.0	
6460.751	4.3519^o	3.5	2.4335	3.5	6460.711	45.3		0.7	
6471.617	3.3608^o	3.5	1.4456	2.5	6471.583^c	393.0	0.0	-0.0	
6483.923	3.3572^o	2.5	1.4456	2.5	6483.956^b	34.2	-0.7	-1.1	
6483.957	4.2716^o	2.5	2.3600	2.5	6483.956^b	33.6		0.4	
6498.654	2.9709	1.5	1.0636	1.5	6498.642^n	35.2		-1.7	-1.1
6514.632	3.9394^o	3.5	2.0368	2.5	6514.638^c	56.4		0.1	
6517.096	4.0102^o	4.5	2.1083	3.5	6517.048	15.9		-0.3	
6542.764	3.0611^o	3.5	1.1667	2.5	6542.786	18.1	-1.8	-1.8	
6569.286	3.3801	7.5	1.4934	8.5	6569.282^n	416.6		0.1	-0.2
6574.427	3.2549^o	0.5	1.3697	1.5	6574.391	13.0	-1.5	-1.6	
6577.373	3.2433^o	3.5	1.3589	4.5	6577.420	21.3	-1.4	-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	[48]
6579.226	3.6339^o	3.5	1.7500	4.5	6579.264^c	62.3		-0.3	
6587.502	3.3443^o	2.5	1.4628	2.5	6587.484^c	131.2	-0.3	-0.5	
6591.550	3.2500^o	2.5	1.3697	1.5	6591.542	97.9		-0.8	
6604.574	3.6749^o	6.5	1.7982	7.5	6604.594	80.9	-0.4	-0.2	
6627.737	3.8411^o	5.5	1.9710	5.5	6627.776^c	28.5		-0.3	
6641.550	3.6259^o	3.5	1.7597	2.5	6641.566	34.3		-0.6	
6649.037	3.2472^o	2.5	1.3830	1.5	6649.089	98.1	-0.6	-0.8	
6654.321	3.8665^o	0.5	2.0038	0.5	6654.274	61.2		0.0	
6665.244	3.9740^o	1.5	2.1144	0.5	6665.249	41.7		0.0	
6706.807	3.9081^o	5.5	2.0600	6.5	6706.846	39.2		-0.1	
6733.200	3.5104^o	4.5	1.6696	5.5	6733.201	10.2		-1.3	
6741.496	2.8361^o	3.5	0.9976	3.5	6741.475	123.7	-1.3	-1.3	
6743.565	3.2836^o	1.5	1.4456	2.5	6743.609^c	29.6	-1.1	-1.2	
6757.070	4.0310^o	5.5	2.1967	4.5	6757.095^c	7.1		-0.6	
6787.942	4.0041^o	0.5	2.1781	1.5	6787.975	9.9		-0.5	
6808.241	3.1064^o	1.5	1.2859	0.5	6808.287^c	315.2	-1.5	-0.4	
6813.484	3.1672^o	2.5	1.3481	2.5	6813.526	24.2	-1.3	-1.5	
6820.880	3.1213^o	2.5	1.3041	1.5	6820.891^c	246.2	-0.4	-0.5	
6829.864	3.1736	4.5	1.3589	4.5	6829.859^n	4.9		-2.1	-1.2
6838.297	3.5723^o	1.5	1.7597	2.5	6838.316^c	272.0		0.2	
6864.073	3.4160^o	3.5	1.6102	3.5	6864.057^c	14.5		-1.3	
6867.119	3.6948^o	5.5	1.8898	4.5	6867.101^c	280.1		0.5	
6868.124	3.4743^o	4.5	1.6696	5.5	6868.126^c	18.0		-1.1	
6873.701	4.3632^o	5.5	2.5600	5.5	6873.686^c	87.8			
6875.294	3.3608^o	3.5	1.5580	2.5	6875.287	30.6	-1.0	-1.0	
6900.289	3.1443^o	1.5	1.3481	2.5	6900.330	41.0	-1.1	-1.3	
6912.775	3.7863^o	1.5	1.9933	1.5	6912.781^c	197.4		0.5	
6949.421	3.9617^o	1.5	2.1781	1.5	6949.441^c	50.5		0.2	
6952.330	3.5425^o	2.5	1.7597	2.5	6952.343^c	29.0		-0.8	
6954.328	4.1876^o	5.5	2.4053	4.5	6954.319	125.1		0.9	
6955.663	2.6666	1.5	0.8846	1.5	6955.653^n	40.7		-2.0	-1.7
6987.355	4.0118^o	1.5	2.2380	2.5	6987.372	52.8		0.3	
6990.091	3.1213^o	2.5	1.3481	2.5	6990.090^c	143.0	-0.6	-0.7	
6996.568	3.9682^o	4.5	2.1967	4.5	6996.519	14.3		-0.4	
6996.936	3.2342^o	3.5	1.4628	2.5	6996.954^c	31.4	-1.2	-1.2	
7039.162	2.7584^o	2.5	0.9976	3.5	7039.185^{bc}	164.2	-1.2	-1.2	
7039.172	3.1736^o	4.5	1.4128	3.5	7039.185^b	163.8	-0.6	-0.6	
7054.934	3.1697^o	3.5	1.4128	3.5	7054.985^c	29.9	-1.3	-1.3	
7082.363	2.6347	0.5	0.8846	1.5	7082.356^n	392.6		-1.1	-1.0
7091.843	3.3399^o	3.5	1.5921	4.5	7091.867	56.0	-0.8	-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	[48]
7104.508	4.1047^o	2.5	2.3600	2.5	7104.535^c	5403.5			
7106.245	3.1139^o	0.5	1.3697	1.5	7106.235^c	3164.6		0.6	
7106.771	3.6339^o	3.5	1.8898	4.5	7106.823	5.8		-1.3	
7111.422	3.0288^o	1.5	1.2859	0.5	7111.436	25.9	-1.5	-1.6	
7115.334	3.9386^o	5.5	2.1967	4.5	7115.276	42.4		0.1	
7121.315	3.3262^o	5.5	1.5857	5.5	7121.300	9.9	-1.8	-1.5	
7124.461	3.2978^o	1.5	1.5580	2.5	7124.504	29.9		-1.1	
7127.433	4.2409^o	5.5	2.5019	4.5	7127.377^c	39.8		0.5	
7148.277	4.1674^o	4.5	2.4335	3.5	7148.291	8.4		-0.2	
7153.576	3.0807^o	2.5	1.3481	2.5	7153.563	5.7	-2.1	-2.2	
7166.196	3.3399^o	3.5	1.6102	3.5	7166.150	19.1	-1.3	-1.2	
7189.071	3.1697^o	3.5	1.4456	2.5	7189.026	5.3	-2.0	-2.0	
7192.252	4.0834^o	2.5	2.3600	2.5	7192.288	14.2		-0.1	
7219.280	4.2768^o	4.5	2.5600	5.5	7219.312	42.1		0.6	
7288.896	3.2862^o	5.5	1.5857	5.5	7288.931	4.2	-2.0	-1.9	
7300.681	3.6687^o	4.5	1.9710	5.5	7300.663^c	29.4	-0.8	-0.5	
7310.130	2.9996^o	2.5	1.3041	1.5	7310.089^c	38.8	-2.7	-1.4	
7316.298	3.8025^o	2.5	2.1083	3.5	7316.297^c	97.1		0.3	
7371.051	3.1443^o	1.5	1.4628	2.5	7371.098	14.9	-1.5	-1.6	
7376.664	3.1736^o	4.5	1.4934	4.5	7376.644	52.3	-1.1	-1.0	
7410.676	3.6435^o	4.5	1.9710	5.5	7410.691^c	52.9	-0.5	-0.2	
7431.201	3.0807^o	2.5	1.4128	3.5	7431.214^c	8.5	-1.9	-1.9	
7445.469	3.0478^o	2.5	1.3830	1.5	7445.427^c	85.8	-1.0	-1.0	
7462.514	3.9927^o	3.5	2.3318	3.5	7462.509	3.1		-0.9	
7472.521	2.8254^o	3.5	1.1667	2.5	7472.464	16757.1		0.9	
7531.325	3.0288^o	1.5	1.3830	1.5	7531.365^c	36.6	-1.3	-1.4	
7546.556	3.9334^o	2.5	2.2909	1.5	7546.540^c	123.7		0.6	
7577.530	4.1876^o	5.5	2.5518	6.5	7577.478	7.0		-0.2	
7631.720	3.5951^o	4.5	1.9710	5.5	7631.747^b	11.3		-1.0	
7631.790	3.7324^o	4.5	2.1083	3.5	7631.747^b	10.7		-0.8	
7643.010	2.8839^o	3.5	1.2622	3.5	7643.013	5.6	-2.5	-2.4	
7645.073	2.6849^o	0.5	1.0636	1.5	7645.037^c	43.3	-1.8	-1.8	
7648.284	3.5104^o	4.5	1.8898	4.5	7648.298^c	8.5		-1.2	
7694.423	3.7192^o	4.5	2.1083	3.5	7694.375	6.3		-1.0	
7712.308	3.0199^o	3.5	1.4128	3.5	7712.299^{bc}	9.5		-1.9	
7712.331	3.6440^o	2.5	2.0368	2.5	7712.299^b	9.5		-0.9	
7718.059	3.5769^o	5.5	1.9710	5.5	7718.098	3.1		-1.5	
7758.105	3.3476^o	4.5	1.7500	4.5	7758.078^c	57.7	-0.4	-0.6	
7789.714	2.8953^o	0.5	1.3041	1.5	7789.651	9.1	-2.1	-2.2	
7812.762	3.3327^o	5.5	1.7462	6.5	7812.770^c	47.3	-0.9	-0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[48]
7854.928	3.6863^o	2.5	2.1083	3.5	7854.948	8.8		-0.9	
7868.250	3.3253^o	4.5	1.7500	4.5	7868.275^c	7.8	-1.6	-1.5	
7880.078	2.9318^o	4.5	1.3589	4.5	7880.116	41.2	-1.4	-1.4	
7885.473	4.0737^o	4.5	2.5019	4.5	7885.463^c	11.2		-0.1	
7889.250	4.0046^o	4.5	2.4335	3.5	7889.291^c	34.7		0.2	
7925.148	3.6723^o	3.5	2.1083	3.5	7925.122	7.9	-0.9	-0.9	
7928.134	3.1736	4.5	1.6102	3.5	7928.139^n	15.2		-1.5	-0.7
8021.486	3.7233^o	2.5	2.1781	1.5	8021.500	45.7		-0.1	
8048.681	3.2862^o	5.5	1.7462	6.5	8048.632	6.6	-1.6	-1.6	
8068.461	3.2862^o	5.5	1.7500	4.5	8068.412	16.5	-1.2	-1.2	
8071.731	3.3337^o	7.5	1.7982	7.5	8071.751	9.2	-1.6	-1.4	
8141.913	3.8133^o	1.5	2.2909	1.5	8141.943	7.6		-0.7	
8208.146	3.8701^o	3.5	2.3600	2.5	8208.199^c	77.8		0.4	
8312.707	3.0767^o	5.5	1.5857	5.5	8312.665^c	15.9	-1.6	-1.5	
8355.106	3.6616^o	1.5	2.1781	1.5	8355.149	22.0		-0.4	
8383.707	3.5384^o	5.5	2.0600	6.5	8383.766^c	84.5	-0.2	-0.0	
8472.916	3.9647^o	5.5	2.5019	4.5	8472.854^c	19.9		0.0	
8641.453	3.6723^o	3.5	2.2380	2.5	8641.502^c	10.1	-0.7	-0.7	
8751.037	3.5247^o	2.5	2.1083	3.5	8751.102	35.8		-0.4	
9049.092	3.3735^o	0.5	2.0038	0.5	9049.024	7.5	-1.2	-1.3	
9119.179	2.9449	4.5	1.5857	5.5	9119.208^n	19.0		-1.5	-1.5

Table A.11: Measured wavelengths (λ_o) and intensities of Eu I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3865.563	5.1382^o	5.5	1.9318	5.5	3865.576	104.6		-0.2	
3884.741	4.9962^o	3.5	1.8056	4.5	3884.751	259.2		0.0	
3900.510	4.8170	5.5	1.6393^o	4.5	3900.512	261.6		-0.2	
3949.613	4.7560	4.5	1.6178^o	3.5	3949.601	62.7		-0.9	
3955.746	5.0651^o	4.5	1.9318	5.5	3955.763	101.5		-0.3	
3961.116	4.8732^o	4.5	1.7441	3.5	3961.131	22.9		-1.2	
3964.477	4.8706^o	3.5	1.7441	3.5	3964.491	73.1		-0.7	
3964.930	4.7439	4.5	1.6178^o	3.5	3964.943	41.6		-1.0	
3967.169	4.8684^o	2.5	1.7441	3.5	3967.181	86.4		-0.6	
3969.222	5.0545^o	4.5	1.9318	5.5	3969.220	70.3		-0.5	
3978.402	5.5284	2.5	2.4129^o	2.5	3978.420^b	89.1		0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3978.417	4.7839	6.5	1.6684^o	5.5	3978.420^b	89.1		-0.7	
4004.578	5.5062	4.5	2.4111^o	5.5	4004.552^c	25.8		-0.4	
4010.411	4.6929	3.5	1.6023^o	2.5	4010.420	122.9		-0.6	
4010.432	4.8962^o	4.5	1.8056	4.5	4010.420	84.4		-0.6	
4016.691	4.6881	3.5	1.6023^o	2.5	4016.698	181.2		-0.5	
4026.503	4.9902	4.5	1.9119^o	3.5	4026.490	20.6		-1.1	
4029.957	5.4651	3.5	2.3895^o	4.5	4029.972^b	122.6		0.2	
4029.968	5.4764	4.5	2.4008^o	3.5	4029.972^b	122.6		0.3	
4029.973	4.7839	6.5	1.7083^o	6.5	4029.972^b	120.0		-0.5	
4029.986	4.7839	7.5	1.7083^o	6.5	4029.972^b	120.0		-0.5	
4036.146	4.8765^o	5.5	1.8056	4.5	4036.150	165.5		-0.3	
4040.477	4.8732^o	4.5	1.8056	4.5	4040.487	140.3		-0.4	
4058.449	4.9308	2.5	1.8768^o	1.5	4058.469	13.8		-1.3	
4068.954	4.9902	4.5	1.9441^o	4.5	4068.938	29.9		-0.9	
4071.198	4.9885	5.5	1.9441^o	4.5	4071.176	36.5		-0.8	
4102.691	4.6604	3.5	1.6393^o	4.5	4102.703	23.4		-1.3	
4106.859	4.6203	2.5	1.6023^o	2.5	4106.874	314.0		-0.3	
4128.088	4.6203	2.5	1.6178^o	3.5	4128.100	33.0		-1.2	
4137.067	4.9896	6.5	1.9936^o	5.5	4137.068	100.2		-0.3	
4152.139	4.6029	4.5	1.6178^o	3.5	4152.120	111.5		-0.7	
4157.712	4.5989	2.5	1.6178^o	3.5	4157.731	113.9		-0.7	
4182.215	4.6029	4.5	1.6393^o	4.5	4182.224	337.6		-0.2	
4192.617	5.1062^o	3.5	2.1499	3.5	4192.584	414.8		0.4	
4194.294	4.8671	4.5	1.9119^o	3.5	4194.280	71.5		-0.6	
4194.489	5.1049^o	4.5	2.1499	3.5	4194.494	72.8		-0.3	
4202.685	4.8810^o	6.5	1.9318	5.5	4202.703	415.9		0.2	
4209.146	4.8765^o	5.5	1.9318	5.5	4209.161	88.4		-0.5	
4213.856	4.8732^o	4.5	1.9318	5.5	4213.874	16.8		-1.2	
4230.626	4.8417	4.5	1.9119^o	3.5	4230.648	45.8		-0.8	
4244.741	4.5378	3.5	1.6178^o	3.5	4244.760	57.3		-1.0	
4247.041	4.8962^o	4.5	1.9778	3.5	4247.036	29.2		-0.9	
4287.413	4.8029	2.5	1.9119^o	3.5	4287.423	13.8		-1.4	
4298.729	4.5916	5.5	1.7083^o	6.5	4298.725	1010.4		0.3	
4314.716	5.3065	4.5	2.4339^o	4.5	4314.721	10.8		-0.9	
4317.369	5.3048	3.5	2.4339^o	4.5	4317.372	13.1		-0.8	
4322.566	4.6116^o	4.5	1.7441	3.5	4322.552	94.1		-0.7	
4329.358	4.5314	4.5	1.6684^o	5.5	4329.363^b	245.5		-0.4	
4329.360	5.2524	4.5	2.3895^o	4.5	4329.363^b	245.5		0.4	
4329.969	4.5708	5.5	1.7083^o	6.5	4329.964^n	252.3		-0.3	-0.5
4331.160	4.4640	3.5	1.6023^o	2.5	4331.182	105.9		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4337.674	4.5259	4.5	1.6684^o	5.5	4337.685	292.5		-0.3	
4345.896	4.4698	2.5	1.6178^o	3.5	4345.910	117.1		-0.8	
4354.778	4.4640	3.5	1.6178^o	3.5	4354.790	210.1		-0.5	
4370.469	4.8955^o	5.5	2.0595	4.5	4370.480^b	120.9		-0.3	
4370.513	5.2255	3.5	2.3895^o	4.5	4370.480^b	122.5		0.1	
4387.872	4.4640	3.5	1.6393^o	4.5	4387.885	577.3		-0.1	
4417.245	4.6116^o	4.5	1.8056	4.5	4417.234	118.7		-0.6	
4436.993	5.2476	2.5	2.4541^o	1.5	4436.986^b	14.5		-0.8	
4437.001	5.1943	3.5	2.4008^o	3.5	4436.986^b	14.5		-0.9	
4441.306	4.4300	4.5	1.6393^o	4.5	4441.340	66.7		-1.0	
4464.550	4.7203	3.5	1.9441^o	4.5	4464.567	19.8		-1.2	
4471.991	4.7417^o	1.5	1.9701	2.5	4471.990	74.0		-0.6	
4508.129	5.1502	4.5	2.4008^o	3.5	4508.130	42.0		-0.4	
4526.685	4.7159^o	2.5	1.9778	3.5	4526.690	74.5		-0.7	
4570.436	5.1248	3.5	2.4129^o	2.5	4570.449	141.3		0.1	
4594.035	2.6980	4.5	0.0000^o	3.5	4594.015^n	152468.3		0.4	0.7
4597.341	4.4402^o	4.5	1.7441	3.5	4597.333	221.2		-0.5	
4621.343	4.6598^o	3.5	1.9778	3.5	4621.334	20.0		-1.3	
4625.280	5.1339	2.5	2.4541^o	1.5	4625.287^b	174.7		0.2	
4625.297	4.6116^o	4.5	1.9318	5.5	4625.287^b	176.4		-0.4	
4627.226	2.6786	3.5	0.0000^o	3.5	4627.216^n	117653.0		0.3	0.6
4650.475	4.2831	4.5	1.6178^o	3.5	4650.493	164.4		-0.8	
4656.712	4.5736	4.5	1.9119^o	3.5	4656.737	122.4		-0.6	
4660.346	4.5502	3.5	1.8906^o	2.5	4660.367	207.4		-0.4	
4661.441	4.5358	2.5	1.8768^o	1.5	4661.472	88.2		-0.7	
4661.878	2.6587	2.5	0.0000^o	3.5	4661.866^n	81595.6		0.1	0.5
4684.762	4.2850	3.5	1.6393^o	4.5	4684.737	14.1		-1.8	
4685.254	4.5360	1.5	1.8906^o	2.5	4685.253	35.7		-1.1	
4688.235	4.2831	4.5	1.6393^o	4.5	4688.251	198.8		-0.7	
4698.123	4.5502	3.5	1.9119^o	3.5	4698.142	176.6		-0.4	
4713.585	4.5736	4.5	1.9441^o	4.5	4713.612	316.1		-0.1	
4717.217	4.5181	2.5	1.8906^o	2.5	4717.230	27.4		-1.3	
4718.609	4.5708	5.5	1.9441^o	4.5	4718.628	63.0	-1.1	-0.8	
4720.547	4.2280	3.5	1.6023^o	2.5	4720.545	20.0		-1.7	
4728.131	4.2607	4.5	1.6393^o	4.5	4728.144	27.9		-1.5	
4736.588	4.3609^o	2.5	1.7441	3.5	4736.587	28.4		-1.4	
4739.150	4.2547	5.5	1.6393^o	4.5	4739.130	49.0		-1.3	
4740.516	4.2831	4.5	1.6684^o	5.5	4740.528	175.5		-0.7	
4755.926	4.5181	2.5	1.9119^o	3.5	4755.931	40.8		-1.1	
4762.907	4.5143	2.5	1.9119^o	3.5	4762.919^c	37.6		-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4763.963	4.5336^o	4.5	1.9318	5.5	4763.955^b	225.3		-0.3	
4763.965	4.2040	3.5	1.6023^o	2.5	4763.955^b	225.3		-0.7	
4769.599	4.5106	3.5	1.9119^o	3.5	4769.619^c	28.9		-1.2	
4770.781	4.5916	5.5	1.9936^o	5.5	4770.780	152.5		-0.4	
4777.691	4.9838	5.5	2.3895^o	4.5	4777.690	60.0		-0.4	
4781.311	4.2607	4.5	1.6684^o	5.5	4781.319	58.1		-1.2	
4783.999	4.3965^o	5.5	1.8056	4.5	4784.006^b	59.6		-1.0	
4784.004	5.0348	3.5	2.4439^o	3.5	4784.006^b	59.6		-0.3	
4792.554	4.2040	3.5	1.6178^o	3.5	4792.553^b	545.3		-0.3	
4792.579	4.2547	5.5	1.6684^o	5.5	4792.553^b	545.3		-0.2	
4798.061	4.9841	4.5	2.4008^o	3.5	4798.051	170.9		0.1	
4799.367	4.2004	4.5	1.6178^o	3.5	4799.376	55.1		-1.3	
4800.745	4.5259	4.5	1.9441^o	4.5	4800.759^b	20.4		-1.3	
4800.752	5.0157	4.5	2.4339^o	4.5	4800.759^b	20.4		-0.8	
4804.072	4.5736	4.5	1.9936^o	5.5	4804.097	133.4		-0.5	
4809.290	4.5708	5.5	1.9936^o	5.5	4809.296	175.4	-0.6	-0.4	
4829.281	4.5106	3.5	1.9441^o	4.5	4829.304	151.3		-0.5	
4830.341	4.7159^o	2.5	2.1499	3.5	4830.341	289.3		0.0	
4840.482	4.7105^o	3.5	2.1499	3.5	4840.477	267.3		-0.0	
4849.640	4.5336^o	4.5	1.9778	3.5	4849.644	201.8		-0.3	
4867.595	4.2547	5.5	1.7083^o	6.5	4867.583^{bc}	847.2		-0.0	
4867.607	4.7417^o	1.5	2.1954	2.5	4867.583^{bc}	847.7		0.5	
4884.056	4.5314	4.5	1.9936^o	5.5	4884.065	160.4		-0.4	
4894.642	4.5259	4.5	1.9936^o	5.5	4894.652	148.9		-0.5	
4900.847	4.2732^o	4.5	1.7441	3.5	4900.827	818.8	-0.2	0.0	
4907.174	4.2700^o	3.5	1.7441	3.5	4907.158	1884.8		0.4	
4911.407	4.2678^o	2.5	1.7441	3.5	4911.404	2430.4		0.5	
4922.219	4.4300	4.5	1.9119^o	3.5	4922.235	32.3		-1.2	
4924.692	4.7417^o	1.5	2.2249	1.5	4924.687	1298.9		0.7	
4927.996	4.7105^o	3.5	2.1954	2.5	4927.991	123.9		-0.3	
4932.828	4.4905^o	4.5	1.9778	3.5	4932.807	127.9		-0.6	
4938.276	4.6598^o	3.5	2.1499	3.5	4938.249	338.9		0.1	
4947.372	4.4754^o	3.5	1.9701	2.5	4947.342	204.5		-0.4	
4953.506	4.4723^o	2.5	1.9701	2.5	4953.481	350.8		-0.1	
4960.198	4.4689^o	1.5	1.9701	2.5	4960.166	412.9		-0.1	
4962.545	4.4754^o	3.5	1.9778	3.5	4962.513	497.7		0.0	
4968.716	4.4723^o	2.5	1.9778	3.5	4968.692	162.5		-0.5	
4975.754	4.7159^o	2.5	2.2249	1.5	4975.755	220.6		-0.1	
4986.757	4.5451^o	3.5	2.0595	4.5	4986.752	108.3		-0.6	
4996.872	4.9308	2.5	2.4503^o	2.5	4996.847	40.1		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5013.149	4.2780^o	5.5	1.8056	4.5	5013.133	2569.1	0.3	0.5	
5022.909	4.2732^o	4.5	1.8056	4.5	5022.883^n	2332.8		0.5	0.2
5029.555	4.2700^o	3.5	1.8056	4.5	5029.548	710.7		-0.0	
5033.549	4.4402^o	4.5	1.9778	3.5	5033.542	1095.7		0.3	
5056.005	4.3955	5.5	1.9441^o	4.5	5056.007	31.2		-1.2	
5065.691	4.8698	1.5	2.4230^o	1.5	5065.681	13.1		-1.1	
5067.943	4.0850	5.5	1.6393^o	4.5	5067.936^n	389.8		-0.5	-0.6
5070.270	4.8575	2.5	2.4129^o	2.5	5070.261	25.9		-0.8	
5078.011	4.8417	4.5	2.4008^o	3.5	5078.004	51.5		-0.5	
5079.970	4.8698	1.5	2.4299^o	0.5	5079.960	18.3		-0.9	
5085.578	4.8380	2.5	2.4008^o	3.5	5085.581	74.9		-0.4	
5089.065	4.8251	3.5	2.3895^o	4.5	5089.063^c	243.0		0.1	
5092.681	4.4934^o	5.5	2.0595	4.5	5092.645	391.2		-0.0	
5096.420	4.8760	3.5	2.4439^o	3.5	5096.389	444.2		0.5	
5098.744	4.4905^o	4.5	2.0595	4.5	5098.717	206.7		-0.3	
5101.231	4.8427	3.5	2.4129^o	2.5	5101.234	22.7		-0.9	
5110.940	4.8380	2.5	2.4129^o	2.5	5110.957	67.9		-0.4	
5114.342	4.0413	4.5	1.6178^o	3.5	5114.356^n	1175.0		-0.0	-0.1
5119.439	4.8322	4.5	2.4111^o	5.5	5119.426	75.5		-0.4	
5124.771	4.3887^o	2.5	1.9701	2.5	5124.774	468.6		-0.1	
5129.091	4.0850	5.5	1.6684^o	5.5	5129.079^n	1551.8		0.1	-0.0
5130.089	4.3862^o	3.5	1.9701	2.5	5130.090	371.1		-0.2	
5133.482	4.0168	3.5	1.6023^o	2.5	5133.493^n	2785.2		0.3	0.1
5135.409	4.8575	2.5	2.4439^o	3.5	5135.403	25.1		-0.8	
5141.053	4.3887^o	2.5	1.9778	3.5	5141.058	41.9		-1.1	
5147.764	4.8417	4.5	2.4339^o	4.5	5147.768	50.8		-0.5	
5155.412	4.3743^o	1.5	1.9701	2.5	5155.415	121.8		-0.6	
5160.047	4.0413	4.5	1.6393^o	4.5	5160.060^n	2073.1		0.2	0.1
5166.693	4.0168	3.5	1.6178^o	3.5	5166.702^n	1558.5		0.1	-0.1
5167.174	4.8427	3.5	2.4439^o	3.5	5167.170	84.5		-0.3	
5169.295	4.8417	4.5	2.4439^o	3.5	5169.300	86.8		-0.3	
5169.755	4.8516	0.5	2.4541^o	1.5	5169.734^c	37.6		-0.6	
5174.901	4.5451^o	3.5	2.1499	3.5	5174.889	54.8		-0.8	
5177.949	4.7833	4.5	2.3895^o	4.5	5177.983^b	72.6		-0.4	
5178.010	4.2843	2.5	1.8906^o	2.5	5177.983^b	63.1		-1.0	
5178.681	4.3053	4.5	1.9119^o	3.5	5178.689^b	49.8	-1.3	-1.1	
5178.689	4.0618	6.5	1.6684^o	5.5	5178.689^b	49.8	-1.4	-1.4	
5181.000	4.8427	3.5	2.4503^o	2.5	5181.000	37.9		-0.6	
5183.536	4.8251	3.5	2.4339^o	4.5	5183.539	10.4		-1.2	
5189.857	4.8322	4.5	2.4439^o	3.5	5189.841	13.6		-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5199.845	4.5336^o	4.5	2.1499	3.5	5199.845	534.4		0.2	
5200.954	4.3609^o	2.5	1.9778	3.5	5200.953	490.7		-0.0	
5206.428	4.4402^o	4.5	2.0595	4.5	5206.428	68.0		-0.8	
5207.876	4.0193	5.5	1.6393^o	4.5	5207.879	35.8	-1.7	-1.6	
5213.343	4.0168	3.5	1.6393^o	4.5	5213.360	328.6	-0.8	-0.6	
5215.105	4.0850	5.5	1.7083^o	6.5	5215.094^n	3304.6		0.5	0.3
5217.019	4.3459^o	3.5	1.9701	2.5	5217.017	284.5		-0.3	
5223.452	4.0413	4.5	1.6684^o	5.5	5223.460^n	1096.4		-0.0	-0.1
5236.105	5.0651^o	4.5	2.6980	4.5	5236.115^b	56.1		-0.2	
5236.130	4.7680	2.5	2.4008^o	3.5	5236.115^b	56.1		-0.5	
5239.173	4.3435^o	3.5	1.9778	3.5	5239.200	171.7		-0.5	
5240.412	4.3353^o	2.5	1.9701	2.5	5240.419	24.5		-1.4	
5242.690	4.7771	1.5	2.4129^o	2.5	5242.672	71.0		-0.4	
5245.537	4.3070	4.5	1.9441^o	4.5	5245.537	133.5		-0.7	
5248.619	4.7623	3.5	2.4008^o	3.5	5248.624	154.0		-0.1	
5249.098	4.7952	3.5	2.4339^o	4.5	5249.128^b	136.5		-0.1	
5249.115	4.3053	4.5	1.9441^o	4.5	5249.128^b	136.5	-0.8	-0.6	
5249.167	5.0399^o	3.5	2.6786	3.5	5249.128^b	138.7		0.2	
5256.080	4.7812	0.5	2.4230^o	1.5	5256.068	30.4		-0.8	
5263.020	4.7680	2.5	2.4129^o	2.5	5263.010	45.8		-0.6	
5266.389	4.0618	6.5	1.7083^o	6.5	5266.383^n	960.5		-0.1	-0.1
5271.957	4.2829^o	6.5	1.9318	5.5	5271.945^n	5350.1		0.9	0.6
5272.469	4.0193	5.5	1.6684^o	5.5	5272.474	538.1	-0.5	-0.4	
5275.638	4.7623	3.5	2.4129^o	2.5	5275.655	48.2		-0.6	
5278.148	4.7491	3.5	2.4008^o	3.5	5278.166	58.0		-0.5	
5280.660	4.7771	1.5	2.4299^o	0.5	5280.648^c	55.7		-0.5	
5282.833	4.2780^o	5.5	1.9318	5.5	5282.811^n	1597.0		0.4	0.2
5285.456	4.5404^o	1.5	2.1954	2.5	5285.459	78.6	-0.7	-0.6	
5285.738	4.7680	2.5	2.4230^o	1.5	5285.723^b	80.2		-0.4	
5285.763	4.7560	4.5	2.4111^o	5.5	5285.723^b	79.4		-0.4	
5287.237	3.9835	4.5	1.6393^o	4.5	5287.240	121.6	-0.8	-1.0	
5289.254	4.5387^o	2.5	2.1954	2.5	5289.250	248.5		-0.1	
5291.236	4.7320	4.5	2.3895^o	4.5	5291.252	416.5		0.3	
5293.673	4.2732^o	4.5	1.9318	5.5	5293.655^n	273.6		-0.4	-0.4
5294.615	4.5364^o	3.5	2.1954	2.5	5294.616	489.8		0.2	
5302.715	4.2280	3.5	1.8906^o	2.5	5302.709	284.5		-0.4	
5303.860	4.3965^o	5.5	2.0595	4.5	5303.861^c	576.2		0.1	
5305.472	4.7491	3.5	2.4129^o	2.5	5305.502	21.8		-0.9	
5312.210	4.0415	6.5	1.7083^o	6.5	5312.185	19.1		-1.8	
5350.407	4.5415^o	0.5	2.2249	1.5	5350.403	163.6		-0.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5351.679	4.2280	3.5	1.9119^o	3.5	5351.671	1114.3		0.2	
5352.831	4.5404^o	1.5	2.2249	1.5	5352.818^n	244.8		-0.1	-0.2
5356.691	4.7680	2.5	2.4541^o	1.5	5356.720^b	143.4		-0.1	
5356.726	4.5387^o	2.5	2.2249	1.5	5356.720^b	142.1		-0.3	
5357.598	3.9819	6.5	1.6684^o	5.5	5357.586^n	2288.4		0.2	0.1
5360.776	4.1889	2.5	1.8768^o	1.5	5360.798	773.7	-0.3	0.0	
5360.776	4.1889	2.5	1.8768^o	1.5	5360.790^n	777.5		0.0	-0.3
5361.575	4.3053	4.5	1.9936^o	5.5	5361.573^n	1146.0		0.3	0.1
5364.584	4.7000	4.5	2.3895^o	4.5	5364.598	49.8		-0.6	
5376.934	4.3647^o	5.5	2.0595	4.5	5376.919	1150.9		0.4	
5390.985	4.7000	4.5	2.4008^o	3.5	5391.005	16.6		-1.1	
5392.887	4.1889	2.5	1.8906^o	2.5	5392.907	853.5	-0.2	0.1	
5392.887	4.1889	2.5	1.8906^o	2.5	5392.899^n	860.1		0.1	-0.2
5395.975	4.6865	5.5	2.3895^o	4.5	5395.974	26.5		-0.9	
5402.767	3.9334	5.5	1.6393^o	4.5	5402.767^n	3140.5		0.3	0.2
5405.320	4.3526^o	4.5	2.0595	4.5	5405.305	409.9		-0.1	
5411.854	4.4402^o	4.5	2.1499	3.5	5411.845	267.3		-0.2	
5413.765	4.2831	4.5	1.9936^o	5.5	5413.770	129.7		-0.7	
5416.226	4.2004	4.5	1.9119^o	3.5	5416.268^b	137.1		-0.7	
5416.235	4.2325	3.5	1.9441^o	4.5	5416.268^b	137.1		-0.7	
5421.063	4.3459^o	3.5	2.0595	4.5	5421.069^b	417.8		-0.1	
5421.072	4.7203	3.5	2.4339^o	4.5	5421.069^b	420.9		0.3	
5426.931	4.2280	3.5	1.9441^o	4.5	5426.923	1736.9		0.4	
5443.538	4.1889	2.5	1.9119^o	3.5	5443.553^b	573.5	-0.4	-0.1	
5443.568	4.4723^o	2.5	2.1954	2.5	5443.553^b	573.4		0.2	
5451.517	3.9819	6.5	1.7083^o	6.5	5451.507^n	3349.0		0.4	0.3
5452.918	3.8908	4.5	1.6178^o	3.5	5452.944^n	2895.6		0.3	0.1
5457.603	4.6606	4.5	2.3895^o	4.5	5457.615	548.4		0.4	
5467.035	4.2607	4.5	1.9936^o	5.5	5467.022	252.2		-0.4	
5472.317	3.9334	5.5	1.6684^o	5.5	5472.312^n	815.2		-0.2	-0.3
5485.471	4.6604	3.5	2.4008^o	3.5	5485.479	80.9		-0.4	
5488.640	3.8605	3.5	1.6023^o	2.5	5488.638^n	1596.2		-0.0	-0.2
5495.195	3.8578	3.5	1.6023^o	2.5	5495.173^n	371.6		-0.7	-0.6
5497.946	3.8567	2.5	1.6023^o	2.5	5497.906	24.2		-1.8	
5500.475	4.2235^o	2.5	1.9701	2.5	5500.462	143.3		-0.7	
5502.303	4.6865	5.5	2.4339^o	4.5	5502.301	30.5		-0.8	
5510.534	3.9934^o	4.5	1.7441	3.5	5510.545	1311.5		0.1	
5511.069	4.6499	3.5	2.4008^o	3.5	5511.094	159.7		-0.1	
5526.622	3.8605	3.5	1.6178^o	3.5	5526.621	149.4	-1.2	-1.0	
5533.269	3.8578	3.5	1.6178^o	3.5	5533.236^n	101.2		-1.2	-1.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5542.531	4.3862^o	3.5	2.1499	3.5	5542.539	285.6		-0.2	
5547.433	3.8366	2.5	1.6023^o	2.5	5547.432^n	2396.1		0.1	-0.0
5566.398	4.6606	4.5	2.4339^o	4.5	5566.415	31.6		-0.8	
5570.337	3.9334	5.5	1.7083^o	6.5	5570.331^n	1874.0		0.2	0.0
5572.657	4.3741^o	4.5	2.1499	3.5	5572.644	22.9		-1.3	
5577.127	3.8908	4.5	1.6684^o	5.5	5577.146^n	2387.0		0.2	0.1
5579.624	4.0270^o	5.5	1.8056	4.5	5579.638^c	1084.0		0.0	
5580.032	3.8605	3.5	1.6393^o	4.5	5580.026^n	1564.3		-0.0	-0.1
5586.237	3.8366	2.5	1.6178^o	3.5	5586.232^n	1030.3		-0.2	-0.3
5593.059	3.8184	2.5	1.6023^o	2.5	5593.078	38.5	-1.8	-1.7	
5599.114	4.2732^o	4.5	2.0595	4.5	5599.093	73.0	-1.1	-0.9	
5599.764	3.8312	4.5	1.6178^o	3.5	5599.790^n	154.6		-1.0	-1.0
5605.852	4.3609^o	2.5	2.1499	3.5	5605.851	190.2		-0.4	
5607.374	4.2700^o	3.5	2.0595	4.5	5607.366	36.7		-1.2	
5617.056	4.8653^o	3.5	2.6587	2.5	5617.028	28.6		-0.6	
5618.805	3.8452	5.5	1.6393^o	4.5	5618.790^n	279.7		-0.8	-0.8
5620.191	4.6062	3.5	2.4008^o	3.5	5620.235	21.7		-1.0	
5622.436	3.9486^o	3.5	1.7441	3.5	5622.443	599.8		-0.3	
5627.075	4.3526^o	4.5	2.1499	3.5	5627.063	77.2		-0.8	
5632.506	3.8184	2.5	1.6178^o	3.5	5632.537^n	855.8		-0.3	-0.5
5635.103	4.6499	3.5	2.4503^o	2.5	5635.141	30.8		-0.8	
5640.202	4.8955^o	5.5	2.6980	4.5	5640.214	27.5		-0.6	
5645.783	2.1954	2.5	0.0000^o	3.5	5645.791	14483.0		-0.9	
5650.279	4.3435^o	3.5	2.1499	3.5	5650.288	24.5		-1.3	
5651.106	4.3887^o	2.5	2.1954	2.5	5651.111	67.8		-0.8	
5654.680	4.8706^o	3.5	2.6786	3.5	5654.658	25.5		-0.7	
5668.200	4.8653^o	3.5	2.6786	3.5	5668.209	97.0		-0.1	
5673.810	3.8238	3.5	1.6393^o	4.5	5673.844	731.6	-0.2	-0.4	
5674.960	4.5736	4.5	2.3895^o	4.5	5674.985	41.8		-0.8	
5681.081	3.8210	5.5	1.6393^o	4.5	5681.081	178.4		-1.0	
5684.234	4.5916	5.5	2.4111^o	5.5	5684.226^c	431.9		0.3	
5688.387	4.3743^o	1.5	2.1954	2.5	5688.375	62.1		-0.8	
5728.193	4.3887^o	2.5	2.2249	1.5	5728.208	35.4		-1.0	
5730.833	3.8312	4.5	1.6684^o	5.5	5730.860^n	361.3		-0.6	-0.6
5736.582	4.5502	3.5	2.3895^o	4.5	5736.610	33.8		-0.9	
5738.986	4.5708	5.5	2.4111^o	5.5	5738.970^n	686.4		0.5	0.2
5744.354	4.5916	5.5	2.4339^o	4.5	5744.349	57.1		-0.6	
5751.595	4.5989	2.5	2.4439^o	3.5	5751.594	22.5		-1.0	
5783.679	3.9486^o	3.5	1.8056	4.5	5783.696	735.1		-0.2	
5789.410	4.0850	5.5	1.9441^o	4.5	5789.380	19.9	-1.8	-1.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5792.687	4.5736	4.5	2.4339^o	4.5	5792.720	137.9		-0.2	
5800.269	3.8452	5.5	1.7083^o	6.5	5800.258^n	521.8		-0.4	-0.5
5805.655	4.5358	2.5	2.4008^o	3.5	5805.657	47.4		-0.7	
5829.461	4.0168	3.5	1.8906^o	2.5	5829.439^b	67.9	-1.3	-1.1	
5829.478	3.8704^o	3.5	1.7441	3.5	5829.438^b	63.9		-1.3	
5830.977	3.8340	7.5	1.7083^o	6.5	5830.991^n	6610.0		0.7	0.6
5838.036	4.5360	1.5	2.4129^o	2.5	5838.019	37.9		-0.8	
5843.506	4.5106	3.5	2.3895^o	4.5	5843.531	28.2		-1.0	
5845.772	4.5314	4.5	2.4111^o	5.5	5845.760	97.2		-0.4	
5860.944	4.5259	4.5	2.4111^o	5.5	5860.961	97.6		-0.4	
5884.794	4.5502	3.5	2.4439^o	3.5	5884.821	32.4		-0.9	
5891.268	4.5378	3.5	2.4339^o	4.5	5891.279	14.5		-1.2	
5895.302	4.5255	1.5	2.4230^o	1.5	5895.286	101.9		-0.4	
5908.717	4.5106	3.5	2.4129^o	2.5	5908.759^c	8.1		-1.5	
5909.377	4.5314	4.5	2.4339^o	4.5	5909.393	15.7		-1.2	
5909.915	4.0413	4.5	1.9441^o	4.5	5909.945	56.8	-1.3	-1.2	
5914.649	4.5255	1.5	2.4299^o	0.5	5914.641	55.6		-0.6	
5915.741	4.0270^o	5.5	1.9318	5.5	5915.760	751.6		-0.1	
5925.282	4.5358	2.5	2.4439^o	3.5	5925.302	90.6		-0.4	
5937.768	4.5314	4.5	2.4439^o	3.5	5937.779	17.6		-1.1	
5942.678	4.4986	2.5	2.4129^o	2.5	5942.715^b	187.4		-0.1	
5942.748	4.5360	1.5	2.4503^o	2.5	5942.715^b	177.4		-0.1	
5953.422	4.5259	4.5	2.4439^o	3.5	5953.469^b	94.2		-0.4	
5953.518	4.5360	1.5	2.4541^o	1.5	5953.469^b	92.1		-0.4	
5954.241	4.5358	2.5	2.4541^o	1.5	5954.289	216.0		-0.0	
5963.725	3.9903	4.5	1.9119^o	3.5	5963.739^n	529.2		-0.2	-0.2
5967.114	3.7456	6.5	1.6684^o	5.5	5967.109^n	4787.1		0.4	0.4
5968.407	4.5106	3.5	2.4339^o	4.5	5968.432	88.2		-0.4	
5971.658	4.4986	2.5	2.4230^o	1.5	5971.671	211.1		-0.1	
5972.739	4.0193	5.5	1.9441^o	4.5	5972.741^n	1554.3		0.3	0.1
5979.931	4.0168	3.5	1.9441^o	4.5	5979.949	26.1	-1.7	-1.5	
5980.453	4.4734	3.5	2.4008^o	3.5	5980.459	94.2		-0.5	
5983.141	3.9835	4.5	1.9119^o	3.5	5983.124^n	64.0		-1.2	-0.9
5983.782	4.4722	4.5	2.4008^o	3.5	5983.805	186.3		-0.2	
5986.792	4.5143	2.5	2.4439^o	3.5	5986.819	24.4		-1.0	
5992.832	4.0618	6.5	1.9936^o	5.5	5992.830^n	1848.9		0.4	0.4
6004.347	3.9411	1.5	1.8768^o	1.5	6004.362	248.8		-0.6	
6005.623	4.0079	5.5	1.9441^o	4.5	6005.611	96.9		-1.0	
6012.179	3.9934^o	4.5	1.9318	5.5	6012.201	605.6		-0.2	
6012.529	3.9520	2.5	1.8906^o	2.5	6012.556^n	450.3		-0.3	-0.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6015.558	4.4734	3.5	2.4129^o	2.5	6015.572	346.5		0.1	
6016.003	4.5106	3.5	2.4503^o	2.5	6016.033	41.8		-0.8	
6016.358	4.5143	2.5	2.4541^o	1.5	6016.400^b	34.6		-0.8	
6016.430	3.6994	4.5	1.6393^o	4.5	6016.399^b	32.4		-1.8	
6018.154	2.0595	4.5	0.0000^o	3.5	6018.159^n	20427.1		-0.8	-1.3
6023.140	3.9346	0.5	1.8768^o	1.5	6023.149	176.1		-0.8	
6028.970	3.9678	3.5	1.9119^o	3.5	6028.986^n	859.1		-0.0	0.0
6032.360	4.4986	2.5	2.4439^o	3.5	6032.385	15.7		-1.2	
6040.842	4.7105^o	3.5	2.6587	2.5	6040.839	19.2		-0.9	
6044.659	3.9411	1.5	1.8906^o	2.5	6044.660	362.8		-0.4	
6051.212	4.4986	2.5	2.4503^o	2.5	6051.244	19.3		-1.1	
6057.324	3.9903	4.5	1.9441^o	4.5	6057.341^n	997.0		0.1	0.1
6083.850	3.7456	6.5	1.7083^o	6.5	6083.845^n	1770.5		0.0	0.0
6099.351	3.6714	5.5	1.6393^o	4.5	6099.357^n	1470.0		-0.1	0.1
6100.036	4.7105^o	3.5	2.6786	3.5	6100.033	41.1		-0.5	
6107.470	4.4734	3.5	2.4439^o	3.5	6107.461	36.0		-0.8	
6108.120	4.4300	4.5	2.4008^o	3.5	6108.131	386.5		0.1	
6118.774	4.0193	5.5	1.9936^o	5.5	6118.767^n	573.3		-0.1	-0.1
6124.645	3.9678	3.5	1.9441^o	4.5	6124.675	183.9	-0.6	-0.7	
6158.693	4.7105^o	3.5	2.6980	4.5	6158.715	19.9		-0.8	
6178.764	4.3955	5.5	2.3895^o	4.5	6178.749	785.5		0.4	
6188.138	3.6714	5.5	1.6684^o	5.5	6188.127^n	1487.0		-0.1	0.1
6195.063	3.6185	4.5	1.6178^o	3.5	6195.060^n	614.9		-0.5	-0.3
6207.577	3.9903	4.5	1.9936^o	5.5	6207.593^n	82.0		-1.0	-0.8
6209.323	4.4300	4.5	2.4339^o	4.5	6209.346	38.6		-0.8	
6230.495	3.9334	5.5	1.9441^o	4.5	6230.503^n	56.2		-1.2	-0.9
6233.723	3.9819	6.5	1.9936^o	5.5	6233.726	272.4	-0.6	-0.5	
6240.677	4.4300	4.5	2.4439^o	3.5	6240.709	19.0		-1.1	
6250.440	3.5853	3.5	1.6023^o	2.5	6250.450^n	183.5		-1.1	-0.9
6262.252	3.6185	4.5	1.6393^o	4.5	6262.251^n	1474.1		-0.1	0.1
6263.398	3.8908	4.5	1.9119^o	3.5	6263.435	28.5	-1.7	-1.6	
6285.944	3.5741	3.5	1.6023^o	2.5	6285.935^n	66.6		-1.5	-1.2
6288.954	3.9486^o	3.5	1.9778	3.5	6288.945	41.0		-1.3	
6291.316	1.9701	2.5	0.0000^o	3.5	6291.313^n	2678.1		-1.7	-2.2
6291.783	3.8605	3.5	1.8906^o	2.5	6291.790	13.6	-2.1	-1.9	
6299.745	3.5853	3.5	1.6178^o	3.5	6299.750^n	1070.0		-0.3	-0.2
6318.578	4.3955	5.5	2.4339^o	4.5	6318.570	78.1		-0.6	
6324.422	3.8366	2.5	1.8768^o	1.5	6324.438	33.9	-1.7	-1.5	
6350.003	3.5542	2.5	1.6023^o	2.5	6350.038^n	859.6		-0.4	-0.2
6355.881	3.6185	4.5	1.6684^o	5.5	6355.869^n	215.7		-1.0	-0.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6369.236	3.5853	3.5	1.6393^o	4.5	6369.226^n	319.2		-0.8	-0.5
6411.267	3.8238	3.5	1.8906^o	2.5	6411.312	1054.4	0.1	-0.0	
6411.267	3.8238	3.5	1.8906^o	2.5	6411.304^n	1054.2		-0.0	0.1
6428.285	3.8187	1.5	1.8906^o	2.5	6428.283	447.3		-0.4	
6435.349	3.8166	3.5	1.8906^o	2.5	6435.315	10.4		-2.0	
6439.933	3.8366	2.5	1.9119^o	3.5	6439.923^n	55.1		-1.3	-0.9
6457.917	3.8312	4.5	1.9119^o	3.5	6457.953^n	909.6		-0.1	0.1
6467.426	3.8605	3.5	1.9441^o	4.5	6467.429	12.6	-2.1	-1.9	
6470.704	3.6597^o	3.5	1.7441	3.5	6470.678	80.5		-1.3	
6476.531	3.8578	3.5	1.9441^o	4.5	6476.508	16.5	-1.7	-1.8	
6482.982	3.8238	3.5	1.9119^o	3.5	6483.022	86.2	-1.0	-1.1	
6501.503	3.8184	2.5	1.9119^o	3.5	6501.546	441.4	-0.6	-0.4	
6519.569	3.8452	5.5	1.9441^o	4.5	6519.564^n	454.8		-0.4	-0.1
6522.730	3.8704^o	3.5	1.9701	2.5	6522.694	85.2		-1.1	
6549.129	3.8704^o	3.5	1.9778	3.5	6549.099	59.4		-1.2	
6561.151	3.9486^o	3.5	2.0595	4.5	6561.159	19.6		-1.6	
6567.815	3.8312	4.5	1.9441^o	4.5	6567.867^b	454.5	-0.2	-0.4	
6567.815	3.8312	4.5	1.9441^o	4.5	6567.859^n	454.1		-0.4	-0.2
6570.763	4.5451^o	3.5	2.6587	2.5	6570.753	39.5		-0.6	
6593.741	3.8238	3.5	1.9441^o	4.5	6593.778^n	332.5		-0.5	-0.4
6603.562	3.8210	5.5	1.9441^o	4.5	6603.548	89.7		-1.1	
6619.215	3.8166	3.5	1.9441^o	4.5	6619.182	6.5		-2.2	
6685.198	3.6597^o	3.5	1.8056	4.5	6685.194	182.4		-0.9	
6693.959	3.8452	5.5	1.9936^o	5.5	6693.947^n	835.0		-0.1	0.1
6695.801	4.2850	3.5	2.4339^o	4.5	6695.811	10.7		-1.5	
6701.039	4.2607	4.5	2.4111^o	5.5	6701.052	57.6		-0.8	
6710.435	4.5451^o	3.5	2.6980	4.5	6710.450	71.2		-0.3	
6741.891	4.2280	3.5	2.3895^o	4.5	6741.867	4.7		-1.9	
6744.829	3.8312	4.5	1.9936^o	5.5	6744.878	128.8	-0.7	-0.9	
6744.829	3.8312	4.5	1.9936^o	5.5	6744.870^n	128.5		-0.9	-0.6
6758.527	4.2843	2.5	2.4503^o	2.5	6758.477	5.6		-1.7	
6787.472	3.7962^o	2.5	1.9701	2.5	6787.444	49.2		-1.3	
6802.714	3.5662^o	4.5	1.7441	3.5	6802.673	1529.5		-0.1	
6816.062	3.7962^o	2.5	1.9778	3.5	6816.038	134.2		-0.9	
6834.300	4.4723^o	2.5	2.6587	2.5	6834.272	62.0		-0.5	
6840.945	4.4905^o	4.5	2.6786	3.5	6840.908	99.4		-0.2	
6844.842	3.8704^o	3.5	2.0595	4.5	6844.802	70.7		-1.1	
6847.046	4.4689^o	1.5	2.6587	2.5	6847.004	67.9		-0.4	
6864.554	1.8056	4.5	0.0000^o	3.5	6864.556^n	14489.2		-1.0	-1.4
6898.232	4.4754^o	3.5	2.6786	3.5	6898.183	96.3		-0.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6903.658	4.4934^o	5.5	2.6980	4.5	6903.629	334.9		0.3	
6908.696	4.2280	3.5	2.4339^o	4.5	6908.673	10.3		-1.5	
6910.162	4.4723^o	2.5	2.6786	3.5	6910.134	27.3		-0.8	
6914.803	4.4905^o	4.5	2.6980	4.5	6914.784	90.6		-0.3	
6947.533	4.2280	3.5	2.4439^o	3.5	6947.500	3.0		-2.0	
6973.338	4.4754^o	3.5	2.6980	4.5	6973.298	5.6		-1.5	
7040.188	3.5662^o	4.5	1.8056	4.5	7040.159	1674.7		0.0	
7074.524	3.7456	6.5	1.9936^o	5.5	7074.540	80.8	-1.2	-1.1	
7075.716	3.6958	3.5	1.9441^o	4.5	7075.700	2.5		-2.7	
7103.140	4.1889	2.5	2.4439^o	3.5	7103.170	2.2	-2.5	-2.2	
7106.442	1.7441	3.5	0.0000^o	3.5	7106.468	7114.2		-1.4	
7164.645	4.3887^o	2.5	2.6587	2.5	7164.665	25.1		-0.9	
7204.365	3.8704^o	3.5	2.1499	3.5	7204.330	12.1		-1.8	
7224.675	4.3743^o	1.5	2.6587	2.5	7224.669	93.1		-0.3	
7258.703	4.3862^o	3.5	2.6786	3.5	7258.727	54.6		-0.5	
7262.764	3.6185	4.5	1.9119^o	3.5	7262.767^n	104.8		-1.1	-0.6
7266.058	3.6994	4.5	1.9936^o	5.5	7266.047	5.5		-2.3	
7281.516	4.3609^o	2.5	2.6587	2.5	7281.521	43.9		-0.7	
7297.536	4.3965^o	5.5	2.6980	4.5	7297.576	26.6		-0.8	
7310.461	4.3741^o	4.5	2.6786	3.5	7310.477^b	39.4		-0.7	
7310.509	4.0850	5.5	2.3895^o	4.5	7310.477^b	38.9	-1.2	-1.0	
7313.590	3.5853	3.5	1.8906^o	2.5	7313.605^n	49.3		-1.5	-1.0
7336.173	3.6597^o	3.5	1.9701	2.5	7336.125	607.9		-0.3	
7346.244	4.3459^o	3.5	2.6587	2.5	7346.246	18.3		-1.0	
7356.650	4.3435^o	3.5	2.6587	2.5	7356.703	19.1		-1.0	
7362.246	3.5741	3.5	1.8906^o	2.5	7362.241	24.2	-1.4	-1.8	
7369.584	3.6597^o	3.5	1.9778	3.5	7369.545	250.2		-0.7	
7387.348	3.6714	5.5	1.9936^o	5.5	7387.380	7.2	-2.0	-2.2	
7389.128	3.5542	2.5	1.8768^o	1.5	7389.181	64.1	-1.2	-1.4	
7392.712	4.3353^o	2.5	2.6587	2.5	7392.723	6.4		-1.5	
7394.867	4.3741^o	4.5	2.6980	4.5	7394.901	9.8		-1.3	
7399.952	3.8704^o	3.5	2.1954	2.5	7399.917	8.1		-1.9	
7404.397	4.3526^o	4.5	2.6786	3.5	7404.405	51.9		-0.6	
7444.626	4.3435^o	3.5	2.6786	3.5	7444.650	19.6		-1.0	
7450.274	3.5542	2.5	1.8906^o	2.5	7450.317	6.6	-2.1	-2.3	
7470.528	3.5359	1.5	1.8768^o	1.5	7470.557^n	32.6		-1.7	-1.2
7507.047	4.0850	5.5	2.4339^o	4.5	7507.057	5.1	-2.0	-1.9	
7508.513	4.0618	6.5	2.4111^o	5.5	7508.515	12.8	-1.5	-1.5	
7521.268	4.3459^o	3.5	2.6980	4.5	7521.308	6.7		-1.4	
7528.705	3.7962^o	2.5	2.1499	3.5	7528.680	235.6		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7532.177	4.3435^o	3.5	2.6980	4.5	7532.227^b	7.6		-1.4	
7532.239	5.5159	2.5	3.8704^o	3.5	7532.227^b	7.6		-0.1	
7533.034	3.5359	1.5	1.8906^o	2.5	7533.022	27.4	-1.3	-1.7	
7547.291	3.5542	2.5	1.9119^o	3.5	7547.324	20.2	-1.6	-1.8	
7551.995	3.5853	3.5	1.9441^o	4.5	7552.019	8.3	-2.0	-2.2	
7583.876	3.5662^o	4.5	1.9318	5.5	7583.854	1938.4		0.2	
7627.667	3.6185	4.5	1.9936^o	5.5	7627.677	5.0	-2.0	-2.4	
7710.922	4.0413	4.5	2.4339^o	4.5	7710.959	1.9	-2.4	-2.3	
7742.561	3.7962^o	2.5	2.1954	2.5	7742.521	181.4		-0.6	
7746.160	3.6597^o	3.5	2.0595	4.5	7746.132	882.1		-0.0	
7759.333	4.0413	4.5	2.4439^o	3.5	7759.366	1.6	-2.5	-2.4	
7818.218	4.0193	5.5	2.4339^o	4.5	7818.213^n	28.0		-1.1	-0.8
7882.364	3.9835	4.5	2.4111^o	5.5	7882.358	8.6	-1.4	-1.7	
7887.999	3.7962^o	2.5	2.2249	1.5	7887.981	215.2		-0.5	
8015.434	3.9903	4.5	2.4439^o	3.5	8015.468	17.0	-1.3	-1.4	
8133.738	3.9678	3.5	2.4439^o	3.5	8133.779	11.3	-1.5	-1.5	
8168.049	3.9678	3.5	2.4503^o	2.5	8168.106	10.5	-1.5	-1.6	
8209.805	3.6597^o	3.5	2.1499	3.5	8209.771	161.3		-0.7	
8226.816	3.5662^o	4.5	2.0595	4.5	8226.761	106.9		-1.0	
8335.559	3.9411	1.5	2.4541^o	1.5	8335.569	3.2		-2.1	
8514.649	3.8452	5.5	2.3895^o	4.5	8514.629	5.8	-1.8	-1.9	
8641.602	3.8238	3.5	2.3895^o	4.5	8641.670	7.9	-1.7	-1.8	
8642.693	3.8452	5.5	2.4111^o	5.5	8642.684^n	136.7		-0.5	-0.2
8790.920	3.8210	5.5	2.4111^o	5.5	8790.910	27.0		-1.2	
8870.222	3.8312	4.5	2.4339^o	4.5	8870.317^n	34.7		-1.1	-0.6
8934.345	3.8312	4.5	2.4439^o	3.5	8934.406	19.2	-1.2	-1.3	
8982.389	3.8238	3.5	2.4439^o	3.5	8982.451	10.0		-1.6	

Table A.12: Measured wavelengths (λ_o) and intensities of Eu II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3819.672	3.2449	5.0	0.0000^o	4.0	3819.665^n	8576.4		0.4	0.5
3866.753	4.4554	4.0	1.2499^o	3.0	3866.742	281.9		0.3	
3907.106	3.3793	2.0	0.2070^o	3.0	3907.108^n	3221.2		0.1	0.2
3930.499	3.3604	3.0	0.2070^o	3.0	3930.493^n	4895.2		0.3	0.2
3971.972	3.3275	4.0	0.2070^o	3.0	3971.972^n	5921.6		0.4	0.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4004.176	6.8383^o	3.0	3.7429	2.0	4004.187	51.1			
4004.583	4.3450	4.0	1.2499^o	3.0	4004.552^c	25.8		-0.9	
4011.680	6.0909^o	4.0	3.0013	4.0	4011.674	59.7			
4017.585	4.4047	4.0	1.3196^o	5.0	4017.578	14.9		-1.0	
4129.725	3.0013	4.0	0.0000^o	4.0	4129.719^n	8835.3		0.2	0.2
4205.041	2.9476	3.0	0.0000^o	4.0	4205.040^n	9872.7		0.2	0.1
4329.984	6.7680^o	3.0	3.9055	3.0	4329.972^c	252.3			
4355.087	6.0909^o	4.0	3.2449	5.0	4355.088	68.2			
4435.578	3.0013	4.0	0.2070^o	3.0	4435.573^n	3054.7		-0.1	-0.1
4522.581	2.9476	3.0	0.2070^o	3.0	4522.576^n	843.7		-0.7	-0.7
4762.937	4.7105	4.0	2.1082^o	4.0	4762.919^c	40.5		-0.0	
4769.636	6.7421^o	4.0	4.1435	5.0	4769.619^c	29.0			
4867.557	6.8383^o	3.0	4.2919	4.0	4867.583^c	848.1			
5089.096	6.9793^o	4.0	4.5438	5.0	5089.063^c	243.0			
5129.128	7.3205^o	3.0	4.9040	4.0	5129.087^c	1553.0			
5169.739	7.1004^o	4.0	4.7029	5.0	5169.734^c	40.7			
5280.632	7.0398^o	5.0	4.6926	5.0	5280.648^b	47.6			
5280.662	4.4554	4.0	2.1082^o	4.0	5280.648^{bc}	55.7		-0.0	
5303.843	7.0398^o	5.0	4.7029	5.0	5303.861^c	578.1			
5579.611	6.5665^o	5.0	4.3450	4.0	5579.638^c	1084.0			
5580.026	6.7650^o	6.0	4.5438	5.0	5580.034^c	1564.3			
5602.083	6.9813^o	3.0	4.7688	3.0	5602.096	37.0			
5665.412	6.7316^o	4.0	4.5438	5.0	5665.369	41.7			
5684.256	6.8429^o	3.0	4.6624	3.0	5684.226^c	432.0			
5685.863	6.5896^o	4.0	4.4097	3.0	5685.855	12.3			
5818.746	3.3604	3.0	1.2303^o	2.0	5818.731	18.9	-1.7	-1.6	
5908.797	4.1881	4.0	2.0904^o	5.0	5908.760^c	6.9		-1.1	
6049.476	6.9793^o	4.0	4.9304	3.0	6049.504^b	45.5			
6049.513	3.3275	4.0	1.2786^o	4.0	6049.504^b	45.9	-1.3	-1.2	
6437.640	3.2449	5.0	1.3196^o	5.0	6437.628	66.5	-0.9	-1.1	
6645.064	3.2449	5.0	1.3797^o	6.0	6645.103	189.8	-0.4	-0.6	
6772.359	6.6778^o	2.0	4.8476	2.0	6772.400	12.3			
7077.088	3.0013	4.0	1.2499^o	3.0	7077.076	39.9	-1.4	-1.4	
7194.830	3.0013	4.0	1.2786^o	4.0	7194.797	91.3	-1.1	-1.0	
7217.560	2.9476	3.0	1.2303^o	2.0	7217.538	122.1	-1.0	-1.0	
7301.187	2.9476	3.0	1.2499^o	3.0	7301.182	105.3	-1.0	-1.0	
7370.220	3.0013	4.0	1.3196^o	5.0	7370.219	66.9	-1.2	-1.1	
7426.569	2.9476	3.0	1.2786^o	4.0	7426.548	53.0	-1.3	-1.3	
7907.096	6.1552^o	3.0	4.5877	2.0	7907.112	15.1			
8022.806	7.3205^o	3.0	5.7756	4.0	8022.771	33.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	log gf Boltz.	NIST-ASD

Table A.13: Measured wavelengths (λ_o) and intensities of Gd I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	log gf Boltz.	NIST-ASD
3804.973	4.5687	2.0	1.3113^o	3.0	3804.988	289.6			
3843.272	3.4381	5.0	0.2131^o	6.0	3843.277	607.8		0.1	
3866.989	3.4184	5.0	0.2131^o	6.0	3866.988^c	638.0		0.1	
3887.735	3.2542	3.0	0.0661^o	4.0	3887.750	46.8		-1.4	
3902.716	3.2998	5.0	0.1239^o	5.0	3902.720	275.6		-0.5	
3905.647	3.3866	5.0	0.2131^o	6.0	3905.654	289.6		-0.3	
3934.787	3.2161	5.0	0.0661^o	4.0	3934.787	395.3		-0.5	
3935.388	3.1495	3.0	0.0000^o	2.0	3935.385^c	111.1		-1.2	
3940.675	5.0990	4.0	1.9537^o	3.0	3940.679	60.9			
3941.797	3.3575	6.0	0.2131^o	6.0	3941.797	323.3		-0.3	
3943.236	3.1433	1.0	0.0000^o	2.0	3943.235	248.2		-0.8	
3945.532	3.2653	6.0	0.1239^o	5.0	3945.544^b	615.7		-0.2	
3945.563	3.1414	2.0	0.0000^o	2.0	3945.544^b	600.9		-0.4	
3953.366	3.2013	4.0	0.0661^o	4.0	3953.371	193.7		-0.8	
3958.674	3.1310	3.0	0.0000^o	2.0	3958.684	47.8		-1.6	
3960.108	3.9948	6.0	0.8650^o	5.0	3960.113	93.6		0.3	
3966.276	3.3381	7.0	0.2131^o	6.0	3966.276^b	309.2		-0.4	
3966.280	5.0787	4.0	1.9537^o	3.0	3966.276^b	309.2			
3968.999	3.1495	3.0	0.0267^o	3.0	3969.001	319.6		-0.7	
3972.706	3.1199	2.0	0.0000^o	2.0	3972.710	184.9		-1.0	
3974.812	3.3314	7.0	0.2131^o	6.0	3974.813^c	101.4		-0.9	
3979.314	4.0355	4.0	0.9208^o	3.0	3979.333^b	395.9			
3979.349	3.1414	2.0	0.0267^o	3.0	3979.333^b	387.5		-0.6	
3987.834	3.1081	1.0	0.0000^o	2.0	3987.844	186.3		-1.0	
3992.686	3.1310	3.0	0.0267^o	3.0	3992.695	110.5		-1.2	
4006.961	3.1199	2.0	0.0267^o	3.0	4006.987	107.5		-1.2	
4015.217	3.9839	3.0	0.8970^o	4.0	4015.216	31.9		-0.2	
4015.581	3.2998	5.0	0.2131^o	6.0	4015.591	28.7		-1.5	
4017.244	4.0229	3.0	0.9376^o	2.0	4017.245	66.2		0.2	
4017.709	3.9499	4.0	0.8650^o	5.0	4017.711	106.0		0.3	
4019.726	3.1495	3.0	0.0661^o	4.0	4019.731	56.9		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4020.217	4.9644[o]	6.0	1.8813	5.0	4020.240	17.8			
4023.141	3.2940	6.0	0.2131[o]	6.0	4023.149	843.1		0.0	
4023.347	3.1467	5.0	0.0661[o]	4.0	4023.351	391.1		-0.6	
4027.611	3.2013	4.0	0.1239[o]	5.0	4027.630[b]	99.8		-1.1	
4027.620	4.0150	3.0	0.9376[o]	2.0	4027.630[b]	99.8		0.4	
4028.152	3.9419	6.0	0.8650[o]	5.0	4028.159	593.2			
4033.269	5.2280[o]	2.0	2.1549	2.0	4033.273[c]	19.0			
4033.489	3.9699	5.0	0.8970[o]	4.0	4033.489	365.3		0.9	
4035.389	3.0981	4.0	0.0267[o]	3.0	4035.395[bc]	168.1		-1.0	
4035.411	4.0091	2.0	0.9376[o]	2.0	4035.395[bc]	168.1		0.6	
4036.832	3.9674	3.0	0.8970[o]	4.0	4036.837	109.2		0.3	
4043.706	3.9859	2.0	0.9208[o]	3.0	4043.701	120.3		0.4	
4044.024	3.1310	3.0	0.0661[o]	4.0	4044.023[b]	49.2		-1.5	
4044.051	5.0280	4.0	1.9631[o]	4.0	4044.023[b]	49.2			
4044.985	4.5590	6.0	1.4949[o]	5.0	4045.008[b]	986.2			
4045.009	3.0642	3.0	0.0000[o]	2.0	4045.008[b]	993.9		-0.3	
4045.856	4.0011	3.0	0.9376[o]	2.0	4045.864[b]	63.3		0.2	
4045.883	4.4129	3.0	1.3493[o]	4.0	4045.864[b]	65.8		0.9	
4047.086	4.0115	1.0	0.9489[o]	1.0	4047.090	99.3		0.4	
4049.194	3.9986	1.0	0.9376[o]	2.0	4049.201	69.5		0.2	
4050.366	4.0091	2.0	0.9489[o]	1.0	4050.367	84.1		0.3	
4053.640	3.1815	6.0	0.1239[o]	5.0	4053.638[n]	2551.1		0.3	0.3
4054.700	5.1928[o]	1.0	2.1359	1.0	4054.725[b]	742.9			
4054.722	3.0568	2.0	0.0000[o]	2.0	4054.725[b]	744.8		-0.5	
4058.220	3.0809	4.0	0.0267[o]	3.0	4058.219[n]	2544.9		0.1	0.1
4059.870	3.9499	4.0	0.8970[o]	4.0	4059.878	318.8		0.8	
4061.157	3.2651	5.0	0.2131[o]	6.0	4061.158[b]	37.3		-1.4	
4061.185	5.1019	5.0	2.0500[o]	5.0	4061.158[b]	35.0			
4061.818	3.9485	4.0	0.8970[o]	4.0	4061.820	20.6		-0.4	
4066.017	4.4489	4.0	1.4005[o]	5.0	4066.033[b]	53.8		0.9	
4066.032	3.9859	2.0	0.9376[o]	2.0	4066.033[b]	52.3		0.1	
4068.316	3.9273	5.0	0.8807[o]	5.0	4068.346[b]	154.7		0.4	
4068.342	3.9674	3.0	0.9208[o]	3.0	4068.346[b]	157.2		0.5	
4068.744	3.9839	3.0	0.9376[o]	2.0	4068.746	40.3		-0.1	
4078.704	3.1049	5.0	0.0661[o]	4.0	4078.694[n]	2301.1		0.1	0.2
4080.528	3.0642	3.0	0.0267[o]	3.0	4080.524[bc]	111.6		-1.3	
4080.548	4.7030[o]	3.0	1.6655	3.0	4080.524[bc]	112.0			
4087.323	3.0324	2.0	0.0000[o]	2.0	4087.318	19.6		-2.1	
4090.203	3.9273	5.0	0.8970[o]	4.0	4090.193	11.6		-0.7	
4091.742	3.9499	4.0	0.9208[o]	3.0	4091.756	18.0		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4092.715	3.2416	7.0	0.2131[o]	6.0	4092.720	1115.0		0.1	
4093.720	3.9485	4.0	0.9208[o]	3.0	4093.725	125.0		0.4	
4100.269	3.1467	5.0	0.1239[o]	5.0	4100.270	407.5		-0.6	
4101.268	4.9644[o]	6.0	1.9422	5.0	4101.247	12.9			
4112.934	3.9512	3.0	0.9376[o]	2.0	4112.924	26.4		-0.3	
4119.205	4.4095	4.0	1.4005[o]	5.0	4119.221	34.2		0.7	
4123.391	4.5540	8.0	1.5481[o]	7.0	4123.392	13.7		0.5	
4123.592	3.0324	2.0	0.0267[o]	3.0	4123.594	33.5		-1.8	
4125.769	4.0578	7.0	1.0536[o]	8.0	4125.765	17.1		-0.3	
4128.110	4.9516	4.0	1.9491[o]	5.0	4128.093	8.2			
4134.157	4.7247[o]	3.0	1.7266	4.0	4134.170[b]	791.6			
4134.164	3.0642	3.0	0.0661[o]	4.0	4134.170[b]	791.6		-0.4	
4144.249	3.9116	2.0	0.9208[o]	3.0	4144.245	39.8		-0.2	
4148.855	3.2006	6.0	0.2131[o]	6.0	4148.855	149.9		-0.9	
4149.480	3.8840	3.0	0.8970[o]	4.0	4149.481	53.1		-0.1	
4157.778	3.1049	5.0	0.1239[o]	5.0	4157.794[b]	92.5	-1.2	-1.3	
4157.825	3.8780	5.0	0.8970[o]	4.0	4157.794[b]	83.0		0.1	
4158.479	3.9182	1.0	0.9376[o]	2.0	4158.467	15.5		-0.6	
4167.270	3.0981	4.0	0.1239[o]	5.0	4167.277	212.7		-0.9	
4171.708	4.4379	5.0	1.4667[o]	6.0	4171.710[b]	38.3		0.8	
4171.710	4.3284[o]	5.0	1.3572	6.0	4171.710[b]	38.3		0.6	
4174.362	3.9182	1.0	0.9489[o]	1.0	4174.373	13.8		-0.6	
4175.539	3.1815	6.0	0.2131[o]	6.0	4175.534[n]	1726.8		0.2	0.2
4182.767	3.8602	4.0	0.8970[o]	4.0	4182.759[b]	29.8		-0.4	
4182.780	3.8840	3.0	0.9208[o]	3.0	4182.759[b]	27.8		-0.4	
4190.206	3.8229	4.0	0.8650[o]	5.0	4190.205	60.3		-0.1	
4190.781	3.0815	6.0	0.1239[o]	5.0	4190.772[n]	1816.5		0.0	0.0
4191.622	3.0809	4.0	0.1239[o]	5.0	4191.620	583.2	-0.5	-0.5	
4201.735	4.8921[o]	6.0	1.9422	5.0	4201.717	71.0			
4208.079	4.3942	3.0	1.4488[o]	4.0	4208.092[b]	23.6		0.5	
4208.085	3.7576	4.0	0.8121[o]	3.0	4208.092[b]	23.6		-0.7	
4212.041	4.7614[o]	5.0	1.8187	4.0	4212.015[c]	24.6			
4215.255	4.4885	6.0	1.5481[o]	7.0	4215.251	34.3		0.8	
4225.032	3.1467	5.0	0.2131[o]	6.0	4225.029	189.9		-0.8	
4225.848	3.1462	7.0	0.2131[o]	6.0	4225.841[n]	5103.9		0.6	0.6
4235.312	4.9089	5.0	1.9824[o]	5.0	4235.293	14.3			
4240.684	3.8198	3.0	0.8970[o]	4.0	4240.686	14.9		-0.7	
4245.342	3.8003	6.0	0.8807[o]	5.0	4245.346	44.7		-0.3	
4250.270	3.7576	4.0	0.8414[o]	4.0	4250.278	29.6		-0.5	
4254.062	3.7044	3.0	0.7908[o]	2.0	4254.056	14.6		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4260.116	2.9755	5.0	0.0661[o]	4.0	4260.112	534.4		-0.7	
4262.082	3.7495	5.0	0.8414[o]	4.0	4262.080[c]	139.5		0.1	
4266.594	3.0289	6.0	0.1239[o]	5.0	4266.590	537.4	-0.6	-0.6	
4267.008	2.9314	4.0	0.0267[o]	3.0	4267.003	334.5		-1.0	
4268.004	5.0137	7.0	2.1097[o]	6.0	4268.005	65.7			
4270.274	3.7439	5.0	0.8414[o]	4.0	4270.256	63.4		-0.2	
4270.796	3.8229	4.0	0.9208[o]	3.0	4270.793	39.0		-0.3	
4273.291	3.7975	5.0	0.8970[o]	4.0	4273.293[b]	34.8		-0.4	
4273.296	4.6677[o]	3.0	1.7672	3.0	4273.293[b]	34.8			
4274.168	2.8999	3.0	0.0000[o]	2.0	4274.166	173.3	-1.2	-1.3	
4278.988	5.0588	3.0	2.1622[o]	4.0	4278.995	18.4			
4284.942	3.7576	4.0	0.8650[o]	5.0	4284.950	33.9		-0.5	
4285.815	3.7041	4.0	0.8121[o]	3.0	4285.818[b]	238.8		0.3	
4285.834	4.8854	3.0	1.9934[o]	2.0	4285.818[b]	238.8			
4286.120	3.1049	5.0	0.2131[o]	6.0	4286.123	161.9	-0.9	-1.0	
4290.057	3.6799	3.0	0.7908[o]	2.0	4290.066	28.3		-0.7	
4296.948	3.7495	5.0	0.8650[o]	5.0	4296.946	39.3		-0.4	
4299.291	3.6737	3.0	0.7908[o]	2.0	4299.290	315.4		0.4	
4306.343	2.8782	2.0	0.0000[o]	2.0	4306.337	1400.2		-0.4	
4307.251	4.8407	3.0	1.9631[o]	4.0	4307.277[b]	37.0			
4307.300	4.6448[o]	4.0	1.7672	3.0	4307.277[b]	34.7			
4309.288	3.8616	7.0	0.9853[o]	7.0	4309.284	262.5		0.6	
4311.997	4.9841	5.0	2.1097[o]	6.0	4311.993	46.8			
4313.845	2.8999	3.0	0.0267[o]	3.0	4313.838[n]	2489.3		-0.1	-0.1
4314.401	3.8003	6.0	0.9274[o]	6.0	4314.400	468.6		0.8	
4316.083	4.6389[o]	2.0	1.7672	3.0	4316.054[c]	34.9			
4320.517	3.7495	5.0	0.8807[o]	5.0	4320.520[b]	333.6		0.5	
4320.527	5.3113[o]	4.0	2.4425	5.0	4320.520[b]	333.5			
4321.201	3.0815	6.0	0.2131[o]	6.0	4321.202	657.9	-0.4	-0.4	
4322.365	5.1096[o]	6.0	2.2420	5.0	4322.378	59.6			
4325.694	2.9314	4.0	0.0661[o]	4.0	4325.697	3355.7		0.0	
4327.102	2.8644	1.0	0.0000[o]	2.0	4327.099[n]	2066.8		-0.3	-0.4
4328.935	3.7439	5.0	0.8807[o]	5.0	4328.940	89.0		-0.1	
4329.580	3.7041	4.0	0.8414[o]	4.0	4329.580	353.3		0.5	
4331.376	3.6737	3.0	0.8121[o]	3.0	4331.376	231.1		0.2	
4333.242	4.5348[o]	3.0	1.6745	4.0	4333.243	27.8		0.9	
4337.494	3.6483	3.0	0.7908[o]	2.0	4337.513[c]	42.5		-0.6	
4340.262	4.6744[o]	4.0	1.8187	4.0	4340.261	39.9			
4346.455	2.9755	5.0	0.1239[o]	5.0	4346.449	3973.7		0.2	
4347.857	3.7883	1.0	0.9376[o]	2.0	4347.832	25.9		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4353.798	4.6141[o]	3.0	1.7672	3.0	4353.788	42.5			
4363.520	4.7943	2.0	1.9538[o]	1.0	4363.517	26.0			
4369.159	4.3317	6.0	1.4949[o]	5.0	4369.162	104.2			
4370.190	4.1934[o]	5.0	1.3572	6.0	4370.192	227.0			
4373.836	2.8999	3.0	0.0661[o]	4.0	4373.834[b]	1611.8	-0.2	-0.3	
4373.850	4.8381	4.0	2.0043[o]	3.0	4373.834[b]	1619.0			
4374.985	4.7144[o]	6.0	1.8813	5.0	4374.978	38.1			
4376.082	3.6737	3.0	0.8414[o]	4.0	4376.079	52.1		-0.4	
4378.552	3.7684	2.0	0.9376[o]	2.0	4378.575[b]	144.5		0.2	
4378.573	4.2795	5.0	1.4488[o]	4.0	4378.575[b]	144.5			
4387.185	4.5924[o]	4.0	1.7672	3.0	4387.179	70.6			
4389.893	3.7041	4.0	0.8807[o]	5.0	4389.892	140.6		0.1	
4397.368	4.6999[o]	5.0	1.8813	5.0	4397.372	20.5			
4400.764	3.7439	5.0	0.9274[o]	6.0	4400.767	93.5		-0.0	
4401.851	3.0289	6.0	0.2131[o]	6.0	4401.845[n]	3003.1		0.2	0.2
4403.133	3.8003	6.0	0.9853[o]	7.0	4403.135[c]	674.7		0.9	
4414.157	3.8616	7.0	1.0536[o]	8.0	4414.158	1376.6			
4414.739	2.9314	4.0	0.1239[o]	5.0	4414.737	1223.3		-0.4	
4415.025	3.7044	3.0	0.8970[o]	4.0	4415.023	46.6		-0.4	
4415.351	4.5744[o]	2.0	1.7672	3.0	4415.350	42.5			
4415.991	4.6389[o]	2.0	1.8322	2.0	4415.993	64.8			
4422.407	2.8294	4.0	0.0267[o]	3.0	4422.403[n]	3392.4		-0.1	-0.1
4430.629	2.7975	3.0	0.0000[o]	2.0	4430.623[n]	2554.1		-0.3	-0.2
4432.291	4.1970	6.0	1.4005[o]	5.0	4432.305	51.1		0.5	
4433.414	4.7891	1.0	1.9934[o]	2.0	4433.399	150.0			
4433.721	4.6768[o]	5.0	1.8813	5.0	4433.723	118.2			
4436.096	3.0072	7.0	0.2131[o]	6.0	4436.096	254.6		-0.9	
4436.960	4.9557	5.0	2.1622[o]	4.0	4436.977	32.5			
4437.880	3.7203	6.0	0.9274[o]	6.0	4437.879	35.4		-0.5	
4438.456	4.7579[o]	7.0	1.9654	6.0	4438.458	69.2			
4444.979	4.4629[o]	3.0	1.6745	4.0	4444.983	31.4		0.8	
4447.337	4.8074	3.0	2.0205[o]	4.0	4447.344	22.5			
4447.978	5.0067	6.0	2.2201[o]	6.0	4447.986	21.7			
4449.020	4.6181[o]	3.0	1.8322	2.0	4449.021	32.2			
4449.404	4.6179[o]	1.0	1.8322	2.0	4449.406	28.9			
4461.327	4.6530[o]	2.0	1.8747	1.0	4461.358[b]	35.4			
4461.361	3.6990	2.0	0.9208[o]	3.0	4461.358[b]	34.8		-0.5	
4462.823	4.2722	4.0	1.4949[o]	5.0	4462.826	72.3		0.8	
4464.738	4.3284[o]	5.0	1.5522	5.0	4464.738	223.7			
4465.807	3.6404	6.0	0.8650[o]	5.0	4465.799	25.5		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4466.598	3.6399	4.0	0.8650[o]	5.0	4466.594	62.4		-0.4	
4468.907	4.9557	5.0	2.1822[o]	5.0	4468.914	107.6			
4470.463	4.5398[o]	4.0	1.7672	3.0	4470.476	257.3			
4473.278	2.7975	3.0	0.0267[o]	3.0	4473.275[b]	89.7	-1.7	-1.7	
4473.292	4.9530	6.0	2.1822[o]	5.0	4473.275[b]	89.7			
4476.120	2.7691	2.0	0.0000[o]	2.0	4476.119	2414.0	-0.4	-0.3	
4481.064	4.0773	4.0	1.3113[o]	3.0	4481.068[c]	16.0		-0.2	
4481.804	4.9181	3.0	2.1526[o]	3.0	4481.825	9.1			
4484.698	4.3160[o]	6.0	1.5522	5.0	4484.703	195.3			
4485.477	2.8294	4.0	0.0661[o]	4.0	4485.476	54.5	-1.9	-1.9	
4486.905	2.9755	5.0	0.2131[o]	6.0	4486.903	431.1		-0.7	
4488.553	3.6990	2.0	0.9376[o]	2.0	4488.546	37.5		-0.5	
4503.202	4.3046[o]	5.0	1.5522	5.0	4503.192	25.4		0.5	
4504.958	3.6483	3.0	0.8970[o]	4.0	4504.953	25.8		-0.7	
4506.218	2.8166	5.0	0.0661[o]	4.0	4506.216	2984.8		-0.2	
4507.663	4.3019[o]	4.0	1.5522	5.0	4507.666	100.3			
4508.988	4.2795	5.0	1.5307[o]	6.0	4508.995	90.3		1.0	
4514.875	4.6694	4.0	1.9241[o]	4.0	4514.884	98.6			
4516.989	4.5112[o]	4.0	1.7672	3.0	4516.974	92.0			
4519.654	2.7691	2.0	0.0267[o]	3.0	4519.648[n]	3062.7		-0.2	-0.2
4521.346	4.6226	3.0	1.8812[o]	3.0	4521.320	30.2			
4524.123	4.4142[o]	4.0	1.6745	4.0	4524.126	121.1			
4531.142	3.6844	2.0	0.9489[o]	1.0	4531.148	33.2		-0.5	
4531.818	3.7203	6.0	0.9853[o]	7.0	4531.816	53.9		-0.3	
4535.589	5.0990	4.0	2.3663[o]	5.0	4535.598	52.3			
4536.965	4.2842[o]	4.0	1.5522	5.0	4536.970[bc]	73.4		0.9	
4536.976	4.8808	1.0	2.1489[o]	2.0	4536.970[bc]	73.5			
4542.031	2.7555	4.0	0.0267[o]	3.0	4542.030	1486.5		-0.6	
4542.747	3.7821	7.0	1.0536[o]	8.0	4542.749	49.0		-0.2	
4544.234	3.6483	3.0	0.9208[o]	3.0	4544.230[c]	70.7		-0.3	
4548.007	4.0825[o]	7.0	1.3572	6.0	4548.009	286.8			
4559.622	4.4856[o]	4.0	1.7672	3.0	4559.623	64.8			
4561.087	4.7973[o]	8.0	2.0798	7.0	4561.088	139.1			
4564.595	4.0647	4.0	1.3493[o]	4.0	4564.594	26.6		0.1	
4565.904	4.9351[o]	7.0	2.2205	8.0	4565.887	36.4			
4566.820	3.6111	3.0	0.8970[o]	4.0	4566.831	14.4		-1.0	
4570.837	4.0229	3.0	1.3113[o]	3.0	4570.830	14.6		-0.3	
4572.203	3.5758	6.0	0.8650[o]	5.0	4572.203	32.7		-0.7	
4573.812	2.7099	3.0	0.0000[o]	2.0	4573.813	1065.2		-0.8	
4575.910	3.6940	8.0	0.9853[o]	7.0	4575.912	358.4		0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4579.596	4.2372	7.0	1.5307^o	6.0	4579.597	424.2			
4581.295	2.8294	4.0	0.1239^o	5.0	4581.296	1126.7	-0.6	-0.5	
4583.081	3.6319	7.0	0.9274^o	6.0	4583.084	616.8		0.6	
4584.270	3.6890	8.0	0.9853^o	7.0	4584.273^b	88.5		-0.1	
4584.275	4.0150	3.0	1.3113^o	3.0	4584.273^b	88.5		0.5	
4586.082	4.5348^o	3.0	1.8322	2.0	4586.093	24.4		0.9	
4586.994	4.1970	6.0	1.4949^o	5.0	4586.994	109.1		0.9	
4594.267	4.6219	5.0	1.9241^o	4.0	4594.230	95.6			
4597.876	4.4629^o	3.0	1.7672	3.0	4597.891^c	54.4			
4598.897	3.5758	6.0	0.8807^o	5.0	4598.898	698.5		0.6	
4602.933	2.8166	5.0	0.1239^o	5.0	4602.930	684.0		-0.8	
4604.519	4.8407	3.0	2.1489^o	2.0	4604.502	54.0			
4606.062	4.6400	5.0	1.9491^o	5.0	4606.061	45.4			
4606.660	4.0399	5.0	1.3493^o	4.0	4606.678	54.2		0.3	
4608.584	2.7555	4.0	0.0661^o	4.0	4608.577	100.9		-1.7	
4614.497	3.5274	5.0	0.8414^o	4.0	4614.496^{bc}	613.8		0.5	
4614.501	3.4981	3.0	0.8121^o	3.0	4614.496^{bc}	613.8		0.4	
4619.136	3.9507	2.0	1.2674^o	1.0	4619.136^b	30.9		-0.1	
4619.154	5.1019	5.0	2.4186^o	4.0	4619.136^b	32.0			
4622.305	3.5622	6.0	0.8807^o	5.0	4622.307	30.5		-0.8	
4622.601	4.6350	3.0	1.9537^o	3.0	4622.583	27.3			
4624.422	3.4924	4.0	0.8121^o	3.0	4624.426	117.4		-0.3	
4630.518	4.0773	4.0	1.4005^o	5.0	4630.517	29.0		0.1	
4634.745	4.4145^o	2.0	1.7402	2.0	4634.765	24.6		0.7	
4636.636	5.0280	4.0	2.3548^o	3.0	4636.647^b	650.4			
4636.646	3.4853	4.0	0.8121^o	3.0	4636.647^b	649.1		0.4	
4637.215	4.6219	5.0	1.9491^o	5.0	4637.248^b	31.4			
4637.252	3.5698	4.0	0.8970^o	4.0	4637.248^b	32.3		-0.7	
4637.258	5.1019	5.0	2.4291^o	5.0	4637.248^b	32.3			
4640.041	4.1200	5.0	1.4488^o	4.0	4640.038	90.1		0.7	
4640.546	2.6709	3.0	0.0000^o	2.0	4640.542	75.2		-2.0	
4647.635	4.4856^o	4.0	1.8187	4.0	4647.654^b	357.5			
4647.653	2.8800	6.0	0.2131^o	6.0	4647.654^b	361.6		-0.9	
4653.537	4.6548^o	4.0	1.9913	3.0	4653.549^b	358.4			
4653.552	3.4542	3.0	0.7908^o	2.0	4653.549^b	355.6		0.1	
4654.770	2.8759	5.0	0.2131^o	6.0	4654.769	47.3		-1.8	
4658.613	2.6873	4.0	0.0267^o	3.0	4658.615	163.6		-1.6	
4661.668	4.6219	5.0	1.9631^o	4.0	4661.672	22.4			
4669.636	4.6623^o	3.0	2.0080	4.0	4669.616^b	10.0		0.7	
4669.642	4.6477	2.0	1.9934^o	2.0	4669.616^b	10.0		0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4674.412	5.0918	6.0	2.4402^o	6.0	4674.396	11.9			
4675.628	2.6509	1.0	0.0000^o	2.0	4675.615	29.4		-2.4	
4677.628	2.7158	5.0	0.0661^o	4.0	4677.632	72.1		-1.9	
4679.164	4.6694	4.0	2.0205^o	4.0	4679.163^b	243.6			
4679.181	4.1970	6.0	1.5481^o	7.0	4679.163^b	235.0			
4680.047	3.5758	6.0	0.9274^o	6.0	4680.047	222.5		0.1	
4683.072	3.5274	5.0	0.8807^o	5.0	4683.076^c	50.7		-0.6	
4683.336	3.6319	7.0	0.9853^o	7.0	4683.339^c	641.4		0.7	
4687.353	2.6709	3.0	0.0267^o	3.0	4687.343	42.3		-2.2	
4688.130	2.7099	3.0	0.0661^o	4.0	4688.129	816.2		-0.9	
4691.166	3.4542	3.0	0.8121^o	3.0	4691.170	59.6		-0.7	
4695.493	4.1345	5.0	1.4949^o	5.0	4695.489	187.2			
4695.984	3.9507	2.0	1.3113^o	3.0	4695.986^b	83.8		0.4	
4696.022	4.0399	5.0	1.4005^o	5.0	4695.986^b	104.5		0.6	
4696.769	4.3045^o	4.0	1.6655	3.0	4696.756	42.1		0.7	
4697.427	3.4294	2.0	0.7908^o	2.0	4697.426	458.7		0.2	
4703.133	3.6890	8.0	1.0536^o	8.0	4703.138^b	253.5		0.4	
4703.175	4.5985	4.0	1.9631^o	4.0	4703.138^b	257.3			
4705.755	5.0002	5.0	2.3663^o	5.0	4705.755	28.7			
4707.880	2.6594	2.0	0.0267^o	3.0	4707.883	133.3		-1.7	
4709.793	2.7555	4.0	0.1239^o	5.0	4709.791	776.5		-0.8	
4718.714	3.4388	2.0	0.8121^o	3.0	4718.719	32.7		-0.9	
4720.605	4.9841	5.0	2.3585^o	4.0	4720.585	11.3			
4728.654	2.6873	4.0	0.0661^o	4.0	4728.655	419.4		-1.2	
4731.853	4.6694	4.0	2.0500^o	5.0	4731.817	42.3			
4735.757	3.4294	2.0	0.8121^o	3.0	4735.759	327.2		0.1	
4743.613	4.9792	6.0	2.3663^o	5.0	4743.651^b	537.1			
4743.652	3.4542	3.0	0.8414^o	4.0	4743.651^b	528.9		0.3	
4745.828	3.4924	4.0	0.8807^o	5.0	4745.830	134.6		-0.2	
4746.978	3.5318	3.0	0.9208^o	3.0	4746.964	65.4		-0.5	
4752.401	5.1606	6.0	2.5526^o	5.0	4752.416	59.2			
4756.478	4.4871	4.0	1.8812^o	3.0	4756.515	337.0			
4758.267	2.6709	3.0	0.0661^o	4.0	4758.261^b	653.7		-1.0	
4758.292	4.7030^o	3.0	2.0982	2.0	4758.261^b	653.7			
4758.704	3.4853	4.0	0.8807^o	5.0	4758.708	679.4		0.5	
4760.749	2.8166	5.0	0.2131^o	6.0	4760.747	229.5		-1.2	
4767.248	3.5274	5.0	0.9274^o	6.0	4767.249	529.6		0.4	
4781.926	2.7158	5.0	0.1239^o	5.0	4781.927	1318.6		-0.6	
4784.618	3.9399	5.0	1.3493^o	4.0	4784.636^b	436.6			
4784.638	3.5758	6.0	0.9853^o	7.0	4784.636^b	441.3		0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
4786.530	4.4708^o	4.0	1.8813	5.0	4786.537	1480.0			
4786.757	4.1200	5.0	1.5307^o	6.0	4786.759	144.6		1.0	
4790.188	4.3277^o	2.0	1.7402	2.0	4790.217	318.8			
4795.925	4.5924^o	4.0	2.0080	4.0	4795.929	24.9			
4799.631	4.0773	4.0	1.4949^o	5.0	4799.624	31.6		0.2	
4805.329	4.9945^o	5.0	2.4152	6.0	4805.369	15.1			
4807.443	3.9788	6.0	1.4005^o	5.0	4807.457^b	241.2		0.9	
4807.462	3.6319	7.0	1.0536^o	8.0	4807.457^b	241.0		0.3	
4808.009	4.3045^o	4.0	1.7266	4.0	4808.011	38.9		0.7	
4810.598	5.0167	5.0	2.4402^o	6.0	4810.638	57.0			
4815.026	4.0229	3.0	1.4488^o	4.0	4815.019	18.3		-0.1	
4816.178	3.3643	3.0	0.7908^o	2.0	4816.164	6.9		-1.7	
4816.795	4.8136^o	7.0	2.2404	6.0	4816.827^b	48.2			
4816.832	4.0399	5.0	1.4667^o	6.0	4816.827^b	45.8		0.3	
4816.841	3.4381	5.0	0.8650^o	5.0	4816.827^b	45.8		-0.8	
4829.940	4.0150	3.0	1.4488^o	4.0	4829.941	18.3		-0.1	
4835.266	2.6873	4.0	0.1239^o	5.0	4835.267	807.7		-0.9	
4838.637	4.5038^o	4.0	1.9422	5.0	4838.642	51.5			
4848.053	4.6548^o	1.0	2.0982	2.0	4848.093^b	120.1			
4848.095	4.0873	6.0	1.5307^o	6.0	4848.093^b	118.1		0.8	
4854.153	3.4184	5.0	0.8650^o	5.0	4854.166	20.1		-1.1	
4856.188	4.0011	3.0	1.4488^o	4.0	4856.183	25.8		0.0	
4856.730	4.6298	7.0	2.0778^o	7.0	4856.730	76.9			
4861.789	3.9499	4.0	1.4005^o	5.0	4861.795^b	46.1		0.2	
4861.835	5.1019	5.0	2.5526^o	5.0	4861.795^b	45.2			
4862.600	3.8602	4.0	1.3113^o	3.0	4862.600	116.0		0.4	
4870.044	4.0399	5.0	1.4949^o	5.0	4870.043	52.5		0.4	
4871.517	3.8287	3.0	1.2844^o	2.0	4871.519	85.7		0.2	
4873.444	4.6231^o	6.0	2.0798	7.0	4873.442	81.9			
4881.090	3.9399	5.0	1.4005^o	5.0	4881.093	68.0		0.3	
4881.374	4.0873	6.0	1.5481^o	7.0	4881.375	60.9		0.5	
4883.204	3.8056	2.0	1.2674^o	1.0	4883.204	75.9		0.1	
4883.476	3.9869	4.0	1.4488^o	4.0	4883.479	27.2		0.0	
4892.540	5.1928^o	1.0	2.6594	2.0	4892.560^b	23.7			
4892.571	4.4871	4.0	1.9537^o	3.0	4892.559^b	26.2		0.9	
4894.255	4.4816	6.0	1.9491^o	5.0	4894.254	59.2			
4902.801	3.9948	6.0	1.4667^o	6.0	4902.803	22.3		-0.0	
4909.768	4.7579^o	7.0	2.2334	7.0	4909.761	23.8			
4910.126	3.3893	6.0	0.8650^o	5.0	4910.122	86.2		-0.6	
4912.003	3.3141	3.0	0.7908^o	2.0	4912.022	20.6		-1.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4915.831	3.4184	5.0	0.8970^o	4.0	4915.834	26.3		-1.0	
4916.580	4.7614^o	5.0	2.2404	6.0	4916.604^{bc}	36.6			
4916.597	3.7883	1.0	1.2674^o	1.0	4916.604^{bc}	35.3		-0.2	
4918.608	3.5053	8.0	0.9853^o	7.0	4918.642^b	26.2		-0.9	
4918.612	4.9351^o	7.0	2.4152	6.0	4918.642^b	26.2			
4918.639	4.4012	4.0	1.8812^o	3.0	4918.642^b	31.1		0.8	
4918.640	4.6181^o	3.0	2.0982	2.0	4918.642^b	31.1			
4918.649	4.5112^o	4.0	1.9913	3.0	4918.642^b	26.7		1.0	
4920.307	3.4567	1.0	0.9376^o	2.0	4920.326	23.1		-1.0	
4923.461	3.8287	3.0	1.3113^o	3.0	4923.465	21.0		-0.4	
4924.655	4.8753	4.0	2.3585^o	4.0	4924.626	14.5			
4930.696	4.4379	5.0	1.9241^o	4.0	4930.710^c	32.8		0.9	
4934.131	3.9788	6.0	1.4667^o	6.0	4934.133	260.2		1.0	
4936.048	4.4741	3.0	1.9631^o	4.0	4936.016	61.4			
4936.299	5.1690	5.0	2.6581^o	5.0	4936.338^b	83.4			
4936.335	3.8602	4.0	1.3493^o	4.0	4936.338^b	83.5		0.3	
4938.612	4.0578	7.0	1.5481^o	7.0	4938.612	324.8			
4948.560	4.4871	4.0	1.9824^o	5.0	4948.551	35.5			
4950.113	3.7883	1.0	1.2844^o	2.0	4950.110	91.3		0.2	
4952.481	2.7158	5.0	0.2131^o	6.0	4952.484	559.9		-0.9	
4953.149	3.9512	3.0	1.4488^o	4.0	4953.189^b	106.0		0.6	
4953.168	4.7030^o	3.0	2.2007	2.0	4953.189^b	105.1			
4961.479	3.9930	4.0	1.4949^o	5.0	4961.474	43.3		0.3	
4967.475	4.4489	4.0	1.9537^o	3.0	4967.479^b	11.9		0.5	
4967.490	5.2051^o	2.0	2.7099	3.0	4967.479^b	11.9			
4969.172	3.8056	2.0	1.3113^o	3.0	4969.171	100.9		0.3	
4972.613	3.3575	6.0	0.8650^o	5.0	4972.602	62.0		-0.7	
4980.199	4.4379	5.0	1.9491^o	5.0	4980.172	237.1			
4986.381	3.4065	3.0	0.9208^o	3.0	4986.379	51.2		-0.7	
4999.067	3.8287	3.0	1.3493^o	4.0	4999.070^b	127.0		0.4	
4999.089	5.1019	5.0	2.6226^o	4.0	4999.070^b	125.3			
5004.168	4.4400	3.0	1.9631^o	4.0	5004.175	71.7			
5009.993	4.7144^o	6.0	2.2404	6.0	5010.019	19.4			
5011.742	3.9399	5.0	1.4667^o	6.0	5011.739	41.6		0.2	
5015.049	3.5251	9.0	1.0536^o	8.0	5015.044	1942.8			
5020.373	3.4065	3.0	0.9376^o	2.0	5020.375^c	53.2		-0.7	
5039.088	3.8602	4.0	1.4005^o	5.0	5039.087	56.8		0.2	
5048.874	4.6371	4.0	2.1822^o	5.0	5048.839	38.0			
5051.483	4.4741	3.0	2.0205^o	4.0	5051.505	23.2		0.9	
5052.930	4.3277^o	2.0	1.8747	1.0	5052.942^c	111.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5066.108	4.4400	3.0	1.9934^{o}	2.0	5066.095^{c}	16.5		0.7	
5070.192	4.4489	4.0	2.0043^{o}	3.0	5070.190	18.2		0.7	
5072.982	4.8095	6.0	2.3663^{o}	5.0	5072.977	19.3			
5082.801	4.4885	6.0	2.0500^{o}	5.0	5082.795	19.3		0.8	
5096.922	4.8374	1.0	2.4056^{o}	2.0	5096.917^{b}	52.4			
5096.938	3.3526	4.0	0.9208^{o}	3.0	5096.917^{b}	54.3		-0.8	
5103.457	3.4140	8.0	0.9853^{o}	7.0	5103.454	1523.8		0.8	
5125.208	4.6026^{o}	4.0	2.1843	3.0	5125.229	33.3			
5126.769	4.4089^{o}	4.0	1.9913	3.0	5126.770	24.9		0.8	
5132.226	3.3527	3.0	0.9376^{o}	2.0	5132.221	27.4		-1.1	
5135.582	4.5231	7.0	2.1097^{o}	6.0	5135.584	17.6		0.9	
5136.036	3.2940	6.0	0.8807^{o}	5.0	5136.035^{bc}	44.0		-1.0	
5136.048	3.3622	2.0	0.9489^{o}	1.0	5136.035^{bc}	44.0		-0.8	
5141.467	4.4885	6.0	2.0778^{o}	7.0	5141.494^{b}	48.4			
5141.495	3.3381	7.0	0.9274^{o}	6.0	5141.494^{b}	48.6		-0.8	
5155.849	3.3314	7.0	0.9274^{o}	6.0	5155.850	875.2		0.4	
5158.475	4.6448^{o}	4.0	2.2420	5.0	5158.481^{b}	39.9			
5158.486	3.2998	5.0	0.8970^{o}	4.0	5158.481^{b}	39.9		-1.0	
5163.701	3.2653	6.0	0.8650^{o}	5.0	5163.694	35.1		-1.1	
5171.675	3.9273	5.0	1.5307^{o}	6.0	5171.697^{b}	279.0		1.0	
5171.698	2.3966	2.0	0.0000^{o}	2.0	5171.697^{b}	279.0		-1.8	
5181.990	4.2731	3.0	1.8812^{o}	3.0	5182.006^{b}	12.7		0.3	
5181.997	2.4185	4.0	0.0267^{o}	3.0	5182.006^{b}	12.7		-3.1	
5183.803	2.3910	1.0	0.0000^{o}	2.0	5183.799^{b}	245.8		-1.8	
5183.818	4.6141^{o}	3.0	2.2230	4.0	5183.799^{b}	246.5			
5187.881	3.2013	4.0	0.8121^{o}	3.0	5187.882	34.8		-1.2	
5197.773	3.2653	6.0	0.8807^{o}	5.0	5197.774	422.3		-0.0	
5211.032	2.4052	3.0	0.0267^{o}	3.0	5211.031	265.1		-1.8	
5217.475	2.4995	6.0	0.1239^{o}	5.0	5217.474	857.6		-1.1	
5219.405	3.2161	5.0	0.8414^{o}	4.0	5219.405^{b}	488.0		-0.0	
5219.407	4.1934^{o}	5.0	1.8187	4.0	5219.405^{b}	488.0			
5229.901	2.3966	2.0	0.0267^{o}	3.0	5229.901	84.4		-2.3	
5244.378	4.5106^{o}	5.0	2.1472	6.0	5244.380	31.0			
5245.161	3.9112	8.0	1.5481^{o}	7.0	5245.146	13.7		-0.3	
5245.781	3.4164	9.0	1.0536^{o}	8.0	5245.806^{b}	7.9		-1.5	
5245.808	5.0588	3.0	2.6960^{o}	2.0	5245.806^{b}	9.1			
5246.863	4.3045^{o}	4.0	1.9422	5.0	5246.866	35.1		0.8	
5251.201	3.4140	8.0	1.0536^{o}	8.0	5251.199	240.7		0.0	
5252.147	3.2013	4.0	0.8414^{o}	4.0	5252.148^{c}	45.1		-1.1	
5254.746	3.1495	3.0	0.7908^{o}	2.0	5254.749^{bc}	53.2		-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5254.758	3.2795	4.0	0.9208^o	3.0	5254.749^{bc}	53.2		-0.9	
5260.392	3.7056	5.0	1.3493^o	4.0	5260.392^c	13.4		-0.7	
5260.812	4.3191	4.0	1.9631^o	4.0	5260.853	28.9		0.7	
5263.800	2.4208	5.0	0.0661^o	4.0	5263.800	256.4		-1.7	
5268.805	2.4185	4.0	0.0661^o	4.0	5268.800	377.7		-1.6	
5272.903	3.1414	2.0	0.7908^o	2.0	5272.908^b	42.5		-1.2	
5272.922	4.3160^o	6.0	1.9654	6.0	5272.908^b	42.4		0.9	
5275.674	2.3761	4.0	0.0267^o	3.0	5275.673	50.1		-2.5	
5282.482	3.6576	4.0	1.3113^o	3.0	5282.475	65.3		-0.1	
5283.076	3.3314	7.0	0.9853^o	7.0	5283.075	441.8		0.1	
5283.851	3.7030^o	6.0	1.3572	6.0	5283.849^b	33.0		-0.3	
5283.853	4.3578	6.0	2.0121^o	6.0	5283.849^b	33.0		0.9	
5283.872	5.4507^o	6.0	3.1049	5.0	5283.849^b	30.9			
5295.544	4.7614^o	5.0	2.4208	5.0	5295.542	8.6			
5296.345	3.1310	3.0	0.7908^o	2.0	5296.347	16.6		-1.6	
5298.585	3.6066	2.0	1.2674^o	1.0	5298.589^b	29.3		-0.5	
5298.602	4.8591	5.0	2.5199^o	4.0	5298.589^b	29.3			
5298.616	5.0067	6.0	2.6674^o	7.0	5298.589^b	29.3			
5301.664	5.1690	5.0	2.8312^o	4.0	5301.672^b	515.0			
5301.673	3.2653	6.0	0.9274^o	6.0	5301.672^b	512.7		0.1	
5302.757	3.1495	3.0	0.8121^o	3.0	5302.758	327.2		-0.3	
5303.622	3.8038	7.0	1.4667^o	6.0	5303.620^b	33.1		-0.1	
5303.633	4.3450^o	3.0	2.0080	4.0	5303.620^b	34.2		0.9	
5306.711	3.2006	6.0	0.8650^o	5.0	5306.708	40.5		-1.1	
5307.308	3.2161	5.0	0.8807^o	5.0	5307.307	552.5		0.0	
5321.247	3.1414	2.0	0.8121^o	3.0	5321.248	68.6		-1.0	
5321.493	3.1199	2.0	0.7908^o	2.0	5321.494^b	215.9		-0.5	
5321.493	3.9947^o	2.0	1.6655	3.0	5321.494^b	215.9			
5322.376	3.5961	2.0	1.2674^o	1.0	5322.367	22.5		-0.7	
5322.704	3.6399	4.0	1.3113^o	3.0	5322.702	40.3		-0.3	
5327.321	3.6111	3.0	1.2844^o	2.0	5327.318	121.6		0.1	
5328.310	3.5936	1.0	1.2674^o	1.0	5328.312	92.0		-0.0	
5331.926	3.5920	0.0	1.2674^o	1.0	5331.933^c	43.9		-0.4	
5337.532	3.6066	2.0	1.2844^o	2.0	5337.533	61.8		-0.2	
5341.814	2.5334	7.0	0.2131^o	6.0	5341.813	302.3		-1.4	
5343.009	3.7203	6.0	1.4005^o	5.0	5343.004	480.2		0.9	
5345.122	3.1310	3.0	0.8121^o	3.0	5345.126^b	124.1		-0.8	
5345.159	4.7614^o	5.0	2.4425	5.0	5345.126^b	124.1			
5345.666	4.7454	3.0	2.4268^o	3.0	5345.681^b	499.5			
5345.682	2.4425	5.0	0.1239^o	5.0	5345.681^b	499.5		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5348.671	3.1081	1.0	0.7908^o	2.0	5348.677^b	430.4		-0.3	
5348.720	4.2804	4.0	1.9631^o	4.0	5348.677^b	442.7			
5350.355	3.2542	3.0	0.9376^o	2.0	5350.377^b	598.5		0.2	
5350.377	3.8647	8.0	1.5481^o	7.0	5350.377^b	598.3			
5353.254	4.4679	2.0	2.1526^o	3.0	5353.268^b	635.3			
5353.269	3.7821	7.0	1.4667^o	6.0	5353.268^b	655.7			
5353.299	3.2361	3.0	0.9208^o	3.0	5353.268^b	636.3		0.2	
5354.414	4.3191	4.0	2.0043^o	3.0	5354.410	18.1		0.6	
5359.175	4.3333	5.0	2.0205^o	4.0	5359.170	34.0		0.9	
5361.675	3.5961	2.0	1.2844^o	2.0	5361.671	79.1		-0.1	
5363.535	4.6694	4.0	2.3585^o	4.0	5363.556	7.7		0.8	
5365.677	2.3761	4.0	0.0661^o	4.0	5365.669	18.3		-2.9	
5367.690	4.0493^o	1.0	1.7402	2.0	5367.698^{bc}	44.2		0.5	
5367.697	3.5936	1.0	1.2844^o	2.0	5367.698^{bc}	44.2		-0.4	
5368.796	3.2940	6.0	0.9853^o	7.0	5368.792	22.1		-1.2	
5369.614	3.6576	4.0	1.3493^o	4.0	5369.612^c	60.3		-0.1	
5369.918	3.1495	3.0	0.8414^o	4.0	5369.919^b	172.1		-0.6	
5369.940	4.3286	3.0	2.0205^o	4.0	5369.919^b	172.5			
5370.736	3.1199	2.0	0.8121^o	3.0	5370.736	222.2		-0.5	
5371.313	4.9750	8.0	2.6674^o	7.0	5371.324	45.7			
5377.237	3.7056	5.0	1.4005^o	5.0	5377.244	23.5		-0.4	
5384.156	3.6514	5.0	1.3493^o	4.0	5384.165	41.2		-0.3	
5385.388	4.4112	7.0	2.1097^o	6.0	5385.391	32.4		1.0	
5389.460	5.1292^o	4.0	2.8294	4.0	5389.500^b	154.7			
5389.501	3.6111	3.0	1.3113^o	3.0	5389.500^b	153.5		0.2	
5409.492	2.4152	6.0	0.1239^o	5.0	5409.511	11.8		-3.1	
5411.179	3.6399	4.0	1.3493^o	4.0	5411.191^c	64.1		-0.1	
5411.746	4.4966^o	2.0	2.2063	3.0	5411.731^b	108.3			
5411.752	3.9559^o	3.0	1.6655	3.0	5411.731^b	108.3		0.7	
5415.679	3.2161	5.0	0.9274^o	6.0	5415.680	119.6		-0.6	
5416.292	5.0859^o	4.0	2.7975	3.0	5416.308^{bc}	6.4			
5416.311	4.5304^o	5.0	2.2420	5.0	5416.307^{bc}	7.2		0.6	
5421.176	2.4995	6.0	0.2131^o	6.0	5421.175^b	597.3		-1.2	
5421.198	4.9089	5.0	2.6226^o	4.0	5421.175^b	601.2			
5425.572	4.7030^o	3.0	2.4185	4.0	5425.562	6.4		0.8	
5436.293	3.2653	6.0	0.9853^o	7.0	5436.288	29.6		-1.1	
5441.565	3.3314	7.0	1.0536^o	8.0	5441.563^b	25.7		-1.1	
5441.607	4.4400	3.0	2.1622^o	4.0	5441.563^b	25.1		0.9	
5453.449	3.6734	5.0	1.4005^o	5.0	5453.451	68.9		-0.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5482.000	3.6103	5.0	1.3493[o]	4.0	5482.004	19.6		-0.7	
5491.418	3.6576	4.0	1.4005[o]	5.0	5491.430[b]	17.0		-0.6	
5491.437	4.6623[o]	3.0	2.4052	3.0	5491.430[b]	16.7			
5493.415	3.2416	7.0	0.9853[o]	7.0	5493.416	19.0		-1.3	
5494.846	4.4379	5.0	2.1822[o]	5.0	5494.869[b]	14.0		0.7	
5494.899	3.8038	7.0	1.5481[o]	7.0	5494.868[b]	14.8		-0.4	
5498.722	3.1815	6.0	0.9274[o]	6.0	5498.724	13.2	-1.6	-1.6	
5499.956	3.7203	6.0	1.4667[o]	6.0	5499.950	46.6		-0.1	
5503.365	2.3761	4.0	0.1239[o]	5.0	5503.363	72.7		-2.3	
5505.086	4.3374[o]	3.0	2.0859	4.0	5505.080	8.9		0.3	
5511.460	4.6399[o]	2.0	2.3910	1.0	5511.493	26.6			
5521.728	3.0568	2.0	0.8121[o]	3.0	5521.735[c]	22.0		-1.6	
5535.198	4.3374[o]	3.0	2.0982	2.0	5535.200	15.0		0.6	
5541.628	4.9466[o]	4.0	2.7099	3.0	5541.634	6.6			
5548.179	3.1310	3.0	0.8970[o]	4.0	5548.203[b]	38.5		-1.2	
5548.182	4.6548[o]	4.0	2.4208	5.0	5548.203[b]	38.4			
5548.210	3.7821	7.0	1.5481[o]	7.0	5548.203[b]	38.0		-0.0	
5550.197	3.0981	4.0	0.8650[o]	5.0	5550.196	24.1		-1.5	
5559.721	2.4425	5.0	0.2131[o]	6.0	5559.721	129.6		-1.9	
5572.517	3.1049	5.0	0.8807[o]	5.0	5572.516	19.2	-1.5	-1.6	
5592.169	4.5112[o]	4.0	2.2948	5.0	5592.133	35.2			
5594.106	3.9559[o]	3.0	1.7402	2.0	5594.100	41.6		0.3	
5594.641	4.1577[o]	4.0	1.9422	5.0	5594.668	59.4		0.8	
5610.923	4.5038[o]	4.0	2.2948	5.0	5610.914	11.9		0.8	
5614.403	4.6262[o]	3.0	2.4185	4.0	5614.434[b]	215.5			
5614.435	2.4208	5.0	0.2131[o]	6.0	5614.434[b]	221.8		-1.7	
5617.912	2.2063	3.0	0.0000[o]	2.0	5617.911	3054.8		-1.0	
5619.497	3.1433	1.0	0.9376[o]	2.0	5619.505	16.1		-1.6	
5628.776	2.4152	6.0	0.2131[o]	6.0	5628.776	34.3		-2.5	
5629.548	2.2284	4.0	0.0267[o]	3.0	5629.546	630.6		-1.6	
5633.479	3.0809	4.0	0.8807[o]	5.0	5633.480	31.6	-1.4	-1.4	
5643.242	2.2230	4.0	0.0267[o]	3.0	5643.242	3957.0		-0.8	
5653.315	3.1414	2.0	0.9489[o]	1.0	5653.313[b]	16.5		-1.5	
5653.319	3.0574	5.0	0.8650[o]	5.0	5653.313[b]	15.8		-1.7	
5672.143	3.0822	3.0	0.8970[o]	4.0	5672.134	22.6		-1.5	
5674.514	2.1843	3.0	0.0000[o]	2.0	5674.500	11.1		-3.4	
5677.433	3.9559[o]	3.0	1.7727	3.0	5677.429	22.7		0.1	
5686.658	2.2063	3.0	0.0267[o]	3.0	5686.661	68.3		-2.6	
5692.111	3.1049	5.0	0.9274[o]	6.0	5692.111	29.0	-1.3	-1.3	
5697.980	3.5758	6.0	1.4005[o]	5.0	5697.984	13.9		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5701.309	4.8451	4.0	2.6711^o	4.0	5701.341^b	1386.7			
5701.346	2.2007	2.0	0.0267^o	3.0	5701.341^b	1386.5		-1.3	
5705.915	3.4567	1.0	1.2844^o	2.0	5705.917^b	5.9		-1.4	
5705.932	3.7203	6.0	1.5481^o	7.0	5705.917^b	5.8		-0.9	
5709.413	2.2948	5.0	0.1239^o	5.0	5709.414	412.3		-1.7	
5710.319	3.9893^o	4.0	1.8187	4.0	5710.313	41.2		0.4	
5715.038	4.3160^o	6.0	2.1472	6.0	5715.066	169.0			
5724.731	3.6319	7.0	1.4667^o	6.0	5724.735	25.1		-0.5	
5732.146	2.2284	4.0	0.0661^o	4.0	5732.140	91.9		-2.4	
5735.966	3.1462	7.0	0.9853^o	7.0	5735.956	16.9	-1.5	-1.5	
5744.660	2.1843	3.0	0.0267^o	3.0	5744.656	191.8		-2.2	
5746.345	2.2230	4.0	0.0661^o	4.0	5746.343	747.2		-1.5	
5751.871	2.1549	2.0	0.0000^o	2.0	5751.871	182.3		-2.3	
5769.738	3.0289	6.0	0.8807^o	5.0	5769.753	18.8	-1.7	-1.7	
5776.005	3.6940	8.0	1.5481^o	7.0	5776.008	51.5		-0.0	
5789.332	3.6890	8.0	1.5481^o	7.0	5789.327	8.1		-0.8	
5791.368	2.2063	3.0	0.0661^o	4.0	5791.370^c	1332.0		-1.3	
5796.789	4.0873	6.0	1.9491^o	5.0	5796.784	19.5		0.3	
5802.861	5.1928^o	1.0	3.0568	2.0	5802.905^b	185.1			
5802.906	2.1359	1.0	0.0000^o	2.0	5802.905^b	185.1		-2.3	
5807.699	5.0953	7.0	2.9611^o	7.0	5807.715^b	22.5			
5807.706	2.9755	5.0	0.8414^o	4.0	5807.715^b	22.6		-1.7	
5809.197	4.0990^o	6.0	1.9654	6.0	5809.187	38.2		0.6	
5823.955	2.1549	2.0	0.0267^o	3.0	5823.954	99.1		-2.5	
5856.218	2.2404	6.0	0.1239^o	5.0	5856.216^c	1979.8		-1.0	
5868.895	3.4692^o	7.0	1.3572	6.0	5868.889	21.0		-0.8	
5886.453	3.9869	4.0	1.8812^o	3.0	5886.454	30.4		0.3	
5899.877	5.0323^o	3.0	2.9314	4.0	5899.866	27.3			
5904.552	2.2230	4.0	0.1239^o	5.0	5904.549	890.2		-1.4	
5907.349	2.0982	2.0	0.0000^o	2.0	5907.358^b	36.7		-3.0	
5907.387	4.2507	2.0	2.1526^o	3.0	5907.358^b	37.8		0.9	
5908.388	2.0978	3.0	0.0000^o	2.0	5908.392	90.3		-2.6	
5916.735	3.0324	2.0	0.9376^o	2.0	5916.748^b	41.4		-1.3	
5916.749	2.9755	5.0	0.8807^o	5.0	5916.748^b	41.2		-1.4	
5916.749	3.3622	2.0	1.2674^o	1.0	5916.748^b	41.2		-0.7	
5916.749	4.0861^o	2.0	1.9913	3.0	5916.748^b	41.2		0.6	
5916.781	4.1883^o	5.0	2.0935	5.0	5916.748^b	41.4		0.8	
5922.018	4.5540	8.0	2.4610^o	8.0	5922.026	12.8		1.0	
5930.268	2.9314	4.0	0.8414^o	4.0	5930.269	70.7		-1.2	
5931.721	4.7943	2.0	2.7047^o	1.0	5931.747	19.1			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5936.813	2.8999	3.0	0.8121^o	3.0	5936.818	58.7	-1.3	-1.4	
5937.697	2.8782	2.0	0.7908^o	2.0	5937.699^b	36.8		-1.6	
5937.703	4.6400	5.0	2.5526^o	5.0	5937.699^b	36.8			
5939.329	4.4629^o	3.0	2.3761	4.0	5939.316	1353.1			
5963.155	2.9755	5.0	0.8970^o	4.0	5963.139	7.6		-2.1	
5980.394	4.6060^o	6.0	2.5334	7.0	5980.387	14.2			
5983.408	2.0982	2.0	0.0267^o	3.0	5983.413	100.8		-2.6	
5984.475	2.0978	3.0	0.0267^o	3.0	5984.479	67.8		-2.7	
5999.071	2.8782	2.0	0.8121^o	3.0	5999.074^c	39.6		-1.6	
6008.705	3.9869	4.0	1.9241^o	4.0	6008.703	22.7		0.2	
6009.696	4.0829	5.0	2.0205^o	4.0	6009.700	1.9		-0.7	
6109.077	2.2420	5.0	0.2131^o	6.0	6109.070	147.6		-2.1	
6109.350	4.7843^o	4.0	2.7555	4.0	6109.391	34.1			
6112.159	4.0399	5.0	2.0121^o	6.0	6112.193	7.1		-0.2	
6114.078	2.2404	6.0	0.2131^o	6.0	6114.074	2099.5		-1.0	
6135.035	2.2334	7.0	0.2131^o	6.0	6135.033^c	47.0		-2.6	
6136.430	2.0859	4.0	0.0661^o	4.0	6136.432	149.0		-2.4	
6151.087	2.8800	6.0	0.8650^o	5.0	6151.088	24.3		-1.7	
6180.358	4.0990^o	6.0	2.0935	5.0	6180.349	11.1		0.1	
6191.213	4.4129	3.0	2.4109^o	3.0	6191.181	13.5		0.8	
6199.431	4.6703^o	3.0	2.6709	3.0	6199.482^b	4.6		0.8	
6199.497	2.8800	6.0	0.8807^o	5.0	6199.482^b	4.7		-2.4	
6203.615	3.9893^o	4.0	1.9913	3.0	6203.612	10.8		-0.1	
6204.139	4.2209^o	5.0	2.2230	4.0	6204.139	5.4		0.1	
6204.565	4.1599	3.0	2.1622^o	4.0	6204.604^b	9.0		0.2	
6204.643	4.4379	5.0	2.4402^o	6.0	6204.604^b	8.4		0.6	
6224.434	1.9913	3.0	0.0000^o	2.0	6224.434	98.8		-2.7	
6255.749	2.0080	4.0	0.0267^o	3.0	6255.753	29.4		-3.2	
6289.721	4.1911^o	7.0	2.2205	8.0	6289.709^b	42.6		0.9	
6289.746	4.8381	4.0	2.8675^o	5.0	6289.709^b	42.7			
6292.865	2.0935	5.0	0.1239^o	5.0	6292.864	91.7		-2.5	
6301.349	4.3333	5.0	2.3663^o	5.0	6301.367^b	120.1			
6301.410	4.6179^o	1.0	2.6509	1.0	6301.367^b	117.5			
6317.154	4.1822	5.0	2.2201^o	6.0	6317.187^b	147.9			
6317.181	2.0859	4.0	0.1239^o	5.0	6317.187^b	147.6		-2.3	
6363.199	3.9559^o	3.0	2.0080	4.0	6363.208	7.9		-0.2	
6408.544	2.1472	6.0	0.2131^o	6.0	6408.543	57.7		-2.6	
6435.244	4.2209^o	5.0	2.2948	5.0	6435.247	3.2		-0.1	
6456.744	2.8166	5.0	0.8970^o	4.0	6456.729	3.3		-2.6	
6459.683	2.7837	6.0	0.8650^o	5.0	6459.693	5.3		-2.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6517.105	4.0861[o]	2.0	2.1843	3.0	6517.051	12.1		0.2	
6538.113	3.9893[o]	4.0	2.0935	5.0	6538.108	17.4		0.2	
6549.217	4.1156[o]	3.0	2.2230	4.0	6549.213	9.3		0.2	
6555.983	2.7555	4.0	0.8650[o]	5.0	6555.975	3.2		-2.8	
6573.738	5.0666	5.0	3.1811[o]	6.0	6573.766[b]	5.9			
6573.763	4.0861[o]	2.0	2.2007	2.0	6573.766[b]	6.0		-0.1	
6578.482	2.0080	4.0	0.1239[o]	5.0	6578.485	13.3		-3.5	
6591.592	2.0935	5.0	0.2131[o]	6.0	6591.594	118.4		-2.4	
6640.749	4.3090[o]	6.0	2.4425	5.0	6640.791	11.5		0.6	
6642.721	5.0470	5.0	3.1811[o]	6.0	6642.749[b]	4.5			
6642.750	3.4140	8.0	1.5481[o]	7.0	6642.749[b]	4.2		-1.4	
6643.628	3.8287	3.0	1.9631[o]	4.0	6643.629	27.3		0.1	
6643.941	4.0990[o]	6.0	2.2334	7.0	6643.938	14.8		0.4	
6693.285	3.8056	2.0	1.9538[o]	1.0	6693.270	174.5		0.9	
6730.732	1.9654	6.0	0.1239[o]	5.0	6730.731	578.8		-1.9	
6763.366	5.0137	7.0	3.1811[o]	6.0	6763.359	1.1		0.9	
6767.803	4.2336	2.0	2.4022[o]	1.0	6767.769	11.4		0.5	
6783.368	3.2940	6.0	1.4667[o]	6.0	6783.374[b]	5.8		-1.5	
6783.406	3.1766	4.0	1.3493[o]	4.0	6783.374[b]	5.7		-1.7	
6787.140	3.1834[o]	7.0	1.3572	6.0	6787.144	4.8		-1.8	
6795.830	3.1811[o]	6.0	1.3572	6.0	6795.841	2.8		-2.0	
6816.470	1.9422	5.0	0.1239[o]	5.0	6816.473	123.8		-2.6	
6828.239	1.8813	5.0	0.0661[o]	4.0	6828.237	1075.3		-1.8	
6849.844	4.3090[o]	6.0	2.4995	6.0	6849.856	3.6		0.2	
6864.200	4.2209[o]	5.0	2.4152	6.0	6864.192	7.8		0.3	
6916.580	1.8187	4.0	0.0267[o]	3.0	6916.582[c]	595.0		-2.1	
6964.324	3.0642	3.0	1.2844[o]	2.0	6964.331[b]	3.3		-2.1	
6964.332	4.4379	5.0	2.6581[o]	5.0	6964.331[b]	3.3		0.4	
6980.888	4.3090[o]	6.0	2.5334	7.0	6980.884[b]	8.4		0.6	
6980.926	4.6399[o]	2.0	2.8644	1.0	6980.884[b]	8.5			
6991.905	1.7727	3.0	0.0000[o]	2.0	6991.911	336.1		-2.4	
6993.165	3.0568	2.0	1.2844[o]	2.0	6993.171	7.4		-1.8	
7016.584	2.6873	4.0	0.9208[o]	3.0	7016.588	13.6		-2.2	
7052.789	1.8813	5.0	0.1239[o]	5.0	7052.784	78.9		-2.8	
7070.971	3.0642	3.0	1.3113[o]	3.0	7070.975	9.5		-1.6	
7073.609	1.9654	6.0	0.2131[o]	6.0	7073.606	86.1		-2.7	
7093.864	3.9893[o]	4.0	2.2420	5.0	7093.871	2.7		-0.5	
7098.087	3.1467	5.0	1.4005[o]	5.0	7098.087	4.6		-1.8	
7098.708	1.7727	3.0	0.0267[o]	3.0	7098.717	41.6		-3.3	
7100.704	3.0568	2.0	1.3113[o]	3.0	7100.710	2.2		-2.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7119.501	4.4282^o	3.0	2.6873	4.0	7119.497	2.0		0.2	
7122.560	1.7402	2.0	0.0000^o	2.0	7122.559	192.4		-2.7	
7150.712	5.0377	6.0	3.3043^o	5.0	7150.738^b	13.9			
7150.747	2.6709	3.0	0.9376^o	2.0	7150.738^b	14.0		-2.2	
7150.776	5.0859^o	4.0	3.3526	4.0	7150.738^b	13.4			
7158.268	3.0809	4.0	1.3493^o	4.0	7158.283^b	4.5	-1.9	-1.9	
7158.275	4.1523^o	5.0	2.4208	5.0	7158.283^b	4.6		0.0	
7168.366	1.9422	5.0	0.2131^o	6.0	7168.368	1784.8		-1.4	
7227.968	3.0642	3.0	1.3493^o	4.0	7227.981^b	5.6		-1.8	
7228.021	4.9690^o	3.0	3.2542	3.0	7227.981^b	5.8			
7232.735	3.6990	2.0	1.9853^o	1.0	7232.705	3.0		-0.9	
7233.424	1.7402	2.0	0.0267^o	3.0	7233.428	88.7		-3.0	
7262.624	1.7727	3.0	0.0661^o	4.0	7262.630	159.5		-2.7	
7282.595	2.6509	1.0	0.9489^o	1.0	7282.599	8.5		-2.4	
7291.305	1.7266	4.0	0.0267^o	3.0	7291.319	57.5		-3.2	
7300.723	2.6467	0.0	0.9489^o	1.0	7300.733	5.2		-2.6	
7313.259	1.8187	4.0	0.1239^o	5.0	7313.261	159.5		-2.6	
7318.938	4.9351^o	7.0	3.2416	7.0	7318.975^b	2.8			
7318.958	3.7056	5.0	2.0121^o	6.0	7318.975^b	2.8		-0.9	
7319.000	3.2416	7.0	1.5481^o	7.0	7318.975^b	2.3		-1.9	
7327.016	4.1911^o	7.0	2.4995	6.0	7327.008	5.0		0.2	
7373.728	4.0861^o	2.0	2.4052	3.0	7373.778^b	4.7		-0.0	
7373.779	3.0815	6.0	1.4005^o	5.0	7373.778^b	4.7	-1.8	-1.8	
7376.381	3.0809	4.0	1.4005^o	5.0	7376.389	6.9	-1.7	-1.7	
7380.264	3.1462	7.0	1.4667^o	6.0	7380.257	3.4	-1.9	-1.9	
7417.078	5.0990	4.0	3.4279^o	4.0	7417.115	5.4			
7417.921	3.8198	3.0	2.1489^o	2.0	7417.909	4.0		-0.6	
7422.211	3.2006	6.0	1.5307^o	6.0	7422.269^b	67.9		-0.5	
7422.233	5.0701^o	5.0	3.4002	4.0	7422.269^b	71.1			
7430.168	4.0229	3.0	2.3548^o	3.0	7430.184^b	95.2			
7430.183	1.8813	5.0	0.2131^o	6.0	7430.184^b	95.2		-2.7	
7430.183	3.6505	6.0	1.9824^o	5.0	7430.184^b	95.2		0.5	
7433.458	5.0470	5.0	3.3796^o	5.0	7433.471	4.7			
7441.832	1.6655	3.0	0.0000^o	2.0	7441.845	325.2		-2.6	
7460.746	4.1812	4.0	2.5199^o	4.0	7460.706	3.7		0.1	
7464.322	4.7247^o	3.0	3.0642	3.0	7464.360^b	313.5			
7464.345	1.7266	4.0	0.0661^o	4.0	7464.360^b	315.3		-2.5	
7480.464	4.7144^o	6.0	3.0574	5.0	7480.492	7.8			
7511.221	5.2200^o	3.0	3.5698	4.0	7511.169^c	3.3			
7552.498	4.9351^o	7.0	3.2940	6.0	7552.485	1.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7562.943	1.6655	3.0	0.0267^o	3.0	7562.953^b	435.0		-2.4	
7563.012	4.7030^o	3.0	3.0642	3.0	7562.953^b	434.6			
7566.041	3.5920	0.0	1.9538^o	1.0	7566.066^b	2.0		-1.2	
7566.074	3.1049	5.0	1.4667^o	6.0	7566.066^b	2.0	-2.0	-2.1	
7572.471	4.7417^o	6.0	3.1049	5.0	7572.496	2.6		0.9	
7583.073	2.4995	6.0	0.8650^o	5.0	7583.067	1.1		-3.5	
7588.163	3.1815	6.0	1.5481^o	7.0	7588.180	3.2	-1.8	-1.8	
7619.252	3.9930	4.0	2.3663^o	5.0	7619.204	24.9		0.6	
7621.941	2.9755	5.0	1.3493^o	4.0	7621.951	8.9		-1.7	
7638.637	5.0918	6.0	3.4692^o	7.0	7638.646	1.1			
7650.323	2.9314	4.0	1.3113^o	3.0	7650.325	11.1		-1.7	
7667.790	4.9690^o	3.0	3.3526	4.0	7667.789	12.0			
7672.558	2.8999	3.0	1.2844^o	2.0	7672.555	11.9	-1.6	-1.7	
7676.076	3.0815	6.0	1.4667^o	6.0	7676.075	4.1	-1.8	-1.9	
7677.065	4.0353^o	5.0	2.4208	5.0	7677.067	4.5		-0.1	
7683.292	3.9893^o	4.0	2.3761	4.0	7683.298	3.3		-0.3	
7694.415	4.6677^o	3.0	3.0568	2.0	7694.453^b	5.0			
7694.456	2.8782	2.0	1.2674^o	1.0	7694.453^b	5.0		-2.1	
7694.497	3.5961	2.0	1.9853^o	1.0	7694.453^b	5.1		-0.8	
7714.382	4.4379	5.0	2.8312^o	4.0	7714.324	22.7			
7717.638	2.5334	7.0	0.9274^o	6.0	7717.680^c	14.1		-2.3	
7733.505	1.7266	4.0	0.1239^o	5.0	7733.523	444.6		-2.3	
7749.280	1.6655	3.0	0.0661^o	4.0	7749.289	258.3		-2.6	
7755.958	3.1462	7.0	1.5481^o	7.0	7755.973^b	4.0	-1.8	-1.7	
7755.987	3.9947^o	2.0	2.3966	2.0	7755.973^b	4.0		-0.2	
7760.955	4.0373	5.0	2.4402^o	6.0	7760.995	1.7		-0.5	
7769.204	4.6768^o	5.0	3.0815	6.0	7769.249^b	3.5		1.0	
7769.239	3.7576	4.0	2.1622^o	4.0	7769.249^b	3.3		-0.7	
7831.260	4.9449^o	3.0	3.3622	2.0	7831.316	2.0			
7834.435	2.9314	4.0	1.3493^o	4.0	7834.435	2.4		-2.3	
7844.822	2.8644	1.0	1.2844^o	2.0	7844.836	3.3	-2.4	-2.3	
7845.716	4.9664^o	5.0	3.3866	5.0	7845.770^b	4.2			
7845.725	3.5878^o	5.0	2.0080	4.0	7845.770^b	4.2		-0.9	
7845.751	3.9559^o	3.0	2.3761	4.0	7845.770^b	4.3		-0.2	
7845.763	4.5112^o	4.0	2.9314	4.0	7845.770^b	4.3		0.8	
7845.825	3.5622	6.0	1.9824^o	5.0	7845.770	3.9		-1.0	
7856.942	2.4425	5.0	0.8650^o	5.0	7856.985^{bc}	123.6		-1.5	
7856.994	4.4885	6.0	2.9110^o	6.0	7856.985^{bc}	124.5			
7884.393	2.4995	6.0	0.9274^o	6.0	7884.418	8.9		-2.5	
7910.081	2.8782	2.0	1.3113^o	3.0	7910.080	3.1		-2.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7925.281	2.3761	4.0	0.8121[o]	3.0	7925.288[b]	8.5		-2.8	
7925.309	3.9930	4.0	2.4291[o]	5.0	7925.288[b]	8.6		0.2	
7925.328	4.6448[o]	4.0	3.0809	4.0	7925.288[b]	8.6			
7936.098	2.4425	5.0	0.8807[o]	5.0	7936.123[b]	3.9		-3.0	
7936.134	5.3113[o]	4.0	3.7495	5.0	7936.123[b]	3.8			
7966.656	2.4208	5.0	0.8650[o]	5.0	7966.661	9.3		-2.6	
7978.127	2.4185	4.0	0.8650[o]	5.0	7978.143	21.7		-2.3	
8006.241	2.5334	7.0	0.9853[o]	7.0	8006.250[b]	20.1		-2.1	
8006.254	3.4294	2.0	1.8812[o]	3.0	8006.250[b]	19.7		-0.5	
8019.809	2.4425	5.0	0.8970[o]	4.0	8019.814	15.4		-2.4	
8037.427	3.9869	4.0	2.4447[o]	4.0	8037.424	3.1		-0.3	
8048.044	4.9466[o]	4.0	3.4065	3.0	8048.064[b]	24.1			
8048.050	2.4208	5.0	0.8807[o]	5.0	8048.064[b]	24.1		-2.2	
8059.756	2.4185	4.0	0.8807[o]	5.0	8059.768	2.9		-3.1	
8077.550	2.4152	6.0	0.8807[o]	5.0	8077.569	17.8		-2.4	
8143.993	3.5340	7.0	2.0121[o]	6.0	8143.991	2.3		-1.2	
8146.111	2.4185	4.0	0.8970[o]	4.0	8146.111	81.9		-1.7	
8185.846	2.4995	6.0	0.9853[o]	7.0	8185.862[c]	6.8		-2.6	
8202.357	2.3761	4.0	0.8650[o]	5.0	8202.357[c]	4.7		-3.0	
8209.058	3.9869	4.0	2.4770[o]	5.0	8209.052	3.0		-0.3	
8218.093	2.4052	3.0	0.8970[o]	4.0	8218.092	62.9		-1.8	
8227.907	3.9512	3.0	2.4447[o]	4.0	8227.951[c]	2.5		-0.4	
8331.280	2.4152	6.0	0.9274[o]	6.0	8331.306[c]	8.5		-2.6	
8349.741	2.4052	3.0	0.9208[o]	3.0	8349.727	28.7		-2.1	
8398.290	2.3966	2.0	0.9208[o]	3.0	8398.313	50.5		-1.9	
8445.493	2.4052	3.0	0.9376[o]	2.0	8445.481	40.7		-2.0	
8471.387	4.6768[o]	5.0	3.2137	4.0	8471.366	2.2		0.9	
8527.876	2.3910	1.0	0.9376[o]	2.0	8527.886[b]	65.2		-1.8	
8527.886	2.2948	5.0	0.8414[o]	4.0	8527.886[b]	64.8		-1.9	
8533.696	4.3284[o]	5.0	2.8759	5.0	8533.756[c]	2.0		0.2	
8541.603	2.8999	3.0	1.4488[o]	4.0	8541.582	15.8	-1.4	-1.5	
8553.113	4.0229	3.0	2.5738[o]	3.0	8553.061	4.1		-0.0	
8594.939	2.3910	1.0	0.9489[o]	1.0	8594.981	12.9		-2.5	
8674.836	2.8294	4.0	1.4005[o]	5.0	8674.857[b]	1.8	-2.5	-2.5	
8674.892	5.0787	4.0	3.6499[o]	5.0	8674.857[b]	1.8			
8926.453	2.2007	2.0	0.8121[o]	3.0	8926.495[b]	5.9		-3.1	
8926.460	4.9644[o]	6.0	3.5758	6.0	8926.495[b]	5.9			
8968.147	4.4629[o]	3.0	3.0809	4.0	8968.167	8.1			
9000.752	2.2420	5.0	0.8650[o]	5.0	9000.732[b]	8.1		-2.9	
9000.779	4.2082	3.0	2.8312[o]	4.0	9000.732[b]	8.1		0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
9326.481	4.3045^o	4.0	2.9755	5.0	9326.544	27565.1			
9404.518	4.6179^o	1.0	3.2999	1.0	9404.594	938.3			
9585.134	4.6351^o	1.0	3.3419	1.0	9585.179	607.2			
9599.926	4.7835^o	3.0	3.4924	4.0	9599.902^c	112.1			
9730.455	2.0859	4.0	0.8121^o	3.0	9730.526	62.6		-2.2	
9898.712	2.0935	5.0	0.8414^o	4.0	9898.689	67.1		-2.1	
9959.011	2.0859	4.0	0.8414^o	4.0	9959.083	74.8		-2.1	
10161.223	4.0873	6.0	2.8675^o	5.0	10161.282^b	143.9			
10161.269	2.1472	6.0	0.9274^o	6.0	10161.282^b	143.9		-1.6	
10359.615	5.2337^o	6.0	4.0373	5.0	10359.613	688.9			
10620.794	3.5878^o	5.0	2.4208	5.0	10620.723	4323.9			
10832.766	4.5444^o	5.0	3.4002	4.0	10832.682	5718.5			

Table A.14: Measured wavelengths (λ_o) and intensities of Gd II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3866.956	4.6521^o	3.5	1.4468	2.5	3866.988^{bc}	663.6
3866.996	4.7892	2.5	1.5840^o	2.5	3866.988^b	638.0
3881.844	3.6200	2.5	0.4270^o	3.5	3881.867	741.9
3894.693	3.1824	3.5	0.0000^o	2.5	3894.719	108.1
3935.399	5.4996	1.5	2.3501^o	2.5	3935.385^c	111.1
3974.790	5.3954^o	6.5	2.2771	7.5	3974.812^c	106.2
3984.127	5.6022^o	4.5	2.4912	5.5	3984.149	31.0
4033.261	5.3903^o	4.5	2.3172	5.5	4033.273^c	19.0
4035.396	5.2996	2.5	2.2281^o	2.5	4035.395^c	168.1
4080.552	6.1112	3.5	3.0737^o	2.5	4080.524^c	112.0
4085.558	3.7649	5.5	0.7311^o	6.5	4085.573	28.2
4094.475	3.5495	2.5	0.5223^o	2.5	4094.486	13.1
4098.599	3.8430	6.5	0.8189^o	7.5	4098.610	55.8
4130.352	3.6011	4.5	0.6002^o	5.5	4130.371^b	31.9
4130.366	3.7320	5.5	0.7311^o	6.5	4130.371^b	30.7
4132.264	3.6011	4.5	0.6016^o	4.5	4132.278	14.9
4163.087	3.6393	6.5	0.6620^o	5.5	4163.108	41.2
4184.258	3.4547	5.5	0.4925^o	4.5	4184.259	42.3
4204.858	3.4700	3.5	0.5223^o	2.5	4204.861	12.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4212.006	4.3895^o	2.5	1.4468	2.5	4212.015^b	25.4
4212.010	3.3676	4.5	0.4249^o	3.5	4212.015^{bc}	25.4
4215.022	3.3676	4.5	0.4270^o	3.5	4215.021	15.3
4217.187	3.6011	4.5	0.6620^o	5.5	4217.172	166.4
4251.731	3.2973	3.5	0.3821^o	2.5	4251.735	32.8
4253.358	3.4700	3.5	0.5559^o	3.5	4253.373	14.8
4262.087	3.6393	6.5	0.7311^o	6.5	4262.080^c	139.5
4280.491	3.2498	2.5	0.3542^o	1.5	4280.501	26.8
4284.658	5.6281^o	2.5	2.7353	2.5	4284.680	23.2
4313.340	5.3654^o	3.5	2.4918	3.5	4313.323	10.3
4316.047	3.5337	5.5	0.6620^o	5.5	4316.054^c	31.7
4337.523	5.0551	6.5	2.1976^o	5.5	4337.513^c	38.8
4360.110	3.2697	3.5	0.4270^o	3.5	4360.145	23.3
4403.100	3.4152	4.5	0.6002^o	5.5	4403.135^c	669.5
4422.423	5.0739	4.5	2.2712^o	4.5	4422.409^c	3392.4
4456.427	5.3856^o	2.5	2.6043	1.5	4456.443	18.1
4467.101	3.2671	4.5	0.4925^o	4.5	4467.086	565.2
4481.054	3.3676	4.5	0.6016^o	4.5	4481.068^c	16.0
4521.951	5.0566	5.5	2.3156^o	6.5	4521.984	50.1
4536.990	2.9718	6.5	0.2399^o	6.5	4536.970^c	73.2
4544.257	4.9557	2.5	2.2281^o	2.5	4544.230^c	74.5
4597.910	3.2973	3.5	0.6016^o	4.5	4597.890^c	42.8
4607.742	3.1824	3.5	0.4925^o	4.5	4607.711	100.2
4614.526	5.4797^o	6.5	2.7937	5.5	4614.496^c	603.1
4683.074	3.9860	2.5	1.3393^o	1.5	4683.076^c	50.7
4683.339	5.1377^o	5.5	2.4912	5.5	4683.339^c	641.4
4717.605	3.1496	2.5	0.5223^o	2.5	4717.612	39.3
4841.275	2.9423	1.5	0.3821^o	2.5	4841.243	31.8
4916.626	5.6022^o	4.5	3.0812	4.5	4916.604^c	36.3
4918.326	3.3390	6.5	0.8189^o	7.5	4918.363	151.6
4930.745	3.7649	5.5	1.2512^o	4.5	4930.710^c	31.2
5014.235	3.1339	6.5	0.6620^o	5.5	5014.215	44.9
5020.347	3.6255	3.5	1.1566^o	2.5	5020.375^c	50.2
5052.911	5.4797^o	6.5	3.0267	5.5	5052.942^c	110.7
5054.870	5.1009^o	2.5	2.6488	3.5	5054.829	39.7
5066.062	3.5801	4.5	1.1335^o	3.5	5066.095^{bc}	18.9
5066.070	5.0045^o	2.5	2.5579	2.5	5066.095^b	18.9
5135.995	2.4918	3.5	0.0785^o	4.5	5136.035^c	44.5
5252.156	3.7320	5.5	1.3721^o	4.5	5252.148^c	45.6
5254.708	3.6472	3.5	1.2884^o	3.5	5254.749^c	52.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5260.422	4.9141^o	2.5	2.5579	2.5	5260.392^c	12.7
5331.947	4.5681	2.5	2.2435^o	2.5	5331.932^c	44.4
5367.735	5.3903^o	4.5	3.0812	4.5	5367.698^c	42.5
5369.604	2.7353	2.5	0.4270^o	3.5	5369.612^c	61.4
5411.232	4.7823^o	4.5	2.4918	3.5	5411.191^c	72.6
5416.321	4.7802^o	4.5	2.4918	3.5	5416.307^c	7.2
5521.741	4.7955^o	4.5	2.5508	4.5	5521.735^c	22.0
5669.898	4.9976^o	0.5	2.8116	1.5	5669.925	10.3
5694.968	3.6233^o	3.5	1.4468	2.5	5694.984	34.3
5791.364	3.7152	2.5	1.5750^o	1.5	5791.370^c	1332.0
5856.224	3.8430	6.5	1.7265^o	6.5	5856.216^c	1979.8
5999.062	3.3844	2.5	1.3183^o	2.5	5999.074^c	39.6
6086.297	5.1318	1.5	3.0953^o	1.5	6086.281	13.5
6134.991	3.1539	4.5	1.1335^o	3.5	6135.033^c	49.2
6272.467	4.9141^o	2.5	2.9380	2.5	6272.419	16.9
6752.649	4.1605	6.5	2.3250^o	7.5	6752.658	1.9
6846.569	3.1824	3.5	1.3721^o	4.5	6846.585	2.1
6916.543	5.6055^o	1.5	3.8135	0.5	6916.582^c	597.8
7108.140	5.2848^o	4.5	3.5411	3.5	7108.154^b	1.1
7108.150	4.9623^o	1.5	3.2186	1.5	7108.154^b	1.1
7197.029	3.9996	2.5	2.2774^o	1.5	7196.998	2.2
7466.932	4.7802^o	4.5	3.1203	3.5	7466.919	2.2
7553.200	4.3763^o	1.5	2.7353	2.5	7553.206	1.3
7717.660	4.1139	1.5	2.5079^o	2.5	7717.680^c	14.4
7857.023	5.3095^o	6.5	3.7320	5.5	7856.985^c	124.4
8185.896	3.9996	2.5	2.4855^o	3.5	8185.862^c	6.7
8202.415	5.2431^o	5.5	3.7320	5.5	8202.357^c	4.9
8218.892	4.6577^o	1.5	3.1496	2.5	8218.876	3.6
8227.912	4.8701^o	1.5	3.3637	2.5	8227.951^c	2.5
8331.371	5.3606^o	1.5	3.8729	2.5	8331.306^c	8.7
8433.671	4.6521^o	3.5	3.1824	3.5	8433.721	3.7
8533.738	4.8200^o	3.5	3.3676	4.5	8533.756^c	2.0
8561.469	2.6043	1.5	1.1566^o	2.5	8561.416	20.3
8865.706	3.0737^o	2.5	1.6756	1.5	8865.771	55285.6
9599.934	6.1112	3.5	4.8200^o	3.5	9599.902^c	112.1

Table A.15: Measured wavelengths (λ_o) and intensities of Tb I spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3759.334	3.2970	6.5	0.0000^o	7.5	3759.338^b	10155.8
3759.342	3.6491^o	4.5	0.3521	4.5	3759.338^b	10155.8
3760.023	3.4664^o	5.5	0.1700	4.5	3760.033	2567.2
3763.969	4.0805^o	5.5	0.7875	6.5	3763.974	594.2
3765.116	3.4619^o	4.5	0.1700	4.5	3765.124	4370.5
3769.266	3.3237^o	5.5	0.0354	6.5	3769.279	1282.7
3791.055	3.6216^o	4.5	0.3521	4.5	3791.068	951.7
3792.200	3.9322^o	4.5	0.6637	5.5	3792.225^b	1250.5
3792.222	3.5684^o	4.5	0.3000	3.5	3792.225^b	1426.4
3794.184	3.7279^o	7.5	0.4612	6.5	3794.196	646.1
3796.242	3.7261^o	5.5	0.4612	6.5	3796.259	3743.1
3797.005	3.9871^o	3.5	0.7228	4.5	3797.016	743.9
3799.578	3.8382^o	7.5	0.5761	8.5	3799.555	659.3
3799.918	3.6554^o	2.5	0.3936	2.5	3799.943	791.9
3801.421	3.3237^o	5.5	0.0632	5.5	3801.423	1981.8
3804.433	3.3211^o	6.5	0.0632	5.5	3804.438	4675.1
3817.806	3.5465^o	3.5	0.3000	3.5	3817.816	486.8
3821.407	3.4134^o	3.5	0.1700	4.5	3821.423	715.4
3824.226	3.7022^o	5.5	0.4612	6.5	3824.242	410.1
3824.466	3.7020^o	7.5	0.4612	6.5	3824.459	2704.8
3826.793	3.9026^o	4.5	0.6637	5.5	3826.812	441.9
3827.845	3.9106^o	6.5	0.6726	7.5	3827.850	2671.7
3828.738	3.5237^o	4.5	0.2864	5.5	3828.760	966.8
3833.420	3.5854^o	5.5	0.3521	4.5	3833.426	10901.7
3834.017	3.2960^o	6.5	0.0632	5.5	3834.027	9190.8
3835.903	3.5176^o	6.5	0.2864	5.5	3835.909	1891.5
3837.805	3.2650^o	5.5	0.0354	6.5	3837.819	546.3
3840.390	3.3974^o	5.5	0.1700	4.5	3840.409	1204.1
3840.713	3.9499^o	4.5	0.7228	4.5	3840.721	1295.1
3843.351	3.2882^o	5.5	0.0632	5.5	3843.362	1687.2
3844.846	3.5237^o	4.5	0.3000	3.5	3844.862	917.3
3847.577	3.6826^o	6.5	0.4612	6.5	3847.604	1699.3
3847.884	3.8937^o	7.5	0.6726	7.5	3847.892	2058.4
3849.794	3.2549^o	6.5	0.0354	6.5	3849.804	367.6
3850.893	3.7947^o	7.5	0.5761	8.5	3850.902^{bc}	1051.8
3850.929	4.2341^o	6.5	1.0155	7.5	3850.902^{bc}	938.3
3851.722	3.2533^o	5.5	0.0354	6.5	3851.735	751.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3852.861	4.1870[o]	4.5	0.9701	4.5	3852.885	521.0
3853.721	3.5684[o]	4.5	0.3521	4.5	3853.732	778.4
3857.143	3.6746[o]	5.5	0.4612	6.5	3857.142	234.8
3858.497	3.6859[o]	3.5	0.4736	3.5	3858.504	601.3
3858.865	3.6856[o]	4.5	0.4736	3.5	3858.881	561.8
3859.605	3.2746[o]	5.5	0.0632	5.5	3859.618	711.7
3862.006	3.9322[o]	4.5	0.7228	4.5	3862.009	168.3
3864.114	3.2430[o]	6.5	0.0354	6.5	3864.126	561.7
3871.374	3.6628[o]	6.5	0.4612	6.5	3871.383[b]	1424.1
3871.379	3.8815[o]	2.5	0.6799	1.5	3871.383[b]	1424.1
3873.006	3.2356[o]	7.5	0.0354	6.5	3873.013	5136.2
3873.926	3.2349[o]	5.5	0.0354	6.5	3873.933	4148.5
3876.147	3.2609[o]	4.5	0.0632	5.5	3876.157[b]	1313.1
3876.152	3.2549[o]	6.5	0.0573	7.5	3876.157[b]	1313.1
3876.688	3.2604[o]	5.5	0.0632	5.5	3876.694	2183.6
3877.568	4.0397[o]	3.5	0.8432	2.5	3877.584	787.1
3878.232	3.6554[o]	2.5	0.4595	1.5	3878.238	1878.6
3881.264	3.2288[o]	6.5	0.0354	6.5	3881.271	2519.6
3883.324	4.1618[o]	5.5	0.9701	4.5	3883.313	927.1
3883.669	3.7736[o]	3.5	0.5822	2.5	3883.688[b]	612.1
3883.711	4.1954[o]	5.5	1.0040	4.5	3883.688[b]	642.0
3885.127	3.3602[o]	4.5	0.1700	4.5	3885.100	4313.3
3887.861	3.5401[o]	5.5	0.3521	4.5	3887.876[c]	2223.3
3888.691	3.9634[o]	1.5	0.7760	0.5	3888.702	221.2
3890.831	3.6450[o]	2.5	0.4595	1.5	3890.858	2106.2
3893.707	3.9877[o]	4.5	0.8044	3.5	3893.717	781.3
3895.369	3.9694[o]	7.5	0.7875	6.5	3895.374	840.7
3895.959	3.5335[o]	5.5	0.3521	4.5	3895.973	1975.4
3897.214	3.3504[o]	4.5	0.1700	4.5	3897.225	712.4
3898.721	3.4655[o]	4.5	0.2864	5.5	3898.730	1282.8
3899.684	3.2356[o]	7.5	0.0573	7.5	3899.706	1760.2
3903.137	3.6491[o]	4.5	0.4736	3.5	3903.147[b]	858.5
3903.159	3.4619[o]	4.5	0.2864	5.5	3903.147[b]	858.5
3904.168	3.6359[o]	5.5	0.4612	6.5	3904.177	1686.2
3905.833	3.3433[o]	4.5	0.1700	4.5	3905.843	632.0
3909.556	3.8931[o]	5.5	0.7228	4.5	3909.556[c]	1523.5
3910.851	3.8330[o]	5.5	0.6637	5.5	3910.846	3270.5
3912.256	3.1681	6.5	0.0000[o]	7.5	3912.266	4162.1
3914.574	3.4527[o]	6.5	0.2864	5.5	3914.587	4626.7
3916.628	3.6258[o]	5.5	0.4612	6.5	3916.641	1589.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3916.942	3.8370^o	6.5	0.6726	7.5	3916.953^c	758.0
3917.294	3.1995^o	6.5	0.0354	6.5	3917.309	1215.6
3919.018	3.5563^o	2.5	0.3936	2.5	3919.032	1347.5
3919.744	4.2341^o	6.5	1.0720	5.5	3919.712	164.0
3919.937	3.8847^o	3.5	0.7228	4.5	3919.947	95.9
3920.950	3.2243^o	4.5	0.0632	5.5	3920.962	498.6
3921.250	3.4608^o	3.5	0.3000	3.5	3921.261	1849.2
3923.801	3.5109^o	4.5	0.3521	4.5	3923.815	121.1
3928.965	3.8346^o	0.5	0.6799	1.5	3928.976	985.7
3929.873	3.1893^o	6.5	0.0354	6.5	3929.882	3177.8
3930.275	3.8173^o	4.5	0.6637	5.5	3930.293	2940.4
3932.562	3.7279^o	7.5	0.5761	8.5	3932.570^b	523.0
3932.566	3.3218^o	3.5	0.1700	4.5	3932.570^b	523.0
3934.129	3.7266^o	8.5	0.5761	8.5	3934.143^b	733.9
3934.135	3.5441^o	2.5	0.3936	2.5	3934.143^b	733.9
3935.815	3.8218^o	6.5	0.6726	7.5	3935.820	241.3
3937.132	3.8709^o	5.5	0.7228	4.5	3937.135	1574.1
3938.046	3.3174^o	4.5	0.1700	4.5	3938.054	2223.9
3940.885	3.9944^o	2.5	0.8492	1.5	3940.892	467.2
3946.113	3.5345^o	2.5	0.3936	2.5	3946.125	114.3
3946.893	3.5339^o	3.5	0.3936	2.5	3946.890^c	425.3
3947.259	4.1101^o	5.5	0.9701	4.5	3947.266	943.5
3950.134	3.2010^o	5.5	0.0632	5.5	3950.141	9407.3
3952.995	3.7992^o	4.5	0.6637	5.5	3953.008	455.2
3956.662	3.4190^o	5.5	0.2864	5.5	3956.683	319.4
3957.343	3.1893^o	6.5	0.0573	7.5	3957.364	10466.6
3958.972	3.5919^o	5.5	0.4612	6.5	3959.003	308.1
3960.697	3.8020^o	8.5	0.6726	7.5	3960.700	1225.7
3964.297	4.1346^o	1.5	1.0080	2.5	3964.314	1033.0
3964.669	4.0488^o	5.5	0.9225	4.5	3964.645	391.1
3964.840	3.1893^o	6.5	0.0632	5.5	3964.856	525.5
3969.903	3.7947^o	7.5	0.6726	7.5	3969.933^b	1054.5
3969.931	3.4085^o	5.5	0.2864	5.5	3969.933^b	1057.2
3971.126	3.9877^o	4.5	0.8665	5.5	3971.130	277.6
3973.061	3.4196^o	4.5	0.3000	3.5	3973.064	1317.5
3974.671	3.7910^o	7.5	0.6726	7.5	3974.681	3392.8
3974.958	3.2882^o	5.5	0.1700	4.5	3974.971	358.3
3976.532	3.4033^o	4.5	0.2864	5.5	3976.536	1407.8
3978.972	3.7876^o	6.5	0.6726	7.5	3978.979	330.9
3981.020	3.4655^o	4.5	0.3521	4.5	3981.017	809.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3981.722	3.1483^o	6.5	0.0354	6.5	3981.733	11396.3
3983.464	3.5851^o	4.5	0.4736	3.5	3983.453	397.4
3984.113	3.3974^o	5.5	0.2864	5.5	3984.119	424.2
3984.682	3.3970^o	6.5	0.2864	5.5	3984.695	188.9
3984.861	3.9148^o	4.5	0.8044	3.5	3984.883^b	1301.3
3984.888	4.0805^o	5.5	0.9701	4.5	3984.883^b	1332.0
3985.136	3.8330^o	5.5	0.7228	4.5	3985.130	1512.6
3986.928	3.1720^o	4.5	0.0632	5.5	3986.943	1758.9
3987.658	3.2782^o	4.5	0.1700	4.5	3987.674	4788.3
3990.210	3.8937^o	7.5	0.7875	6.5	3990.222	874.7
3990.615	3.7697^o	6.5	0.6637	5.5	3990.637	4273.3
3991.012	3.8931^o	5.5	0.7875	6.5	3991.027	96.5
3992.346	3.2746^o	5.5	0.1700	4.5	3992.357^b	416.8
3992.379	3.5782^o	4.5	0.4736	3.5	3992.357^b	420.1
3993.466	3.6859^o	3.5	0.5822	2.5	3993.481	409.8
3995.124	3.2724^o	3.5	0.1700	4.5	3995.135	4857.3
3995.507	3.9296^o	5.5	0.8275	5.5	3995.519	710.4
4002.371	3.5563^o	2.5	0.4595	1.5	4002.374	690.6
4004.602	3.5545^o	1.5	0.4595	1.5	4004.607	1191.3
4009.175	3.3915^o	2.5	0.3000	3.5	4009.184	3515.8
4010.049	3.2609^o	4.5	0.1700	4.5	4010.053	12768.5
4013.258	3.3748^o	5.5	0.2864	5.5	4013.271^b	7969.9
4013.297	4.0604^o	3.5	0.9720	3.5	4013.271^b	7965.4
4015.614	3.4802^o	2.5	0.3936	2.5	4015.626	1189.0
4017.622	3.1483^o	6.5	0.0632	5.5	4017.624	165.9
4017.902	3.6670^o	3.5	0.5822	2.5	4017.910	282.2
4018.433	3.8889^o	4.5	0.8044	3.5	4018.446	1255.0
4019.123	4.1101^o	5.5	1.0262	6.5	4019.109	477.4
4020.726	3.5563^o	2.5	0.4736	3.5	4020.738	2283.7
4025.140	3.1147^o	6.5	0.0354	6.5	4025.150	3976.7
4028.905	3.7992^o	4.5	0.7228	4.5	4028.888	643.2
4029.233	3.9426^o	6.5	0.8665	5.5	4029.219	1285.2
4031.004	4.1295^o	9.5	1.0547	8.5	4031.004	451.4
4034.240	3.5335^o	5.5	0.4612	6.5	4034.242	282.7
4034.876	4.1870^o	4.5	1.1152	3.5	4034.883	61.3
4036.006	3.7509^o	2.5	0.6799	1.5	4036.010	917.3
4036.214	3.5320^o	7.5	0.4612	6.5	4036.219	9134.5
4039.085	3.5281^o	2.5	0.4595	1.5	4039.089	49.8
4039.472	3.1257^o	6.5	0.0573	7.5	4039.482	10838.7
4039.711	3.2382^o	4.5	0.1700	4.5	4039.728	1457.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4040.107	3.6440^o	9.5	0.5761	8.5	4040.102	2793.0
4040.935	3.4608^o	3.5	0.3936	2.5	4040.943	1418.9
4041.534	3.3532^o	6.5	0.2864	5.5	4041.541	3599.6
4041.841	4.0706^o	5.5	1.0040	4.5	4041.849	2793.5
4042.031	3.3664^o	4.5	0.3000	3.5	4042.037	205.3
4043.766	3.9877^o	4.5	0.9225	4.5	4043.771	359.6
4044.674	3.7872^o	4.5	0.7228	4.5	4044.682^b	379.9
4044.681	3.1276^o	4.5	0.0632	5.5	4044.682^b	379.9
4046.396	3.9296^o	5.5	0.8665	5.5	4046.429^b	394.6
4046.424	4.1705^o	4.5	1.1074	5.5	4046.429^b	392.1
4047.150	3.1258^o	5.5	0.0632	5.5	4047.155	10812.3
4048.780	3.4134^o	3.5	0.3521	4.5	4048.794^b	1205.5
4048.798	3.9045^o	3.5	0.8432	2.5	4048.794^b	1205.5
4054.584	4.0650^o	2.5	1.0080	2.5	4054.602^b	1448.3
4054.590	3.3433^o	4.5	0.2864	5.5	4054.602^b	1448.3
4056.754	3.7279^o	7.5	0.6726	7.5	4056.761^b	444.5
4056.777	3.8597^o	2.5	0.8044	3.5	4056.761^b	433.8
4057.259	3.3413^o	6.5	0.2864	5.5	4057.266	92.5
4057.780	3.5281^o	2.5	0.4736	3.5	4057.795	595.3
4058.019	3.2243^o	4.5	0.1700	4.5	4058.031	1617.3
4058.834	3.9030^o	2.5	0.8492	1.5	4058.839	679.6
4061.830	3.1147^o	6.5	0.0632	5.5	4061.837	2087.7
4062.184	3.4033^o	4.5	0.3521	4.5	4062.198	2878.6
4063.044	3.8550^o	3.5	0.8044	3.5	4063.033	1833.9
4064.908	3.8252^o	1.5	0.7760	0.5	4064.905	88.3
4070.710	4.0488^o	5.5	1.0040	4.5	4070.717	1939.4
4072.256	4.2708^o	3.5	1.2271	4.5	4072.259	441.3
4073.931	3.0778^o	6.5	0.0354	6.5	4073.937	11553.6
4074.874	3.0771^o	5.5	0.0354	6.5	4074.879	1310.4
4076.683	4.1478^o	5.5	1.1074	5.5	4076.680	145.7
4077.876	3.8155^o	1.5	0.7760	0.5	4077.883	467.1
4078.172	3.7030^o	6.5	0.6637	5.5	4078.180	763.1
4078.805	3.4324^o	1.5	0.3936	2.5	4078.812	2149.7
4080.774	3.3237^o	5.5	0.2864	5.5	4080.760	613.3
4083.211	3.0709^o	6.5	0.0354	6.5	4083.219	7132.1
4084.824	3.3864^o	4.5	0.3521	4.5	4084.828^b	6274.5
4084.846	3.8218^o	6.5	0.7875	6.5	4084.828^b	6248.1
4087.566	3.8815^o	2.5	0.8492	1.5	4087.561	229.0
4088.397	4.0397^o	3.5	1.0080	2.5	4088.421	288.1
4088.633	3.4909^o	2.5	0.4595	1.5	4088.639	1511.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4089.288	3.2010^{o}	5.5	0.1700	4.5	4089.311^{b}	3376.1
4089.315	3.3174^{o}	4.5	0.2864	5.5	4089.311^{b}	3379.1
4093.379	4.1618^{o}	5.5	1.1338	4.5	4093.363	536.9
4094.031	3.3796^{o}	3.5	0.3521	4.5	4094.039	5595.6
4094.499	3.0625^{o}	5.5	0.0354	6.5	4094.515	22900.2
4095.908	3.5243^{o}	1.5	0.4982	0.5	4095.923	3302.6
4096.373	4.0977^{o}	6.5	1.0720	5.5	4096.404	795.3
4099.530	4.0315^{o}	2.5	1.0080	2.5	4099.522	109.7
4100.169	3.1929^{o}	5.5	0.1700	4.5	4100.178	696.4
4105.105	3.0547^{o}	7.5	0.0354	6.5	4105.111	6722.0
4105.727	3.6826^{o}	6.5	0.6637	5.5	4105.720	909.0
4106.337	3.4796^{o}	5.5	0.4612	6.5	4106.341	1303.9
4107.790	3.4909^{o}	2.5	0.4736	3.5	4107.795	2965.0
4108.375	3.0801^{o}	4.5	0.0632	5.5	4108.381	1522.4
4110.838	3.9871^{o}	3.5	0.9720	3.5	4110.849	691.1
4111.520	3.0778^{o}	6.5	0.0632	5.5	4111.523	640.2
4112.481	3.0771^{o}	5.5	0.0632	5.5	4112.492^{b}	28145.1
4112.517	3.3138^{o}	2.5	0.3000	3.5	4112.492^{b}	28147.1
4116.525	3.6908^{o}	1.5	0.6799	1.5	4116.538	237.2
4117.211	3.1804^{o}	3.5	0.1700	4.5	4117.221	8822.6
4118.342	3.9322^{o}	4.5	0.9225	4.5	4118.370^{b}	3401.9
4118.360	3.2960^{o}	6.5	0.2864	5.5	4118.370^{b}	3256.9
4119.924	3.0717^{o}	4.5	0.0632	5.5	4119.935	23876.7
4120.378	3.3602^{o}	4.5	0.3521	4.5	4120.379	1083.7
4120.972	3.0709^{o}	6.5	0.0632	5.5	4121.000^{b}	3712.0
4121.019	3.4671^{o}	1.5	0.4595	1.5	4120.999^{b}	2518.4
4125.432	3.8709^{o}	5.5	0.8665	5.5	4125.428	490.0
4126.251	3.4774^{o}	4.5	0.4736	3.5	4126.263	339.4
4126.716	3.7910^{o}	7.5	0.7875	6.5	4126.725	2428.0
4126.937	3.7261^{o}	5.5	0.7228	4.5	4126.945	980.0
4127.272	3.4643^{o}	6.5	0.4612	6.5	4127.247	1663.4
4128.733	3.1720^{o}	4.5	0.1700	4.5	4128.745	408.7
4129.285	3.8061^{o}	4.5	0.8044	3.5	4129.296	404.7
4131.353	3.7876^{o}	6.5	0.7875	6.5	4131.366	304.9
4132.835	3.6628^{o}	6.5	0.6637	5.5	4132.849	3410.6
4133.478	4.0706^{o}	5.5	1.0720	5.5	4133.500	1214.3
4134.373	3.3915^{o}	2.5	0.3936	2.5	4134.392^{bc}	1199.0
4134.392	4.0315^{o}	2.5	1.0335	1.5	4134.392^{bc}	1199.4
4134.823	3.2840^{o}	6.5	0.2864	5.5	4134.837	237.2
4137.712	3.2955^{o}	4.5	0.3000	3.5	4137.719	1073.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4137.986	3.7997^o	2.5	0.8044	3.5	4137.967^c	1058.6
4139.377	3.8218^o	6.5	0.8275	5.5	4139.381	68.2
4141.549	3.1627^o	4.5	0.1700	4.5	4141.563	22031.5
4142.170	3.9148^o	4.5	0.9225	4.5	4142.173	216.7
4142.435	3.3857^o	1.5	0.3936	2.5	4142.437	3193.5
4147.898	3.2746^o	5.5	0.2864	5.5	4147.904	1252.7
4149.158	3.4608^o	3.5	0.4736	3.5	4149.162^c	714.7
4150.871	4.2296^o	2.5	1.2436	2.5	4150.883^b	2058.7
4150.877	3.3796^o	3.5	0.3936	2.5	4150.883^b	2058.7
4152.215	3.3372^o	5.5	0.3521	4.5	4152.219	4633.7
4154.627	3.1533^o	3.5	0.1700	4.5	4154.634	1382.4
4156.257	3.7697^o	6.5	0.7875	6.5	4156.271	1736.3
4159.172	3.9026^o	4.5	0.9225	4.5	4159.181	437.2
4160.030	3.7022^o	5.5	0.7228	4.5	4160.036	543.9
4161.703	3.2782^o	4.5	0.3000	3.5	4161.709	940.0
4165.583	3.6554^o	2.5	0.6799	1.5	4165.595	378.7
4167.010	3.2609^o	4.5	0.2864	5.5	4167.026	205.0
4167.635	3.2604^o	5.5	0.2864	5.5	4167.650	1408.9
4168.774	3.0364^o	5.5	0.0632	5.5	4168.790	1401.1
4169.919	3.5545^o	1.5	0.5822	2.5	4169.931	2126.7
4170.486	3.0352^o	4.5	0.0632	5.5	4170.496	8163.0
4171.026	3.3237^o	5.5	0.3521	4.5	4171.035	1866.2
4171.799	3.6437^o	7.5	0.6726	7.5	4171.811	3809.3
4175.049	3.4299^o	6.5	0.4612	6.5	4175.061	4058.4
4176.224	3.4415^o	2.5	0.4736	3.5	4176.236	739.2
4178.547	3.8155^o	1.5	0.8492	1.5	4178.553	560.9
4181.566	3.6869^o	5.5	0.7228	4.5	4181.568	97.7
4183.406	3.6856^o	5.5	0.7228	4.5	4183.408	566.6
4184.316	3.4233^o	7.5	0.4612	6.5	4184.320	6868.6
4184.598	3.5441^o	2.5	0.5822	2.5	4184.604	918.6
4185.909	3.0242^o	5.5	0.0632	5.5	4185.909	9831.1
4188.109	3.1295^o	3.5	0.1700	4.5	4188.119	15783.0
4189.304	3.0159^o	7.5	0.0573	7.5	4189.309	4234.8
4189.792	3.2583^o	3.5	0.3000	3.5	4189.795	836.4
4190.428	3.6216^o	4.5	0.6637	5.5	4190.439^b	852.1
4190.450	3.4190^o	5.5	0.4612	6.5	4190.439^b	849.0
4191.578	3.3506^o	2.5	0.3936	2.5	4191.583	8011.8
4193.350	3.1258^o	5.5	0.1700	4.5	4193.360	5184.8
4194.021	3.8218^o	6.5	0.8665	5.5	4194.023^b	2168.9
4194.026	3.9634^o	1.5	1.0080	2.5	4194.023^b	2168.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4194.322	4.0703[o]	2.5	1.1152	3.5	4194.316	600.5
4195.457	3.3064[o]	3.5	0.3521	4.5	4195.472	326.3
4197.012	3.4126[o]	2.5	0.4595	1.5	4197.019	762.3
4198.152	3.5345[o]	2.5	0.5822	2.5	4198.163	368.6
4198.440	3.2522[o]	2.5	0.3000	3.5	4198.448	6056.7
4205.668	3.9552[o]	3.5	1.0080	2.5	4205.680[b]	378.1
4205.680	4.1705[o]	4.5	1.2234	3.5	4205.680[b]	404.0
4206.898	2.9817[o]	6.5	0.0354	6.5	4206.916[b]	6337.4
4206.902	3.1162[o]	3.5	0.1700	4.5	4206.916[b]	6337.4
4207.211	3.4196[o]	4.5	0.4736	3.5	4207.226	1123.4
4207.542	3.7502[o]	4.5	0.8044	3.5	4207.556[b]	6585.7
4207.547	3.1158[o]	5.5	0.1700	4.5	4207.556[b]	6585.7
4208.653	3.2972[o]	3.5	0.3521	4.5	4208.668	2628.4
4209.335	3.6083[o]	6.5	0.6637	5.5	4209.355	1554.0
4211.009	4.1705[o]	4.5	1.2271	4.5	4211.042[b]	2904.0
4211.036	3.2955[o]	4.5	0.3521	4.5	4211.042[b]	2882.1
4211.064	4.1815[o]	3.5	1.2382	4.5	4211.042[b]	2839.5
4211.300	3.9694[o]	7.5	1.0262	6.5	4211.293	326.7
4212.022	3.9762[o]	2.5	1.0335	1.5	4212.040[c]	304.3
4212.372	3.2288[o]	6.5	0.2864	5.5	4212.373	1365.3
4212.724	3.7697[o]	6.5	0.8275	5.5	4212.738	264.0
4217.502	3.2388[o]	3.5	0.3000	3.5	4217.505	12076.3
4218.153	3.3996[o]	7.5	0.4612	6.5	4218.152	593.3
4218.816	4.1815[o]	3.5	1.2436	2.5	4218.839[b]	5917.6
4218.833	3.2243[o]	4.5	0.2864	5.5	4218.839[b]	5956.4
4221.372	3.2883[o]	3.5	0.3521	4.5	4221.374	3758.4
4221.559	3.2882[o]	5.5	0.3521	4.5	4221.554	1265.5
4224.272	2.9695[o]	5.5	0.0354	6.5	4224.283	29165.7
4230.597	3.4033[o]	4.5	0.4736	3.5	4230.580	1815.7
4231.356	2.9865[o]	6.5	0.0573	7.5	4231.361	6835.4
4231.881	2.9862[o]	7.5	0.0573	7.5	4231.885	36357.0
4232.818	3.5919[o]	5.5	0.6637	5.5	4232.822	10665.8
4234.198	3.5094[o]	3.5	0.5822	2.5	4234.221	3608.3
4236.577	3.9296[o]	5.5	1.0040	4.5	4236.592	290.6
4238.392	2.9817[o]	6.5	0.0573	7.5	4238.404[b]	1925.8
4238.399	3.2243[o]	4.5	0.3000	3.5	4238.404[b]	1931.2
4239.661	3.6034[o]	0.5	0.6799	1.5	4239.678	1025.6
4239.928	2.9865[o]	6.5	0.0632	5.5	4239.931	17244.7
4240.509	3.3841[o]	6.5	0.4612	6.5	4240.521	419.5
4241.178	3.2746[o]	5.5	0.3521	4.5	4241.186	712.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4242.248	3.5854^o	5.5	0.6637	5.5	4242.262	1381.7
4242.920	2.9566^o	6.5	0.0354	6.5	4242.933	2079.3
4245.136	3.2061^o	4.5	0.2864	5.5	4245.151	5857.6
4245.749	3.4954^o	8.5	0.5761	8.5	4245.761	1236.3
4247.457	3.5818^o	6.5	0.6637	5.5	4247.461	481.1
4247.728	3.3915^o	2.5	0.4736	3.5	4247.747	450.5
4249.648	3.4988^o	3.5	0.5822	2.5	4249.659	879.1
4250.110	4.0315^o	2.5	1.1152	3.5	4250.123	137.4
4252.442	3.9694^o	7.5	1.0547	8.5	4252.464^b	1214.1
4252.482	3.8847^o	3.5	0.9701	4.5	4252.464^b	1216.4
4252.677	3.7020^o	7.5	0.7875	6.5	4252.675	3660.3
4253.985	3.3748^o	5.5	0.4612	6.5	4253.996	3190.9
4255.229	2.9760^o	6.5	0.0632	5.5	4255.227	32954.4
4258.656	3.8330^o	5.5	0.9225	4.5	4258.642	400.6
4259.294	3.7532^o	3.5	0.8432	2.5	4259.279	258.3
4260.434	3.5818^o	6.5	0.6726	7.5	4260.457	2271.8
4261.815	3.2604^o	5.5	0.3521	4.5	4261.820	4465.5
4264.065	2.9640^o	7.5	0.0573	7.5	4264.071	1684.4
4264.701	2.9695^o	5.5	0.0632	5.5	4264.710	10632.2
4264.989	3.2583^o	3.5	0.3521	4.5	4264.988	8239.8
4265.950	2.9409^o	6.5	0.0354	6.5	4265.960	2731.9
4267.256	2.9619^o	7.5	0.0573	7.5	4267.260	3294.7
4268.749	3.2972^o	3.5	0.3936	2.5	4268.753	488.2
4269.689	3.1893^o	6.5	0.2864	5.5	4269.702	15401.4
4271.515	2.9371^o	6.5	0.0354	6.5	4271.539^b	8223.6
4271.527	3.0717^o	4.5	0.1700	4.5	4271.539^b	8262.9
4271.530	3.7509^o	2.5	0.8492	1.5	4271.539^b	8262.9
4272.233	3.2533^o	5.5	0.3521	4.5	4272.237	3098.9
4273.210	3.9045^o	3.5	1.0040	4.5	4273.216	115.6
4276.809	3.6856^o	5.5	0.7875	6.5	4276.815	836.5
4277.218	3.9133^o	7.5	1.0155	7.5	4277.220	1019.8
4277.768	3.9310^o	2.5	1.0335	1.5	4277.755	2880.9
4278.978	3.1966^o	2.5	0.3000	3.5	4278.986	1737.6
4281.273	3.6826^o	6.5	0.7875	6.5	4281.288	1317.9
4281.835	3.2883^o	3.5	0.3936	2.5	4281.846	579.2
4283.708	2.9566^o	6.5	0.0632	5.5	4283.719	6021.0
4284.177	2.9504^o	8.5	0.0573	7.5	4284.186	1747.0
4285.015	3.0625^o	5.5	0.1700	4.5	4285.030	1521.1
4285.768	3.3532^o	6.5	0.4612	6.5	4285.776	386.3
4290.068	3.8931^o	5.5	1.0040	4.5	4290.079	498.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4290.601	3.3500^o	5.5	0.4612	6.5	4290.609	1390.6
4294.669	3.2382^o	4.5	0.3521	4.5	4294.667	622.3
4295.315	3.1720^o	4.5	0.2864	5.5	4295.323	11756.0
4296.296	3.4671^o	1.5	0.5822	2.5	4296.304^b	996.2
4296.312	3.8550^o	3.5	0.9701	4.5	4296.304^b	996.1
4299.566	3.2349^o	5.5	0.3521	4.5	4299.567	2292.5
4305.639	3.4608^o	3.5	0.5822	2.5	4305.644	549.8
4307.184	2.9409^o	6.5	0.0632	5.5	4307.192	35000.5
4308.136	3.3506^o	2.5	0.4736	3.5	4308.144	1196.6
4308.655	3.8847^o	3.5	1.0080	2.5	4308.678^{bc}	684.5
4308.676	3.7992^o	4.5	0.9225	4.5	4308.678^{bc}	684.5
4309.138	3.5563^o	2.5	0.6799	1.5	4309.172^b	1424.2
4309.188	3.1627^o	4.5	0.2864	5.5	4309.172^b	1385.6
4309.652	3.3372^o	5.5	0.4612	6.5	4309.660	776.8
4317.653	3.9426^o	6.5	1.0720	5.5	4317.643	280.2
4317.906	2.9059^o	5.5	0.0354	6.5	4317.923^b	1545.0
4317.906	3.3300^o	0.5	0.4595	1.5	4317.923^b	1545.0
4317.931	3.8405^o	5.5	0.9701	4.5	4317.923^b	1545.0
4328.968	3.5358^o	6.5	0.6726	7.5	4328.954	4819.3
4335.885	3.9133^o	7.5	1.0547	8.5	4335.890	3732.6
4336.450	3.2019	7.5	0.3436^o	6.5	4336.454	62089.0
4339.617	3.6437^o	7.5	0.7875	6.5	4339.605	10303.0
4341.919	3.5345^o	2.5	0.6799	1.5	4341.926	375.6
4343.898	3.1533^o	3.5	0.3000	3.5	4343.884	2263.8
4344.697	2.9160^o	4.5	0.0632	5.5	4344.692	4322.6
4346.094	2.9092^o	7.5	0.0573	7.5	4346.104	566.7
4348.072	3.0206^o	4.5	0.1700	4.5	4348.080	516.2
4350.745	3.2010^o	5.5	0.3521	4.5	4350.746	3800.4
4351.771	3.3218^o	3.5	0.4736	3.5	4351.784	2329.9
4352.382	3.5277^o	0.5	0.6799	1.5	4352.391^b	655.1
4352.393	3.7703^o	3.5	0.9225	4.5	4352.391^b	655.1
4354.528	4.1705^o	4.5	1.3241	4.5	4354.525	818.1
4356.832	3.1885	6.5	0.3436^o	6.5	4356.838	65006.8
4358.341	3.4260^o	1.5	0.5822	2.5	4358.346	478.5
4359.045	4.0706^o	5.5	1.2271	4.5	4359.054	417.6
4360.156	2.9059^o	5.5	0.0632	5.5	4360.161^b	19358.3
4360.184	2.8781^o	7.5	0.0354	6.5	4360.161^b	19375.1
4363.912	3.3138^o	2.5	0.4736	3.5	4363.933	206.4
4365.296	3.1258^o	5.5	0.2864	5.5	4365.312	274.5
4365.779	3.8020^o	8.5	0.9630	7.5	4365.747	403.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4366.386	3.9106^o	6.5	1.0720	5.5	4366.393	692.0
4368.518	2.9005^o	5.5	0.0632	5.5	4368.532	530.2
4369.703	3.7030^o	6.5	0.8665	5.5	4369.709	438.6
4370.825	3.7022^o	5.5	0.8665	5.5	4370.829	186.0
4374.422	3.3070^o	4.5	0.4736	3.5	4374.432	2957.5
4377.347	3.8396^o	2.5	1.0080	2.5	4377.354	766.7
4377.727	3.4134^o	3.5	0.5822	2.5	4377.733	71.3
4377.949	3.4949^o	5.5	0.6637	5.5	4377.966	213.8
4378.957	3.4126^o	2.5	0.5822	2.5	4378.967	92.7
4381.291	2.8644^o	5.5	0.0354	6.5	4381.300	17792.8
4383.310	3.7502^o	4.5	0.9225	4.5	4383.346^b	2582.8
4383.322	3.7030^o	6.5	0.8753	6.5	4383.346^b	2576.8
4385.672	3.8597^o	2.5	1.0335	1.5	4385.675	5800.6
4387.410	2.8823^o	6.5	0.0573	7.5	4387.414	6299.7
4387.874	3.9322^o	4.5	1.1074	5.5	4387.881	1035.9
4389.793	4.1870^o	4.5	1.3635	5.5	4389.813	1595.8
4392.925	3.8370^o	6.5	1.0155	7.5	4392.927	1199.0
4393.271	3.1077^o	4.5	0.2864	5.5	4393.282	1227.8
4395.653	3.4835^o	6.5	0.6637	5.5	4395.637	380.0
4399.952	3.9322^o	4.5	1.1152	3.5	4399.973^b	1684.5
4399.970	2.9870^o	4.5	0.1700	4.5	4399.973^b	1657.4
4400.827	4.3393^o	9.5	1.5229	10.5	4400.804	1683.4
4401.027	4.0397^o	3.5	1.2234	3.5	4401.055^b	944.2
4401.077	3.1162^o	3.5	0.3000	3.5	4401.055^b	1395.5
4401.319	3.9499^o	4.5	1.1338	4.5	4401.346^b	800.4
4401.354	3.6826^o	6.5	0.8665	5.5	4401.346^b	800.7
4403.148	2.9849^o	3.5	0.1700	4.5	4403.178^b	1618.6
4403.163	3.1013^o	4.5	0.2864	5.5	4403.178^b	1628.1
4405.566	3.2746^o	5.5	0.4612	6.5	4405.593	547.5
4407.733	3.8382^o	7.5	1.0262	6.5	4407.701	1012.7
4409.700	3.8370^o	6.5	1.0262	6.5	4409.708	1336.5
4410.424	3.6856^o	5.5	0.8753	6.5	4410.414	3469.8
4411.879	3.3915^o	2.5	0.5822	2.5	4411.873	822.6
4416.676	3.8218^o	6.5	1.0155	7.5	4416.689	709.4
4418.365	3.1052^o	3.5	0.3000	3.5	4418.363	182.1
4419.336	3.2782^o	4.5	0.4736	3.5	4419.349	179.4
4421.894	3.1966^o	2.5	0.3936	2.5	4421.902	437.8
4424.480	3.1013^o	4.5	0.3000	3.5	4424.486	3845.9
4426.210	3.4802^o	2.5	0.6799	1.5	4426.244^b	2819.2
4426.230	3.7703^o	3.5	0.9701	4.5	4426.244^b	2823.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4426.236	2.9702[o]	4.5	0.1700	4.5	4426.244[b]	2818.0
4427.356	2.9695[o]	5.5	0.1700	4.5	4427.357	9986.2
4435.609	3.5818[o]	6.5	0.7875	6.5	4435.645	918.4
4436.609	3.0801[o]	4.5	0.2864	5.5	4436.620	1057.1
4437.621	3.5159[o]	3.5	0.7228	4.5	4437.623	732.7
4439.084	3.2533[o]	5.5	0.4612	6.5	4439.075	298.5
4440.276	3.0778[o]	6.5	0.2864	5.5	4440.288	182.8
4442.756	3.1834[o]	2.5	0.3936	2.5	4442.774	1146.6
4447.710	3.6532[o]	4.5	0.8665	5.5	4447.707	305.0
4449.230	2.8212[o]	5.5	0.0354	6.5	4449.234	5831.5
4451.023	3.2583[o]	3.5	0.4736	3.5	4451.036	549.7
4451.303	3.0709[o]	6.5	0.2864	5.5	4451.315	2345.1
4455.551	3.2430[o]	6.5	0.4612	6.5	4455.539	808.5
4458.252	3.0801[o]	4.5	0.3000	3.5	4458.256	114.2
4459.444	3.8056[o]	5.5	1.0262	6.5	4459.443	770.1
4460.225	3.7509[o]	2.5	0.9720	3.5	4460.221	5945.5
4460.854	3.5545[o]	1.5	0.7760	0.5	4460.832	514.1
4464.721	3.0625[o]	5.5	0.2864	5.5	4464.729	123.6
4464.951	3.4988[o]	3.5	0.7228	4.5	4464.967	613.1
4465.721	3.1276[o]	4.5	0.3521	4.5	4465.721	2143.1
4467.378	3.2356[o]	7.5	0.4612	6.5	4467.383	230.7
4468.731	3.1258[o]	5.5	0.3521	4.5	4468.760	528.8
4471.207	2.8075[o]	6.5	0.0354	6.5	4471.222[b]	416.2
4471.249	3.4949[o]	5.5	0.7228	4.5	4471.222[b]	459.2
4471.855	3.0717[o]	4.5	0.3000	3.5	4471.863	443.1
4472.180	2.9415[o]	4.5	0.1700	4.5	4472.183	1123.7
4473.256	3.0572[o]	5.5	0.2864	5.5	4473.269	3915.4
4477.081	3.3506[o]	2.5	0.5822	2.5	4477.083	717.8
4478.369	3.2288[o]	6.5	0.4612	6.5	4478.403	829.7
4478.888	2.8306[o]	5.5	0.0632	5.5	4478.888	303.6
4481.516	4.1618[o]	5.5	1.3961	5.5	4481.533	169.1
4484.125	3.1162[o]	3.5	0.3521	4.5	4484.131	353.8
4484.801	3.9871[o]	3.5	1.2234	3.5	4484.809[b]	795.1
4484.816	3.7266[o]	8.5	0.9630	7.5	4484.809[b]	791.5
4488.762	3.5657[o]	3.5	0.8044	3.5	4488.790	272.1
4489.933	2.8178[o]	6.5	0.0573	7.5	4489.945[b]	4059.6
4489.945	3.9877[o]	4.5	1.2271	4.5	4489.945[b]	4048.4
4491.257	3.1533[o]	3.5	0.3936	2.5	4491.272	1874.4
4495.049	3.6006[o]	3.5	0.8432	2.5	4495.025	619.9
4495.415	2.7926[o]	5.5	0.0354	6.5	4495.419	437.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4496.893	3.2299^o	3.5	0.4736	3.5	4496.908	825.6
4498.917	3.8889^o	4.5	1.1338	4.5	4498.925	278.2
4501.724	2.7887^o	6.5	0.0354	6.5	4501.732	7117.5
4502.523	3.9762^o	2.5	1.2234	3.5	4502.510	346.6
4503.107	3.4324^o	1.5	0.6799	1.5	4503.116	162.3
4504.008	4.2708^o	3.5	1.5189	3.5	4504.036	205.8
4506.800	2.8075^o	6.5	0.0573	7.5	4506.806	2921.5
4507.127	3.0364^o	5.5	0.2864	5.5	4507.142	712.1
4507.965	3.9877^o	4.5	1.2382	4.5	4507.956	2875.9
4509.128	3.0352^o	4.5	0.2864	5.5	4509.127	1691.1
4510.156	3.1417^o	1.5	0.3936	2.5	4510.167	619.0
4512.750	2.8098^o	4.5	0.0632	5.5	4512.750^b	1059.7
4512.753	4.1101^o	5.5	1.3635	5.5	4512.750^b	1059.7
4513.632	2.9160^o	4.5	0.1700	4.5	4513.631^b	4172.9
4513.657	3.5335^o	5.5	0.7875	6.5	4513.631^b	4493.7
4515.019	4.1618^o	5.5	1.4166	6.5	4515.025^b	332.9
4515.044	3.7532^o	3.5	1.0080	2.5	4515.025^b	336.6
4516.104	3.8597^o	2.5	1.1152	3.5	4516.135^b	911.4
4516.129	3.5320^o	7.5	0.7875	6.5	4516.135^b	931.4
4518.186	4.0397^o	3.5	1.2964	2.5	4518.202	561.6
4519.038	3.4655^o	4.5	0.7228	4.5	4519.018	191.6
4520.636	3.6083^o	6.5	0.8665	5.5	4520.622	193.6
4522.947	3.4130^o	6.5	0.6726	7.5	4522.966	279.8
4524.310	2.7750^o	6.5	0.0354	6.5	4524.320	9220.9
4525.924	3.2122^o	3.5	0.4736	3.5	4525.940	2262.6
4526.405	3.1995^o	6.5	0.4612	6.5	4526.436	1994.3
4527.162	3.0242^o	5.5	0.2864	5.5	4527.167	1771.1
4528.300	3.1966^o	2.5	0.4595	1.5	4528.307	1430.8
4529.654	3.7910^o	7.5	1.0547	8.5	4529.670	217.6
4531.486	3.0352^o	4.5	0.3000	3.5	4531.517^b	531.9
4531.515	3.3113^o	7.5	0.5761	8.5	4531.517^b	534.1
4532.892	2.9044^o	5.5	0.1700	4.5	4532.915	4050.7
4535.721	4.0866^o	2.5	1.3539	1.5	4535.730^b	590.4
4535.760	3.9762^o	2.5	1.2436	2.5	4535.730^b	557.0
4541.228	2.7926^o	5.5	0.0632	5.5	4541.231	2072.6
4543.209	3.1893^o	6.5	0.4612	6.5	4543.219	1268.8
4545.207	3.3996^o	7.5	0.6726	7.5	4545.201	154.3
4547.667	2.7887^o	6.5	0.0632	5.5	4547.675	2391.2
4552.302	3.3864^o	4.5	0.6637	5.5	4552.310	518.2
4552.727	3.5657^o	3.5	0.8432	2.5	4552.727	293.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4553.986	3.7937^o	4.5	1.0720	5.5	4554.003	195.5
4555.819	3.0206^o	4.5	0.3000	3.5	4555.827	516.6
4556.946	2.7553^o	7.5	0.0354	6.5	4556.955	6919.0
4557.214	2.7552^o	6.5	0.0354	6.5	4557.223^b	3974.7
4557.221	3.9634^o	1.5	1.2436	2.5	4557.223^b	3974.7
4557.622	3.0717^o	4.5	0.3521	4.5	4557.622	2536.4
4558.006	3.0057^o	6.5	0.2864	5.5	4558.004	1521.9
4560.757	2.7750^o	6.5	0.0573	7.5	4560.768	9029.7
4564.818	3.7872^o	4.5	1.0720	5.5	4564.826	212.6
4567.348	4.2326^o	4.5	1.5189	3.5	4567.374	427.2
4568.499	4.1954^o	5.5	1.4823	4.5	4568.517^b	1044.2
4568.518	3.2921	5.5	0.5790^o	5.5	4568.517^b	1056.6
4568.527	3.5563^o	2.5	0.8432	2.5	4568.517^b	1056.6
4570.717	2.7750^o	6.5	0.0632	5.5	4570.715	253.8
4571.778	4.1277^o	6.5	1.4166	6.5	4571.788^b	487.6
4571.801	3.3748^o	5.5	0.6637	5.5	4571.788^b	487.6
4573.920	3.1834^o	2.5	0.4736	3.5	4573.898	3662.0
4576.507	3.5358^o	6.5	0.8275	5.5	4576.517	146.8
4578.679	4.0706^o	5.5	1.3635	5.5	4578.703^b	1967.9
4578.681	3.5563^o	2.5	0.8492	1.5	4578.703^b	1967.9
4578.690	3.9871^o	3.5	1.2801	3.5	4578.703^b	1967.9
4581.540	2.8753^o	4.5	0.1700	4.5	4581.552	961.1
4586.115	2.7380^o	7.5	0.0354	6.5	4586.107	450.3
4587.700	3.7279^o	7.5	1.0262	6.5	4587.704	3729.3
4589.661	2.9870^o	4.5	0.2864	5.5	4589.665	1720.9
4592.384	2.7622^o	5.5	0.0632	5.5	4592.381	1619.3
4593.273	3.1720^o	4.5	0.4736	3.5	4593.281	494.6
4593.923	2.7553^o	7.5	0.0573	7.5	4593.933	8484.1
4594.195	2.7552^o	6.5	0.0573	7.5	4594.202	4421.1
4599.114	3.6670^o	3.5	0.9720	3.5	4599.119	439.8
4601.103	3.9172^o	2.5	1.2234	3.5	4601.135	330.2
4604.302	2.7552^o	6.5	0.0632	5.5	4604.316	2567.5
4605.389	3.5345^o	2.5	0.8432	2.5	4605.407^b	666.4
4605.411	3.2735^o	1.5	0.5822	2.5	4605.407^b	666.4
4606.452	3.5339^o	3.5	0.8432	2.5	4606.485	3073.2
4608.355	2.9760^o	6.5	0.2864	5.5	4608.362	1432.4
4611.940	3.7030^o	6.5	1.0155	7.5	4611.942	1395.9
4612.293	4.2341^o	6.5	1.5468	6.5	4612.317	4365.4
4612.827	2.9870^o	4.5	0.3000	3.5	4612.814	1070.2
4616.307	3.1586^o	2.5	0.4736	3.5	4616.319^b	770.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4616.320	2.9849^o	3.5	0.3000	3.5	4616.319^b	754.4
4617.478	3.0364^o	5.5	0.3521	4.5	4617.489	980.1
4618.078	2.8539^o	4.5	0.1700	4.5	4618.083	895.9
4619.142	3.8937^o	7.5	1.2104	6.5	4619.149^b	990.7
4619.157	4.0604^o	3.5	1.3771	3.5	4619.149^b	1028.1
4619.466	2.9695^o	5.5	0.2864	5.5	4619.450	1707.7
4620.906	3.1417^o	1.5	0.4595	1.5	4620.916	380.0
4622.082	3.6856^o	5.5	1.0040	4.5	4622.072	846.3
4623.568	2.7380^o	7.5	0.0573	7.5	4623.582	1194.1
4625.201	3.7872^o	4.5	1.1074	5.5	4625.181	217.8
4631.028	2.7118^o	5.5	0.0354	6.5	4631.034	3812.4
4632.045	3.7020^o	7.5	1.0262	6.5	4632.049	2826.4
4634.165	3.3974^o	5.5	0.7228	4.5	4634.185	112.6
4636.961	3.4774^o	4.5	0.8044	3.5	4636.992^c	305.0
4638.508	3.0242^o	5.5	0.3521	4.5	4638.511	3163.6
4638.747	3.7266^o	8.5	1.0547	8.5	4638.757	1958.5
4639.107	3.8056^o	5.5	1.1338	4.5	4639.110	125.8
4640.959	3.3506^o	2.5	0.6799	1.5	4640.969	506.4
4641.775	2.9566^o	6.5	0.2864	5.5	4641.779	3353.9
4642.167	3.2522^o	2.5	0.5822	2.5	4642.175	939.0
4643.250	3.5919^o	5.5	0.9225	4.5	4643.261	353.0
4644.119	2.7043^o	7.5	0.0354	6.5	4644.122	877.7
4644.868	3.0206^o	4.5	0.3521	4.5	4644.878	529.6
4649.585	2.7290^o	4.5	0.0632	5.5	4649.593	1119.1
4651.612	3.1258^o	5.5	0.4612	6.5	4651.632	2153.2
4653.475	3.9877^o	4.5	1.3241	4.5	4653.444	121.9
4655.947	2.8321^o	4.5	0.1700	4.5	4655.948	503.2
4657.313	3.8847^o	3.5	1.2234	3.5	4657.313	541.6
4657.664	3.4655^o	4.5	0.8044	3.5	4657.668	182.0
4659.622	3.3237^o	5.5	0.6637	5.5	4659.619	1088.4
4662.808	3.2343^o	8.5	0.5761	8.5	4662.796	6666.0
4664.586	3.5237^o	4.5	0.8665	5.5	4664.598	341.3
4665.437	4.1295^o	9.5	1.4728	8.5	4665.432	1706.4
4667.129	3.6258^o	5.5	0.9701	4.5	4667.122	219.1
4668.287	2.9415^o	4.5	0.2864	5.5	4668.261	1945.1
4668.483	3.8931^o	5.5	1.2382	4.5	4668.475	799.2
4669.353	2.9409^o	6.5	0.2864	5.5	4669.373^b	3517.5
4669.399	4.1705^o	4.5	1.5161	4.5	4669.373^b	3607.1
4670.247	4.0706^o	5.5	1.4166	6.5	4670.252	415.9
4671.258	3.7872^o	4.5	1.1338	4.5	4671.225	493.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4674.643	4.1744[o]	10.5	1.5229	10.5	4674.658[b]	679.9
4674.646	4.1954[o]	5.5	1.5440	5.5	4674.658[b]	679.9
4675.097	2.8212[o]	5.5	0.1700	4.5	4675.115	414.3
4679.591	4.1954[o]	5.5	1.5468	6.5	4679.605	282.4
4683.293	3.8847[o]	3.5	1.2382	4.5	4683.327	1120.0
4683.630	2.7096[o]	6.5	0.0632	5.5	4683.634[b]	8447.2
4683.640	4.0424[o]	6.5	1.3961	5.5	4683.634[b]	8457.0
4689.071	3.3070[o]	4.5	0.6637	5.5	4689.090	407.5
4690.228	3.1162[o]	3.5	0.4736	3.5	4690.240	534.1
4690.818	3.5176[o]	6.5	0.8753	6.5	4690.816	653.5
4691.925	3.4909[o]	2.5	0.8492	1.5	4691.959	269.4
4692.255	2.9415[o]	4.5	0.3000	3.5	4692.253	358.7
4695.323	3.7736[o]	3.5	1.1338	4.5	4695.320	806.7
4701.517	3.8597[o]	2.5	1.2234	3.5	4701.541	417.9
4702.146	3.4634[o]	6.5	0.8275	5.5	4702.179	7194.9
4703.731	3.7502[o]	4.5	1.1152	3.5	4703.744	134.3
4704.141	2.9870[o]	4.5	0.3521	4.5	4704.139	2124.0
4705.467	3.1077[o]	4.5	0.4736	3.5	4705.485[b]	836.6
4705.508	3.0277[o]	1.5	0.3936	2.5	4705.485[b]	838.5
4711.699	4.2918[o]	9.5	1.6611	9.5	4711.680	639.6
4712.753	3.2122[o]	3.5	0.5822	2.5	4712.758	822.3
4713.472	2.9160[o]	4.5	0.2864	5.5	4713.473	1872.7
4717.017	2.6630[o]	5.5	0.0354	6.5	4717.027	8378.2
4718.961	4.1705[o]	4.5	1.5440	5.5	4718.982[b]	3473.2
4719.016	3.8370[o]	6.5	1.2104	6.5	4718.982[b]	3483.9
4726.116	2.7926[o]	5.5	0.1700	4.5	4726.120[b]	1809.0
4726.142	3.8330[o]	5.5	1.2104	6.5	4726.120[b]	1809.1
4726.584	3.9762[o]	2.5	1.3539	1.5	4726.582	240.6
4726.895	3.5941[o]	4.5	0.9720	3.5	4726.889	91.5
4729.791	3.3433[o]	4.5	0.7228	4.5	4729.795	138.9
4732.802	3.5818[o]	6.5	0.9630	7.5	4732.811	101.3
4734.177	2.9702[o]	4.5	0.3521	4.5	4734.187	1091.9
4734.463	3.6334[o]	8.5	1.0155	7.5	4734.489[b]	2172.3
4734.479	2.9044[o]	5.5	0.2864	5.5	4734.489[b]	2179.1
4735.226	2.6529[o]	7.5	0.0354	6.5	4735.233	2296.7
4735.457	2.9695[o]	5.5	0.3521	4.5	4735.468	4385.2
4736.236	3.4835[o]	6.5	0.8665	5.5	4736.248	101.1
4736.847	3.0778[o]	6.5	0.4612	6.5	4736.812	200.8
4738.122	3.0771[o]	5.5	0.4612	6.5	4738.130	514.7
4738.805	3.0091[o]	2.5	0.3936	2.5	4738.800	220.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4739.145	3.5854^o	5.5	0.9701	4.5	4739.177	601.9
4740.921	3.3372^o	5.5	0.7228	4.5	4740.917	161.6
4742.689	3.8405^o	5.5	1.2271	4.5	4742.692	643.9
4744.077	2.9126^o	2.5	0.3000	3.5	4744.079	736.0
4746.318	3.8550^o	3.5	1.2436	2.5	4746.348^b	1141.9
4746.325	3.2840^o	6.5	0.6726	7.5	4746.348^b	1141.9
4746.370	4.1954^o	5.5	1.5840	4.5	4746.348^b	1193.1
4747.797	3.6826^o	6.5	1.0720	5.5	4747.807^b	2639.2
4747.822	3.9877^o	4.5	1.3771	3.5	4747.807^b	2582.1
4749.398	3.0709^o	6.5	0.4612	6.5	4749.406	2199.5
4749.863	3.3970^o	6.5	0.7875	6.5	4749.888^b	239.4
4749.892	3.1885	6.5	0.5790^o	5.5	4749.888^b	237.8
4749.893	3.9634^o	1.5	1.3539	1.5	4749.888^b	237.8
4750.685	3.4134^o	3.5	0.8044	3.5	4750.673	378.0
4753.190	3.2714^o	6.5	0.6637	5.5	4753.172	443.2
4754.113	3.6111^o	4.5	1.0040	4.5	4754.135	399.5
4764.428	4.3393^o	9.5	1.7378	8.5	4764.408	507.7
4767.483	2.6630^o	5.5	0.0632	5.5	4767.476	269.6
4767.930	3.6258^o	5.5	1.0262	6.5	4767.950^b	109.9
4767.972	3.1786	5.5	0.5790^o	5.5	4767.950^b	103.7
4768.721	3.9762^o	2.5	1.3771	3.5	4768.741	125.5
4770.344	3.4415^o	2.5	0.8432	2.5	4770.351^b	254.5
4770.347	3.1804^o	3.5	0.5822	2.5	4770.351^b	254.5
4770.356	2.7682^o	4.5	0.1700	4.5	4770.351^b	254.5
4770.697	3.0717^o	4.5	0.4736	3.5	4770.714	149.3
4772.396	3.2609^o	4.5	0.6637	5.5	4772.425	445.1
4774.652	2.8823^o	6.5	0.2864	5.5	4774.656	4497.3
4775.913	4.1954^o	5.5	1.6002	6.5	4775.950^b	722.2
4775.941	2.6306^o	6.5	0.0354	6.5	4775.950^b	725.7
4779.000	3.2735^o	1.5	0.6799	1.5	4779.036^b	293.4
4779.045	3.0547^o	7.5	0.4612	6.5	4779.036^b	305.0
4780.687	2.6280^o	5.5	0.0354	6.5	4780.690	5841.5
4781.548	2.7622^o	5.5	0.1700	4.5	4781.553^b	323.0
4781.587	3.4196^o	4.5	0.8275	5.5	4781.553^b	304.2
4785.195	3.8173^o	4.5	1.2271	4.5	4785.211	211.6
4787.244	3.1681	6.5	0.5790^o	5.5	4787.267	604.5
4788.525	3.5109^o	4.5	0.9225	4.5	4788.528	650.0
4791.998	2.6438^o	8.5	0.0573	7.5	4792.016^b	781.0
4792.026	4.2326^o	4.5	1.6461	3.5	4792.016^b	898.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4793.860	3.4130^o	6.5	0.8275	5.5	4793.830	1092.3
4795.784	3.0439^o	1.5	0.4595	1.5	4795.787	258.5
4797.123	4.1277^o	6.5	1.5440	5.5	4797.136	219.0
4800.452	4.2431^o	10.5	1.6611	9.5	4800.438	654.0
4805.813	3.3666^o	7.5	0.7875	6.5	4805.823	108.3
4807.893	2.8644^o	5.5	0.2864	5.5	4807.903	3153.3
4810.832	3.1586^o	2.5	0.5822	2.5	4810.838	2635.1
4812.163	3.7095^o	3.5	1.1338	4.5	4812.158	385.0
4812.788	2.8753^o	4.5	0.3000	3.5	4812.790	2632.6
4816.573	2.6306^o	6.5	0.0573	7.5	4816.583	1221.7
4820.758	3.0447^o	4.5	0.4736	3.5	4820.759^b	2813.6
4820.777	3.0305^o	1.5	0.4595	1.5	4820.759^b	2813.6
4824.584	3.5320^o	7.5	0.9630	7.5	4824.584	493.9
4825.138	3.0299^o	5.5	0.4612	6.5	4825.163	187.1
4827.488	2.8539^o	4.5	0.2864	5.5	4827.496	5655.9
4830.868	3.3532^o	6.5	0.7875	6.5	4830.876	542.4
4831.989	3.2288^o	6.5	0.6637	5.5	4832.015	231.4
4832.743	3.8889^o	4.5	1.3241	4.5	4832.753	357.0
4834.265	3.6359^o	5.5	1.0720	5.5	4834.292^b	753.5
4834.293	2.9160^o	4.5	0.3521	4.5	4834.291^b	694.9
4835.909	3.2356^o	7.5	0.6726	7.5	4835.906	883.8
4837.996	3.5339^o	3.5	0.9720	3.5	4838.006	193.2
4838.434	3.2343^o	8.5	0.6726	7.5	4838.454^b	418.1
4838.447	3.5657^o	3.5	1.0040	4.5	4838.454^b	390.0
4841.492	3.7872^o	4.5	1.2271	4.5	4841.494^b	478.8
4841.516	2.8465^o	5.5	0.2864	5.5	4841.494^b	398.6
4842.573	3.8396^o	2.5	1.2801	3.5	4842.587	298.9
4843.590	2.7290^o	4.5	0.1700	4.5	4843.591^b	1650.4
4843.616	3.3864^o	4.5	0.8275	5.5	4843.591^b	1658.9
4849.177	2.7260^o	5.5	0.1700	4.5	4849.181	1342.1
4850.449	3.6628^o	6.5	1.1074	5.5	4850.447	237.8
4853.110	3.3300^o	0.5	0.7760	0.5	4853.132^b	1766.5
4853.124	2.8539^o	4.5	0.3000	3.5	4853.132^b	1765.5
4853.169	3.9310^o	2.5	1.3771	3.5	4853.132^b	1750.5
4854.809	3.6869^o	5.5	1.1338	4.5	4854.812	1549.1
4856.394	2.9044^o	5.5	0.3521	4.5	4856.413	1446.5
4861.221	3.0091^o	2.5	0.4595	1.5	4861.221^b	727.8
4861.235	3.3372^o	5.5	0.7875	6.5	4861.221^b	727.8
4863.867	3.3915^o	2.5	0.8432	2.5	4863.857	1585.5
4864.386	3.4233^o	7.5	0.8753	6.5	4864.395	1415.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4867.915	3.3506^o	2.5	0.8044	3.5	4867.876	973.0
4868.884	2.8321^o	4.5	0.2864	5.5	4868.892	655.5
4871.066	3.0057^o	6.5	0.4612	6.5	4871.072	1910.8
4872.856	2.7136^o	4.5	0.1700	4.5	4872.873	101.6
4874.178	2.5783^o	5.5	0.0354	6.5	4874.186	6989.9
4874.877	2.5780^o	6.5	0.0354	6.5	4874.885	1393.3
4876.238	2.7118^o	5.5	0.1700	4.5	4876.241	2178.5
4878.053	3.5109^o	4.5	0.9701	4.5	4878.083	483.2
4881.443	2.6023^o	6.5	0.0632	5.5	4881.445	2427.6
4883.478	3.2609^o	4.5	0.7228	4.5	4883.490^b	121.0
4883.517	3.6532^o	4.5	1.1152	3.5	4883.490^b	112.2
4886.517	4.0805^o	5.5	1.5440	5.5	4886.525	72.7
4887.038	3.3237^o	5.5	0.7875	6.5	4887.050	146.8
4893.533	3.1090^o	7.5	0.5761	8.5	4893.533	529.1
4894.317	3.4954^o	8.5	0.9630	7.5	4894.333	2473.6
4894.963	2.8321^o	4.5	0.3000	3.5	4894.965	2546.2
4896.958	2.5665^o	7.5	0.0354	6.5	4896.960	1033.9
4898.124	3.3970^o	6.5	0.8665	5.5	4898.102^b	151.8
4898.124	4.2326^o	4.5	1.7022	3.5	4898.102^b	151.8
4899.312	3.6450^o	2.5	1.1152	3.5	4899.293	136.3
4900.585	3.1929^o	5.5	0.6637	5.5	4900.609	1186.2
4903.828	4.1277^o	6.5	1.6002	6.5	4903.860^b	236.1
4903.886	3.7509^o	2.5	1.2234	3.5	4903.860^b	235.4
4908.098	2.9865^o	6.5	0.4612	6.5	4908.071	948.7
4908.804	2.9862^o	7.5	0.4612	6.5	4908.796	408.8
4910.105	4.1277^o	6.5	1.6034	7.5	4910.123	161.5
4911.349	3.3902^o	6.5	0.8665	5.5	4911.349	159.7
4912.464	3.7502^o	4.5	1.2271	4.5	4912.473	162.1
4914.885	2.8655	7.5	0.3436^o	6.5	4914.892	1769.2
4915.242	3.3970^o	6.5	0.8753	6.5	4915.264	202.1
4917.217	2.5780^o	6.5	0.0573	7.5	4917.223	2292.2
4918.572	3.5919^o	5.5	1.0720	5.5	4918.597^b	101.3
4918.603	3.3864^o	4.5	0.8665	5.5	4918.597^b	99.5
4918.914	3.5238^o	3.5	1.0040	4.5	4918.947	317.1
4925.235	3.5320^o	7.5	1.0155	7.5	4925.239	269.6
4926.272	3.2388^o	3.5	0.7228	4.5	4926.274	150.7
4926.806	3.0919^o	7.5	0.5761	8.5	4926.824	4385.5
4928.082	2.5783^o	5.5	0.0632	5.5	4928.088	861.9
4928.920	3.9195^o	9.5	1.4048	9.5	4928.906	3689.7
4931.477	2.9870^o	4.5	0.4736	3.5	4931.481	299.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4933.668	2.8644^o	5.5	0.3521	4.5	4933.676	303.7
4933.987	3.2349^o	5.5	0.7228	4.5	4933.996	292.1
4935.470	2.9849^o	3.5	0.4736	3.5	4935.471	160.2
4940.348	3.8330^o	5.5	1.3241	4.5	4940.383	1303.5
4941.042	3.2960^o	6.5	0.7875	6.5	4941.044	165.4
4945.671	2.7926^o	5.5	0.2864	5.5	4945.672	533.4
4946.112	2.9795^o	3.5	0.4736	3.5	4946.128	4446.6
4950.871	3.1834^o	2.5	0.6799	1.5	4950.866	136.1
4951.285	3.7997^o	2.5	1.2964	2.5	4951.286	234.8
4953.309	2.7887^o	6.5	0.2864	5.5	4953.323	1406.6
4953.598	3.5176^o	6.5	1.0155	7.5	4953.593	294.7
4960.850	4.0424^o	6.5	1.5440	5.5	4960.859	456.5
4961.955	2.6679^o	4.5	0.1700	4.5	4961.958	502.5
4962.892	3.2735^o	1.5	0.7760	0.5	4962.880	133.9
4964.496	2.9702^o	4.5	0.4736	3.5	4964.489^b	1445.9
4964.524	2.7966^o	3.5	0.3000	3.5	4964.489^b	1276.3
4966.858	2.9566^o	6.5	0.4612	6.5	4966.865	402.6
4968.644	3.5281^o	2.5	1.0335	1.5	4968.609	433.9
4969.079	2.8465^o	5.5	0.3521	4.5	4969.084	617.9
4969.678	2.5573^o	4.5	0.0632	5.5	4969.683	6960.6
4971.667	2.6630^o	5.5	0.1700	4.5	4971.677	591.4
4973.883	3.6258^o	5.5	1.1338	4.5	4973.854	89.5
4976.708	2.5259^o	5.5	0.0354	6.5	4976.716	205.2
4984.310	3.3532^o	6.5	0.8665	5.5	4984.328^b	141.2
4984.313	3.5941^o	4.5	1.1074	5.5	4984.329^b	114.0
4985.890	2.6559^o	3.5	0.1700	4.5	4985.900	2394.5
4993.871	4.0009^o	2.5	1.5189	3.5	4993.830	1852.5
4994.138	2.7682^o	4.5	0.2864	5.5	4994.151	2607.0
5000.678	3.0547^o	7.5	0.5761	8.5	5000.675	213.3
5001.011	2.8306^o	5.5	0.3521	4.5	5001.013	1036.0
5002.878	3.2650^o	5.5	0.7875	6.5	5002.890^b	368.8
5002.886	3.9133^o	7.5	1.4358	7.5	5002.890^b	363.0
5003.186	3.5320^o	7.5	1.0547	8.5	5003.171	162.0
5003.594	3.8937^o	7.5	1.4166	6.5	5003.570	185.5
5004.809	2.7765^o	2.5	0.3000	3.5	5004.824^b	4492.0
5004.854	3.8931^o	5.5	1.4166	6.5	5004.824^b	4488.9
5006.088	2.9371^o	6.5	0.4612	6.5	5006.097	298.3
5007.374	2.5107^o	5.5	0.0354	6.5	5007.376	449.1
5009.095	3.5818^o	6.5	1.1074	5.5	5009.099	157.5
5010.187	3.7703^o	3.5	1.2964	2.5	5010.195	119.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5012.348	3.9552^o	3.5	1.4823	4.5	5012.326	455.8
5016.361	3.7509^o	2.5	1.2801	3.5	5016.365	238.2
5017.153	2.5337^o	4.5	0.0632	5.5	5017.149	2230.1
5018.577	2.4698	7.5	0.0000^o	7.5	5018.575	1481.6
5019.986	2.8212^o	5.5	0.3521	4.5	5019.982	1648.2
5020.215	3.3442^o	6.5	0.8753	6.5	5020.224	120.7
5021.580	2.7682^o	4.5	0.3000	3.5	5021.584	2946.7
5022.143	3.4835^o	6.5	1.0155	7.5	5022.150^b	4681.7
5022.160	3.2724^o	3.5	0.8044	3.5	5022.150^b	4681.7
5024.199	4.2918^o	9.5	1.8248	8.5	5024.181	2253.4
5024.628	3.6006^o	3.5	1.1338	4.5	5024.608	2537.4
5025.636	2.7527^o	4.5	0.2864	5.5	5025.641	832.9
5030.469	3.1276^o	4.5	0.6637	5.5	5030.494^b	131.3
5030.527	3.3864^o	4.5	0.9225	4.5	5030.494^b	158.1
5032.917	2.5259^o	5.5	0.0632	5.5	5032.922	1925.1
5034.043	3.6856^o	4.5	1.2234	3.5	5034.061	1185.0
5034.601	3.3372^o	5.5	0.8753	6.5	5034.581	398.0
5035.222	3.8155^o	1.5	1.3539	1.5	5035.235^b	2704.2
5035.227	2.4970^o	6.5	0.0354	6.5	5035.235^b	2704.2
5035.267	3.4655^o	4.5	1.0040	4.5	5035.235^b	2747.8
5038.948	3.6869^o	5.5	1.2271	4.5	5038.957	312.9
5041.052	3.6859^o	3.5	1.2271	4.5	5041.013	455.3
5045.025	3.7532^o	3.5	1.2964	2.5	5044.997	714.7
5047.331	4.0397^o	3.5	1.5840	4.5	5047.356	242.4
5059.624	2.8433^o	3.5	0.3936	2.5	5059.633	1656.3
5062.003	2.9080^o	2.5	0.4595	1.5	5062.004	366.9
5063.142	2.9092^o	7.5	0.4612	6.5	5063.158	1892.5
5064.281	2.5107^o	5.5	0.0632	5.5	5064.278^b	2589.5
5064.303	3.6746^o	5.5	1.2271	4.5	5064.278^b	2587.4
5065.804	3.9195^o	9.5	1.4728	8.5	5065.808	3848.1
5067.620	3.7997^o	2.5	1.3539	1.5	5067.628^b	186.1
5067.625	3.3211^o	6.5	0.8753	6.5	5067.628^b	186.1
5070.452	2.7966^o	3.5	0.3521	4.5	5070.470^b	1214.1
5070.478	3.8405^o	5.5	1.3961	5.5	5070.470^b	1218.3
5071.533	3.1077^o	4.5	0.6637	5.5	5071.539	263.2
5074.462	2.7290^o	4.5	0.2864	5.5	5074.462^b	2297.2
5074.503	3.8061^o	4.5	1.3635	5.5	5074.462^b	2307.7
5075.428	3.1147^o	6.5	0.6726	7.5	5075.428^b	100.6
5075.444	3.8056^o	5.5	1.3635	5.5	5075.428^b	100.6
5076.213	2.8353^o	1.5	0.3936	2.5	5076.218	833.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5076.857	3.4044^o	8.5	0.9630	7.5	5076.864	491.9
5082.951	3.4085^o	5.5	0.9701	4.5	5082.956^b	463.6
5082.976	2.9121^o	2.5	0.4736	3.5	5082.956^b	456.6
5084.919	3.2650^o	5.5	0.8275	5.5	5084.956	414.3
5092.773	2.4970^o	6.5	0.0632	5.5	5092.778^b	1850.4
5092.819	3.2382^o	4.5	0.8044	3.5	5092.778^b	1888.6
5093.924	3.6437^o	7.5	1.2104	6.5	5093.937	166.9
5094.939	3.5401^o	5.5	1.1074	5.5	5094.918	86.9
5095.292	3.3551^o	5.5	0.9225	4.5	5095.327	145.2
5106.579	3.3902^o	6.5	0.9630	7.5	5106.599^b	1023.6
5106.593	2.7136^o	4.5	0.2864	5.5	5106.599^b	1013.2
5109.702	3.8218^o	6.5	1.3961	5.5	5109.707	520.6
5113.408	3.8405^o	5.5	1.4166	6.5	5113.410	73.7
5115.041	2.7096^o	6.5	0.2864	5.5	5115.048	2224.9
5115.815	2.9989^o	8.5	0.5761	8.5	5115.824	1315.4
5116.216	3.9694^o	7.5	1.5468	6.5	5116.227^b	784.7
5116.229	4.0488^o	5.5	1.6262	6.5	5116.227^b	780.3
5118.394	2.8152^o	2.5	0.3936	2.5	5118.387	3121.4
5119.304	2.8823^o	6.5	0.4612	6.5	5119.304	2029.6
5120.156	2.4840^o	4.5	0.0632	5.5	5120.155	15892.4
5120.996	3.8370^o	6.5	1.4166	6.5	5121.018	947.6
5123.301	3.0919^o	7.5	0.6726	7.5	5123.314	2269.5
5124.547	3.4341^o	6.5	1.0155	7.5	5124.558	950.2
5126.966	3.2840^o	6.5	0.8665	5.5	5126.928	255.9
5127.899	2.4525^o	5.5	0.0354	6.5	5127.896	501.0
5128.311	2.8781^o	7.5	0.4612	6.5	5128.319	1599.3
5129.373	3.0801^o	4.5	0.6637	5.5	5129.339	173.9
5129.983	2.7682^o	4.5	0.3521	4.5	5129.993	369.4
5136.409	3.7095^o	3.5	1.2964	2.5	5136.409	291.0
5138.807	3.1995^o	6.5	0.7875	6.5	5138.816	98.5
5140.298	2.4745^o	5.5	0.0632	5.5	5140.296	9054.1
5141.729	2.8042^o	1.5	0.3936	2.5	5141.739	1633.8
5142.928	2.7622^o	5.5	0.3521	4.5	5142.924^b	1772.9
5142.931	2.9862^o	7.5	0.5761	8.5	5142.924^b	1772.9
5144.013	3.8056^o	5.5	1.3961	5.5	5144.016	174.1
5147.558	3.4233^o	7.5	1.0155	7.5	5147.557	4538.6
5151.565	3.9499^o	4.5	1.5440	5.5	5151.583	128.4
5152.704	3.4774^o	4.5	1.0720	5.5	5152.705	412.4
5153.297	4.1101^o	5.5	1.7049	4.5	5153.310^b	350.7
5153.302	3.8218^o	6.5	1.4166	6.5	5153.310^b	350.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5154.046	3.1276^o	4.5	0.7228	4.5	5154.052	163.8
5155.448	2.5742^o	3.5	0.1700	4.5	5155.448	11998.4
5159.217	3.8382^o	7.5	1.4358	7.5	5159.193^b	509.5
5159.225	3.5363^o	4.5	1.1338	4.5	5159.193^b	482.1
5159.768	3.6986^o	1.5	1.2964	2.5	5159.785	777.5
5160.410	2.4373^o	6.5	0.0354	6.5	5160.410	16616.3
5164.235	3.5339^o	3.5	1.1338	4.5	5164.218	2248.0
5170.097	3.6208^o	2.5	1.2234	3.5	5170.097^b	1195.1
5170.099	2.9795^o	3.5	0.5822	2.5	5170.097^b	1195.1
5170.565	3.8020^o	8.5	1.4048	9.5	5170.606^b	1231.6
5170.608	3.4233^o	7.5	1.0262	6.5	5170.606^b	1320.1
5177.179	2.6941^o	3.5	0.3000	3.5	5177.182	1423.5
5184.561	3.4061^o	7.5	1.0155	7.5	5184.568	2563.9
5187.596	2.4525^o	5.5	0.0632	5.5	5187.594	5438.7
5189.830	3.3602^o	4.5	0.9720	3.5	5189.832	184.1
5191.952	2.5573^o	4.5	0.1700	4.5	5191.960	2238.3
5195.270	2.9619^o	7.5	0.5761	8.5	5195.265	1285.6
5195.505	3.9296^o	5.5	1.5440	5.5	5195.531^b	665.4
5195.542	3.9045^o	3.5	1.5189	3.5	5195.531^b	714.7
5196.246	2.8465^o	5.5	0.4612	6.5	5196.261	4879.3
5198.558	2.8824^o	0.5	0.4982	0.5	5198.547	1044.2
5198.862	3.3996^o	7.5	1.0155	7.5	5198.858	3644.8
5200.975	2.8426^o	2.5	0.4595	1.5	5200.974	313.7
5201.434	2.7765^o	2.5	0.3936	2.5	5201.439	681.8
5203.230	3.0547^o	7.5	0.6726	7.5	5203.231	440.5
5207.111	2.8539^o	4.5	0.4736	3.5	5207.119	45.2
5207.879	2.4373^o	6.5	0.0573	7.5	5207.892	3577.1
5211.967	2.4413^o	4.5	0.0632	5.5	5211.974^b	21824.4
5211.987	3.7022^o	5.5	1.3241	4.5	5211.974^b	21828.1
5212.998	3.3857^o	1.5	1.0080	2.5	5212.995	88.8
5214.774	2.7290^o	4.5	0.3521	4.5	5214.773	653.3
5215.217	2.6630^o	5.5	0.2864	5.5	5215.231	2932.9
5216.221	4.0706^o	5.5	1.6944	5.5	5216.255^b	231.2
5216.235	3.7532^o	3.5	1.3771	3.5	5216.255^b	231.2
5216.940	2.8353^o	1.5	0.4595	1.5	5216.947	1798.3
5217.522	3.5094^o	3.5	1.1338	4.5	5217.534	132.6
5219.477	3.3902^o	6.5	1.0155	7.5	5219.491	336.0
5220.372	2.9504^o	8.5	0.5761	8.5	5220.371	1558.9
5221.250	2.7260^o	5.5	0.3521	4.5	5221.246	1195.6
5228.920	2.8316^o	7.5	0.4612	6.5	5228.923	1210.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5229.879	3.8889^o	4.5	1.5189	3.5	5229.918	237.2
5231.573	3.9694^o	7.5	1.6002	6.5	5231.579	254.5
5232.783	3.8847^o	3.5	1.5161	4.5	5232.760	653.1
5233.491	2.5383^o	3.5	0.1700	4.5	5233.495	3501.8
5234.340	2.6679^o	4.5	0.3000	3.5	5234.341	2099.6
5237.482	3.9133^o	7.5	1.5468	6.5	5237.495	241.8
5238.717	3.9694^o	7.5	1.6034	7.5	5238.723	272.0
5239.011	3.8847^o	3.5	1.5189	3.5	5238.984	1340.9
5243.791	2.5337^o	4.5	0.1700	4.5	5243.789	1033.6
5244.726	2.9454^o	1.5	0.5822	2.5	5244.728	248.7
5247.128	3.4341^o	6.5	1.0720	5.5	5247.116	166.3
5248.114	3.6859^o	3.5	1.3241	4.5	5248.103	107.9
5248.712	2.7136^o	4.5	0.3521	4.5	5248.710^b	43634.9
5248.715	2.3969^o	5.5	0.0354	6.5	5248.710^b	43634.9
5248.732	3.6856^o	5.5	1.3241	4.5	5248.710^b	43639.7
5250.250	3.1483^o	6.5	0.7875	6.5	5250.256^b	707.4
5250.284	3.6408^o	3.5	1.2801	3.5	5250.256^b	720.4
5250.799	3.0242^o	5.5	0.6637	5.5	5250.803	160.3
5251.940	2.8212^o	5.5	0.4612	6.5	5251.926	91.5
5252.637	2.7118^o	5.5	0.3521	4.5	5252.634	1450.8
5252.877	3.2349^o	5.5	0.8753	6.5	5252.910	9262.3
5254.406	3.2342^o	6.5	0.8753	6.5	5254.391	364.2
5255.307	2.8321^o	4.5	0.4736	3.5	5255.314	288.0
5256.686	3.3841^o	6.5	1.0262	6.5	5256.683	623.6
5257.919	3.0801^o	4.5	0.7228	4.5	5257.922	255.8
5259.148	2.7504^o	2.5	0.3936	2.5	5259.152	1555.6
5259.430	2.8178^o	6.5	0.4612	6.5	5259.433	77.3
5260.982	2.6559^o	3.5	0.3000	3.5	5260.985^b	5488.9
5261.014	2.5259^o	5.5	0.1700	4.5	5260.985^b	5492.4
5264.190	3.4619^o	4.5	1.1074	5.5	5264.233	352.6
5265.989	3.5919^o	5.5	1.2382	4.5	5265.998^b	3033.3
5265.995	2.3891^o	6.5	0.0354	6.5	5265.998^b	3033.3
5269.501	3.3857^o	1.5	1.0335	1.5	5269.528	1975.7
5271.009	3.4061^o	7.5	1.0547	8.5	5271.025	551.5
5271.781	3.3551^o	5.5	1.0040	4.5	5271.796^b	156.8
5271.792	3.3666^o	7.5	1.0155	7.5	5271.796^b	156.8
5275.009	3.4044^o	8.5	1.0547	8.5	5275.009	874.2
5276.181	3.8931^o	5.5	1.5440	5.5	5276.187	150.8
5276.821	3.1533^o	3.5	0.8044	3.5	5276.859^b	331.4
5276.849	3.0717^o	4.5	0.7228	4.5	5276.859^b	325.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5278.193	2.4115^o	4.5	0.0632	5.5	5278.192	8994.3
5280.436	2.6994^o	3.5	0.3521	4.5	5280.441^b	350.2
5280.478	3.5854^o	5.5	1.2382	4.5	5280.441^b	354.9
5284.255	3.9296^o	5.5	1.5840	4.5	5284.275	56.0
5285.777	3.8889^o	4.5	1.5440	5.5	5285.787^b	742.7
5285.791	3.3996^o	7.5	1.0547	8.5	5285.787^b	753.4
5285.802	3.9106^o	6.5	1.5657	7.5	5285.787^b	753.4
5286.230	3.6986^o	1.5	1.3539	1.5	5286.229	487.7
5286.578	3.1720^o	4.5	0.8275	5.5	5286.586	227.9
5287.340	2.6306^o	6.5	0.2864	5.5	5287.348	631.6
5288.733	3.4774^o	4.5	1.1338	4.5	5288.736	294.7
5291.706	3.5657^o	3.5	1.2234	3.5	5291.708	248.0
5292.336	3.0057^o	6.5	0.6637	5.5	5292.345	715.2
5295.271	3.6208^o	2.5	1.2801	3.5	5295.310^b	2691.3
5295.295	2.5107^o	5.5	0.1700	4.5	5295.310^b	2718.9
5299.872	2.6386^o	2.5	0.3000	3.5	5299.876	466.3
5300.145	3.5657^o	3.5	1.2271	4.5	5300.155	1272.7
5303.395	2.8353^o	1.5	0.4982	0.5	5303.403	746.3
5305.472	2.8098^o	4.5	0.4736	3.5	5305.507	414.6
5309.468	3.0572^o	5.5	0.7228	4.5	5309.450	719.5
5311.275	2.3969^o	5.5	0.0632	5.5	5311.264	1737.4
5312.498	3.0057^o	6.5	0.6726	7.5	5312.504	364.8
5315.567	2.3950^o	5.5	0.0632	5.5	5315.566	2313.0
5316.412	2.7926^o	5.5	0.4612	6.5	5316.418^b	838.9
5316.451	3.4033^o	4.5	1.0720	5.5	5316.418^b	841.2
5317.712	3.9148^o	4.5	1.5840	4.5	5317.727	261.0
5319.827	2.9121^o	2.5	0.5822	2.5	5319.832	1120.4
5321.406	3.8020^o	8.5	1.4728	8.5	5321.378	87.0
5325.240	2.7887^o	6.5	0.4612	6.5	5325.267^b	141.2
5325.272	3.5657^o	3.5	1.2382	4.5	5325.267^b	138.5
5326.001	3.1147^o	6.5	0.7875	6.5	5326.004	514.3
5328.008	3.4415^o	2.5	1.1152	3.5	5328.050	1798.8
5329.468	3.2010^o	5.5	0.8753	6.5	5329.476	76.3
5330.011	3.3974^o	5.5	1.0720	5.5	5330.017^b	182.1
5330.025	3.2955^o	4.5	0.9701	4.5	5330.017^b	184.2
5332.951	3.8709^o	5.5	1.5468	6.5	5332.993	291.8
5335.569	2.7966^o	3.5	0.4736	3.5	5335.568	1486.1
5336.788	3.4299^o	6.5	1.1074	5.5	5336.790	55.4
5337.760	3.6856^o	5.5	1.3635	5.5	5337.737	149.4
5338.860	3.5320^o	7.5	1.2104	6.5	5338.872	123.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5344.715	3.6826^o	6.5	1.3635	5.5	5344.735^b	357.4
5344.733	2.7126^o	2.5	0.3936	2.5	5344.735^b	357.4
5346.698	3.3902^o	6.5	1.0720	5.5	5346.717	327.2
5351.894	2.6023^o	6.5	0.2864	5.5	5351.905	1922.6
5352.232	2.6679^o	4.5	0.3521	4.5	5352.241	934.1
5357.143	2.4837^o	3.5	0.1700	4.5	5357.146	5841.9
5357.417	2.9862^o	7.5	0.6726	7.5	5357.416	1042.7
5361.437	3.1162^o	3.5	0.8044	3.5	5361.439	550.5
5361.815	2.3749^o	4.5	0.0632	5.5	5361.815	1936.0
5362.622	3.7279^o	7.5	1.4166	6.5	5362.630	259.3
5363.534	2.6630^o	5.5	0.3521	4.5	5363.541	6728.9
5364.426	3.5339^o	3.5	1.2234	3.5	5364.438	661.8
5367.733	3.8931^o	5.5	1.5840	4.5	5367.737	138.8
5378.463	2.4745^o	5.5	0.1700	4.5	5378.468	1224.0
5380.091	2.6559^o	3.5	0.3521	4.5	5380.096	1256.7
5381.009	3.9296^o	5.5	1.6262	6.5	5381.019^b	489.0
5381.020	2.9760^o	6.5	0.6726	7.5	5381.019^b	489.0
5383.447	2.4723^o	3.5	0.1700	4.5	5383.450^b	2813.0
5383.449	3.2724^o	3.5	0.9701	4.5	5383.450^b	2813.0
5384.391	2.8781^o	7.5	0.5761	8.5	5384.387	412.1
5385.136	3.6258^o	5.5	1.3241	4.5	5385.115	87.6
5386.790	2.7604^o	0.5	0.4595	1.5	5386.778	1029.5
5387.204	2.6943^o	1.5	0.3936	2.5	5387.192	2623.3
5387.866	2.6941^o	3.5	0.3936	2.5	5387.872	1814.2
5389.051	3.2629^o	6.5	0.9630	7.5	5389.059	92.2
5395.123	2.4674^o	3.5	0.1700	4.5	5395.133	1898.5
5396.208	3.1013^o	4.5	0.8044	3.5	5396.217	120.2
5396.855	3.5238^o	3.5	1.2271	4.5	5396.892	173.2
5397.129	3.5237^o	4.5	1.2271	4.5	5397.127	184.8
5398.207	2.3315^o	6.5	0.0354	6.5	5398.207	5078.3
5404.078	3.8937^o	7.5	1.6002	6.5	5404.107	222.0
5407.963	3.8597^o	2.5	1.5678	3.5	5407.998^b	303.0
5408.007	2.5783^o	5.5	0.2864	5.5	5407.998^b	258.9
5410.571	3.6869^o	5.5	1.3961	5.5	5410.584^b	354.7
5410.583	3.2609^o	4.5	0.9701	4.5	5410.584^b	354.7
5411.848	2.7497^o	1.5	0.4595	1.5	5411.846	764.1
5413.721	3.6856^o	4.5	1.3961	5.5	5413.701	557.3
5414.237	2.9619^o	7.5	0.6726	7.5	5414.249	1076.4
5415.495	3.5159^o	3.5	1.2271	4.5	5415.500	225.5
5419.852	3.8709^o	5.5	1.5840	4.5	5419.862	198.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5420.807	3.6826^o	6.5	1.3961	5.5	5420.821	215.2
5421.407	3.8330^o	5.5	1.5468	6.5	5421.420^b	284.0
5421.413	3.1295^o	3.5	0.8432	2.5	5421.420^b	284.0
5421.907	3.9322^o	4.5	1.6461	3.5	5421.890	206.2
5428.148	3.0709^o	6.5	0.7875	6.5	5428.188	530.0
5429.713	3.9877^o	4.5	1.7049	4.5	5429.696^b	373.6
5429.725	3.3902^o	6.5	1.1074	5.5	5429.696^b	373.6
5432.130	2.5817^o	2.5	0.3000	3.5	5432.124	446.9
5438.176	2.6313^o	3.5	0.3521	4.5	5438.178	8971.1
5441.426	3.8218^o	6.5	1.5440	5.5	5441.437^b	1161.0
5441.427	2.3410^o	5.5	0.0632	5.5	5441.437^b	1155.2
5443.735	2.7380^o	7.5	0.4612	6.5	5443.739	1193.6
5445.430	3.6532^o	4.5	1.3771	3.5	5445.400	157.8
5446.005	2.6280^o	5.5	0.3521	4.5	5446.004	1324.5
5447.267	3.6715^o	5.5	1.3961	5.5	5447.303^b	143.8
5447.308	3.4988^o	3.5	1.2234	3.5	5447.303^b	154.9
5450.121	2.5742^o	3.5	0.3000	3.5	5450.117	5498.2
5450.432	3.9762^o	2.5	1.7022	3.5	5450.433	63.5
5450.734	2.3372^o	4.5	0.0632	5.5	5450.734	2055.3
5452.076	3.8173^o	4.5	1.5440	5.5	5452.082^b	31.4
5452.106	2.9371^o	6.5	0.6637	5.5	5452.082^b	25.2
5452.918	3.4835^o	6.5	1.2104	6.5	5452.951^b	224.3
5452.945	3.1162^o	3.5	0.8432	2.5	5452.951^b	224.1
5453.752	3.2356^o	7.5	0.9630	7.5	5453.751	196.6
5454.120	3.8931^o	5.5	1.6206	5.5	5454.146	97.1
5455.910	2.4418^o	3.5	0.1700	4.5	5455.920	1407.0
5456.964	3.2343^o	8.5	0.9630	7.5	5456.988^b	19305.6
5456.976	2.4413^o	4.5	0.1700	4.5	5456.988^b	19305.6
5460.829	3.0572^o	5.5	0.7875	6.5	5460.839	100.0
5461.384	3.4033^o	4.5	1.1338	4.5	5461.342	60.8
5463.282	3.9148^o	4.5	1.6461	3.5	5463.295	45.4
5465.824	2.6198^o	4.5	0.3521	4.5	5465.824	2393.6
5466.446	3.3748^o	5.5	1.1074	5.5	5466.444	99.6
5466.909	3.0547^o	7.5	0.7875	6.5	5466.911	404.8
5469.224	3.7020^o	7.5	1.4358	7.5	5469.260	250.6
5469.903	3.6826^o	6.5	1.4166	6.5	5469.911	119.4
5471.038	2.9454^o	1.5	0.6799	1.5	5471.042	138.4
5472.642	2.7260^o	5.5	0.4612	6.5	5472.630^b	4170.6
5472.652	3.2349^o	5.5	0.9701	4.5	5472.630^b	4112.8
5473.506	2.9371^o	6.5	0.6726	7.5	5473.497	133.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5479.017	2.7604^o	0.5	0.4982	0.5	5478.975	881.7
5482.884	3.4988^o	3.5	1.2382	4.5	5482.896	49.1
5483.301	2.8426^o	2.5	0.5822	2.5	5483.304	138.7
5486.110	3.1258^o	5.5	0.8665	5.5	5486.069	108.1
5488.254	3.9045^o	3.5	1.6461	3.5	5488.293^b	212.0
5488.305	3.9195^o	9.5	1.6611	9.5	5488.294^b	182.8
5489.257	3.6746^o	5.5	1.4166	6.5	5489.296	144.3
5489.643	3.2840^o	6.5	1.0262	6.5	5489.638	171.1
5490.934	2.5573^o	4.5	0.3000	3.5	5490.936	917.7
5492.898	3.9026^o	4.5	1.6461	3.5	5492.857	520.1
5495.615	2.7290^o	4.5	0.4736	3.5	5495.616	2277.9
5496.842	2.5548^o	2.5	0.3000	3.5	5496.845^b	1096.4
5496.845	3.6715^o	5.5	1.4166	6.5	5496.845^b	1096.4
5497.667	3.0305^o	1.5	0.7760	0.5	5497.676	284.9
5498.369	3.7703^o	3.5	1.5161	4.5	5498.358	164.7
5501.048	2.8353^o	1.5	0.5822	2.5	5501.011	809.2
5502.385	3.3864^o	4.5	1.1338	4.5	5502.428	61.4
5504.706	3.0277^o	1.5	0.7760	0.5	5504.724	369.0
5507.133	2.7118^o	5.5	0.4612	6.5	5507.137	3031.1
5512.468	2.3117^o	4.5	0.0632	5.5	5512.471	9793.3
5514.938	3.2629^o	6.5	1.0155	7.5	5514.974^b	150.4
5514.979	2.9702^o	4.5	0.7228	4.5	5514.974^b	157.0
5519.104	3.3796^o	3.5	1.1338	4.5	5519.099	357.9
5522.263	3.6216^o	4.5	1.3771	3.5	5522.305	70.4
5522.832	2.3075^o	4.5	0.0632	5.5	5522.837^b	514.2
5522.842	3.5684^o	4.5	1.3241	4.5	5522.837^b	514.3
5522.864	3.7910^o	7.5	1.5468	6.5	5522.837^b	515.3
5532.681	3.0447^o	4.5	0.8044	3.5	5532.714	238.6
5533.321	2.7136^o	4.5	0.4736	3.5	5533.327	496.8
5534.516	2.5259^o	5.5	0.2864	5.5	5534.520	939.2
5534.813	3.1147^o	6.5	0.8753	6.5	5534.813	241.4
5535.705	2.7126^o	2.5	0.4736	3.5	5535.713	179.7
5537.416	2.5383^o	3.5	0.3000	3.5	5537.418	63.7
5538.933	2.6313^o	3.5	0.3936	2.5	5538.936	3071.5
5541.360	2.9005^o	5.5	0.6637	5.5	5541.379^b	285.4
5541.379	3.0242^o	5.5	0.7875	6.5	5541.379^b	285.4
5541.403	3.2629^o	6.5	1.0262	6.5	5541.379^b	300.8
5541.784	2.9092^o	7.5	0.6726	7.5	5541.790	574.4
5543.729	3.5159^o	3.5	1.2801	3.5	5543.746	62.3
5545.971	2.6943^o	1.5	0.4595	1.5	5545.969	634.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5548.948	2.5337[o]	4.5	0.3000	3.5	5548.942[b]	3470.3
5548.970	3.1090[o]	7.5	0.8753	6.5	5548.942[b]	3470.3
5552.810	2.9121[o]	2.5	0.6799	1.5	5552.789	314.7
5555.272	2.5176[o]	6.5	0.2864	5.5	5555.276	522.2
5556.223	3.2388[o]	3.5	1.0080	2.5	5556.241[b]	981.9
5556.226	3.0352[o]	4.5	0.8044	3.5	5556.241[b]	993.7
5556.242	3.1533[o]	3.5	0.9225	4.5	5556.241[b]	993.7
5557.918	2.2933[o]	4.5	0.0632	5.5	5557.908	1083.7
5565.503	3.6437[o]	7.5	1.4166	6.5	5565.521[b]	264.5
5565.520	3.0545[o]	6.5	0.8275	5.5	5565.521[b]	264.5
5567.660	2.5783[o]	5.5	0.3521	4.5	5567.662	327.1
5568.856	2.2889[o]	5.5	0.0632	5.5	5568.847[b]	2028.6
5568.882	3.7697[o]	6.5	1.5440	5.5	5568.847[b]	1973.1
5571.620	3.1966[o]	2.5	0.9720	3.5	5571.628	137.0
5572.467	2.5107[o]	5.5	0.2864	5.5	5572.468	3544.4
5573.853	3.4341[o]	6.5	1.2104	6.5	5573.859	63.1
5578.052	2.5742[o]	3.5	0.3521	4.5	5578.049[b]	537.0
5578.058	3.8061[o]	4.5	1.5840	4.5	5578.049[b]	537.0
5578.072	2.8042[o]	1.5	0.5822	2.5	5578.049[b]	537.0
5581.988	2.6941[o]	3.5	0.4736	3.5	5581.969	281.7
5582.305	3.2243[o]	4.5	1.0040	4.5	5582.324	73.3
5582.559	3.1428[o]	4.5	0.9225	4.5	5582.582	187.2
5585.828	2.2543[o]	5.5	0.0354	6.5	5585.836	268.8
5586.082	3.2343[o]	8.5	1.0155	7.5	5586.059	130.9
5587.660	3.0057[o]	6.5	0.7875	6.5	5587.665	231.6
5592.546	2.2163	6.5	0.0000[o]	7.5	5592.540	2310.3
5592.953	3.3500[o]	5.5	1.1338	4.5	5592.921	138.9
5597.150	2.7966[o]	3.5	0.5822	2.5	5597.140	1443.8
5597.722	2.6878[o]	2.5	0.4736	3.5	5597.723	915.4
5599.891	3.2288[o]	6.5	1.0155	7.5	5599.880	110.4
5600.567	2.2485[o]	6.5	0.0354	6.5	5600.558	114.6
5602.613	2.5644[o]	3.5	0.3521	4.5	5602.618[c]	1610.0
5603.232	3.2840[o]	6.5	1.0720	5.5	5603.192	147.5
5609.136	2.8823[o]	6.5	0.6726	7.5	5609.132	71.4
5613.435	3.5851[o]	4.5	1.3771	3.5	5613.418	1086.2
5614.225	3.0352[o]	4.5	0.8275	5.5	5614.229	217.3
5617.959	3.2782[o]	4.5	1.0720	5.5	5617.955	116.9
5619.446	2.6651[o]	2.5	0.4595	1.5	5619.452	150.7
5619.951	2.8781[o]	7.5	0.6726	7.5	5619.952	549.9
5620.947	3.1276[o]	4.5	0.9225	4.5	5620.948	236.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5621.467	2.3749[o]	4.5	0.1700	4.5	5621.473[b]	2364.0
5621.500	3.5684[o]	4.5	1.3635	5.5	5621.473[b]	2360.0
5621.863	3.0091[o]	2.5	0.8044	3.5	5621.857	105.4
5625.709	3.6856[o]	4.5	1.4823	4.5	5625.726[b]	38.3
5625.717	3.1258[o]	5.5	0.9225	4.5	5625.726[b]	38.3
5625.761	3.7872[o]	4.5	1.5840	4.5	5625.726[b]	37.8
5627.446	3.7703[o]	3.5	1.5678	3.5	5627.481	171.1
5629.162	2.6630[o]	5.5	0.4612	6.5	5629.173	174.3
5632.227	2.8644[o]	5.5	0.6637	5.5	5632.238	521.5
5636.444	2.9865[o]	6.5	0.7875	6.5	5636.442	1082.8
5639.283	3.4415[o]	2.5	1.2436	2.5	5639.242	339.5
5645.209	3.0709[o]	6.5	0.8753	6.5	5645.209[b]	159.8
5645.251	3.8218[o]	6.5	1.6262	6.5	5645.209[b]	134.0
5647.537	3.0439[o]	1.5	0.8492	1.5	5647.533	114.1
5650.729	3.8396[o]	2.5	1.6461	3.5	5650.732[b]	161.2
5650.761	3.7095[o]	3.5	1.5161	4.5	5650.732[b]	162.7
5655.697	2.6651[o]	2.5	0.4736	3.5	5655.707	496.5
5657.714	3.0572[o]	5.5	0.8665	5.5	5657.721[b]	623.9
5657.759	3.1627[o]	4.5	0.9720	3.5	5657.721[b]	635.9
5659.100	3.5441[o]	2.5	1.3539	1.5	5659.140[b]	239.0
5659.136	2.8539[o]	4.5	0.6637	5.5	5659.140[b]	237.6
5661.942	3.6715[o]	5.5	1.4823	4.5	5661.933	107.5
5662.862	2.3587[o]	3.5	0.1700	4.5	5662.851	258.6
5663.416	3.1966[o]	2.5	1.0080	2.5	5663.414	133.2
5665.884	3.7910[o]	7.5	1.6034	7.5	5665.897[c]	87.1
5666.597	3.0305[o]	1.5	0.8432	2.5	5666.601	124.1
5672.780	2.4849[o]	2.5	0.3000	3.5	5672.772	487.0
5676.036	2.4837[o]	3.5	0.3000	3.5	5676.037	4362.9
5679.013	2.9870[o]	4.5	0.8044	3.5	5679.026	196.8
5679.532	2.6559[o]	3.5	0.4736	3.5	5679.531	41.7
5681.543	2.9044[o]	5.5	0.7228	4.5	5681.566	252.4
5682.192	3.1533[o]	3.5	0.9720	3.5	5682.206[b]	1427.6
5682.227	3.0305[o]	1.5	0.8492	1.5	5682.206[b]	1432.2
5684.109	2.5742[o]	3.5	0.3936	2.5	5684.107	289.0
5687.144	3.0547[o]	7.5	0.8753	6.5	5687.151[b]	1000.3
5687.160	3.8056[o]	5.5	1.6262	6.5	5687.151[b]	989.3
5690.198	3.0057[o]	6.5	0.8275	5.5	5690.204	109.7
5694.439	3.5401[o]	5.5	1.3635	5.5	5694.468[b]	158.9
5694.485	3.2840[o]	6.5	1.1074	5.5	5694.468[b]	147.0
5695.520	3.4033[o]	4.5	1.2271	4.5	5695.515	57.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5697.682	3.1834^o	2.5	1.0080	2.5	5697.685	482.3
5701.841	2.5259^o	5.5	0.3521	4.5	5701.848^b	2157.5
5701.861	3.5277^o	0.5	1.3539	1.5	5701.848^b	2264.9
5705.574	2.4723^o	3.5	0.3000	3.5	5705.568^b	52.7
5705.593	3.1804^o	3.5	1.0080	2.5	5705.568^b	50.9
5709.039	2.3410^o	5.5	0.1700	4.5	5709.029^b	3177.0
5709.076	3.2430^o	6.5	1.0720	5.5	5709.029^b	3161.9
5709.616	2.5644^o	3.5	0.3936	2.5	5709.626^b	581.3
5709.657	3.6869^o	5.5	1.5161	4.5	5709.626^b	575.9
5711.085	3.3974^o	5.5	1.2271	4.5	5711.075	465.5
5712.006	3.0364^o	5.5	0.8665	5.5	5712.016	141.3
5714.075	2.9566^o	6.5	0.7875	6.5	5714.080	185.6
5716.108	2.8321^o	4.5	0.6637	5.5	5716.117	283.5
5716.761	3.3915^o	2.5	1.2234	3.5	5716.773	111.2
5718.205	2.7497^o	1.5	0.5822	2.5	5718.204	145.7
5724.883	2.6386^o	2.5	0.4736	3.5	5724.898	747.7
5727.396	2.1995^o	5.5	0.0354	6.5	5727.394	1098.2
5727.799	3.2714^o	6.5	1.1074	5.5	5727.811	75.4
5730.163	3.2782^o	4.5	1.1152	3.5	5730.194^b	35.3
5730.166	3.1966^o	2.5	1.0335	1.5	5730.194^b	35.3
5731.111	3.1257^o	6.5	0.9630	7.5	5731.158^b	70.3
5731.155	2.8426^o	2.5	0.6799	1.5	5731.158^b	74.5
5734.948	2.5548^o	2.5	0.3936	2.5	5734.950	123.9
5738.501	3.0091^o	2.5	0.8492	1.5	5738.517	38.0
5741.003	2.8316^o	7.5	0.6726	7.5	5740.991	154.4
5744.301	2.6313^o	3.5	0.4736	3.5	5744.301	1331.6
5749.882	3.1276^o	4.5	0.9720	3.5	5749.883	105.7
5750.282	3.7022^o	5.5	1.5468	6.5	5750.327	285.0
5750.824	3.7020^o	7.5	1.5468	6.5	5750.840	58.8
5751.804	2.4413^o	4.5	0.2864	5.5	5751.816	1521.5
5752.747	3.0771^o	5.5	0.9225	4.5	5752.780	153.9
5753.962	2.8178^o	6.5	0.6637	5.5	5753.996^b	32.2
5753.979	3.0206^o	4.5	0.8665	5.5	5753.996^b	32.2
5754.022	3.5176^o	6.5	1.3635	5.5	5753.996^b	36.0
5758.324	3.3796^o	3.5	1.2271	4.5	5758.338	168.4
5758.625	3.2243^o	4.5	1.0720	5.5	5758.626	50.0
5762.649	2.4373^o	6.5	0.2864	5.5	5762.651	9733.8
5765.247	3.1834^o	2.5	1.0335	1.5	5765.284^b	73.6
5765.297	2.4498^o	2.5	0.3000	3.5	5765.284^b	76.0
5773.798	3.5238^o	3.5	1.3771	3.5	5773.784	83.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5775.159	2.6198^o	4.5	0.4736	3.5	5775.166^b	2085.5
5775.199	3.1162^o	3.5	0.9701	4.5	5775.166^b	2088.6
5777.699	3.1533^o	3.5	1.0080	2.5	5777.732	136.7
5779.092	2.6042^o	2.5	0.4595	1.5	5779.124^b	179.0
5779.127	2.5383^o	3.5	0.3936	2.5	5779.124^b	180.0
5780.428	3.1162^o	3.5	0.9720	3.5	5780.413	154.4
5788.233	2.4413^o	4.5	0.3000	3.5	5788.239	2949.3
5788.944	3.7872^o	4.5	1.6461	3.5	5788.952	845.2
5792.690	3.5358^o	6.5	1.3961	5.5	5792.663	116.9
5793.969	3.0057^o	6.5	0.8665	5.5	5793.971	177.5
5798.713	2.3075^o	4.5	0.1700	4.5	5798.716	1735.0
5806.309	3.0572^o	5.5	0.9225	4.5	5806.315	174.2
5810.288	3.1052^o	3.5	0.9720	3.5	5810.336	361.6
5814.069	2.4840^o	4.5	0.3521	4.5	5814.067	1536.6
5814.928	2.4837^o	3.5	0.3521	4.5	5814.927	313.6
5817.796	2.7126^o	2.5	0.5822	2.5	5817.800	359.4
5821.350	2.9566^o	6.5	0.8275	5.5	5821.349	442.8
5824.109	2.7043^o	7.5	0.5761	8.5	5824.105	540.2
5826.003	3.2349^o	5.5	1.1074	5.5	5826.006	78.9
5826.716	3.3506^o	2.5	1.2234	3.5	5826.692	427.5
5827.395	2.1624^o	6.5	0.0354	6.5	5827.404^b	2826.6
5827.426	3.3504^o	4.5	1.2234	3.5	5827.404^b	2868.7
5829.718	2.4698	7.5	0.3436^o	6.5	5829.720	3576.0
5831.476	3.1295^o	3.5	1.0040	4.5	5831.458	84.6
5832.566	2.4115^o	4.5	0.2864	5.5	5832.577	1147.5
5834.769	2.8042^o	1.5	0.6799	1.5	5834.768	52.8
5837.404	2.2933^o	4.5	0.1700	4.5	5837.400	1107.9
5838.759	3.3500^o	5.5	1.2271	4.5	5838.807	114.8
5840.055	2.4745^o	5.5	0.3521	4.5	5840.057	1868.7
5841.881	2.9092^o	7.5	0.7875	6.5	5841.886	134.8
5845.933	2.4723^o	3.5	0.3521	4.5	5845.932	359.2
5846.438	2.9865^o	6.5	0.8665	5.5	5846.424	385.6
5849.471	2.2889^o	5.5	0.1700	4.5	5849.472	4107.8
5857.434	3.4796^o	5.5	1.3635	5.5	5857.446	528.9
5858.159	2.1512^o	5.5	0.0354	6.5	5858.165	68.2
5863.108	2.9415^o	4.5	0.8275	5.5	5863.133	182.4
5865.321	3.4671^o	1.5	1.3539	1.5	5865.322	23.8
5867.974	3.1162^o	3.5	1.0040	4.5	5867.986	47.0
5868.938	2.6941^o	3.5	0.5822	2.5	5868.972	259.1
5870.029	2.4115^o	4.5	0.3000	3.5	5870.029	696.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5871.853	2.9862^o	7.5	0.8753	6.5	5871.857	336.3
5876.202	2.8321^o	4.5	0.7228	4.5	5876.201	81.0
5879.461	3.0801^o	4.5	0.9720	3.5	5879.498^b	661.4
5879.513	2.5817^o	2.5	0.4736	3.5	5879.498^b	666.0
5884.229	2.8824^o	0.5	0.7760	0.5	5884.238	177.1
5886.334	2.6878^o	2.5	0.5822	2.5	5886.331	67.4
5886.859	3.6216^o	4.5	1.5161	4.5	5886.893^b	119.1
5886.887	2.5649^o	1.5	0.4595	1.5	5886.894^b	127.9
5887.326	2.5665^o	7.5	0.4612	6.5	5887.324	2172.9
5888.000	2.1624^o	6.5	0.0573	7.5	5888.010	1599.6
5894.631	2.3891^o	6.5	0.2864	5.5	5894.635^b	234.3
5894.655	3.7638^o	9.5	1.6611	9.5	5894.635^b	234.3
5900.594	2.5742^o	3.5	0.4736	3.5	5900.594	1136.7
5901.148	3.8382^o	7.5	1.7378	8.5	5901.187^b	1214.5
5901.183	2.4525^o	5.5	0.3521	4.5	5901.187^b	1214.9
5901.197	3.4774^o	4.5	1.3771	3.5	5901.187^b	1214.9
5906.737	2.8212^o	5.5	0.7228	4.5	5906.729	87.9
5910.960	3.6437^o	7.5	1.5468	6.5	5910.969	114.5
5911.774	2.7765^o	2.5	0.6799	1.5	5911.783^b	207.1
5911.812	3.3237^o	5.5	1.2271	4.5	5911.783^b	209.4
5912.984	2.9454^o	1.5	0.8492	1.5	5913.013^b	1573.5
5913.014	2.1594^o	4.5	0.0632	5.5	5913.013^b	1570.9
5915.216	2.5548^o	2.5	0.4595	1.5	5915.245	183.9
5920.497	3.1090^o	7.5	1.0155	7.5	5920.480	501.3
5925.505	3.0547^o	7.5	0.9630	7.5	5925.510	533.7
5926.318	2.7552^o	6.5	0.6637	5.5	5926.360	422.4
5928.085	2.5644^o	3.5	0.4736	3.5	5928.097	787.1
5930.278	2.4837^o	3.5	0.3936	2.5	5930.276	50.1
5932.433	3.4134^o	3.5	1.3241	4.5	5932.471	200.7
5932.740	2.4413^o	4.5	0.3521	4.5	5932.750	3320.0
5933.373	2.7527^o	4.5	0.6637	5.5	5933.378	1125.5
5934.846	2.3749^o	4.5	0.2864	5.5	5934.855	493.4
5938.989	2.1224^o	5.5	0.0354	6.5	5938.994^b	499.2
5938.992	2.8098^o	4.5	0.7228	4.5	5938.994^b	499.2
5943.091	3.3237^o	5.5	1.2382	4.5	5943.052	127.6
5946.508	2.2543^o	5.5	0.1700	4.5	5946.513	4673.6
5948.463	2.5573^o	4.5	0.4736	3.5	5948.472	942.1
5950.460	3.6670^o	3.5	1.5840	4.5	5950.481^b	386.5
5950.475	2.6651^o	2.5	0.5822	2.5	5950.481^b	392.4
5968.594	2.2466^o	3.5	0.1700	4.5	5968.605	415.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5969.583	3.1483^o	6.5	1.0720	5.5	5969.560	26.0
5970.055	3.0801^o	4.5	1.0040	4.5	5970.075	20.8
5973.342	2.9415^o	4.5	0.8665	5.5	5973.362	58.8
5985.369	3.1428^o	4.5	1.0720	5.5	5985.382	110.8
5994.403	3.6334^o	8.5	1.5657	7.5	5994.443^b	476.5
5994.428	2.6438^o	8.5	0.5761	8.5	5994.443^b	418.3
5994.473	3.0717^o	4.5	1.0040	4.5	5994.442^b	408.5
5997.207	2.5649^o	1.5	0.4982	0.5	5997.190	101.9
6001.524	3.1804^o	3.5	1.1152	3.5	6001.549^b	273.8
6001.549	2.7290^o	4.5	0.6637	5.5	6001.549^b	273.7
6001.848	3.0352^o	4.5	0.9701	4.5	6001.851	88.8
6003.052	2.5383^o	3.5	0.4736	3.5	6003.048	400.2
6003.375	2.1278^o	4.5	0.0632	5.5	6003.380^b	168.6
6003.405	3.1720^o	4.5	1.1074	5.5	6003.380^b	170.0
6007.496	3.0352^o	4.5	0.9720	3.5	6007.491	45.2
6014.772	3.6869^o	5.5	1.6262	6.5	6014.817	22.1
6016.608	2.5337^o	4.5	0.4736	3.5	6016.608	965.2
6018.676	3.6628^o	6.5	1.6034	7.5	6018.705^b	1188.6
6018.701	2.4115^o	4.5	0.3521	4.5	6018.705^b	1186.2
6019.210	2.1224^o	5.5	0.0632	5.5	6019.209	8896.3
6020.390	2.9080^o	2.5	0.8492	1.5	6020.395^b	1263.9
6020.405	2.3587^o	3.5	0.3000	3.5	6020.395^b	1271.4
6026.008	2.1142^o	6.5	0.0573	7.5	6025.984	385.4
6027.110	2.6386^o	2.5	0.5822	2.5	6027.114	79.1
6027.401	2.5176^o	6.5	0.4612	6.5	6027.403^b	254.5
6027.425	3.6826^o	6.5	1.6262	6.5	6027.403^b	254.6
6032.539	2.3410^o	5.5	0.2864	5.5	6032.522	537.0
6035.008	3.1258^o	5.5	1.0720	5.5	6035.005	58.1
6037.466	3.0159^o	7.5	0.9630	7.5	6037.465	138.8
6041.408	3.0778^o	6.5	1.0262	6.5	6041.408	56.9
6043.979	2.3372^o	4.5	0.2864	5.5	6043.988	45.5
6047.522	2.9160^o	4.5	0.8665	5.5	6047.564	83.9
6051.547	2.4418^o	3.5	0.3936	2.5	6051.552	220.2
6059.619	2.7682^o	4.5	0.7228	4.5	6059.631	636.6
6060.416	2.3452^o	2.5	0.3000	3.5	6060.420^b	108.7
6060.434	3.5919^o	5.5	1.5468	6.5	6060.420^b	108.7
6060.791	2.3315^o	6.5	0.2864	5.5	6060.796	67.8
6062.408	3.2549^o	6.5	1.2104	6.5	6062.366	251.7
6065.107	3.0517^o	2.5	1.0080	2.5	6065.124	153.9
6069.906	2.3941^o	3.5	0.3521	4.5	6069.909	435.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6078.647	3.0545^o	6.5	1.0155	7.5	6078.652	203.0
6079.156	2.8433^o	3.5	0.8044	3.5	6079.173	49.4
6079.784	3.5854^o	5.5	1.5468	6.5	6079.765	92.1
6082.148	2.9044^o	5.5	0.8665	5.5	6082.167^b	893.7
6082.174	3.2650^o	5.5	1.2271	4.5	6082.167^b	873.4
6082.192	2.6140^o	7.5	0.5761	8.5	6082.167^b	893.3
6083.443	2.0728^o	7.5	0.0354	6.5	6083.444	266.5
6084.302	3.0091^o	2.5	0.9720	3.5	6084.327^b	4907.1
6084.324	2.0371	7.5	0.0000^o	7.5	6084.327^b	4912.0
6084.828	2.7096^o	6.5	0.6726	7.5	6084.832	594.4
6087.857	2.9989^o	8.5	0.9630	7.5	6087.865	227.1
6088.324	2.4970^o	6.5	0.4612	6.5	6088.332	1096.8
6094.528	3.2609^o	4.5	1.2271	4.5	6094.571	2055.5
6100.702	2.7043^o	7.5	0.6726	7.5	6100.702	968.1
6102.111	3.0352^o	4.5	1.0040	4.5	6102.121	173.0
6105.695	3.6334^o	8.5	1.6034	7.5	6105.696	85.0
6106.053	2.7527^o	4.5	0.7228	4.5	6106.038^b	1136.7
6106.053	3.2735^o	1.5	1.2436	2.5	6106.038^b	1136.7
6107.211	2.1995^o	5.5	0.1700	4.5	6107.200	4723.7
6109.075	3.1627^o	4.5	1.1338	4.5	6109.064	37.7
6110.815	3.0545^o	6.5	1.0262	6.5	6110.817	656.6
6111.234	2.8042^o	1.5	0.7760	0.5	6111.229	64.2
6114.945	3.3070^o	4.5	1.2801	3.5	6114.905	27.5
6116.440	2.8539^o	4.5	0.8275	5.5	6116.440	261.7
6116.966	3.4033^o	4.5	1.3771	3.5	6117.015^b	4824.3
6117.022	2.0263	7.5	0.0000^o	7.5	6117.015^b	4860.2
6126.294	2.9862^o	7.5	0.9630	7.5	6126.288	349.9
6127.674	2.3749^o	4.5	0.3521	4.5	6127.676	438.8
6129.784	2.6042^o	2.5	0.5822	2.5	6129.782	362.1
6135.982	2.8075^o	6.5	0.7875	6.5	6135.984	1311.9
6136.845	2.3197^o	2.5	0.3000	3.5	6136.839	79.7
6139.223	2.9415^o	4.5	0.9225	4.5	6139.215	546.8
6149.521	2.0728^o	7.5	0.0573	7.5	6149.526	194.3
6150.327	3.6359^o	5.5	1.6206	5.5	6150.297	1936.3
6152.923	2.6943^o	1.5	0.6799	1.5	6152.911	353.5
6157.509	2.9849^o	3.5	0.9720	3.5	6157.502	378.9
6161.236	2.3117^o	4.5	0.3000	3.5	6161.239	564.4
6162.466	2.4849^o	2.5	0.4736	3.5	6162.473	336.4
6173.395	3.2349^o	5.5	1.2271	4.5	6173.417	89.8
6174.185	2.3075^o	4.5	0.3000	3.5	6174.179	459.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6175.603	2.8823^o	6.5	0.8753	6.5	6175.610	104.0
6176.046	2.2933^o	4.5	0.2864	5.5	6176.041	354.6
6180.750	2.8098^o	4.5	0.8044	3.5	6180.748	51.3
6187.372	2.7260^o	5.5	0.7228	4.5	6187.363	353.0
6193.601	2.7887^o	6.5	0.7875	6.5	6193.611	2332.4
6193.935	3.0091^o	2.5	1.0080	2.5	6193.918	189.6
6195.702	2.3941^o	3.5	0.3936	2.5	6195.702	409.4
6197.310	3.2382^o	4.5	1.2382	4.5	6197.264	51.4
6199.435	2.6630^o	5.5	0.6637	5.5	6199.445	1546.6
6200.696	3.6450^o	2.5	1.6461	3.5	6200.722^b	196.0
6200.706	2.9619^o	7.5	0.9630	7.5	6200.722^b	196.0
6203.840	2.8644^o	5.5	0.8665	5.5	6203.841^b	590.1
6203.848	3.5657^o	3.5	1.5678	3.5	6203.841^b	590.1
6206.663	3.0305^o	1.5	1.0335	1.5	6206.653	39.9
6221.267	3.5363^o	4.5	1.5440	5.5	6221.234	134.4
6222.179	2.5742^o	3.5	0.5822	2.5	6222.209	5972.7
6224.337	2.4525^o	5.5	0.4612	6.5	6224.354	148.1
6231.493	3.1995^o	6.5	1.2104	6.5	6231.500^b	1399.4
6231.497	2.7118^o	5.5	0.7228	4.5	6231.500^b	1399.4
6231.516	3.5358^o	6.5	1.5468	6.5	6231.500^b	1399.4
6231.874	2.3410^o	5.5	0.3521	4.5	6231.860	180.1
6232.181	3.7266^o	8.5	1.7378	8.5	6232.204	82.3
6235.181	2.2743^o	5.5	0.2864	5.5	6235.185	178.9
6236.434	2.7750^o	6.5	0.7875	6.5	6236.460^b	427.0
6236.498	2.9504^o	8.5	0.9630	7.5	6236.460^b	425.4
6236.504	2.8539^o	4.5	0.8665	5.5	6236.460^b	425.4
6240.825	2.8353^o	1.5	0.8492	1.5	6240.831	50.2
6243.320	3.0572^o	5.5	1.0720	5.5	6243.354^b	146.1
6243.331	3.5320^o	7.5	1.5468	6.5	6243.354^b	146.1
6243.378	3.5854^o	5.5	1.6002	6.5	6243.354^b	140.0
6244.033	3.2122^o	3.5	1.2271	4.5	6244.084	386.7
6246.124	2.7604^o	0.5	0.7760	0.5	6246.147^b	977.3
6246.144	3.5684^o	4.5	1.5840	4.5	6246.146^b	1164.4
6247.986	2.0192^o	6.5	0.0354	6.5	6247.990	1538.3
6251.196	2.5649^o	1.5	0.5822	2.5	6251.200	138.9
6254.213	2.9044^o	5.5	0.9225	4.5	6254.239	54.7
6256.117	2.1512^o	5.5	0.1700	4.5	6256.124	243.7
6257.419	3.2609^o	4.5	1.2801	3.5	6257.437	35.6
6259.854	2.8075^o	6.5	0.8275	5.5	6259.838	28.7
6261.452	3.0057^o	6.5	1.0262	6.5	6261.450	30.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6271.799	2.4498^o	2.5	0.4736	3.5	6271.796	76.6
6272.301	2.4373^o	6.5	0.4612	6.5	6272.296	3009.0
6279.453	3.1077^o	4.5	1.1338	4.5	6279.461^b	36.0
6279.453	3.2010^o	5.5	1.2271	4.5	6279.461^b	36.0
6279.840	2.7497^o	1.5	0.7760	0.5	6279.847	153.3
6283.149	2.5548^o	2.5	0.5822	2.5	6283.170	71.0
6285.035	2.7765^o	2.5	0.8044	3.5	6285.039^b	86.7
6285.039	3.2522^o	2.5	1.2801	3.5	6285.039^b	86.3
6287.842	2.6438^o	8.5	0.6726	7.5	6287.867	1345.0
6290.556	3.4061^o	7.5	1.4358	7.5	6290.569	34.5
6297.530	2.4418^o	3.5	0.4736	3.5	6297.542	297.2
6298.308	2.2543^o	5.5	0.2864	5.5	6298.317	1190.8
6298.614	2.7553^o	7.5	0.7875	6.5	6298.623	1581.0
6299.773	3.3841^o	6.5	1.4166	6.5	6299.769	91.4
6301.615	2.6306^o	6.5	0.6637	5.5	6301.623	1349.0
6309.848	2.6871^o	5.5	0.7228	4.5	6309.881^b	409.7
6309.880	2.6280^o	5.5	0.6637	5.5	6309.881^b	408.3
6311.027	2.2639^o	3.5	0.3000	3.5	6311.031	417.7
6317.053	2.2485^o	6.5	0.2864	5.5	6317.055^b	252.1
6317.101	3.6670^o	3.5	1.7049	4.5	6317.055^b	225.1
6319.780	3.0159^o	7.5	1.0547	8.5	6319.775^b	40.6
6319.788	3.5818^o	6.5	1.6206	5.5	6319.775^b	40.6
6320.691	2.8042^o	1.5	0.8432	2.5	6320.713	30.0
6322.056	2.9760^o	6.5	1.0155	7.5	6322.053	37.6
6323.946	2.9862^o	7.5	1.0262	6.5	6323.945^b	32.7
6323.982	3.3138^o	2.5	1.3539	1.5	6323.945^b	31.0
6325.230	2.3117^o	4.5	0.3521	4.5	6325.237	549.9
6330.221	2.6306^o	6.5	0.6726	7.5	6330.229	45.3
6338.879	2.3075^o	4.5	0.3521	4.5	6338.881	524.0
6340.941	2.8212^o	5.5	0.8665	5.5	6340.959^b	1799.2
6340.953	1.9901^o	7.5	0.0354	6.5	6340.959^b	1800.7
6344.205	1.9891^o	6.5	0.0354	6.5	6344.218	191.3
6345.199	2.7966^o	3.5	0.8432	2.5	6345.192	708.8
6348.388	2.1224^o	5.5	0.1700	4.5	6348.390	2420.0
6351.139	2.3452^o	2.5	0.3936	2.5	6351.150	251.6
6354.476	2.7380^o	7.5	0.7875	6.5	6354.480^b	140.7
6354.496	3.4233^o	7.5	1.4728	8.5	6354.480^b	140.7
6359.824	3.7947^o	7.5	1.8458	7.5	6359.830	260.3
6364.437	2.7750^o	6.5	0.8275	5.5	6364.446	110.6
6367.143	2.2466^o	3.5	0.3000	3.5	6367.144^b	1311.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6367.151	3.4655[o]	4.5	1.5189	3.5	6367.144[b]	1311.5
6372.167	2.6679[o]	4.5	0.7228	4.5	6372.147	145.2
6375.012	3.2243[o]	4.5	1.2801	3.5	6375.018[b]	35.3
6375.016	2.9989[o]	8.5	1.0547	8.5	6375.018[b]	35.3
6378.237	3.0771[o]	5.5	1.1338	4.5	6378.198	788.4
6378.994	3.4619[o]	4.5	1.5189	3.5	6378.997	84.0
6391.220	3.1627[o]	4.5	1.2234	3.5	6391.193	92.1
6416.102	1.9891[o]	6.5	0.0573	7.5	6416.119	815.0
6417.544	2.8539[o]	4.5	0.9225	4.5	6417.551	188.0
6418.875	2.5947[o]	6.5	0.6637	5.5	6418.879[b]	721.8
6418.899	3.6359[o]	5.5	1.7049	4.5	6418.880[b]	860.9
6420.552	2.3899[o]	1.5	0.4595	1.5	6420.549	160.7
6422.974	2.6023[o]	6.5	0.6726	7.5	6422.977	83.6
6425.442	3.0364[o]	5.5	1.1074	5.5	6425.479	14.6
6426.450	3.0625[o]	5.5	1.1338	4.5	6426.488	49.8
6428.977	2.3891[o]	6.5	0.4612	6.5	6428.972	154.8
6429.509	3.0352[o]	4.5	1.1074	5.5	6429.512	59.2
6431.171	2.7765[o]	2.5	0.8492	1.5	6431.168	332.5
6435.127	2.3197[o]	2.5	0.3936	2.5	6435.126[b]	834.4
6435.162	2.7926[o]	5.5	0.8665	5.5	6435.126[b]	836.0
6437.423	2.9409[o]	6.5	1.0155	7.5	6437.449[b]	40.3
6437.466	3.5094[o]	3.5	1.5840	4.5	6437.449[b]	37.2
6440.340	2.7290[o]	4.5	0.8044	3.5	6440.332	328.1
6441.187	2.6042[o]	2.5	0.6799	1.5	6441.189	594.6
6446.840	3.4415[o]	2.5	1.5189	3.5	6446.823[c]	816.8
6448.370	2.2743[o]	5.5	0.3521	4.5	6448.362	1889.6
6453.015	2.8433[o]	3.5	0.9225	4.5	6453.020	73.9
6453.794	2.3941[o]	3.5	0.4736	3.5	6453.801	736.4
6456.775	3.4664[o]	5.5	1.5468	6.5	6456.779	251.9
6461.156	2.6943[o]	1.5	0.7760	0.5	6461.154	84.2
6464.741	2.7926[o]	5.5	0.8753	6.5	6464.747	89.2
6466.238	3.0242[o]	5.5	1.1074	5.5	6466.256	56.8
6466.790	3.4634[o]	6.5	1.5468	6.5	6466.826[b]	45.2
6466.874	3.6216[o]	4.5	1.7049	4.5	6466.826[b]	45.9
6469.900	3.2122[o]	3.5	1.2964	2.5	6469.860	43.0
6473.771	2.5783[o]	5.5	0.6637	5.5	6473.777	118.0
6481.187	3.4802[o]	2.5	1.5678	3.5	6481.191	27.1
6483.204	2.2639[o]	3.5	0.3521	4.5	6483.212	637.6
6484.045	3.7947[o]	7.5	1.8832	8.5	6484.037	53.8
6485.450	2.7604[o]	0.5	0.8492	1.5	6485.425	261.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6490.415	2.9817^o	6.5	1.0720	5.5	6490.433^b	595.1
6490.436	2.3691^o	1.5	0.4595	1.5	6490.433^b	613.2
6492.185	2.7136^o	4.5	0.8044	3.5	6492.191	337.0
6496.864	1.9078	7.5	0.0000^o	7.5	6496.861	987.3
6512.216	2.0733^o	3.5	0.1700	4.5	6512.223	4234.3
6515.911	2.2543^o	5.5	0.3521	4.5	6515.916	760.4
6517.372	2.5817^o	2.5	0.6799	1.5	6517.409^b	495.3
6517.461	2.7682^o	4.5	0.8665	5.5	6517.409^b	500.0
6519.697	2.2011^o	4.5	0.3000	3.5	6519.694	253.8
6522.262	3.5465^o	3.5	1.6461	3.5	6522.285^b	51.4
6522.317	3.1804^o	3.5	1.2801	3.5	6522.285^b	52.4
6524.667	2.7750^o	6.5	0.8753	6.5	6524.720	50.0
6524.773	2.6871^o	5.5	0.7875	6.5	6524.720	51.7
6525.527	3.2955^o	4.5	1.3961	5.5	6525.568^b	18.1
6525.548	3.2629^o	6.5	1.3635	5.5	6525.568^b	18.3
6527.604	1.9620^o	4.5	0.0632	5.5	6527.608	9352.6
6528.186	2.8212^o	5.5	0.9225	4.5	6528.175^b	321.1
6528.220	3.1258^o	5.5	1.2271	4.5	6528.175^b	320.4
6528.476	3.4643^o	6.5	1.5657	7.5	6528.513^b	269.1
6528.493	3.1090^o	7.5	1.2104	6.5	6528.513^b	269.1
6528.516	2.7260^o	5.5	0.8275	5.5	6528.513^b	269.6
6529.427	2.9702^o	4.5	1.0720	5.5	6529.454^b	18.4
6529.465	3.2522^o	2.5	1.3539	1.5	6529.454^b	16.9
6536.283	2.3945^o	0.5	0.4982	0.5	6536.292	527.7
6540.790	2.6994^o	3.5	0.8044	3.5	6540.797	11.1
6542.438	2.2466^o	3.5	0.3521	4.5	6542.444	238.6
6544.588	2.5665^o	7.5	0.6726	7.5	6544.589	4227.5
6545.130	2.9092^o	7.5	1.0155	7.5	6545.111	127.6
6545.741	2.5573^o	4.5	0.6637	5.5	6545.751	165.1
6549.536	3.4085^o	5.5	1.5161	4.5	6549.587	143.1
6552.004	2.3899^o	1.5	0.4982	0.5	6551.993	237.6
6557.357	2.4723^o	3.5	0.5822	2.5	6557.353^b	369.7
6557.368	3.4341^o	6.5	1.5440	5.5	6557.353^b	369.7
6559.282	2.6941^o	3.5	0.8044	3.5	6559.284	32.2
6563.498	3.5345^o	2.5	1.6461	3.5	6563.528	21.0
6566.382	3.1258^o	5.5	1.2382	4.5	6566.398	13.7
6567.607	2.8098^o	4.5	0.9225	4.5	6567.604	541.5
6571.208	2.7527^o	4.5	0.8665	5.5	6571.212	30.1
6571.508	2.7136^o	4.5	0.8275	5.5	6571.510	278.7
6572.975	2.3452^o	2.5	0.4595	1.5	6572.990	452.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6574.877	2.3587^o	3.5	0.4736	3.5	6574.882	1014.2
6585.503	2.7096^o	6.5	0.8275	5.5	6585.500	20.7
6586.542	3.1052^o	3.5	1.2234	3.5	6586.588	33.3
6588.880	2.0511^o	5.5	0.1700	4.5	6588.875	39.2
6594.498	2.9870^o	4.5	1.1074	5.5	6594.455	1335.9
6602.612	2.1772^o	2.5	0.3000	3.5	6602.616	1143.2
6608.582	2.6630^o	5.5	0.7875	6.5	6608.596^b	512.8
6608.591	3.3113^o	7.5	1.4358	7.5	6608.596^b	512.8
6610.746	2.5548^o	2.5	0.6799	1.5	6610.753	17.2
6613.789	2.7966^o	3.5	0.9225	4.5	6613.770	8.7
6616.661	2.8433^o	3.5	0.9701	4.5	6616.667^b	81.2
6616.709	3.5782^o	4.5	1.7049	4.5	6616.667^b	81.6
6616.714	3.1533^o	3.5	1.2801	3.5	6616.667^b	81.6
6618.801	2.2163	6.5	0.3436^o	6.5	6618.833^b	11.3
6618.834	3.3915^o	2.5	1.5189	3.5	6618.833^b	11.1
6622.627	2.3452^o	2.5	0.4736	3.5	6622.640^b	216.0
6622.666	3.2882^o	5.5	1.4166	6.5	6622.640^b	214.1
6623.526	2.8433^o	3.5	0.9720	3.5	6623.525	163.9
6624.795	2.3691^o	1.5	0.4982	0.5	6624.784	403.2
6626.902	3.3864^o	4.5	1.5161	4.5	6626.920^b	546.8
6626.918	2.2639^o	3.5	0.3936	2.5	6626.920^b	539.8
6628.390	2.0399^o	3.5	0.1700	4.5	6628.412	1351.5
6630.265	2.7126^o	2.5	0.8432	2.5	6630.260	131.4
6631.580	3.4130^o	6.5	1.5440	5.5	6631.601	5.7
6632.050	2.9409^o	6.5	1.0720	5.5	6632.063	11.8
6633.087	2.8316^o	7.5	0.9630	7.5	6633.092	280.6
6633.745	3.4341^o	6.5	1.5657	7.5	6633.717	15.5
6636.367	2.4498^o	2.5	0.5822	2.5	6636.357	1024.1
6636.894	3.3864^o	4.5	1.5189	3.5	6636.877	56.3
6644.379	2.6529^o	7.5	0.7875	6.5	6644.392	117.8
6645.510	2.9371^o	6.5	1.0720	5.5	6645.484	50.8
6646.685	3.2609^o	4.5	1.3961	5.5	6646.717^b	38.8
6646.707	2.1512^o	5.5	0.2864	5.5	6646.717^b	38.6
6647.463	3.4085^o	5.5	1.5440	5.5	6647.498	116.3
6656.690	2.2556^o	1.5	0.3936	2.5	6656.705	608.3
6661.296	2.6651^o	2.5	0.8044	3.5	6661.300	76.3
6662.368	2.8644^o	5.5	1.0040	4.5	6662.392	263.9
6662.974	2.3197^o	2.5	0.4595	1.5	6662.972^b	1060.1
6663.018	3.2960^o	6.5	1.4358	7.5	6662.972^b	1075.7
6663.454	2.8321^o	4.5	0.9720	3.5	6663.457	40.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6665.184	2.4418[o]	3.5	0.5822	2.5	6665.191	59.6
6665.924	2.1594[o]	4.5	0.3000	3.5	6665.915	2599.5
6683.509	2.9092[o]	7.5	1.0547	8.5	6683.531	731.6
6685.936	2.5176[o]	6.5	0.6637	5.5	6685.938	116.4
6686.509	2.4298[o]	7.5	0.5761	8.5	6686.489	206.9
6688.819	2.2466[o]	3.5	0.3936	2.5	6688.830	1695.0
6694.384	2.6559[o]	3.5	0.8044	3.5	6694.396	305.5
6695.716	2.8212[o]	5.5	0.9701	4.5	6695.718[b]	123.7
6695.747	2.6943[o]	1.5	0.8432	2.5	6695.718[b]	122.5
6697.223	2.7260[o]	5.5	0.8753	6.5	6697.234	9.5
6702.045	3.1295[o]	3.5	1.2801	3.5	6702.063	69.1
6703.614	2.2011[o]	4.5	0.3521	4.5	6703.618	194.2
6710.305	2.7136[o]	4.5	0.8665	5.5	6710.302	9.8
6710.859	2.5107[o]	5.5	0.6637	5.5	6710.896[b]	1184.1
6710.949	3.2430[o]	6.5	1.3961	5.5	6710.896[b]	1182.9
6714.000	2.3197[o]	2.5	0.4736	3.5	6714.030	110.5
6714.915	1.8458	7.5	0.0000[o]	7.5	6714.920	4431.5
6720.599	3.0547[o]	7.5	1.2104	6.5	6720.604[c]	92.4
6721.322	3.0545[o]	6.5	1.2104	6.5	6721.374[b]	1069.7
6721.353	2.1440[o]	2.5	0.3000	3.5	6721.374[b]	1072.5
6721.407	2.9160[o]	4.5	1.0720	5.5	6721.374[b]	1203.0
6724.405	2.3027[o]	0.5	0.4595	1.5	6724.410	125.3
6724.821	2.6306[o]	6.5	0.7875	6.5	6724.836	1282.5
6730.258	2.5644[o]	3.5	0.7228	4.5	6730.268	72.0
6731.042	2.1278[o]	4.5	0.2864	5.5	6731.054[b]	21.9
6731.106	3.5358[o]	6.5	1.6944	5.5	6731.054[b]	22.9
6734.234	2.6280[o]	5.5	0.7875	6.5	6734.239	107.6
6734.590	2.6679[o]	4.5	0.8275	5.5	6734.600	112.3
6741.280	1.9018[o]	4.5	0.0632	5.5	6741.283	304.6
6742.878	2.8644[o]	5.5	1.0262	6.5	6742.897	26.0
6744.311	2.8098[o]	4.5	0.9720	3.5	6744.306	331.5
6750.956	2.1224[o]	5.5	0.2864	5.5	6750.962	826.1
6752.469	3.2714[o]	6.5	1.4358	7.5	6752.483[b]	67.3
6752.495	2.6630[o]	5.5	0.8275	5.5	6752.483[b]	66.7
6752.520	3.4033[o]	4.5	1.5678	3.5	6752.483[b]	65.2
6753.660	2.8433[o]	3.5	1.0080	2.5	6753.657	150.4
6754.198	3.2122[o]	3.5	1.3771	3.5	6754.218	275.4
6756.536	2.5573[o]	4.5	0.7228	4.5	6756.540	507.7
6757.481	2.6386[o]	2.5	0.8044	3.5	6757.483	271.9
6758.714	3.3500[o]	5.5	1.5161	4.5	6758.731[b]	60.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6758.719	2.3075^{o}	4.5	0.4736	3.5	6758.731^{b}	60.8
6760.982	2.4970^{o}	6.5	0.6637	5.5	6761.021	2165.8
6764.179	3.5345^{o}	2.5	1.7022	3.5	6764.224^{bc}	48.0
6764.207	2.9044^{o}	5.5	1.0720	5.5	6764.222^{bc}	29.3
6766.473	3.5339^{o}	3.5	1.7022	3.5	6766.421	55.8
6770.313	3.4341^{o}	6.5	1.6034	7.5	6770.329	47.4
6772.292	2.2238^{o}	1.5	0.3936	2.5	6772.300	736.2
6779.518	3.2243^{o}	4.5	1.3961	5.5	6779.501^{b}	32.6
6779.528	3.0517^{o}	2.5	1.2234	3.5	6779.501^{b}	33.8
6781.392	2.2889^{o}	5.5	0.4612	6.5	6781.398^{b}	180.7
6781.409	2.1142^{o}	6.5	0.2864	5.5	6781.398^{b}	187.9
6784.552	2.6313^{o}	3.5	0.8044	3.5	6784.556	155.4
6792.476	1.8248	8.5	0.0000^{o}	7.5	6792.489	5380.1
6793.921	2.4970^{o}	6.5	0.6726	7.5	6793.931^{b}	92.3
6793.962	3.0625^{o}	5.5	1.2382	4.5	6793.931^{b}	98.4
6798.467	3.4233^{o}	7.5	1.6002	6.5	6798.486	8.9
6804.626	3.5237^{o}	4.5	1.7022	3.5	6804.665^{b}	295.1
6804.668	2.2809^{o}	0.5	0.4595	1.5	6804.665^{b}	298.1
6807.837	2.6871^{o}	5.5	0.8665	5.5	6807.825	13.0
6809.326	2.4840^{o}	4.5	0.6637	5.5	6809.327	42.8
6809.850	3.7279^{o}	7.5	1.9078	7.5	6809.886	98.2
6814.966	3.5237^{o}	4.5	1.7049	4.5	6814.989	14.4
6819.424	3.0447^{o}	4.5	1.2271	4.5	6819.451	16.3
6820.743	2.8212^{o}	5.5	1.0040	4.5	6820.761	100.2
6824.148	3.3602^{o}	4.5	1.5440	5.5	6824.166	7.9
6827.052	2.5383^{o}	3.5	0.7228	4.5	6827.050	374.9
6829.594	2.6023^{o}	6.5	0.7875	6.5	6829.600	100.2
6839.434	3.2288^{o}	6.5	1.4166	6.5	6839.423	9.7
6840.480	2.3941^{o}	3.5	0.5822	2.5	6840.477^{b}	53.0
6840.505	3.8382^{o}	7.5	2.0263	7.5	6840.477^{b}	53.0
6840.950	2.6871^{o}	5.5	0.8753	6.5	6840.966^{b}	126.5
6840.978	3.3796^{o}	3.5	1.5678	3.5	6840.966^{b}	125.5
6844.997	2.4745^{o}	5.5	0.6637	5.5	6844.999	458.5
6855.589	1.9780^{o}	5.5	0.1700	4.5	6855.585	203.5
6858.248	3.5094^{o}	3.5	1.7022	3.5	6858.302^{b}	854.0
6858.305	2.1594^{o}	4.5	0.3521	4.5	6858.302^{b}	770.5
6861.647	3.1834^{o}	2.5	1.3771	3.5	6861.681	38.2
6866.874	2.4849^{o}	2.5	0.6799	1.5	6866.879	64.5
6868.733	2.3027^{o}	0.5	0.4982	0.5	6868.754^{b}	6.7
6868.752	3.5094^{o}	3.5	1.7049	4.5	6868.754^{b}	6.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6872.699	2.7260^o	5.5	0.9225	4.5	6872.707^b	44.8
6872.706	2.8189^o	8.5	1.0155	7.5	6872.707^b	44.8
6873.897	2.6306^o	6.5	0.8275	5.5	6873.908^b	245.0
6873.961	2.5259^o	5.5	0.7228	4.5	6873.908^b	235.1
6880.438	2.6679^o	4.5	0.8665	5.5	6880.438	32.1
6882.266	3.4044^o	8.5	1.6034	7.5	6882.304	132.5
6883.733	2.6280^o	5.5	0.8275	5.5	6883.683	131.8
6885.741	3.0801^o	4.5	1.2801	3.5	6885.752	44.7
6886.813	2.6042^o	2.5	0.8044	3.5	6886.827	28.0
6887.297	2.3758^o	8.5	0.5761	8.5	6887.286	1884.5
6888.288	3.3433^o	4.5	1.5440	5.5	6888.317	26.7
6889.513	2.1512^o	5.5	0.3521	4.5	6889.520	50.7
6891.223	3.3664^o	4.5	1.5678	3.5	6891.207	10.7
6891.584	3.2343^o	8.5	1.4358	7.5	6891.554	14.5
6892.848	2.7682^o	4.5	0.9701	4.5	6892.864	108.1
6897.642	2.9044^o	5.5	1.1074	5.5	6897.670	29.2
6899.127	2.6630^o	5.5	0.8665	5.5	6899.130	64.6
6900.794	2.2556^o	1.5	0.4595	1.5	6900.808	152.6
6903.496	2.6386^o	2.5	0.8432	2.5	6903.463	63.9
6904.010	3.0057^o	6.5	1.2104	6.5	6904.020	60.3
6905.150	2.8212^o	5.5	1.0262	6.5	6905.121	20.7
6912.156	2.2543^o	5.5	0.4612	6.5	6912.163	2254.1
6914.246	2.7966^o	3.5	1.0040	4.5	6914.246	162.0
6915.226	2.7553^o	7.5	0.9630	7.5	6915.232	262.3
6916.532	1.9620^o	4.5	0.1700	4.5	6916.537^b	5238.4
6916.551	2.8075^o	6.5	1.0155	7.5	6916.537^b	5233.1
6917.559	3.0299^o	5.5	1.2382	4.5	6917.567	9.9
6932.602	2.5107^o	5.5	0.7228	4.5	6932.595	151.0
6933.136	2.6630^o	5.5	0.8753	6.5	6933.153	103.0
6934.740	2.2485^o	6.5	0.4612	6.5	6934.735	431.0
6946.224	3.2010^o	5.5	1.4166	6.5	6946.218	23.8
6949.167	2.1772^o	2.5	0.3936	2.5	6949.176	843.3
6964.201	3.3237^o	5.5	1.5440	5.5	6964.236	25.5
6967.258	2.5665^o	7.5	0.7875	6.5	6967.263	174.6
6969.080	3.3442^o	6.5	1.5657	7.5	6969.133^b	16.8
6969.102	3.2609^o	4.5	1.4823	4.5	6969.133^b	16.8
6972.672	2.4413^o	4.5	0.6637	5.5	6972.687	363.1
6973.975	2.5817^o	2.5	0.8044	3.5	6973.976	233.5
6975.182	3.3237^o	5.5	1.5468	6.5	6975.215	18.7
6978.639	2.9865^o	6.5	1.2104	6.5	6978.642	213.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6980.164	2.1278^o	4.5	0.3521	4.5	6980.165	558.1
6982.619	2.7380^o	7.5	0.9630	7.5	6982.619	54.6
6983.241	2.8823^o	6.5	1.1074	5.5	6983.242	95.4
6988.616	2.4373^o	6.5	0.6637	5.5	6988.622	407.2
6989.573	2.0733^o	3.5	0.3000	3.5	6989.569	2900.9
6990.629	2.2466^o	3.5	0.4736	3.5	6990.645	249.1
6996.652	2.6941^o	3.5	0.9225	4.5	6996.657	269.4
7002.905	2.4498^o	2.5	0.6799	1.5	7002.904	42.9
7008.640	3.7947^o	7.5	2.0263	7.5	7008.648	115.5
7010.920	2.8753^o	4.5	1.1074	5.5	7010.932	54.6
7014.059	2.4308^o	6.5	0.6637	5.5	7014.116	38.8
7017.175	3.3504^o	4.5	1.5840	4.5	7017.203	10.5
7020.186	2.9760^o	6.5	1.2104	6.5	7020.190^b	10.5
7020.196	3.0091^o	2.5	1.2436	2.5	7020.190^b	10.5
7023.046	2.3410^o	7.5	0.5761	8.5	7023.034^b	445.7
7023.066	3.8020^o	8.5	2.0371	7.5	7023.034^b	445.7
7023.515	3.7910^o	7.5	2.0263	7.5	7023.570	3102.3
7025.418	2.7682^o	4.5	1.0040	4.5	7025.456^b	169.8
7025.445	2.8189^o	8.5	1.0547	8.5	7025.456^b	169.8
7038.533	2.6042^o	2.5	0.8432	2.5	7038.540	66.4
7038.993	2.4837^o	3.5	0.7228	4.5	7038.990	53.4
7041.805	2.8753^o	4.5	1.1152	3.5	7041.824	44.4
7044.452	2.7750^o	6.5	1.0155	7.5	7044.457	49.3
7045.164	3.3433^o	4.5	1.5840	4.5	7045.176	35.0
7053.659	2.4298^o	7.5	0.6726	7.5	7053.654	734.5
7061.182	2.6306^o	6.5	0.8753	6.5	7061.197	42.2
7061.991	3.8937^o	7.5	2.1386	8.5	7062.019^b	131.1
7062.010	3.0352^o	4.5	1.2801	3.5	7062.019^b	135.8
7066.578	3.3218^o	3.5	1.5678	3.5	7066.529	93.5
7069.301	2.6198^o	4.5	0.8665	5.5	7069.307	58.7
7070.666	3.0771^o	5.5	1.3241	4.5	7070.686	30.2
7071.562	2.6280^o	5.5	0.8753	6.5	7071.563	67.4
7073.813	3.1483^o	6.5	1.3961	5.5	7073.823	4.6
7074.384	3.2960^o	6.5	1.5440	5.5	7074.374	10.6
7075.846	2.4745^o	5.5	0.7228	4.5	7075.845	145.0
7080.732	3.7876^o	6.5	2.0371	7.5	7080.784^b	622.5
7080.825	2.1440^o	2.5	0.3936	2.5	7080.783^b	860.5
7084.476	2.4723^o	3.5	0.7228	4.5	7084.472	146.4
7085.716	3.2960^o	6.5	1.5468	6.5	7085.692	22.8
7091.712	2.4115^o	4.5	0.6637	5.5	7091.724	1553.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7098.036	2.9566^o	6.5	1.2104	6.5	7098.048	104.6
7101.455	2.6679^o	4.5	0.9225	4.5	7101.427	34.5
7104.710	2.4674^o	3.5	0.7228	4.5	7104.717	92.2
7108.913	2.7136^o	4.5	0.9701	4.5	7108.913	6.5
7110.653	2.9702^o	4.5	1.2271	4.5	7110.680	15.5
7113.542	2.9695^o	5.5	1.2271	4.5	7113.575	28.1
7113.911	2.7504^o	2.5	1.0080	2.5	7113.912	12.8
7116.114	2.7118^o	5.5	0.9701	4.5	7116.107	46.5
7116.499	2.7497^o	1.5	1.0080	2.5	7116.463	48.0
7117.976	2.7043^o	7.5	0.9630	7.5	7117.974	879.8
7123.890	2.7553^o	7.5	1.0155	7.5	7123.889	52.4
7124.545	2.7552^o	6.5	1.0155	7.5	7124.602^b	9.7
7124.594	3.3237^o	5.5	1.5840	4.5	7124.602^b	9.4
7129.812	2.5259^o	5.5	0.7875	6.5	7129.835	111.6
7146.918	3.2782^o	4.5	1.5440	5.5	7146.965	27.7
7150.583	2.6559^o	3.5	0.9225	4.5	7150.596	34.3
7151.560	2.3969^o	5.5	0.6637	5.5	7151.562	89.8
7153.080	2.0192^o	6.5	0.2864	5.5	7153.091	1475.8
7156.897	1.9018^o	4.5	0.1700	4.5	7156.905	481.0
7158.130	3.1276^o	4.5	1.3961	5.5	7158.100	33.2
7162.725	2.9409^o	6.5	1.2104	6.5	7162.753	26.2
7164.295	2.5176^o	6.5	0.7875	6.5	7164.319	15.1
7165.780	2.4525^o	5.5	0.7228	4.5	7165.778	53.3
7167.197	3.3500^o	5.5	1.6206	5.5	7167.242^{bc}	104.4
7167.233	2.6994^o	3.5	0.9701	4.5	7167.242^{bc}	104.3
7182.785	2.2238^o	1.5	0.4982	0.5	7182.778	147.4
7183.678	2.3891^o	6.5	0.6637	5.5	7183.682	8.1
7185.415	2.7290^o	4.5	1.0040	4.5	7185.428	9.3
7186.668	2.8321^o	4.5	1.1074	5.5	7186.679	29.0
7188.337	3.1013^o	4.5	1.3771	3.5	7188.323	31.7
7189.443	2.6941^o	3.5	0.9701	4.5	7189.449	55.5
7192.919	2.5107^o	5.5	0.7875	6.5	7192.917	717.0
7193.670	3.3070^o	4.5	1.5840	4.5	7193.700	6.5
7197.717	2.7260^o	5.5	1.0040	4.5	7197.706	366.0
7201.386	2.0733^o	3.5	0.3521	4.5	7201.386	2370.4
7202.154	3.3211^o	6.5	1.6002	6.5	7202.190	388.4
7207.424	3.1158^o	5.5	1.3961	5.5	7207.387	6.2
7208.744	2.5947^o	6.5	0.8753	6.5	7208.756	1273.9
7212.364	2.4413^o	4.5	0.7228	4.5	7212.378	907.3
7215.622	2.1772^o	2.5	0.4595	1.5	7215.630	17.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7218.472	2.6871^o	5.5	0.9701	4.5	7218.478	1060.6
7219.160	3.2609^o	4.5	1.5440	5.5	7219.186	16.3
7220.876	2.3891^o	6.5	0.6726	7.5	7220.875	24.5
7223.730	2.6878^o	2.5	0.9720	3.5	7223.738	55.8
7233.185	3.0771^o	5.5	1.3635	5.5	7233.170	66.5
7241.825	2.7662^o	9.5	1.0547	8.5	7241.844	172.9
7250.533	2.4970^o	6.5	0.7875	6.5	7250.548^b	212.6
7250.606	2.8433^o	3.5	1.1338	4.5	7250.548^b	214.6
7263.476	2.2826^o	7.5	0.5761	8.5	7263.482	125.7
7271.411	2.7126^o	2.5	1.0080	2.5	7271.371	6.5
7271.787	3.3506^o	2.5	1.6461	3.5	7271.787	28.7
7275.502	2.1772^o	2.5	0.4736	3.5	7275.523^b	633.0
7275.534	3.4085^o	5.5	1.7049	4.5	7275.523^b	630.2
7277.472	2.3758^o	8.5	0.6726	7.5	7277.477	61.3
7279.613	2.5780^o	6.5	0.8753	6.5	7279.634	632.5
7280.811	2.8098^o	4.5	1.1074	5.5	7280.791	6.7
7283.108	2.9454^o	1.5	1.2436	2.5	7283.069	23.9
7285.878	3.4033^o	4.5	1.7022	3.5	7285.917^b	1078.4
7285.897	2.1624^o	6.5	0.4612	6.5	7285.917^b	1078.4
7288.131	2.7553^o	7.5	1.0547	8.5	7288.134	26.0
7290.953	2.8152^o	2.5	1.1152	3.5	7290.958	43.9
7293.336	2.9795^o	3.5	1.2801	3.5	7293.318	62.1
7295.252	2.0511^o	5.5	0.3521	4.5	7295.241^b	3330.8
7295.252	3.0625^o	5.5	1.3635	5.5	7295.241^b	3330.8
7297.608	2.5259^o	5.5	0.8275	5.5	7297.620	50.3
7307.084	3.2430^o	6.5	1.5468	6.5	7307.097	10.2
7308.505	2.6679^o	4.5	0.9720	3.5	7308.517	20.7
7312.076	2.5383^o	3.5	0.8432	2.5	7312.080	226.5
7312.723	3.3211^o	6.5	1.6262	6.5	7312.731	23.3
7318.920	2.0371	7.5	0.3436^o	6.5	7318.930	69.0
7323.818	3.1090^o	7.5	1.4166	6.5	7323.819	32.2
7327.441	1.9780^o	5.5	0.2864	5.5	7327.442	3811.4
7328.961	2.5665^o	7.5	0.8753	6.5	7328.969	61.0
7330.084	3.2349^o	5.5	1.5440	5.5	7330.045	9.5
7330.735	2.5573^o	4.5	0.8665	5.5	7330.735	62.2
7333.738	2.5176^o	6.5	0.8275	5.5	7333.752	43.8
7334.255	2.6529^o	7.5	0.9630	7.5	7334.265	546.0
7335.562	3.1720^o	4.5	1.4823	4.5	7335.531	12.8
7339.804	2.4115^o	4.5	0.7228	4.5	7339.813	88.5
7341.108	3.2724^o	3.5	1.5840	4.5	7341.140	5.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7347.242	2.4745^o	5.5	0.7875	6.5	7347.244	94.6
7352.073	2.6559^o	3.5	0.9701	4.5	7352.091	66.5
7352.451	2.1594^o	4.5	0.4736	3.5	7352.474	119.5
7355.226	2.7926^o	5.5	1.1074	5.5	7355.250	266.8
7357.673	2.1440^o	2.5	0.4595	1.5	7357.717	367.0
7363.711	2.7552^o	6.5	1.0720	5.5	7363.726^b	122.1
7363.735	2.5107^o	5.5	0.8275	5.5	7363.726^b	126.1
7366.285	2.0263	7.5	0.3436^o	6.5	7366.286	104.6
7369.951	2.2639^o	3.5	0.5822	2.5	7369.939	90.6
7372.133	2.7887^o	6.5	1.1074	5.5	7372.143^b	10.0
7372.138	3.0861^o	8.5	1.4048	9.5	7372.143^b	10.3
7381.179	2.4837^o	3.5	0.8044	3.5	7381.177	81.3
7389.548	2.3410^o	5.5	0.6637	5.5	7389.539	167.8
7391.657	3.2609^o	4.5	1.5840	4.5	7391.688^b	6.0
7391.685	3.8931^o	5.5	2.2163	6.5	7391.688^b	5.6
7397.105	1.9620^o	4.5	0.2864	5.5	7397.118	1926.6
7400.593	3.0709^o	6.5	1.3961	5.5	7400.609	5.9
7406.791	2.2556^o	1.5	0.5822	2.5	7406.794	155.5
7409.154	3.0364^o	5.5	1.3635	5.5	7409.163	63.8
7413.522	2.8823^o	6.5	1.2104	6.5	7413.528	721.6
7424.129	2.4970^o	6.5	0.8275	5.5	7424.133	559.1
7429.207	2.3410^o	7.5	0.6726	7.5	7429.192	2251.3
7434.505	2.5337^o	4.5	0.8665	5.5	7434.487	79.5
7436.900	2.6386^o	2.5	0.9720	3.5	7436.912	88.3
7444.254	2.4525^o	5.5	0.7875	6.5	7444.260	1193.2
7446.592	2.2466^o	3.5	0.5822	2.5	7446.606	41.4
7449.016	2.6679^o	4.5	1.0040	4.5	7449.078	29.6
7452.662	3.2288^o	6.5	1.5657	7.5	7452.685	12.6
7453.473	2.4674^o	3.5	0.8044	3.5	7453.472	11.2
7457.465	1.9620^o	4.5	0.3000	3.5	7457.460	560.1
7458.862	3.3996^o	7.5	1.7378	8.5	7458.843	511.4
7462.659	3.3070^o	4.5	1.6461	3.5	7462.708^b	498.8
7462.715	2.2370^o	7.5	0.5761	8.5	7462.708^b	498.5
7471.806	2.3315^o	6.5	0.6726	7.5	7471.826	2998.3
7475.717	2.6280^o	5.5	0.9701	4.5	7475.748	101.6
7476.466	3.2840^o	6.5	1.6262	6.5	7476.474	10.3
7479.862	2.6651^o	2.5	1.0080	2.5	7479.844	233.1
7482.462	2.4840^o	4.5	0.8275	5.5	7482.459	871.1
7483.294	3.6826^o	6.5	2.0263	7.5	7483.344	327.8
7484.157	3.7947^o	7.5	2.1386	8.5	7484.160	476.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7492.683	2.1278^o	4.5	0.4736	3.5	7492.709^b	205.7
7492.761	3.2010^o	5.5	1.5468	6.5	7492.709^b	206.7
7493.553	2.7260^o	5.5	1.0720	5.5	7493.556	12.3
7497.943	2.7682^o	4.5	1.1152	3.5	7497.964	111.6
7499.377	1.6882^o	5.5	0.0354	6.5	7499.399	6931.2
7501.121	3.7910^o	7.5	2.1386	8.5	7501.122	147.6
7502.512	2.3749^o	4.5	0.7228	4.5	7502.517	227.5
7504.556	2.5742^o	3.5	0.9225	4.5	7504.539	167.6
7509.049	2.5259^o	5.5	0.8753	6.5	7509.071	418.2
7511.018	3.3551^o	5.5	1.7049	4.5	7511.014	18.9
7513.693	2.7043^o	7.5	1.0547	8.5	7513.696	109.6
7516.558	2.9454^o	1.5	1.2964	2.5	7516.616^b	12.4
7516.580	3.1929^o	5.5	1.5440	5.5	7516.616^b	12.9
7517.213	3.5320^o	7.5	1.8832	8.5	7517.183	15.5
7520.114	3.3504^o	4.5	1.7022	3.5	7520.162^b	10.3
7520.165	2.8753^o	4.5	1.2271	4.5	7520.162^b	13.9
7521.608	2.6559^o	3.5	1.0080	2.5	7521.621	10.9
7525.557	2.4745^o	5.5	0.8275	5.5	7525.557	180.9
7528.657	2.0399^o	3.5	0.3936	2.5	7528.676	2323.4
7530.497	3.0625^o	5.5	1.4166	6.5	7530.546	8.7
7532.937	2.9695^o	5.5	1.3241	4.5	7532.961^b	33.5
7533.000	3.1893^o	6.5	1.5440	5.5	7532.961^b	33.7
7533.474	3.1276^o	4.5	1.4823	4.5	7533.502^b	19.7
7533.493	2.7527^o	4.5	1.1074	5.5	7533.502^b	19.7
7538.458	2.5107^o	5.5	0.8665	5.5	7538.434	32.9
7541.558	3.0206^o	4.5	1.3771	3.5	7541.570	8.9
7542.377	2.4308^o	6.5	0.7875	6.5	7542.390	130.2
7547.308	2.5176^o	6.5	0.8753	6.5	7547.312	8.4
7547.798	3.2883^o	3.5	1.6461	3.5	7547.828	8.3
7549.080	2.5644^o	3.5	0.9225	4.5	7549.083	218.8
7552.268	3.3433^o	4.5	1.7022	3.5	7552.253	24.1
7560.582	2.6023^o	6.5	0.9630	7.5	7560.585	36.2
7569.165	2.7527^o	4.5	1.1152	3.5	7569.161	139.3
7570.501	3.1533^o	3.5	1.5161	4.5	7570.482^b	27.8
7570.504	2.2163	6.5	0.5790^o	5.5	7570.482^b	27.8
7570.850	2.8753^o	4.5	1.2382	4.5	7570.872	51.3
7575.974	2.8465^o	5.5	1.2104	6.5	7575.997	7.3
7579.081	2.5107^o	5.5	0.8753	6.5	7579.077	700.3
7579.926	2.7504^o	2.5	1.1152	3.5	7579.932	38.1
7582.156	2.5573^o	4.5	0.9225	4.5	7582.155^b	149.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7582.179	3.2349^o	5.5	1.6002	6.5	7582.155^b	152.3
7583.870	3.2549^o	6.5	1.6206	5.5	7583.913^b	21.2
7583.911	2.3069^o	6.5	0.6726	7.5	7583.913^b	21.3
7585.997	3.1162^o	3.5	1.4823	4.5	7586.034	8.0
7593.848	2.6042^o	2.5	0.9720	3.5	7593.864	25.5
7595.071	2.4079^o	0.5	0.7760	0.5	7595.099	14.1
7606.038	2.2933^o	4.5	0.6637	5.5	7606.031	372.9
7611.786	2.6438^o	8.5	1.0155	7.5	7611.735	60.5
7613.702	2.9080^o	2.5	1.2801	3.5	7613.702	68.6
7616.542	2.6313^o	3.5	1.0040	4.5	7616.554	15.0
7619.348	2.6529^o	7.5	1.0262	6.5	7619.338	71.9
7621.898	1.6262	6.5	0.0000^o	7.5	7621.870	4.4
7625.468	3.2288^o	6.5	1.6034	7.5	7625.474	45.1
7637.935	2.3027^o	0.5	0.6799	1.5	7637.950	7.4
7643.074	2.4970^o	6.5	0.8753	6.5	7643.096	366.5
7655.796	3.1013^o	4.5	1.4823	4.5	7655.835	15.0
7656.825	3.1627^o	4.5	1.5440	5.5	7656.856	10.9
7657.663	2.7260^o	5.5	1.1074	5.5	7657.653	17.8
7658.315	2.3945^o	0.5	0.7760	0.5	7658.347	22.1
7662.934	2.4840^o	4.5	0.8665	5.5	7662.920	149.7
7663.628	2.9415^o	4.5	1.3241	4.5	7663.617	8.8
7665.443	3.2010^o	5.5	1.5840	4.5	7665.462	5.6
7669.054	2.9126^o	2.5	1.2964	2.5	7669.084	14.4
7671.072	2.5383^o	3.5	0.9225	4.5	7671.069	66.6
7674.785	2.5780^o	6.5	0.9630	7.5	7674.783	173.2
7680.168	2.4413^o	4.5	0.8275	5.5	7680.181	38.7
7691.132	3.1276^o	4.5	1.5161	4.5	7691.076	22.1
7693.221	2.5337^o	4.5	0.9225	4.5	7693.207	12.5
7695.927	2.2743^o	5.5	0.6637	5.5	7695.925	581.7
7699.516	2.4373^o	6.5	0.8275	5.5	7699.502	254.1
7701.607	2.3969^o	5.5	0.7875	6.5	7701.582	8.7
7708.115	3.2342^o	6.5	1.6262	6.5	7708.124^b	43.4
7708.139	2.4745^o	5.5	0.8665	5.5	7708.124^b	42.0
7710.636	2.3950^o	5.5	0.7875	6.5	7710.648	70.1
7711.035	2.8178^o	6.5	1.2104	6.5	7711.048	41.4
7712.635	2.4115^o	4.5	0.8044	3.5	7712.642	130.8
7717.678	2.9695^o	5.5	1.3635	5.5	7717.707	9.2
7725.318	2.6306^o	6.5	1.0262	6.5	7725.371	145.7
7725.365	2.7118^o	5.5	1.1074	5.5	7725.370	174.4
7726.798	2.5742^o	3.5	0.9701	4.5	7726.818	41.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7729.657	2.5665^o	7.5	0.9630	7.5	7729.667	923.0
7730.234	1.6034	7.5	0.0000^o	7.5	7730.219	147.7
7736.162	2.5742^o	3.5	0.9720	3.5	7736.153^b	36.7
7736.186	2.7096^o	6.5	1.1074	5.5	7736.153^b	36.7
7737.659	1.9018^o	4.5	0.3000	3.5	7737.655^c	4515.6
7741.655	2.2809^o	0.5	0.6799	1.5	7741.648	6.4
7748.177	2.0733^o	3.5	0.4736	3.5	7748.185^c	145.7
7749.967	3.0159^o	7.5	1.4166	6.5	7749.966	11.8
7750.616	2.4745^o	5.5	0.8753	6.5	7750.625	825.1
7753.859	2.6140^o	7.5	1.0155	7.5	7753.862	539.9
7757.475	3.0801^o	4.5	1.4823	4.5	7757.523	82.9
7759.538	3.1162^o	3.5	1.5189	3.5	7759.576	5.3
7760.917	2.8075^o	6.5	1.2104	6.5	7760.933	22.5
7764.763	3.6334^o	8.5	2.0371	7.5	7764.820	37.4
7766.325	2.6679^o	4.5	1.0720	5.5	7766.334	99.8
7770.699	2.1772^o	2.5	0.5822	2.5	7770.710	320.2
7774.007	2.5644^o	3.5	0.9701	4.5	7774.014	537.4
7775.440	2.9989^o	8.5	1.4048	9.5	7775.435	24.5
7776.202	2.8321^o	4.5	1.2382	4.5	7776.211	282.4
7780.106	2.3691^o	1.5	0.7760	0.5	7780.118^b	41.0
7780.148	2.9566^o	6.5	1.3635	5.5	7780.118^b	37.6
7784.740	2.7260^o	5.5	1.1338	4.5	7784.718	15.1
7790.145	2.6630^o	5.5	1.0720	5.5	7790.165	39.1
7791.068	2.9870^o	4.5	1.3961	5.5	7791.064	19.5
7792.325	2.2543^o	5.5	0.6637	5.5	7792.331	2076.7
7795.591	2.0511^o	5.5	0.4612	6.5	7795.577	2081.1
7799.590	2.6438^o	8.5	1.0547	8.5	7799.597^b	276.9
7799.596	3.1052^o	3.5	1.5161	4.5	7799.597^b	276.9
7804.589	2.5107^o	5.5	0.9225	4.5	7804.570	6.4
7806.277	2.6140^o	7.5	1.0262	6.5	7806.266	79.0
7810.714	2.6023^o	6.5	1.0155	7.5	7810.707	33.5
7814.985	2.4525^o	5.5	0.8665	5.5	7814.971	352.6
7817.380	3.1533^o	3.5	1.5678	3.5	7817.434	12.9
7821.588	2.3075^o	4.5	0.7228	4.5	7821.616	3.6
7823.755	2.6994^o	3.5	1.1152	3.5	7823.769	47.6
7824.842	2.4115^o	4.5	0.8275	5.5	7824.846	7.5
7830.637	2.5548^o	2.5	0.9720	3.5	7830.637	191.6
7834.141	2.7926^o	5.5	1.2104	6.5	7834.148	133.4
7842.838	3.2010^o	5.5	1.6206	5.5	7842.835	30.2
7846.149	2.6871^o	5.5	1.1074	5.5	7846.185	548.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7858.651	2.4525^o	5.5	0.8753	6.5	7858.698	696.4
7865.149	2.2485^o	6.5	0.6726	7.5	7865.138	3177.1
7866.313	3.4835^o	6.5	1.9078	7.5	7866.339^b	219.4
7866.319	2.2556^o	1.5	0.6799	1.5	7866.339^b	207.3
7870.425	2.4413^o	4.5	0.8665	5.5	7870.420	85.8
7871.057	3.7910^o	7.5	2.2163	6.5	7871.083	11.2
7881.382	2.6878^o	2.5	1.1152	3.5	7881.388	116.5
7886.655	2.8152^o	2.5	1.2436	2.5	7886.664	50.3
7890.744	2.4373^o	6.5	0.8665	5.5	7890.747	119.6
7892.146	2.2933^o	4.5	0.7228	4.5	7892.130	14.7
7893.776	2.5742^o	3.5	1.0040	4.5	7893.788	895.6
7895.119	2.9865^o	6.5	1.4166	6.5	7895.123	6.0
7899.573	3.1158^o	5.5	1.5468	6.5	7899.603	4.6
7903.439	2.5383^o	3.5	0.9701	4.5	7903.447	186.4
7913.192	2.0399^o	3.5	0.4736	3.5	7913.227^b	2019.5
7913.236	2.5383^o	3.5	0.9720	3.5	7913.227^b	2019.0
7917.046	2.6994^o	3.5	1.1338	4.5	7917.041	19.2
7922.316	2.7750^o	6.5	1.2104	6.5	7922.339	50.5
7922.988	2.2370^o	7.5	0.6726	7.5	7922.985	1405.1
7924.190	1.9078	7.5	0.3436^o	6.5	7924.183	14.6
7932.660	2.5780^o	6.5	1.0155	7.5	7932.641	3.5
7933.998	3.1090^o	7.5	1.5468	6.5	7934.013	62.5
7935.264	2.4373^o	6.5	0.8753	6.5	7935.269	548.6
7935.695	2.1440^o	2.5	0.5822	2.5	7935.723	859.6
7936.955	2.3891^o	6.5	0.8275	5.5	7936.999	2863.1
7939.688	2.4837^o	3.5	0.9225	4.5	7939.686	23.0
7942.741	2.6679^o	4.5	1.1074	5.5	7942.754	165.2
7948.829	2.6140^o	7.5	1.0547	8.5	7948.835^c	1048.8
7951.794	2.9126^o	2.5	1.3539	1.5	7951.829^b	73.0
7951.851	3.2609^o	4.5	1.7022	3.5	7951.829^b	64.6
7951.883	2.4079^o	0.5	0.8492	1.5	7951.829^b	64.5
7952.857	3.4044^o	8.5	1.8458	7.5	7952.874	9.3
7961.280	2.5649^o	1.5	1.0080	2.5	7961.283	106.6
7963.811	2.5644^o	3.5	1.0080	2.5	7963.809	3.4
7966.374	2.5259^o	5.5	0.9701	4.5	7966.376	395.3
7967.650	3.4634^o	6.5	1.9078	7.5	7967.679^b	19.3
7967.657	2.6630^o	5.5	1.1074	5.5	7967.680^b	17.0
7968.082	2.4308^o	6.5	0.8753	6.5	7968.032	8.7
7972.928	2.5176^o	6.5	0.9630	7.5	7972.940	9.8
7973.929	2.7926^o	5.5	1.2382	4.5	7973.943	20.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7978.320	2.3410^o	5.5	0.7875	6.5	7978.313	261.6
7979.680	2.5573^o	4.5	1.0040	4.5	7979.682	10.7
7980.537	2.7765^o	2.5	1.2234	3.5	7980.533	15.4
7980.925	2.7966^o	3.5	1.2436	2.5	7980.897	16.7
7981.929	3.0352^o	4.5	1.4823	4.5	7981.935	9.5
7982.404	2.6679^o	4.5	1.1152	3.5	7982.361	72.4
7996.796	2.6651^o	2.5	1.1152	3.5	7996.853	33.2
7998.082	1.9018^o	4.5	0.3521	4.5	7998.098	2335.8
8010.036	2.3749^o	4.5	0.8275	5.5	8010.037	96.4
8013.629	2.3899^o	1.5	0.8432	2.5	8013.617	100.8
8016.424	2.8426^o	2.5	1.2964	2.5	8016.375	5.4
8020.173	3.1295^o	3.5	1.5840	4.5	8020.237	2.8
8021.235	2.3945^o	0.5	0.8492	1.5	8021.245	54.9
8022.426	2.4115^o	4.5	0.8665	5.5	8022.422	1111.6
8023.398	2.4674^o	3.5	0.9225	4.5	8023.407	52.3
8023.759	2.7552^o	6.5	1.2104	6.5	8023.780	13.7
8027.812	2.3315^o	6.5	0.7875	6.5	8027.819	30.8
8028.263	2.2238^o	1.5	0.6799	1.5	8028.285	490.9
8029.675	3.1276^o	4.5	1.5840	4.5	8029.705	3.9
8044.924	2.3899^o	1.5	0.8492	1.5	8044.876	410.1
8057.731	3.3841^o	6.5	1.8458	7.5	8057.727^b	32.8
8057.734	3.0206^o	4.5	1.4823	4.5	8057.727^b	32.8
8062.292	2.2011^o	4.5	0.6637	5.5	8062.299	164.5
8078.224	2.5383^o	3.5	1.0040	4.5	8078.237	779.7
8079.876	2.4970^o	6.5	0.9630	7.5	8079.886	114.6
8080.709	3.0778^o	6.5	1.5440	5.5	8080.743	145.4
8086.676	2.3372^o	4.5	0.8044	3.5	8086.694	54.8
8091.756	3.1158^o	5.5	1.5840	4.5	8091.786	45.9
8092.895	2.2543^o	5.5	0.7228	4.5	8092.899	225.6
8093.819	2.5649^o	1.5	1.0335	1.5	8093.881	54.4
8098.727	2.5459^o	8.5	1.0155	7.5	8098.727	908.1
8100.679	2.7682^o	4.5	1.2382	4.5	8100.711	25.9
8101.369	2.4525^o	5.5	0.9225	4.5	8101.356^b	40.5
8101.375	3.2243^o	4.5	1.6944	5.5	8101.356^b	40.8
8102.262	2.8539^o	4.5	1.3241	4.5	8102.282	15.0
8102.790	2.5337^o	4.5	1.0040	4.5	8102.791	12.1
8104.869	2.7527^o	4.5	1.2234	3.5	8104.861	20.7
8105.323	2.6630^o	5.5	1.1338	4.5	8105.298	13.5
8112.113	1.9891^o	6.5	0.4612	6.5	8112.146	329.9
8133.858	2.2466^o	3.5	0.7228	4.5	8133.920	58.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8139.818	2.5947^o	6.5	1.0720	5.5	8139.824	37.8
8143.193	2.6559^o	3.5	1.1338	4.5	8143.196	21.9
8151.021	2.6280^o	5.5	1.1074	5.5	8151.002	67.8
8156.108	2.3950^o	5.5	0.8753	6.5	8156.116	185.9
8157.366	2.3069^o	6.5	0.7875	6.5	8157.377	28.1
8158.577	2.4418^o	3.5	0.9225	4.5	8158.574	103.7
8160.961	2.4413^o	4.5	0.9225	4.5	8160.966	81.6
8165.027	2.5727^o	9.5	1.0547	8.5	8165.053	601.7
8168.790	3.1013^o	4.5	1.5840	4.5	8168.747	16.8
8174.287	3.0352^o	4.5	1.5189	3.5	8174.307	6.7
8177.122	3.0625^o	5.5	1.5468	6.5	8177.162	9.7
8183.876	2.7527^o	4.5	1.2382	4.5	8183.895^b	27.7
8183.910	3.1147^o	6.5	1.6002	6.5	8183.895^b	26.8
8187.174	2.4840^o	4.5	0.9701	4.5	8187.170	5.6
8187.703	2.3891^o	6.5	0.8753	6.5	8187.718	145.1
8189.021	2.3410^o	5.5	0.8275	5.5	8188.994	19.6
8192.561	3.2019	7.5	1.6890^o	6.5	8192.598^b	148.7
8192.602	2.4849^o	2.5	0.9720	3.5	8192.598^b	149.7
8198.548	2.5665^o	7.5	1.0547	8.5	8198.564	325.3
8199.395	2.4837^o	3.5	0.9720	3.5	8199.378	13.6
8205.364	3.0545^o	6.5	1.5440	5.5	8205.393^c	98.2
8210.118	2.3372^o	4.5	0.8275	5.5	8210.108	241.0
8217.207	2.3749^o	4.5	0.8665	5.5	8217.194	174.9
8219.531	3.0547^o	7.5	1.5468	6.5	8219.559^b	22.6
8219.552	2.8321^o	4.5	1.3241	4.5	8219.559^b	23.8
8225.875	2.7504^o	2.5	1.2436	2.5	8225.872	22.3
8228.299	2.5783^o	5.5	1.0720	5.5	8228.296	39.3
8236.006	2.2809^o	0.5	0.7760	0.5	8236.024	137.1
8237.730	2.6198^o	4.5	1.1152	3.5	8237.735^b	74.6
8237.795	2.9870^o	4.5	1.4823	4.5	8237.735^b	74.6
8238.796	2.4745^o	5.5	0.9701	4.5	8238.783	312.9
8241.170	2.3315^o	6.5	0.8275	5.5	8241.155	1037.1
8246.387	2.3075^o	4.5	0.8044	3.5	8246.401	34.4
8250.498	2.4723^o	3.5	0.9701	4.5	8250.503	83.7
8250.985	1.8458	7.5	0.3436^o	6.5	8251.003	28.7
8251.591	2.5176^o	6.5	1.0155	7.5	8251.563	61.3
8252.480	2.3452^o	2.5	0.8432	2.5	8252.506	269.2
8281.232	2.0728^o	7.5	0.5761	8.5	8281.272	447.7
8311.663	2.5459^o	8.5	1.0547	8.5	8311.678^b	1106.9
8311.670	3.0352^o	4.5	1.5440	5.5	8311.678^b	1107.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8312.303	2.0733^o	3.5	0.5822	2.5	8312.310	511.6
8317.147	3.0091^o	2.5	1.5189	3.5	8317.134	6.5
8322.908	2.7126^o	2.5	1.2234	3.5	8322.930	17.1
8324.509	2.4115^o	4.5	0.9225	4.5	8324.531	26.7
8327.137	3.0919^o	7.5	1.6034	7.5	8327.074	19.6
8331.120	2.9044^o	5.5	1.4166	6.5	8331.182	14.9
8332.703	2.1512^o	5.5	0.6637	5.5	8332.732	23.7
8336.650	2.2743^o	5.5	0.7875	6.5	8336.648	46.8
8341.199	3.7022^o	5.5	2.2163	6.5	8341.222^b	116.5
8341.220	2.6198^o	4.5	1.1338	4.5	8341.222^b	117.2
8348.297	2.7118^o	5.5	1.2271	4.5	8348.265	17.2
8350.985	2.3117^o	4.5	0.8275	5.5	8350.977	269.9
8360.976	2.4525^o	5.5	0.9701	4.5	8360.961	181.0
8366.199	2.4970^o	6.5	1.0155	7.5	8366.182	163.9
8374.792	2.3075^o	4.5	0.8275	5.5	8374.798	607.8
8384.481	2.2011^o	4.5	0.7228	4.5	8384.477	265.4
8386.971	2.4498^o	2.5	0.9720	3.5	8386.952	9.9
8392.625	2.4849^o	2.5	1.0080	2.5	8392.627^b	59.4
8392.632	2.8539^o	4.5	1.3771	3.5	8392.627^b	59.5
8394.845	2.3197^o	2.5	0.8432	2.5	8394.853	38.0
8400.297	3.1804^o	3.5	1.7049	4.5	8400.257	8.4
8400.749	2.7136^o	4.5	1.2382	4.5	8400.764	9.4
8427.973	2.6941^o	3.5	1.2234	3.5	8428.013	26.8
8436.550	3.0159^o	7.5	1.5468	6.5	8436.598^b	18.1
8436.593	3.4954^o	8.5	2.0263	7.5	8436.598^b	21.8
8441.155	2.4723^o	3.5	1.0040	4.5	8441.170	36.5
8443.979	2.4308^o	6.5	0.9630	7.5	8443.964	53.9
8448.835	2.8306^o	5.5	1.3635	5.5	8448.779	29.4
8449.885	2.2543^o	5.5	0.7875	6.5	8449.884^b	4763.9
8449.924	2.4298^o	7.5	0.9630	7.5	8449.884^b	4762.6
8453.400	2.8433^o	3.5	1.3771	3.5	8453.422	4.3
8455.734	2.2933^o	4.5	0.8275	5.5	8455.705	858.0
8456.596	2.3410^o	7.5	0.8753	6.5	8456.585^b	255.1
8456.618	3.0919^o	7.5	1.6262	6.5	8456.585^b	255.1
8465.677	2.1278^o	4.5	0.6637	5.5	8465.665	1943.8
8469.897	2.4674^o	3.5	1.0040	4.5	8469.937	12.7
8479.650	2.5337^o	4.5	1.0720	5.5	8479.640	34.8
8481.078	2.2889^o	5.5	0.8275	5.5	8481.074	144.9
8482.075	2.8152^o	2.5	1.3539	1.5	8482.120	3.9
8483.658	2.2485^o	6.5	0.7875	6.5	8483.663	1042.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8485.646	3.0447^o	4.5	1.5840	4.5	8485.603	5.4
8492.328	2.2639^o	3.5	0.8044	3.5	8492.330	530.4
8502.515	2.0399^o	3.5	0.5822	2.5	8502.536	3072.7
8503.134	2.8212^o	5.5	1.3635	5.5	8503.163	69.4
8511.836	2.3315^o	6.5	0.8753	6.5	8511.835	1167.1
8513.438	2.6941^o	3.5	1.2382	4.5	8513.449	18.3
8527.700	2.9695^o	5.5	1.5161	4.5	8527.755^b	475.5
8527.751	2.3027^o	0.5	0.8492	1.5	8527.755^b	477.7
8528.631	2.7497^o	1.5	1.2964	2.5	8528.639	98.2
8534.427	2.3749^o	4.5	0.9225	4.5	8534.415	30.4
8540.048	2.4849^o	2.5	1.0335	1.5	8540.111^b	6.9
8540.084	2.9702^o	4.5	1.5189	3.5	8540.111^b	6.7
8541.536	3.0545^o	6.5	1.6034	7.5	8541.587	17.0
8545.180	2.6941^o	3.5	1.2436	2.5	8545.191	26.9
8552.431	2.5644^o	3.5	1.1152	3.5	8552.468	266.8
8554.173	2.6871^o	5.5	1.2382	4.5	8554.206	30.3
8554.619	2.7290^o	4.5	1.2801	3.5	8554.641	5.8
8556.834	2.4525^o	5.5	1.0040	4.5	8556.819	62.8
8594.251	2.2466^o	3.5	0.8044	3.5	8594.266	54.5
8594.908	2.5573^o	4.5	1.1152	3.5	8594.952	50.3
8598.190	2.1142^o	6.5	0.6726	7.5	8598.160	501.3
8601.527	2.3075^o	4.5	0.8665	5.5	8601.499	72.2
8605.436	2.5742^o	3.5	1.1338	4.5	8605.374	57.2
8609.394	2.5548^o	2.5	1.1152	3.5	8609.398	34.5
8615.151	2.5107^o	5.5	1.0720	5.5	8615.124	21.0
8618.738	2.8152^o	2.5	1.3771	3.5	8618.775	28.4
8623.344	2.4413^o	4.5	1.0040	4.5	8623.397	425.0
8627.880	2.1594^o	4.5	0.7228	4.5	8627.916	326.0
8630.204	2.3587^o	3.5	0.9225	4.5	8630.214	369.5
8632.700	1.4358	7.5	0.0000^o	7.5	8632.712	25.4
8643.455	3.0801^o	4.5	1.6461	3.5	8643.444	21.4
8643.926	3.0545^o	6.5	1.6206	5.5	8643.980	7.1
8652.335	2.6559^o	3.5	1.2234	3.5	8652.308^b	60.9
8652.365	3.2921	5.5	1.8596^o	6.5	8652.308^b	61.2
8657.250	2.2809^o	0.5	0.8492	1.5	8657.217	378.0
8673.429	2.7926^o	5.5	1.3635	5.5	8673.409	24.6
8678.262	1.9018^o	4.5	0.4736	3.5	8678.286	5353.0
8686.598	2.2543^o	5.5	0.8275	5.5	8686.609	115.4
8691.024	2.3891^o	6.5	0.9630	7.5	8691.023	13.5
8694.466	2.9695^o	5.5	1.5440	5.5	8694.518	12.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8697.931	2.4970^o	6.5	1.0720	5.5	8697.929	11.3
8712.576	2.7765^o	2.5	1.3539	1.5	8712.601	25.8
8713.685	2.2889^o	5.5	0.8665	5.5	8713.655	18.2
8716.325	2.9044^o	5.5	1.4823	4.5	8716.260	43.9
8757.188	2.4308^o	6.5	1.0155	7.5	8757.214	25.4
8759.648	2.8316^o	7.5	1.4166	6.5	8759.655	37.5
8761.935	2.3372^o	4.5	0.9225	4.5	8761.917	12.5
8763.583	2.4298^o	7.5	1.0155	7.5	8763.538	593.4
8765.754	2.6941^o	3.5	1.2801	3.5	8765.827^b	34866.4
8765.823	1.9901^o	7.5	0.5761	8.5	8765.827^b	35227.5
8768.006	2.2889^o	5.5	0.8753	6.5	8768.003	55.6
8775.896	2.2556^o	1.5	0.8432	2.5	8775.905^b	729.5
8775.911	2.6559^o	3.5	1.2436	2.5	8775.905^b	729.5
8778.107	2.4840^o	4.5	1.0720	5.5	8778.082^b	896.5
8778.107	2.1995^o	5.5	0.7875	6.5	8778.082^b	896.5
8803.554	2.6313^o	3.5	1.2234	3.5	8803.579	19.1
8804.384	2.2743^o	5.5	0.8665	5.5	8804.370	51.8
8806.156	2.4115^o	4.5	1.0040	4.5	8806.186	871.1
8812.494	2.7604^o	0.5	1.3539	1.5	8812.468	19.8
8813.442	2.2556^o	1.5	0.8492	1.5	8813.446	116.7
8821.623	2.1278^o	4.5	0.7228	4.5	8821.614	369.1
8824.107	2.4308^o	6.5	1.0262	6.5	8824.079	380.1
8826.935	2.6313^o	3.5	1.2271	4.5	8827.004	110.0
8832.777	2.5107^o	5.5	1.1074	5.5	8832.760	355.7
8842.292	1.6882^o	5.5	0.2864	5.5	8842.331	88.2
8859.846	2.2743^o	5.5	0.8753	6.5	8859.840	984.8
8865.715	3.0242^o	5.5	1.6262	6.5	8865.778	24014.0
8876.239	2.6198^o	4.5	1.2234	3.5	8876.253	9.4
8930.777	2.2543^o	5.5	0.8665	5.5	8930.766	101.4
8931.519	2.6313^o	3.5	1.2436	2.5	8931.519	31.2
8933.642	2.0511^o	5.5	0.6637	5.5	8933.615	1250.8
8937.924	2.3587^o	3.5	0.9720	3.5	8937.888	23.9
8948.900	2.6651^o	2.5	1.2801	3.5	8948.923	213.4
8954.022	2.5947^o	6.5	1.2104	6.5	8954.044	58.6
8961.262	2.8189^o	8.5	1.4358	7.5	8961.311	17.8
8962.218	3.2288^o	6.5	1.8458	7.5	8962.211	95.3
8968.437	2.8644^o	5.5	1.4823	4.5	8968.477^b	39.6
8968.513	2.2485^o	6.5	0.8665	5.5	8968.477^b	39.5
8969.511	2.3899^o	1.5	1.0080	2.5	8969.518	894.1
8977.936	2.2238^o	1.5	0.8432	2.5	8977.960	366.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8984.779	3.0057^o	6.5	1.6262	6.5	8984.784	34.5
8987.848	2.2543^o	5.5	0.8753	6.5	8987.867	75.5
8994.604	2.3410^o	7.5	0.9630	7.5	8994.565	760.4
9002.279	2.5107^o	5.5	1.1338	4.5	9002.243	36.3
9004.152	2.4840^o	4.5	1.1074	5.5	9004.148	98.1
9008.720	2.6559^o	3.5	1.2801	3.5	9008.775^b	6.8
9008.801	3.4130^o	6.5	2.0371	7.5	9008.774^b	7.6
9010.059	3.5919^o	5.5	2.2163	6.5	9010.042	6.1
9012.577	2.6994^o	3.5	1.3241	4.5	9012.627	37.8
9015.211	2.1624^o	6.5	0.7875	6.5	9015.158	83.7
9018.244	2.4079^o	0.5	1.0335	1.5	9018.275	371.3
9023.425	2.2011^o	4.5	0.8275	5.5	9023.426	906.0
9026.395	2.3452^o	2.5	0.9720	3.5	9026.396	922.6
9028.873	2.1772^o	2.5	0.8044	3.5	9028.870	598.2
9040.679	2.3410^o	5.5	0.9701	4.5	9040.703	14.0
9042.838	2.3969^o	5.5	1.0262	6.5	9042.843	206.7
9048.953	2.4849^o	2.5	1.1152	3.5	9048.919	21.6
9102.358	2.9619^o	7.5	1.6002	6.5	9102.415	81.0
9104.604	2.7662^o	9.5	1.4048	9.5	9104.647^c	146.6
9106.487	2.3691^o	1.5	1.0080	2.5	9106.475	158.1
9111.583	2.9865^o	6.5	1.6262	6.5	9111.650	25.6
9121.326	2.4308^o	6.5	1.0720	5.5	9121.278	99.6
9121.925	2.8316^o	7.5	1.4728	8.5	9121.909	105.7
9123.357	2.6386^o	2.5	1.2801	3.5	9123.376	453.9
9136.497	2.7527^o	4.5	1.3961	5.5	9136.548	106.6
9137.437	2.3719^o	8.5	1.0155	7.5	9137.481	216.8
9144.228	2.0192^o	6.5	0.6637	5.5	9144.299	138.4
9159.291	2.9566^o	6.5	1.6034	7.5	9159.298	5.5
9166.337	2.4674^o	3.5	1.1152	3.5	9166.380	11.2
9173.208	2.5783^o	5.5	1.2271	4.5	9173.217	293.2
9176.046	2.5742^o	3.5	1.2234	3.5	9176.022	281.6
9177.941	2.0733^o	3.5	0.7228	4.5	9177.938	511.4
9179.189	3.0447^o	4.5	1.6944	5.5	9179.190	12.6
9180.499	2.3656^o	7.5	1.0155	7.5	9180.492	744.6
9182.502	2.4837^o	3.5	1.1338	4.5	9182.553^b	9.5
9182.536	2.9760^o	6.5	1.6262	6.5	9182.553^b	9.4
9192.769	2.8644^o	5.5	1.5161	4.5	9192.814^b	103.2
9192.812	2.7118^o	5.5	1.3635	5.5	9192.814^b	103.3
9192.812	3.0861^o	8.5	1.7378	8.5	9192.814^b	103.3
9196.989	2.3197^o	2.5	0.9720	3.5	9196.991	685.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
9207.645	2.8189^o	8.5	1.4728	8.5	9207.670	137.4
9214.817	2.4525^o	5.5	1.1074	5.5	9214.858	146.9
9225.872	2.9092^o	7.5	1.5657	7.5	9225.834	37.2
9270.113	2.3410^o	5.5	1.0040	4.5	9270.144	139.3
9277.447	2.5742^o	3.5	1.2382	4.5	9277.479	5913.5
9285.163	2.1624^o	6.5	0.8275	5.5	9285.198^b	376.5
9285.168	2.6313^o	3.5	1.2964	2.5	9285.198^b	361.4
9287.195	2.2011^o	4.5	0.8665	5.5	9287.215	766.1
9291.450	2.1772^o	2.5	0.8432	2.5	9291.467	96.4
9319.774	2.7260^o	5.5	1.3961	5.5	9319.840	35.1
9330.952	2.0511^o	5.5	0.7228	4.5	9330.973	2602.2
9343.196	2.4418^o	3.5	1.1152	3.5	9343.221	483.2
9355.235	2.3969^o	5.5	1.0720	5.5	9355.189	341.6
9360.955	2.2466^o	3.5	0.9225	4.5	9360.961	1013.8
9483.336	3.0091^o	2.5	1.7022	3.5	9483.387	486.2
9531.751	2.1278^o	4.5	0.8275	5.5	9531.784	294.5
9571.732	2.1224^o	5.5	0.8275	5.5	9571.739	625.7
9700.491	2.5742^o	3.5	1.2964	2.5	9700.492	155.6
9740.356	2.5107^o	5.5	1.2382	4.5	9740.351	217.1
9768.404	2.0733^o	3.5	0.8044	3.5	9768.438	415.9
9771.154	2.7043^o	7.5	1.4358	7.5	9771.160^b	106.8
9771.202	2.5649^o	1.5	1.2964	2.5	9771.160^b	105.2
9912.895	2.2543^o	5.5	1.0040	4.5	9912.974	210.2
9924.128	2.4723^o	3.5	1.2234	3.5	9924.192	87.5
9931.078	2.2743^o	5.5	1.0262	6.5	9931.136^b	59.9
9931.088	2.8321^o	4.5	1.5840	4.5	9931.136^b	62.9
9935.431	2.2556^o	1.5	1.0080	2.5	9935.507	142.5
9936.823	2.4745^o	5.5	1.2271	4.5	9936.885	99.4
9938.799	2.1224^o	5.5	0.8753	6.5	9938.858^b	917.8
9938.848	2.9415^o	4.5	1.6944	5.5	9938.858^b	919.6
9949.175	2.4840^o	4.5	1.2382	4.5	9949.184	86.1
9963.880	2.4674^o	3.5	1.2234	3.5	9963.915	117.2
9969.066	2.7662^o	9.5	1.5229	10.5	9969.101	1920.3
9979.087	2.4525^o	5.5	1.2104	6.5	9979.120	2727.0
9987.441	2.3749^o	4.5	1.1338	4.5	9987.402	112.4
10101.747	1.6882^o	5.5	0.4612	6.5	10101.777	345.4
10129.156	2.0511^o	5.5	0.8275	5.5	10129.173	3965.7
10140.401	2.2485^o	6.5	1.0262	6.5	10140.460	320.9
10176.913	2.4413^o	4.5	1.2234	3.5	10176.939	203.9
10411.741	1.9780^o	5.5	0.7875	6.5	10411.801	3116.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]

Table A.16: Measured wavelengths (λ_o) and intensities of Tb II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3850.877	4.6832^o	7.0	1.4646	7.0	3850.902^c	1056.1
3887.880	4.6526^o	6.0	1.4646	7.0	3887.876^b	2487.1
3887.898	4.0041^o	5.0	0.8162	5.0	3887.876^{bc}	2488.7
3893.359	3.6079^o	7.0	0.4244	8.0	3893.367	121.7
3909.537	3.9419^o	7.0	0.7716	7.0	3909.556^c	1523.5
3913.770	4.6099^o	7.0	1.4430	6.0	3913.780	708.6
3916.945	4.1907^o	6.0	1.0263	5.0	3916.953^c	758.0
3919.505	3.9524	6.0	0.7901^o	6.0	3919.512	217.3
3925.428	3.7987	6.0	0.6412^o	6.0	3925.434	699.3
3940.652	3.2713	7.0	0.1260^o	7.0	3940.620	391.1
3946.890	3.5135	6.0	0.3732^o	7.0	3946.890^c	419.1
3986.330	3.7474^o	7.0	0.6382	6.0	3986.345	84.1
4004.209	3.9524	6.0	0.8570^o	5.0	4004.231	311.9
4012.723	3.7379	5.0	0.6490^o	5.0	4012.738	190.1
4020.469	3.8142^o	6.0	0.7313	6.0	4020.495	928.1
4031.625	3.5135	6.0	0.4392^o	6.0	4031.632	368.9
4036.702	3.7086^o	6.0	0.6382	6.0	4036.725	209.1
4066.174	3.8198^o	8.0	0.7716	7.0	4066.188	205.9
4103.912	3.1462	7.0	0.1260^o	7.0	4103.916	807.2
4109.558	4.3997^o	7.0	1.3837	8.0	4109.531	33.9
4134.401	4.6832^o	7.0	1.6853	8.0	4134.392^c	1199.4
4137.950	4.4383^o	7.0	1.4430	6.0	4137.966^c	991.0
4149.172	3.7185^o	5.0	0.7313	6.0	4149.162^c	729.3
4165.063	3.7474^o	7.0	0.7716	7.0	4165.084	210.3
4201.003	3.7474^o	7.0	0.7970	6.0	4201.005	1096.0
4212.052	4.3856^o	5.0	1.4430	6.0	4212.040^c	299.1
4308.681	3.6079^o	7.0	0.7313	6.0	4308.678^c	734.2
4323.638	4.2504^o	8.0	1.3837	8.0	4323.603	428.2
4326.981	3.5135	6.0	0.6490^o	5.0	4326.962	2339.8
4367.302	3.9419^o	7.0	1.1039	7.0	4367.307^b	670.8
4367.327	3.6951	6.0	0.8570^o	5.0	4367.307^b	515.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4416.252	2.9326	7.0	0.1260^o	7.0	4416.247	1058.3
4562.237	3.6079^o	7.0	0.8912	7.0	4562.246	217.4
4573.196	3.8142^o	6.0	1.1039	7.0	4573.164	386.4
4591.570	3.8142^o	6.0	1.1147	6.0	4591.561	89.2
4636.976	3.3142	6.0	0.6412^o	6.0	4636.992^c	276.3
4699.254	5.3662^o	7.0	2.7286	7.0	4699.228	797.1
4758.464	3.7086^o	6.0	1.1039	7.0	4758.485	241.8
4959.923	3.9419^o	7.0	1.4430	6.0	4959.940	514.2
4972.673	3.8888	7.0	1.3962^o	8.0	4972.701	118.0
5162.246	3.9136	6.0	1.5126^o	7.0	5162.263	146.5
5227.169	4.2266^o	7.0	1.8554	6.0	5227.189^b	1985.5
5227.193	3.8142^o	6.0	1.4430	6.0	5227.189^b	1991.3
5347.516	3.8305	7.0	1.5126^o	7.0	5347.499	196.6
5347.857	2.4437	8.0	0.1260^o	7.0	5347.862	149.9
5550.575	4.6767^o	7.0	2.4437	8.0	5550.565	133.6
5602.607	4.2549	5.0	2.0426^o	4.0	5602.618^c	1610.0
5659.853	4.0526	6.0	1.8627^o	6.0	5659.814	70.6
5665.913	4.1520	6.0	1.9644^o	7.0	5665.896^c	90.3
5937.733	2.7286	7.0	0.6412^o	6.0	5937.779	35.2
5940.241	3.9419^o	7.0	1.8554	6.0	5940.241	135.3
5967.315	3.4733	8.0	1.3962^o	8.0	5967.305	71.8
6093.949	4.7021^o	8.0	2.6682	7.0	6093.928	485.1
6280.578	4.7021^o	8.0	2.7286	7.0	6280.616	16.6
6446.777	3.6079^o	7.0	1.6853	8.0	6446.823^c	801.2
6720.567	4.0526	6.0	2.2083^o	6.0	6720.604^c	92.0
6764.234	3.6951	6.0	1.8627^o	6.0	6764.222^c	29.3
6893.311	2.2225^o	8.0	0.4244	8.0	6893.294	10.0
6896.255	3.4733	8.0	1.6760^o	9.0	6896.234	31.7
7081.274	3.6459	7.0	1.8956^o	8.0	7081.309	5.0
7082.739	3.1462	7.0	1.3962^o	8.0	7082.744	34.0
7145.033	4.4634^o	6.0	2.7286	7.0	7145.017	12.6
7167.218	1.8554	6.0	0.1260^o	7.0	7167.242^c	104.3
7204.240	3.1167	8.0	1.3962^o	8.0	7204.231	78.5
7268.181	3.9136	6.0	2.2083^o	6.0	7268.202	10.6
7348.620	3.1993	7.0	1.5126^o	7.0	7348.608	75.2
7371.198	3.6459	7.0	1.9644^o	7.0	7371.190	36.6
7587.410	3.1462	7.0	1.5126^o	7.0	7587.404	25.6
7737.647	3.4974	7.0	1.8956^o	8.0	7737.655^c	4515.6
7748.156	2.1153^o	5.0	0.5156	5.0	7748.185^c	145.7
7793.382	3.7987	6.0	2.2083^o	6.0	7793.376	5.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7869.923	4.5106^o	6.0	2.9356	6.0	7869.983	32.8
7948.797	1.6853	8.0	0.1260^o	7.0	7948.835^c	1046.4
8025.466	3.2204	8.0	1.6760^o	9.0	8025.460	84.6
8067.439	2.9326	7.0	1.3962^o	8.0	8067.413	18.5
8070.702	5.3662^o	7.0	3.8305	7.0	8070.637	1150.0
8205.391	3.7189	5.0	2.2083^o	6.0	8205.393^c	99.6
8473.763	4.3953^o	6.0	2.9326	7.0	8473.790	11.8
8603.340	3.1167	8.0	1.6760^o	9.0	8603.314	37.9
9104.662	4.2970^o	6.0	2.9356	6.0	9104.647^c	145.8
9888.163	4.3997^o	7.0	3.1462	7.0	9888.086	109.4

Table A.17: Measured wavelengths (λ_o) and intensities of Dy I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
3821.467	4.2996	6.0	1.0562^o	7.0	3821.474	205.8		-0.0	
3832.896	4.8027	7.0	1.5690^o	7.0	3832.872^c	526.0			
3840.890	4.2832	6.0	1.0562^o	7.0	3840.890	181.9		-0.1	
3847.019	4.1599	7.0	0.9380^o	8.0	3847.030	253.4		-0.1	
3868.805	4.1417	8.0	0.9380^o	8.0	3868.799^n	1080.3		0.5	1.1
3874.052	4.2556	7.0	1.0562^o	7.0	3874.042	152.8		-0.2	
3883.313	4.6804	9.0	1.4887^o	8.0	3883.321	79.1		0.1	
3891.967	4.1227	9.0	0.9380^o	8.0	3891.980	232.8		-0.2	
3892.880	4.8572	10.0	1.6732^o	9.0	3892.910^b	259.6		0.8	
3892.899	4.1219	8.0	0.9380^o	8.0	3892.910^b	259.2		-0.1	
3894.530	4.6712	8.0	1.4887^o	8.0	3894.532	33.2		-0.3	
3896.646	4.4317	6.0	1.2508^o	6.0	3896.661^c	53.5		-0.4	
3913.621	4.1050	7.0	0.9380^o	8.0	3913.641^b	102.5		-0.6	
3913.647	5.2019	4.0	2.0349^o	4.0	3913.641^b	103.0		0.9	
3917.286	4.1021	9.0	0.9380^o	8.0	3917.308	651.1		0.2	
3919.121	4.6099	5.0	1.4473^o	6.0	3919.152^b	97.7		0.1	
3919.153	4.2188	7.0	1.0562^o	7.0	3919.152^b	62.7		-0.6	
3927.858	4.6029	6.0	1.4473^o	6.0	3927.873	80.2		-0.0	
3930.127	5.7517	7.0	2.5979^o	7.0	3930.150^{bc}	183.6			
3930.145	4.7522	10.0	1.5985^o	10.0	3930.150^{bc}	186.1		0.6	
3936.699	4.3872	10.0	1.2387^o	9.0	3936.706	218.0		0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3937.163	4.2043	6.0	1.0562^o	7.0	3937.167	115.4		-0.4	
3938.202	4.5946	6.0	1.4473^o	6.0	3938.206	130.2		0.2	
3953.496	4.1913	7.0	1.0562^o	7.0	3953.509^c	65.1		-0.6	
3961.802	4.1847	8.0	1.0562^o	7.0	3961.806	87.7		-0.5	
3962.591	4.3666	9.0	1.2387^o	9.0	3962.594^c	219.7		0.1	
3966.354	4.6136	7.0	1.4887^o	8.0	3966.376	27.9		-0.4	
3967.509	4.0620	9.0	0.9380^o	8.0	3967.505^n	418.3		0.0	-0.2
3968.406	4.5706	7.0	1.4473^o	6.0	3968.388^c	508.9		0.8	
3969.225	4.6917	8.0	1.5690^o	7.0	3969.217	36.5		-0.2	
3970.444	4.7950	9.0	1.6732^o	9.0	3970.429	125.8		0.5	
3973.871	4.0570	7.0	0.9380^o	8.0	3973.875	165.5		-0.4	
3981.365	4.0511	8.0	0.9380^o	8.0	3981.370	92.3		-0.7	
3985.351	3.1100^o	9.0	0.0000	8.0	3985.359	19.5		-2.6	
3988.883	4.3460	8.0	1.2387^o	9.0	3988.915^c	44.9		-0.6	
3993.569	4.1599	7.0	1.0562^o	7.0	3993.580	70.8		-0.6	
3994.530	3.6155^o	7.0	0.5126	7.0	3994.540^c	71.1		-1.3	
3996.917	3.1010^o	8.0	0.0000	8.0	3996.923	45.8		-2.2	
3998.936	3.0995^o	8.0	0.0000	8.0	3998.936	25.2	-2.7	-2.5	
4005.838	4.1504	7.0	1.0562^o	7.0	4005.839^c	179.9		-0.2	
4006.066	4.1502	6.0	1.0562^o	7.0	4006.074	188.5		-0.2	
4009.662	4.6160	5.0	1.5248^o	5.0	4009.679	66.5		-0.0	
4013.823	3.0880^o	7.0	0.0000	8.0	4013.817^n	687.3		-1.1	-1.0
4014.091	4.0258	7.0	0.9380^o	8.0	4014.107	45.6		-1.0	
4023.714	4.0184	7.0	0.9380^o	8.0	4023.718^n	224.5		-0.3	0.0
4024.899	4.3182	9.0	1.2387^o	9.0	4024.907	125.2		-0.2	
4025.389	4.5264	7.0	1.4473^o	6.0	4025.405	18.0		-0.7	
4028.409	4.0148	7.0	0.9380^o	8.0	4028.420^c	535.9		0.1	
4031.075	4.5634	8.0	1.4887^o	8.0	4031.078	24.9		-0.5	
4032.838	4.7467	9.0	1.6732^o	9.0	4032.844^c	53.7		0.1	
4033.548	4.3116	10.0	1.2387^o	9.0	4033.554	24.8		-0.9	
4038.826	4.3197	5.0	1.2508^o	6.0	4038.834	86.3		-0.3	
4045.970	3.0634^o	7.0	0.0000	8.0	4045.962^n	38429.0		0.7	0.8
4047.732	4.3008	9.0	1.2387^o	9.0	4047.718	33.8		-0.7	
4048.928	4.1174	6.0	1.0562^o	7.0	4048.935	140.7		-0.4	
4049.361	3.5734^o	7.0	0.5126	7.0	4049.367^c	127.5		-1.1	
4049.739	4.2993	8.0	1.2387^o	9.0	4049.747	51.9		-0.6	
4054.985	4.3075	7.0	1.2508^o	6.0	4055.012^b	100.9		-0.3	
4055.007	4.3074	5.0	1.2508^o	6.0	4055.012^b	98.9		-0.3	
4057.157	4.6240	7.0	1.5690^o	7.0	4057.175	11.5		-0.8	
4065.389	4.1050	7.0	1.0562^o	7.0	4065.391^b	30.1		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4065.389	4.2996	6.0	1.2508^o	6.0	4065.391^b	30.1		-0.8	
4066.738	4.9317	7.0	1.8839^o	7.0	4066.754^b	30.4		0.1	
4066.760	5.0673	8.0	2.0195^o	8.0	4066.754^b	30.4		0.2	
4067.994	4.9029	6.0	1.8561^o	6.0	4067.963^c	30.6		0.0	
4070.255	4.7999	6.0	1.7548^o	5.0	4070.252^c	24.2		-0.2	
4071.021	4.6136	7.0	1.5690^o	7.0	4071.018^c	29.0		-0.4	
4079.587	3.9123^o	6.0	0.8741	6.0	4079.590	52.1		-1.1	
4083.102	4.2864	5.0	1.2508^o	6.0	4083.095	48.0		-0.6	
4085.128	3.9082^o	5.0	0.8741	6.0	4085.134^b	238.2		-0.4	
4085.133	4.8474	7.0	1.8133^o	8.0	4085.134^b	238.2		0.8	
4085.333	3.9719	7.0	0.9380^o	8.0	4085.329^n	522.7		0.0	-0.2
4087.378	4.2832	6.0	1.2508^o	6.0	4087.386	56.3		-0.5	
4089.499	4.4781	7.0	1.4473^o	6.0	4089.509	56.5		-0.3	
4093.840	4.4749	6.0	1.4473^o	6.0	4093.853	19.7		-0.7	
4096.096	4.6244	11.0	1.5985^o	10.0	4096.108	177.3		0.4	
4096.622	4.5946	6.0	1.5690^o	7.0	4096.632	22.4		-0.5	
4099.880	3.5357^o	8.0	0.5126	7.0	4099.886	58.3		-1.5	
4101.841	3.8959^o	7.0	0.8741	6.0	4101.852	23.4		-1.4	
4103.874	3.8944^o	5.0	0.8741	6.0	4103.868^n	1761.3		0.5	0.2
4105.805	3.8929^o	6.0	0.8741	6.0	4105.807	53.9		-1.1	
4105.987	4.8320	8.0	1.8133^o	8.0	4105.990	29.2		-0.1	
4113.058	4.3680^o	3.0	1.3545	4.0	4113.054^c	69.3		-0.3	
4126.084	3.0040^o	9.0	0.0000	8.0	4126.093^b	208.1		-1.7	
4126.086	4.6024	9.0	1.5985^o	10.0	4126.093^b	215.7		0.5	
4129.122	4.3563^o	3.0	1.3545	4.0	4129.116^n	228.1		0.2	0.2
4129.353	3.9396	9.0	0.9380^o	8.0	4129.384	79.0		-0.8	
4130.351	3.0009^o	8.0	0.0000	8.0	4130.353^n	381.4		-1.4	-1.1
4133.853	4.2370	9.0	1.2387^o	9.0	4133.858^b	240.5		0.1	
4133.860	4.7796	8.0	1.7813^o	7.0	4133.858^b	240.5		0.8	
4134.124	4.8820	8.0	1.8839^o	7.0	4134.156^b	151.1		0.7	
4134.149	4.3526^o	3.0	1.3545	4.0	4134.156^b	153.8		0.0	
4134.708	3.8718^o	7.0	0.8741	6.0	4134.718^c	69.6		-1.0	
4138.538	4.0511	8.0	1.0562^o	7.0	4138.539	237.7		-0.2	
4139.558	3.8683^o	5.0	0.8741	6.0	4139.562	204.5		-0.5	
4146.063	4.1316^o	4.0	1.1421	5.0	4146.052^n	1155.9		0.6	0.7
4149.779	4.2376	6.0	1.2508^o	6.0	4149.793^c	23.6		-0.9	
4153.109	4.5829	9.0	1.5985^o	10.0	4153.129	85.3		0.1	
4156.958	4.7950	9.0	1.8133^o	8.0	4156.956	36.9		-0.0	
4158.057	3.4934^o	8.0	0.5126	7.0	4158.062	26.5		-1.9	
4159.314	4.0362	8.0	1.0562^o	7.0	4159.315	268.4		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4161.629	4.4256	7.0	1.4473^o	6.0	4161.635	26.5		-0.6	
4167.974	3.4863^o	6.0	0.5126	7.0	4167.973^n	15244.1		0.9	0.8
4174.834	4.8989	9.0	1.9301^o	8.0	4174.842	14.8		-0.3	
4177.114	4.4559	9.0	1.4887^o	8.0	4177.107	29.9		-0.5	
4177.763	4.5653	9.0	1.5985^o	10.0	4177.772^b	43.1		-0.2	
4177.800	5.2680	5.0	2.3012^o	6.0	4177.772^b	43.8		0.7	
4178.088	4.1086^o	5.0	1.1421	5.0	4178.091	119.2		-0.4	
4180.301	4.9317	7.0	1.9667^o	6.0	4180.302^c	16.4		-0.2	
4181.268	4.0205	8.0	1.0562^o	7.0	4181.271^c	94.1		-0.6	
4183.717	3.4751^o	8.0	0.5126	7.0	4183.711^n	2155.6		0.0	0.6
4186.821	2.9604^o	8.0	0.0000	8.0	4186.814^n	43609.6		0.6	0.8
4190.938	3.8316^o	5.0	0.8741	6.0	4190.931^n	569.6		-0.1	-0.2
4191.640	3.4695^o	7.0	0.5126	7.0	4191.632^n	4548.3		0.3	0.4
4194.846	2.9547^o	8.0	0.0000	8.0	4194.838^n	32412.5		0.5	0.6
4197.783	4.5511	9.0	1.5985^o	10.0	4197.800	54.4		-0.2	
4198.019	4.0946^o	5.0	1.1421	5.0	4198.010^n	895.6		0.5	0.5
4201.025	3.8884	7.0	0.9380^o	8.0	4201.029^c	120.9		-0.7	
4201.309	4.3047^o	4.0	1.3545	4.0	4201.297^n	586.6		0.6	0.6
4202.240	3.8237^o	6.0	0.8741	6.0	4202.235^n	1538.4		0.3	0.2
4207.697	4.0878^o	6.0	1.1421	5.0	4207.703^b	195.5		-0.2	
4207.714	4.8296	7.0	1.8839^o	7.0	4207.703^b	195.5		0.8	
4208.367	4.7266	7.0	1.7813^o	7.0	4208.386^b	38.9		-0.1	
4208.378	4.4339	9.0	1.4887^o	8.0	4208.386^b	41.7		-0.4	
4211.715	2.9429^o	9.0	0.0000	8.0	4211.711^n	64041.3		0.8	1.0
4213.180	3.8160^o	6.0	0.8741	6.0	4213.175^n	2711.0		0.6	0.6
4215.160	3.4530^o	8.0	0.5126	7.0	4215.151^n	6165.5		0.4	0.6
4218.094	3.4510^o	7.0	0.5126	7.0	4218.085^n	5702.5		0.4	0.7
4221.110	3.4489^o	8.0	0.5126	7.0	4221.101^n	7557.8		0.5	0.8
4222.212	4.0776^o	5.0	1.1421	5.0	4222.204^n	580.1		0.3	0.3
4225.154	3.8077^o	7.0	0.8741	6.0	4225.147^n	4009.9		0.7	0.9
4232.025	4.0708^o	6.0	1.1421	5.0	4232.017^n	891.7		0.4	0.4
4234.809	4.6566	5.0	1.7298^o	4.0	4234.832^b	33.6		-0.2	
4234.834	4.9463	9.0	2.0195^o	8.0	4234.832^b	31.8		0.2	
4236.578	4.5241	10.0	1.5985^o	10.0	4236.595	27.0		-0.5	
4239.856	4.0654^o	6.0	1.1421	5.0	4239.852^n	1145.8		0.5	0.5
4241.819	4.1728	6.0	1.2508^o	6.0	4241.820	16.2		-1.2	
4242.997	4.2757^o	4.0	1.3545	4.0	4243.002	21.0		-0.9	
4243.433	3.8589	7.0	0.9380^o	8.0	4243.444	75.3		-0.9	
4245.914	4.2737^o	5.0	1.3545	4.0	4245.909^n	722.1		0.6	0.5
4251.323	3.7896^o	7.0	0.8741	6.0	4251.323	46.1		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4258.152	3.7849^o	7.0	0.8741	6.0	4258.152	198.5		-0.6	
4258.581	4.2650^o	5.0	1.3545	4.0	4258.577	243.5		0.1	
4259.837	4.8397	9.0	1.9301^o	8.0	4259.828^b	18.2		-0.2	
4259.852	4.5829	9.0	1.6732^o	9.0	4259.828^b	18.4		-0.6	
4266.008	4.2600^o	4.0	1.3545	4.0	4266.022	34.3		-0.7	
4268.267	3.4165^o	7.0	0.5126	7.0	4268.260^n	115.4		-1.3	-1.3
4269.762	3.8409	8.0	0.9380^o	8.0	4269.726	55.4		-1.1	
4272.980	4.0428^o	6.0	1.1421	5.0	4272.977	29.1		-1.1	
4274.631	5.4215	8.0	2.5219^o	8.0	4274.656^b	51.9			
4274.692	4.1504	7.0	1.2508^o	6.0	4274.656^b	52.2		-0.7	
4274.951	4.1502	6.0	1.2508^o	6.0	4274.951	31.6		-0.9	
4276.691	3.7723^o	6.0	0.8741	6.0	4276.686^n	564.0		-0.2	-0.4
4277.715	4.3861	8.0	1.4887^o	8.0	4277.715	8.3		-1.2	
4283.263	2.8937^o	7.0	0.0000	8.0	4283.274	13.3		-3.0	
4283.562	4.8602	5.0	1.9667^o	6.0	4283.585^b	21.9		-0.1	
4283.595	4.9621	4.0	2.0686^o	5.0	4283.585^b	22.4		0.0	
4288.783	5.0878	8.0	2.1978^o	9.0	4288.749	22.2		0.2	
4291.954	3.4004^o	7.0	0.5126	7.0	4291.949^n	528.8		-0.7	-1.0
4298.912	4.1219	8.0	1.2387^o	9.0	4298.916	36.9		-0.9	
4306.222	4.9480	8.0	2.0697^o	7.0	4306.246^{bc}	63.0		0.5	
4306.256	4.8449	7.0	1.9667^o	6.0	4306.246^{bc}	62.7		0.3	
4308.347	4.8572	10.0	1.9803^o	9.0	4308.352^c	50.4		0.3	
4311.947	3.3870^o	8.0	0.5126	7.0	4311.939	27.0		-2.0	
4312.429	3.3867^o	7.0	0.5126	7.0	4312.433^c	21.0		-2.1	
4313.934	3.8111	8.0	0.9380^o	8.0	4313.930	41.3	-1.3	-1.2	
4315.629	4.9406	6.0	2.0686^o	5.0	4315.623	14.4		-0.2	
4318.356	3.8082	9.0	0.9380^o	8.0	4318.358	26.7		-1.4	
4322.738	5.3239	4.0	2.4566^o	5.0	4322.745	14.0		0.3	
4323.795	4.1174	6.0	1.2508^o	6.0	4323.809	23.2		-1.1	
4325.864	5.2900	10.0	2.4248^o	9.0	4325.886^b	37.9		0.7	
4325.915	5.1624	8.0	2.2972^o	7.0	4325.886^b	51.2		0.7	
4326.377	4.7950	9.0	1.9301^o	8.0	4326.381	63.5		0.3	
4335.998	3.7965	7.0	0.9380^o	8.0	4335.999	37.7		-1.3	
4347.712	4.5241	10.0	1.6732^o	9.0	4347.714	255.0		0.5	
4356.114	3.9016	8.0	1.0562^o	7.0	4356.119	36.4		-1.1	
4366.724	3.7764	9.0	0.9380^o	8.0	4366.730	716.1		-0.0	
4369.541	3.7746	7.0	0.9380^o	8.0	4369.549	39.2		-1.3	
4390.928	2.8228^o	8.0	0.0000	8.0	4390.925	24.3		-2.8	
4399.712	4.3861	8.0	1.5690^o	7.0	4399.718^b	15.7		-0.8	
4399.729	5.0101	6.0	2.1930^o	7.0	4399.718^b	17.4		0.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4407.531	4.3008	9.0	1.4887^o	8.0	4407.529	24.9		-0.8	
4411.352	5.1000	9.0	2.2903^o	8.0	4411.363^c	18.8		0.2	
4411.668	3.8657	6.0	1.0562^o	7.0	4411.680	14.3		-1.6	
4438.358	5.0898	7.0	2.2972^o	7.0	4438.362	15.9		0.1	
4444.576	4.3872	10.0	1.5985^o	10.0	4444.587	188.9		0.2	
4462.471	4.8502	9.0	2.0727^o	9.0	4462.453	36.3		0.2	
4463.729	3.6509^o	6.0	0.8741	6.0	4463.709	36.6		-1.4	
4470.445	4.8472	8.0	2.0746^o	8.0	4470.479^b	87.3		0.5	
4470.491	4.8296	7.0	2.0570^o	6.0	4470.480^b	75.2		0.4	
4480.684	3.7042	7.0	0.9380^o	8.0	4480.685^c	201.2		-0.6	
4484.357	4.0148	7.0	1.2508^o	6.0	4484.361	105.1		-0.5	
4487.861	3.6998	8.0	0.9380^o	8.0	4487.864	24.3		-1.6	
4503.371	3.8944^o	5.0	1.1421	5.0	4503.368	18.8	-1.6	-1.4	
4513.588	3.6841	9.0	0.9380^o	8.0	4513.593^c	80.5		-1.0	
4526.082	4.9100^o	9.0	2.1715	9.0	4526.087^b	33.9		0.2	
4526.097	4.5946	6.0	1.8561^o	6.0	4526.087^b	32.7		-0.2	
4527.523	3.7938	8.0	1.0562^o	7.0	4527.538^b	68.4		-1.0	
4527.568	5.1624	8.0	2.4248^o	9.0	4527.538^b	72.4		0.9	
4531.556	2.7352^o	7.0	0.0000	8.0	4531.559^c	289.3		-1.8	
4533.251	4.2228	7.0	1.4887^o	8.0	4533.249	12.8		-1.1	
4539.101	4.2996	6.0	1.5690^o	7.0	4539.132^b	43.5		-0.5	
4539.136	4.6607	9.0	1.9301^o	8.0	4539.132^b	41.8		-0.0	
4539.166	4.5119	8.0	1.7813^o	7.0	4539.132^b	44.3		-0.2	
4553.134	3.7784	6.0	1.0562^o	7.0	4553.158^c	93.9		-0.8	
4555.225	3.6590	7.0	0.9380^o	8.0	4555.230	209.5		-0.7	
4565.093	2.7151^o	8.0	0.0000	8.0	4565.087^n	781.4		-1.3	-1.5
4567.012	5.4215	8.0	2.7076^o	9.0	4567.049^b	48.3			
4567.048	4.3872	10.0	1.6732^o	9.0	4567.049^b	54.2		-0.3	
4568.446	4.5264	7.0	1.8133^o	8.0	4568.421	18.8		-0.5	
4577.776	2.7076^o	9.0	0.0000	8.0	4577.778^c	3496.9		-0.7	
4579.705	5.4215	8.0	2.7151^o	8.0	4579.685^{bc}	17.7		0.6	
4579.714	3.9451	8.0	1.2387^o	9.0	4579.685^{bc}	17.7		-1.3	
4585.701	4.1502	6.0	1.4473^o	6.0	4585.709	26.2		-0.9	
4589.083	4.8846^o	8.0	2.1837	8.0	4589.094^b	59.3		0.4	
4589.097	3.9396	9.0	1.2387^o	9.0	4589.094^b	59.3		-0.8	
4589.364	2.7007^o	7.0	0.0000	8.0	4589.357^n	19509.4		0.0	-0.2
4591.661	4.6294	8.0	1.9301^o	8.0	4591.659	26.2		-0.2	
4599.844	3.2071^o	6.0	0.5126	7.0	4599.863^b	38.1		-2.0	
4599.846	4.6748	10.0	1.9803^o	9.0	4599.863^b	38.1		-0.0	
4602.800	5.5156	8.0	2.8228^o	8.0	4602.801	263.0			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4606.041	4.6712	8.0	1.9803^o	9.0	4606.036	48.8		0.1	
4612.259	2.6873^o	7.0	0.0000	8.0	4612.247^n	16322.7		-0.0	-0.4
4613.829	4.8579^o	10.0	2.1715	9.0	4613.823	50.0		0.3	
4614.820	4.8572	10.0	2.1713^o	10.0	4614.832^b	63.1		0.4	
4614.862	5.6664	6.0	2.9806^o	6.0	4614.831^b	72.1			
4620.295	4.5387	7.0	1.8561^o	6.0	4620.288	16.4		-0.6	
4622.733	3.1938^o	8.0	0.5126	7.0	4622.742	15.4		-2.4	
4625.644	4.5634	8.0	1.8839^o	7.0	4625.631^b	23.3		-0.4	
4625.663	4.2043	6.0	1.5248^o	5.0	4625.631^b	23.3		-0.9	
4627.397	3.6165	7.0	0.9380^o	8.0	4627.404	37.3		-1.4	
4631.490	3.9270	7.0	1.2508^o	6.0	4631.496^c	113.8		-0.5	
4650.122	4.4468	7.0	1.7813^o	7.0	4650.157^b	146.3		0.3	
4650.149	3.9041	10.0	1.2387^o	9.0	4650.157^b	147.6		-0.4	
4660.824	4.8572	10.0	2.1978^o	9.0	4660.831	52.4		0.4	
4675.804	5.3214	8.0	2.6706^o	9.0	4675.798^b	32.6		0.8	
4675.815	5.0179	8.0	2.3671^o	8.0	4675.798^b	32.6		0.4	
4680.687	4.1728	6.0	1.5248^o	5.0	4680.715^b	19.1		-1.0	
4680.741	3.7042	7.0	1.0562^o	7.0	4680.714^b	21.5		-1.5	
4680.960	4.5779	7.0	1.9301^o	8.0	4680.968	27.0		-0.3	
4697.514	4.2370	9.0	1.5985^o	10.0	4697.477	38.6		-0.6	
4703.484	4.5653	9.0	1.9301^o	8.0	4703.492^c	56.0		0.0	
4706.779	4.5634	8.0	1.9301^o	8.0	4706.776	27.4		-0.3	
4717.620	5.0955	8.0	2.4682^o	7.0	4717.605	38.9		0.6	
4723.918	3.6800	6.0	1.0562^o	7.0	4723.922	113.8		-0.8	
4724.223	4.7950	9.0	2.1713^o	10.0	4724.227	37.5		0.2	
4728.874	4.5511	9.0	1.9301^o	8.0	4728.871	56.0		0.0	
4729.086	4.9100^o	9.0	2.2890	10.0	4729.089	45.3		0.4	
4732.102	4.6890	8.0	2.0697^o	7.0	4732.100	28.3		-0.1	
4753.317	4.5376	8.0	1.9301^o	8.0	4753.306	32.6		-0.2	
4754.429	4.7999	6.0	2.1930^o	7.0	4754.450	17.4		-0.2	
4766.484	3.5384	8.0	0.9380^o	8.0	4766.471	28.5		-1.6	
4771.942	4.7811^o	9.0	2.1837	8.0	4771.940	74.4		0.5	
4775.790	4.5756	10.0	1.9803^o	9.0	4775.790	151.1		0.5	
4786.565	5.1293	7.0	2.5398^o	7.0	4786.539	539.2			
4791.293	3.0995^o	8.0	0.5126	7.0	4791.280^n	487.1		-1.0	-1.2
4800.602	4.9198	7.0	2.3379^o	7.0	4800.638^b	73.6		0.6	
4800.641	4.5119	8.0	1.9301^o	8.0	4800.638^b	66.7		0.1	
4804.517	4.7635^o	7.0	2.1837	8.0	4804.516	34.7		0.1	
4806.948	3.0910^o	6.0	0.5126	7.0	4806.978^b	147.2		-1.5	
4806.968	4.0258	7.0	1.4473^o	6.0	4806.978^b	149.3		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4807.946	3.5159	7.0	0.9380^o	8.0	4807.934^n	86.3		-1.2	-1.3
4808.728	4.7754	8.0	2.1978^o	9.0	4808.737^{bc}	21.7		-0.1	
4808.739	4.9630^o	9.0	2.3855	9.0	4808.737^{bc}	20.1		0.1	
4816.517	4.0620	9.0	1.4887^o	8.0	4816.504	15.8	-1.4	-1.2	
4818.206	3.8111	8.0	1.2387^o	9.0	4818.205	15.1	-1.6	-1.5	
4819.041	4.5523	9.0	1.9803^o	9.0	4819.040	105.1		0.3	
4823.722	3.8082	9.0	1.2387^o	9.0	4823.728^{bc}	29.0		-1.2	
4823.726	4.4256	7.0	1.8561^o	6.0	4823.728^{bc}	29.0		-0.4	
4824.965	4.8579^o	10.0	2.2890	10.0	4824.969	67.9		0.5	
4832.372	4.3197	5.0	1.7548^o	5.0	4832.374^b	75.1		-0.1	
4832.374	4.7364^o	8.0	2.1715	9.0	4832.374^b	75.1		0.4	
4841.082	3.6165	7.0	1.0562^o	7.0	4841.070^c	64.8		-1.1	
4841.755	4.8502	9.0	2.2903^o	8.0	4841.776	73.6		0.6	
4845.780	4.6275	6.0	2.0697^o	7.0	4845.767	26.7		-0.2	
4854.201	4.9317	7.0	2.3783^o	6.0	4854.200	159.6			
4857.378	4.5320	8.0	1.9803^o	9.0	4857.379	22.5		-0.4	
4866.254	4.6041	7.0	2.0570^o	6.0	4866.268^c	113.7		0.4	
4880.162	2.5398^o	7.0	0.0000	8.0	4880.153^n	775.3		-1.5	-1.6
4884.152	3.7764	9.0	1.2387^o	9.0	4884.154	49.6		-1.0	
4888.082	3.5919	8.0	1.0562^o	7.0	4888.074^n	458.9		-0.3	-0.5
4893.674	4.5523	9.0	2.0195^o	8.0	4893.676^b	116.4		0.4	
4893.679	5.1307	8.0	2.5979^o	7.0	4893.676^b	116.4			
4895.850	4.5119	8.0	1.9803^o	9.0	4895.848	67.6		0.1	
4899.274	5.0628	4.0	2.5329^o	4.0	4899.239	29.7		0.5	
4901.945	3.4665	7.0	0.9380^o	8.0	4901.946	46.5		-1.5	
4903.682	3.7784	6.0	1.2508^o	6.0	4903.686	38.1		-1.1	
4906.250	3.4004^o	7.0	0.8741	6.0	4906.256	123.8	-1.5	-1.1	
4907.482	4.4557	8.0	1.9301^o	8.0	4907.478^c	14.2		-0.7	
4909.822	4.9100^o	9.0	2.3855	9.0	4909.794^c	13.4		-0.1	
4911.166	3.7746	7.0	1.2508^o	6.0	4911.163	21.8		-1.4	
4913.981	4.7567	7.0	2.2344^o	8.0	4913.979^b	24.5		-0.0	
4913.998	4.7657^o	8.0	2.2434	7.0	4913.978^b	21.7		-0.1	
4914.696	4.8191	8.0	2.2972^o	7.0	4914.731^b	104.7		0.7	
4914.730	2.5219^o	8.0	0.0000	8.0	4914.731^b	106.7	-2.0	-2.4	
4916.407	4.7554	8.0	2.2344^o	8.0	4916.410^b	120.4		0.7	
4916.446	4.8993	7.0	2.3783^o	6.0	4916.410^b	117.7		0.9	
4917.178	3.4587	8.0	0.9380^o	8.0	4917.173	37.3		-1.6	
4937.391	4.7537^o	7.0	2.2434	7.0	4937.353^c	65.1		0.4	
4940.427	3.6509^o	6.0	1.1421	5.0	4940.441^b	43.1		-1.2	
4940.438	5.0898	7.0	2.5810^o	6.0	4940.441^b	43.1		0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4944.981	5.3293	7.0	2.8228^{o}	8.0	4944.989	236.1			
4949.322	3.9930	9.0	1.4887^{o}	8.0	4949.319	32.0		-0.9	
4951.013	4.9283	10.0	2.4248^{o}	9.0	4951.029	24.2		0.2	
4959.603	4.8846^{o}	8.0	2.3855	9.0	4959.593	35.4		0.3	
4969.860	3.7327	10.0	1.2387^{o}	9.0	4969.855	27.6		-1.3	
4971.768	4.7364^{o}	8.0	2.2434	7.0	4971.755	15.9		-0.2	
4998.458	3.9270	7.0	1.4473^{o}	6.0	4998.473	72.9		-0.6	
5000.373	4.9406	6.0	2.4619^{o}	6.0	5000.350	35.8		0.4	
5003.867	4.6748	10.0	2.1978^{o}	9.0	5003.863^{bc}	98.1		0.5	
5003.867	5.1293	7.0	2.6523^{o}	6.0	5003.863^{bc}	98.1			
5010.601	4.9283	10.0	2.4546^{o}	10.0	5010.609	21.2		0.2	
5021.829	2.4682^{o}	7.0	0.0000	8.0	5021.828	40.2		-2.8	
5022.117	2.9806^{o}	6.0	0.5126	7.0	5022.103^{n}	287.0		-1.3	-1.2
5024.532	3.4048	7.0	0.9380^{o}	8.0	5024.523^{n}	111.6		-1.1	-1.2
5027.878	4.7554	8.0	2.2903^{o}	8.0	5027.882	24.8		0.0	
5028.999	5.0626	8.0	2.5979^{o}	7.0	5028.980	6.8		-0.1	
5032.657	4.6607	9.0	2.1978^{o}	9.0	5032.661	33.2		0.0	
5033.009	4.6556	7.0	2.1930^{o}	7.0	5032.997^{c}	30.3		-0.0	
5039.047	3.5159	7.0	1.0562^{o}	7.0	5039.051	30.2	-1.7	-1.6	
5042.638	3.3960	9.0	0.9380^{o}	8.0	5042.630^{n}	1488.2		-0.0	-0.3
5047.244	3.5119	6.0	1.0562^{o}	7.0	5047.244^{n}	58.2		-1.3	-1.3
5052.014	3.7042	7.0	1.2508^{o}	6.0	5052.018	44.5		-1.1	
5063.439	4.8412	5.0	2.3934^{o}	6.0	5063.437	14.1		-0.1	
5064.616	5.1624	8.0	2.7151^{o}	8.0	5064.655	19.1		0.5	
5065.540	4.7440	7.0	2.2972^{o}	7.0	5065.533^{c}	18.6		-0.1	
5070.674	3.6831	10.0	1.2387^{o}	9.0	5070.667^{n}	424.4		-0.2	-0.4
5077.667	2.4410^{o}	8.0	0.0000	8.0	5077.657^{n}	1314.3		-1.3	-1.6
5102.348	3.6800	6.0	1.2508^{o}	6.0	5102.351	45.7		-1.1	
5106.385	4.4468	7.0	2.0195^{o}	8.0	5106.343^{c}	44.4		-0.1	
5106.883	4.5985^{o}	9.0	2.1715	9.0	5106.859^{c}	25.1		-0.2	
5110.324	4.8502	9.0	2.4248^{o}	9.0	5110.318^{c}	53.1		0.5	
5112.710	2.9368^{o}	6.0	0.5126	7.0	5112.718	24.7		-2.4	
5120.036	4.5921	11.0	2.1713^{o}	10.0	5120.035	282.7		0.9	
5128.281	3.3549	8.0	0.9380^{o}	8.0	5128.292^{b}	32.1		-1.7	
5128.289	4.5882	10.0	2.1713^{o}	10.0	5128.292^{b}	32.1		-0.1	
5133.604	3.6531	9.0	1.2387^{o}	9.0	5133.604^{c}	22.4		-1.5	
5135.022	3.4700	6.0	1.0562^{o}	7.0	5135.021	49.7		-1.4	
5137.072	4.7030	9.0	2.2903^{o}	8.0	5137.092	19.7		-0.1	
5142.793	4.7537^{o}	7.0	2.3436	8.0	5142.773	38.9		0.2	
5143.248	4.6029	6.0	2.1930^{o}	7.0	5143.269	20.2		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5155.300	4.5756	10.0	2.1713^{o}	10.0	5155.305	54.9		0.2	
5165.390	4.5710^{o}	10.0	2.1715	9.0	5165.373^{c}	74.1		0.3	
5171.919	2.9091^{o}	6.0	0.5126	7.0	5171.917	47.2		-2.1	
5184.511	3.3287	7.0	0.9380^{o}	8.0	5184.517	53.7		-1.5	
5185.162	4.5882	10.0	2.1978^{o}	9.0	5185.155	97.8		0.4	
5196.823	4.5829	9.0	2.1978^{o}	9.0	5196.809^{c}	12.9		-0.5	
5198.455	3.9091	6.0	1.5248^{o}	5.0	5198.460	17.5		-1.2	
5205.663	4.8846^{o}	8.0	2.5036	8.0	5205.652	38.6		0.4	
5226.920	4.5428^{o}	10.0	2.1715	9.0	5226.919	45.5		0.0	
5227.412	4.9063	10.0	2.5352^{o}	11.0	5227.383	19.0		0.2	
5236.256	2.3671^{o}	8.0	0.0000	8.0	5236.251	364.1		-2.0	
5238.367	3.2403^{o}	5.0	0.8741	6.0	5238.367^{bc}	68.3		-1.5	
5238.396	5.1293	7.0	2.7631^{o}	6.0	5238.367^{bc}	68.6			
5259.877	4.7419^{o}	10.0	2.3855	9.0	5259.877^{c}	40.0		0.3	
5264.348	4.5523	9.0	2.1978^{o}	9.0	5264.351	14.5		-0.4	
5267.114	3.5919	8.0	1.2387^{o}	9.0	5267.106^{n}	189.7		-0.6	-0.7
5277.883	4.8520^{o}	8.0	2.5036	8.0	5277.866	29.8		0.3	
5282.057	4.1599	7.0	1.8133^{o}	8.0	5282.071^{bc}	214.9		0.2	
5282.074	3.4028	8.0	1.0562^{o}	7.0	5282.071^{bc}	214.7		-0.8	
5290.032	3.5938	5.0	1.2508^{o}	6.0	5290.034	16.9		-1.6	
5300.881	3.2762	7.0	0.9380^{o}	8.0	5300.887^{b}	72.6		-1.4	
5300.887	4.7948	5.0	2.4566^{o}	5.0	5300.887^{b}	72.6		0.6	
5301.584	2.3379^{o}	7.0	0.0000	8.0	5301.570^{n}	4564.5		-0.9	-1.3
5312.625	4.6767^{o}	8.0	2.3436	8.0	5312.622	27.3		0.0	
5313.749	3.9016	8.0	1.5690^{o}	7.0	5313.763	15.0		-1.3	
5322.233	3.2668	8.0	0.9380^{o}	8.0	5322.236^{bc}	65.6		-1.5	
5322.267	5.2537^{o}	6.0	2.9249	7.0	5322.236^{bc}	65.6			
5335.680	5.0628	4.0	2.7399^{o}	4.0	5335.712^{b}	33.4		0.6	
5335.709	4.3916	6.0	2.0686^{o}	5.0	5335.712^{b}	35.8		-0.2	
5340.301	4.6100^{o}	11.0	2.2890	10.0	5340.295	160.0		0.7	
5352.120	3.2538	9.0	0.9380^{o}	8.0	5352.120	210.6		-1.0	
5356.143	4.5119	8.0	2.1978^{o}	9.0	5356.125	9.5		-0.6	
5361.357	4.4956^{o}	9.0	2.1837	8.0	5361.337^{c}	13.1		-0.5	
5364.867	4.6075	6.0	2.2972^{o}	7.0	5364.844	8.5		-0.6	
5370.588	4.5981	8.0	2.2903^{o}	8.0	5370.586^{b}	38.7		0.1	
5370.591	3.7965	7.0	1.4887^{o}	8.0	5370.586^{b}	38.7		-1.0	
5371.286	4.8474	7.0	2.5398^{o}	7.0	5371.321	16.9		0.1	
5376.098	4.6910^{o}	9.0	2.3855	9.0	5376.088^{b}	22.3		-0.0	
5376.127	4.7674	7.0	2.4619^{o}	6.0	5376.088^{b}	22.9		0.1	
5376.668	5.6664	6.0	3.3611^{o}	5.0	5376.631	14.0			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5377.243	4.9029	6.0	2.5979^o	7.0	5377.261^c	9.7		-0.1	
5381.345	4.5376	8.0	2.2344^o	8.0	5381.364^{bc}	24.5		-0.2	
5381.357	3.5541	5.0	1.2508^o	6.0	5381.364^{bc}	25.2		-1.5	
5381.361	4.0846	6.0	1.7813^o	7.0	5381.364^{bc}	25.2		-0.8	
5392.035	5.0628	4.0	2.7641^o	5.0	5392.041^{bc}	119.6			
5392.046	3.3549	8.0	1.0562^o	7.0	5392.041^{bc}	119.7		-1.1	
5392.078	4.3182	9.0	2.0195^o	8.0	5392.041^{bc}	117.6		0.2	
5395.535	4.8191	8.0	2.5219^o	8.0	5395.576^{bc}	440.8			
5395.576	2.2972^o	7.0	0.0000	8.0	5395.576^{bc}	435.7		-1.9	
5404.193	2.8061^o	6.0	0.5126	7.0	5404.191	371.6		-1.3	
5407.732	4.5264	7.0	2.2344^o	8.0	5407.740^c	16.6		-0.4	
5409.681	4.6767^o	8.0	2.3855	9.0	5409.651	25.6		0.0	
5416.551	4.6319^o	7.0	2.3436	8.0	5416.524	8.9		-0.5	
5419.106	4.8765	7.0	2.5893^o	8.0	5419.133^b	156.3			
5419.150	4.8765	9.0	2.5893^o	8.0	5419.134^b	148.1			
5420.760	5.1093	9.0	2.8228^o	8.0	5420.770^b	65.7			
5420.770	3.5252	10.0	1.2387^o	9.0	5420.770^b	65.7		-1.1	
5424.275	4.4565^o	10.0	2.1715	9.0	5424.281	54.2		0.1	
5425.305	4.4559	9.0	2.1713^o	10.0	5425.321	11.5		-0.6	
5426.716	4.6319^o	7.0	2.3479	7.0	5426.722^c	13.0		-0.3	
5437.640	4.9317	7.0	2.6523^o	6.0	5437.628^c	21.1		0.3	
5455.688	3.8409	8.0	1.5690^o	7.0	5455.707^b	18.6		-1.2	
5455.704	3.9451	8.0	1.6732^o	9.0	5455.707^b	20.2		-1.0	
5471.964	3.5159	7.0	1.2508^o	6.0	5471.957	26.0	-1.7	-1.5	
5479.915	4.7948	5.0	2.5329^o	4.0	5479.907^b	9.1		-0.3	
5479.933	4.6055^o	8.0	2.3436	8.0	5479.907^b	9.5		-0.5	
5486.836	3.5098	5.0	1.2508^o	6.0	5486.827	10.4		-1.9	
5491.808	3.7042	7.0	1.4473^o	6.0	5491.803	19.2		-1.4	
5496.830	4.5985^o	9.0	2.3436	8.0	5496.829^c	29.5		-0.0	
5497.290	4.1847	8.0	1.9301^o	8.0	5497.304	8.0		-1.1	
5499.552	4.5428^o	10.0	2.2890	10.0	5499.556	9.4		-0.6	
5501.852	4.5965^o	7.0	2.3436	8.0	5501.837^{bc}	6.8		-0.6	
5501.864	4.7210	8.0	2.4682^o	7.0	5501.837^{bc}	6.8		-0.5	
5502.795	3.4911	9.0	1.2387^o	9.0	5502.793	82.0		-1.0	
5511.460	5.3338	5.0	3.0849^o	5.0	5511.498^b	18.0		0.8	
5511.519	5.0628	4.0	2.8140^o	4.0	5511.497^b	19.1		0.4	
5528.013	3.8111	8.0	1.5690^o	7.0	5528.010^n	70.6		-0.7	-0.8
5542.147	4.6910^o	9.0	2.4546	10.0	5542.191^b	26.1		0.1	
5542.196	4.7419^o	10.0	2.5055	9.0	5542.191^b	24.6		0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5552.850	4.4036^{o}	8.0	2.1715	9.0	5552.861	9.1		-0.8	
5568.144	4.5739^{o}	8.0	2.3479	7.0	5568.143^{c}	11.9		-0.4	
5576.608	2.7352^{o}	7.0	0.5126	7.0	5576.614^{b}	15.2		-2.8	
5576.630	4.6160	5.0	2.3934^{o}	6.0	5576.614^{b}	15.2		-0.3	
5579.898	3.2775	7.0	1.0562^{o}	7.0	5579.894	11.7		-2.1	
5583.189	3.2762	7.0	1.0562^{o}	7.0	5583.200^{bc}	34.4		-1.7	
5583.224	3.4587	8.0	1.2387^{o}	9.0	5583.200^{bc}	35.4		-1.4	
5605.629	4.6100^{o}	11.0	2.3989	11.0	5605.615	32.0		0.1	
5609.857	3.7784	6.0	1.5690^{o}	7.0	5609.848	8.3		-1.6	
5613.227	4.7136^{o}	10.0	2.5055	9.0	5613.227^{c}	50.6		0.4	
5616.469	4.4502^{o}	8.0	2.2434	7.0	5616.455	6.8		-0.8	
5620.605	4.6734	7.0	2.4682^{o}	7.0	5620.615^{b}	6.9		-0.5	
5620.625	3.3473^{o}	4.0	1.1421	5.0	5620.615^{b}	7.4		-2.2	
5622.496	4.1847	8.0	1.9803^{o}	9.0	5622.485	12.6		-0.9	
5626.097	4.6712	8.0	2.4682^{o}	7.0	5626.136^{b}	7.7		-0.5	
5626.143	3.5576^{o}	3.0	1.3545	4.0	5626.137^{b}	6.9		-2.0	
5627.484	2.7151^{o}	8.0	0.5126	7.0	5627.476^{n}	101.7		-1.9	-1.9
5637.159	3.7235	5.0	1.5248^{o}	5.0	5637.142^{b}	7.2		-1.7	
5637.165	4.9063	10.0	2.7076^{o}	9.0	5637.142^{b}	7.2		-0.2	
5639.499	2.1978^{o}	9.0	0.0000	8.0	5639.490^{n}	5261.0		-0.9	-1.4
5645.726	3.6841	9.0	1.4887^{o}	8.0	5645.725	15.5		-1.5	
5645.946	4.7763	7.0	2.5810^{o}	6.0	5645.983^{bc}	127.2		0.9	
5645.990	4.3668^{o}	9.0	2.1715	9.0	5645.983^{bc}	128.3		0.4	
5651.423	4.1599	7.0	1.9667^{o}	6.0	5651.464^{b}	11.8		-1.0	
5651.467	4.3861	8.0	2.1930^{o}	7.0	5651.464^{b}	11.5		-0.7	
5652.014	2.1930^{o}	7.0	0.0000	8.0	5652.004^{n}	3165.7		-1.1	-1.5
5666.430	4.6910^{o}	9.0	2.5036	8.0	5666.422	11.9		-0.2	
5671.248	4.5710^{o}	10.0	2.3855	9.0	5671.254	18.3		-0.2	
5677.690	4.3668^{o}	9.0	2.1837	8.0	5677.677^{c}	31.8		-0.2	
5682.156	4.6495	7.0	2.4682^{o}	7.0	5682.199^{b}	18.6		-0.1	
5682.183	3.9111	5.0	1.7298^{o}	4.0	5682.199^{b}	19.0		-1.1	
5682.999	4.2556	7.0	2.0746^{o}	8.0	5683.030^{bc}	9.1		-0.9	
5683.045	3.4318	5.0	1.2508^{o}	6.0	5683.029^{bc}	10.6		-2.0	
5685.583	3.0542^{o}	5.0	0.8741	6.0	5685.581	126.7		-1.4	
5690.951	3.7764	9.0	1.5985^{o}	10.0	5690.964	8.6		-1.6	
5692.312	4.7754	8.0	2.5979^{o}	7.0	5692.338^{b}	8.2		-0.3	
5692.348	5.0329^{o}	9.0	2.8555	8.0	5692.339^{b}	11.5		0.2	
5699.329	2.6873^{o}	7.0	0.5126	7.0	5699.325	102.2	-2.3	-2.0	
5702.908	3.1114	8.0	0.9380^{o}	8.0	5702.906	148.6		-1.2	
5707.030	4.1913	7.0	2.0195^{o}	8.0	5707.042	5.4		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5707.808	4.3430^o	8.0	2.1715	9.0	5707.800^{bc}	32.3		-0.3	
5707.844	4.5295^o	8.0	2.3580	8.0	5707.800^{bc}	32.0		-0.0	
5710.749	5.6664	6.0	3.4960^o	6.0	5710.785	8.5		0.9	
5710.984	5.1307	8.0	2.9604^o	8.0	5711.022^{bc}	16.2		0.5	
5711.020	3.6590	7.0	1.4887^o	8.0	5711.023^{bc}	20.1		-1.4	
5713.847	3.6165	7.0	1.4473^o	6.0	5713.841^c	8.2		-1.8	
5715.085	4.3666	9.0	2.1978^o	9.0	5715.064^c	63.5		0.1	
5718.462	4.4565^o	10.0	2.2890	10.0	5718.459^c	81.9		0.3	
5732.907	4.5057^o	9.0	2.3436	8.0	5732.907	23.7		-0.2	
5737.701	4.4036^o	8.0	2.2434	7.0	5737.710^c	15.2		-0.5	
5740.188	4.9473^o	9.0	2.7880	10.0	5740.197^{bc}	44.7		0.7	
5740.208	4.3430^o	8.0	2.1837	8.0	5740.197^{bc}	44.7		-0.1	
5745.506	4.5428^o	10.0	2.3855	9.0	5745.526^b	167.8		0.7	
5745.534	3.3960	9.0	1.2387^o	9.0	5745.526^b	170.5	-1.1	-0.8	
5750.483	4.6100^o	11.0	2.4546	10.0	5750.477	20.5		-0.1	
5754.261	3.4048	7.0	1.2508^o	6.0	5754.259	17.1	-1.8	-1.8	
5758.227	4.3362^o	7.0	2.1837	8.0	5758.227^c	17.2		-0.5	
5758.761	4.0362	8.0	1.8839^o	7.0	5758.791^b	163.7		0.1	
5758.791	3.2085	7.0	1.0562^o	7.0	5758.791^b	163.7		-1.1	
5761.858	4.4991^o	8.0	2.3479	7.0	5761.849	9.4		-0.6	
5790.909	4.1599	7.0	2.0195^o	8.0	5790.877	24.6		-0.6	
5802.602	4.4941^o	7.0	2.3580	8.0	5802.612^b	26.3		-0.1	
5802.619	3.2781^o	4.0	1.1421	5.0	5802.612^b	26.9		-1.7	
5805.548	3.8082	9.0	1.6732^o	9.0	5805.548	31.8		-1.0	
5807.652	3.7327	10.0	1.5985^o	10.0	5807.661^{bc}	35.7		-1.0	
5807.702	4.7088	7.0	2.5746^o	7.0	5807.661^{bc}	34.2		0.3	
5813.031	4.3666	9.0	2.2344^o	8.0	5813.070	6.3		-0.9	
5829.284	3.9396	9.0	1.8133^o	8.0	5829.289	12.0		-1.2	
5889.922	5.2667^o	5.0	3.1623	6.0	5889.950	6.1		0.3	
5931.807	4.4750^o	10.0	2.3855	9.0	5931.758	13.6		-0.4	
5933.169	3.6875	11.0	1.5985^o	10.0	5933.175	12.7		-1.5	
5964.466	3.3168	10.0	1.2387^o	9.0	5964.463^{bc}	317.2		-0.6	
5964.468	4.8412	5.0	2.7631^o	6.0	5964.463^{bc}	317.2			
5969.975	4.8989	9.0	2.8228^o	8.0	5970.008^{bc}	11.1		0.1	
5970.028	4.4750^o	10.0	2.3989	11.0	5970.008^{bc}	11.1		-0.5	
5979.995	2.0727^o	9.0	0.0000	8.0	5979.990	54.6		-3.0	
5984.861	4.4565^o	10.0	2.3855	9.0	5984.861^c	31.6		-0.1	
5985.993	3.2127^o	5.0	1.1421	5.0	5985.988^c	61.5		-1.4	
5988.564	2.0697^o	7.0	0.0000	8.0	5988.554^n	2837.1		-1.3	-1.3
6003.265	3.5119	6.0	1.4473^o	6.0	6003.252	22.2	-1.5	-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6008.938	2.9368^{o}	6.0	0.8741	6.0	6008.940^{c}	74.2		-1.7	
6009.318	5.5156	8.0	3.4530^{o}	8.0	6009.335^{b}	19.8			
6009.327	3.6316	8.0	1.5690^{o}	7.0	6009.335^{b}	19.8		-1.3	
6010.817	2.5746^{o}	7.0	0.5126	7.0	6010.811^{n}	313.4		-1.6	-1.3
6017.267	3.2019^{o}	6.0	1.1421	5.0	6017.264^{c}	59.8		-1.4	
6052.395	5.0673	8.0	3.0194^{o}	7.0	6052.443^{b}	12.5		0.4	
6052.428	4.7554	8.0	2.7076^{o}	9.0	6052.443^{b}	12.5		-0.0	
6058.177	2.9201^{o}	5.0	0.8741	6.0	6058.174^{c}	104.9		-1.6	
6067.898	3.1847^{o}	4.0	1.1421	5.0	6067.894^{c}	22.7		-1.9	
6085.051	2.9110^{o}	7.0	0.8741	6.0	6085.054	170.3		-1.4	
6088.260	2.5484^{o}	6.0	0.5126	7.0	6088.250^{n}	747.6		-1.2	-1.0
6089.264	4.9317	7.0	2.8962^{o}	6.0	6089.304^{b}	28.4		0.6	
6089.298	3.2863	5.0	1.2508^{o}	6.0	6089.304^{b}	28.1		-1.6	
6090.852	4.9411	4.0	2.9062^{o}	5.0	6090.887^{b}	41.0		0.7	
6090.891	2.9091^{o}	6.0	0.8741	6.0	6090.887^{b}	41.2		-2.0	
6103.372	3.0870	6.0	1.0562^{o}	7.0	6103.374^{c}	25.9		-1.9	
6115.278	3.0831	6.0	1.0562^{o}	7.0	6115.267	20.1		-2.1	
6115.672	3.2775	7.0	1.2508^{o}	6.0	6115.672^{c}	17.9		-1.8	
6116.180	4.6075	6.0	2.5810^{o}	6.0	6116.169	6.8		-0.5	
6119.625	3.2762	7.0	1.2508^{o}	6.0	6119.632^{b}	41.6		-1.5	
6119.669	4.9621	4.0	2.9367^{o}	4.0	6119.632^{b}	41.5		0.8	
6124.832	3.7784	6.0	1.7548^{o}	5.0	6124.864^{b}	10.8		-1.4	
6124.899	4.9327	6.0	2.9091^{o}	6.0	6124.864^{b}	10.3		0.1	
6126.484	4.3668^{o}	9.0	2.3436	8.0	6126.484^{c}	17.5		-0.4	
6127.148	3.5919	8.0	1.5690^{o}	7.0	6127.144^{n}	33.1		-1.2	-1.0
6133.645	3.2716	6.0	1.2508^{o}	6.0	6133.643	91.0		-1.1	
6158.237	3.9930	9.0	1.9803^{o}	9.0	6158.285^{bc}	49.4		-0.4	
6158.279	4.6029	6.0	2.5902^{o}	5.0	6158.284^{bc}	47.0		0.4	
6158.283	2.9507	7.0	0.9380^{o}	8.0	6158.284^{bc}	47.0		-1.9	
6168.429	2.5219^{o}	8.0	0.5126	7.0	6168.424^{n}	421.2		-1.5	-1.1
6182.095	4.6029	6.0	2.5979^{o}	7.0	6182.143	13361.9			
6204.009	3.8111	8.0	1.8133^{o}	8.0	6204.011^{b}	5.5	-1.7	-1.6	
6204.017	5.1307	8.0	3.1329^{o}	7.0	6204.011^{b}	5.4		0.1	
6204.052	4.5376	8.0	2.5398^{o}	7.0	6204.011^{b}	5.5		-0.7	
6207.974	4.8520^{o}	8.0	2.8555	8.0	6207.975^{c}	8.0		-0.1	
6224.370	4.9473^{o}	9.0	2.9559	9.0	6224.421	25.7		0.6	
6255.438	4.6890	8.0	2.7076^{o}	9.0	6255.439^{bc}	9.1		-0.2	
6255.446	4.0511	8.0	2.0697^{o}	7.0	6255.439^{bc}	9.1		-1.1	
6259.088	1.9803^{o}	9.0	0.0000	8.0	6259.078^{n}	4252.3		-1.2	-1.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6260.359	3.6531	9.0	1.6732^o	9.0	6260.382^{bc}	74.0		-0.7	
6260.378	4.1728	6.0	2.1930^o	7.0	6260.382^{bc}	74.6		0.0	
6281.276	3.1153^o	5.0	1.1421	5.0	6281.275^c	5.3		-2.6	
6291.653	3.4587	8.0	1.4887^o	8.0	6291.649	14.0		-1.7	
6338.080	2.4682^o	7.0	0.5126	7.0	6338.082	42.8		-2.5	
6343.327	4.7419^o	10.0	2.7880	10.0	6343.318	12.7		0.0	
6366.875	4.2370	9.0	2.2903^o	8.0	6366.838	10.1		-0.8	
6427.284	2.4410^o	8.0	0.5126	7.0	6427.285	30.9	-2.9	-2.7	
6432.959	3.5252	10.0	1.5985^o	10.0	6432.969^c	9.4		-1.7	
6450.504	5.0368	4.0	3.1153^o	5.0	6450.484^{bc}	3.4		-0.2	
6450.509	5.0329^o	9.0	3.1114	8.0	6450.484^{bc}	3.4		-0.2	
6460.832	2.7926^o	5.0	0.8741	6.0	6460.819	26.5		-2.2	
6474.907	4.8572	10.0	2.9429^o	9.0	6474.910	8.9		0.0	
6486.578	4.5981	8.0	2.6873^o	7.0	6486.583^{bc}	53.0		0.5	
6486.595	3.8409	8.0	1.9301^o	8.0	6486.583^{bc}	53.0		-0.5	
6486.599	4.8170	6.0	2.9062^o	5.0	6486.583^{bc}	53.0		0.8	
6542.609	2.9507	7.0	1.0562^o	7.0	6542.602	3.9		-2.9	
6557.983	5.0747	5.0	3.1847^o	4.0	6558.015^{bc}	106.6			
6558.027	2.7641^o	5.0	0.8741	6.0	6558.015^{bc}	107.4		-1.7	
6565.115	4.3561	7.0	2.4682^o	7.0	6565.103^c	13.4		-0.4	
6570.193	3.6998	8.0	1.8133^o	8.0	6570.192	4.7		-1.8	
6579.368	1.8839^o	7.0	0.0000	8.0	6579.352^n	3351.2		-1.3	-1.1
6639.216	3.9396	9.0	2.0727^o	9.0	6639.216^c	6.1		-1.3	
6641.462	3.3549	8.0	1.4887^o	8.0	6641.452	3.1		-2.4	
6643.373	2.3783^o	6.0	0.5126	7.0	6643.384^b	191.3		-1.9	
6643.408	4.4042	5.0	2.5385^o	4.0	6643.384^b	185.3		0.8	
6645.493	3.5384	8.0	1.6732^o	9.0	6645.490^c	2.6		-2.2	
6658.039	2.9178	8.0	1.0562^o	7.0	6658.033	9.0		-2.5	
6658.359	4.3297	8.0	2.4682^o	7.0	6658.347	16.3		-0.4	
6661.638	3.8409	8.0	1.9803^o	9.0	6661.623^c	41.5		-0.6	
6667.858	3.7889	9.0	1.9301^o	8.0	6667.852	189.1		-0.0	
6688.066	3.3419	9.0	1.4887^o	8.0	6688.068^c	13.4		-1.8	
6736.027	2.8963	7.0	1.0562^o	7.0	6736.066^{bc}	5.5		-2.7	
6736.077	3.3287	7.0	1.4887^o	8.0	6736.066^{bc}	5.6		-2.2	
6739.855	3.2863	5.0	1.4473^o	6.0	6739.865	2.6		-2.5	
6742.269	4.0362	8.0	2.1978^o	9.0	6742.256^c	2.9		-1.5	
6744.438	4.5710^o	10.0	2.7333	9.0	6744.443^{bc}	3.0		-0.8	
6744.470	4.2996	6.0	2.4619^o	6.0	6744.443^{bc}	3.0		-1.1	
6747.939	3.9065	7.0	2.0697^o	7.0	6747.923	35.6		-0.6	
6750.149	4.7299	8.0	2.8937^o	7.0	6750.203^{bc}	11.0		0.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6750.213	3.0870	6.0	1.2508^{o}	6.0	6750.203^{bc}	10.4		-2.2	
6757.627	4.3561	7.0	2.5219^{o}	8.0	6757.608^{c}	8.4		-0.6	
6759.107	3.4028	8.0	1.5690^{o}	7.0	6759.116	3.0		-2.3	
6764.780	3.0831	6.0	1.2508^{o}	6.0	6764.774	5.2		-2.5	
6765.900	3.9065	7.0	2.0746^{o}	8.0	6765.885^{b}	85.4		-0.2	
6765.928	4.6459	5.0	2.8140^{o}	4.0	6765.885^{b}	85.8		0.8	
6767.765	3.9041	10.0	2.0727^{o}	9.0	6767.773^{bc}	6.4		-1.3	
6767.820	4.5946	6.0	2.7631^{o}	6.0	6767.772^{bc}	5.6		-0.5	
6777.028	3.2762	7.0	1.4473^{o}	6.0	6777.042	10.7		-1.9	
6787.375	3.8959	7.0	2.0697^{o}	7.0	6787.371^{c}	6.8		-1.3	
6790.304	2.3379^{o}	7.0	0.5126	7.0	6790.301	32.4	-3.1	-2.7	
6803.320	5.0238	6.0	3.2019^{o}	6.0	6803.308^{c}	1.9		-0.4	
6805.548	3.8959	7.0	2.0746^{o}	8.0	6805.541^{b}	5.1		-1.4	
6805.562	4.5086	6.0	2.6873^{o}	7.0	6805.541^{b}	5.1		-0.6	
6805.576	4.6675	5.0	2.8462^{o}	6.0	6805.541^{b}	4.9		-0.4	
6818.201	3.4911	9.0	1.6732^{o}	9.0	6818.205	18.1		-1.4	
6821.755	4.8989	9.0	3.0820^{o}	10.0	6821.774^{b}	10.7		0.2	
6821.783	4.3916	6.0	2.5746^{o}	7.0	6821.774^{b}	9.4		-0.5	
6833.655	3.8884	7.0	2.0746^{o}	8.0	6833.645	2.2		-1.8	
6843.732	4.9958	3.0	3.1847^{o}	4.0	6843.747^{bc}	2.3		-0.3	
6843.746	5.0238	6.0	3.2127^{o}	5.0	6843.747^{bc}	2.3		-0.3	
6851.997	4.7200	6.0	2.9110^{o}	7.0	6851.973	2.7		-0.6	
6852.960	3.7889	9.0	1.9803^{o}	9.0	6852.951^{c}	196.3		0.0	
6856.461	4.3297	8.0	2.5219^{o}	8.0	6856.448	23.9		-0.2	
6857.897	2.3199^{o}	6.0	0.5126	7.0	6857.895^{b}	4.8		-3.5	
6857.900	4.4596	6.0	2.6523^{o}	6.0	6857.895^{b}	4.8		-0.7	
6886.372	4.9327	6.0	3.1329^{o}	7.0	6886.392^{bc}	3.3		-0.2	
6886.395	4.7200	6.0	2.9201^{o}	5.0	6886.392^{bc}	3.3		-0.5	
6886.433	4.8993	7.0	3.0995^{o}	8.0	6886.392^{bc}	3.3		-0.3	
6888.830	2.8555	8.0	1.0562^{o}	7.0	6888.829	84.8		-1.6	
6894.474	3.8724	8.0	2.0746^{o}	8.0	6894.495^{bc}	4.9		-1.5	
6894.526	4.7088	7.0	2.9110^{o}	7.0	6894.495^{bc}	4.7		-0.4	
6895.501	3.3960	9.0	1.5985^{o}	10.0	6895.508^{bc}	8.4	-2.1	-1.9	
6895.505	4.1174	6.0	2.3199^{o}	6.0	6895.508^{bc}	8.4		-0.9	
6898.908	4.7664	9.0	2.9698^{o}	10.0	6898.936	3.3		-0.4	
6905.947	2.9368^{o}	6.0	1.1421	5.0	6905.940	2.0		-3.1	
6906.453	2.9367^{o}	4.0	1.1421	5.0	6906.442^{bc}	23.0		-2.0	
6906.476	5.0083	7.0	3.2137^{o}	6.0	6906.442^{bc}	23.0		0.7	
6945.221	4.5179^{o}	9.0	2.7333	9.0	6945.263^{b}	12.0		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
6945.265	2.2972^o	7.0	0.5126	7.0	6945.263^b	12.0		-3.2	
6951.417	4.5710^o	10.0	2.7880	10.0	6951.406	9.2		-0.2	
6956.411	3.6731	3.0	1.8913^o	3.0	6956.404	1.7		-2.2	
6957.426	4.8449	7.0	3.0634^o	7.0	6957.473^b	3.2		-0.3	
6957.488	4.3561	7.0	2.5746^o	7.0	6957.473^b	2.8		-1.0	
6957.517	5.1307	8.0	3.3492^o	9.0	6957.473^b	2.7		-0.0	
6958.045	5.1125	9.0	3.3311^o	8.0	6958.078^{bc}	385.1			
6958.086	1.7813^o	7.0	0.0000	8.0	6958.078^{bc}	388.9		-2.3	
6958.098	4.6275	6.0	2.8462^o	6.0	6958.078^{bc}	384.9			
6966.962	4.8080^o	7.0	3.0289	7.0	6966.965^b	1.8		-0.6	
6966.996	5.0329^o	9.0	3.2538	9.0	6966.965^b	1.8		-0.3	
6968.769	3.5919	8.0	1.8133^o	8.0	6968.782^c	1.8	-2.4	-2.3	
6970.426	3.2668	8.0	1.4887^o	8.0	6970.424	25.2		-1.5	
6982.426	4.3561	7.0	2.5810^o	6.0	6982.429^{bc}	8.9		-0.5	
6982.465	5.0739	4.0	3.2988^o	3.0	6982.429^{bc}	9.0		0.4	
6998.096	3.8409	8.0	2.0697^o	7.0	6998.085^b	76.2		-0.3	
6998.116	4.6674^o	8.0	2.8963	7.0	6998.085^b	76.2		0.8	
7017.357	5.3239	4.0	3.5576^o	3.0	7017.403^b	25.2			
7017.416	3.8409	8.0	2.0746^o	8.0	7017.403^b	25.3		-0.8	
7037.477	5.2019	4.0	3.4407^o	4.0	7037.535^b	35.2			
7037.507	3.2085	7.0	1.4473^o	6.0	7037.535^b	35.3		-1.5	
7043.621	3.3287	7.0	1.5690^o	7.0	7043.625	5.8		-2.1	
7091.732	4.2043	6.0	2.4566^o	5.0	7091.727	1.5		-1.5	
7109.283	3.3419	9.0	1.5985^o	10.0	7109.267^c	1.0		-2.8	
7121.230	2.2531^o	6.0	0.5126	7.0	7121.230^c	88.6		-2.3	
7156.474	4.6748	10.0	2.9429^o	9.0	7156.460^c	5.8		-0.3	
7162.030	3.5119	6.0	1.7813^o	7.0	7162.056	2.7	-2.2	-2.1	
7194.831	3.3960	9.0	1.6732^o	9.0	7194.826	5.2	-2.3	-2.0	
7198.649	2.2344^o	8.0	0.5126	7.0	7198.648^c	7.5		-3.4	
7206.764	3.2085	7.0	1.4887^o	8.0	7206.767^b	8.3		-2.1	
7206.811	4.6136	7.0	2.8937^o	7.0	7206.767^b	8.4		-0.2	
7207.278	4.6919^o	8.0	2.9721	7.0	7207.328^b	4.7		-0.3	
7207.327	2.5939^o	5.0	0.8741	6.0	7207.328^b	5.3		-3.1	
7215.502	4.2397	7.0	2.5219^o	8.0	7215.505^b	3.0		-1.1	
7215.508	4.6607	9.0	2.9429^o	9.0	7215.505^b	3.0		-0.6	
7220.782	4.3872	10.0	2.6706^o	9.0	7220.764	1.3		-1.3	
7222.514	3.9091	6.0	2.1930^o	7.0	7222.515^b	1.9		-1.8	
7222.535	5.0329^o	9.0	3.3168	10.0	7222.515^b	1.8		-0.3	
7222.902	2.5902^o	5.0	0.8741	6.0	7222.906^c	5.1		-3.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7230.035	4.9280	5.0	3.2137^{o}	6.0	7230.033^{bc}	22.7		0.7	
7230.046	3.7889	9.0	2.0746^{o}	8.0	7230.033^{bc}	22.5		-0.8	
7250.009	2.9483	9.0	1.2387^{o}	9.0	7250.006	37.0		-1.7	
7261.742	2.5810^{o}	6.0	0.8741	6.0	7261.743^{b}	10.2		-2.8	
7261.767	4.6240	7.0	2.9172^{o}	6.0	7261.743^{b}	10.0		-0.1	
7273.237	2.8462^{o}	6.0	1.1421	5.0	7273.235	3.2		-2.9	
7279.894	3.2716	6.0	1.5690^{o}	7.0	7279.894	4.2		-2.3	
7291.613	2.9507	7.0	1.2508^{o}	6.0	7291.609^{b}	2.1		-3.0	
7291.665	5.0869	9.0	3.3870^{o}	8.0	7291.609^{b}	2.2		-0.1	
7300.217	4.1227	9.0	2.4248^{o}	9.0	7300.271^{b}	7.0		-0.9	
7300.265	3.2668	8.0	1.5690^{o}	7.0	7300.271^{b}	7.1		-2.0	
7300.307	4.2376	6.0	2.5398^{o}	7.0	7300.271^{b}	7.2		-0.7	
7353.583	2.9363	6.0	1.2508^{o}	6.0	7353.603^{c}	2.5		-2.9	
7367.531	4.4749	6.0	2.7926^{o}	5.0	7367.523^{b}	6.8		-0.4	
7367.564	3.9354	5.0	2.2531^{o}	6.0	7367.524^{b}	7.4		-1.1	
7376.039	2.1930^{o}	7.0	0.5126	7.0	7376.023^{n}	159.1		-2.1	-1.9
7381.568	2.9178	8.0	1.2387^{o}	9.0	7381.565	28.9		-1.9	
7401.075	4.6294	8.0	2.9547^{o}	8.0	7401.103	6.8		-0.2	
7403.042	4.3526^{o}	7.0	2.6784	8.0	7403.094^{b}	8.3		-0.5	
7403.104	2.5484^{o}	6.0	0.8741	6.0	7403.094^{b}	8.3	-2.7	-2.9	
7403.953	4.5295^{o}	8.0	2.8555	8.0	7404.010^{b}	8.4		-0.3	
7404.014	2.9249	7.0	1.2508^{o}	6.0	7404.010^{b}	8.3		-2.4	
7407.600	1.6732^{o}	9.0	0.0000	8.0	7407.594	49.6		-3.3	
7412.379	3.9065	7.0	2.2344^{o}	8.0	7412.361	40.7		-0.4	
7427.889	3.3419	9.0	1.6732^{o}	9.0	7427.886	6.4		-2.0	
7428.545	4.4565^{o}	10.0	2.7880	10.0	7428.528	3.8		-0.7	
7459.992	3.8959	7.0	2.2344^{o}	8.0	7459.992^{c}	5.6		-1.3	
7481.508	4.6607	9.0	3.0040^{o}	9.0	7481.483	2.1		-0.7	
7483.036	4.3916	6.0	2.7352^{o}	7.0	7483.030	5.7		-0.6	
7503.841	5.0385	8.0	3.3867^{o}	7.0	7503.868^{b}	2.1		-0.2	
7503.886	4.3669	7.0	2.7151^{o}	8.0	7503.868^{b}	2.8		-0.9	
7509.602	2.7926^{o}	5.0	1.1421	5.0	7509.590	4.5		-2.8	
7521.404	3.9451	8.0	2.2972^{o}	7.0	7521.420^{b}	4.1		-1.3	
7521.461	3.8409	8.0	2.1930^{o}	7.0	7521.420^{b}	4.0		-1.5	
7521.478	4.4111	5.0	2.7631^{o}	6.0	7521.420^{b}	4.0		-0.7	
7533.119	4.7088	7.0	3.0634^{o}	7.0	7533.156^{b}	7.1		-0.1	
7533.170	4.5882	10.0	2.9429^{o}	9.0	7533.156^{b}	7.4		-0.2	
7539.789	4.5376	8.0	2.8937^{o}	7.0	7539.842^{b}	2.2		-0.8	
7539.846	2.7001	7.0	1.0562^{o}	7.0	7539.842^{b}	2.3		-3.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7548.687	3.6615	7.0	2.0195^o	8.0	7548.695^b	1.8		-2.0	
7548.704	4.7299	8.0	3.0880^o	7.0	7548.695^b	1.8		-0.6	
7553.010	4.3561	7.0	2.7151^o	8.0	7552.995	18.3		-0.1	
7557.807	4.5829	9.0	2.9429^o	9.0	7557.840^b	11.0		-0.0	
7557.860	2.8787	9.0	1.2387^o	9.0	7557.840^b	11.2		-2.3	
7559.790	2.5775	8.0	0.9380^o	8.0	7559.782	128.4		-1.6	
7564.183	4.4941^o	7.0	2.8555	8.0	7564.245^b	1.4		-1.1	
7564.251	4.7266	7.0	3.0880^o	7.0	7564.245^b	1.3		-0.8	
7566.977	3.8724	8.0	2.2344^o	8.0	7566.984^{bc}	1.7		-1.8	
7567.028	5.0869	9.0	3.4489^o	8.0	7566.984^{bc}	1.8		-0.1	
7591.363	4.6367	8.0	3.0040^o	9.0	7591.318	23.8		0.4	
7617.694	4.7266	7.0	3.0995^o	8.0	7617.676	3.2		-0.4	
7631.266	4.7229	5.0	3.0987^o	5.0	7631.280	2.7		-0.4	
7639.312	4.5829	9.0	2.9604^o	8.0	7639.295	3.9		-0.5	
7641.094	3.6570	5.0	2.0349^o	4.0	7641.097^b	22.1		-1.0	
7641.094	4.3297	8.0	2.7076^o	9.0	7641.097^b	22.1		-0.1	
7645.137	4.5816	8.0	2.9604^o	8.0	7645.143^b	1.7		-0.8	
7645.167	4.7200	6.0	3.0987^o	5.0	7645.143^b	1.5		-0.7	
7645.798	4.9630^o	9.0	3.3419	9.0	7645.858^{bc}	20.9		0.8	
7645.916	2.7631^o	6.0	1.1421	5.0	7645.858^{bc}	20.9		-2.2	
7646.623	4.5320	8.0	2.9110^o	7.0	7646.625^b	11.2		-0.1	
7646.640	4.3561	7.0	2.7352^o	7.0	7646.625^b	11.0		-0.3	
7662.353	3.7889	9.0	2.1713^o	10.0	7662.357^c	122.3		-0.0	
7676.656	4.8217	5.0	3.2071^o	6.0	7676.683^{bc}	5.2		-0.0	
7676.692	4.3297	8.0	2.7151^o	8.0	7676.683^{bc}	4.9		-0.7	
7696.538	3.4665	7.0	1.8561^o	6.0	7696.535	3.4		-2.0	
7714.264	4.3075	7.0	2.7007^o	7.0	7714.321	10.0		-0.4	
7715.331	3.8409	8.0	2.2344^o	8.0	7715.327^c	34.8		-0.5	
7750.088	4.4991^o	8.0	2.8998	8.0	7750.151^{bc}	9.2		-0.2	
7750.164	2.9538^o	3.0	1.3545	4.0	7750.151^{bc}	8.9		-2.3	
7751.632	4.3916	6.0	2.7926^o	5.0	7751.616^c	4.4		-0.7	
7757.341	2.7399^o	4.0	1.1421	5.0	7757.331	19.2		-2.2	
7760.091	4.5576	8.0	2.9604^o	8.0	7760.087	2.8		-0.6	
7775.781	2.4682^o	7.0	0.8741	6.0	7775.787	2.6		-3.5	
7777.807	3.2668	8.0	1.6732^o	9.0	7777.820	3.4		-2.3	
7780.893	4.3561	7.0	2.7631^o	6.0	7780.872^c	5.0		-0.6	
7790.018	3.7889	9.0	2.1978^o	9.0	7790.003	25.9		-0.7	
7797.607	4.5264	7.0	2.9368^o	6.0	7797.571	10.5		-0.1	
7798.008	3.4028	8.0	1.8133^o	8.0	7798.006	4.4		-2.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7801.544	5.6664	6.0	4.0776^o	5.0	7801.573^b	1.2		0.5	
7801.617	3.8790	9.0	2.2903^o	8.0	7801.573^b	1.4		-1.8	
7812.066	3.9065	7.0	2.3199^o	6.0	7812.047^c	44.7		-0.3	
7814.582	3.4700	6.0	1.8839^o	7.0	7814.599^c	4.8		-1.8	
7833.894	2.9367^o	4.0	1.3545	4.0	7833.878	2.4		-2.8	
7836.812	3.0289	7.0	1.4473^o	6.0	7836.833	5.2		-2.4	
7864.939	4.7088	7.0	3.1329^o	7.0	7864.962^b	3.9		-0.3	
7864.970	3.8959	7.0	2.3199^o	6.0	7864.962^b	4.0		-1.3	
7902.533	3.8884	7.0	2.3199^o	6.0	7902.524^b	2.4		-1.6	
7902.583	4.9406	6.0	3.3722^o	6.0	7902.523^b	2.2		-0.2	
7909.360	4.1417	8.0	2.5746^o	7.0	7909.361^{bc}	11.3	0.0	-0.6	
7909.411	4.4781	7.0	2.9110^o	7.0	7909.361^{bc}	11.9		-0.1	
7914.251	3.3209	6.0	1.7548^o	5.0	7914.255	6.8		-1.9	
7916.739	2.5036	8.0	0.9380^o	8.0	7916.738^c	9.0		-2.8	
7934.969	2.0746^o	8.0	0.5126	7.0	7934.969^b	16.6		-3.1	
7934.974	5.8710	8.0	4.3090^o	8.0	7934.969^b	16.5			
7954.136	3.0831	6.0	1.5248^o	5.0	7954.169^b	1.7		-2.8	
7954.179	3.6153	6.0	2.0570^o	6.0	7954.170^b	1.6		-2.1	
7973.103	4.8602	5.0	3.3056^o	4.0	7973.122^b	3.8		-0.1	
7973.134	3.7889	9.0	2.2344^o	8.0	7973.122^b	4.0		-1.5	
8010.198	3.3287	7.0	1.7813^o	7.0	8010.176	6.5		-1.9	
8025.306	2.0570^o	6.0	0.5126	7.0	8025.324	54.7		-2.6	
8027.219	4.6075	6.0	3.0634^o	7.0	8027.225^b	4.0		-0.4	
8027.244	4.3669	7.0	2.8228^o	8.0	8027.225^b	4.0		-0.7	
8040.091	3.3549	8.0	1.8133^o	8.0	8040.094^c	7.2		-1.8	
8041.773	4.6566	5.0	3.1153^o	5.0	8041.811^b	5.1		-0.2	
8041.812	4.4781	7.0	2.9368^o	6.0	8041.811^b	5.3		-0.4	
8042.620	4.5015	8.0	2.9604^o	8.0	8042.665^b	2.3		-0.7	
8042.659	4.8080^o	7.0	3.2668	8.0	8042.665^b	2.3		-0.3	
8042.668	2.4153^o	5.0	0.8741	6.0	8042.665^b	2.3		-3.5	
8047.276	3.0289	7.0	1.4887^o	8.0	8047.280	8.6		-2.1	
8050.843	3.3209	6.0	1.7813^o	7.0	8050.848	7.8		-1.8	
8106.303	3.2588	5.0	1.7298^o	4.0	8106.306^c	3.9		-2.2	
8147.294	2.5775	8.0	1.0562^o	7.0	8147.270^c	40.9		-2.0	
8201.547	3.7042	7.0	2.1930^o	7.0	8201.571^c	2.7		-1.7	
8225.139	2.0195^o	8.0	0.5126	7.0	8225.139	10.5		-3.4	
8240.935	3.8420	6.0	2.3379^o	7.0	8240.940^b	4.0		-1.4	
8240.942	3.2588	5.0	1.7548^o	5.0	8240.940^b	4.0		-2.1	
8279.346	3.5541	5.0	2.0570^o	6.0	8279.286	7.9		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8300.384	4.9463	9.0	3.4530^{o}	8.0	8300.331	98846.7			
8323.836	4.8602	5.0	3.3711^{o}	6.0	8323.860^{b}	10.8		0.5	
8323.843	2.9363	6.0	1.4473^{o}	6.0	8323.860^{b}	10.7		-2.1	
8326.096	4.8846^{o}	8.0	3.3960	9.0	8326.117^{bc}	279.1			
8326.103	1.4887^{o}	8.0	0.0000	8.0	8326.117^{bc}	280.3		-2.6	
8388.519	2.9249	7.0	1.4473^{o}	6.0	8388.525	7.7		-2.3	
8459.917	3.9270	7.0	2.4619^{o}	6.0	8459.862	4.6		-1.1	
8490.135	3.0289	7.0	1.5690^{o}	7.0	8490.156^{bc}	16.6		-1.8	
8490.150	4.0374^{o}	7.0	2.5775	8.0	8490.156^{bc}	16.9		-0.4	
8630.084	4.5242	7.0	3.0880^{o}	7.0	8630.144^{b}	17.5		0.3	
8630.115	2.9249	7.0	1.4887^{o}	8.0	8630.144^{b}	17.5		-1.9	
8652.732	5.1646^{o}	6.0	3.7321	6.0	8652.770	131.7			
8672.617	2.9178	8.0	1.4887^{o}	8.0	8672.604	15.7		-1.9	
8685.261	2.3012^{o}	6.0	0.8741	6.0	8685.253^{bc}	25.9		-2.5	
8685.312	3.6615	7.0	2.2344^{o}	8.0	8685.253^{bc}	26.2		-0.7	
8709.199	3.9451	8.0	2.5219^{o}	8.0	8709.214	5.9		-1.0	
8790.982	2.3479	7.0	0.9380^{o}	8.0	8791.015	4.7		-3.2	
8805.408	2.8963	7.0	1.4887^{o}	8.0	8805.428	4.2		-2.5	
9038.613	1.8839^{o}	7.0	0.5126	7.0	9038.633	58.9	-2.5	-2.7	
9052.238	4.5311^{o}	8.0	3.1619	7.0	9052.265	9.4		0.1	
9100.593	4.1847	8.0	2.8228^{o}	8.0	9100.592	12.6		-0.3	
9141.485	2.9249	7.0	1.5690^{o}	7.0	9141.544	4.4		-2.4	
9171.593	4.7562^{o}	7.0	3.4048	7.0	9171.602^{c}	3.1		-0.1	
9182.325	2.9483	9.0	1.5985^{o}	10.0	9182.334^{b}	73.0		-1.1	
9182.409	4.0205	10.0	2.6706^{o}	9.0	9182.334^{b}	72.6		0.3	
9681.759	4.6294	8.0	3.3492^{o}	9.0	9681.762^{b}	83.2			
9681.796	2.8787	9.0	1.5985^{o}	10.0	9681.762^{b}	87.5		-1.1	
9690.233	4.1728	6.0	2.8937^{o}	7.0	9690.246^{c}	13.7		-0.2	
9806.935	3.3209	6.0	2.0570^{o}	6.0	9807.014^{b}	82.2		-0.5	
9806.955	5.3293	7.0	4.0654^{o}	6.0	9807.014^{b}	82.2			
9890.608	4.3362^{o}	7.0	3.0831	6.0	9890.650	67.8		0.8	
10090.404	4.0511	8.0	2.8228^{o}	8.0	10090.377	595.5			
10105.806	4.6313^{o}	8.0	3.4048	7.0	10105.862^{bc}	42.0		1.0	
10105.826	4.5576	8.0	3.3311^{o}	8.0	10105.862^{bc}	42.0		0.9	
10105.857	4.7999	6.0	3.5734^{o}	7.0	10105.862^{bc}	42.0			
10108.460	3.4695^{o}	7.0	2.2434	7.0	10108.443	51.7	-0.3	-0.5	
10113.187	4.6319^{o}	7.0	3.4063	6.0	10113.222	746.2			
10152.935	4.6075	6.0	3.3867^{o}	7.0	10152.906	122.3			
10562.480	4.3561	7.0	3.1826^{o}	6.0	10562.400	16085.4			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
10841.770	4.5946	6.0	3.4513^o	7.0	10841.855	2825.7			

Table A.18: Measured wavelengths (λ_o) and intensities of Dy II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3832.890	4.5918^o	3.5	1.3581	3.5	3832.872^c	526.0			
3841.310	3.3294^o	6.5	0.1027	7.5	3841.330	761.7		0.6	
3872.104	3.2010^o	8.5	0.0000	8.5	3872.107^n	252.8		-0.0	0.0
3887.084	5.8090	7.5	2.6203^o	6.5	3887.066	54.9			
3889.700	6.2012	9.5	3.0147^o	8.5	3889.681	153.7			
3896.671	6.3384	7.5	3.1576^o	6.5	3896.661^c	57.2			
3898.529	3.7689^o	7.5	0.5896	6.5	3898.531^n	144.1		0.5	0.2
3930.171	6.4119	8.5	3.2582^o	9.5	3930.150^c	201.7			
3944.680	3.1421^o	8.5	0.0000	8.5	3944.679^n	249.4		-0.1	0.1
3953.537	5.3167	6.5	2.1816^o	6.5	3953.509^c	89.3			
3962.609	5.8769	5.5	2.7490^o	6.5	3962.594^c	221.8			
3967.530	5.9576	7.5	2.8335^o	7.5	3967.514^c	418.3			
3968.385	3.1233^o	7.5	0.0000	8.5	3968.379^n	508.9		0.2	0.2
3983.650	3.6496^o	7.5	0.5382	7.5	3983.659	30.4		-0.3	
3988.941	5.5208	3.5	2.4136^o	4.5	3988.915^c	47.3			
3994.512	6.1759	7.5	3.0730^o	6.5	3994.540^c	71.3			
3996.691	3.6908^o	6.5	0.5896	6.5	3996.688	26.7		-0.3	
4000.450	3.2010^o	8.5	0.1027	7.5	4000.443^n	321.4		0.1	0.0
4005.814	5.5944	6.5	2.5003^o	7.5	4005.839^c	179.9			
4015.165	5.1226^o	4.5	2.0356	3.5	4015.145	23.3			
4017.748	5.4351	3.5	2.3501^o	4.5	4017.720	15.3			
4023.712	4.8319^o	4.5	1.7515	4.5	4023.728^{bc}	224.5			
4023.712	6.0689	7.5	2.9885^o	6.5	4023.728^b	224.5			
4025.652	6.1173	6.5	3.0384^o	6.5	4025.623	24.7			
4028.400	6.1498	6.5	3.0730^o	6.5	4028.420^b	535.1			
4028.414	4.7643	7.5	1.6875^o	7.5	4028.420^{bc}	535.9			
4032.877	6.1504	5.5	3.0770^o	6.5	4032.844^c	44.8			
4049.397	6.2637	7.5	3.2028^o	7.5	4049.367^c	132.8			
4050.544	5.8090	7.5	2.7490^o	6.5	4050.567^b	17.3			
4050.566	3.6496^o	7.5	0.5896	6.5	4050.567^b	12.5		-0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4067.954	6.2497	6.5	3.2028^{o}	7.5	4067.963^{c}	30.1			
4070.225	5.0263^{o}	4.5	1.9811	4.5	4070.251^{c}	19.6			
4070.997	5.4613	6.5	2.4167^{o}	6.5	4071.018^{b}	24.2			
4071.046	4.6983^{o}	4.5	1.6537	5.5	4071.018^{bc}	29.0			
4073.117	3.5812^{o}	7.5	0.5382	7.5	4073.127	40.0		-0.3	
4077.965	3.1421^{o}	8.5	0.1027	7.5	4077.961^{n}	224.2		-0.1	-0.0
4079.258	5.1162^{o}	2.5	2.0778	1.5	4079.264	41.5			
4101.402	4.9921^{o}	2.5	1.9700	2.5	4101.403	17.7			
4103.305	3.1233^{o}	7.5	0.1027	7.5	4103.298^{n}	109.4		-0.4	-0.4
4111.343	3.0147^{o}	8.5	0.0000	8.5	4111.342	140.1		-0.5	
4113.058	5.5944	6.5	2.5809^{o}	5.5	4113.054^{c}	69.3			
4124.631	3.9304^{o}	5.5	0.9254	5.5	4124.628	4.6		-0.7	
4127.979	6.2054	6.5	3.2028^{o}	7.5	4128.013	17.4			
4134.718	4.9833	5.5	1.9856^{o}	4.5	4134.718^{c}	69.6			
4148.494	5.8769	5.5	2.8891^{o}	6.5	4148.509	293.6			
4149.806	6.0823	5.5	3.0955^{o}	6.5	4149.793^{c}	21.7			
4160.257	5.9940	9.5	3.0147^{o}	8.5	4160.261	27.5			
4162.253	6.4481	6.5	3.4703^{o}	5.5	4162.249	36.5			
4165.758	5.6233	6.5	2.6480^{o}	6.5	4165.792	12.2			
4170.299	6.6625	8.5	3.6904^{o}	8.5	4170.332	8.3			
4180.333	6.2943	5.5	3.3294^{o}	6.5	4180.302^{c}	17.3			
4181.284	5.1687^{o}	3.5	2.2044	2.5	4181.271^{c}	94.1			
4186.856	6.0558	6.5	3.0955^{o}	6.5	4186.823^{c}	43561.9			
4198.033	5.4962	5.5	2.5438^{o}	5.5	4198.020^{c}	895.6			
4201.060	6.0737	7.5	3.1233^{o}	7.5	4201.029^{c}	120.7			
4206.542	2.9465^{o}	8.5	0.0000	8.5	4206.536	34.0		-1.1	
4207.243	5.2390	4.5	2.2930^{o}	5.5	4207.231	17.1			
4213.192	4.5955^{o}	4.5	1.6537	5.5	4213.184^{bc}	2711.0			
4213.206	5.0341	7.5	2.0923^{o}	7.5	4213.184^{b}	2717.0			
4218.086	6.0115	6.5	3.0730^{o}	6.5	4218.095^{c}	5702.5			
4234.141	5.2431	6.5	2.3158^{o}	7.5	4234.132	15.5			
4245.926	5.9576	7.5	3.0384^{o}	6.5	4245.918^{c}	723.7			
4256.336	3.0147^{o}	8.5	0.1027	7.5	4256.338	21.3		-1.2	
4287.979	4.7443^{o}	8.5	1.8538	7.5	4288.002	158.7			
4292.178	6.2943	5.5	3.4066^{o}	4.5	4292.161	14.9			
4306.265	5.9538	8.5	3.0756^{o}	7.5	4306.246^{c}	62.7			
4308.356	5.9810	5.5	3.1041^{o}	5.5	4308.352^{c}	50.4			
4308.628	2.8767^{o}	7.5	0.0000	8.5	4308.630	122.1		-0.6	
4312.428	6.0541	6.5	3.1800^{o}	5.5	4312.433^{c}	21.0			
4336.252	6.1324	5.5	3.2740^{o}	5.5	4336.227	21.8			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4358.451	2.9465^o	8.5	0.1027	7.5	4358.456	9.5		-1.6	
4384.146	4.7727^o	5.5	1.9455	6.5	4384.111	44.5			
4394.971	6.6505	10.5	3.8303^o	9.5	4394.954	85.3			
4409.337	5.5965	7.5	2.7855^o	7.5	4409.304	1456.9			
4411.374	4.8453^o	3.5	2.0356	3.5	4411.363^c	18.8			
4432.319	5.4167	5.5	2.6203^o	6.5	4432.305	59.5			
4449.704	2.7855^o	7.5	0.0000	8.5	4449.711	56.0		-1.1	
4480.650	5.9462	6.5	3.1800^o	5.5	4480.685^c	204.0			
4488.538	4.7314^o	2.5	1.9700	2.5	4488.544	8.0		0.7	
4491.305	6.2054	6.5	3.4457^o	6.5	4491.324	15.5			
4502.734	5.9555	6.5	3.2028^o	7.5	4502.757^b	22.2			
4502.771	6.3339	6.5	3.5812^o	7.5	4502.757^b	22.0			
4513.572	4.7443^o	8.5	1.9983	9.5	4513.593^{bc}	72.2			
4513.606	5.5965	7.5	2.8504^o	8.5	4513.593^b	80.5			
4531.572	6.2054	6.5	3.4703^o	5.5	4531.559^c	290.7			
4541.732	6.2012	9.5	3.4722^o	9.5	4541.760	120.8			
4546.942	5.3167	6.5	2.5908^o	6.5	4546.930	48.2			
4553.190	4.3759^o	4.5	1.6537	5.5	4553.158^c	90.1			
4554.358	5.1921	6.5	2.4706^o	5.5	4554.359	20.3			
4554.831	5.2992	8.5	2.5780^o	8.5	4554.817	67.4			
4577.815	5.0233	7.5	2.3158^o	7.5	4577.778^c	3496.8			
4579.686	5.7834	5.5	3.0770^o	6.5	4579.684^c	14.6			
4582.417	4.6859^o	5.5	1.9811	4.5	4582.454	154.0			
4631.500	5.2486^o	6.5	2.5724	6.5	4631.496^c	113.8			
4662.110	6.2558	8.5	3.5972^o	8.5	4662.135	49.9			
4664.667	3.1953^o	6.5	0.5382	7.5	4664.671	17.6		-0.9	
4672.455	6.0541	6.5	3.4014^o	7.5	4672.462	21.6			
4703.460	2.7379^o	6.5	0.1027	7.5	4703.492^c	54.5		-1.1	
4718.825	4.2803^o	5.5	1.6537	5.5	4718.795	32.3		0.8	
4721.214	5.0369	7.5	2.4116^o	7.5	4721.228	66.4			
4725.110	6.0689	7.5	3.4457^o	6.5	4725.145	22.8			
4726.334	5.5354^o	3.5	2.9130	4.5	4726.351	40.3			
4732.458	5.5917^o	3.5	2.9727	3.5	4732.459^b	44.0			
4732.481	6.6625	8.5	4.0434^o	8.5	4732.459^b	43.2			
4745.782	5.0233	7.5	2.4116^o	7.5	4745.777	32.0			
4791.320	5.2242	6.5	2.6373^o	7.5	4791.289^c	484.0			
4794.823	5.9585	10.5	3.3735^o	9.5	4794.827	62.8			
4807.926	6.2151	7.5	3.6371^o	8.5	4807.943^b	86.2			
4807.937	2.5780^o	8.5	0.0000	8.5	4807.943^{bc}	86.2		-1.0	
4808.716	6.1173	6.5	3.5397^o	6.5	4808.737^c	20.1			

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
4823.191	5.6468	5.5	3.0770^o	6.5	4823.165	46.9			
4823.711	6.3384	7.5	3.7689^o	7.5	4823.728^c	26.6			
4841.056	4.8994^o	4.5	2.3391	5.5	4841.070^c	64.8			
4866.292	4.4008^o	8.5	1.8538	7.5	4866.268^c	103.8			
4888.111	4.9523	6.5	2.4167^o	6.5	4888.084^c	458.4			
4907.441	5.9305	5.5	3.4048^o	5.5	4907.478^b	12.3			
4907.465	4.5068^o	5.5	1.9811	4.5	4907.478^{bc}	12.7		0.7	
4909.757	4.3651^o	7.5	1.8406	8.5	4909.794^c	17.3		0.7	
4930.942	5.6091	5.5	3.0955^o	6.5	4930.975	28.2			
4937.329	5.7114	9.5	3.2010^o	8.5	4937.353^c	61.1			
4957.335	6.1498	6.5	3.6496^o	7.5	4957.347^b	222.7			
4957.347	2.5003^o	7.5	0.0000	8.5	4957.347^b	222.7		-0.7	
5003.847	6.1813	6.5	3.7042^o	6.5	5003.863^c	97.8			
5024.012	5.8385	7.5	3.3714^o	6.5	5024.025	21.3			
5024.537	5.6468	5.5	3.1800^o	5.5	5024.532^c	111.6			
5032.963	5.3394	8.5	2.8767^o	7.5	5032.997^c	32.2			
5047.213	6.2247	7.5	3.7689^o	7.5	5047.254^c	70.8			
5052.971	5.9810	5.5	3.5280^o	6.5	5052.945	86.8			
5065.532	6.0558	6.5	3.6090^o	7.5	5065.533^c	18.0			
5082.348	5.3517^o	3.5	2.9130	4.5	5082.345	24.6			
5106.343	5.9012	7.5	3.4739^o	6.5	5106.343^c	38.4			
5106.878	4.6859^o	5.5	2.2589	6.5	5106.859^c	25.1			
5110.313	6.1588	8.5	3.7334^o	7.5	5110.318^c	53.1			
5133.566	5.5944	6.5	3.1800^o	5.5	5133.604^c	19.9			
5145.170	5.1510^o	6.5	2.7420	6.5	5145.134	695.6			
5165.358	5.0369	7.5	2.6373^o	7.5	5165.373^c	74.6			
5196.820	5.3316	7.5	2.9465^o	8.5	5196.809^c	12.9			
5238.352	5.4417	7.5	3.0756^o	7.5	5238.367^c	67.5			
5259.844	6.4119	8.5	4.0554^o	7.5	5259.877^c	41.0			
5260.589	5.7305	6.5	3.3744^o	7.5	5260.559	221.8			
5282.046	5.9555	6.5	3.6090^o	7.5	5282.071^c	214.2			
5308.794	5.0837	6.5	2.7490^o	6.5	5308.835	13.2			
5321.693	5.7305	6.5	3.4014^o	7.5	5321.710	22.1			
5322.216	6.0092	5.5	3.6804^o	5.5	5322.236^c	63.8			
5361.328	5.4477^o	2.5	3.1358	3.5	5361.337^c	14.3			
5377.289	6.0092	5.5	3.7042^o	6.5	5377.261^c	10.0			
5381.382	6.4960	7.5	4.1927^o	6.5	5381.364^c	26.1			
5392.064	5.4787	6.5	3.1800^o	5.5	5392.041^c	119.7			
5395.556	3.9509^o	4.5	1.6537	5.5	5395.576^c	440.2			
5407.732	5.8200	6.5	3.5280^o	6.5	5407.740^c	16.6			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
5426.695	4.8278	6.5	2.5438^o	5.5	5426.722^c	13.2			
5437.617	5.3835	6.5	3.1041^o	5.5	5437.628^c	21.1			
5451.104	6.0823	5.5	3.8085^o	5.5	5451.109	4104.5			
5496.812	6.4119	8.5	4.1570^o	8.5	5496.829^c	29.2			
5501.880	6.2962	7.5	4.0434^o	8.5	5501.837^c	6.4			
5506.540	4.8639^o	6.5	2.6130	7.5	5506.513	30.3			
5566.324	5.1397^o	3.5	2.9130	4.5	5566.300	7.4			
5568.172	4.4849^o	6.5	2.2589	6.5	5568.143^c	10.7		0.8	
5576.014	4.4437^o	4.5	2.2208	3.5	5576.033	58.8			
5583.220	6.1504	5.5	3.9304^o	5.5	5583.200^c	35.4			
5613.243	5.1211^o	5.5	2.9130	4.5	5613.226^c	49.3			
5625.353	5.0369	7.5	2.8335^o	7.5	5625.328	6.7			
5627.525	5.6091	5.5	3.4066^o	4.5	5627.485^c	102.6			
5645.942	3.1233^o	7.5	0.9280	6.5	5645.983^c	127.2	0.1	0.1	
5651.989	5.5944	6.5	3.4014^o	7.5	5652.014^c	3165.8			
5677.706	4.3874^o	3.5	2.2044	2.5	5677.677^c	31.6			
5683.031	3.4048^o	5.5	1.2238	5.5	5683.029^c	10.6		-0.6	
5707.782	6.0117	7.5	3.8402^o	6.5	5707.800^c	32.5			
5708.092	6.1173	6.5	3.9459^o	7.5	5708.069	21.2			
5711.065	6.2497	6.5	4.0794^o	5.5	5711.023^c	21.5			
5713.834	6.2247	7.5	4.0554^o	7.5	5713.841^c	8.2			
5715.026	3.8225^o	4.5	1.6537	5.5	5715.064^c	63.2		0.7	
5718.501	5.9555	6.5	3.7881^o	5.5	5718.459^c	82.5			
5737.717	5.0369	7.5	2.8767^o	7.5	5737.710^c	15.2			
5740.221	4.4984^o	6.5	2.3391	5.5	5740.197^c	45.2			
5758.231	6.1173	6.5	3.9648^o	6.5	5758.227^c	17.2			
5807.679	5.9462	6.5	3.8120^o	7.5	5807.661^b	34.4			
5807.702	5.0233	7.5	2.8891^o	6.5	5807.661^{bc}	34.2			
5964.511	5.6468	5.5	3.5687^o	6.5	5964.463^c	310.0			
5970.032	5.9576	7.5	3.8814^o	7.5	5970.008^c	11.1			
5984.853	3.8225^o	4.5	1.7515	4.5	5984.861^c	31.3		0.5	
5986.000	6.3384	7.5	4.2678^o	7.5	5985.988^c	61.8			
5988.517	4.9464	6.5	2.8767^o	7.5	5988.563^c	2833.1			
6008.894	5.6468	5.5	3.5841^o	5.5	6008.940^c	74.3			
6017.259	5.8241	5.5	3.7643^o	6.5	6017.264^c	59.8			
6058.165	6.1417	8.5	4.0958^o	9.5	6058.174^c	104.9			
6063.187	5.2242	6.5	3.1800^o	5.5	6063.236^b	114.5			
6063.195	6.2012	9.5	4.1570^o	8.5	6063.236^b	114.5			
6067.905	5.3167	6.5	3.2740^o	5.5	6067.894^c	22.7			
6103.334	5.7997	6.5	3.7689^o	7.5	6103.374^b	25.9			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6103.365	5.1569^{o}	4.5	3.1261	4.5	6103.374^{bc}	25.9			
6115.686	3.6804^{o}	5.5	1.6537	5.5	6115.672^{c}	18.0		0.1	
6126.529	5.5212^{o}	1.5	3.4981	1.5	6126.484^{c}	16.8			
6158.271	6.2054	6.5	4.1927^{o}	6.5	6158.284^{c}	47.0			
6207.931	6.1594	6.5	4.1628^{o}	7.5	6207.974^{c}	7.2			
6255.422	5.1172^{o}	2.5	3.1358	3.5	6255.439^{c}	9.2			
6260.382	5.8200	6.5	3.8402^{o}	6.5	6260.382^{c}	74.6			
6281.292	5.2754	7.5	3.3021^{o}	7.5	6281.275^{c}	5.7			
6282.057	6.1040	7.5	4.1309^{o}	6.5	6282.101	4.8			
6432.967	4.8994^{o}	4.5	2.9727	3.5	6432.969^{c}	9.1			
6450.455	5.4613	6.5	3.5397^{o}	6.5	6450.485^{c}	3.0			
6486.620	5.6751	6.5	3.7643^{o}	6.5	6486.583^{b}	52.5			
6486.628	5.0341	7.5	3.1233^{o}	7.5	6486.583^{bc}	53.2			
6558.000	6.4960	7.5	4.6060^{o}	6.5	6558.015^{b}	106.1			
6558.026	5.1921	6.5	3.3021^{o}	7.5	6558.015^{bc}	107.4			
6565.071	5.8200	6.5	3.9321^{o}	6.5	6565.103^{c}	13.0			
6639.190	4.5281	8.5	2.6612^{o}	9.5	6639.216^{c}	6.3		0.8	
6645.456	6.2497	6.5	4.3846^{o}	7.5	6645.490^{c}	2.7			
6661.673	6.0360	4.5	4.1754^{o}	5.5	6661.623^{c}	40.8			
6688.074	6.0823	5.5	4.2290^{o}	6.5	6688.068^{c}	13.5			
6736.049	6.2247	7.5	4.3846^{o}	7.5	6736.066^{c}	5.5			
6742.291	5.2472^{o}	2.5	3.4088	2.5	6742.256^{c}	2.9			
6744.497	5.3080	5.5	3.4703^{o}	5.5	6744.443^{c}	2.4			
6750.203	4.7473^{o}	5.5	2.9111	6.5	6750.203^{c}	11.1			
6757.613	5.2390	4.5	3.4048^{o}	5.5	6757.608^{c}	8.3			
6767.719	6.2247	7.5	4.3932^{o}	6.5	6767.773^{c}	6.0			
6787.375	5.9555	6.5	4.1294^{o}	5.5	6787.371^{c}	6.8			
6803.288	6.2151	7.5	4.3932^{o}	6.5	6803.308^{c}	1.9			
6843.802	6.0581	5.5	4.2471^{o}	6.5	6843.747^{c}	2.5			
6852.983	6.1813	6.5	4.3726^{o}	5.5	6852.951^{c}	198.0			
6886.343	6.2637	7.5	4.4638^{o}	6.5	6886.392^{c}	3.9			
6894.450	5.8385	7.5	4.0407^{o}	6.5	6894.495^{c}	5.4			
6895.515	5.8529	8.5	4.0554^{o}	7.5	6895.508^{c}	8.5			
6899.289	4.0554^{o}	7.5	2.2589	6.5	6899.330	2.1		-0.2	
6899.321	3.6371^{o}	8.5	1.8406	8.5	6899.330	1.8		-0.8	
6906.448	5.4746	10.5	3.6800^{o}	9.5	6906.442^{c}	23.0			
6958.122	5.7134	7.5	3.9321^{o}	6.5	6958.078^{c}	386.0			
6968.759	6.0823	5.5	4.3037^{o}	4.5	6968.782^{c}	1.8			
6982.431	6.1759	7.5	4.4008^{o}	8.5	6982.429^{c}	8.9			
7109.257	3.5972^{o}	8.5	1.8538	7.5	7109.267^{c}	1.0		-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7121.219	5.9940	9.5	4.2535^o	9.5	7121.230^b	88.8			
7121.290	5.8715	6.5	4.1309^o	6.5	7121.230^{bc}	88.4			
7156.454	5.4962	5.5	3.7643^o	6.5	7156.460^c	5.8			
7198.606	6.3055	6.5	4.5837^o	5.5	7198.648^b	7.5			
7198.669	4.4638^o	6.5	2.7420	6.5	7198.648^{bc}	7.5		0.9	
7222.957	4.6060^o	6.5	2.8900	5.5	7222.906^c	5.3		1.0	
7229.999	6.0823	5.5	4.3679^o	6.5	7230.033^b	22.5			
7230.015	5.6233	6.5	3.9090^o	5.5	7230.033^{bc}	22.7			
7264.658	5.9597	9.5	4.2535^o	9.5	7264.652	2.7			
7345.132	1.6875^o	7.5	0.0000	8.5	7345.127	2.3		-3.3	
7353.598	6.0581	5.5	4.3726^o	5.5	7353.603^c	2.5			
7385.225	4.9523	6.5	3.2740^o	5.5	7385.255	1.9			
7417.054	6.1813	6.5	4.5102^o	7.5	7417.106	2.8			
7460.031	6.2962	7.5	4.6348^o	6.5	7459.992^c	5.4			
7475.343	6.4024	9.5	4.7443^o	8.5	7475.371	4.6			
7567.028	5.0837	6.5	3.4457^o	6.5	7566.984^c	1.8			
7645.903	6.1324	5.5	4.5113^o	6.5	7645.858^c	20.9			
7647.900	3.1921	6.5	1.5714^o	6.5	7647.846^b	1.2		-1.5	
7647.904	4.6962	6.5	3.0756^o	7.5	7647.846^b	1.2		0.5	
7662.294	5.4297	7.5	3.8120^o	7.5	7662.357^c	122.3			
7676.637	5.3835	6.5	3.7689^o	7.5	7676.683^c	5.2			
7715.391	6.3339	6.5	4.7274^o	6.5	7715.327^c	34.2			
7750.184	5.6951	10.5	4.0958^o	9.5	7750.151^c	8.9			
7751.590	3.5972^o	8.5	1.9983	9.5	7751.616^c	4.6		-0.3	
7780.814	3.9321^o	6.5	2.3391	5.5	7780.872^c	5.0		0.2	
7812.005	6.0823	5.5	4.4956^o	4.5	7812.047^b	43.3			
7812.041	5.2666	9.5	3.6800^o	9.5	7812.047^{bc}	44.7			
7814.594	6.4481	6.5	4.8620^o	5.5	7814.599^c	4.9			
7909.335	4.1927^o	6.5	2.6256	5.5	7909.361^c	11.4		0.9	
7916.764	6.0360	4.5	4.4704^o	5.5	7916.738^c	9.0			
7962.700	5.9810	5.5	4.4244^o	5.5	7962.767	21.6			
8035.322	5.6233	6.5	4.0808^o	6.5	8035.388	1.1			
8040.040	4.9464	6.5	3.4048^o	5.5	8040.094^c	7.2			
8106.256	5.8385	7.5	4.3095^o	6.5	8106.306^c	4.6			
8141.978	6.2497	6.5	4.7274^o	6.5	8141.937	4.4			
8147.234	5.7305	6.5	4.2092^o	7.5	8147.270^c	41.3			
8201.565	3.5095^o	9.5	1.9983	9.5	8201.571^c	2.6		-0.6	
8326.164	2.4167^o	6.5	0.9280	6.5	8326.117^c	280.2		-0.0	
8448.856	5.9305	5.5	4.4635^o	4.5	8448.820	8.7			
8490.224	5.0970	7.5	3.6371^o	8.5	8490.156^c	17.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8607.792	5.7649	5.5	4.3250^o	5.5	8607.831	5.6			
8685.221	5.7997	6.5	4.3726^o	5.5	8685.253^c	25.7			
9171.582	3.5095^o	9.5	2.1581	10.5	9171.602^c	3.1		-0.4	
9690.317	5.0341	7.5	3.7551^o	6.5	9690.245^c	10.4			
10105.867	5.5944	6.5	4.3679^o	6.5	10105.862^c	42.0			

Table A.19: Measured wavelengths (λ_o) and intensities of Ho I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
3774.222	4.4917^o	9.5	1.2077	9.5	3774.241^n	39698.9		0.1	0.1
3774.792	3.9554	5.5	0.6719^o	6.5	3774.889^n	35525.1		-0.6	-0.6
3776.076	4.3211^o	7.5	1.0387	8.5	3776.187^n	28534.1		-0.3	-0.2
3783.077	4.3211^o	7.5	1.0448	7.5	3783.060^n	9340.7		-0.7	-0.8
3791.543	4.4031^o	5.5	1.1341	6.5	3791.558^n	27397.5		-0.2	-0.1
3792.694	4.3067^o	9.5	1.0387	8.5	3792.837^n	19756.6		-0.4	-0.3
3811.928	4.2963^o	6.5	1.0448	7.5	3811.833^n	46529.7		-0.1	0.0
3829.304	4.2816^o	6.5	1.0448	7.5	3829.257^n	80681.3		0.2	0.2
3857.675	4.2517^o	8.5	1.0387	8.5	3857.706^n	98690.5		0.2	0.4
3864.983	4.2517^o	8.5	1.0448	7.5	3864.889^n	6255.0		-1.0	-0.6
3866.179	4.4136^o	8.5	1.2077	9.5	3866.196^n	4595.9		-0.9	-0.7
3881.189	4.2383^o	6.5	1.0448	7.5	3881.097^n	3433.3		-1.2	-1.2
3909.573	3.1703	6.5	0.0000^o	7.5	3909.560^n	39417.7		-1.6	-1.8
3919.536	4.2963^o	6.5	1.1341	6.5	3919.436^n	37180.0		-0.1	0.0
3951.138	4.2038	6.5	1.0669^o	5.5	3951.127^n	6526.1		-1.0	-1.1
3955.829	3.1332	7.5	0.0000^o	7.5	3955.722^n	283047.7		-0.8	-0.6
3967.289	4.5734^o	9.5	1.4492	9.5	3967.323^n	6467.6		-0.5	-0.3
3976.916	4.3243^o	10.5	1.2077	9.5	3976.912^n	47696.3		0.0	0.0
3998.230	3.7719	5.5	0.6719^o	6.5	3998.269^n	531067.6		0.4	0.4
3999.509	4.3067^o	9.5	1.2077	9.5	3999.574^n	78587.3		0.2	0.2
4003.353	4.1629	4.5	1.0669^o	5.5	4003.377^n	64199.2		-0.0	-0.2
4037.631	3.0698	6.5	0.0000^o	7.5	4037.602^n	45813.0		-1.6	-1.4
4040.895	3.0673	6.5	0.0000^o	7.5	4040.800^n	1695364.0		-0.0	0.2
4059.536	4.0920^o	7.5	1.0388	8.5	4059.540	3868.7		-1.3	
4068.027	4.3728	4.5	1.3260^o	4.5	4068.038^n	55192.1		0.2	0.3
4071.838	4.2517^o	8.5	1.2077	9.5	4071.788^n	25742.0		-0.3	-0.1
4101.238	3.0222	7.5	0.0000^o	7.5	4101.090^n	211294.6		-1.0	-0.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
4112.035	4.0811	5.5	1.0669^o	5.5	4111.957^n	65697.3		-0.1	-0.1
4115.329	4.0506^o	7.5	1.0388	8.5	4115.325	10114.0		-0.9	
4120.339	3.0082	8.5	0.0000^o	7.5	4120.191^n	630908.4		-0.5	-0.2
4125.611	4.0712	5.5	1.0669^o	5.5	4125.637^n	232196.4		0.4	0.6
4175.161	4.1027^o	7.5	1.1341	6.5	4175.164	6235.6		-1.1	
4222.319	3.6074	5.5	0.6719^o	6.5	4222.328^n	103574.9		-0.5	-0.7
4223.389	4.2607	5.5	1.3260^o	4.5	4223.520^n	56077.7		0.1	0.1
4243.828	4.3243^o	10.5	1.4037	10.5	4243.793^n	51525.8		0.2	0.1
4249.714	4.0506^o	7.5	1.1341	6.5	4249.724	1431.6		-1.8	
4264.102	2.9067	7.5	0.0000^o	7.5	4264.026^n	406513.2		-0.8	-0.8
4266.103	3.9722	4.5	1.0669^o	5.5	4266.002^n	148499.5		0.2	-0.0
4278.528	3.9417^o	8.5	1.0448	7.5	4278.537	2550.3		-1.6	
4287.683	4.7605^o	6.5	1.8698	6.5	4287.687	208.8		-1.6	
4307.833	4.3067^o	9.5	1.4295	8.5	4307.939^n	30562.5		-0.1	-0.2
4310.991	4.3243^o	10.5	1.4492	9.5	4311.031^n	46661.7		0.1	0.0
4314.712	4.4031^o	5.5	1.5304	6.5	4314.809^n	8323.8		-0.5	-0.6
4316.337	3.9104^o	7.5	1.0388	8.5	4316.338	434.1		-2.4	
4337.552	4.3067^o	9.5	1.4492	9.5	4337.693^n	1479.2		-1.4	-1.3
4350.766	2.8488	6.5	0.0000^o	7.5	4350.741^n	1077445.8		-0.4	-0.4
4369.020	4.1629	4.5	1.3260^o	4.5	4369.149^n	13884.3		-0.6	-0.7
4373.416	3.8789^o	8.5	1.0448	7.5	4373.316^n	31699.0		-0.6	-0.9
4411.136	3.8487^o	7.5	1.0388	8.5	4411.132	5505.5		-1.4	
4420.538	3.8487^o	7.5	1.0448	7.5	4420.560	16732.0		-0.9	
4422.754	4.2517^o	8.5	1.4492	9.5	4422.743^n	1528.8		-1.4	-1.2
4433.542	4.3254^o	7.5	1.5298	7.5	4433.482^n	1071.5		-1.5	-1.6
4441.420	4.3211^o	7.5	1.5304	6.5	4441.491^n	1836.5		-1.2	-1.3
4443.075	2.7896	7.5	0.0000^o	7.5	4443.064	1043.8		-3.5	
4447.765	2.7867	8.5	0.0000^o	7.5	4447.773	672.1		-3.7	
4456.666	4.4031^o	5.5	1.6219	5.5	4456.847^n	7133.1		-0.5	-0.8
4457.660	3.8192^o	8.5	1.0387	8.5	4457.671^n	492.9		-2.5	-2.6
4460.237	2.7789	6.5	0.0000^o	7.5	4460.229	7005.2		-2.7	
4464.030	3.8153^o	7.5	1.0387	8.5	4464.098^n	1175.7		-2.1	-2.3
4464.406	3.9104^o	7.5	1.1341	6.5	4464.412	717.4		-2.2	
4467.421	3.8192^o	8.5	1.0448	7.5	4467.273^n	43848.1		-0.5	-0.9
4494.542	4.7605^o	6.5	2.0028	7.5	4494.518	15630.3		0.3	
4504.256	4.2816^o	6.5	1.5298	7.5	4504.164^n	1603.1		-1.3	-1.3
4505.271	4.2816^o	6.5	1.5304	6.5	4505.287^n	394.9		-1.9	-1.7
4531.205	4.0614	3.5	1.3260^o	4.5	4531.306^n	30837.3		-0.3	-0.5
4533.555	3.9417^o	8.5	1.2078	9.5	4533.561	525.7		-2.2	
4554.827	3.7600^o	8.5	1.0388	8.5	4554.831^b	1677.5		-2.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
4554.827	4.5910^o	5.5	1.8698	6.5	4554.831^b	1677.5		-0.9	
4576.215	4.2383^o	6.5	1.5298	7.5	4576.065^n	1233.4		-1.5	-1.6
4622.660	3.8153^o	7.5	1.1341	6.5	4622.639	2791.4	-1.9	-1.7	
4631.573	2.6761	6.5	0.0000^o	7.5	4631.604	4221.7		-3.0	
4634.635	4.2964^o	6.5	1.6220	5.5	4634.602	4538.6	-0.7	-0.8	
4640.149	3.8789^o	8.5	1.2077	9.5	4640.116^n	4991.8		-1.3	-1.6
4659.583	3.6989^o	7.5	1.0388	8.5	4659.594	1755.0		-2.0	
4670.075	3.6989^o	7.5	1.0448	7.5	4670.080	884.0		-2.3	
4690.492	3.6813^o	9.5	1.0388	8.5	4690.503	7856.0	-1.6	-1.4	
4699.778	4.2607	5.5	1.6235^o	4.5	4699.754	3944.8	-0.9	-0.9	
4713.883	3.9554	5.5	1.3260^o	4.5	4714.008^n	1007.0		-1.9	-1.9
4728.847	4.0506^o	7.5	1.4296	8.5	4728.845	1155.6		-1.7	
4750.437	2.6092	6.5	0.0000^o	7.5	4750.435	2622.1		-3.2	
4756.949	3.6504^o	8.5	1.0448	7.5	4756.980^n	158262.1		-0.1	-0.6
4760.784	3.7375^o	5.5	1.1341	6.5	4760.794	4519.3		-1.5	
4825.011	4.5716^o	6.5	2.0028	7.5	4825.051	1403.9		-0.9	
4832.582	4.9040	6.5	2.3392^o	6.5	4832.619^b	1463.8		-0.5	
4832.610	3.6989^o	7.5	1.1341	6.5	4832.619^b	1750.8		-2.0	
4833.304	3.7721^o	9.5	1.2077	9.5	4833.303^n	54334.7		-0.4	-0.9
4838.741	4.0920^o	7.5	1.5305	6.5	4838.721	2892.6		-1.2	
4880.734	4.1629	4.5	1.6234^o	4.5	4880.806^n	7952.7		-0.7	-0.7
4892.438	3.5782^o	8.5	1.0448	7.5	4892.370^n	31240.2		-0.9	-1.1
4916.883	4.0506^o	7.5	1.5298	7.5	4916.877	711.5		-1.9	
4918.216	4.0506^o	7.5	1.5305	6.5	4918.216	1473.5		-1.6	
4922.793	3.7255^o	9.5	1.2077	9.5	4922.745^n	39122.5		-0.6	-0.8
4933.848	3.9417^o	8.5	1.4296	8.5	4933.851	2892.7		-1.4	
4939.089	2.5095	6.5	0.0000^o	7.5	4939.022^n	1126128.7		-0.7	-1.0
4953.462	3.5410^o	7.5	1.0388	8.5	4953.430	254.1		-3.0	
4960.902	3.1703	6.5	0.6719^o	6.5	4961.034^n	2479.1		-2.5	-2.7
4972.923	3.9417^o	8.5	1.4493	9.5	4972.924	3841.2		-1.3	
4980.179	2.4888	7.5	0.0000^o	7.5	4979.973^n	822249.0		-0.8	-1.2
4994.859	3.5202^o	9.5	1.0387	8.5	4995.047^n	121759.0		-0.3	-0.7
4996.200	3.9104^o	7.5	1.4296	8.5	4996.199	697.1		-2.0	
5010.882	3.6812^o	9.5	1.2077	9.5	5010.840^n	14727.0		-1.0	-1.2
5013.267	4.7750	6.5	2.3026^o	7.5	5013.294	1746.3		-0.5	
5014.401	3.5105^o	7.5	1.0387	8.5	5014.435^n	883.8		-2.5	-2.6
5032.323	3.5017^o	8.5	1.0387	8.5	5032.483^n	11626.2		-1.3	-1.4
5035.636	3.1333	7.5	0.6719^o	6.5	5035.603	817.4	-2.9	-3.0	
5038.448	3.1320	5.5	0.6719^o	6.5	5038.442	6460.6		-2.1	
5042.476	4.6752^o	10.5	2.2172	9.5	5042.400^n	48798.1		0.8	0.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
5044.766	3.5017^o	8.5	1.0448	7.5	5044.725^n	25195.4		-1.0	-1.1
5047.313	4.3254^o	7.5	1.8698	6.5	5047.258^n	718.1		-1.5	-1.5
5070.352	4.3211^o	7.5	1.8766	7.5	5070.309^n	330.8		-1.8	-1.8
5074.212	3.6504^o	8.5	1.2077	9.5	5074.338^n	22760.7		-0.8	-0.9
5075.676	3.8457^o	9.5	1.4038	10.5	5075.690	2168.2		-1.6	
5106.891	4.7605^o	6.5	2.3335	5.5	5106.857	716.4		-0.9	
5107.801	4.2964^o	6.5	1.8698	6.5	5107.766	449.8	-1.6	-1.7	
5121.524	4.4917^o	9.5	2.0716	8.5	5121.596^n	1651.9		-0.9	-0.8
5123.655	3.8487^o	7.5	1.4296	8.5	5123.644	7731.6		-1.0	
5139.163	4.2816^o	6.5	1.8698	6.5	5139.070^n	304.9		-1.9	-1.6
5153.735	4.2816^o	6.5	1.8766	7.5	5153.616^n	235.9		-2.0	-1.7
5174.323	3.0674	6.5	0.6719^o	6.5	5174.299	2445.5	-2.3	-2.6	
5180.710	3.4372^o	6.5	1.0448	7.5	5180.645^n	29667.3		-1.0	-1.0
5186.623	3.8192^o	8.5	1.4295	8.5	5186.536^n	1276.4		-1.8	-1.9
5187.700	3.4280^o	7.5	1.0387	8.5	5187.816^n	38199.9		-0.9	-0.9
5195.248	3.8153^o	7.5	1.4295	8.5	5195.240^n	16289.0		-0.7	-0.9
5200.924	3.4280^o	7.5	1.0448	7.5	5200.825^n	5217.3		-1.7	-1.8
5211.552	4.9191	7.5	2.5408^o	6.5	5211.591	223.5		-1.2	
5215.576	3.5105^o	7.5	1.1341	6.5	5215.392^n	1975.9		-2.1	-2.1
5218.571	4.2517^o	8.5	1.8766	7.5	5218.361^n	1796.3		-1.1	-0.9
5228.670	3.5782^o	8.5	1.2077	9.5	5228.685^n	13788.8		-1.1	-1.3
5233.323	3.7721^o	9.5	1.4037	10.5	5233.272^n	6231.2		-1.2	-1.5
5262.613	3.4000^o	6.5	1.0448	7.5	5262.619	615.0		-2.7	
5290.933	3.7721^o	9.5	1.4295	8.5	5290.955^n	5459.5		-1.3	-1.7
5291.667	3.7916^o	8.5	1.4493	9.5	5291.658	4503.3		-1.3	
5330.144	2.3254	7.5	0.0000^o	7.5	5330.095^n	63308.3		-2.1	-1.8
5334.126	4.2816^o	6.5	1.9579	5.5	5334.019^n	109.7		-2.3	-1.9
5345.135	3.8487^o	7.5	1.5298	7.5	5345.149	1551.5		-1.7	
5363.971	3.7600^o	8.5	1.4493	9.5	5363.967	2459.8		-1.6	
5373.477	3.7362^o	8.5	1.4296	8.5	5373.502	2616.7		-1.6	
5376.433	2.9773	6.5	0.6719^o	6.5	5376.434	1325.4		-2.9	
5381.504	3.4372^o	6.5	1.1341	6.5	5381.433^n	24537.9		-1.0	-1.1
5398.359	3.7255^o	9.5	1.4295	8.5	5398.319^n	2494.8		-1.6	-1.8
5403.319	3.4280^o	7.5	1.1341	6.5	5403.202^n	45121.5		-0.8	-0.9
5404.093	4.2964^o	6.5	2.0028	7.5	5404.056	643.0	-1.3	-1.5	
5413.601	3.8193^o	8.5	1.5298	7.5	5413.605	2681.9	-1.7	-1.5	
5423.719	3.3241^o	7.5	1.0388	8.5	5423.722	1165.1		-2.5	
5424.722	3.8153^o	7.5	1.5304	6.5	5424.715^n	4310.8		-1.3	-1.5
5435.854	3.3190^o	9.5	1.0388	8.5	5435.868	9724.8		-1.6	
5445.110	3.7255^o	9.5	1.4492	9.5	5445.125^n	25126.5		-0.6	-0.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
5461.921	3.6989^o	7.5	1.4296	8.5	5461.931	278.3		-2.6	
5469.924	3.4000^o	6.5	1.1341	6.5	5469.928	266.8		-3.0	
5479.999	3.7916^o	8.5	1.5298	7.5	5479.997	8182.9		-1.0	
5504.472	3.6812^o	9.5	1.4295	8.5	5504.445^n	15175.7		-0.9	-1.1
5507.201	4.3254^o	7.5	2.0748	6.5	5507.372^n	1656.1		-1.0	-1.2
5510.149	3.6532^o	9.5	1.4038	10.5	5510.173	702.6		-2.2	
5537.569	4.5614	8.5	2.3231^o	8.5	5537.547	269.8		-1.5	
5539.898	3.6669^o	7.5	1.4296	8.5	5539.938	61.0		-3.3	
5546.131	2.9068	7.5	0.6719^o	6.5	5546.091	1381.3	-2.9	-2.9	
5550.812	4.1027^o	7.5	1.8698	6.5	5550.809	978.8		-1.5	
5553.088	3.6812^o	9.5	1.4492	9.5	5553.113^n	31518.1		-0.5	-0.8
5557.579	3.7600^o	8.5	1.5298	7.5	5557.580	2740.6		-1.5	
5566.504	2.8986	5.5	0.6719^o	6.5	5566.518	37031.1		-1.5	
5584.193	3.3537^o	5.5	1.1341	6.5	5584.208	323.9		-3.0	
5610.278	3.2481^o	7.5	1.0388	8.5	5610.297	847.2		-2.7	
5615.914	3.7375^o	5.5	1.5305	6.5	5615.910	227.6		-2.6	
5616.844	3.2515^o	6.5	1.0448	7.5	5616.843	4111.2		-2.0	
5625.495	3.2481^o	7.5	1.0448	7.5	5625.511^b	3460.2		-2.1	
5625.495	4.2964^o	6.5	2.0931	7.5	5625.511^b	3460.2	-0.6	-0.7	
5627.484	3.2412^o	8.5	1.0387	8.5	5627.607^n	32018.4		-1.1	-1.1
5630.970	3.6504^o	8.5	1.4492	9.5	5631.205^n	627.5		-2.3	-2.3
5643.049	3.2412^o	8.5	1.0448	7.5	5642.919^n	8348.5		-1.7	-1.7
5648.115	3.2393^o	6.5	1.0448	7.5	5648.109	7349.2		-1.7	
5665.881	3.2264^o	7.5	1.0388	8.5	5665.884	2334.9		-2.3	
5681.401	3.2264^o	7.5	1.0448	7.5	5681.407	18291.5		-1.4	
5683.365	4.0506^o	7.5	1.8698	6.5	5683.367	311.4		-2.0	
5693.505	2.8488	6.5	0.6719^o	6.5	5693.671^n	8297.0		-2.2	-1.8
5699.302	4.0506^o	7.5	1.8759	8.5	5699.286	459.2		-1.9	
5704.018	3.3070^o	6.5	1.1341	6.5	5704.025	334.4		-3.0	
5708.036	4.5614	8.5	2.3900^o	7.5	5708.018	452.5		-1.2	
5768.408	3.5782^o	8.5	1.4295	8.5	5768.451^n	4766.9		-1.5	-1.5
5780.071	3.2784^o	5.5	1.1341	6.5	5780.080	3906.8		-1.9	
5784.934	3.1814^o	8.5	1.0388	8.5	5784.952	86.7		-3.7	
5821.819	3.5782^o	8.5	1.4492	9.5	5821.921^n	5620.3		-1.4	-1.4
5856.264	3.5202^o	9.5	1.4037	10.5	5856.311^n	2416.0		-1.8	-1.7
5858.934	3.7375^o	5.5	1.6220	5.5	5858.943	439.4		-2.3	
5870.822	3.3190^o	9.5	1.2078	9.5	5870.834	17231.1		-1.2	
5887.601	3.2393^o	6.5	1.1341	6.5	5887.597	7833.1		-1.7	
5932.687	4.0920^o	7.5	2.0028	7.5	5932.669	778.9		-1.5	
5949.330	4.8140	6.5	2.7306^o	6.5	5949.295	1055.3		-0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
5956.050	3.5105^o	7.5	1.4295	8.5	5955.971^n	19115.7		-0.9	-0.9
5981.351	3.5017^o	8.5	1.4295	8.5	5981.447^n	6097.3		-1.4	-1.2
5984.932	3.5202^o	9.5	1.4492	9.5	5985.136^n	645.4		-2.4	-2.2
5999.749	3.9417^o	8.5	1.8759	8.5	5999.745	437.0		-2.0	
6002.039	3.1320	5.5	1.0669^o	5.5	6002.021^b	8227.7		-1.8	
6002.057	4.5540^o	7.5	2.4889	7.5	6002.021^b	8142.1		0.1	
6038.799	3.5017^o	8.5	1.4492	9.5	6038.958^n	3119.7		-1.7	-1.4
6050.860	3.5782^o	8.5	1.5298	7.5	6050.719^n	4912.9		-1.4	-1.2
6053.040	4.5534	9.5	2.5057^o	10.5	6053.053	1781.7		-0.5	
6103.451	3.9073^o	6.5	1.8766	7.5	6103.471	108.5		-2.6	
6109.979	3.8984^o	7.5	1.8698	6.5	6109.964	461.3		-2.0	
6167.621	4.1027^o	7.5	2.0931	7.5	6167.630	679.3		-1.5	
6188.624	2.0028	7.5	0.0000^o	7.5	6188.628	187.1		-4.8	
6200.592	4.0920^o	7.5	2.0931	7.5	6200.613	112.1		-2.3	
6235.741	4.1027^o	7.5	2.1150	6.5	6235.759	1430.9		-1.2	
6247.491	3.6074	5.5	1.6234^o	4.5	6247.353^n	302.7		-2.5	-2.4
6259.617	3.5105^o	7.5	1.5304	6.5	6259.528^n	2010.5		-1.8	-1.5
6272.665	3.9417^o	8.5	1.9658	7.5	6272.651	1243.6		-1.5	
6273.562	4.0506^o	7.5	2.0749	6.5	6273.556	341.1		-1.9	
6282.776	3.8487^o	7.5	1.8759	8.5	6282.781	951.2		-1.7	
6285.047	3.8487^o	7.5	1.8766	7.5	6285.031	318.0		-2.2	
6285.494	3.5018^o	8.5	1.5298	7.5	6285.487	207.4	-2.8	-2.8	
6288.930	4.7605^o	6.5	2.7896	7.5	6288.952	266.8		-1.0	
6291.776	4.5822	7.5	2.6122^o	7.5	6291.743	405.4		-1.1	
6292.191	3.8457^o	9.5	1.8759	8.5	6292.204	912.0		-1.7	
6347.258	3.0196	4.5	1.0669^o	5.5	6347.294	1182.7		-2.7	
6370.913	3.8153^o	7.5	1.8698	6.5	6370.730^n	143.0		-2.5	-2.2
6413.427	3.8984^o	7.5	1.9658	7.5	6413.424	3597.4		-1.0	
6467.091	2.9614^o	8.5	1.0448	7.5	6467.117	71.9		-3.9	
6478.671	3.8789^o	8.5	1.9657	7.5	6478.493^n	442.1		-1.9	-1.7
6479.330	2.5849	5.5	0.6719^o	6.5	6479.340	4791.0		-2.6	
6497.628	3.9104^o	7.5	2.0028	7.5	6497.619	106.1		-2.5	
6497.907	3.4373^o	6.5	1.5298	7.5	6497.905	62.7	-3.4	-3.4	
6500.154	3.4372^o	6.5	1.5304	6.5	6500.242^n	118.5		-3.1	-2.5
6529.657	4.6275	7.5	2.7293^o	7.5	6529.672^b	566.4		-0.8	
6529.674	3.4280^o	7.5	1.5298	7.5	6529.672^b	537.2	-2.5	-2.4	
6538.899	4.5716^o	6.5	2.6761	6.5	6538.887	1658.4		-0.4	
6542.370	3.3241^o	7.5	1.4296	8.5	6542.386^b	319.2		-2.8	
6542.417	4.6417	5.5	2.7472^o	4.5	6542.386^b	338.1		-1.0	
6560.035	3.3190^o	9.5	1.4296	8.5	6560.051	3862.8		-1.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[45]
6578.351	3.7600^o	8.5	1.8759	8.5	6578.344	231.1		-2.4	
6580.841	3.7600^o	8.5	1.8766	7.5	6580.840	781.0		-1.8	
6619.732	3.9104^o	7.5	2.0380	8.5	6619.728	70.6		-2.7	
6632.240	2.5408	5.5	0.6719^o	6.5	6632.242	4273.0		-2.7	
6636.057	3.7375^o	5.5	1.8698	6.5	6636.067	87.6		-2.8	
6697.798	3.2801^o	7.5	1.4296	8.5	6697.804	150.5		-3.2	
6701.322	3.8153^o	7.5	1.9658	7.5	6701.305	706.3	-2.0	-1.8	
6745.043	2.5095	6.5	0.6719^o	6.5	6745.055	11899.6	-2.5	-2.3	
6752.957	3.9104^o	7.5	2.0749	6.5	6752.953	115.9		-2.4	
6764.490	4.3211^o	7.5	2.4888	7.5	6764.806^n	37.0		-2.4	-1.9
6766.711	2.8986	5.5	1.0669^o	5.5	6766.728	2121.4		-2.5	
6788.435	3.7916^o	8.5	1.9658	7.5	6788.379	250.9		-2.2	
6799.114	3.6989^o	7.5	1.8759	8.5	6799.121	698.7		-1.9	
6801.774	3.6989^o	7.5	1.8766	7.5	6801.772	35.2		-3.2	
6815.760	3.2481^o	7.5	1.4296	8.5	6815.778	1283.7		-2.2	
6821.639	2.4889	7.5	0.6719^o	6.5	6821.643	3335.2	-3.2	-2.8	
6823.590	3.8192^o	8.5	2.0028	7.5	6823.275^n	105.1		-2.6	-2.2
6828.050	3.4373^o	6.5	1.6220	5.5	6828.061	381.0	-2.5	-2.5	
6841.334	3.2412^o	8.5	1.4295	8.5	6841.346^n	1421.0		-2.2	-1.7
6845.348	3.8487^o	7.5	2.0380	8.5	6845.331	128.3		-2.4	
6897.999	3.2264^o	7.5	1.4296	8.5	6898.006	3755.4		-1.8	
6908.820	4.8140	6.5	3.0199^o	7.5	6908.845	15.5		-2.1	
6916.592	3.2412^o	8.5	1.4492	9.5	6916.694^n	2178.2		-2.0	-1.5
6958.045	3.8193^o	8.5	2.0380	8.5	6958.042	30.9	-3.4	-3.1	
6964.885	4.0920^o	7.5	2.3124	7.5	6964.859	286.6		-1.8	
6974.165	3.3070^o	6.5	1.5298	7.5	6974.205	412.1		-2.6	
6981.256	3.3059^o	5.5	1.5305	6.5	6981.242	700.9		-2.4	
6987.907	3.8487^o	7.5	2.0749	6.5	6987.903	331.8		-2.0	
7000.856	3.7362^o	8.5	1.9658	7.5	7000.844	1813.2		-1.4	
7043.288	3.7255^o	7.5	1.9657	7.5	7043.383^n	33.2		-3.2	-2.6
7047.618	3.2892^o	5.5	1.5305	6.5	7047.610	1075.9		-2.2	
7053.585	3.7600^o	8.5	2.0028	7.5	7053.582	35.6		-3.1	
7062.250	4.7750	6.5	3.0199^o	7.5	7062.249	88.5		-1.4	
7068.067	2.9614^o	8.5	1.2078	9.5	7068.121^b	110.2		-3.6	
7068.117	3.7916^o	8.5	2.0380	8.5	7068.121^b	94.8		-2.6	
7079.008	3.8193^o	8.5	2.0684	9.5	7079.044	112.3	-2.8	-2.5	
7081.364	3.2801^o	7.5	1.5298	7.5	7081.367	614.5		-2.5	
7084.129	3.2801^o	7.5	1.5305	6.5	7084.137	256.2		-2.8	
7090.968	3.2784^o	5.5	1.5305	6.5	7090.976	464.4		-2.6	
7192.971	3.7916^o	8.5	2.0684	9.5	7192.965	51.8		-2.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
7199.140	3.2515^o	6.5	1.5298	7.5	7199.135	862.4		-2.3	
7201.998	3.2515^o	6.5	1.5305	6.5	7202.011	162.0		-3.1	
7205.143	3.7231^o	6.5	2.0028	7.5	7205.171	48.9		-3.0	
7242.003	3.2413^o	8.5	1.5298	7.5	7242.033^b	1676.0	-2.0	-2.1	
7242.056	4.2964^o	6.5	2.5849	5.5	7242.033^b	1700.8	-0.5	-0.7	
7250.591	3.2393^o	6.5	1.5298	7.5	7250.575^b	1698.4		-2.1	
7250.606	4.6645^o	7.5	2.9551	7.5	7250.575^b	1706.1		-0.2	
7253.489	3.2393^o	6.5	1.5305	6.5	7253.483	428.4		-2.6	
7280.731	3.5783^o	8.5	1.8759	8.5	7280.760	9.5	-4.0	-3.9	
7283.967	3.5782^o	8.5	1.8766	7.5	7283.767^n	328.0		-2.3	-2.0
7288.874	3.7722^o	9.5	2.0717	8.5	7288.888	197.5	-2.7	-2.3	
7308.478	3.2264^o	7.5	1.5305	6.5	7308.490	2415.7		-1.9	
7318.687	3.0196	4.5	1.3261^o	4.5	7318.687	324.6		-3.0	
7327.226	3.7600^o	8.5	2.0684	9.5	7327.238	84.9		-2.7	
7331.928	2.7293^o	7.5	1.0388	8.5	7331.966	152.1		-3.8	
7341.378	3.7600^o	8.5	2.0717	8.5	7341.344	220.4		-2.2	
7352.489	2.7306^o	6.5	1.0448	7.5	7352.521	437.4		-3.3	
7360.799	3.3059^o	5.5	1.6220	5.5	7360.795	1108.2		-2.1	
7376.571	2.7472	6.5	1.0669^o	5.5	7376.557	206.7		-3.6	
7421.271	4.6315	8.5	2.9614^o	8.5	7421.268	89.0		-1.5	
7462.837	3.6989^o	7.5	2.0380	8.5	7462.853	13.8		-3.5	
7482.868	3.2784^o	5.5	1.6220	5.5	7482.893	319.1		-2.7	
7496.144	2.3254	7.5	0.6719^o	6.5	7496.172	888.6	-3.2	-3.5	
7514.473	2.6883^o	7.5	1.0388	8.5	7514.487	354.9		-3.4	
7520.453	3.7231^o	6.5	2.0749	6.5	7520.437	63.5		-2.8	
7541.797	2.6883^o	7.5	1.0448	7.5	7541.812	373.1		-3.4	
7554.214	3.5105^o	7.5	1.8698	6.5	7553.844^n	234.6		-2.5	-2.1
7582.289	3.5105^o	7.5	1.8758	8.5	7581.994^n	76.0		-3.0	-2.5
7585.320	3.5106^o	8.5	1.8766	7.5	7585.304	6.3	-4.0	-4.1	
7589.132	2.6720^o	8.5	1.0388	8.5	7589.159	4476.7		-2.3	
7605.246	2.3017	6.5	0.6719^o	6.5	7605.267	3084.9		-3.0	
7609.176	3.6669^o	7.5	2.0380	8.5	7609.124	92.4		-2.7	
7626.695	3.5018^o	8.5	1.8766	7.5	7626.678	28.0	-3.4	-3.4	
7628.307	3.8984^o	7.5	2.2735	8.5	7628.313	8634.3		-0.4	
7636.191	3.7231^o	6.5	2.0999	5.5	7636.199	20.4		-3.3	
7648.120	2.2926	5.5	0.6719^o	6.5	7648.128	1911.3		-3.2	
7664.080	3.2393^o	6.5	1.6220	5.5	7664.083	592.3		-2.4	
7667.336	4.9191	7.5	3.3026^o	8.5	7667.324	1847.4		0.3	
7673.905	3.6532^o	9.5	2.0380	8.5	7673.940	123.7		-2.6	
7687.187	3.6504^o	8.5	2.0380	8.5	7687.249	130.1	-3.0	-2.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
7690.410	2.6505^o	8.5	1.0388	8.5	7690.438	6126.4		-2.2	
7704.836	3.9104^o	7.5	2.3017	6.5	7704.824	105.1		-2.3	
7719.031	2.6505^o	8.5	1.0448	7.5	7719.078	3475.6		-2.4	
7738.965	4.5716^o	6.5	2.9701	6.5	7738.998^b	1170.0		-0.4	
7738.983	4.5700	7.5	2.9684^o	6.5	7738.997^b	1160.9		-0.4	
7756.624	3.9104^o	7.5	2.3124	7.5	7756.618	2269.1		-1.0	
7763.575	2.7306^o	6.5	1.1341	6.5	7763.598	1070.4		-2.8	
7769.651	2.7293^o	7.5	1.1341	6.5	7769.681	426.2		-3.2	
7820.144	3.9104^o	7.5	2.3254	7.5	7820.123	7.9		-3.4	
7829.920	2.6499	4.5	1.0669^o	5.5	7829.984	443.7		-3.3	
7832.380	4.0920^o	7.5	2.5095	6.5	7832.358	223.5		-1.7	
7837.427	3.6532^o	9.5	2.0717	8.5	7837.421	45.0		-3.0	
7882.053	2.8986	5.5	1.3261^o	4.5	7882.017	79.6		-3.7	
7914.175	4.9040	6.5	3.3379^o	7.5	7914.189	19.6		-1.7	
7958.320	3.4272^o	5.5	1.8698	6.5	7958.330	26.5		-3.5	
7974.947	2.6883^o	7.5	1.1341	6.5	7974.983	5091.7		-2.2	
7981.212	4.5060	7.5	2.9530^o	7.5	7981.186	22.7		-2.1	
8036.601	2.6092	6.5	1.0669^o	5.5	8036.590	57.5		-4.2	
8039.096	3.8153^o	7.5	2.2735	8.5	8039.119	4.4	-3.9	-3.7	
8047.113	3.5783^o	8.5	2.0380	8.5	8047.068	64.0	-3.0	-2.9	
8068.213	3.8487^o	7.5	2.3124	7.5	8068.203	41.7		-2.7	
8098.514	1.5305	6.5	0.0000^o	7.5	8098.510	2648.7		-4.0	
8099.747	3.4000^o	6.5	1.8698	6.5	8099.753	48.0		-3.2	
8102.130	1.5298	7.5	0.0000^o	7.5	8102.134	12080.6		-3.3	
8159.862	3.7362^o	8.5	2.2172	9.5	8159.908	18.4		-3.2	
8165.041	2.5849	5.5	1.0669^o	5.5	8165.042	1757.6		-2.7	
8171.094	2.5557^o	8.5	1.0388	8.5	8171.142	349.8		-3.5	
8203.412	2.5557^o	8.5	1.0448	7.5	8203.440	188.8		-3.7	
8220.748	3.5105^o	7.5	2.0028	7.5	8220.345^n	23.4		-3.4	-2.8
8225.483	3.8192^o	8.5	2.3124	7.5	8225.242^n	49.7		-2.7	-2.2
8247.156	3.8153^o	7.5	2.3124	7.5	8247.149	6.3	-3.7	-3.6	
8317.970	3.0199^o	7.5	1.5298	7.5	8317.974	121.6		-3.3	
8345.558	3.5783^o	8.5	2.0931	7.5	8345.598^b	218.4	-2.4	-2.3	
8345.641	4.9191	7.5	3.4340^o	6.5	8345.598^b	230.5		-0.5	
8345.648	3.9723	4.5	2.4872^o	5.5	8345.598^b	230.5	-2.0	-1.8	
8464.702	2.6720^o	8.5	1.2078	9.5	8464.723	2127.4		-2.5	
8512.995	2.6637^o	9.5	1.2078	9.5	8512.969	20959.6		-1.5	
8594.864	3.4000^o	6.5	1.9579	5.5	8594.871	89.5		-2.9	
8615.596	2.9684^o	6.5	1.5298	7.5	8615.591	130.0		-3.3	
8619.689	2.9684^o	6.5	1.5305	6.5	8619.697	391.1		-2.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[45]
8623.824	3.3070^o	6.5	1.8698	6.5	8623.855	279.9		-2.5	
8630.561	3.3059^o	5.5	1.8698	6.5	8630.591	100.6		-3.0	
8632.275	3.7375^o	5.5	2.3017	6.5	8632.294	270.0		-2.0	
8670.224	1.4296	8.5	0.0000^o	7.5	8670.233	5717.9		-3.7	
8708.789	2.9530^o	7.5	1.5298	7.5	8708.832	349.2		-2.9	
8712.971	2.9530^o	7.5	1.5305	6.5	8712.974	420.0		-2.8	
8788.332	3.2801^o	7.5	1.8698	6.5	8788.365	71.2		-3.1	
8794.857	4.5822	7.5	3.1729^o	7.5	8794.924	51.6		-1.6	
8826.499	3.2801^o	7.5	1.8759	8.5	8826.463	9.0		-4.0	
8834.424	2.0749	6.5	0.6719^o	6.5	8834.442	1298.6		-3.4	
8868.208	3.7231^o	6.5	2.3254	7.5	8868.211	76.4		-2.5	
8871.009	3.4000^o	6.5	2.0028	7.5	8871.074	37.5		-3.2	
8915.955	4.6417	5.5	3.2515^o	6.5	8916.022	149.3		-1.0	
9187.312	3.3070^o	6.5	1.9579	5.5	9187.296	260.1		-2.5	
9194.959	3.3059^o	5.5	1.9579	5.5	9194.922	832.7		-2.0	
9205.763	2.9684^o	6.5	1.6220	5.5	9205.783	420.2		-2.7	
9284.055	3.3379^o	7.5	2.0028	7.5	9284.092	260.3		-2.4	
9503.539	3.3070^o	6.5	2.0028	7.5	9503.538	2307.2		-1.5	
9536.119	2.7293^o	7.5	1.4296	8.5	9536.098	2239.3		-2.2	
9696.022	2.3231^o	8.5	1.0448	7.5	9696.029	12363.5		-2.0	
9703.711	3.2801^o	7.5	2.0028	7.5	9703.742	2133.1		-1.5	
9975.851	2.6720^o	8.5	1.4296	8.5	9975.900	5256.0		-1.9	
9978.589	3.2801^o	7.5	2.0380	8.5	9978.612	4603.0		-1.1	
9982.545	4.6417	5.5	3.4000^o	6.5	9982.625	59.5		-1.2	
10206.232	2.6637^o	9.5	1.4493	9.5	10206.189	1416.4			

Table A.20: Measured wavelengths (λ_o) and intensities of Ho II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3798.263	4.6070	5.0	1.3438^o	4.0	3798.247	1758.5
3838.383	4.5729	4.0	1.3438^o	4.0	3838.353	1045.8
3851.774	4.6070	5.0	1.3891^o	5.0	3851.803	11976.0
3896.732	3.9060	6.0	0.7253^o	6.0	3896.720	10023.5
4197.878	4.2964	5.0	1.3438^o	4.0	4197.856	675.7
4686.424	5.0005	5.0	2.3557^o	5.0	4686.394	419.8
5610.933	4.2276	6.0	2.0186^o	6.0	5610.954	1979.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7389.357	3.6960	7.0	2.0186^o	6.0	7389.352	246.1
7465.813	4.2008	6.0	2.5406^o	7.0	7465.870	67.3
7653.765	3.6960	7.0	2.0766^o	7.0	7653.753	98.7
8545.662	3.6466	8.0	2.1962^o	9.0	8545.684	136.0
9371.477	3.5864	9.0	2.2638^o	10.0	9371.501	1600.7
9705.218	3.6466	8.0	2.3695^o	9.0	9705.253	917.0

Table A.21: Measured wavelengths (λ_o) and intensities of Er I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3747.430	4.1972	6.0	0.8898^o	6.0	3747.454	12920.9		0.5	
3759.534	4.2511	8.0	0.9543^o	7.0	3759.536	1078.2		-0.5	
3761.988	4.1844	6.0	0.8898^o	6.0	3761.995	3208.7		-0.1	
3768.689	4.1515^o	5.0	0.8627	5.0	3768.704	1031.3		-0.6	
3791.159	4.3381	8.0	1.0688^o	9.0	3791.159	1019.6		-0.4	
3798.211	4.1260^o	4.0	0.8627	5.0	3798.220	1020.2		-0.7	
3798.628	5.2553	6.0	1.9924^o	6.0	3798.633^b	3105.9			
3798.629	3.8872^o	4.0	0.6243	4.0	3798.633^b	3105.9		-0.5	
3803.733	4.4178	8.0	1.1592^o	8.0	3803.738	414.4		-0.7	
3815.850	5.6098	3.0	2.3616^o	4.0	3815.877^b	1830.1			
3815.880	3.2482^o	5.0	0.0000	6.0	3815.877^b	1519.2		-1.7	
3818.673	4.5787^o	3.0	1.3329	4.0	3818.695^c	745.1		-0.2	
3825.836	3.8640^o	3.0	0.6243	4.0	3825.847	246.6		-1.6	
3827.316	3.8627^o	4.0	0.6243	4.0	3827.319^c	1607.3		-0.8	
3837.125	5.5578	7.0	2.3276^o	7.0	3837.141	421.8		0.9	
3838.495	4.3883	7.0	1.1592^o	8.0	3838.499	2147.0		0.0	
3839.266	4.0911^o	5.0	0.8627	5.0	3839.272^c	3099.9		-0.2	
3849.915	4.2882	9.0	1.0688^o	9.0	3849.915	7313.9		0.4	
3852.420	5.3682	6.0	2.1508^o	5.0	3852.430^b	1056.5			
3852.427	4.3766	8.0	1.1592^o	8.0	3852.430^b	1044.4		-0.3	
3854.514	4.5246	9.0	1.3090^o	9.0	3854.518	464.2		-0.4	
3855.898	3.8387^o	4.0	0.6243	4.0	3855.904	18680.0		0.2	
3859.324	4.5206	10.0	1.3090^o	9.0	3859.331	143.4		-1.0	
3859.980	4.0737^o	5.0	0.8627	5.0	3859.985	1286.4		-0.6	
3862.851	3.2087^o	6.0	0.0000	6.0	3862.857^n	346307.8		0.6	0.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3864.286	4.0702^o	4.0	0.8627	5.0	3864.286^c	1237.0		-0.6	
3865.563	4.0691^o	6.0	0.8627	5.0	3865.563^c	276.5		-1.3	
3866.156	4.0957	5.0	0.8898^o	6.0	3866.157	424.8		-1.1	
3871.753	4.6342	8.0	1.4329^o	8.0	3871.753	468.1		-0.3	
3882.865	4.3893	9.0	1.1971^o	10.0	3882.888^c	1435.5		-0.1	
3884.119	4.8150^o	3.0	1.6239	2.0	3884.127	371.4		-0.1	
3887.686	4.5211^o	5.0	1.3329	4.0	3887.688	206.0		-0.8	
3891.662	5.2262^o	6.0	2.0413	7.0	3891.654	161.3		0.1	
3892.685	3.1841^o	5.0	0.0000	6.0	3892.693^n	148080.1		0.2	0.3
3892.950	4.5168^o	4.0	1.3329	4.0	3892.952	431.3		-0.5	
3894.817	4.2511	8.0	1.0688^o	9.0	3894.817	188.7		-1.2	
3895.308	4.3412	7.0	1.1592^o	8.0	3895.305	459.7		-0.7	
3901.639	4.0665	7.0	0.8898^o	6.0	3901.638	929.9		-0.8	
3903.984	3.7991^o	4.0	0.6243	4.0	3903.988	9011.8		-0.1	
3908.653	3.7953^o	3.0	0.6243	4.0	3908.655^c	198.8		-1.8	
3909.805	4.7940^o	3.0	1.6239	2.0	3909.808	254.2		-0.3	
3910.495	3.7938^o	5.0	0.6243	4.0	3910.495	2545.9		-0.7	
3915.998	4.4980^o	4.0	1.3329	4.0	3916.002^b	934.2		-0.2	
3916.018	5.0478	5.0	1.8827^o	5.0	3916.002^b	927.9		0.6	
3918.044	4.6980^o	4.0	1.5346	3.0	3918.047	2875.3		0.6	
3919.666	4.5951	9.0	1.4329^o	8.0	3919.668	116.2		-0.9	
3920.856	4.5747	5.0	1.4135^o	5.0	3920.860	121.6		-0.9	
3922.203	5.1836	7.0	2.0235^o	6.0	3922.222	31.3		-0.7	
3929.264	4.1087	6.0	0.9543^o	7.0	3929.262	1359.7		-0.5	
3931.726	5.4801	8.0	2.3276^o	7.0	3931.725	124.4		0.3	
3932.270	5.1167	7.0	1.9647^o	7.0	3932.255^c	1312.9		0.8	
3933.678	5.0209	7.0	1.8700^o	8.0	3933.660	72.4		-0.6	
3934.891	4.3092	8.0	1.1592^o	8.0	3934.886	442.4		-0.7	
3935.873	4.6121	6.0	1.4629^o	6.0	3935.877	40.3		-1.4	
3936.594	5.3549	6.0	2.2064^o	7.0	3936.579	893.9		1.0	
3937.013	3.1482^o	6.0	0.0000	6.0	3937.017^n	87117.9		-0.0	-0.1
3939.804	4.3052	9.0	1.1592^o	8.0	3939.802	665.4		-0.6	
3942.574	5.0138	9.0	1.8700^o	8.0	3942.572	1028.5		0.6	
3950.982	4.7610^o	2.0	1.6239	2.0	3950.985	534.0		-0.0	
3951.481	4.7606^o	3.0	1.6239	2.0	3951.481	920.3		0.2	
3954.149	5.1581	5.0	2.0235^o	6.0	3954.171	67.1		-0.4	
3955.859	4.6678^o	3.0	1.5346	3.0	3955.864	63.9		-1.1	
3956.415	3.1328^o	6.0	0.0000	6.0	3956.422	16155.8		-0.8	
3958.336	3.9940^o	4.0	0.8627	5.0	3958.339	44.9		-2.2	
3959.857	4.2893	7.0	1.1592^o	8.0	3959.883^c	112.4		-1.3	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I		$\log gf$	
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
3964.148	5.2539	8.0	2.1272^{o}	7.0	3964.150	48.6		-0.4	
3966.352	4.4579^{o}	4.0	1.3329	4.0	3966.348	3774.2		0.4	
3967.153	5.1167	7.0	1.9924^{o}	6.0	3967.149	321.0		0.2	
3969.036	4.0771	8.0	0.9543^{o}	7.0	3969.034	286.9		-1.2	
3973.036	3.1197^{o}	5.0	0.0000	6.0	3973.038^{n}	102206.1		0.0	0.1
3973.574	3.1193^{o}	7.0	0.0000	6.0	3973.576^{n}	189148.5		0.3	0.1
3975.261	4.4508^{o}	4.0	1.3329	4.0	3975.263^{c}	389.3		-0.6	
3976.731	4.4497^{o}	5.0	1.3329	4.0	3976.732	2781.5		0.3	
3977.017	3.7408^{o}	3.0	0.6243	4.0	3977.017	23008.9		0.2	
3977.586	4.5899	8.0	1.4738^{o}	7.0	3977.583	326.7		-0.5	
3980.604	4.6483^{o}	3.0	1.5346	3.0	3980.604	1189.1		0.2	
3981.347	4.5267	6.0	1.4135^{o}	5.0	3981.344	114.7		-1.0	
3985.047	5.1338	6.0	2.0235^{o}	6.0	3985.062	81.6		-0.3	
3985.461	4.5729	5.0	1.4629^{o}	6.0	3985.463	40.7		-1.4	
3986.641	4.5720	6.0	1.4629^{o}	6.0	3986.641	162.3		-0.8	
3986.958	4.4178	8.0	1.3090^{o}	9.0	3986.956	181.8		-1.0	
3987.655	3.7325^{o}	4.0	0.6243	4.0	3987.661	23021.7		0.2	
3991.172	4.9755	7.0	1.8700^{o}	8.0	3991.159	578.4		0.3	
3993.127	3.9937	6.0	0.8898^{o}	6.0	3993.126	133.6		-1.7	
3993.641	4.4365^{o}	4.0	1.3329	4.0	3993.647	249.3		-0.8	
3999.067	4.1682	10.0	1.0688^{o}	9.0	3999.064	1315.5		-0.4	
4002.861	3.7207^{o}	4.0	0.6243	4.0	4002.859	1182.4		-1.1	
4007.069	5.1167	7.0	2.0235^{o}	6.0	4007.079	190.7		0.0	
4007.964	3.0925^{o}	7.0	0.0000	6.0	4007.963^{n}	340162.9		0.5	0.8
4008.758	4.2511	8.0	1.1592^{o}	8.0	4008.754	1209.3		-0.4	
4009.139	4.5545	7.0	1.4629^{o}	6.0	4009.156^{c}	2655.5		0.4	
4012.986	4.6232^{o}	3.0	1.5346	3.0	4012.985^{c}	918.7		0.0	
4016.338	5.0784	5.0	1.9924^{o}	6.0	4016.368^{b}	635.4		0.5	
4016.365	4.7099^{o}	2.0	1.6239	2.0	4016.368^{b}	635.4		-0.0	
4016.931	4.6202^{o}	4.0	1.5346	3.0	4016.931^{c}	143.2		-0.8	
4018.438	5.1957	6.0	2.1113^{o}	5.0	4018.468^{c}	38.1		-0.6	
4019.135	4.2431	9.0	1.1592^{o}	8.0	4019.133	73.8		-1.6	
4021.550	3.7063^{o}	5.0	0.6243	4.0	4021.557	14915.9		0.0	
4023.293	4.5545	7.0	1.4738^{o}	7.0	4023.280	46.3		-1.4	
4024.376	4.4128^{o}	5.0	1.3329	4.0	4024.380	1035.9		-0.2	
4025.527	4.4119^{o}	3.0	1.3329	4.0	4025.535^{c}	1046.7		-0.2	
4026.458	4.0326	8.0	0.9543^{o}	7.0	4026.459	1320.5		-0.6	
4027.069	3.9676	7.0	0.8898^{o}	6.0	4027.071	984.5		-0.8	
4029.676	5.4470	6.0	2.3712^{o}	7.0	4029.688^{b}	133.7		0.3	
4029.689	5.0682	7.0	1.9924^{o}	6.0	4029.688^{b}	133.7		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	NIST-ASD
4030.525	4.2344	7.0	1.1592^o	8.0	4030.525	54.9		-1.7	
4031.855	3.6984^o	3.0	0.6243	4.0	4031.852^c	1145.1		-1.1	
4033.442	4.9557	6.0	1.8827^o	5.0	4033.437	46.0		-0.8	
4036.939	4.5032	9.0	1.4329^o	8.0	4036.938	79.9		-1.2	
4037.685	3.6940^o	5.0	0.6243	4.0	4037.681^c	6964.6		-0.3	
4039.643	4.6028^o	3.0	1.5346	3.0	4039.636	758.8		-0.1	
4040.488	4.3766	8.0	1.3090^o	9.0	4040.483	253.9		-0.9	
4044.647	4.5274	5.0	1.4629^o	6.0	4044.643	83.4		-1.1	
4046.954	4.3956^o	5.0	1.3329	4.0	4046.953	6615.6		0.6	
4047.761	4.5967^o	3.0	1.5346	3.0	4047.760	48.7		-1.3	
4048.975	4.5957^o	2.0	1.5346	3.0	4048.973	63.5		-1.2	
4052.152	4.0130	6.0	0.9543^o	7.0	4052.147	24.6		-2.4	
4052.501	5.4391	6.0	2.3806^o	5.0	4052.510	18.6		-0.5	
4052.898	5.1041	8.0	2.0459^o	9.0	4052.898	77.4		-0.4	
4063.619	5.0425	6.0	1.9924^o	6.0	4063.597	13.7		-1.2	
4067.178	5.2539	8.0	2.2064^o	7.0	4067.178	17.7		-0.8	
4067.444	4.4802	9.0	1.4329^o	8.0	4067.440	201.0		-0.8	
4068.327	4.4795	8.0	1.4329^o	8.0	4068.304^c	45.9		-1.4	
4069.153	4.2431	9.0	1.1971^o	10.0	4069.147	231.6		-1.1	
4069.569	3.6699^o	3.0	0.6243	4.0	4069.563	656.2		-1.4	
4071.652	4.5787^o	3.0	1.5346	3.0	4071.648	62.3		-1.2	
4071.906	4.4575	5.0	1.4135^o	5.0	4071.923^b	106.5		-1.1	
4071.931	4.6678^o	3.0	1.6239	2.0	4071.923^b	110.4		-0.8	
4074.902	5.2060	7.0	2.1643^o	6.0	4074.894	55.6		-0.4	
4075.482	5.1581	5.0	2.1168^o	6.0	4075.481	35.4		-0.6	
4077.662	3.9023^o	6.0	0.8627	5.0	4077.660	1371.2		-0.8	
4078.117	4.3722^o	3.0	1.3329	4.0	4078.118	831.6		-0.3	
4081.632	4.5713^o	2.0	1.5346	3.0	4081.633	96.5		-1.0	
4084.008	3.6592^o	4.0	0.6243	4.0	4084.008	269.5		-1.8	
4087.632	3.0322^o	6.0	0.0000	6.0	4087.638^n	77172.9		-0.2	-0.0
4091.785	4.3381	8.0	1.3090^o	9.0	4091.785	646.6		-0.5	
4096.131	3.8886^o	5.0	0.8627	5.0	4096.133	17.9		-2.6	
4098.409	4.3572^o	4.0	1.3329	4.0	4098.415	43.9		-1.6	
4104.393	5.1311	6.0	2.1113^o	5.0	4104.397	16.8		-1.0	
4105.047	5.1836	7.0	2.1643^o	6.0	4105.033	62.6		-0.3	
4106.081	3.9083	6.0	0.8898^o	6.0	4106.075	128.3		-1.8	
4110.132	4.4786	7.0	1.4629^o	6.0	4110.120	40.1		-1.5	
4110.542	4.8980	5.0	1.8827^o	5.0	4110.519	83.4		-0.6	
4113.306	3.9676	7.0	0.9543^o	7.0	4113.302	439.4		-1.1	
4114.567	5.2856	8.0	2.2733^o	8.0	4114.562	49.0		-0.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4116.362	4.2082	10.0	1.1971^{o}	10.0	4116.353	3716.2		0.1	
4117.489	4.4238	5.0	1.4135^{o}	5.0	4117.490	123.0		-1.1	
4118.545	4.3424^{o}	4.0	1.3329	4.0	4118.545	2993.0		0.2	
4119.850	4.4220	6.0	1.4135^{o}	5.0	4119.846	182.3		-0.9	
4120.118	4.0771	8.0	1.0688^{o}	9.0	4120.117^{c}	77.4		-1.7	
4121.531	5.1581	5.0	2.1508^{o}	5.0	4121.536	53.0		-0.4	
4122.264	4.4697	6.0	1.4629^{o}	6.0	4122.264	79.2		-1.2	
4124.757	3.6292^{o}	5.0	0.6243	4.0	4124.761	5195.7		-0.5	
4134.827	4.9623	6.0	1.9647^{o}	7.0	4134.828	26.5		-1.0	
4136.710	4.3052	9.0	1.3090^{o}	9.0	4136.712	135.6		-1.2	
4137.291	4.4588	6.0	1.4629^{o}	6.0	4137.293	60.0		-1.3	
4138.004	4.4282	7.0	1.4329^{o}	8.0	4138.000	92.0		-1.2	
4138.595	4.4084	6.0	1.4135^{o}	5.0	4138.594	56.1		-1.4	
4140.174	3.8564^{o}	5.0	0.8627	5.0	4140.172^{c}	636.6		-1.1	
4143.120	3.9459	8.0	0.9543^{o}	7.0	4143.122	450.1		-1.2	
4149.898	5.5578	7.0	2.5711^{o}	6.0	4149.879	28.8		-0.2	
4151.107	2.9859^{o}	5.0	0.0000	6.0	4151.105^{n}	274697.3		0.3	0.4
4153.284	4.9767	6.0	1.9924^{o}	6.0	4153.277	120.4		-0.3	
4156.204	4.5168^{o}	4.0	1.5346	3.0	4156.200	182.4		-0.8	
4158.427	5.2539	8.0	2.2733^{o}	8.0	4158.427	67.1		-0.2	
4159.598	4.4427	7.0	1.4629^{o}	6.0	4159.593	26.5		-1.7	
4160.312	4.2882	9.0	1.3090^{o}	9.0	4160.308	869.6		-0.4	
4160.741	4.3925	4.0	1.4135^{o}	5.0	4160.736^{bc}	144.5		-1.0	
4160.759	4.6028^{o}	3.0	1.6239	2.0	4160.736^{bc}	145.6		-0.7	
4162.229	5.3775^{o}	8.0	2.3997	9.0	4162.228	36.1		-0.3	
4163.611	5.1041	8.0	2.1272^{o}	7.0	4163.641	135.4		-0.1	
4167.181	5.3549	6.0	2.3806^{o}	5.0	4167.173	18.4		-0.6	
4170.661	4.5957^{o}	2.0	1.6239	2.0	4170.662	52.2		-1.2	
4170.850	4.3853	6.0	1.4135^{o}	5.0	4170.850	419.7		-0.6	
4171.543	4.3041^{o}	3.0	1.3329	4.0	4171.548	1255.6		-0.2	
4171.840	4.1682	10.0	1.1971^{o}	10.0	4171.842	1340.4		-0.4	
4172.217	3.5950^{o}	3.0	0.6243	4.0	4172.219	5449.9		-0.5	
4173.414	4.9623	6.0	1.9924^{o}	6.0	4173.414	14.9		-1.2	
4174.903	3.8586	5.0	0.8898^{o}	6.0	4174.873	76.5		-2.0	
4176.166	5.0138	9.0	2.0459^{o}	9.0	4176.162^{c}	438.0		0.3	
4177.093	4.3002^{o}	5.0	1.3329	4.0	4177.093	389.0		-0.7	
4177.826	3.8565	7.0	0.8898^{o}	6.0	4177.821	682.8		-1.1	
4178.118	4.3801	5.0	1.4135^{o}	5.0	4178.118	63.4		-1.4	
4179.892	4.4282	7.0	1.4629^{o}	6.0	4179.911	234.3		-0.8	
4182.029	4.0326	8.0	1.0688^{o}	9.0	4182.023	457.9		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4182.485	4.4980^o	4.0	1.5346	3.0	4182.483	197.0		-0.8	
4182.751	4.9557	6.0	1.9924^o	6.0	4182.749^b	39.2		-0.8	
4182.784	4.9279	6.0	1.9647^o	7.0	4182.749^b	42.9		-0.8	
4185.100	5.0784	5.0	2.1168^o	6.0	4185.098	135.1		-0.1	
4188.066	5.0018	5.0	2.0423^o	4.0	4188.085^b	98.1		-0.4	
4188.094	5.1041	8.0	2.1446^o	8.0	4188.086^b	92.6		-0.3	
4192.559	4.3893	9.0	1.4329^o	8.0	4192.554	119.6		-1.1	
4193.991	4.3883	7.0	1.4329^o	8.0	4193.990	35.6		-1.6	
4194.724	4.5787^o	3.0	1.6239	2.0	4194.722	578.8		-0.2	
4194.970	2.9546^o	6.0	0.0000	6.0	4194.968	137.5		-3.0	
4195.280	4.4282	7.0	1.4738^o	7.0	4195.283	55.3		-1.4	
4195.772	3.9083	6.0	0.9543^o	7.0	4195.771	267.2		-1.4	
4197.426	4.3664	6.0	1.4135^o	5.0	4197.422	1250.6		-0.1	
4198.444	4.9169	6.0	1.9647^o	7.0	4198.441^b	42.2		-0.8	
4198.446	4.2851^o	3.0	1.3329	4.0	4198.441^b	42.2		-1.7	
4198.695	4.9755	7.0	2.0235^o	6.0	4198.710^c	18.2		-1.1	
4203.285	4.3623	5.0	1.4135^o	5.0	4203.284	161.2		-1.0	
4204.105	4.4220	6.0	1.4738^o	7.0	4204.107	60.7		-1.4	
4205.318	4.5713^o	2.0	1.6239	2.0	4205.323	736.7		-0.1	
4206.152	5.4470	6.0	2.5002^o	6.0	4206.158^c	79.8		0.2	
4208.030	4.4084	6.0	1.4629^o	6.0	4208.035	91.4		-1.2	
4210.209	4.4178	8.0	1.4738^o	7.0	4210.202	40.2		-1.5	
4212.796	4.2511	8.0	1.3090^o	9.0	4212.794	346.8		-0.8	
4214.382	5.0682	7.0	2.1272^o	7.0	4214.387	69.4		-0.4	
4220.987	3.7991^o	4.0	0.8627	5.0	4220.986	4366.3		-0.3	
4221.599	4.0048	9.0	1.0688^o	9.0	4221.596^b	359.5		-1.1	
4221.604	5.3166	6.0	2.3806^o	5.0	4221.596^b	359.5		0.6	
4224.258	4.2431	9.0	1.3090^o	9.0	4224.253	144.8		-1.2	
4225.444	5.4025^o	7.0	2.4692	7.0	4225.446^b	109.7		0.2	
4225.446	5.5578	7.0	2.6245^o	7.0	4225.446^b	109.7		0.5	
4226.348	5.2060	7.0	2.2733^o	8.0	4226.365	149.4		0.1	
4228.600	3.7938^o	5.0	0.8627	5.0	4228.608	91.6		-2.0	
4235.183	3.5509^o	4.0	0.6243	4.0	4235.184	3027.0		-0.8	
4237.026	4.3883	7.0	1.4629^o	6.0	4237.046	645.4		-0.4	
4244.053	5.3166	6.0	2.3961^o	6.0	4244.057	19.1		-0.6	
4245.721	5.2905	7.0	2.3712^o	7.0	4245.730	25.4		-0.5	
4246.115	5.2520	5.0	2.3329^o	4.0	4246.123	31.8		-0.5	
4247.838	4.0771	8.0	1.1592^o	8.0	4247.818	138.2		-1.5	
4248.897	4.3801	5.0	1.4629^o	6.0	4248.901	42.1		-1.6	
4250.158	4.4508^o	4.0	1.5346	3.0	4250.162	92.1		-1.1	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
4251.508	5.0425	6.0	2.1272^o	7.0	4251.502	138.5		-0.1	
4252.804	5.2856	8.0	2.3712^o	7.0	4252.813^b	36.0		-0.4	
4252.839	4.3883	7.0	1.4738^o	7.0	4252.813^b	35.3		-1.6	
4255.376	5.0635	6.0	2.1508^o	5.0	4255.384^c	106.4		-0.2	
4255.764	4.9359	5.0	2.0235^o	6.0	4255.767	14.4		-1.3	
4258.131	4.7808	7.0	1.8700^o	8.0	4258.129^b	18.4		-1.4	
4258.134	5.3561^o	9.0	2.4453	8.0	4258.129^b	18.4		-0.6	
4261.907	4.3412	7.0	1.4329^o	8.0	4261.902^b	143.7		-1.1	
4261.911	5.4793	6.0	2.5711^o	6.0	4261.902^b	143.7		0.5	
4263.723	2.9070^o	5.0	0.0000	6.0	4263.719	1797.4		-1.9	
4268.297	3.7666^o	5.0	0.8627	5.0	4268.296	104.3		-2.0	
4268.866	4.3664	6.0	1.4629^o	6.0	4268.858	260.3		-0.8	
4269.946	4.3766	8.0	1.4738^o	7.0	4269.943	1285.1		-0.1	
4270.715	3.8565	7.0	0.9543^o	7.0	4270.710	514.5		-1.2	
4273.821	4.3631	7.0	1.4629^o	6.0	4273.802	14.4		-2.0	
4274.927	4.3623	5.0	1.4629^o	6.0	4274.921	135.3		-1.1	
4275.125	5.0635	6.0	2.1643^o	6.0	4275.150^b	1591.1		1.0	
4275.156	4.2082	10.0	1.3090^o	9.0	4275.150^b	1610.5		-0.2	
4277.069	5.3166	6.0	2.4187^o	6.0	4277.043^c	24.5		-0.5	
4277.418	5.1041	8.0	2.2064^o	7.0	4277.414	51.5		-0.5	
4278.729	2.8968^o	7.0	0.0000	6.0	4278.730	536.6		-2.5	
4282.340	5.2905	7.0	2.3961^o	6.0	4282.342	82.7		-0.0	
4283.264	5.0209	7.0	2.1272^o	7.0	4283.262	51.4		-0.6	
4284.918	4.3664	6.0	1.4738^o	7.0	4284.924	76.7		-1.3	
4286.243	5.0425	6.0	2.1508^o	5.0	4286.236	40.2		-0.7	
4289.910	4.3631	7.0	1.4738^o	7.0	4289.944	129.4		-1.1	
4291.824	3.7507^o	5.0	0.8627	5.0	4291.827	41.7		-2.4	
4292.134	3.7775	6.0	0.8898^o	6.0	4292.128^c	109.2		-2.0	
4293.195	3.9558	9.0	1.0688^o	9.0	4293.190	1038.2		-0.7	
4295.712	4.7680	6.0	1.8827^o	5.0	4295.715	19.7		-1.3	
4299.677	5.2539	8.0	2.3712^o	7.0	4299.678	31.8		-0.5	
4301.259	4.4162^o	2.0	1.5346	3.0	4301.260^b	825.0		-0.2	
4301.260	5.5061	8.0	2.6245^o	7.0	4301.260^b	825.0			
4303.830	5.2511	6.0	2.3712^o	7.0	4303.817^c	381.7		0.6	
4304.709	4.4139^o	4.0	1.5346	3.0	4304.706	104.8		-1.1	
4306.355	4.3412	7.0	1.4629^o	6.0	4306.350	992.4		-0.2	
4307.666	4.4119^o	3.0	1.5346	3.0	4307.665	119.8		-1.0	
4308.021	3.9459	8.0	1.0688^o	9.0	4308.015	116.2		-1.7	
4309.178	5.0209	7.0	2.1446^o	8.0	4309.209	69.1		-0.5	
4310.682	3.4996^o	3.0	0.6243	4.0	4310.679	82.9		-2.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4313.132	5.4859^o	7.0	2.6122	8.0	4313.133	18.4		-0.4	
4313.675	4.3063	7.0	1.4329^o	8.0	4313.672^b	1529.2		-0.1	
4313.677	4.0326	8.0	1.1592^o	8.0	4313.672^b	1529.2		-0.5	
4315.229	4.3052	9.0	1.4329^o	8.0	4315.226	544.2		-0.5	
4317.975	5.2511	6.0	2.3806^o	5.0	4317.967	17.4		-0.7	
4319.122	5.4859^o	7.0	2.6162	7.0	4319.129	28.1		-0.2	
4325.825	4.1982^o	4.0	1.3329	4.0	4325.828^c	175.1		-1.2	
4327.276	4.3381	8.0	1.4738^o	7.0	4327.278	275.9		-0.8	
4335.028	4.1682	10.0	1.3090^o	9.0	4335.028^b	723.6		-0.6	
4335.046	5.2553	6.0	2.3961^o	6.0	4335.028^b	723.7		0.9	
4336.812	3.7207^o	4.0	0.8627	5.0	4336.811	203.4		-1.7	
4344.149	5.4821^o	9.0	2.6290	9.0	4344.147	111.0		0.4	
4346.599	4.3861^o	3.0	1.5346	3.0	4346.596	162.5		-0.9	
4347.299	3.8054	7.0	0.9543^o	7.0	4347.295	1152.8		-0.9	
4348.334	3.4747^o	5.0	0.6243	4.0	4348.335	12203.9		-0.3	
4349.305	5.0006	6.0	2.1508^o	5.0	4349.300	31.9		-0.8	
4349.756	4.9767	6.0	2.1272^o	7.0	4349.755	377.5		0.2	
4351.317	4.9224^o	7.0	2.0739	8.0	4351.312	72.7		-0.6	
4351.627	3.7380	5.0	0.8898^o	6.0	4351.623^c	1152.7		-1.0	
4356.065	3.7351	5.0	0.8898^o	6.0	4356.058	309.7		-1.5	
4357.591	4.9557	6.0	2.1113^o	5.0	4357.586	79.0		-0.5	
4358.757	3.7063^o	5.0	0.8627	5.0	4358.760	598.9		-1.3	
4359.026	5.1167	7.0	2.2733^o	8.0	4359.026	568.2		0.6	
4359.215	4.3063	7.0	1.4629^o	6.0	4359.212^c	247.0		-0.9	
4359.465	4.3777^o	4.0	1.5346	3.0	4359.467	203.1		-0.8	
4362.723	3.7308	7.0	0.8898^o	6.0	4362.720	772.3		-1.1	
4363.317	4.2542	6.0	1.4135^o	5.0	4363.318^c	95.6		-1.3	
4366.106	4.9557	6.0	2.1168^o	6.0	4366.115	23.5		-1.0	
4366.484	3.9978	7.0	1.1592^o	8.0	4366.486	69.8		-1.8	
4371.488	4.3092	8.0	1.4738^o	7.0	4371.489	116.8		-1.2	
4371.841	4.9623	6.0	2.1272^o	7.0	4371.846	90.2		-0.4	
4372.786	4.1674^o	5.0	1.3329	4.0	4372.788	298.6		-1.0	
4380.650	4.7941	6.0	1.9647^o	7.0	4380.651^b	2466.1		0.8	
4380.651	3.4537^o	5.0	0.6243	4.0	4380.651^b	2466.1		-1.0	
4385.383	4.2893	7.0	1.4629^o	6.0	4385.374	491.1		-0.6	
4386.122	4.9767	6.0	2.1508^o	5.0	4386.114	188.2		-0.1	
4387.562	3.7792	7.0	0.9543^o	7.0	4387.555	492.6		-1.3	
4389.759	3.4478^o	3.0	0.6243	4.0	4389.755	171.0		-2.2	
4390.234	3.7775	6.0	0.9543^o	7.0	4390.229	1617.4		-0.8	
4395.892	3.4439^o	4.0	0.6243	4.0	4395.888	35.3		-2.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4400.090	4.4408[o]	3.0	1.6239	2.0	4400.090[c]	26.9		-1.6	
4402.890	5.1957	6.0	2.3806[o]	5.0	4402.891	23.4		-0.7	
4406.119	4.8366	6.0	2.0235[o]	6.0	4406.133[c]	43.6		-0.9	
4408.579	4.9623	6.0	2.1508[o]	5.0	4408.580	40.2		-0.7	
4410.582	4.2431	9.0	1.4329[o]	8.0	4410.578	222.1		-1.0	
4412.167	5.4337	7.0	2.6245[o]	7.0	4412.168[b]	43.7		-0.1	
4412.170	4.2721	6.0	1.4629[o]	6.0	4412.168[b]	43.7		-1.6	
4413.510	3.9676	7.0	1.1592[o]	8.0	4413.507	250.3		-1.3	
4414.165	4.2709	5.0	1.4629[o]	6.0	4414.163	17.6		-2.0	
4414.352	4.3424[o]	4.0	1.5346	3.0	4414.352	495.9		-0.5	
4414.599	4.0048	9.0	1.1971[o]	10.0	4414.593	65.4		-1.8	
4416.421	3.6692[o]	4.0	0.8627	5.0	4416.415	2000.3		-0.8	
4422.931	3.6651[o]	6.0	0.8627	5.0	4422.924	1038.9		-1.1	
4424.569	3.4256[o]	4.0	0.6243	4.0	4424.569	23642.6		-0.1	
4425.009	3.6637[o]	5.0	0.8627	5.0	4425.007	75.4		-2.2	
4432.224	3.6592[o]	4.0	0.8627	5.0	4432.225	2826.5		-0.7	
4434.284	3.8640	9.0	1.0688[o]	9.0	4434.280	71.1		-2.0	
4434.643	5.0682	7.0	2.2733[o]	8.0	4434.642	284.6		0.3	
4435.764	5.4064[o]	8.0	2.6122	8.0	4435.757	225.4		0.6	
4437.663	4.1260[o]	4.0	1.3329	4.0	4437.665	1786.3		-0.2	
4438.741	5.6034	11.0	2.8110[o]	10.0	4438.738	120.9		0.6	
4440.568	4.2542	6.0	1.4629[o]	6.0	4440.564	38.9		-1.7	
4442.179	3.6800	7.0	0.8898[o]	6.0	4442.180	289.7		-1.6	
4446.770	3.7416	6.0	0.9543[o]	7.0	4446.765	28.6		-2.5	
4450.372	3.6478[o]	6.0	0.8627	5.0	4450.371	96.1		-2.1	
4453.071	2.7834[o]	5.0	0.0000	6.0	4453.072	376.6		-2.7	
4457.939	4.2542	6.0	1.4738[o]	7.0	4457.939	56.1		-1.5	
4458.483	5.5203	9.0	2.7403[o]	9.0	4458.509	83.8		0.4	
4462.515	5.4064[o]	8.0	2.6290	9.0	4462.524[b]	85.6		0.2	
4462.534	5.1581	5.0	2.3806[o]	5.0	4462.524[b]	85.6		-0.1	
4462.847	4.2511	8.0	1.4738[o]	7.0	4462.838	122.9		-1.2	
4464.115	3.7308	7.0	0.9543[o]	7.0	4464.105	151.5		-1.8	
4471.529	4.6546	6.0	1.8827[o]	5.0	4471.526	59.3		-1.0	
4473.128	4.1844	6.0	1.4135[o]	5.0	4473.118	119.8		-1.3	
4475.546	4.7618	6.0	1.9924[o]	6.0	4475.541	448.0		0.1	
4477.635	4.0771	8.0	1.3090[o]	9.0	4477.632	262.6		-1.1	
4480.259	3.6292[o]	5.0	0.8627	5.0	4480.258[c]	3534.8		-0.6	
4486.724	4.8364[o]	7.0	2.0739	8.0	4486.713	75.7		-0.6	
4488.902	3.7154	7.0	0.9543[o]	7.0	4488.901	1265.2		-0.9	
4489.312	3.6507	6.0	0.8898[o]	6.0	4489.308	3058.0		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4491.241	4.8011^o	7.0	2.0413	7.0	4491.238	78.4		-0.6	
4492.014	4.2222	6.0	1.4629^o	6.0	4492.028	29.0		-1.9	
4492.952	3.9558	9.0	1.1971^o	10.0	4492.947	72.9		-1.8	
4493.807	4.0911^o	5.0	1.3329	4.0	4493.810^c	537.6		-0.8	
4498.333	4.7789	7.0	2.0235^o	6.0	4498.344	250.1		-0.2	
4504.010	3.6417	5.0	0.8898^o	6.0	4503.999	31.3		-2.6	
4504.364	3.6144^o	6.0	0.8627	5.0	4504.364	529.8		-1.4	
4512.207	4.7393	5.0	1.9924^o	6.0	4512.202	674.6		0.2	
4512.508	5.1473^o	5.0	2.4005	5.0	4512.506	272.0		0.4	
4514.180	5.4470	6.0	2.7013^o	7.0	4514.184	84.6		0.3	
4516.114	4.7680	6.0	2.0235^o	6.0	4516.111	108.9		-0.5	
4522.355	3.8095	8.0	1.0688^o	9.0	4522.350	190.1		-1.6	
4526.412	4.7618	6.0	2.0235^o	6.0	4526.420^c	593.9		0.2	
4527.046	5.1384^o	6.0	2.4005	5.0	4527.042	194.7		0.2	
4531.082	3.6897	8.0	0.9543^o	7.0	4531.081	10545.2		-0.0	
4533.505	4.8508	5.0	2.1168^o	6.0	4533.505	41.9		-0.8	
4539.858	5.3381^o	7.0	2.6080	6.0	4539.853	37.1		-0.2	
4542.248	5.4691	10.0	2.7403^o	9.0	4542.246	33.8		-0.1	
4542.743	4.8556	6.0	2.1272^o	7.0	4542.754	14.5		-1.3	
4544.832	4.8440	7.0	2.1168^o	6.0	4544.841^b	301.3		0.0	
4544.847	4.8011^o	7.0	2.0739	8.0	4544.841^b	304.2		-0.0	
4544.870	5.3561^o	9.0	2.6290	9.0	4544.841^b	304.2		0.7	
4547.342	3.6800	7.0	0.9543^o	7.0	4547.340	39.2		-2.5	
4550.197	5.3362^o	8.0	2.6122	8.0	4550.210	26.6		-0.4	
4554.246	4.0545^o	4.0	1.3329	4.0	4554.254	22.1		-2.2	
4555.697	4.0536^o	3.0	1.3329	4.0	4555.701	1810.3		-0.3	
4557.305	4.8366	6.0	2.1168^o	6.0	4557.302	394.6		0.1	
4562.152	4.8440	7.0	2.1272^o	7.0	4562.149	149.7		-0.3	
4563.915	4.7393	5.0	2.0235^o	6.0	4563.923	825.8		0.3	
4566.394	3.6041	5.0	0.8898^o	6.0	4566.383^c	281.1		-1.7	
4569.287	4.7539^o	8.0	2.0413	7.0	4569.280	782.2		0.3	
4573.479	4.5928	6.0	1.8827^o	5.0	4573.467	47.0		-1.1	
4574.720	4.8366	6.0	2.1272^o	7.0	4574.721^b	65.1		-0.7	
4574.727	4.7833^o	7.0	2.0739	8.0	4574.721^b	65.1		-0.7	
4575.422	4.8258	6.0	2.1168^o	6.0	4575.427	40.1		-0.9	
4578.350	5.3362^o	8.0	2.6290	9.0	4578.354	37.7		-0.2	
4585.853	4.7767^o	8.0	2.0739	8.0	4585.849^b	358.5		0.0	
4585.856	4.8671	6.0	2.1643^o	6.0	4585.849^b	358.5		0.1	
4590.557	4.8508	5.0	2.1508^o	5.0	4590.558	18.9		-1.2	
4592.946	4.8099	5.0	2.1113^o	5.0	4592.923	4211.3			

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
4594.832	4.8088	6.0	2.1113[o]	5.0	4594.863[b]	71.7		-0.6	
4594.870	3.7663	9.0	1.0688[o]	9.0	4594.862[b]	86.2		-2.0	
4595.370	3.6515	8.0	0.9543[o]	7.0	4595.365	185.2		-1.8	
4596.745	3.6507	6.0	0.9543[o]	7.0	4596.738	3230.0		-0.6	
4597.748	4.0048	9.0	1.3090[o]	9.0	4597.743	178.3		-1.3	
4598.118	3.5853	7.0	0.8898[o]	6.0	4598.113[c]	6833.5		-0.3	
4598.821	4.1087	6.0	1.4135[o]	5.0	4598.823	89.7		-1.5	
4602.063	5.0209	7.0	2.3276[o]	7.0	4602.063[b]	1138.5		0.8	
4602.066	4.8101	7.0	2.1168[o]	6.0	4602.063[b]	1138.5		0.6	
4602.099	5.6034	11.0	2.9102[o]	11.0	4602.063[b]	1112.6			
4604.301	4.8088	6.0	2.1168[o]	6.0	4604.303	57.9		-0.7	
4604.821	5.2850	6.0	2.5933[o]	5.0	4604.851	34.6		-0.3	
4606.604	2.6906[o]	6.0	0.0000	6.0	4606.610[n]	147224.1		-0.2	-0.5
4608.894	4.5720	6.0	1.8827[o]	5.0	4608.896	31.3		-1.3	
4611.718	4.8045	7.0	2.1168[o]	6.0	4611.716	791.1		0.4	
4611.928	4.8147	8.0	2.1272[o]	7.0	4611.928	370.3		0.1	
4614.961	4.8366	6.0	2.1508[o]	5.0	4614.961[c]	97.2		-0.5	
4617.602	5.2553	6.0	2.5711[o]	6.0	4617.623[b]	114.9		0.2	
4617.630	4.7581[o]	7.0	2.0739	8.0	4617.623[b]	109.1		-0.5	
4623.005	5.2744	5.0	2.5933[o]	5.0	4622.996[b]	427.4		0.8	
4623.024	3.3053[o]	5.0	0.6243	4.0	4622.996[b]	435.3		-1.9	
4624.422	4.3041[o]	3.0	1.6239	2.0	4624.430	50.1		-1.5	
4624.784	4.7539[o]	8.0	2.0739	8.0	4624.776[c]	276.4		-0.1	
4625.145	3.8770	10.0	1.1971[o]	10.0	4625.142	2871.9		-0.3	
4629.620	4.7941	6.0	2.1168[o]	6.0	4629.620[c]	26.0		-1.1	
4631.125	3.7452	9.0	1.0688[o]	9.0	4631.121	360.3		-1.4	
4634.056	4.8255	4.0	2.1508[o]	5.0	4634.051[b]	94.1		-0.5	
4634.069	5.1749	6.0	2.5002[o]	6.0	4634.051[b]	94.1		-0.0	
4637.443	4.2966[o]	1.0	1.6239	2.0	4637.445	243.8		-0.8	
4639.151	3.2960[o]	3.0	0.6243	4.0	4639.154	173.0		-2.3	
4647.482	4.7941	8.0	2.1272[o]	7.0	4647.480	195.1		-0.2	
4649.927	5.6034	11.0	2.9379[o]	10.0	4649.924[c]	310.8			
4650.333	5.0659[o]	6.0	2.4005	5.0	4650.329	277.2		0.3	
4653.301	4.8144	5.0	2.1508[o]	5.0	4653.300[b]	540.8		0.3	
4653.318	5.4470	6.0	2.7834[o]	5.0	4653.300[b]	554.9			
4656.025	4.7789	7.0	2.1168[o]	6.0	4656.018	53.8		-0.8	
4656.798	4.1962[o]	3.0	1.5346	3.0	4656.801	746.0		-0.4	
4658.459	4.8671	6.0	2.2064[o]	7.0	4658.485[bc]	65.5		-0.6	
4658.520	5.4887[o]	8.0	2.8281	8.0	4658.485[bc]	69.9		0.3	
4661.218	4.8099	5.0	2.1508[o]	5.0	4661.217[b]	432.8		0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4661.230	4.7330^o	7.0	2.0739	8.0	4661.217^b	432.8		0.1	
4670.076	5.4821^o	9.0	2.8281	8.0	4670.075	20.6		-0.2	
4671.590	5.5633	12.0	2.9102^o	11.0	4671.584	387.0			
4671.796	3.5158^o	4.0	0.8627	5.0	4671.765	188.3		-2.0	
4673.158	2.6523^o	5.0	0.0000	6.0	4673.162	45143.5		-0.8	
4674.205	4.7789	7.0	2.1272^o	7.0	4674.206	671.4		0.3	
4677.673	5.0209	7.0	2.3712^o	7.0	4677.671	30.0		-0.7	
4682.799	3.9558	9.0	1.3090^o	9.0	4682.793	142.0		-1.5	
4683.593	5.0425	6.0	2.3961^o	6.0	4683.587	26.0		-0.7	
4684.027	3.8054	7.0	1.1592^o	8.0	4684.022	1193.9		-0.8	
4684.718	4.1087	6.0	1.4629^o	6.0	4684.753^b	217.9		-1.1	
4684.761	3.5355	5.0	0.8898^o	6.0	4684.753^b	224.2		-1.9	
4685.759	4.5152	7.0	1.8700^o	8.0	4685.754	224.3		-0.5	
4689.133	4.7941	6.0	2.1508^o	5.0	4689.139	63.2		-0.7	
4696.989	5.0958^o	6.0	2.4569	6.0	4696.972	248.1		0.3	
4702.218	5.0546	6.0	2.4187^o	6.0	4702.182	86.4		-0.2	
4703.077	4.7862	6.0	2.1508^o	5.0	4703.085	37.4		-0.9	
4706.376	4.0665	7.0	1.4329^o	8.0	4706.396^b	83.8		-1.6	
4706.406	5.1338	6.0	2.5002^o	6.0	4706.396^b	83.7		-0.1	
4706.769	4.7842	4.0	2.1508^o	5.0	4706.768	102.0		-0.5	
4710.844	4.6546	6.0	2.0235^o	6.0	4710.882^b	907.0		0.3	
4710.888	3.5853	7.0	0.9543^o	7.0	4710.882^b	912.1		-1.2	
4711.174	5.1311	6.0	2.5002^o	6.0	4711.170	238.6		0.3	
4713.811	5.0006	6.0	2.3712^o	7.0	4713.819	20.7		-0.9	
4716.341	4.9557	6.0	2.3276^o	7.0	4716.311^b	77.1		-0.4	
4716.346	4.7393	5.0	2.1113^o	5.0	4716.311^b	79.9		-0.7	
4718.692	4.7539	8.0	2.1272^o	7.0	4718.690	1413.7		0.6	
4722.016	3.4876^o	5.0	0.8627	5.0	4722.011^c	1217.0		-1.2	
4723.763	3.2482^o	5.0	0.6243	4.0	4723.757	698.7		-1.7	
4724.544	4.1580^o	2.0	1.5346	3.0	4724.536^c	1211.6		-0.3	
4725.192	5.6098	3.0	2.9867^o	2.0	4725.194	129.2		0.7	
4730.784	5.0006	6.0	2.3806^o	5.0	4730.799^b	1270.9		0.9	
4730.803	3.7792	7.0	1.1592^o	8.0	4730.799^b	1268.2		-0.8	
4733.182	4.7355	7.0	2.1168^o	6.0	4733.221	168.0		-0.3	
4735.415	3.5072	7.0	0.8898^o	6.0	4735.410^c	1973.2		-0.9	
4736.978	4.7808	7.0	2.1643^o	6.0	4736.956^c	235.4		-0.1	
4738.996	3.4782^o	6.0	0.8627	5.0	4738.998^c	1010.5		-1.3	
4741.320	5.4064^o	8.0	2.7923	7.0	4741.316	155.5		0.5	
4741.913	5.5040	7.0	2.8902^o	6.0	4741.881	68.6		0.3	
4747.098	4.7618	6.0	2.1508^o	5.0	4747.091^{bc}	31.1		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4747.124	5.2830	3.0	2.6720^{o}	4.0	4747.092^{bc}	44.3		-0.2	
4749.890	5.4887^{o}	8.0	2.8793	7.0	4749.852	79.3		0.4	
4751.541	4.4786	7.0	1.8700^{o}	8.0	4751.526^{c}	3383.9		0.6	
4751.970	4.7355	7.0	2.1272^{o}	7.0	4751.957^{bc}	48.0		-0.9	
4751.974	4.8147	8.0	2.2064^{o}	7.0	4751.957^{bc}	48.0		-0.8	
4755.256	5.5203	9.0	2.9138^{o}	8.0	4755.252	139.8		0.7	
4759.679	4.7487	7.0	2.1446^{o}	8.0	4759.655	4826.5			
4759.918	3.5582	8.0	0.9543^{o}	7.0	4759.913^{c}	2712.1		-0.7	
4760.194	5.1749	6.0	2.5711^{o}	6.0	4760.179	119.1		0.1	
4762.643	5.6876	7.0	3.0851^{o}	8.0	4762.643^{c}	432.0			
4764.654	3.2256^{o}	4.0	0.6243	4.0	4764.650	1290.2		-1.5	
4768.059	4.0130	6.0	1.4135^{o}	5.0	4768.044	45.7		-1.9	
4778.530	3.4565^{o}	6.0	0.8627	5.0	4778.532	1658.0		-1.1	
4779.401	2.5933^{o}	5.0	0.0000	6.0	4779.415	64.8		-3.7	
4781.838	5.5203	9.0	2.9283^{o}	9.0	4781.833	57.7		0.3	
4783.785	3.4537^{o}	5.0	0.8627	5.0	4783.785^{b}	790.1		-1.4	
4783.822	5.6098	3.0	3.0188^{o}	4.0	4783.785^{b}	793.3			
4793.113	3.7452	9.0	1.1592^{o}	8.0	4793.120	29.9		-2.4	
4796.775	4.4666	6.0	1.8827^{o}	5.0	4796.779	67.9		-1.1	
4799.120	3.6515	8.0	1.0688^{o}	9.0	4799.113	1248.2		-0.9	
4799.999	5.3072	9.0	2.7250^{o}	8.0	4799.995	140.8		0.4	
4802.334	3.9945	5.0	1.4135^{o}	5.0	4802.354	141.9		-1.4	
4802.787	5.4859^{o}	7.0	2.9052	6.0	4802.786	34.8		0.0	
4803.749	3.9937	6.0	1.4135^{o}	5.0	4803.747	33.7		-2.0	
4804.050	4.8533	7.0	2.2733^{o}	8.0	4804.081	37.9		-0.8	
4807.150	5.4064^{o}	8.0	2.8281	8.0	4807.154	22.2		-0.3	
4811.435	4.4588	6.0	1.8827^{o}	5.0	4811.428	18.6		-1.6	
4812.047	4.9763^{o}	5.0	2.4005	5.0	4812.038	42.2		-0.6	
4813.354	4.9557	6.0	2.3806^{o}	5.0	4813.385	9.9		-1.2	
4814.629	4.9359	5.0	2.3616^{o}	4.0	4814.630	18.1		-1.0	
4816.646	3.4630	6.0	0.8898^{o}	6.0	4816.641	1329.5		-1.1	
4819.340	4.0048	9.0	1.4329^{o}	8.0	4819.330	84.6		-1.6	
4820.783	2.5711^{o}	6.0	0.0000	6.0	4820.784	5939.9		-1.7	
4824.435	3.7663	9.0	1.1971^{o}	10.0	4824.429	288.7		-1.4	
4825.200	3.1930^{o}	4.0	0.6243	4.0	4825.204	816.4		-1.7	
4826.579	3.8770	10.0	1.3090^{o}	9.0	4826.576^{bc}	33.6		-2.2	
4826.591	5.0682	7.0	2.5002^{o}	6.0	4826.576^{bc}	33.6		-0.6	
4828.669	5.3072	9.0	2.7403^{o}	9.0	4828.666	280.5		0.7	
4829.526	3.5207	8.0	0.9543^{o}	7.0	4829.523	2433.2		-0.8	
4836.206	3.4256^{o}	4.0	0.8627	5.0	4836.207	801.3		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4836.555	5.1338	6.0	2.5711^o	6.0	4836.547	28.2		-0.5	
4840.477	5.2856	8.0	2.7250^o	8.0	4840.470	142.3		0.4	
4844.039	4.0326	8.0	1.4738^o	7.0	4844.030	37.0		-1.9	
4847.703	3.9703	5.0	1.4135^o	5.0	4847.690	78.5		-1.7	
4847.704	5.4470	6.0	2.8902^o	6.0	4847.690	90.3		0.4	
4851.159	3.8640	9.0	1.3090^o	9.0	4851.151	45.3		-2.1	
4855.107	3.5072	7.0	0.9543^o	7.0	4855.100	297.5		-1.7	
4855.762	5.2539	8.0	2.7013^o	7.0	4855.752	38.0		-0.2	
4859.925	3.4401	5.0	0.8898^o	6.0	4859.919	2361.9		-0.9	
4864.941	4.4178	8.0	1.8700^o	8.0	4864.935	35.2		-1.4	
4869.634	5.2856	8.0	2.7403^o	9.0	4869.625^c	57.1		-0.0	
4877.009	4.8147	8.0	2.2733^o	8.0	4876.997	23.1		-1.0	
4878.325	5.4691	10.0	2.9283^o	9.0	4878.325^c	140.8		0.6	
4880.893	4.8671	6.0	2.3276^o	7.0	4880.891	159.3		-0.1	
4882.023	3.9524	6.0	1.4135^o	5.0	4882.017	258.6		-1.2	
4886.292	4.5013	6.0	1.9647^o	7.0	4886.287^c	132.9		-0.7	
4888.840	3.4250	7.0	0.8898^o	6.0	4888.832	7315.8		-0.4	
4890.099	3.9676	7.0	1.4329^o	8.0	4890.095^c	445.8		-0.9	
4891.057	4.1580^o	2.0	1.6239	2.0	4891.057	80.6		-1.4	
4895.492	4.8648	4.0	2.3329^o	4.0	4895.491	88.0		-0.4	
4896.712	5.4691	10.0	2.9379^o	10.0	4896.712^b	88.8		0.4	
4896.721	4.8045	7.0	2.2733^o	8.0	4896.712^b	88.8		-0.5	
4898.084	3.6897	8.0	1.1592^o	8.0	4898.099	4726.9		-0.3	
4898.682	4.9557	6.0	2.4255^o	5.0	4898.678	80.8		-0.3	
4907.371	4.4084	6.0	1.8827^o	5.0	4907.363	33.4		-1.4	
4909.185	5.3381^o	7.0	2.8134	6.0	4909.212	59.8		0.1	
4910.729	3.9978	7.0	1.4738^o	7.0	4910.725	28.4		-2.1	
4913.042	4.5152	7.0	1.9924^o	6.0	4913.041	123.4		-0.7	
4916.786	4.7941	8.0	2.2733^o	8.0	4916.787	284.3		0.0	
4917.082	4.9169	6.0	2.3961^o	6.0	4917.088^b	621.8		0.5	
4917.090	3.6800	7.0	1.1592^o	8.0	4917.088^b	621.8		-1.2	
4917.128	5.1369^o	7.0	2.6162	7.0	4917.088^b	622.8		0.8	
4919.872	5.2917	4.0	2.7724^o	4.0	4919.904^c	27.1		-0.3	
4920.410	4.0536^o	3.0	1.5346	3.0	4920.420	36.9		-1.9	
4921.593	5.1306^o	8.0	2.6122	8.0	4921.590	269.2		0.5	
4922.555	4.8508	5.0	2.3329^o	4.0	4922.553	143.3		-0.2	
4923.858	4.9359	5.0	2.4187^o	6.0	4923.848	16.9		-1.0	
4926.839	3.4055	5.0	0.8898^o	6.0	4926.830	209.6		-2.0	
4928.877	3.4044	7.0	0.8898^o	6.0	4928.872	8221.2		-0.4	
4929.394	5.1306^o	8.0	2.6162	7.0	4929.394	34.6		-0.4	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
4930.445	4.4786	7.0	1.9647^o	7.0	4930.427	15.3		-1.7	
4931.188	5.2539	8.0	2.7403^o	9.0	4931.179	92.6		0.2	
4931.790	5.4064^o	8.0	2.8932	7.0	4931.774	21.3		-0.3	
4937.879	4.9106^o	6.0	2.4005	5.0	4937.886^c	46.5		-0.6	
4943.244	3.9703	5.0	1.4629^o	6.0	4943.256	247.8		-1.2	
4943.912	4.7803	8.0	2.2733^o	8.0	4943.914^b	306.9		0.0	
4943.924	5.4038	8.0	2.8968^o	7.0	4943.914^b	306.9		0.9	
4943.941	4.6342	8.0	2.1272^o	7.0	4943.914^b	325.9		-0.1	
4944.363	3.5756	9.0	1.0688^o	9.0	4944.360^b	13462.4		0.0	
4944.385	5.4935	3.0	2.9867^o	2.0	4944.360^b	13430.5			
4946.018	4.8336	7.0	2.3276^o	7.0	4946.020	81.2		-0.5	
4946.380	4.5517	10.0	2.0459^o	9.0	4946.378^b	80.5		-0.8	
4946.382	3.8387^o	4.0	1.3329	4.0	4946.378^b	80.5		-1.8	
4946.413	5.1581	5.0	2.6523^o	5.0	4946.378^b	81.2		-0.0	
4946.704	4.7789	7.0	2.2733^o	8.0	4946.711^c	56.1		-0.7	
4952.787	4.3853	6.0	1.8827^o	5.0	4952.781	45.6		-1.3	
4953.891	5.2744	5.0	2.7724^o	4.0	4953.928^b	26.2		-0.3	
4953.941	4.4666	6.0	1.9647^o	7.0	4953.928^b	27.3		-1.4	
4956.765	3.8095	8.0	1.3090^o	9.0	4956.759	429.4		-1.1	
4960.962	4.7717	9.0	2.2733^o	8.0	4960.963	90.0		-0.5	
4963.040	4.3801	5.0	1.8827^o	5.0	4963.030^c	53.5		-1.3	
4965.448	5.3072	9.0	2.8110^o	10.0	4965.442	72.1		0.1	
4966.975	3.1197^o	5.0	0.6243	4.0	4966.974	1872.4	-1.4	-1.4	
4968.160	3.9083	6.0	1.4135^o	5.0	4968.156	338.9		-1.1	
4971.091	3.1176^o	4.0	0.6243	4.0	4971.090^b	77.6		-2.8	
4971.099	5.3549	6.0	2.8616^o	7.0	4971.090^b	77.6		0.2	
4971.672	4.3631	7.0	1.8700^o	8.0	4971.669	57.0		-1.2	
4973.294	3.6515	8.0	1.1592^o	8.0	4973.287	1416.8		-0.8	
4974.407	4.5152	7.0	2.0235^o	6.0	4974.422	30.4		-1.3	
4978.868	3.5582	8.0	1.0688^o	9.0	4978.897^b	162.5		-1.9	
4978.936	3.9524	6.0	1.4629^o	6.0	4978.897^b	178.2		-1.3	
4990.307	4.3664	6.0	1.8827^o	5.0	4990.301	408.6		-0.4	
4995.922	5.2060	7.0	2.7250^o	8.0	4995.947	152.4		0.3	
4996.542	3.9136	7.0	1.4329^o	8.0	4996.557^b	45.8		-1.9	
4996.558	4.7539	8.0	2.2733^o	8.0	4996.557^b	46.0		-0.8	
4998.067	3.9128	8.0	1.4329^o	8.0	4998.053	56.0		-1.9	
4998.591	4.3623	5.0	1.8827^o	5.0	4998.577	63.6		-1.2	
5000.366	3.6759	10.0	1.1971^o	10.0	5000.376^c	1957.7		-0.6	
5000.785	3.9524	6.0	1.4738^o	7.0	5000.774	810.5		-0.6	
5001.797	4.4427	7.0	1.9647^o	7.0	5001.792	68.9		-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5003.270	4.4697	6.0	1.9924^{o}	6.0	5003.265	119.3		-0.8	
5003.785	4.9224^{o}	7.0	2.4453	8.0	5003.774	27.1		-0.8	
5004.209	3.5456	10.0	1.0688^{o}	9.0	5004.204^{bc}	2240.8		-0.8	
5004.236	4.8045	7.0	2.3276^{o}	7.0	5004.204^{bc}	2147.8		0.9	
5008.957	5.2744	5.0	2.7999^{o}	6.0	5008.966	53.9		-0.0	
5012.291	4.8440	7.0	2.3712^{o}	7.0	5012.285	124.3		-0.2	
5014.335	3.8854	6.0	1.4135^{o}	5.0	5014.324	50.2		-1.9	
5016.518	3.4250	7.0	0.9543^{o}	7.0	5016.508	1355.7		-1.1	
5019.137	4.7427	8.0	2.2733^{o}	8.0	5019.175^{c}	46.1		-0.8	
5021.928	4.3381	8.0	1.8700^{o}	8.0	5021.901	49.4		-1.3	
5026.924	4.9659	5.0	2.5002^{o}	6.0	5026.927	63.1		-0.4	
5027.354	4.9224^{o}	7.0	2.4569	6.0	5027.343	65.8		-0.4	
5027.717	5.4691	10.0	3.0038^{o}	9.0	5027.711	120.3		0.6	
5028.326	3.4192	8.0	0.9543^{o}	7.0	5028.319	16751.3		-0.0	
5029.491	5.6034	11.0	3.1390^{o}	10.0	5029.485	31.7		0.2	
5032.078	4.8593	6.0	2.3961^{o}	6.0	5032.075	203.1		-0.0	
5032.912	3.8763	4.0	1.4135^{o}	5.0	5032.903	61.7		-1.9	
5033.886	4.7355	7.0	2.2733^{o}	8.0	5033.849	21.1		-1.2	
5037.371	3.3503	5.0	0.8898^{o}	6.0	5037.362	72.6		-2.5	
5040.909	3.9326	7.0	1.4738^{o}	7.0	5040.905^{c}	174.6		-1.3	
5046.777	4.8366	6.0	2.3806^{o}	5.0	5046.776	55.9		-0.6	
5052.655	4.4178	8.0	1.9647^{o}	7.0	5052.685^{b}	1507.9		0.3	
5052.697	3.5219	9.0	1.0688^{o}	9.0	5052.685^{b}	1491.0		-1.0	
5055.078	3.5207	8.0	1.0688^{o}	9.0	5055.073	574.1		-1.4	
5057.743	3.9136	7.0	1.4629^{o}	6.0	5057.739	29.3		-2.1	
5058.683	3.4044	7.0	0.9543^{o}	7.0	5058.677	2509.7		-0.9	
5062.386	4.8671	6.0	2.4187^{o}	6.0	5062.379	53.6		-0.6	
5063.406	4.8440	7.0	2.3961^{o}	6.0	5063.405	619.9		0.5	
5068.558	3.9083	6.0	1.4629^{o}	6.0	5068.551	96.7		-1.6	
5069.270	3.8586	5.0	1.4135^{o}	5.0	5069.262	1188.5		-0.6	
5070.827	5.2553	6.0	2.8110^{o}	5.0	5070.844	73.7		0.1	
5072.439	4.8147	8.0	2.3712^{o}	7.0	5072.439	618.5		0.4	
5079.228	5.0525^{o}	7.0	2.6122	8.0	5079.241	26.4		-0.6	
5081.867	3.9128	8.0	1.4738^{o}	7.0	5081.861	39.7		-2.0	
5085.510	4.9786^{o}	4.0	2.5413	4.0	5085.511	27.3		-0.7	
5088.481	4.4005	8.0	1.9647^{o}	7.0	5088.479	338.8		-0.4	
5089.769	4.3052	9.0	1.8700^{o}	8.0	5089.768	277.2		-0.6	
5090.274	4.9763^{o}	5.0	2.5413	4.0	5090.270	441.2		0.5	
5091.202	3.9083	6.0	1.4738^{o}	7.0	5091.198	422.2		-1.0	
5092.662	4.8144	5.0	2.3806^{o}	5.0	5092.689^{b}	101.7		-0.4	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
5092.708	4.8593	6.0	2.4255^o	5.0	5092.689^b	100.2		-0.3	
5093.766	4.8045	7.0	2.3712^o	7.0	5093.767	520.9		0.3	
5094.290	5.4391	6.0	3.0061^o	6.0	5094.269	522.0			
5095.446	4.8330^o	4.0	2.4005	5.0	5095.458^b	58.1		-0.6	
5095.449	5.1338	6.0	2.7013^o	7.0	5095.458^b	58.1		-0.2	
5095.491	4.8321^o	8.0	2.3997	9.0	5095.458^b	57.0		-0.6	
5096.794	3.8948	5.0	1.4629^o	6.0	5096.791	363.8		-1.0	
5101.037	5.1311	6.0	2.7013^o	7.0	5101.030	123.4		0.2	
5108.874	3.5853	7.0	1.1592^o	8.0	5108.870	702.1		-1.2	
5110.236	2.4255^o	5.0	0.0000	6.0	5110.237	919.6		-2.6	
5113.429	3.7329	10.0	1.3090^o	9.0	5113.424	130.7		-1.7	
5114.176	4.3883	7.0	1.9647^o	7.0	5114.184^b	300.8		-0.5	
5114.192	3.8565	7.0	1.4329^o	8.0	5114.184^b	297.8		-1.2	
5114.721	3.6205	9.0	1.1971^o	10.0	5114.715	634.4		-1.2	
5115.481	4.7941	8.0	2.3712^o	7.0	5115.480	225.6		-0.0	
5119.593	5.5061	8.0	3.0851^o	8.0	5119.633^c	50.6		0.3	
5124.561	2.4187^o	6.0	0.0000	6.0	5124.563^b	9910.2		-1.6	
5124.582	4.6919	8.0	2.2733^o	8.0	5124.563^b	9913.9			
5125.365	4.8144	5.0	2.3961^o	6.0	5125.364	178.3		-0.1	
5129.442	3.5756	9.0	1.1592^o	8.0	5129.433	18.8		-2.8	
5131.507	5.1167	7.0	2.7013^o	7.0	5131.522^b	11889.4			
5131.528	3.3697	8.0	0.9543^o	7.0	5131.522^b	11885.6		-0.2	
5132.039	4.4575	5.0	2.0423^o	4.0	5132.017^c	24.3		-1.4	
5134.548	4.8101	7.0	2.3961^o	6.0	5134.546^c	183.8		-0.1	
5134.972	4.8099	5.0	2.3961^o	6.0	5134.975	49.3		-0.7	
5137.330	4.8088	6.0	2.3961^o	6.0	5137.334	26.2		-0.9	
5138.339	4.7928	4.0	2.3806^o	5.0	5138.334	37.7		-0.8	
5140.662	4.8366	6.0	2.4255^o	5.0	5140.662	42.2		-0.7	
5142.803	4.4840^o	8.0	2.0739	8.0	5142.792	38.7		-1.2	
5147.179	3.4768	9.0	1.0688^o	9.0	5147.175	668.8		-1.3	
5159.188	3.2922	5.0	0.8898^o	6.0	5159.178^c	104.3		-2.4	
5160.422	3.7108	8.0	1.3090^o	9.0	5160.414	2672.8		-0.4	
5166.588	3.5582	8.0	1.1592^o	8.0	5166.584	289.5		-1.6	
5168.870	4.7941	6.0	2.3961^o	6.0	5168.867	295.3		0.1	
5169.819	4.7936	7.0	2.3961^o	6.0	5169.822	21.2		-1.0	
5173.838	3.8586	5.0	1.4629^o	6.0	5173.832	582.2		-0.9	
5176.226	3.0188^o	4.0	0.6243	4.0	5176.220	48.2		-3.1	
5178.328	3.8565	7.0	1.4629^o	6.0	5178.329^b	59.1		-1.9	
5178.344	4.8627^o	7.0	2.4692	7.0	5178.329^b	59.1		-0.5	
5178.704	5.3072	9.0	2.9138^o	8.0	5178.694	18.5		-0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5180.965	3.3466	6.0	0.9543^o	7.0	5180.959	3101.3		-0.8	
5182.382	5.1167	7.0	2.7250^o	8.0	5182.422	26.0		-0.5	
5184.682	4.7618	6.0	2.3712^o	7.0	5184.679	296.2		0.1	
5185.634	3.2529^o	6.0	0.8627	5.0	5185.629	127.6		-2.4	
5186.032	4.5013	6.0	2.1113^o	5.0	5186.026	34.4		-1.2	
5190.014	4.2709	5.0	1.8827^o	5.0	5190.008	56.6		-1.3	
5191.609	4.7680	6.0	2.3806^o	5.0	5191.639^c	30.1		-0.9	
5199.058	3.5433	8.0	1.1592^o	8.0	5199.042	28.8		-2.6	
5203.107	3.3364	6.0	0.9543^o	7.0	5203.104	1315.1		-1.2	
5204.584	4.2642	5.0	1.8827^o	5.0	5204.611	31.9		-1.6	
5206.168	3.6897	8.0	1.3090^o	9.0	5206.163^b	683.2		-1.0	
5206.179	5.1730^o	7.0	2.7923	7.0	5206.163^b	661.7		1.0	
5209.458	4.9206^o	3.0	2.5413	4.0	5209.463	20.9		-0.9	
5212.731	5.3061	8.0	2.9283^o	9.0	5212.739	37.1		-0.1	
5215.286	3.8095	8.0	1.4329^o	8.0	5215.281^b	163.7		-1.5	
5215.312	4.5274	5.0	2.1508^o	5.0	5215.281^b	164.7		-0.5	
5221.115	4.4153^o	8.0	2.0413	7.0	5221.104	390.4		-0.3	
5222.327	3.7063^o	5.0	1.3329	4.0	5222.350	1702.2		-0.6	
5223.319	3.9968^o	2.0	1.6239	2.0	5223.317	294.8		-1.0	
5224.404	3.8054	7.0	1.4329^o	8.0	5224.394	35.2		-2.2	
5233.522	4.9763^o	5.0	2.6080	6.0	5233.511	36.2		-0.5	
5235.588	3.2571	7.0	0.8898^o	6.0	5235.588	36.6		-2.9	
5235.950	4.8364^o	7.0	2.4692	7.0	5235.940	27.3		-0.9	
5236.622	5.0682	7.0	2.7013^o	7.0	5236.636^b	105.6		0.0	
5236.642	3.6759	10.0	1.3090^o	9.0	5236.636^b	95.7		-1.9	
5239.697	4.9777^o	7.0	2.6122	8.0	5239.701^{bc}	174.2		0.1	
5239.719	3.6984^o	3.0	1.3329	4.0	5239.701^{bc}	174.2		-1.6	
5241.422	4.3883	7.0	2.0235^o	6.0	5241.440	88.1		-1.0	
5242.456	4.6919	8.0	2.3276^o	7.0	5242.422	18.0		-1.2	
5245.438	3.2256^o	4.0	0.8627	5.0	5245.433^c	550.5		-1.7	
5246.909	3.6952^o	4.0	1.3329	4.0	5246.915^b	163.2		-1.6	
5246.917	4.7628^o	5.0	2.4005	5.0	5246.915^b	163.2		-0.2	
5248.700	3.5207	8.0	1.1592^o	8.0	5248.694	1365.2		-0.9	
5249.570	3.6940^o	5.0	1.3329	4.0	5249.562	80.4		-1.9	
5254.971	3.3129	6.0	0.9543^o	7.0	5254.958^b	201.0		-2.1	
5254.987	4.5032	9.0	2.1446^o	8.0	5254.958^b	201.0		-0.4	
5255.000	5.2519^o	8.0	2.8932	7.0	5254.958^b	199.7		0.6	
5258.533	5.2539	8.0	2.8968^o	7.0	5258.527	13.6		-0.6	
5260.270	4.4302^o	7.0	2.0739	8.0	5260.264	165.6		-0.6	
5261.422	4.8011^o	7.0	2.4453	8.0	5261.414	70.6		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5264.746	5.2511	6.0	2.8968^o	7.0	5264.760^b	570.9			
5264.767	4.7539^o	8.0	2.3997	9.0	5264.760^b	574.5		0.4	
5272.233	4.5152	7.0	2.1643^o	6.0	5272.231	32.8		-1.2	
5272.940	4.8508	5.0	2.5002^o	6.0	5272.910	1398.3		0.9	
5273.300	3.4192	8.0	1.0688^o	9.0	5273.295	270.8		-1.8	
5278.929	3.5072	7.0	1.1592^o	8.0	5278.920	1390.1		-0.9	
5283.399	3.2087^o	6.0	0.8627	5.0	5283.401	44.9	-3.0	-2.8	
5286.423	5.1369^o	7.0	2.7923	7.0	5286.429	28.8		-0.4	
5287.023	5.2060	7.0	2.8616^o	7.0	5287.061^b	12.2		-0.7	
5287.064	3.8789^o	4.0	1.5346	3.0	5287.061^b	12.3		-2.5	
5287.487	4.8011^o	7.0	2.4569	6.0	5287.477	201.6		-0.0	
5289.165	4.3893	9.0	2.0459^o	9.0	5289.153	33.5		-1.4	
5290.233	4.3664	6.0	2.0235^o	6.0	5290.250	59.5		-1.1	
5292.455	4.4588	6.0	2.1168^o	6.0	5292.425^c	24.7		-1.4	
5293.144	4.3830^o	8.0	2.0413	7.0	5293.139	215.7		-0.6	
5293.701	4.4153^o	8.0	2.0739	8.0	5293.697	180.7		-0.6	
5300.079	3.2283	5.0	0.8898^o	6.0	5300.064	15.1		-3.3	
5300.603	5.1306^o	8.0	2.7923	7.0	5300.601	104.6		0.1	
5301.846	4.9623	6.0	2.6245^o	7.0	5301.829^c	145.2		0.1	
5303.593	3.6699^o	3.0	1.3329	4.0	5303.585^b	30.8		-2.4	
5303.601	4.5013	6.0	2.1643^o	6.0	5303.585^b	30.8		-1.2	
5306.595	3.8095	8.0	1.4738^o	7.0	5306.590	62.0		-1.9	
5310.504	4.4786	7.0	2.1446^o	8.0	5310.502	32.3		-1.3	
5310.703	5.1473^o	5.0	2.8134	6.0	5310.747	46.5		-0.2	
5311.839	4.8336	7.0	2.5002^o	6.0	5311.883^b	483.5		0.4	
5311.888	2.9576^o	5.0	0.6243	4.0	5311.883^b	491.5		-2.1	
5313.903	4.7330^o	5.0	2.4005	5.0	5313.898	99.7		-0.4	
5315.277	4.8011^o	7.0	2.4692	7.0	5315.265	207.2		-0.0	
5316.456	4.7767^o	8.0	2.4453	8.0	5316.446	210.7		-0.0	
5317.900	5.3166	6.0	2.9859^o	5.0	5317.935^b	195.0		0.7	
5317.954	4.3766	8.0	2.0459^o	9.0	5317.935^b	194.2		-0.6	
5318.913	3.1930^o	4.0	0.8627	5.0	5318.916^b	447.2		-1.9	
5318.932	5.0209	7.0	2.6906^o	6.0	5318.916^b	454.3		0.6	
5319.977	5.4567^o	9.0	3.1268	9.0	5319.976	42.5		0.2	
5320.974	3.8640^o	3.0	1.5346	3.0	5320.974	29.2		-2.1	
5323.991	3.7416	6.0	1.4135^o	5.0	5323.981	18.3		-2.5	
5324.999	2.3276^o	7.0	0.0000	6.0	5325.002	2217.2		-2.3	
5329.081	3.3946	10.0	1.0688^o	9.0	5329.076	1308.3		-1.1	
5331.677	3.5219	9.0	1.1971^o	10.0	5331.672	673.5		-1.2	
5332.204	3.7380	5.0	1.4135^o	5.0	5332.199^c	38.8		-2.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5337.151	5.2519^o	8.0	2.9295	7.0	5337.147	104.1		0.3	
5339.367	3.1841^o	5.0	0.8627	5.0	5339.368	85.8	-2.6	-2.6	
5341.093	4.7393	5.0	2.4187^o	6.0	5341.089	19621.8			
5351.121	3.7792	7.0	1.4629^o	6.0	5351.116	244.6		-1.3	
5355.407	5.4337	7.0	3.1193^o	7.0	5355.398	174.4		0.8	
5356.191	4.7833^o	7.0	2.4692	7.0	5356.186	25.5		-0.9	
5359.211	4.7581^o	7.0	2.4453	8.0	5359.211	35.9		-0.8	
5367.760	4.3830^o	8.0	2.0739	8.0	5367.755	137.4		-0.7	
5368.390	5.1369^o	7.0	2.8281	8.0	5368.395^b	26.9		-0.4	
5368.424	4.5152	7.0	2.2064^o	7.0	5368.396^b	31.7		-1.2	
5368.850	4.7539^o	8.0	2.4453	8.0	5368.842	344.7		0.2	
5372.771	4.4238	5.0	2.1168^o	6.0	5372.775	7.4		-2.0	
5379.302	3.8387^o	4.0	1.5346	3.0	5379.306	12.3		-2.5	
5380.380	3.7775	6.0	1.4738^o	7.0	5380.370	537.8		-1.0	
5381.356	3.3720	9.0	1.0688^o	9.0	5381.350	184.0		-2.0	
5382.703	4.9106^o	6.0	2.6080	6.0	5382.713	26.1		-0.7	
5386.256	4.7581^o	7.0	2.4569	6.0	5386.245	59.2		-0.6	
5394.031	3.7308	7.0	1.4329^o	8.0	5394.015	18.8		-2.5	
5395.703	4.4084	6.0	2.1113^o	5.0	5395.702	52.1		-1.1	
5403.693	4.9017^o	6.0	2.6080	6.0	5403.686	93.6		-0.2	
5415.097	4.7581^o	7.0	2.4692	7.0	5415.087	28.8		-0.9	
5418.028	4.7330^o	7.0	2.4453	8.0	5418.014	97.7		-0.4	
5421.539	3.2405	7.0	0.9543^o	7.0	5421.531	30.3		-2.9	
5423.119	3.1482^o	6.0	0.8627	5.0	5423.121^b	47.2	-2.9	-2.9	
5423.131	4.9017^o	6.0	2.6162	7.0	5423.121^b	47.2		-0.5	
5424.938	4.7539^o	8.0	2.4692	7.0	5424.923	68.0		-0.5	
5428.507	4.6838^o	5.0	2.4005	5.0	5428.507	31.1		-1.0	
5429.765	2.9070^o	5.0	0.6243	4.0	5429.752	62.6		-3.1	
5430.262	3.7154	7.0	1.4329^o	8.0	5430.253	42.5		-2.1	
5433.319	3.7551	6.0	1.4738^o	7.0	5433.363	142.2		-1.6	
5435.428	5.4567^o	9.0	3.1763	10.0	5435.423	63.4		0.4	
5436.989	3.4768	9.0	1.1971^o	10.0	5436.982	678.0		-1.3	
5439.953	4.4427	7.0	2.1643^o	6.0	5439.935	27.0		-1.3	
5441.224	3.7108	8.0	1.4329^o	8.0	5441.216	273.8		-1.3	
5444.591	5.4528^o	10.0	3.1763	10.0	5444.605	76.3		0.5	
5445.672	4.7330^o	7.0	2.4569	6.0	5445.660	176.1		-0.1	
5446.481	5.0680^o	8.0	2.7923	7.0	5446.472^c	22.8		-0.6	
5452.547	5.3381^o	7.0	3.0650	8.0	5452.548^b	69.0		0.3	
5452.553	4.4178	8.0	2.1446^o	8.0	5452.548^b	69.0		-1.0	
5454.286	5.4801	8.0	3.2076^o	9.0	5454.271^c	54.9		0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5460.811	4.2344	7.0	1.9647^o	7.0	5460.802	19.5		-1.8	
5462.145	3.1589	6.0	0.8898^o	6.0	5462.136	1184.6		-1.4	
5470.306	3.4250	7.0	1.1592^o	8.0	5470.297	125.2		-2.1	
5472.911	4.6644^o	8.0	2.3997	9.0	5472.898	44.4		-0.8	
5475.154	4.7330^o	7.0	2.4692	7.0	5475.146	257.3		0.0	
5479.245	3.2164	8.0	0.9543^o	7.0	5479.266^b	55.6		-2.7	
5479.272	3.5950^o	3.0	1.3329	4.0	5479.266^b	54.6		-2.2	
5480.705	3.7961^o	2.0	1.5346	3.0	5480.734	25.5		-2.2	
5484.349	3.4192	8.0	1.1592^o	8.0	5484.342	437.5		-1.5	
5485.561	4.4238	5.0	2.1643^o	6.0	5485.554	57.6		-1.0	
5485.901	4.3052	9.0	2.0459^o	9.0	5485.895	1640.8		0.3	
5486.891	4.6595^o	4.0	2.4005	5.0	5486.895^c	22.7		-1.1	
5490.170	4.4084	6.0	2.1508^o	5.0	5490.167^b	47.5		-1.1	
5490.171	5.0006	6.0	2.7430^o	5.0	5490.167^b	47.5		-0.3	
5491.705	3.1197^o	5.0	0.8627	5.0	5491.705	521.2	-1.8	-1.8	
5492.109	3.6897	8.0	1.4329^o	8.0	5492.101	477.0		-1.1	
5506.249	4.8632^o	8.0	2.6122	8.0	5506.251	37.4		-0.6	
5509.687	4.3664	6.0	2.1168^o	6.0	5509.689	14.6		-1.7	
5510.561	3.5582	8.0	1.3090^o	9.0	5510.554	400.3		-1.4	
5513.806	5.1384^o	6.0	2.8905	5.0	5513.819	13.3		-0.7	
5515.208	4.2709	5.0	2.0235^o	6.0	5515.237	21.4		-1.7	
5516.016	4.8632^o	8.0	2.6162	7.0	5516.018^b	247.9		0.2	
5516.016	3.6800	7.0	1.4329^o	8.0	5516.018^b	247.9		-1.4	
5517.203	4.8627^o	7.0	2.6162	7.0	5517.205	17.5		-0.9	
5521.782	4.3893	9.0	2.1446^o	8.0	5521.806^c	10.9		-1.8	
5522.614	3.7182	6.0	1.4738^o	7.0	5522.616^{bc}	52.4		-2.0	
5522.615	4.5720	6.0	2.3276^o	7.0	5522.616^{bc}	52.4		-0.9	
5523.606	4.9786^o	4.0	2.7346	5.0	5523.610	12.2		-0.9	
5530.550	3.8650^o	3.0	1.6239	2.0	5530.537	27.0		-2.1	
5535.162	4.3664	6.0	2.1272^o	7.0	5535.180	26.2		-1.4	
5535.544	5.0525^o	7.0	2.8134	6.0	5535.550	45.5		-0.3	
5539.792	5.1306^o	8.0	2.8932	7.0	5539.787^c	28.9		-0.4	
5540.692	3.7108	8.0	1.4738^o	7.0	5540.685	308.0		-1.3	
5540.961	3.0996^o	4.0	0.8627	5.0	5540.964^c	55.6		-2.8	
5541.620	3.5456	10.0	1.3090^o	9.0	5541.614	194.3		-1.7	
5542.420	4.4427	7.0	2.2064^o	7.0	5542.404	12.9		-1.6	
5547.513	3.5433	8.0	1.3090^o	9.0	5547.505^b	99.1		-2.0	
5547.529	4.8632^o	8.0	2.6290	9.0	5547.505^b	101.6		-0.2	
5553.166	4.3766	8.0	2.1446^o	8.0	5553.160	282.4		-0.4	
5553.864	5.1369^o	7.0	2.9052	6.0	5553.858	25.2		-0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5555.268	5.4793	6.0	3.2482^o	5.0	5555.279^b	35.5		0.2	
5555.298	4.8556	6.0	2.6245^o	7.0	5555.279^b	34.5		-0.7	
5556.715	3.1203	5.0	0.8898^o	6.0	5556.703	498.2		-1.9	
5557.081	4.7717^o	4.0	2.5413	4.0	5557.095^b	24.6		-0.9	
5557.117	4.7803	8.0	2.5499^o	8.0	5557.095^b	21.1		-1.0	
5559.903	5.3561^o	9.0	3.1268	9.0	5559.920^b	26.6		-0.1	
5559.940	4.3801	5.0	2.1508^o	5.0	5559.920^b	28.0		-1.4	
5561.745	4.2709	5.0	2.0423^o	4.0	5561.736	18.5		-1.7	
5568.102	4.1087	6.0	1.8827^o	5.0	5568.096	18.2		-1.9	
5573.145	4.3883	7.0	2.1643^o	6.0	5573.135	18.2		-1.6	
5575.946	4.9659	5.0	2.7430^o	5.0	5575.983	124.9		0.1	
5578.481	4.2642	5.0	2.0423^o	4.0	5578.471^b	30.2		-1.5	
5578.509	4.4282	7.0	2.2064^o	7.0	5578.471^b	30.1		-1.3	
5579.440	4.7628^o	5.0	2.5413	4.0	5579.437^c	23.7		-0.9	
5583.323	4.8321^o	8.0	2.6122	8.0	5583.326^b	36.4		-0.7	
5583.347	5.3682	6.0	3.1482^o	6.0	5583.326^b	36.9		0.1	
5584.098	4.6202^o	4.0	2.4005	5.0	5584.101	47.7		-0.8	
5585.454	5.2830	3.0	3.0639^o	3.0	5585.487	17.4		-0.4	
5589.105	4.6182^o	5.0	2.4005	5.0	5589.113	15.0		-1.3	
5594.647	4.8088	6.0	2.5933^o	5.0	5594.637	60.4		-0.5	
5596.219	4.9398	8.0	2.7250^o	8.0	5596.212	846.9		0.9	
5601.690	4.9557	6.0	2.7430^o	5.0	5601.693	24.2		-0.7	
5604.069	3.5207	8.0	1.3090^o	9.0	5604.056^c	82.7		-2.1	
5604.935	4.4178	8.0	2.2064^o	7.0	5604.931	57.2		-1.0	
5606.135	4.2344	7.0	2.0235^o	6.0	5606.151^c	96.0		-1.0	
5610.639	4.8336	7.0	2.6245^o	7.0	5610.641	9.2		-1.2	
5611.503	3.8327^o	3.0	1.6239	2.0	5611.496	20.4		-2.3	
5611.821	3.0984	5.0	0.8898^o	6.0	5611.812	1126.5		-1.5	
5615.865	4.0771	8.0	1.8700^o	8.0	5615.857	122.1		-1.1	
5617.989	3.7408^o	3.0	1.5346	3.0	5617.989	38.2		-2.1	
5618.262	3.6800	7.0	1.4738^o	7.0	5618.305^c	33.1		-2.3	
5622.013	3.1589	6.0	0.9543^o	7.0	5622.006	3269.5		-1.0	
5625.771	4.8321^o	8.0	2.6290	9.0	5625.776	37.5		-0.6	
5628.740	4.4084	6.0	2.2064^o	7.0	5628.734	41.1		-1.2	
5632.556	5.2856	8.0	3.0851^o	8.0	5632.574^c	29.3		-0.1	
5634.153	5.6196	7.0	3.4196^o	6.0	5634.139^{bc}	10.8		-0.1	
5634.155	5.4567^o	9.0	3.2567	8.0	5634.139^{bc}	10.8		-0.3	
5636.154	4.9004	8.0	2.7013^o	7.0	5636.189^b	1084.3		0.9	
5636.195	3.6126	6.0	1.4135^o	5.0	5636.189^b	1053.5		-0.8	
5640.937	4.2431	9.0	2.0459^o	9.0	5640.934^b	11.8		-1.9	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
5640.946	5.4038	8.0	3.2066^o	9.0	5640.934^b	11.9		-0.3	
5641.427	4.5976^o	4.0	2.4005	5.0	5641.428^c	175.4		-0.3	
5642.926	4.0665	7.0	1.8700^o	8.0	5642.920	95.9		-1.3	
5651.579	5.2856	8.0	3.0925^o	7.0	5651.576^b	11.6		-0.5	
5651.595	4.8176	7.0	2.6245^o	7.0	5651.576^b	11.6		-1.2	
5652.054	4.9359	5.0	2.7430^o	5.0	5652.014	34.1		-0.5	
5667.644	5.2519^o	8.0	3.0650	8.0	5667.643	81.8		0.3	
5668.141	2.8110^o	5.0	0.6243	4.0	5668.141	51.3		-3.2	
5671.433	4.9777^o	7.0	2.7923	7.0	5671.424	30.1		-0.5	
5678.176	3.5158^o	4.0	1.3329	4.0	5678.176	11.0		-2.9	
5680.477	4.3092	8.0	2.1272^o	7.0	5680.494	9.6		-1.9	
5686.852	3.5931	5.0	1.4135^o	5.0	5686.839	11.6		-2.8	
5688.565	5.2986	5.0	3.1197^o	5.0	5688.558^b	13.3		-0.4	
5688.571	4.3853	6.0	2.2064^o	7.0	5688.558^b	13.3		-1.7	
5691.758	3.6515	8.0	1.4738^o	7.0	5691.750	604.4		-1.0	
5692.382	5.4603	8.0	3.2829^o	8.0	5692.426	31.9		0.2	
5693.868	3.6507	6.0	1.4738^o	7.0	5693.854	70.4		-1.9	
5697.786	5.0659^o	6.0	2.8905	5.0	5697.788	13.5		-0.7	
5698.949	3.3720	9.0	1.1971^o	10.0	5698.942	2495.2		-0.8	
5701.373	5.4793	6.0	3.3053^o	5.0	5701.342	4.1		-0.7	
5702.231	4.5013	6.0	2.3276^o	7.0	5702.250	23.8		-1.3	
5704.938	5.0659^o	6.0	2.8932	7.0	5704.946	16.6		-0.6	
5706.053	3.7961^o	2.0	1.6239	2.0	5706.046	188.4		-1.3	
5708.035	3.7953^o	3.0	1.6239	2.0	5708.029^b	143.5		-1.4	
5708.043	5.0784	5.0	2.9070^o	5.0	5708.029^b	143.5		0.3	
5709.041	4.7833^o	7.0	2.6122	8.0	5709.033	8.3		-1.3	
5711.306	4.3766	8.0	2.2064^o	7.0	5711.299	93.2		-0.8	
5712.401	5.1311	6.0	2.9613^o	5.0	5712.430	17.9		-0.5	
5713.089	3.0322^o	6.0	0.8627	5.0	5713.093	22.6	-3.1	-3.3	
5717.486	3.4768	9.0	1.3090^o	9.0	5717.481	2422.6		-0.6	
5720.587	3.4996^o	3.0	1.3329	4.0	5720.587	127.9		-1.9	
5726.975	2.1643^o	6.0	0.0000	6.0	5726.978	5212.9		-2.1	
5728.042	3.6984^o	3.0	1.5346	3.0	5728.035	279.2		-1.3	
5729.187	4.1558	6.0	1.9924^o	6.0	5729.173	43.4		-1.5	
5731.516	4.0326	8.0	1.8700^o	8.0	5731.506^c	40.8		-1.7	
5732.816	5.1167	7.0	2.9546^o	6.0	5732.772	19.8		-0.5	
5735.797	4.1844	6.0	2.0235^o	6.0	5735.818	22.2		-1.7	
5736.556	4.3052	9.0	2.1446^o	8.0	5736.566	210.2		-0.6	
5736.943	4.7767^o	8.0	2.6162	7.0	5736.945^c	85.0		-0.3	
5738.123	4.3664	6.0	2.2064^o	7.0	5738.115^c	18.8		-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5740.611	2.7834^o	5.0	0.6243	4.0	5740.608	2884.9		-1.5	
5742.957	4.6274^o	6.0	2.4692	7.0	5742.913	34.7		-0.9	
5746.761	5.2744	5.0	3.1176^o	4.0	5746.713	59.4		0.2	
5750.266	4.5560^o	4.0	2.4005	5.0	5750.266	47.5		-0.9	
5751.978	4.8799	7.0	2.7250^o	8.0	5752.010^b	72.2		-0.3	
5752.008	4.7628^o	5.0	2.6080	6.0	5752.010^b	73.6		-0.4	
5752.535	3.4876^o	5.0	1.3329	4.0	5752.526^c	967.4		-1.0	
5754.132	4.8447	6.0	2.6906^o	6.0	5754.139^b	31.9		-0.7	
5754.145	4.2709	5.0	2.1168^o	6.0	5754.138^b	32.0		-1.4	
5755.867	4.8440	7.0	2.6906^o	6.0	5755.840	11.4		-1.1	
5758.516	3.5853	7.0	1.4329^o	8.0	5758.508	143.8		-1.7	
5759.854	4.4795	8.0	2.3276^o	7.0	5759.851	29.9		-1.2	
5764.076	5.2986	5.0	3.1482^o	6.0	5764.052	1656.1			
5765.749	5.4064^o	8.0	3.2567	8.0	5765.754^b	107.7		0.6	
5765.759	3.6126	6.0	1.4629^o	6.0	5765.754^b	107.4		-1.8	
5768.137	3.4817^o	4.0	1.3329	4.0	5768.134^b	70.0		-2.2	
5768.155	5.0626	7.0	2.9138^o	8.0	5768.134^b	70.3		-0.0	
5769.920	2.7724^o	4.0	0.6243	4.0	5769.915	9453.4		-1.0	
5771.815	4.5729	5.0	2.4255^o	5.0	5771.815	9.2		-1.6	
5772.244	5.0525^o	7.0	2.9052	6.0	5772.241	5.1		-1.2	
5780.997	4.1087	6.0	1.9647^o	7.0	5780.991^b	217.6		-0.8	
5781.034	4.5152	7.0	2.3712^o	7.0	5780.991^b	218.8		-0.3	
5782.772	4.8447	6.0	2.7013^o	7.0	5782.809^b	2600.1			
5782.817	3.0061^o	6.0	0.8627	5.0	5782.809^b	2600.7		-1.2	
5784.661	3.5756	9.0	1.4329^o	8.0	5784.654^{bc}	2036.2		-0.6	
5784.676	5.1749	6.0	3.0322^o	6.0	5784.654^{bc}	2039.0			
5786.424	4.6919	8.0	2.5499^o	8.0	5786.441^b	15.6		-1.2	
5786.477	5.1306^o	8.0	2.9886	8.0	5786.441^b	18.1		-0.5	
5786.484	4.3063	7.0	2.1643^o	6.0	5786.441^b	19.9		-1.6	
5787.086	3.4747^o	5.0	1.3329	4.0	5787.088^b	45.2		-2.4	
5787.113	4.7941	6.0	2.6523^o	5.0	5787.088^b	46.0		-0.6	
5794.574	4.4666	6.0	2.3276^o	7.0	5794.612	10.2		-1.7	
5795.079	3.6126	6.0	1.4738^o	7.0	5795.074	128.3		-1.7	
5798.000	4.7539^o	8.0	2.6162	7.0	5798.008	19.0		-1.0	
5806.056	3.6694^o	2.0	1.5346	3.0	5806.079^b	476.0		-1.1	
5806.062	4.3412	7.0	2.2064^o	7.0	5806.079^b	476.0		-0.2	
5806.101	4.0048	9.0	1.8700^o	8.0	5806.079^b	474.9		-0.6	
5806.533	3.6692^o	4.0	1.5346	3.0	5806.523^b	173.7		-1.5	
5806.559	5.2539	8.0	3.1193^o	7.0	5806.523^b	173.4		0.7	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
5815.644	4.5274	5.0	2.3961^o	6.0	5815.639	7.8		-1.7	
5818.531	5.5022^o	10.0	3.3720	9.0	5818.544	9.6		-0.3	
5825.116	3.9978	7.0	1.8700^o	8.0	5825.091	50.4		-1.6	
5826.805	2.1272^o	7.0	0.0000	6.0	5826.802^n	59692.1		-1.1	-1.1
5831.947	3.5582	8.0	1.4329^o	8.0	5831.940	244.5		-1.5	
5833.881	3.6592^o	4.0	1.5346	3.0	5833.890	74.5		-1.9	
5835.841	3.3210	11.0	1.1971^o	10.0	5835.834^c	4064.0		-0.6	
5839.959	3.5853	7.0	1.4629^o	6.0	5839.954	495.3		-1.2	
5841.161	3.5355	5.0	1.4135^o	5.0	5841.153	965.8		-0.9	
5844.437	4.7928	4.0	2.6720^o	4.0	5844.471^b	70.3		-0.4	
5844.468	3.4537^o	5.0	1.3329	4.0	5844.471^b	70.6		-2.2	
5845.022	4.5211^o	5.0	2.4005	5.0	5845.022	16.4		-1.4	
5850.070	2.7430^o	5.0	0.6243	4.0	5850.065	7985.7		-1.1	
5855.304	2.1168^o	6.0	0.0000	6.0	5855.299	10275.7		-1.8	
5856.929	4.5168^o	4.0	2.4005	5.0	5856.927^b	206.6		-0.3	
5856.967	5.4859^o	7.0	3.3697	8.0	5856.927^b	206.7			
5860.690	3.4478^o	3.0	1.3329	4.0	5860.685	379.9		-1.5	
5863.568	4.8045	7.0	2.6906^o	6.0	5863.554	3.5		-1.6	
5867.498	4.0771	8.0	1.9647^o	7.0	5867.493	126.6		-1.1	
5871.628	3.4439^o	4.0	1.3329	4.0	5871.623^b	577.7		-1.3	
5871.672	4.2222	6.0	2.1113^o	5.0	5871.623^b	580.8		-0.2	
5872.351	3.0650	8.0	0.9543^o	7.0	5872.341	11240.0		-0.5	
5873.526	3.4192	8.0	1.3090^o	9.0	5873.516	1087.2		-1.0	
5873.922	4.7181^o	5.0	2.6080	6.0	5873.927	45.9		-0.6	
5875.839	4.9017^o	6.0	2.7923	7.0	5875.837	15.5		-0.9	
5877.413	5.0635	6.0	2.9546^o	6.0	5877.393	77.3		0.1	
5881.147	3.1763	10.0	1.0688^o	9.0	5881.136	8229.6		-0.5	
5885.617	5.2262^o	6.0	3.1203	5.0	5885.618	8.1		-0.7	
5892.538	4.7941	6.0	2.6906^o	6.0	5892.578	41.5		-0.6	
5893.009	4.0957	5.0	1.9924^o	6.0	5893.001	24.4		-1.8	
5897.044	4.0665	7.0	1.9647^o	7.0	5897.036	101.2		-1.2	
5906.058	2.9613^o	5.0	0.8627	5.0	5906.053	2078.6		-1.4	
5908.132	3.2571	7.0	1.1592^o	8.0	5908.132	379.4		-1.7	
5909.237	3.2567	8.0	1.1592^o	8.0	5909.234^b	1293.1		-1.2	
5909.253	4.4980^o	4.0	2.4005	5.0	5909.234^b	1298.0		0.5	
5922.903	3.4256^o	4.0	1.3329	4.0	5922.906	60.8		-2.3	
5930.888	4.8980	5.0	2.8082^o	4.0	5930.926^b	43.9		-0.4	
5930.930	4.2344	7.0	2.1446^o	8.0	5930.926^b	44.4		-1.3	
5930.975	4.3631	7.0	2.2733^o	8.0	5930.926^b	44.1		-1.1	
5933.501	3.5219	9.0	1.4329^o	8.0	5933.494	1162.4		-0.9	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
5936.035	3.7119^o	1.0	1.6239	2.0	5936.031	102.7		-1.6	
5936.785	3.5207	8.0	1.4329^o	8.0	5936.779	319.9		-1.4	
5937.158	3.9703	5.0	1.8827^o	5.0	5937.154	21.4		-2.0	
5937.502	4.9763^o	5.0	2.8888	4.0	5937.499	17.8		-0.7	
5938.919	4.8980	5.0	2.8110^o	5.0	5938.963^b	25.3		-0.6	
5939.007	4.7393	5.0	2.6523^o	5.0	5938.962^b	23.2		-0.9	
5942.811	3.3946	10.0	1.3090^o	9.0	5942.816	75.2		-2.2	
5946.362	3.5582	8.0	1.4738^o	7.0	5946.354	664.1		-1.0	
5958.913	4.7323	5.0	2.6523^o	5.0	5958.908	7.1		-1.4	
5960.764	5.0680^o	8.0	2.9886	8.0	5960.773	23.0		-0.4	
5978.609	5.2060	7.0	3.1328^o	6.0	5978.625^b	16.7		-0.4	
5978.629	5.6876	7.0	3.6144^o	6.0	5978.625^b	16.8		0.3	
5978.637	4.1844	6.0	2.1113^o	5.0	5978.625^b	16.8		-1.8	
5980.386	4.9777^o	7.0	2.9052	6.0	5980.424^b	19.4		-0.6	
5980.436	3.5355	5.0	1.4629^o	6.0	5980.424^b	19.3		-2.6	
5981.560	5.3072	9.0	3.2351^o	8.0	5981.599^b	8.3		-0.6	
5981.600	4.6135^o	4.0	2.5413	4.0	5981.599^b	8.2		-1.5	
5984.557	4.9763^o	5.0	2.9052	6.0	5984.543	7.2		-1.1	
5985.626	3.6053^o	2.0	1.5346	3.0	5985.616	7.6		-2.9	
5989.413	3.5433	8.0	1.4738^o	7.0	5989.402	12.5		-2.8	
5993.814	4.3412	7.0	2.2733^o	8.0	5993.856^b	111.8		-0.7	
5993.861	4.0326	8.0	1.9647^o	7.0	5993.856^b	112.1		-1.2	
5993.897	5.4935	3.0	3.4256^o	4.0	5993.856^b	112.4		0.8	
5993.902	5.2520	5.0	3.1841^o	5.0	5993.856^b	112.4		0.5	
5994.678	4.1844	6.0	2.1168^o	6.0	5994.685	44.9		-1.4	
6000.055	5.2744	5.0	3.2087^o	6.0	6000.062^b	20.1		-0.2	
6000.069	4.2721	6.0	2.2064^o	7.0	6000.062^b	19.8		-1.6	
6002.635	4.3381	8.0	2.2733^o	8.0	6002.648	5.1		-2.1	
6005.616	5.0525^o	7.0	2.9886	8.0	6005.623	20.9		-0.5	
6007.894	3.3720	9.0	1.3090^o	9.0	6007.888	1077.8		-1.1	
6010.415	4.4238	5.0	2.3616^o	4.0	6010.407	6.9		-1.8	
6014.825	3.3697	8.0	1.3090^o	9.0	6014.821	2723.8		-0.7	
6034.080	4.6663^o	7.0	2.6122	8.0	6034.083^c	9.8		-1.3	
6043.609	4.4220	6.0	2.3712^o	7.0	6043.592	4.9		-2.0	
6044.333	4.5919^o	5.0	2.5413	4.0	6044.340	14.8		-1.3	
6047.624	3.4630	6.0	1.4135^o	5.0	6047.614	480.0		-1.3	
6048.925	3.9318	4.0	1.8827^o	5.0	6048.916	45.0		-1.7	
6052.793	2.6720^o	4.0	0.6243	4.0	6052.784	648.1		-2.2	
6054.846	3.2063	7.0	1.1592^o	8.0	6054.837	1898.9		-1.0	
6055.392	3.5207	8.0	1.4738^o	7.0	6055.382	56.2		-2.1	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
6057.836	3.6699^o	3.0	1.6239	2.0	6057.829	11.1		-2.6	
6059.266	5.2519^o	8.0	3.2063	7.0	6059.266	22.7		-0.2	
6059.571	3.6694^o	2.0	1.6239	2.0	6059.557	16.1		-2.5	
6063.216	4.4697	6.0	2.4255^o	5.0	6063.224^b	407.9		0.0	
6063.230	3.5072	7.0	1.4629^o	6.0	6063.224^b	407.9		-1.3	
6064.220	3.4768	9.0	1.4329^o	8.0	6064.215	45.2		-2.3	
6067.492	3.9128	8.0	1.8700^o	8.0	6067.489	392.5		-0.8	
6079.654	3.2359	9.0	1.1971^o	10.0	6079.648	591.2		-1.5	
6087.854	4.4365^o	4.0	2.4005	5.0	6087.851	11.7		-1.6	
6089.139	3.4491	6.0	1.4135^o	5.0	6089.124	101.5		-2.0	
6089.405	4.6644^o	8.0	2.6290	9.0	6089.430^b	39.0		-0.7	
6089.436	4.3631	7.0	2.3276^o	7.0	6089.430^b	40.3		-1.1	
6102.031	4.0771	8.0	2.0459^o	9.0	6102.025	46.0		-1.5	
6108.303	5.4603	8.0	3.4311^o	9.0	6108.336	64.5		0.6	
6111.665	2.6523^o	5.0	0.6243	4.0	6111.669^b	282.7		-2.6	
6111.667	4.2344	7.0	2.2064^o	7.0	6111.669^b	282.7		-0.5	
6113.301	2.8902^o	6.0	0.8627	5.0	6113.302	5.9		-4.0	
6116.008	3.4401	5.0	1.4135^o	5.0	6116.001	674.6		-1.2	
6120.653	4.6412^o	6.0	2.6162	7.0	6120.643^b	12.1		-1.3	
6120.668	4.7680	6.0	2.7430^o	5.0	6120.643^b	13.6		-1.0	
6125.339	2.0235^o	6.0	0.0000	6.0	6125.311	2939.2		-2.4	
6133.974	4.0130	6.0	1.9924^o	6.0	6133.980	12.3		-2.1	
6155.223	4.5848	6.0	2.5711^o	6.0	6155.221	12.5		-1.3	
6180.609	4.3766	8.0	2.3712^o	7.0	6180.611	6.9		-1.9	
6186.304	5.4601	7.0	3.4565^o	6.0	6186.272	15.4		-0.0	
6187.537	4.6321^o	8.0	2.6290	9.0	6187.514	56.3		-0.6	
6191.709	4.5729	5.0	2.5711^o	6.0	6191.719	16.7		-1.2	
6194.917	4.7842	4.0	2.7834^o	5.0	6194.953^b	8.9		-1.2	
6194.990	2.8905	5.0	0.8898^o	6.0	6194.953^b	7.7		-3.8	
6194.996	4.3623	5.0	2.3616^o	4.0	6194.953^b	7.7		-1.8	
6197.045	3.4630	6.0	1.4629^o	6.0	6197.034	3.4		-3.4	
6197.782	4.9763^o	5.0	2.9764	4.0	6197.776	9.0		-0.9	
6207.935	4.4220	6.0	2.4255^o	5.0	6207.938^c	15.0		-1.5	
6209.220	3.0650	8.0	1.0688^o	9.0	6209.208	903.7		-1.5	
6210.665	5.2917	4.0	3.2960^o	3.0	6210.664	16.0		-0.2	
6221.831	4.3883	7.0	2.3961^o	6.0	6221.867^b	833.1		0.2	
6221.878	3.4250	7.0	1.4329^o	8.0	6221.867^b	834.6		-1.1	
6221.904	4.8889	8.0	2.8968^o	7.0	6221.867^b	835.6		0.9	
6222.359	3.4055	5.0	1.4135^o	5.0	6222.346	64.3		-2.2	
6230.928	3.4630	6.0	1.4738^o	7.0	6230.919	1070.4		-0.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6232.237	4.4457[o]	7.0	2.4569	6.0	6232.233	63.4		-0.8	
6238.816	4.0326	8.0	2.0459[o]	9.0	6238.808	32.9		-1.6	
6240.049	4.7862	6.0	2.7999[o]	6.0	6240.044[b]	310.0		0.4	
6240.052	3.4192	8.0	1.4329[o]	8.0	6240.044[b]	310.0		-1.5	
6244.573	4.7610[o]	2.0	2.7761	3.0	6244.620[b]	54.7		-0.4	
6244.623	4.4302[o]	7.0	2.4453	8.0	6244.620[b]	54.6		-0.9	
6255.113	4.1087	6.0	2.1272[o]	7.0	6255.076[b]	30.4		-1.6	
6255.114	5.4887[o]	8.0	3.5072	7.0	6255.076[b]	30.4		0.3	
6262.562	3.1763	10.0	1.1971[o]	10.0	6262.553	3095.6		-0.8	
6268.811	4.3777[o]	4.0	2.4005	5.0	6268.860[b]	1005.0		0.3	
6268.870	3.4401	5.0	1.4629[o]	6.0	6268.860[b]	1011.2		-1.0	
6270.881	4.9049	9.0	2.9283[o]	9.0	6270.868[b]	32.3		-0.5	
6270.882	4.4457[o]	7.0	2.4692	7.0	6270.868[b]	32.3		-1.1	
6273.742	3.3892	6.0	1.4135[o]	5.0	6273.734[c]	11.4		-3.0	
6274.948	2.9295	7.0	0.9543[o]	7.0	6274.954	1493.0		-1.5	
6277.980	3.9978	7.0	2.0235[o]	6.0	6278.001	16.0		-2.0	
6281.373	4.4302[o]	7.0	2.4569	6.0	6281.362	82.0		-0.7	
6286.870	3.4044	7.0	1.4329[o]	8.0	6286.858	1376.2		-0.9	
6288.120	3.5950[o]	3.0	1.6239	2.0	6288.098	7.0		-2.9	
6288.567	3.9945	5.0	2.0235[o]	6.0	6288.582[b]	231.2		-0.8	
6288.634	5.2539	8.0	3.2829[o]	8.0	6288.582[b]	230.8		0.9	
6289.674	2.5949[o]	4.0	0.6243	4.0	6289.679	44.9		-3.5	
6290.126	4.4274[o]	6.0	2.4569	6.0	6290.121	6.6		-1.8	
6291.767	4.8632[o]	8.0	2.8932	7.0	6291.782[b]	101.7		-0.0	
6291.792	4.4153[o]	8.0	2.4453	8.0	6291.782[b]	80.9		-0.7	
6294.662	2.5933[o]	5.0	0.6243	4.0	6294.687[b]	45.2		-3.4	
6294.700	4.8593	6.0	2.8902[o]	6.0	6294.687[b]	44.7		-0.4	
6299.420	3.1268	9.0	1.1592[o]	8.0	6299.413	1865.9		-1.1	
6317.061	5.0546	6.0	3.0925[o]	7.0	6317.054[b]	185.1		0.5	
6317.064	3.4250	7.0	1.4629[o]	6.0	6317.054[b]	185.1		-1.7	
6320.631	4.4302[o]	7.0	2.4692	7.0	6320.627	83.2		-0.7	
6327.290	4.0048	9.0	2.0459[o]	9.0	6327.284	190.6		-0.9	
6352.276	3.4250	7.0	1.4738[o]	7.0	6352.260	23.3		-2.6	
6353.312	2.9052	6.0	0.9543[o]	7.0	6353.309[b]	9.7		-3.7	
6353.328	4.6759	7.0	2.7250[o]	8.0	6353.309[b]	9.0		-1.3	
6356.508	4.0771	8.0	2.1272[o]	7.0	6356.516	11.9		-2.0	
6357.260	4.0665	7.0	2.1168[o]	6.0	6357.261	13.1		-2.0	
6358.045	4.7628[o]	5.0	2.8134	6.0	6358.090[b]	15.6		-0.9	
6358.109	4.1558	6.0	2.2064[o]	7.0	6358.090[b]	15.4		-1.8	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I		$\log gf$	
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
6358.120	5.1581	5.0	3.2087^o	6.0	6358.090^b	15.4		-0.4	
6361.816	2.8110^o	5.0	0.8627	5.0	6361.821^c	246.0		-2.4	
6362.286	3.9128	8.0	1.9647^o	7.0	6362.281	51.4		-1.6	
6363.541	4.3664	6.0	2.4187^o	6.0	6363.535^b	67.9		-0.8	
6363.548	3.2567	8.0	1.3090^o	9.0	6363.535^b	67.9		-2.4	
6366.590	3.9703	5.0	2.0235^o	6.0	6366.617	65.3		-1.4	
6368.960	4.4153^o	8.0	2.4692	7.0	6368.953	12.2		-1.5	
6370.842	5.0659^o	6.0	3.1203	5.0	6370.845	5.4		-1.0	
6371.220	3.4192	8.0	1.4738^o	7.0	6371.213^b	24.5		-2.6	
6371.240	3.5693^o	2.0	1.6239	2.0	6371.213^b	25.4		-2.4	
6374.558	4.3631	7.0	2.4187^o	6.0	6374.548	6.0		-1.9	
6375.652	3.9676	7.0	2.0235^o	6.0	6375.683	25.5		-1.8	
6376.881	5.1306^o	8.0	3.1869	7.0	6376.904^b	13.1		-0.5	
6376.924	3.9083	6.0	1.9647^o	7.0	6376.903^b	11.6		-2.2	
6420.035	3.4044	7.0	1.4738^o	7.0	6420.027	80.3		-2.1	
6423.165	3.1268	9.0	1.1971^o	10.0	6423.158	203.8		-2.0	
6425.918	3.9524	6.0	2.0235^o	6.0	6425.946	14.9		-2.1	
6428.686	3.9703	5.0	2.0423^o	4.0	6428.676^b	19.0		-1.9	
6428.691	4.4282	7.0	2.5002^o	6.0	6428.676^b	19.0		-1.3	
6432.531	3.2359	9.0	1.3090^o	9.0	6432.523	611.5		-1.4	
6436.724	3.9491	5.0	2.0235^o	6.0	6436.744	14.7		-2.1	
6441.357	4.8144	5.0	2.8902^o	6.0	6441.321^c	21.8		-0.7	
6449.069	4.0665	7.0	2.1446^o	8.0	6449.066^{bc}	5.6		-2.3	
6449.075	4.6980^o	4.0	2.7761	3.0	6449.066^{bc}	5.6		-1.5	
6451.564	3.9136	7.0	1.9924^o	6.0	6451.564	220.8		-0.9	
6453.198	3.8854	6.0	1.9647^o	7.0	6453.196	19.5		-2.0	
6459.602	4.6094	7.0	2.6906^o	6.0	6459.629	3.0		-1.8	
6460.623	4.8255	4.0	2.9070^o	5.0	6460.628	24.1		-0.7	
6466.071	3.9582^o	6.0	2.0413	7.0	6466.057	4.1		-2.6	
6468.062	5.1730^o	7.0	3.2567	8.0	6468.056	4.9		-0.9	
6476.434	4.7833^o	7.0	2.8694	6.0	6476.462^b	5.0		-1.4	
6476.466	4.3830^o	8.0	2.4692	7.0	6476.462^b	5.2		-1.9	
6479.271	3.3265	5.0	1.4135^o	5.0	6479.277	6.4		-3.3	
6481.741	4.8192	6.0	2.9070^o	5.0	6481.739	84.7		-0.1	
6485.870	5.4567^o	9.0	3.5456	10.0	6485.872^c	23.1		0.2	
6492.322	3.9326	7.0	2.0235^o	6.0	6492.345	1307.9		-0.1	
6514.261	4.5747	5.0	2.6720^o	4.0	6514.276	37.0		-0.8	
6514.859	2.7923	7.0	0.8898^o	6.0	6514.852	29.0		-3.3	
6515.781	4.0665	7.0	2.1643^o	6.0	6515.776	36.2		-1.5	
6520.519	4.5729	5.0	2.6720^o	4.0	6520.516^b	130.7		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6520.539	4.8147	8.0	2.9138^o	8.0	6520.516^b	130.4		0.1	
6537.819	3.3697	8.0	1.4738^o	7.0	6537.813	193.8		-1.7	
6541.531	5.1306^o	8.0	3.2359	9.0	6541.560^b	1886.6			
6541.567	2.8490	6.0	0.9543^o	7.0	6541.560^b	1891.5		-1.4	
6543.676	4.5848	6.0	2.6906^o	6.0	6543.725	2.8		-1.9	
6547.681	3.8854	6.0	1.9924^o	6.0	6547.678^b	6.2		-2.5	
6547.722	5.4983	2.0	3.6053^o	2.0	6547.678^b	6.3		-0.3	
6548.552	4.7622^o	6.0	2.8694	6.0	6548.579^b	4.0		-1.5	
6548.598	3.2256^o	4.0	1.3329	4.0	6548.579^b	4.0		-3.6	
6551.655	3.8565	7.0	1.9647^o	7.0	6551.663	9.7		-2.3	
6554.542	3.4256^o	4.0	1.5346	3.0	6554.543	22.1		-2.6	
6557.107	4.2709	5.0	2.3806^o	5.0	6557.109	14.8		-1.6	
6557.794	3.9136	7.0	2.0235^o	6.0	6557.821	498.0		-0.6	
6559.875	5.0958^o	6.0	3.2063	7.0	6559.924^b	17.4		-0.4	
6559.930	3.9318	4.0	2.0423^o	4.0	6559.924^b	17.3		-2.0	
6565.038	4.0326	8.0	2.1446^o	8.0	6565.032	51.8		-1.4	
6567.273	3.3503	5.0	1.4629^o	6.0	6567.278	11.4		-3.0	
6568.177	4.7941	6.0	2.9070^o	5.0	6568.143^c	4.0		-1.5	
6572.407	4.0130	6.0	2.1272^o	7.0	6572.415	4.7		-2.4	
6575.985	3.9083	6.0	2.0235^o	6.0	6576.015	42.2		-1.6	
6580.063	3.3466	6.0	1.4629^o	6.0	6580.059	42.8		-2.4	
6581.664	3.9945	5.0	2.1113^o	5.0	6581.657	11.8		-2.1	
6586.603	5.4025^o	7.0	3.5207	8.0	6586.643^b	42.4		0.4	
6586.677	5.5022^o	10.0	3.6205	9.0	6586.643^b	43.1		0.5	
6588.212	5.0006	6.0	3.1193^o	7.0	6588.222	8.2		-0.9	
6591.902	2.7430^o	5.0	0.8627	5.0	6591.897	18.4		-3.6	
6593.512	5.2519^o	8.0	3.3720	9.0	6593.514	66.4		0.4	
6594.219	5.2262^o	6.0	3.3466	6.0	6594.211^c	13.3		-0.3	
6594.920	5.0635	6.0	3.1841^o	5.0	6594.967^b	22.8		-0.3	
6594.960	4.5514	5.0	2.6720^o	4.0	6594.967^b	21.8		-1.0	
6611.902	4.8632^o	8.0	2.9886	8.0	6611.902	16.3		-0.7	
6614.392	4.7355	7.0	2.8616^o	7.0	6614.394	4.8		-1.4	
6614.741	2.8281	8.0	0.9543^o	7.0	6614.721^b	40.7		-3.1	
6614.758	4.8799	7.0	3.0061^o	6.0	6614.721^b	40.8		-0.3	
6615.819	3.3364	6.0	1.4629^o	6.0	6615.816^{bc}	14.0		-2.9	
6615.834	5.1306^o	8.0	3.2571	7.0	6615.816^{bc}	13.7		-0.4	
6616.695	5.4859^o	7.0	3.6126	6.0	6616.742^c	7.9		-0.2	
6618.277	3.3466	6.0	1.4738^o	7.0	6618.267	40.9		-2.4	
6625.634	4.0771	8.0	2.2064^o	7.0	6625.631	30.8		-1.5	
6635.836	4.8255	4.0	2.9576^o	5.0	6635.837	18.9		-0.7	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
6637.646	3.1763	10.0	1.3090^o	9.0	6637.637	335.4		-1.7	
6638.974	3.9128	8.0	2.0459^o	9.0	6638.966	3.9		-2.6	
6640.412	3.9937	6.0	2.1272^o	7.0	6640.418	15.3		-1.9	
6641.664	3.8586	5.0	1.9924^o	6.0	6641.660	13.1		-2.2	
6644.051	5.0525^o	7.0	3.1869	7.0	6644.049	11.1		-0.6	
6644.649	5.2850	6.0	3.4196^o	6.0	6644.693^b	4.0		-0.8	
6644.701	4.6576^o	7.0	2.7923	7.0	6644.693^b	4.0		-1.6	
6647.905	4.8258	6.0	2.9613^o	5.0	6647.894	24.1		-0.6	
6648.967	4.8255	4.0	2.9613^o	5.0	6649.008	86.2		-0.1	
6654.451	3.3364	6.0	1.4738^o	7.0	6654.450	10.3		-3.0	
6655.788	4.0130	6.0	2.1508^o	5.0	6655.785	31.6		-1.6	
6660.590	4.8220	5.0	2.9611^o	4.0	6660.607	29.7		-0.5	
6661.377	4.8220	5.0	2.9613^o	5.0	6661.364	3.5		-1.5	
6663.079	4.0048	9.0	2.1446^o	8.0	6663.073	27.1		-1.7	
6663.515	3.1930^o	4.0	1.3329	4.0	6663.528^b	152.9		-2.0	
6663.523	5.3166	6.0	3.4565^o	6.0	6663.528^b	154.6		0.9	
6687.133	3.9703	5.0	2.1168^o	6.0	6687.141	241.1		-0.8	
6695.648	3.1841^o	5.0	1.3329	4.0	6695.655^b	14.9	-3.0	-3.0	
6695.677	4.8088	6.0	2.9576^o	5.0	6695.655^b	14.7		-0.8	
6697.131	3.9676	7.0	2.1168^o	6.0	6697.141	25.5		-1.7	
6701.749	3.9607	6.0	2.1113^o	5.0	6701.732	64.4		-1.4	
6713.910	4.5891	4.0	2.7430^o	5.0	6713.905	33.7		-0.8	
6721.910	5.2917	4.0	3.4478^o	3.0	6721.905^b	265.9			
6721.910	3.9607	6.0	2.1168^o	6.0	6721.905^b	265.9		-0.7	
6722.764	3.9945	5.0	2.1508^o	5.0	6722.769	91.6		-1.1	
6725.538	3.9937	6.0	2.1508^o	5.0	6725.546	45.3		-1.5	
6728.991	5.0525^o	7.0	3.2105	6.0	6728.988	11.2		-0.6	
6732.271	3.9524	6.0	2.1113^o	5.0	6732.274	7.4		-2.3	
6733.206	3.7108	8.0	1.8700^o	8.0	6733.213	5.1		-2.8	
6742.691	4.6663^o	7.0	2.8281	8.0	6742.699	4.8		-1.5	
6743.577	2.7923	7.0	0.9543^o	7.0	6743.553	7.7		-3.9	
6750.634	4.5267	6.0	2.6906^o	6.0	6750.620^b	3.2		-1.9	
6750.636	5.0525^o	7.0	3.2164	8.0	6750.620^b	3.2		-1.2	
6751.341	3.2494	6.0	1.4135^o	5.0	6751.338^b	1.3		-4.0	
6751.367	4.6358	7.0	2.7999^o	6.0	6751.338^b	1.4		-2.1	
6752.616	3.9524	6.0	2.1168^o	6.0	6752.619	41.4		-1.5	
6754.066	4.7928	4.0	2.9576^o	5.0	6754.064^b	6.1		-1.2	
6754.069	4.6274^o	6.0	2.7923	7.0	6754.064^b	6.1		-1.5	
6758.505	3.8763	4.0	2.0423^o	4.0	6758.499	24.6		-1.9	
6759.866	3.9607	6.0	2.1272^o	7.0	6759.861^b	1226.2		-0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6759.911	3.9978	7.0	2.1643^o	6.0	6759.861^b	1227.2		-0.0	
6761.651	4.9659	5.0	3.1328^o	6.0	6761.694^c	7.6		-0.9	
6762.916	4.6052	3.0	2.7724^o	4.0	6762.909^b	99.4		-0.3	
6762.938	4.7941	6.0	2.9613^o	5.0	6762.909^b	100.1		-0.0	
6764.528	5.2520	5.0	3.4196^o	6.0	6764.547^b	127.7		0.7	
6764.534	4.7393	5.0	2.9070^o	5.0	6764.547^b	127.7		0.0	
6764.549	3.9491	5.0	2.1168^o	6.0	6764.547^b	127.7		-1.1	
6766.622	4.5747	5.0	2.7430^o	5.0	6766.626	35.4		-0.8	
6767.133	4.7862	6.0	2.9546^o	6.0	6767.119	5.9		-1.3	
6768.924	3.8770	10.0	2.0459^o	9.0	6768.959^c	11.8		-2.2	
6772.186	3.9945	5.0	2.1643^o	6.0	6772.170	25.4		-1.7	
6773.373	4.5729	5.0	2.7430^o	5.0	6773.373	137.9		-0.2	
6778.341	4.8144	5.0	2.9859^o	5.0	6778.337	6.6		-1.2	
6780.019	4.5891	4.0	2.7610^o	3.0	6780.027	74.8		-0.4	
6780.753	2.6906^o	6.0	0.8627	5.0	6780.767	227.4	-2.8	-2.5	
6782.209	5.0680^o	8.0	3.2405	7.0	6782.247^b	5.6		-0.9	
6782.256	3.8689^o	6.0	2.0413	7.0	6782.247^b	5.5		-2.5	
6784.034	4.8593	6.0	3.0322^o	6.0	6784.033	4.0		-1.3	
6785.953	4.7842	4.0	2.9576^o	5.0	6785.961	3.4		-1.5	
6786.356	5.1730^o	7.0	3.3466	6.0	6786.355	2.7		-1.1	
6787.165	4.7808	7.0	2.9546^o	6.0	6787.203^b	40.6		-0.4	
6787.211	4.0326	8.0	2.2064^o	7.0	6787.203^b	40.7		-1.4	
6787.906	4.5870	4.0	2.7610^o	3.0	6787.918	47.1		-0.6	
6790.920	3.9524	6.0	2.1272^o	7.0	6790.929	669.2		-0.3	
6794.572	3.2571	7.0	1.4329^o	8.0	6794.576	21.4		-2.8	
6795.153	4.8099	5.0	2.9859^o	5.0	6795.158	9.5		-1.0	
6796.033	3.2567	8.0	1.4329^o	8.0	6796.026	153.2		-1.9	
6797.596	4.6368^o	5.0	2.8134	6.0	6797.613	8.8		-1.3	
6803.539	5.2262^o	6.0	3.4044	7.0	6803.543	5.0		-0.7	
6808.449	3.9318	4.0	2.1113^o	5.0	6808.444	5.8		-2.4	
6811.297	4.8258	6.0	3.0061^o	6.0	6811.294^b	8.2		-1.0	
6811.298	3.6897	8.0	1.8700^o	8.0	6811.294^b	8.2		-2.6	
6812.011	3.9703	5.0	2.1508^o	5.0	6812.015	33.6		-1.6	
6818.341	3.1268	9.0	1.3090^o	9.0	6818.337	18.7		-3.0	
6822.678	4.5891	4.0	2.7724^o	4.0	6822.668	7.8		-1.4	
6824.230	3.8586	5.0	2.0423^o	4.0	6824.233^c	9.7		-2.3	
6825.441	4.8220	5.0	3.0061^o	6.0	6825.429	69.2		-0.1	
6825.982	3.9326	7.0	2.1168^o	6.0	6825.982	165.2		-1.0	
6829.790	3.2283	5.0	1.4135^o	5.0	6829.838	25.5		-2.7	
6830.665	4.5870	4.0	2.7724^o	4.0	6830.688^b	14.0		-1.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6830.720	3.7792	7.0	1.9647^o	7.0	6830.688^b	14.0		-2.2	
6835.882	4.3631	7.0	2.5499^o	8.0	6835.900^{bc}	37.0		-1.0	
6835.896	4.8192	6.0	3.0061^o	6.0	6835.900^{bc}	37.0		-0.4	
6837.200	3.7775	6.0	1.9647^o	7.0	6837.192	34.5		-1.8	
6838.119	4.7984	5.0	2.9859^o	5.0	6838.132	1.8		-1.7	
6839.989	3.6948	6.0	1.8827^o	5.0	6839.991	5.6		-2.8	
6841.097	4.8440	7.0	3.0322^o	6.0	6841.079	5.2		-1.2	
6843.165	5.0680^o	8.0	3.2567	8.0	6843.193^b	4.0		-1.0	
6843.197	3.9558	9.0	2.1446^o	8.0	6843.193^b	3.8		-2.6	
6843.225	4.4274^o	6.0	2.6162	7.0	6843.193^b	3.8		-1.9	
6848.102	3.9607	6.0	2.1508^o	5.0	6848.095^b	1479.8		0.0	
6848.107	3.6800	7.0	1.8700^o	8.0	6848.095^b	1462.8		-0.4	
6850.433	2.6720^o	4.0	0.8627	5.0	6850.385	2.1		-4.6	
6853.735	4.5514	5.0	2.7430^o	5.0	6853.735	18.4		-1.1	
6854.570	4.9279	6.0	3.1197^o	5.0	6854.625^b	6.5		-1.0	
6854.640	4.7941	6.0	2.9859^o	5.0	6854.625^b	6.4		-1.2	
6857.227	4.6980^o	4.0	2.8905	5.0	6857.228^b	150.2		0.0	
6857.233	5.1836	7.0	3.3761^o	7.0	6857.228^b	149.8		0.7	
6857.238	3.2405	7.0	1.4329^o	8.0	6857.228^b	149.8		-1.9	
6859.501	4.7928	4.0	2.9859^o	5.0	6859.497	17.9		-0.7	
6860.453	4.8255	4.0	3.0188^o	4.0	6860.455	7.2		-1.1	
6862.759	3.9703	5.0	2.1643^o	6.0	6862.795	4.7		-2.4	
6864.117	4.5891	4.0	2.7834^o	5.0	6864.112	15.1		-1.1	
6865.126	3.9326	7.0	2.1272^o	7.0	6865.128	908.4		-0.2	
6866.251	4.4575	5.0	2.6523^o	5.0	6866.240	13.2		-1.3	
6870.057	5.2917	4.0	3.4876^o	5.0	6870.028	14.5		-0.2	
6870.493	4.6321^o	8.0	2.8281	8.0	6870.485^b	11.8		-1.1	
6870.513	4.8101	7.0	3.0061^o	6.0	6870.486^b	14.2		-0.8	
6871.253	4.0771	8.0	2.2733^o	8.0	6871.274^b	13.3		-1.8	
6871.272	4.8099	5.0	3.0061^o	6.0	6871.274^b	13.3		-0.8	
6871.286	4.1844	6.0	2.3806^o	5.0	6871.274^b	13.2		-1.7	
6872.201	4.5870	4.0	2.7834^o	5.0	6872.206	7.3		-1.4	
6873.088	5.1730^o	7.0	3.3697	8.0	6873.086	30.1		-0.0	
6873.667	4.8220	5.0	3.0188^o	4.0	6873.657	63.7		-0.2	
6874.769	3.2359	9.0	1.4329^o	8.0	6874.763	395.6		-1.5	
6877.119	4.5747	5.0	2.7724^o	4.0	6877.128	5.4		-1.6	
6879.934	4.4178^o	6.0	2.6162	7.0	6879.980^b	317.5		-0.0	
6879.954	5.2511	6.0	3.4495^o	7.0	6879.980^b	317.7			
6879.975	3.9524	6.0	2.1508^o	5.0	6879.980^b	317.6		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6881.398	2.4255^o	5.0	0.6243	4.0	6881.403^c	105.1		-3.2	
6884.093	4.5729	5.0	2.7724^o	4.0	6884.092	38.3		-0.7	
6886.480	5.4983	2.0	3.6984^o	3.0	6886.482	3.5		-0.5	
6889.380	4.4153^o	8.0	2.6162	7.0	6889.431^b	9.1		-1.5	
6889.427	4.0723	7.0	2.2733^o	8.0	6889.431^b	9.1		-2.0	
6892.363	3.9491	5.0	2.1508^o	5.0	6892.392^b	39.9		-1.5	
6892.394	4.7842	4.0	2.9859^o	5.0	6892.392^b	38.8		-0.4	
6895.252	4.3925	4.0	2.5949^o	4.0	6895.296^b	2.1		-2.2	
6895.293	4.4220	6.0	2.6245^o	7.0	6895.296^b	2.1		-2.2	
6898.385	4.2222	6.0	2.4255^o	5.0	6898.398^b	20.8		-1.5	
6898.394	3.9136	7.0	2.1168^o	6.0	6898.398^b	20.7		-1.9	
6908.246	3.2571	7.0	1.4629^o	6.0	6908.247	379.5		-1.5	
6913.284	4.5928	6.0	2.7999^o	6.0	6913.253	4.7		-1.6	
6916.184	5.2917	4.0	3.4996^o	3.0	6916.146	4.1		-0.7	
6918.527	3.9083	6.0	2.1168^o	6.0	6918.545^c	6.8		-2.4	
6925.942	2.6523^o	5.0	0.8627	5.0	6925.953	368.3		-2.3	
6936.672	3.7792	7.0	1.9924^o	6.0	6936.667	18.1		-2.1	
6938.374	3.9136	7.0	2.1272^o	7.0	6938.382	205.4		-0.9	
6941.316	3.9128	8.0	2.1272^o	7.0	6941.324^c	5.6		-2.4	
6945.189	4.1558	6.0	2.3712^o	7.0	6945.182^c	9.4		-1.9	
6946.117	4.5274	5.0	2.7430^o	5.0	6946.123	8.0		-1.4	
6946.715	4.5246	9.0	2.7403^o	9.0	6946.678^b	5.1		-1.6	
6946.721	5.2917	4.0	3.5075^o	3.0	6946.678^b	5.1		-0.6	
6950.379	3.2571	7.0	1.4738^o	7.0	6950.386^c	36.3		-2.5	
6951.908	3.2567	8.0	1.4738^o	7.0	6951.900^c	498.8		-1.4	
6957.910	4.9017^o	6.0	3.1203	5.0	6957.951	5.9		-1.1	
6959.095	5.3955	7.0	3.6144^o	6.0	6959.104^b	1.4		-1.0	
6959.113	4.1087	6.0	2.3276^o	7.0	6959.104^b	1.4		-2.8	
6967.120	4.5514	5.0	2.7724^o	4.0	6967.120	1.4		-2.2	
6968.746	4.6838^o	5.0	2.9052	6.0	6968.773^b	2.5		-1.7	
6968.810	4.9268	7.0	3.1482^o	6.0	6968.773^b	2.5		-1.4	
6971.244	3.8948	5.0	2.1168^o	6.0	6971.247^b	6.9		-2.4	
6971.297	4.7393	5.0	2.9613^o	5.0	6971.247^b	6.2		-1.3	
6973.037	3.2405	7.0	1.4629^o	6.0	6973.031	231.5		-1.7	
6974.807	5.6098	3.0	3.8327^o	3.0	6974.775	17.1		0.4	
6975.310	3.7416	6.0	1.9647^o	7.0	6975.358^b	5.6		-2.7	
6975.332	5.4528^o	10.0	3.6759	10.0	6975.358^b	5.6		-0.3	
6984.803	4.6797^o	6.0	2.9052	6.0	6984.792	7.1		-1.3	
6986.485	3.8854	6.0	2.1113^o	5.0	6986.484^c	40.9		-1.6	
6989.338	3.2063	7.0	1.4329^o	8.0	6989.327	253.5		-1.7	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
6990.695	3.8144^o	6.0	2.0413	7.0	6990.696	16.8		-2.1	
6993.777	4.8045	7.0	3.0322^o	6.0	6993.768	3.3		-1.4	
6995.548	4.6412^o	6.0	2.8694	6.0	6995.507	11.1		-1.1	
7001.388	4.9790	7.0	3.2087^o	6.0	7001.443^b	678.9			
7001.444	2.9295	7.0	1.1592^o	8.0	7001.443^b	679.9		-1.7	
7004.742	4.7581^o	7.0	2.9886	8.0	7004.750	10.5		-1.0	
7013.550	4.9777^o	7.0	3.2105	6.0	7013.554	7.8		-0.8	
7019.287	4.9763^o	5.0	3.2105	6.0	7019.285	20.6		-0.4	
7043.714	4.1558	6.0	2.3961^o	6.0	7043.725	6.3		-2.0	
7045.290	2.8281	8.0	1.0688^o	9.0	7045.251	31.8		-3.1	
7056.067	4.7330^o	5.0	2.9764	4.0	7056.024	2.3		-1.7	
7058.567	3.0650	8.0	1.3090^o	9.0	7058.558	329.3		-1.8	
7073.883	4.8447	6.0	3.0925^o	7.0	7073.891	1.2		-1.8	
7076.506	4.8440	7.0	3.0925^o	7.0	7076.503^b	23.5		-0.5	
7076.531	4.5514	5.0	2.7999^o	6.0	7076.503^b	23.9		-0.9	
7080.854	3.6205	9.0	1.8700^o	8.0	7080.846^c	3.0		-3.1	
7085.446	3.9136	7.0	2.1643^o	6.0	7085.436	3.9		-2.6	
7085.831	3.7416	6.0	1.9924^o	6.0	7085.853^b	14.1		-2.2	
7085.899	5.4821^o	9.0	3.7329	10.0	7085.853^b	14.6		0.1	
7090.744	4.6412^o	6.0	2.8932	7.0	7090.776^b	3.9		-1.6	
7090.824	5.1730^o	7.0	3.4250	7.0	7090.776^b	3.6		-0.9	
7090.829	4.6368^o	5.0	2.8888	4.0	7090.776^b	3.6		-1.6	
7091.991	5.2986	5.0	3.5509^o	4.0	7092.037^b	1.6		-1.1	
7092.022	5.3955	7.0	3.6478^o	6.0	7092.037^b	1.6		-0.9	
7092.676	3.2105	6.0	1.4629^o	6.0	7092.659	32.6		-2.6	
7096.185	4.7789	7.0	3.0322^o	6.0	7096.177	2.4		-1.6	
7098.979	3.9524	6.0	2.2064^o	7.0	7098.973	18.6		-1.8	
7100.386	3.7380	5.0	1.9924^o	6.0	7100.381	11.9		-2.3	
7101.301	3.1589	6.0	1.4135^o	5.0	7101.296	673.5		-1.3	
7105.563	4.7330^o	7.0	2.9886	8.0	7105.578	4.0		-1.4	
7107.065	3.8948	5.0	2.1508^o	5.0	7107.074	5.2		-2.5	
7109.680	3.2063	7.0	1.4629^o	6.0	7109.673	219.0		-1.8	
7112.907	3.2164	8.0	1.4738^o	7.0	7112.909	12.2		-3.0	
7134.456	2.3616^o	4.0	0.6243	4.0	7134.475	52.1		-3.5	
7145.686	3.8854	6.0	2.1508^o	5.0	7145.704	9.0		-2.2	
7155.433	2.5949^o	4.0	0.8627	5.0	7155.445^b	359.3		-2.4	
7155.459	4.9398	8.0	3.2076^o	9.0	7155.445^b	359.3		0.8	
7159.709	5.1167	7.0	3.3855^o	7.0	7159.720^b	2.7		-1.1	
7159.722	5.2519^o	8.0	3.5207	8.0	7159.720^b	2.7		-0.9	
7160.451	3.0639^o	3.0	1.3329	4.0	7160.465	22.1		-3.0	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	$\log gf$		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
7161.890	2.5933^o	5.0	0.8627	5.0	7161.929	233.9		-2.6	
7162.322	3.8948	5.0	2.1643^o	6.0	7162.318	24.2		-1.8	
7164.744	3.6126	6.0	1.8827^o	5.0	7164.737	15.1		-2.4	
7167.304	5.6876	7.0	3.9582^o	6.0	7167.352^b	5.5		0.0	
7167.334	3.8565	7.0	2.1272^o	7.0	7167.353^b	5.2		-2.5	
7180.068	4.7323	5.0	3.0061^o	6.0	7180.092^b	23.1		-0.7	
7180.110	3.9326	7.0	2.2064^o	7.0	7180.092^b	23.5		-1.7	
7183.470	3.8763	4.0	2.1508^o	5.0	7183.483^b	8.7		-2.2	
7183.510	4.1260^o	4.0	2.4005	5.0	7183.483^b	8.5		-1.9	
7185.023	3.6897	8.0	1.9647^o	7.0	7185.016	7.2		-2.6	
7186.316	4.8440	7.0	3.1193^o	7.0	7186.306^c	5.6		-1.1	
7189.558	3.1869	7.0	1.4629^o	6.0	7189.537	35.4		-2.6	
7193.375	4.6609	10.0	2.9379^o	10.0	7193.404^b	3.7		-1.5	
7193.413	3.7154	7.0	1.9924^o	6.0	7193.404^b	3.6		-2.8	
7196.043	5.4887^o	8.0	3.7663	9.0	7196.086	5.2		-0.3	
7197.889	4.2222	6.0	2.5002^o	6.0	7197.890	1.2		-2.6	
7206.141	2.8793	7.0	1.1592^o	8.0	7206.145	7.4		-3.7	
7208.796	3.8640	9.0	2.1446^o	8.0	7208.796^b	2.2		-2.9	
7208.810	4.8045	7.0	3.0851^o	8.0	7208.796^b	2.2		-1.6	
7213.697	2.6080	6.0	0.8898^o	6.0	7213.679^b	56.4		-3.2	
7213.710	4.2893	7.0	2.5711^o	6.0	7213.679^b	56.4		-0.9	
7214.182	3.7416	6.0	2.0235^o	6.0	7214.216	2.0		-3.1	
7216.241	4.8101	7.0	3.0925^o	7.0	7216.242	12.0		-0.8	
7225.995	3.6800	7.0	1.9647^o	7.0	7225.976^{bc}	7.2		-2.6	
7226.022	4.6121	6.0	2.8968^o	7.0	7225.976^{bc}	7.1		-1.3	
7228.189	4.9017^o	6.0	3.1869	7.0	7228.179	3.4		-1.3	
7229.270	3.7380	5.0	2.0235^o	6.0	7229.306	6.6		-2.5	
7254.142	2.3329^o	4.0	0.6243	4.0	7254.140^c	37.3		-3.7	
7255.175	5.4859^o	7.0	3.7775	6.0	7255.221^b	15.5		0.2	
7255.214	2.5711^o	6.0	0.8627	5.0	7255.221^b	15.9		-3.7	
7260.274	3.9136	7.0	2.2064^o	7.0	7260.285	17.9		-1.9	
7264.894	4.8258	6.0	3.1197^o	5.0	7264.882^c	8.0		-1.0	
7276.976	4.7355	7.0	3.0322^o	6.0	7276.963	2.4		-1.6	
7279.808	4.5928	6.0	2.8902^o	6.0	7279.752	0.7		-2.3	
7280.715	3.6948	6.0	1.9924^o	6.0	7280.720	2.7		-3.0	
7283.947	4.7941	8.0	3.0925^o	7.0	7283.950	19.6		-0.6	
7301.717	4.4378	8.0	2.7403^o	9.0	7301.726	22.3		-1.1	
7303.794	4.1972	6.0	2.5002^o	6.0	7303.805	2.8		-2.3	
7306.270	4.8447	6.0	3.1482^o	6.0	7306.252	1.5		-1.7	
7307.792	4.9790	7.0	3.2829^o	8.0	7307.786^c	15.9		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7308.160	4.5928	6.0	2.8968^o	7.0	7308.209^b	41.1		-0.6	
7308.214	3.1589	6.0	1.4629^o	6.0	7308.209^b	41.1		-2.5	
7309.068	4.8440	7.0	3.1482^o	6.0	7309.037	4.0		-1.2	
7315.341	5.4935	3.0	3.7991^o	4.0	7315.402^b	1.7		-0.7	
7315.402	3.8586	5.0	2.1643^o	6.0	7315.402^b	1.8		-2.9	
7315.442	3.9676	7.0	2.2733^o	8.0	7315.402^b	1.9		-2.8	
7317.276	3.1268	9.0	1.4329^o	8.0	7317.268	7.3		-3.3	
7317.877	2.5565^o	4.0	0.8627	5.0	7317.891^b	17.8		-3.7	
7317.923	4.7862	6.0	3.0925^o	7.0	7317.891^b	17.7		-0.7	
7320.377	4.7928	4.0	3.0996^o	4.0	7320.403	3.3		-1.4	
7324.382	3.8565	7.0	2.1643^o	6.0	7324.390	22.9		-1.8	
7329.792	5.4064^o	8.0	3.7154	7.0	7329.765^c	10.8		-0.0	
7330.465	4.8101	7.0	3.1193^o	7.0	7330.474	3.2		-1.4	
7333.163	4.8099	5.0	3.1197^o	5.0	7333.158	3.4		-1.4	
7336.466	4.3801	5.0	2.6906^o	6.0	7336.458	1.7		-2.2	
7338.362	3.7304^o	6.0	2.0413	7.0	7338.343	25.1		-2.0	
7340.401	3.8054	7.0	2.1168^o	6.0	7340.413	17.2		-2.0	
7349.802	4.7789	7.0	3.0925^o	7.0	7349.819^c	3.3		-1.4	
7355.383	3.1589	6.0	1.4738^o	7.0	7355.404	561.1		-1.4	
7367.477	3.8095	8.0	2.1272^o	7.0	7367.499	58.3		-1.5	
7377.826	4.5870	4.0	2.9070^o	5.0	7377.785	7.3		-1.3	
7382.225	3.8854	6.0	2.2064^o	7.0	7382.225	10.4		-2.1	
7389.936	4.6537^o	5.0	2.9764	4.0	7389.943	7.8		-1.2	
7396.357	4.6644^o	8.0	2.9886	8.0	7396.349	2.4		-1.7	
7400.342	4.7941	8.0	3.1193^o	7.0	7400.334	4.6		-1.2	
7410.278	3.9459	8.0	2.2733^o	8.0	7410.296	2.1		-2.7	
7418.250	4.2642	5.0	2.5933^o	5.0	7418.201^c	1.4		-2.5	
7426.391	4.6576^o	7.0	2.9886	8.0	7426.377	2.9		-1.6	
7428.663	4.8255	4.0	3.1570^o	3.0	7428.675	53.8		-0.1	
7444.483	3.8095	8.0	2.1446^o	8.0	7444.472^b	5.8		-2.5	
7444.492	5.4793	6.0	3.8144^o	6.0	7444.472^b	5.7		-0.2	
7446.539	4.7842	4.0	3.1197^o	5.0	7446.534	9.3		-0.9	
7449.789	4.7622^o	6.0	3.0984	5.0	7449.778^c	3.3		-1.4	
7455.927	3.7792	7.0	2.1168^o	6.0	7455.932	8.4		-2.3	
7458.236	4.8101	7.0	3.1482^o	6.0	7458.237^c	1.6		-1.7	
7459.538	3.9945	5.0	2.3329^o	4.0	7459.532	999.4		0.0	
7460.361	5.0659^o	6.0	3.4044	7.0	7460.397^b	78.8		0.4	
7460.397	4.7539	8.0	3.0925^o	7.0	7460.397^b	78.8		-0.0	
7460.402	4.0326	8.0	2.3712^o	7.0	7460.397^b	78.8		-1.0	
7469.457	3.9326	7.0	2.2733^o	8.0	7469.469	1938.3		0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7472.519	4.4697	6.0	2.8110^o	5.0	7472.465	7093.1			
7478.507	3.1203	5.0	1.4629^o	6.0	7478.510	24.2		-2.8	
7484.674	3.6983	5.0	2.0423^o	4.0	7484.669	11.5		-2.3	
7494.044	4.0545^o	4.0	2.4005	5.0	7494.069^b	3.3		-2.4	
7494.078	3.6953^o	8.0	2.0413	7.0	7494.069^b	3.1		-2.9	
7495.174	2.6080	6.0	0.9543^o	7.0	7495.153	29.2		-3.4	
7498.582	2.9859^o	5.0	1.3329	4.0	7498.580	7.7	-3.3	-3.5	
7499.256	3.5355	5.0	1.8827^o	5.0	7499.248	18.6		-2.3	
7501.359	5.1730^o	7.0	3.5207	8.0	7501.384	5.9		-0.6	
7504.491	4.5211^o	5.0	2.8694	6.0	7504.480	2.8		-1.8	
7509.223	4.8593	6.0	3.2087^o	6.0	7509.227	9.0		-0.8	
7510.471	3.7775	6.0	2.1272^o	7.0	7510.487^{bc}	5.7		-2.5	
7510.476	4.9557	6.0	3.3053^o	5.0	7510.487^{bc}	5.7		-0.9	
7514.277	4.3925	4.0	2.7430^o	5.0	7514.285	2.2		-2.1	
7521.144	3.6126	6.0	1.9647^o	7.0	7521.134	7.3		-2.6	
7530.872	4.7941	6.0	3.1482^o	6.0	7530.859	2.2		-1.5	
7532.311	4.8192	6.0	3.1737^o	7.0	7532.306	115.8		0.2	
7549.094	4.0130	6.0	2.3712^o	7.0	7549.109	7.6		-2.1	
7549.676	4.6182^o	5.0	2.9764	4.0	7549.686	2.6		-1.7	
7556.250	3.9136	7.0	2.2733^o	8.0	7556.260	660.2		-0.2	
7569.578	3.9703	5.0	2.3329^o	4.0	7569.582	45.3		-1.3	
7574.154	4.8430	10.0	3.2066^o	9.0	7574.180^b	13.4		-0.7	
7574.228	5.0125	8.0	3.3761^o	7.0	7574.180^b	13.4		-0.4	
7576.193	4.8447	6.0	3.2087^o	6.0	7576.182	3.0		-1.3	
7578.664	3.0984	5.0	1.4629^o	6.0	7578.647	26.3		-2.8	
7579.201	4.8440	7.0	3.2087^o	6.0	7579.189	12.1		-0.7	
7582.526	3.7792	7.0	2.1446^o	8.0	7582.532^{bc}	11.3		-2.2	
7582.547	4.7539	8.0	3.1193^o	7.0	7582.532^{bc}	10.9		-0.9	
7589.954	2.7923	7.0	1.1592^o	8.0	7589.947	15.4		-3.4	
7590.479	3.9945	5.0	2.3616^o	4.0	7590.476	30.8		-1.5	
7597.297	4.5891	4.0	2.9576^o	5.0	7597.349	24.7		-0.8	
7607.201	4.5870	4.0	2.9576^o	5.0	7607.217	25.9		-0.7	
7613.484	4.5891	4.0	2.9611^o	4.0	7613.482^{bc}	40.7		-0.5	
7613.528	5.2917	4.0	3.6637^o	5.0	7613.482^{bc}	40.9		0.4	
7613.951	4.8366	6.0	3.2087^o	6.0	7614.003^b	8.6		-0.9	
7614.029	3.7551	6.0	2.1272^o	7.0	7614.002^b	9.8		-2.3	
7614.513	4.5891	4.0	2.9613^o	5.0	7614.509	5.8		-1.4	
7619.333	3.7380	5.0	2.1113^o	5.0	7619.310	8.3		-2.4	
7623.430	4.5870	4.0	2.9611^o	4.0	7623.455	20.0		-0.8	
7624.462	4.5870	4.0	2.9613^o	5.0	7624.473	5.6		-1.4	

Continued from previous page

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
7635.089	4.7680	6.0	3.1447^o	5.0	7635.145	1.9		-1.6	
7638.950	3.9937	6.0	2.3712^o	7.0	7638.977	28.2		-1.5	
7644.529	3.6953^o	8.0	2.0739	8.0	7644.536	1.4		-3.2	
7645.650	4.6052	3.0	2.9840^o	3.0	7645.652^c	45.7		-0.5	
7649.289	4.7941	6.0	3.1737^o	7.0	7649.322	1.3		-1.7	
7649.797	3.6126	6.0	1.9924^o	6.0	7649.796	8.5		-2.5	
7650.611	4.5747	5.0	2.9546^o	6.0	7650.625	44.8		-0.5	
7659.243	4.5729	5.0	2.9546^o	6.0	7659.243^b	179.0		0.1	
7659.301	3.9459	8.0	2.3276^o	7.0	7659.243^b	179.0		-0.8	
7665.642	4.0130	6.0	2.3961^o	6.0	7665.650^b	85.3		-1.0	
7665.694	4.8099	5.0	3.1930^o	4.0	7665.650^b	85.4		0.1	
7668.926	3.9491	5.0	2.3329^o	4.0	7668.922	19.9		-1.7	
7673.526	4.5729	5.0	2.9576^o	5.0	7673.520^b	16.7		-0.9	
7673.580	5.2744	5.0	3.6592^o	4.0	7673.520^b	16.7		0.0	
7676.101	4.7323	5.0	3.1176^o	4.0	7676.055	2.1		-1.6	
7680.003	3.9945	5.0	2.3806^o	5.0	7679.996^c	783.2		-0.0	
7683.620	5.0626	7.0	3.4495^o	7.0	7683.628^b	5.2		-0.8	
7683.623	3.9937	6.0	2.3806^o	5.0	7683.628^b	5.2		-2.2	
7683.966	5.2830	3.0	3.6699^o	3.0	7683.973	8.7		-0.2	
7691.090	4.5729	5.0	2.9613^o	5.0	7691.088	7.3		-1.3	
7695.817	4.8192	6.0	3.2087^o	6.0	7695.815	5.8		-1.1	
7713.460	3.7182	6.0	2.1113^o	5.0	7713.477	6.1		-2.5	
7715.641	3.6478^o	6.0	2.0413	7.0	7715.653	4.5		-2.8	
7732.352	4.5870	4.0	2.9840^o	3.0	7732.371^b	8.5		-1.2	
7732.402	5.1384^o	6.0	3.5355	5.0	7732.371^b	8.2		-0.5	
7738.856	4.3777^o	4.0	2.7761	3.0	7738.867^b	15.1		-1.2	
7738.864	3.7524	4.0	2.1508^o	5.0	7738.867^b	14.9		-2.1	
7741.218	4.5870	4.0	2.9859^o	5.0	7741.282	8.3		-1.2	
7746.215	4.7842	4.0	3.1841^o	5.0	7746.180	13.0		-0.7	
7747.417	4.8255	4.0	3.2256^o	4.0	7747.427	44.3		-0.1	
7752.199	3.9318	4.0	2.3329^o	4.0	7752.225	3.2		-2.5	
7754.620	3.9945	5.0	2.3961^o	6.0	7754.623	225.6		-0.6	
7757.716	5.2917	4.0	3.6940^o	5.0	7757.676^{bc}	7.3		-0.3	
7757.723	4.2222	6.0	2.6245^o	7.0	7757.676^{bc}	7.2		-1.8	
7758.311	3.9937	6.0	2.3961^o	6.0	7758.322	39.4		-1.3	
7762.160	4.5514	5.0	2.9546^o	6.0	7762.171	13.6		-1.0	
7764.273	4.8220	5.0	3.2256^o	4.0	7764.266^c	4.9		-1.1	
7767.057	4.8045	7.0	3.2087^o	6.0	7767.057	7.2		-1.0	
7782.229	5.4567^o	9.0	3.8640	9.0	7782.235^b	0.9		-1.0	
7782.273	4.8980	5.0	3.3053^o	5.0	7782.235^b	0.8		-1.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7789.848	3.0650	8.0	1.4738^o	7.0	7789.858^b	2.8		-3.7	
7789.877	4.8440	7.0	3.2529^o	6.0	7789.858^b	3.3		-1.2	
7791.911	3.8640	9.0	2.2733^o	8.0	7791.921^b	9.6		-2.1	
7791.934	4.3830^o	8.0	2.7923	7.0	7791.921^b	9.3		-1.4	
7793.791	4.5514	5.0	2.9611^o	4.0	7793.815	1.7		-1.9	
7795.388	4.9755	7.0	3.3855^o	7.0	7795.356	2.5		-1.2	
7796.694	3.9703	5.0	2.3806^o	5.0	7796.695	153.9		-0.8	
7797.458	3.9607	6.0	2.3712^o	7.0	7797.450	566.5		-0.2	
7799.677	4.8330^o	4.0	3.2439	4.0	7799.648	4.6		-1.1	
7802.340	5.0958^o	6.0	3.5072	7.0	7802.294	5.4		-0.7	
7803.910	3.7154	7.0	2.1272^o	7.0	7803.921	2.6		-2.9	
7806.145	5.2830	3.0	3.6952^o	4.0	7806.121	1.8		-0.9	
7809.073	3.7380	5.0	2.1508^o	5.0	7809.091^b	1.1		-3.2	
7809.089	4.4153^o	8.0	2.8281	8.0	7809.090^b	1.2		-2.3	
7809.912	4.5729	5.0	2.9859^o	5.0	7809.919^b	3.3		-1.6	
7809.935	3.6983	5.0	2.1113^o	5.0	7809.918^b	3.2		-2.8	
7814.079	4.9623	6.0	3.3761^o	7.0	7814.033	8.6		-0.7	
7815.030	5.0425	6.0	3.4565^o	6.0	7815.065	2.6		-1.1	
7817.970	4.7941	6.0	3.2087^o	6.0	7817.967^{bc}	7.2		-1.0	
7817.983	5.2917	4.0	3.7063^o	5.0	7817.967^{bc}	7.2		-0.3	
7823.376	3.7351	5.0	2.1508^o	5.0	7823.371^{bc}	2.1		-2.9	
7823.411	4.3925	4.0	2.8082^o	4.0	7823.371^{bc}	2.1		-2.1	
7827.371	3.6948	6.0	2.1113^o	5.0	7827.368	1.2		-3.2	
7828.604	3.8565	7.0	2.2733^o	8.0	7828.608	6.6		-2.3	
7843.018	3.4630	6.0	1.8827^o	5.0	7843.011	4.7		-3.0	
7843.953	4.3801	5.0	2.7999^o	6.0	7844.011^b	84.5		-0.5	
7844.010	3.9607	6.0	2.3806^o	5.0	7844.011^b	84.6		-1.0	
7847.574	2.4692	7.0	0.8898^o	6.0	7847.591	1326.1		-1.9	
7858.022	4.8255	4.0	3.2482^o	5.0	7858.080^c	7.8		-0.9	
7873.602	4.9106^o	6.0	3.3364	6.0	7873.613^b	8.7		-0.7	
7873.608	3.9703	5.0	2.3961^o	6.0	7873.613^b	8.7		-2.0	
7874.214	4.7330^o	5.0	3.1589	6.0	7874.268^b	3.1		-1.4	
7874.270	2.9070^o	5.0	1.3329	4.0	7874.268^b	3.0		-3.9	
7875.363	4.8220	5.0	3.2482^o	5.0	7875.352	33.5		-0.3	
7879.381	3.6144^o	6.0	2.0413	7.0	7879.370	174.9		-1.2	
7880.865	4.5274	5.0	2.9546^o	6.0	7880.870^b	3.6		-1.6	
7880.884	4.1972	6.0	2.6245^o	7.0	7880.870^b	3.4		-2.1	
7885.855	3.9524	6.0	2.3806^o	5.0	7885.867	5.4		-2.2	
7887.472	3.9676	7.0	2.3961^o	6.0	7887.508	1.6		-2.7	
7890.707	4.9763^o	5.0	3.4055	5.0	7890.762	0.8		-1.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7893.169	4.5891	4.0	3.0188^o	4.0	7893.187	7.9		-1.2	
7893.567	4.7789	7.0	3.2087^o	6.0	7893.573	3.7		-1.3	
7899.108	4.4579^o	5.0	2.8888	4.0	7899.106^b	16.4		-1.1	
7899.113	4.8220	5.0	3.2529^o	6.0	7899.106^b	16.4		-0.6	
7899.488	4.5267	6.0	2.9576^o	5.0	7899.544^b	290.9		0.3	
7899.547	3.9945	5.0	2.4255^o	5.0	7899.544^b	292.8		-0.4	
7899.593	4.7427	8.0	3.1737^o	7.0	7899.544^b	293.5		0.6	
7902.135	3.9491	5.0	2.3806^o	5.0	7902.139	7.3		-2.1	
7903.377	3.9937	6.0	2.4255^o	5.0	7903.397	1.4		-2.7	
7903.837	5.2986	5.0	3.7304^o	6.0	7903.876^b	3.5		-0.6	
7903.861	4.5870	4.0	3.0188^o	4.0	7903.876^b	3.5		-1.6	
7906.765	3.6948	6.0	2.1272^o	7.0	7906.781	2.3		-2.9	
7908.078	4.4579^o	4.0	2.8905	5.0	7908.027	1.5		-2.1	
7908.946	2.4569	6.0	0.8898^o	6.0	7908.953^{bc}	204.2		-2.7	
7909.016	4.6321^o	8.0	3.0650	8.0	7908.953^{bc}	203.9		0.3	
7910.631	4.5729	5.0	3.0061^o	6.0	7910.633	3.9		-1.5	
7913.119	4.8192	6.0	3.2529^o	6.0	7913.115	45.5		-0.1	
7913.529	3.7108	8.0	2.1446^o	8.0	7913.530	3.0		-2.8	
7921.865	3.9607	6.0	2.3961^o	6.0	7921.855	1028.9		0.1	
7927.715	4.6838^o	5.0	3.1203	5.0	7927.728	1.0		-2.0	
7930.588	2.9764	4.0	1.4135^o	5.0	7930.537	1.8		-4.0	
7931.312	2.4255^o	5.0	0.8627	5.0	7931.314	281.7		-2.6	
7932.282	3.6897	8.0	2.1272^o	7.0	7932.292	2.0		-3.0	
7935.671	3.8948	5.0	2.3329^o	4.0	7935.682	3.1		-2.5	
7936.008	3.5853	7.0	2.0235^o	6.0	7936.054	13.9		-2.3	
7937.846	3.9326	7.0	2.3712^o	7.0	7937.846	965.8		0.0	
7952.935	4.8414	8.0	3.2829^o	8.0	7952.968^b	193.7		0.5	
7952.966	5.5040	7.0	3.9455^o	6.0	7952.968^b	193.7			
7953.021	4.9777^o	7.0	3.4192	8.0	7952.968^b	193.7		0.7	
7956.794	5.4601	7.0	3.9023^o	6.0	7956.832^{bc}	3.2		-0.4	
7956.846	3.8854	6.0	2.3276^o	7.0	7956.832^{bc}	3.1		-2.5	
7958.419	3.4401	5.0	1.8827^o	5.0	7958.415	21.4		-2.3	
7960.562	4.8099	5.0	3.2529^o	6.0	7960.570	1.7		-1.6	
7964.546	3.9524	6.0	2.3961^o	6.0	7964.555	161.2		-0.7	
7965.871	2.4187^o	6.0	0.8627	5.0	7965.888	82.6		-3.1	
8005.311	4.4178^o	6.0	2.8694	6.0	8005.287	2.8		-1.9	
8020.462	4.5514	5.0	3.0061^o	6.0	8020.460^b	2.0		-1.8	
8020.494	5.1384^o	6.0	3.5931	5.0	8020.460^b	1.9		-1.0	
8022.418	3.9455^o	6.0	2.4005	5.0	8022.434	1.8		-2.7	
8023.059	3.9703	5.0	2.4255^o	5.0	8023.064^c	48.0		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8031.028	4.4128^o	5.0	2.8694	6.0	8031.003^b	1.1		-2.3	
8031.050	3.8763	4.0	2.3329^o	4.0	8031.003^b	1.2		-3.0	
8035.938	3.9136	7.0	2.3712^o	7.0	8035.953^b	251.0		-0.6	
8036.001	4.9279	6.0	3.3855^o	7.0	8035.953^b	250.1		0.8	
8042.326	4.7941	6.0	3.2529^o	6.0	8042.321	2.8		-1.3	
8054.951	3.5801^o	8.0	2.0413	7.0	8054.938	15.8		-2.2	
8056.329	4.4178^o	6.0	2.8793	7.0	8056.306	1.5		-2.1	
8066.810	3.9326	7.0	2.3961^o	6.0	8066.808	19.0		-1.7	
8067.999	3.8095	8.0	2.2733^o	8.0	8068.016	4.9		-2.4	
8068.802	3.5775^o	6.0	2.0413	7.0	8068.782	31.0		-2.0	
8073.171	3.9607	6.0	2.4255^o	5.0	8073.154	12.6		-1.8	
8094.002	4.9169	6.0	3.3855^o	7.0	8094.054^b	3.6		-1.1	
8094.020	5.4337	7.0	3.9023^o	6.0	8094.054^b	3.6		-0.4	
8094.082	4.1558	6.0	2.6245^o	7.0	8094.054^b	3.7		-2.1	
8099.099	3.6417	5.0	2.1113^o	5.0	8099.075	1.7		-3.1	
8141.019	4.7330^o	7.0	3.2105	6.0	8140.978	1.9		-1.6	
8159.280	2.8281	8.0	1.3090^o	9.0	8159.258	112.6		-2.4	
8164.442	4.2431	9.0	2.7250^o	8.0	8164.465	2.5		-2.1	
8165.678	2.3806^o	5.0	0.8627	5.0	8165.675	24.0		-3.7	
8168.135	3.9136	7.0	2.3961^o	6.0	8168.167	3.9		-2.4	
8177.525	3.6800	7.0	2.1643^o	6.0	8177.551	3.8		-2.7	
8181.829	4.9004	8.0	3.3855^o	7.0	8181.862^b	885.2			
8181.838	2.4692	7.0	0.9543^o	7.0	8181.862^b	885.2		-2.0	
8182.411	3.5072	7.0	1.9924^o	6.0	8182.420^b	21.8		-2.2	
8182.439	2.9886	8.0	1.4738^o	7.0	8182.420^b	21.7		-2.9	
8185.607	3.8854	6.0	2.3712^o	7.0	8185.669^b	11.6		-1.9	
8185.649	3.8948	5.0	2.3806^o	5.0	8185.669^b	10.8		-2.0	
8196.377	3.9083	6.0	2.3961^o	6.0	8196.387	27.0		-1.5	
8197.676	3.5355	5.0	2.0235^o	6.0	8197.722	12.6		-2.4	
8204.151	2.4005	5.0	0.8898^o	6.0	8204.175^b	4.7		-4.3	
8204.157	4.2511	8.0	2.7403^o	9.0	8204.175^b	4.7		-1.8	
8204.226	5.4567^o	9.0	3.9459	8.0	8204.175^b	4.3		-0.2	
8213.500	3.7154	7.0	2.2064^o	7.0	8213.469	4.2		-2.6	
8236.925	3.8854	6.0	2.3806^o	5.0	8236.933	7.7		-2.1	
8243.849	4.1558	6.0	2.6523^o	5.0	8243.820	4.5		-2.0	
8286.202	3.6126	6.0	2.1168^o	6.0	8286.183	4.1		-2.7	
8301.501	4.8627^o	7.0	3.3697	8.0	8301.557	3452.4			
8309.417	2.9052	6.0	1.4135^o	5.0	8309.412	11.7		-3.2	
8312.814	2.4453	8.0	0.9543^o	7.0	8312.828	4358.5		-1.3	
8322.816	3.8854	6.0	2.3961^o	6.0	8322.851	11.9		-1.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8323.958	3.9582^o	6.0	2.4692	7.0	8323.970	2.4		-2.5	
8328.503	5.2262^o	6.0	3.7380	5.0	8328.553^{bc}	9.8		-0.2	
8328.553	4.4178^o	6.0	2.9295	7.0	8328.553^{bc}	9.5		-1.3	
8335.305	2.1113^o	5.0	0.6243	4.0	8335.328	45.8		-3.7	
8440.319	3.5853	7.0	2.1168^o	6.0	8440.331	18.7		-2.1	
8459.449	4.1558	6.0	2.6906^o	6.0	8459.425	37.8		-1.0	
8472.408	1.4629^o	6.0	0.0000	6.0	8472.442	4032.5		-2.6	
8500.247	3.5853	7.0	2.1272^o	7.0	8500.257	16.9		-2.1	
8513.332	2.8694	6.0	1.4135^o	5.0	8513.332^b	271.6		-1.9	
8513.383	3.8564^o	5.0	2.4005	5.0	8513.332^b	272.0		-0.6	
8528.899	3.6041	5.0	2.1508^o	5.0	8528.896^b	35.0		-1.8	
8528.941	5.1836	7.0	3.7304^o	6.0	8528.896^b	35.1		0.4	
8607.320	3.0639^o	3.0	1.6239	2.0	8607.322	12.1		-3.0	
8626.496	3.4782^o	6.0	2.0413	7.0	8626.498	24.9		-2.1	
8642.142	3.8054	7.0	2.3712^o	7.0	8642.159^b	4.7		-2.4	
8642.201	4.5267	6.0	3.0925^o	7.0	8642.160^b	4.8		-1.4	
8647.044	5.0478	5.0	3.6144^o	6.0	8647.050	13012.2			
8648.535	3.9023^o	6.0	2.4692	7.0	8648.519	5.6		-2.2	
8663.001	4.6412^o	6.0	3.2105	6.0	8662.983	1.3		-1.8	
8665.885	2.8932	7.0	1.4629^o	6.0	8665.863^b	18.4		-3.0	
8665.915	4.6797^o	6.0	3.2494	6.0	8665.863^b	18.2		-0.6	
8694.607	3.4491	6.0	2.0235^o	6.0	8694.652	2.8		-3.1	
8713.427	3.8230^o	4.0	2.4005	5.0	8713.446	5.2		-2.3	
8758.384	4.9224^o	7.0	3.5072	7.0	8758.426^b	12.8		-0.4	
8758.395	3.4565^o	6.0	2.0413	7.0	8758.426^b	12.8		-2.4	
8758.421	5.1306^o	8.0	3.7154	7.0	8758.426^b	12.8		-0.1	
8760.428	3.7478	3.0	2.3329^o	4.0	8760.437	17.8		-1.9	
8768.601	1.4135^o	5.0	0.0000	6.0	8768.601	1048.7		-3.3	
8799.106	5.4064^o	8.0	3.9978	7.0	8799.127^b	6.1		-0.1	
8799.197	4.7941	8.0	3.3855^o	7.0	8799.126^b	5.0		-1.0	
8800.209	4.3925	4.0	2.9840^o	3.0	8800.191	10.1		-1.2	
8802.002	3.4495^o	7.0	2.0413	7.0	8801.987	43.3		-1.9	
8812.444	2.8694	6.0	1.4629^o	6.0	8812.452	183.0		-2.0	
8935.594	3.2571	7.0	1.8700^o	8.0	8935.589	97.3		-1.8	
8968.816	4.8556	6.0	3.4736^o	7.0	8968.870	10.3		-0.6	
8981.643	3.5072	7.0	2.1272^o	7.0	8981.650	2.6		-3.0	
9004.341	2.4453	8.0	1.0688^o	9.0	9004.351	350.0		-2.3	
9041.096	3.5217	4.0	2.1508^o	5.0	9041.150	6.9		-2.5	
9112.893	2.9840^o	3.0	1.6239	2.0	9112.943	1.9		-3.8	
9132.148	3.4311^o	9.0	2.0739	8.0	9132.162	5.6		-2.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
9141.406	4.1558	6.0	2.7999^o	6.0	9141.420	7.9		-1.6	
9165.456	3.6800	7.0	2.3276^o	7.0	9165.454	9.5		-2.2	
9206.032	3.2164	8.0	1.8700^o	8.0	9206.041^c	69.3		-1.9	
9211.052	3.2283	5.0	1.8827^o	5.0	9211.077	36.7		-2.2	
9216.632	4.1558	6.0	2.8110^o	5.0	9216.671	10.1		-1.5	
9490.682	5.2519^o	8.0	3.9459	8.0	9490.702	665.2			
9800.134	3.2571	7.0	1.9924^o	6.0	9800.212	47.7		-1.9	
9992.220	2.3997	9.0	1.1592^o	8.0	9992.250	853.9		-1.8	
10326.959	4.9777^o	7.0	3.7775	6.0	10327.001	2499.0			

Table A.22: Measured wavelengths (λ_o) and intensities of Er II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
3786.836	3.2731^o	5.5	0.0000	6.5	3786.843^n	4056.2		-0.7	-0.5
3791.828	3.3234^o	5.5	0.0546	5.5	3791.829^n	1415.0		-1.0	-0.9
3804.899	4.9585	7.5	1.7010^o	8.5	3804.930	450.7		0.7	
3818.712	3.8821^o	3.5	0.6363	4.5	3818.696^c	713.9		-0.6	
3827.321	6.1569	7.5	2.9185^o	8.5	3827.319^c	1607.3			
3830.482	3.2358^o	6.5	0.0000	6.5	3830.486^n	10650.3		-0.3	-0.2
3832.559	4.9150^o	2.5	1.6810	2.5	3832.548	442.3		0.6	
3839.266	5.3296	5.5	2.1013^o	5.5	3839.272^c	3099.9			
3842.514	4.7878^o	2.5	1.5622	2.5	3842.504	208.5		0.1	
3849.286	3.2200^o	5.5	0.0000	6.5	3849.286	325.3		-1.8	
3851.596	4.1045^o	5.5	0.8864	5.5	3851.611^n	311.4		-0.6	-0.6
3864.317	4.7696^o	1.5	1.5622	2.5	3864.286^c	1255.2		0.9	
3865.585	5.2586^o	3.5	2.0522	4.5	3865.563^c	285.6		0.9	
3876.816	5.7164	6.5	2.5193^o	6.5	3876.795	176.5			
3880.611	3.8303^o	3.5	0.6363	4.5	3880.617^n	1736.6		-0.2	-0.2
3882.886	4.0785^o	4.5	0.8864	5.5	3882.891^n	1435.5		0.0	-0.1
3887.149	4.5577^o	4.5	1.3691	4.5	3887.165	98.1		-0.5	
3889.794	4.0785^o	4.5	0.8921	4.5	3889.799^n	106.6		-1.1	-0.9
3890.613	4.5548^o	3.5	1.3691	4.5	3890.621	277.0		-0.0	
3895.803	4.0679^o	5.5	0.8864	5.5	3895.811^n	171.2		-0.9	-0.9
3896.234	3.2358^o	6.5	0.0546	5.5	3896.238^n	13378.8		-0.2	-0.1
3906.312	3.1730^o	5.5	0.0000	6.5	3906.315^n	35865.6		0.2	0.1
3908.654	4.5217^o	3.5	1.3506	3.5	3908.655^c	198.8		-0.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	log gf Boltz.	[46]
3911.907	3.2230^o	4.5	0.0546	5.5	3911.934	101.0		-2.3	
3912.421	4.5701	8.5	1.4021^o	7.5	3912.434	355.5		0.1	
3915.692	3.2200^o	5.5	0.0546	5.5	3915.705	132.7		-2.2	
3921.880	3.8303^o	3.5	0.6700	3.5	3921.888^n	261.3		-1.0	-1.0
3932.271	4.0441^o	5.5	0.8921	4.5	3932.255^c	1312.9		-0.1	
3938.626	3.1469^o	5.5	0.0000	6.5	3938.628	8811.6		-0.4	
3938.923	5.3588	7.5	2.2122^o	8.5	3938.923	59.4		0.4	
3943.182	4.0297^o	4.5	0.8864	5.5	3943.191^n	162.3		-1.0	-1.1
3959.891	6.3045	6.5	3.1744^o	6.5	3959.883^b	116.9			
3959.899	4.6659	6.5	1.5359^o	5.5	3959.883^{bc}	116.9		-0.2	
3963.361	3.9734	7.5	0.8461^o	7.5	3963.356	154.2		-1.1	
3969.437	3.7589^o	4.5	0.6363	4.5	3969.438^n	162.8		-1.3	-1.2
3974.717	3.1730^o	5.5	0.0546	5.5	3974.715^n	1695.5		-1.1	-0.9
3975.245	4.6786^o	4.5	1.5607	3.5	3975.264^c	305.8		0.2	
3980.144	4.0005^o	4.5	0.8864	5.5	3980.147^n	156.9		-1.0	-1.1
3994.853	3.7390^o	5.5	0.6363	4.5	3994.857^n	33.4		-2.0	-1.9
3995.261	4.7833^o	2.5	1.6810	2.5	3995.263	30.1		-0.7	
4009.156	3.0916^o	6.5	0.0000	6.5	4009.156^c	2637.5		-1.0	
4010.570	4.6527^o	3.5	1.5622	2.5	4010.591	64.4		-0.5	
4012.960	4.7696^o	1.5	1.6810	2.5	4012.985^c	1027.4		0.9	
4015.573	3.7230^o	4.5	0.6363	4.5	4015.577^n	348.4		-1.0	-1.1
4016.931	5.4878	7.5	2.4022^o	7.5	4016.931^c	143.2		1.0	
4018.479	3.9765^o	5.5	0.8921	4.5	4018.471^n	40.5		-1.6	-1.8
4025.528	4.4481^o	4.5	1.3691	4.5	4025.535^c	1046.7		0.4	
4031.862	6.2471	5.5	3.1730^o	5.5	4031.852^c	1147.7			
4037.652	4.7507^o	3.5	1.6810	2.5	4037.681^{bc}	6963.6			
4037.664	5.3588	7.5	2.2891^o	7.5	4037.681^b	6963.6			
4038.073	4.6316^o	1.5	1.5622	2.5	4038.057	72.9		-0.5	
4043.008	3.7356^o	3.5	0.6700	3.5	4043.011	270.4		-1.1	
4048.342	3.9481^o	4.5	0.8864	5.5	4048.341^n	297.7		-0.8	-0.9
4049.485	3.0608^o	5.5	0.0000	6.5	4049.487	513.7		-1.8	
4055.464	3.6926^o	4.5	0.6363	4.5	4055.469^n	1594.1		-0.4	-0.6
4059.779	3.7230^o	4.5	0.6700	3.5	4059.788^n	814.9		-0.7	-0.8
4062.944	3.9427^o	5.5	0.8921	4.5	4062.960^n	104.9		-1.2	-1.6
4068.292	4.6659	6.5	1.6193^o	6.5	4068.304^c	44.5		-0.6	
4074.003	4.6030^o	2.5	1.5607	3.5	4074.000	27.0		-0.9	
4094.642	3.0270^o	5.5	0.0000	6.5	4094.651	938.3		-1.5	
4097.300	6.6816	6.5	3.6565^o	5.5	4097.304	18.3			
4100.558	3.6926^o	4.5	0.6700	3.5	4100.564^n	599.2		-0.8	-0.9
4112.615	5.1135	8.5	2.0997^o	9.5	4112.615	35.4		-0.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
4120.116	6.7430	6.5	3.7347[o]	5.5	4120.117[c]	77.4			
4120.796	4.6271	7.5	1.6193[o]	6.5	4120.792	59.5		-0.5	
4125.574	6.3277	5.5	3.3234[o]	5.5	4125.593[b]	44.9			
4125.585	3.8907[o]	4.5	0.8864	5.5	4125.593[b]	44.9		-1.7	
4136.201	4.3473[o]	4.5	1.3506	3.5	4136.197	21.3		-1.4	
4136.379	4.6316[o]	1.5	1.6351	1.5	4136.384	17.1		-1.1	
4140.199	5.3959	7.5	2.4022[o]	7.5	4140.172[c]	651.0			
4142.914	3.6281[o]	3.5	0.6363	4.5	4142.912[n]	559.1		-0.9	-0.7
4149.133	6.0163	6.5	3.0290[o]	7.5	4149.158	55.0			
4157.438	4.5701	8.5	1.5888[o]	9.5	4157.438	39.6		-0.8	
4160.761	5.9322	5.5	2.9533[o]	5.5	4160.736[c]	145.6			
4161.807	4.3473[o]	4.5	1.3691	4.5	4161.833	63.8		-0.9	
4169.865	3.0270[o]	5.5	0.0546	5.5	4169.867	123.1		-2.4	
4176.196	4.6030[o]	2.5	1.6351	1.5	4176.162[c]	437.6		0.3	
4189.984	3.6281[o]	3.5	0.6700	3.5	4189.985[n]	247.1		-1.3	-1.0
4198.705	5.8334	6.5	2.8814[o]	5.5	4198.710[c]	20.4		0.7	
4200.665	4.6316[o]	1.5	1.6810	2.5	4200.669	12.1		-1.2	
4206.187	3.8332[o]	4.5	0.8864	5.5	4206.158[c]	77.4		-1.5	
4223.729	2.9345[o]	6.5	0.0000	6.5	4223.727	114.3		-2.5	
4226.732	6.2558	6.5	3.3234[o]	5.5	4226.725	594.9			
4234.780	3.5968[o]	4.5	0.6700	3.5	4234.775	52.0		-2.0	
4235.836	4.6271	7.5	1.7010[o]	8.5	4235.835	55.7		-0.5	
4251.936	5.0148	9.5	2.0997[o]	9.5	4251.934	267.6		0.7	
4255.372	5.8850	7.5	2.9723[o]	7.5	4255.384[c]	106.3			
4276.480	4.4871	9.5	1.5888[o]	9.5	4276.480	384.5		0.1	
4277.065	4.5789[o]	2.5	1.6810	2.5	4277.043[c]	24.5		-0.9	
4280.829	4.6659	6.5	1.7705[o]	7.5	4280.830	78.0		-0.3	
4281.305	4.9585	7.5	2.0634[o]	6.5	4281.332	20.8		-0.5	
4292.141	5.3575	4.5	2.4698[o]	4.5	4292.128[c]	102.9		0.7	
4301.596	2.8814[o]	5.5	0.0000	6.5	4301.602[n]	3186.0		-1.1	-1.5
4303.794	3.5163[o]	5.5	0.6363	4.5	4303.817[b]	383.4		-1.2	
4303.816	2.9345[o]	6.5	0.0546	5.5	4303.817[bc]	382.1		-2.0	
4315.778	4.4871	9.5	1.6152[o]	8.5	4315.777	50.0		-0.7	
4316.558	5.9322	5.5	3.0608[o]	5.5	4316.576	41.1			
4319.937	4.5701	8.5	1.7010[o]	8.5	4319.937	210.7		-0.0	
4325.828	5.3440	6.5	2.4787[o]	5.5	4325.828[c]	175.1		1.0	
4330.274	4.1848	6.5	1.3225[o]	6.5	4330.275	64.4		-1.0	
4339.000	4.6271	7.5	1.7705[o]	7.5	4338.994	100.0		-0.3	
4351.654	3.7347[o]	5.5	0.8864	5.5	4351.623[c]	1152.8		-0.4	
4359.242	6.0163	6.5	3.1730[o]	5.5	4359.212[c]	251.0			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
4363.345	5.9322	5.5	3.0916^o	6.5	4363.318^c	103.0			
4367.738	4.9533	6.5	2.1156^o	5.5	4367.749	14.5		-0.6	
4369.386	4.1592	7.5	1.3225^o	6.5	4369.386	193.5		-0.6	
4369.595	3.7230^o	4.5	0.8864	5.5	4369.596^n	28.2		-2.0	-1.9
4373.318	2.8341^o	6.5	0.0000	6.5	4373.318	43.7		-3.0	
4378.345	3.7230^o	4.5	0.8921	4.5	4378.349^n	51.3		-1.8	-1.8
4384.692	2.8814^o	5.5	0.0546	5.5	4384.695	3739.6	-1.5	-1.0	
4397.687	6.2296	7.5	3.4112^o	6.5	4397.707	87.0			
4400.097	5.5693	6.5	2.7524^o	7.5	4400.090^c	26.9		0.5	
4403.173	5.0271	8.5	2.2122^o	8.5	4403.176	36.7		-0.1	
4406.143	4.8653^o	5.5	2.0522	4.5	4406.133^c	39.4		-0.3	
4419.585	5.5569	8.5	2.7524^o	7.5	4419.606^b	2342.0			
4419.608	4.4871	9.5	1.6827^o	10.5	4419.606^b	2342.2		1.0	
4420.580	4.9585	7.5	2.1547^o	6.5	4420.582	37.0		-0.2	
4422.322	6.0758	6.5	3.2731^o	5.5	4422.353^b	330.4			
4422.340	5.4843	8.5	2.6816^o	8.5	4422.353^b	324.7			
4448.610	4.4871	9.5	1.7010^o	8.5	4448.615	72.4		-0.5	
4459.236	2.8341^o	6.5	0.0546	5.5	4459.237	687.2		-1.8	
4480.255	6.7430	6.5	3.9765^o	5.5	4480.258^c	3534.8			
4493.831	5.2257^o	3.5	2.4676	3.5	4493.810^c	548.8			
4495.528	4.1592	7.5	1.4021^o	7.5	4495.535	89.9		-0.9	
4519.437	2.7425^o	6.5	0.0000	6.5	4519.438	1064.6		-1.7	
4526.450	4.2989^o	4.5	1.5607	3.5	4526.420^c	591.2		0.1	
4533.706	3.4038^o	4.5	0.6700	3.5	4533.709	13.2		-2.7	
4540.720	5.0716^o	4.5	2.3419	5.5	4540.725	102.5		0.4	
4563.259	4.1183	8.5	1.4021^o	7.5	4563.267	611.3		-0.1	
4566.381	5.3959	7.5	2.6816^o	8.5	4566.383^c	283.4			
4581.686	2.7053^o	5.5	0.0000	6.5	4581.683	73.7		-2.9	
4589.314	4.8163	6.5	2.1156^o	5.5	4589.318	58.1		-0.2	
4598.107	5.9314	6.5	3.2358^o	6.5	4598.113^c	6841.7			
4611.252	2.7425^o	6.5	0.0546	5.5	4611.252	1502.6		-1.6	
4614.947	5.3708	6.5	2.6850^o	5.5	4614.961^c	96.9		0.8	
4620.272	5.1135	8.5	2.4309^o	8.5	4620.305	20.7		-0.2	
4624.756	5.3651	5.5	2.6850^o	5.5	4624.776^c	276.3			
4629.622	5.3588	7.5	2.6816^o	8.5	4629.620^c	26.0		0.2	
4630.882	4.6271	7.5	1.9506^o	8.5	4630.882	1035.4		0.8	
4640.595	4.4871	9.5	1.8162^o	9.5	4640.594	254.7		0.1	
4649.954	5.3708	6.5	2.7053^o	5.5	4649.924^c	310.9			
4658.519	4.0297^o	4.5	1.3691	4.5	4658.485^c	69.3	-1.3	-1.1	
4665.439	4.6703	5.5	2.0136^o	4.5	4665.439	609.3		0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
4676.494	6.3045	6.5	3.6541^o	7.5	4676.520	174.7			
4679.061	4.1848	6.5	1.5359^o	5.5	4679.063	949.5		0.2	
4688.638	5.3959	7.5	2.7524^o	7.5	4688.624	654.0			
4721.984	5.0271	8.5	2.4022^o	7.5	4722.011^c	1213.4			
4724.522	4.6659	6.5	2.0424^o	7.5	4724.536^c	1212.1		1.0	
4731.588	4.5701	8.5	1.9506^o	8.5	4731.587	701.4		0.6	
4733.963	6.3243	7.5	3.7061^o	6.5	4733.980	70.8			
4735.391	4.9593^o	4.5	2.3419	5.5	4735.410^c	1974.1			
4736.956	4.6659	6.5	2.0493^o	5.5	4736.956^c	234.6		0.3	
4739.013	6.3359	7.5	3.7205^o	6.5	4738.998^c	1012.7			
4747.129	4.7656	5.5	2.1547^o	6.5	4747.092^c	44.3		-0.3	
4751.523	2.6086^o	5.5	0.0000	6.5	4751.526^c	3381.7		-1.3	
4751.974	6.3243	7.5	3.7160^o	7.5	4751.957^c	48.0			
4754.614	4.6703	5.5	2.0634^o	6.5	4754.610	83.6		-0.2	
4759.948	5.0716^o	4.5	2.4676	3.5	4759.913^c	2704.7			
4762.642	4.6659	6.5	2.0634^o	6.5	4762.643^c	432.0		0.6	
4768.399	5.5604^o	1.5	2.9610	2.5	4768.397^b	24.4		0.5	
4768.431	6.2558	6.5	3.6565^o	5.5	4768.397^b	25.8			
4795.476	4.6271	7.5	2.0424^o	7.5	4795.476	584.2		0.6	
4820.354	3.9734	7.5	1.4021^o	7.5	4820.352	2154.4		0.3	
4826.536	6.7430	6.5	4.1750^o	6.5	4826.576^c	37.3			
4834.755	4.6271	7.5	2.0634^o	6.5	4834.750	74.7		-0.2	
4848.415	4.8455	6.5	2.2891^o	7.5	4848.418	32.7		-0.3	
4851.641	4.6703	5.5	2.1156^o	5.5	4851.635	205.8		0.3	
4853.115	2.6086^o	5.5	0.0546	5.5	4853.118	884.6		-1.9	
4854.408	5.4878	7.5	2.9345^o	6.5	4854.412^b	40.9		0.7	
4854.434	5.0209^o	4.5	2.4676	3.5	4854.412^b	40.2		0.0	
4858.448	5.6145	8.5	3.0633^o	9.5	4858.467^b	134.4			
4858.470	4.9533	6.5	2.4022^o	7.5	4858.467^b	133.1		0.5	
4861.597	2.6041^o	6.5	0.0546	5.5	4861.598	692.1		-2.0	
4869.630	5.7683	5.5	3.2230^o	4.5	4869.625^c	57.7			
4872.090	4.1592	7.5	1.6152^o	8.5	4872.088	1327.5		0.4	
4872.476	2.5438^o	7.5	0.0000	6.5	4872.478	1348.2		-1.8	
4878.346	3.4272^o	5.5	0.8864	5.5	4878.325^c	138.6		-1.6	
4879.888	4.1592	7.5	1.6193^o	6.5	4879.895	79.4		-0.8	
4886.284	3.1730^o	5.5	0.6363	4.5	4886.290^n	132.7		-2.0	-1.8
4890.134	6.2551	7.5	3.7205^o	6.5	4890.095^c	446.4			
4896.957	4.1848	6.5	1.6538^o	6.5	4896.944	299.0		-0.2	
4903.641	4.9585	7.5	2.4309^o	8.5	4903.637	131.8		0.5	
4919.902	2.5193^o	6.5	0.0000	6.5	4919.904^c	24.3		-3.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
4935.627	4.6659	6.5	2.1547^o	6.5	4935.632	47.5		-0.4	
4937.862	6.0264	4.5	3.5163^o	5.5	4937.887^c	40.6			
4946.748	5.4878	7.5	2.9822^o	8.5	4946.711^c	56.2		0.8	
4951.743	4.1183	8.5	1.6152^o	8.5	4951.746^b	657.5		0.0	
4951.769	6.3943	6.5	3.8912^o	5.5	4951.746^b	655.1			
4953.587	5.4843	8.5	2.9822^o	8.5	4953.589	42.9		0.7	
4963.056	6.2134	6.5	3.7160^o	7.5	4963.030^c	53.5			
4966.623	4.9743	6.5	2.4787^o	5.5	4966.616	34.4		-0.1	
4988.675	6.8582	7.5	4.3736^o	6.5	4988.673	37.1			
5000.382	2.4787^o	5.5	0.0000	6.5	5000.376^c	1957.7		-1.7	
5004.226	5.4477^o	3.5	2.9709	3.5	5004.204^c	2147.8			
5019.166	4.5217^o	3.5	2.0522	4.5	5019.175^c	53.8		-0.5	
5028.905	2.5193^o	6.5	0.0546	5.5	5028.906	2320.5		-1.6	
5040.916	5.4878	7.5	3.0290^o	7.5	5040.905^c	174.6			
5042.047	4.1592	7.5	1.7010^o	8.5	5042.049	733.0		0.2	
5072.848	4.8455	6.5	2.4022^o	7.5	5072.856^b	120.2		0.3	
5072.870	5.7164	6.5	3.2731^o	5.5	5072.856^b	120.0			
5092.172	4.9533	6.5	2.5193^o	6.5	5092.179	23.8		-0.2	
5119.645	5.4843	8.5	3.0633^o	9.5	5119.632^c	52.8		0.9	
5127.403	4.1183	8.5	1.7010^o	8.5	5127.404	353.2		-0.2	
5131.993	2.4698^o	4.5	0.0546	5.5	5132.017^c	24.9		-3.6	
5133.012	4.9585	7.5	2.5438^o	7.5	5133.010	45.0		0.1	
5133.833	4.1848	6.5	1.7705^o	7.5	5133.832	537.6		0.1	
5134.203	4.8163	6.5	2.4022^o	7.5	5134.186	31.4		-0.3	
5134.588	6.2471	5.5	3.8332^o	4.5	5134.546^c	186.6			
5159.167	6.0758	6.5	3.6734^o	6.5	5159.178^c	102.2			
5188.899	4.1592	7.5	1.7705^o	7.5	5188.897	545.1		0.1	
5191.640	4.4871	9.5	2.0997^o	9.5	5191.639^c	32.1		-0.7	
5229.319	4.9743	6.5	2.6041^o	6.5	5229.339	430.7			
5236.890	4.8455	6.5	2.4787^o	5.5	5236.875	102.0		0.3	
5239.732	5.8472	7.5	3.4817^o	6.5	5239.701^c	174.2			
5245.427	5.0531^o	5.5	2.6901	5.5	5245.433^c	550.5			
5255.933	3.9734	7.5	1.6152^o	8.5	5255.931	766.3		-0.0	
5256.470	4.5701	8.5	2.2122^o	8.5	5256.465	37.8		-0.5	
5292.390	3.6926^o	4.5	1.3506	3.5	5292.425^c	23.9	-2.0	-1.9	
5301.835	5.5736	7.5	3.2358^o	6.5	5301.829^c	145.2			
5302.303	4.8163	6.5	2.4787^o	5.5	5302.302	45.7		-0.1	
5312.371	5.0148	9.5	2.6816^o	8.5	5312.370	27.1		-0.0	
5332.218	4.7921^o	3.5	2.4676	3.5	5332.199^{bc}	42.2		-0.1	
5332.226	6.0264	4.5	3.7019^o	5.5	5332.199^b	44.4			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
5344.505	5.3825	9.5	3.0633^o	9.5	5344.498	33.5		0.6	
5395.898	4.8163	6.5	2.5193^o	6.5	5395.905	30.5		-0.2	
5414.631	2.2891^o	7.5	0.0000	6.5	5414.632	494.3		-2.4	
5419.871	4.7656	5.5	2.4787^o	5.5	5419.861	21.3		-0.4	
5446.508	5.9322	5.5	3.6565^o	5.5	5446.472^c	22.6			
5454.270	3.9734	7.5	1.7010^o	8.5	5454.271^c	56.3		-1.1	
5462.434	4.9743	6.5	2.7053^o	5.5	5462.431	25.7		-0.1	
5486.901	6.6816	6.5	4.4226^o	6.5	5486.895^c	22.4			
5513.418	4.9533	6.5	2.7053^o	5.5	5513.416	13.1		-0.4	
5521.786	5.6485	5.5	3.4038^o	4.5	5521.806^c	10.9		0.5	
5522.581	5.2152^o	2.5	2.9709	3.5	5522.616^c	50.5		0.6	
5539.823	5.4103	5.5	3.1730^o	5.5	5539.787^c	28.6		0.6	
5540.990	6.2134	6.5	3.9765^o	5.5	5540.964^c	55.3			
5579.450	5.3959	7.5	3.1744^o	6.5	5579.437^c	23.7		0.5	
5604.050	5.9322	5.5	3.7205^o	6.5	5604.056^c	81.9			
5606.141	5.9314	6.5	3.7205^o	6.5	5606.151^c	96.0			
5618.307	4.9585	7.5	2.7524^o	7.5	5618.305^{bc}	40.1		0.1	
5618.316	5.4459^o	3.5	3.2398	4.5	5618.305^b	42.7		0.8	
5626.525	3.9734	7.5	1.7705^o	7.5	5626.525	239.3		-0.4	
5632.574	4.6703	5.5	2.4698^o	4.5	5632.574^c	29.9		-0.4	
5634.127	6.6816	6.5	4.4816^o	5.5	5634.139^{bc}	11.9			
5634.137	6.7430	6.5	4.5431^o	5.5	5634.139^b	11.9			
5641.464	5.3440	6.5	3.1469^o	5.5	5641.428^c	175.7			
5710.870	5.1049	7.5	2.9345^o	6.5	5710.867	14.8		-0.1	
5730.635	6.2558	6.5	4.0929^o	6.5	5730.646	23.2			
5731.461	5.8166	8.5	3.6541^o	7.5	5731.506^c	41.5			
5736.943	4.8455	6.5	2.6850^o	5.5	5736.945^c	85.0		0.3	
5738.144	5.8334	6.5	3.6734^o	6.5	5738.115^c	18.7			
5752.503	2.1547^o	6.5	0.0000	6.5	5752.526^c	965.9		-2.3	
5757.639	6.3277	5.5	4.1750^o	6.5	5757.623	52.8			
5784.683	6.2471	5.5	4.1045^o	5.5	5784.654^c	2039.0			
5805.621	3.0270^o	5.5	0.8921	4.5	5805.666	9.5		-3.1	
5810.694	6.0758	6.5	3.9427^o	5.5	5810.713	12.0			
5835.837	5.0849^o	2.5	2.9610	2.5	5835.834^c	4064.0			
5842.682	4.1848	6.5	2.0634^o	6.5	5842.682	10.0		-1.5	
5889.039	5.4459^o	3.5	3.3412	3.5	5889.001	39.6		0.9	
5924.718	5.3651	5.5	3.2731^o	5.5	5924.760	212.4			
5970.874	4.1183	8.5	2.0424^o	7.5	5970.889	337.0		0.0	
5989.886	4.1848	6.5	2.1156^o	5.5	5989.884	11.1		-1.4	
6006.783	2.0634^o	6.5	0.0000	6.5	6006.788	139.1		-3.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[46]
6013.382	2.9533^o	5.5	0.8921	4.5	6013.400	8.9		-3.2	
6015.732	4.7656	5.5	2.7053^o	5.5	6015.731	11.6		-0.6	
6034.120	4.5217^o	3.5	2.4676	3.5	6034.083^c	9.8		-1.0	
6039.651	4.1045^o	5.5	2.0522	4.5	6039.642	2.2	-2.2	-2.2	
6048.147	2.0493^o	5.5	0.0000	6.5	6048.145	45.0		-3.7	
6068.538	2.0424^o	7.5	0.0000	6.5	6068.547	14.9		-4.2	
6105.179	4.1848	6.5	2.1547^o	6.5	6105.178	20.1		-1.1	
6121.955	6.3982	7.5	4.3736^o	6.5	6121.915	12.0			
6126.893	4.6271	7.5	2.6041^o	6.5	6126.889	10.3		-0.8	
6170.064	2.0634^o	6.5	0.0546	5.5	6170.073	94.0		-3.3	
6201.601	5.6908	4.5	3.6922^o	3.5	6201.613	9.2		0.6	
6207.891	4.4642^o	4.5	2.4676	3.5	6207.938^c	14.9		-0.8	
6256.652	4.9533	6.5	2.9723^o	7.5	6256.682	63.3		0.5	
6273.734	6.3982	7.5	4.4226^o	6.5	6273.734^c	11.4			
6319.207	5.3026^o	3.5	3.3412	3.5	6319.176	41.2		0.8	
6347.166	4.9350	7.5	2.9822^o	8.5	6347.168	10.2		-0.3	
6348.554	3.2749	6.5	1.3225^o	6.5	6348.506	4.0		-3.0	
6361.841	4.0005^o	4.5	2.0522	4.5	6361.821^c	243.3	-0.3	-0.2	
6441.316	3.9765^o	5.5	2.0522	4.5	6441.321^c	22.0	-1.4	-1.3	
6449.047	6.0264	4.5	4.1045^o	5.5	6449.066^c	5.7		0.9	
6485.906	4.8455	6.5	2.9345^o	6.5	6485.871^c	20.1		-0.1	
6556.327	3.9427^o	5.5	2.0522	4.5	6556.329^n	11.1		-1.6	-1.7
6568.101	3.4230	4.5	1.5359^o	5.5	6568.143^c	3.1		-2.9	
6594.232	6.3277	5.5	4.4481^o	4.5	6594.211^b	13.2			
6594.263	5.3026^o	3.5	3.4230	4.5	6594.211^{bc}	13.3		0.3	
6615.763	6.2471	5.5	4.3736^o	6.5	6615.816^c	13.4			
6616.741	4.8455	6.5	2.9723^o	7.5	6616.742^c	8.0		-0.5	
6761.677	4.1750^o	6.5	2.3419	5.5	6761.694^c	7.7		-1.4	
6763.868	6.2551	7.5	4.4226^o	6.5	6763.853	3.5			
6768.413	4.1731^o	5.5	2.3419	5.5	6768.435	6.1		-1.5	
6768.935	4.7656	5.5	2.9345^o	6.5	6768.959^c	11.8		-0.4	
6799.625	6.3045	6.5	4.4816^o	5.5	6799.597	5.5			
6824.205	6.6816	6.5	4.8653^o	5.5	6824.233^c	9.7			
6835.408	5.0531^o	5.5	3.2398	4.5	6835.416	5.8		-0.3	
6835.927	2.7053^o	5.5	0.8921	4.5	6835.900^c	36.9		-2.7	
6881.437	6.0864	6.5	4.2852^o	5.5	6881.403^c	105.4			
6918.575	4.4816^o	5.5	2.6901	5.5	6918.545^c	5.8		-1.1	
6935.595	4.9593^o	4.5	3.1722	5.5	6935.628	23.2		0.2	
6941.277	5.3959	7.5	3.6103^o	6.5	6941.324^c	5.2		0.1	
6945.215	6.3277	5.5	4.5431^o	5.5	6945.182^c	11.7			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[46]
6950.399	6.1569	7.5	4.3736^o	6.5	6950.386^c	36.4			
6951.900	6.2471	5.5	4.4642^o	4.5	6951.900^c	505.4			
6986.520	4.4642^o	4.5	2.6901	5.5	6986.484^c	40.9		-0.2	
7054.337	4.2246^o	4.5	2.4676	3.5	7054.379^b	2.6		-1.8	
7054.379	4.1592	7.5	2.4022^o	7.5	7054.379^b	2.4		-1.9	
7065.085	4.9743	6.5	3.2200^o	5.5	7065.034	62.2		0.7	
7070.963	4.4226^o	6.5	2.6697	7.5	7070.984	2.9		-1.4	
7080.872	6.0864	6.5	4.3359^o	5.5	7080.847^c	2.8		0.8	
7186.305	4.8163	6.5	3.0916^o	6.5	7186.306^c	5.4		-0.6	
7225.945	4.2852^o	5.5	2.5699	6.5	7225.976^c	7.0		-1.2	
7254.196	4.6271	7.5	2.9185^o	8.5	7254.140^c	38.0		-0.0	
7264.899	4.1848	6.5	2.4787^o	5.5	7264.882^c	8.0		-1.3	
7307.804	5.3883	4.5	3.6922^o	3.5	7307.786^c	15.9		0.7	
7329.735	4.0329^o	6.5	2.3419	5.5	7329.765^c	10.6		-1.4	
7345.220	4.7921^o	3.5	3.1046	3.5	7345.270^b	1.6		-1.1	
7345.253	4.1183	8.5	2.4309^o	8.5	7345.270^b	1.6		-2.0	
7349.801	5.3883	4.5	3.7019^o	5.5	7349.819^{bc}	3.3		-0.0	
7349.819	5.4211	6.5	3.7347^o	5.5	7349.819^b	3.2		0.0	
7388.814	4.4226^o	6.5	2.7451	6.5	7388.860	1.9		-1.6	
7410.964	5.3651	5.5	3.6926^o	4.5	7411.019	1.8		-0.3	
7418.253	4.4159^o	5.5	2.7451	6.5	7418.201^c	1.4		-1.7	
7449.791	6.0864	6.5	4.4226^o	6.5	7449.778^c	3.3		1.0	
7458.262	4.1295^o	4.5	2.4676	3.5	7458.237^c	1.4		-2.1	
7510.430	5.3708	6.5	3.7205^o	6.5	7510.487^{bc}	5.9		0.2	
7510.485	6.2558	6.5	4.6055^o	5.5	7510.487^b	5.7			
7526.785	5.6908	4.5	4.0441^o	5.5	7526.789	0.9		-0.1	
7582.490	4.6800^o	3.5	3.0454	4.5	7582.532^c	12.0		-0.4	
7613.500	5.3440	6.5	3.7160^o	7.5	7613.482^c	40.7			
7645.685	3.2749	6.5	1.6538^o	6.5	7645.652^c	49.6		-1.7	
7654.442	1.6193^o	6.5	0.0000	6.5	7654.477	90.6		-3.6	
7674.662	4.9562^o	3.5	3.3412	3.5	7674.670	1.9		-0.8	
7679.944	5.4103	5.5	3.7964^o	6.5	7679.996^c	779.4			
7694.178	4.0785^o	4.5	2.4676	3.5	7694.194^n	1.8		-2.0	-1.7
7757.636	4.0653^o	3.5	2.4676	3.5	7757.676^c	7.5		-1.4	
7764.300	5.7683	5.5	4.1720^o	4.5	7764.266^b	4.8		0.7	
7764.309	4.8163	6.5	3.2200^o	5.5	7764.266^{bc}	4.8		-0.6	
7818.000	6.0264	4.5	4.4410^o	3.5	7817.967^c	7.2			
7823.409	4.7498^o	5.5	3.1655	6.5	7823.371^c	2.1		-1.0	
7858.093	6.4778	6.5	4.9004^o	5.5	7858.080	6.9			
7858.124	6.0264	4.5	4.4491^o	5.5	7858.080^c	6.3			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf [46]
7882.334	4.8455	6.5	3.2731^o	5.5	7882.361	15.5		0.0	
7901.442	5.3651	5.5	3.7964^o	6.5	7901.424	1.3		-0.3	
7908.945	6.0163	6.5	4.4491^o	5.5	7908.953^c	204.2			
7934.594	4.0297^o	4.5	2.4676	3.5	7934.555	1.7	-2.2	-2.1	
7956.787	5.9314	6.5	4.3736^o	6.5	7956.832^c	3.2		0.8	
7979.046	3.8953^o	6.5	2.3419	5.5	7979.054	5.1		-1.7	
8023.103	4.9593^o	4.5	3.4145	5.5	8023.064^c	47.9		0.7	
8328.540	3.7964^o	6.5	2.3082	7.5	8328.556^n	9.5		-1.6	-1.0
8367.543	1.5359^o	5.5	0.0546	5.5	8367.562	7.8		-4.7	
8466.139	3.5163^o	5.5	2.0522	4.5	8466.189^b	7.1		-2.0	
8466.230	6.3943	6.5	4.9303^o	5.5	8466.188^b	7.8			
8669.869	3.9734	7.5	2.5438^o	7.5	8669.891	3.2		-1.7	
9171.442	4.6703	5.5	3.3189^o	6.5	9171.432	3.7		-0.6	
9206.019	6.0264	4.5	4.6800^o	3.5	9206.041^b	69.3			
9206.074	4.0608^o	4.5	2.7144	4.5	9206.041^{bc}	67.8		-0.2	
10121.282	3.6922^o	3.5	2.4676	3.5	10121.222	49.5		-0.7	

Table A.23: Measured wavelengths (λ_o) and intensities of Tm I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	log gf Boltz.	log gf NIST-ASD
3751.812	3.3036	4.5	0.0000^o	3.5	3751.812^n	25818.2		-0.9	-0.4
3786.996	5.6274^o	6.5	2.3544	5.5	3787.023^{bc}	329.7		-0.2	
3787.015	5.3133^o	7.5	2.0403	8.5	3787.022^{bc}	269.2		-0.6	
3798.541	4.3505	1.5	1.0875^o	2.5	3798.542^n	2873.8		-0.6	0.0
3802.080	5.1925^o	4.5	1.9326	5.5	3802.072^n	602.0		-0.4	-0.3
3826.386	3.2392	2.5	0.0000^o	3.5	3826.384^n	6074.1		-1.5	-1.4
3830.268	4.8625^o	4.5	1.6266	4.5	3830.263^n	61.5		-1.7	-1.6
3840.872	5.1203^o	8.5	1.8933	7.5	3840.868^n	1424.8		-0.1	0.2
3847.515	5.3855^o	6.5	2.1641	6.5	3847.530	318.2		-0.4	
3853.140	5.3191^o	2.5	2.1023	3.5	3853.139	116.5		-0.9	
3872.801	5.3028^o	4.5	2.1023	3.5	3872.818	141.5		-0.8	
3881.249	4.8200^o	5.5	1.6266	4.5	3881.274^c	178.0	-1.7	-1.3	
3883.131	3.1919	2.5	0.0000^o	3.5	3883.126^n	109212.9		-0.3	0.2
3887.347	3.1884	3.5	0.0000^o	3.5	3887.345^n	67359.3		-0.5	-0.2
3896.617	3.1809	2.5	0.0000^o	3.5	3896.609^n	5404.6		-1.6	-1.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3900.804	5.2532^o	3.5	2.0757	3.5	3900.792^c	166.4		-0.8	
3913.617	4.7936^o	3.5	1.6266	4.5	3913.630^c	150.0		-1.4	
3916.476	4.2522	3.5	1.0875^o	2.5	3916.469^n	26731.5		0.3	0.6
3917.147	5.0968^o	4.5	1.9326	5.5	3917.144^n	85.6		-1.3	-0.9
3921.447	5.0933^o	5.5	1.9326	5.5	3921.448^n	96.9		-1.2	-1.1
3927.354	5.3200^o	6.5	2.1641	6.5	3927.363	23.2		-1.6	
3937.285	5.2237^o	3.5	2.0757	3.5	3937.271^n	116.5		-1.0	-0.8
3939.087	4.7731^o	4.5	1.6266	4.5	3939.089^n	197.3		-1.3	-1.5
3947.221	5.4776^o	5.5	2.3375	5.5	3947.225	67.1		-1.0	
3949.272	4.2259	2.5	1.0875^o	2.5	3949.267^n	12694.2		-0.1	0.3
3954.337	5.3354^o	3.5	2.2010	2.5	3954.363	40.6		-1.3	
3956.875	4.7590^o	4.5	1.6266	4.5	3956.889^c	119.9		-1.5	
3962.687	4.7544^o	5.5	1.6266	4.5	3962.689	107.1		-1.6	
3963.533	5.2295^o	2.5	2.1023	3.5	3963.532	56.6		-1.3	
3976.679	5.1925^o	4.5	2.0757	3.5	3976.675^n	158.9		-0.9	-0.6
3980.662	5.5628^o	4.5	2.4491	3.5	3980.677	19.2		-1.4	
3990.875	5.4778^o	2.5	2.3720	1.5	3990.877	18.9		-1.5	
3994.500	5.2532^o	3.5	2.1502	3.5	3994.518	16.9		-1.8	
3995.607	5.5512^o	4.5	2.4491	3.5	3995.587^c	53.4		-1.0	
4000.570	5.2992^o	3.5	2.2010	2.5	4000.563	45.6		-1.3	
4009.371	5.5151^o	1.5	2.4237	2.5	4009.378	140.6		-0.6	
4010.122	5.0234^o	4.5	1.9326	5.5	4010.121^n	77.1		-1.4	-1.8
4014.302	5.1633^o	3.5	2.0757	3.5	4014.289	33.0		-1.6	
4022.597	4.1687	3.5	1.0875^o	2.5	4022.597^n	25.3		-2.8	-2.1
4024.229	5.1203^o	8.5	2.0403	8.5	4024.230^n	898.3		-0.2	-0.1
4025.193	5.2295^o	2.5	2.1502	3.5	4025.203	71.2		-1.2	
4025.615	5.1547^o	4.5	2.0757	3.5	4025.616^n	271.4		-0.7	-0.5
4026.371	5.1807^o	4.5	2.1023	3.5	4026.366^n	61.5		-1.3	-0.8
4027.638	5.4149^o	4.5	2.3375	5.5	4027.665	51.3		-1.1	
4033.007	5.0059^o	6.5	1.9326	5.5	4033.015	79.2		-1.4	
4033.890	5.1483^o	3.5	2.0757	3.5	4033.877^n	30.1		-1.6	-1.5
4044.473	4.1520	1.5	1.0875^o	2.5	4044.461^n	4605.0		-0.6	-0.6
4050.188	5.1360^o	3.5	2.0757	3.5	4050.182	54.5		-1.4	
4055.806	4.6826^o	4.5	1.6266	4.5	4055.808^n	1574.0		-0.4	-0.7
4060.478	4.9851^o	4.5	1.9326	5.5	4060.478^n	45.3		-1.6	-1.9
4060.733	5.1547^o	4.5	2.1023	3.5	4060.736^n	13.7		-2.0	-1.4
4060.908	5.2532^o	3.5	2.2010	2.5	4060.923	31.8		-1.5	
4061.420	5.2528^o	2.5	2.2010	2.5	4061.432	45.2		-1.3	
4062.012	5.5814	3.5	2.5301^o	2.5	4062.023^c	74.6		-0.8	
4062.752	6.0190	4.5	2.9682^o	4.5	4062.730	9.5		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4064.612	5.3670^o	6.5	2.3176	7.5	4064.613	34.1		-1.3	
4072.767	5.4924^o	2.5	2.4491	3.5	4072.765	29.1		-1.3	
4074.109	4.6689^o	5.5	1.6266	4.5	4074.102^n	153.8		-1.5	-1.5
4076.165	4.9733^o	6.5	1.9326	5.5	4076.178	102.6		-1.3	
4077.218	5.2237^o	3.5	2.1838	4.5	4077.209^n	132.1		-0.9	-0.7
4080.019	6.1321	4.5	3.0943^o	5.5	4080.016	31.9		-0.5	
4080.776	5.1876^o	3.5	2.1502	3.5	4080.766	119.9		-1.0	
4085.739	5.1360^o	3.5	2.1023	3.5	4085.748	84.0		-1.2	
4086.750	5.1969^o	6.5	2.1641	6.5	4086.780^c	30.1		-1.6	
4089.186	5.3855^o	6.5	2.3544	5.5	4089.191^c	23.5		-1.5	
4091.352	5.3670^o	6.5	2.3375	5.5	4091.367	21.0		-1.5	
4091.772	5.4776^o	5.5	2.4484	4.5	4091.780	48.9		-1.0	
4092.425	5.4778^o	2.5	2.4491	3.5	4092.429	86.7		-0.8	
4092.633	5.2295^o	2.5	2.2010	2.5	4092.638^c	55.6		-1.3	
4094.181	3.0274	2.5	0.0000^o	3.5	4094.180^n	133761.1		-0.3	0.2
4102.732	5.0968^o	4.5	2.0757	3.5	4102.725^n	48.6		-1.5	-1.2
4104.189	5.3376^o	7.5	2.3176	7.5	4104.192	20.2		-1.6	
4105.838	3.0188	4.5	0.0000^o	3.5	4105.830^n	186803.0		-0.2	0.2
4107.929	5.0930^o	4.5	2.0757	3.5	4107.910^n	278.4		-0.7	-0.4
4114.317	5.3846^o	2.5	2.3720	1.5	4114.328	41.5		-1.2	
4119.477	5.1925^o	4.5	2.1838	4.5	4119.488^n	23.6		-1.7	-1.3
4125.479	5.1547^o	4.5	2.1502	3.5	4125.480^n	51.5		-1.4	-1.1
4126.301	5.1876^o	3.5	2.1838	4.5	4126.299	101.2		-1.0	
4126.615	5.4520^o	5.5	2.4484	4.5	4126.609	14.3		-1.6	
4128.171	5.3200^o	6.5	2.3176	7.5	4128.174	12.9		-1.8	
4132.741	5.1494^o	2.5	2.1502	3.5	4132.708^c	38.0		-1.5	
4137.501	5.3133^o	7.5	2.3176	7.5	4137.505^c	44.8		-1.3	
4138.331	4.0825	1.5	1.0875^o	2.5	4138.357^n	38353.9		0.3	-0.1
4140.031	5.4073^o	7.5	2.4135	6.5	4140.036	51.7		-1.1	
4141.495	5.5228	1.5	2.5301^o	2.5	4141.504	24.3		-1.3	
4143.995	5.3265^o	5.5	2.3355	4.5	4144.002	38.7		-1.3	
4144.323	5.5208	3.5	2.5301^o	2.5	4144.324	28.4		-1.2	
4144.557	4.9232^o	5.5	1.9326	5.5	4144.536^n	13.3		-2.2	-2.3
4145.912	5.0653^o	4.5	2.0757	3.5	4145.908^n	65.2		-1.4	-1.4
4146.131	5.5195	2.5	2.5301^o	2.5	4146.124	26.8		-1.2	
4146.821	5.3265^o	5.5	2.3375	5.5	4146.826	30.4		-1.4	
4150.108	5.1876^o	3.5	2.2010	2.5	4150.105	255.0		-0.6	
4155.757	5.3200^o	6.5	2.3375	5.5	4155.789	26.0		-1.5	
4158.600	4.0679	3.5	1.0875^o	2.5	4158.594^n	714.6		-1.4	-1.1
4159.864	5.1633^o	3.5	2.1838	4.5	4159.855	27.6		-1.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4161.737	5.0539^{o}	3.5	2.0757	3.5	4161.740	37.3		-1.6	
4168.533	5.1236^{o}	2.5	2.1502	3.5	4168.534	69.0		-1.3	
4168.723	5.3453^{o}	2.5	2.3720	1.5	4168.737^{bc}	90.0		-0.9	
4168.755	5.3867^{o}	5.5	2.4135	6.5	4168.737^{bc}	91.4		-0.9	
4170.430	5.3855^{o}	6.5	2.4135	6.5	4170.459^{b}	115.3		-0.8	
4170.449	5.3265^{o}	5.5	2.3544	5.5	4170.459^{b}	114.4		-0.8	
4175.532	5.3819^{o}	5.5	2.4135	6.5	4175.498	13.9		-1.7	
4180.903	5.1483^{o}	3.5	2.1838	4.5	4180.890^{n}	28.3		-1.6	-1.3
4184.511	4.5886^{o}	4.5	1.6266	4.5	4184.511	227.1		-1.3	
4187.616	2.9598	3.5	0.0000^{o}	3.5	4187.607^{n}	163792.4		-0.3	0.1
4190.977	5.0332^{o}	3.5	2.0757	3.5	4190.963^{n}	22.8		-1.8	-1.4
4192.334	4.8891^{o}	6.5	1.9326	5.5	4192.327^{c}	58.9		-1.6	
4193.513	5.4041^{o}	3.5	2.4484	4.5	4193.512^{bc}	31.0		-1.3	
4193.514	5.8537^{o}	6.5	2.8980	6.5	4193.512^{bc}	31.0		-0.8	
4197.921	4.5791^{o}	3.5	1.6266	4.5	4197.931	32.2		-2.2	
4198.413	5.1360^{o}	3.5	2.1838	4.5	4198.416	102.7		-1.1	
4199.282	5.0539^{o}	3.5	2.1023	3.5	4199.287	26.9		-1.7	
4203.730	2.9485	4.5	0.0000^{o}	3.5	4203.731^{n}	139962.8		-0.4	-0.2
4205.753	5.3191^{o}	2.5	2.3720	1.5	4205.761	16.9		-1.6	
4210.818	5.0938^{o}	3.5	2.1502	3.5	4210.821	29.3		-1.7	
4211.972	5.0930^{o}	4.5	2.1502	3.5	4211.955^{c}	10.7	-1.8	-2.1	
4213.217	5.2794^{o}	5.5	2.3375	5.5	4213.221	62.1		-1.1	
4216.849	5.2768^{o}	4.5	2.3375	5.5	4216.853^{c}	38.2		-1.3	
4217.752	5.7356	5.5	2.7969^{o}	5.5	4217.755	20.8		-1.1	
4221.451	5.3598^{o}	1.5	2.4237	2.5	4221.443^{c}	29.2		-1.4	
4221.638	5.3844^{o}	4.5	2.4484	4.5	4221.638	37.0		-1.2	
4222.672	4.0227	3.5	1.0875^{o}	2.5	4222.662^{n}	3763.8		-0.7	-0.5
4228.051	4.8248^{o}	6.5	1.8933	7.5	4228.051	47.7		-1.7	
4235.193	5.0023^{o}	2.5	2.0757	3.5	4235.197	52.4		-1.5	
4235.441	5.2809^{o}	4.5	2.3544	5.5	4235.443	23.7		-1.5	
4236.403	5.1095^{o}	3.5	2.1838	4.5	4236.382	65.4		-1.3	
4236.951	5.0756^{o}	2.5	2.1502	3.5	4236.945^{c}	15.2		-2.0	
4237.609	5.2794^{o}	5.5	2.3544	5.5	4237.614	18.7		-1.6	
4239.635	4.9992^{o}	4.5	2.0757	3.5	4239.634^{n}	8.5		-2.3	-2.2
4240.497	5.1067^{o}	3.5	2.1838	4.5	4240.492	55.4		-1.4	
4241.284	5.2768^{o}	4.5	2.3544	5.5	4241.289	24.6		-1.5	
4241.530	4.8548^{o}	6.5	1.9326	5.5	4241.530^{n}	18.3		-2.1	-1.8
4243.169	5.0234^{o}	4.5	2.1023	3.5	4243.176	31.1	-2.0	-1.7	
4244.916	5.2743^{o}	5.5	2.3544	5.5	4244.927	32.1		-1.4	
4247.413	4.5447^{o}	5.5	1.6266	4.5	4247.421	779.9		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4252.190	5.0986^o	4.5	2.1838	4.5	4252.186^n	20.9		-1.8	-1.6
4253.451	5.3377^o	3.5	2.4237	2.5	4253.455	103.2		-0.8	
4260.489	5.0930^o	4.5	2.1838	4.5	4260.467^n	126.5		-1.0	-0.8
4268.559	5.0539^o	3.5	2.1502	3.5	4268.561	356.1		-0.6	
4271.709	3.9890	2.5	1.0875^o	2.5	4271.709^n	2705.3		-0.9	-0.8
4272.534	5.0848^o	3.5	2.1838	4.5	4272.536	82.0		-1.2	
4274.352	5.3133^o	7.5	2.4135	6.5	4274.360	33.8		-1.3	
4285.840	5.0561^o	6.5	2.1641	6.5	4285.842	39.3		-1.5	
4287.426	4.7842^o	6.5	1.8933	7.5	4287.440^c	15.3	-2.4	-2.3	
4290.876	5.3377^o	3.5	2.4491	3.5	4290.882	39.2		-1.2	
4297.046	5.2220^o	5.5	2.3375	5.5	4297.010^c	98.5		-1.0	
4298.063	5.0848^o	3.5	2.2010	2.5	4298.068	45.2		-1.5	
4298.364	4.5101^o	4.5	1.6266	4.5	4298.364	4297.5	-0.5	-0.1	
4299.590	4.9851^o	4.5	2.1023	3.5	4299.583^n	59.0		-1.4	-1.8
4306.656	5.3265^o	5.5	2.4484	4.5	4306.660	90.1		-0.9	
4310.401	5.2992^o	3.5	2.4237	2.5	4310.400	22.3		-1.5	
4315.647	5.7651	3.5	2.8931^o	3.5	4315.635^c	19.3		-1.1	
4318.396	5.0539^o	3.5	2.1838	4.5	4318.401^c	664.5		-0.3	
4318.687	5.3191^o	2.5	2.4491	3.5	4318.656	48.0		-1.2	
4328.210	4.7963^o	4.5	1.9326	5.5	4328.212	19.5		-2.1	
4334.653	5.1969^o	6.5	2.3375	5.5	4334.653	36.5		-1.4	
4337.619	5.2295^o	2.5	2.3720	1.5	4337.622^c	52.5		-1.2	
4344.478	5.0539^o	3.5	2.2010	2.5	4344.480	310.9		-0.6	
4345.869	5.0023^o	2.5	2.1502	3.5	4345.867^c	293.4		-0.7	
4346.481	4.7842^o	6.5	1.9326	5.5	4346.482	1474.7	-0.4	-0.3	
4347.840	5.2992^o	3.5	2.4484	4.5	4347.838^c	105.8		-0.8	
4352.029	5.6677	5.5	2.8197^o	6.5	4352.025	42.5		-0.8	
4355.685	5.2947^o	2.5	2.4491	3.5	4355.682^c	64.7		-1.0	
4359.927	2.8428	2.5	0.0000^o	3.5	4359.923^n	43259.0		-0.9	-0.7
4363.450	4.7731^o	4.5	1.9326	5.5	4363.451^n	93.3		-1.5	-1.6
4366.289	5.3688	3.5	2.5301^o	2.5	4366.288^c	47.3		-1.1	
4367.238	5.1925^o	4.5	2.3544	5.5	4367.237^n	97.8		-1.0	-0.9
4368.645	5.1916^o	5.5	2.3544	5.5	4368.635^n	33.8		-1.4	-1.2
4375.135	5.1684^o	5.5	2.3355	4.5	4375.131^n	66.6		-1.2	-1.1
4375.470	6.0190	4.5	3.1863^o	4.5	4375.457	16.6		-0.8	
4375.999	5.2809^o	4.5	2.4484	4.5	4375.992^c	29.1		-1.4	
4377.012	5.2809^o	4.5	2.4491	3.5	4377.011	22.8		-1.5	
4378.284	5.1684^o	5.5	2.3375	5.5	4378.302^{bc}	40.8	-1.3	-1.4	
4378.313	5.2794^o	5.5	2.4484	4.5	4378.302^{bc}	40.9		-1.3	
4384.747	4.9025^o	3.5	2.0757	3.5	4384.749	53.7		-1.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4386.431	2.8257	3.5	0.0000^o	3.5	4386.421^n	45978.0		-0.9	-1.1
4388.353	5.0254^o	3.5	2.2010	2.5	4388.367	45.4		-1.5	
4394.421	3.9080	1.5	1.0875^o	2.5	4394.411^n	3484.7		-0.8	-1.0
4395.956	4.7129^o	6.5	1.8933	7.5	4395.956	1977.9	-0.4	-0.2	
4396.496	3.9067	3.5	1.0875^o	2.5	4396.482^n	1159.7		-1.3	-1.3
4398.575	4.8936^o	2.5	2.0757	3.5	4398.581	29.8		-1.8	
4399.723	5.1547^o	4.5	2.3375	5.5	4399.714^n	141.1		-0.8	-0.8
4400.067	4.8926^o	3.5	2.0757	3.5	4400.058^n	27.3		-1.9	-1.5
4403.650	4.8903^o	4.5	2.0757	3.5	4403.653^c	27.6		-1.9	
4409.598	4.8865^o	3.5	2.0757	3.5	4409.604^b	44.1		-1.6	
4409.633	5.5904	4.5	2.7796^o	4.5	4409.604^b	38.9		-0.9	
4411.700	3.8970	2.5	1.0875^o	2.5	4411.695^n	265.2		-2.0	-2.1
4414.800	4.8832^o	2.5	2.0757	3.5	4414.803^c	13.4		-2.2	
4417.467	5.2295^o	2.5	2.4237	2.5	4417.466	68.2		-1.1	
4420.841	5.2528^o	2.5	2.4491	3.5	4420.841	88.7		-0.9	
4422.305	5.1203^o	8.5	2.3176	7.5	4422.294^n	72.8		-1.2	-1.0
4425.961	4.6937^o	7.5	1.8933	7.5	4425.965	959.5	-0.8	-0.5	
4426.329	5.1547^o	4.5	2.3544	5.5	4426.323^n	126.7		-0.9	-0.8
4436.326	4.8696^o	2.5	2.0757	3.5	4436.324^c	62.7		-1.5	
4442.057	4.8926^o	3.5	2.1023	3.5	4442.049^n	36.2		-1.7	-1.6
4442.734	4.8656^o	4.5	2.0757	3.5	4442.718^n	538.0		-0.6	-0.5
4447.586	4.8625^o	4.5	2.0757	3.5	4447.579^n	265.5		-0.9	-0.8
4452.980	5.1969^o	6.5	2.4135	6.5	4452.981	17.2		-1.7	
4454.038	4.8585^o	3.5	2.0757	3.5	4454.031^n	1290.5		-0.2	-0.2
4455.906	5.6796^o	5.5	2.8980	6.5	4455.885	14.5		-1.2	
4458.061	4.7129^o	6.5	1.9326	5.5	4458.055^n	84.0		-1.5	-1.8
4462.770	5.1494^o	2.5	2.3720	1.5	4462.770	38.0		-1.4	
4466.080	5.2237^o	3.5	2.4484	4.5	4466.062^n	113.0		-0.8	-1.0
4467.983	4.6674^o	6.5	1.8933	7.5	4467.978^n	541.0		-0.8	-1.1
4478.815	5.7356	5.5	2.9682^o	4.5	4478.812^c	40.0		-0.7	
4479.938	4.9169^o	2.5	2.1502	3.5	4479.930^n	34.6		-1.7	-1.4
4481.301	4.9668^o	3.5	2.2010	2.5	4481.275^c	722.0		-0.3	
4486.141	4.9131^o	3.5	2.1502	3.5	4486.145^b	114.4		-1.2	
4486.166	5.1173^o	6.5	2.3544	5.5	4486.145^b	112.7		-1.0	
4489.020	4.3877^o	3.5	1.6266	4.5	4489.023^b	82.0		-1.9	
4489.056	5.5407	4.5	2.7796^o	4.5	4489.023^b	79.9		-0.6	
4492.003	5.0968^o	4.5	2.3375	5.5	4491.992^n	45.0		-1.4	-1.3
4492.269	4.9232^o	5.5	2.1641	6.5	4492.265^n	27.3		-1.8	-1.7
4494.301	4.3844^o	4.5	1.6266	4.5	4494.302^b	101.0		-1.8	
4494.334	5.0933^o	5.5	2.3355	4.5	4494.302^b	98.6	-0.9	-1.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4503.487	4.9025^o	3.5	2.1502	3.5	4503.484^c	118.6		-1.2	
4507.129	4.6826^o	4.5	1.9326	5.5	4507.135	47.4	-2.1	-1.8	
4516.204	5.2745	3.5	2.5301^o	2.5	4516.210	100.0		-0.8	
4516.684	5.0986^o	4.5	2.3544	5.5	4516.666^n	87.9		-1.1	-1.1
4519.589	4.8181^o	2.5	2.0757	3.5	4519.586	2722.7		0.1	
4520.633	5.5274	4.5	2.7856^o	5.5	4520.635^c	39.9		-0.9	
4521.641	5.5208	3.5	2.7796^o	4.5	4521.640	23.3		-1.2	
4532.155	4.6674^o	6.5	1.9326	5.5	4532.150^n	2339.1		-0.1	-0.6
4539.406	5.5274	4.5	2.7969^o	5.5	4539.404	88.7		-0.6	
4542.204	4.8045^o	2.5	2.0757	3.5	4542.208	25.2		-1.9	
4543.818	5.0653^o	4.5	2.3375	5.5	4543.832^n	20.9		-1.7	-2.1
4548.103	4.6185^o	8.5	1.8933	7.5	4548.094^n	376.5		-1.0	-1.4
4548.597	4.8752^o	4.5	2.1502	3.5	4548.588^n	1287.3		-0.2	-0.2
4552.222	5.5024	4.5	2.7796^o	4.5	4552.219	26.4		-1.1	
4553.389	5.5190	6.5	2.7969^o	5.5	4553.391^c	102.4		-0.5	
4557.632	4.3461^o	4.5	1.6266	4.5	4557.626^n	653.1		-1.0	-1.4
4560.360	4.7936^o	3.5	2.0757	3.5	4560.336	45.1		-1.7	
4563.903	4.8181^o	2.5	2.1023	3.5	4563.894	38.3		-1.7	
4564.678	4.8656^o	4.5	2.1502	3.5	4564.670^n	814.2		-0.4	-0.3
4567.327	4.6071^o	7.5	1.8933	7.5	4567.309^n	11.7		-2.5	-2.6
4569.801	4.8625^o	4.5	2.1502	3.5	4569.796^b	22.5	-1.8	-1.9	
4569.805	5.1360^o	3.5	2.4237	2.5	4569.796^b	22.5		-1.6	
4570.236	4.8958^o	4.5	2.1838	4.5	4570.236	83.9		-1.3	
4570.615	5.3354^o	3.5	2.6236	2.5	4570.619^b	35.9		-1.2	
4570.623	5.7306^o	5.5	3.0188	4.5	4570.619^b	35.9		-0.8	
4571.901	4.8948^o	3.5	2.1838	4.5	4571.902^c	139.9	-1.2	-1.1	
4572.201	5.0653^o	4.5	2.3544	5.5	4572.205^n	30.8		-1.6	-1.7
4573.707	5.5069	5.5	2.7969^o	5.5	4573.702^c	48.9		-0.9	
4575.321	4.9100^o	1.5	2.2010	2.5	4575.310^n	52.0		-1.5	-1.3
4575.560	4.8926^o	3.5	2.1838	4.5	4575.551^n	37.2		-1.7	-1.4
4576.315	5.4881	3.5	2.7796^o	4.5	4576.317^c	18.9		-1.3	
4576.613	4.8585^o	3.5	2.1502	3.5	4576.607^n	95.5		-1.3	-1.0
4582.842	3.7920	1.5	1.0875^o	2.5	4582.840^n	439.1		-1.8	-2.1
4584.139	5.1173^o	6.5	2.4135	6.5	4584.115	10.4		-2.0	
4585.868	4.8865^o	3.5	2.1838	4.5	4585.872	22.0		-1.9	
4586.964	4.8045^o	2.5	2.1023	3.5	4586.965	48.9		-1.6	
4587.544	5.7651	3.5	3.0633^o	3.5	4587.564^b	37.5		-0.7	
4587.569	5.2318	2.5	2.5301^o	2.5	4587.564^b	40.2		-1.3	
4590.647	4.6326^o	6.5	1.9326	5.5	4590.652^c	290.1	-1.4	-1.1	
4596.626	4.8802^o	5.5	2.1838	4.5	4596.630^c	956.3		-0.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4603.217	4.8936^{o}	2.5	2.2010	2.5	4603.219^{b}	197.5		-0.9	
4603.231	5.5977	3.5	2.9051^{o}	2.5	4603.219^{b}	250.5		-0.0	
4605.231	4.8752^{o}	4.5	2.1838	4.5	4605.226^{n}	41.3		-1.6	-1.4
4609.348	4.6216^{o}	5.5	1.9326	5.5	4609.341^{n}	289.1		-1.1	-1.4
4612.381	5.5069	5.5	2.8197^{o}	6.5	4612.371	38.1		-1.0	
4613.964	4.8873^{o}	1.5	2.2010	2.5	4613.958^{n}	386.1		-0.6	-0.6
4614.695	5.0234^{o}	4.5	2.3375	5.5	4614.684^{n}	19.2		-1.8	-1.7
4615.291	4.8865^{o}	3.5	2.2010	2.5	4615.293	74.1		-1.4	
4620.990	4.8832^{o}	2.5	2.2010	2.5	4620.990	99.2		-1.2	
4621.716	4.8656^{o}	4.5	2.1838	4.5	4621.709^{n}	266.8		-0.8	-0.7
4625.574	5.5190	6.5	2.8394^{o}	6.5	4625.576	128.8		-0.4	
4626.968	4.8625^{o}	4.5	2.1838	4.5	4626.960^{n}	378.2		-0.7	-0.5
4631.540	5.2947^{o}	2.5	2.6186	3.5	4631.536	20.8		-1.5	
4632.493	5.2992^{o}	3.5	2.6236	2.5	4632.498	44.7		-1.1	
4633.951	4.8585^{o}	3.5	2.1838	4.5	4633.943^{n}	325.3		-0.7	-0.6
4634.300	4.3011^{o}	5.5	1.6266	4.5	4634.302^{bc}	734.5		-1.0	
4634.332	5.1236^{o}	2.5	2.4491	3.5	4634.303^{bc}	747.6		-0.1	
4640.793	4.7731^{o}	4.5	2.1023	3.5	4640.785^{n}	158.1		-1.2	-1.3
4642.598	5.4894	5.5	2.8197^{o}	6.5	4642.596	73.5		-0.7	
4643.128	3.7569	2.5	1.0875^{o}	2.5	4643.118^{n}	1048.4		-1.5	-1.4
4644.578	4.8696^{o}	2.5	2.2010	2.5	4644.581^{c}	379.1		-0.7	
4645.833	5.3706	2.5	2.7027^{o}	1.5	4645.846^{b}	264.8		-0.3	
4645.850	4.8181^{o}	2.5	2.1502	3.5	4645.846^{b}	261.0		-0.9	
4655.085	4.8464^{o}	5.5	2.1838	4.5	4655.086	2232.4		0.1	
4656.711	4.2883^{o}	4.5	1.6266	4.5	4656.711	241.2		-1.5	
4657.790	5.1095^{o}	3.5	2.4484	4.5	4657.798	14.3		-1.8	
4662.704	5.3855^{o}	6.5	2.7273	5.5	4662.727^{b}	18.6		-1.4	
4662.721	5.2768^{o}	4.5	2.6186	3.5	4662.727^{b}	18.1		-1.5	
4662.739	5.1067^{o}	3.5	2.4484	4.5	4662.727^{b}	18.3		-1.7	
4663.889	5.1067^{o}	3.5	2.4491	3.5	4663.884	22.3		-1.6	
4666.634	4.5886^{o}	4.5	1.9326	5.5	4666.645	521.8		-0.8	
4668.690	4.2814^{o}	5.5	1.6266	4.5	4668.693	477.0		-1.2	
4669.748	4.8045^{o}	2.5	2.1502	3.5	4669.752	40.3		-1.7	
4671.217	4.6937^{o}	7.5	2.0403	8.5	4671.206^{n}	48.3		-1.7	-2.0
4675.321	4.5444^{o}	7.5	1.8933	7.5	4675.321	6210.9	-0.0	0.2	
4676.880	5.0986^{o}	4.5	2.4484	4.5	4676.868^{n}	29.0		-1.5	-1.8
4677.210	5.4894	5.5	2.8394^{o}	6.5	4677.203	42.3		-0.9	
4680.158	5.0968^{o}	4.5	2.4484	4.5	4680.125	36.4	-1.2	-1.4	
4681.317	5.0968^{o}	4.5	2.4491	3.5	4681.304^{n}	13.6		-1.8	-1.8
4681.921	3.7348	3.5	1.0875^{o}	2.5	4681.918^{n}	3811.3		-0.9	-1.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4685.110	4.2721^{o}	4.5	1.6266	4.5	4685.104^{n}	2345.8		-0.5	-1.0
4686.922	5.0930^{o}	4.5	2.4484	4.5	4686.908	57.2	-1.0	-1.2	
4689.508	5.5482	3.5	2.9051^{o}	2.5	4689.519	18.1		-1.2	
4691.113	3.7296	2.5	1.0875^{o}	2.5	4691.109^{n}	3581.2		-0.9	-1.2
4691.499	4.8429^{o}	1.5	2.2010	2.5	4691.503	357.7		-0.7	
4701.567	4.8200^{o}	5.5	2.1838	4.5	4701.547^{n}	976.4		-0.3	-0.7
4703.543	4.7375^{o}	3.5	2.1023	3.5	4703.548	40.9		-1.8	
4705.449	4.2607^{o}	3.5	1.6266	4.5	4705.442^{c}	286.8		-1.4	
4712.323	5.0023^{o}	2.5	2.3720	1.5	4712.323	114.2		-1.0	
4713.349	5.1597	3.5	2.5301^{o}	2.5	4713.349	61.1		-1.1	
4716.521	5.4249	4.5	2.7969^{o}	5.5	4716.516	28.2		-1.2	
4719.268	5.5195	2.5	2.8931^{o}	3.5	4719.276	45.2		-0.8	
4724.263	2.6236	2.5	0.0000^{o}	3.5	4724.258^{n}	6821.9		-1.9	-2.1
4725.549	4.7731^{o}	4.5	2.1502	3.5	4725.552	137.2	-1.3	-1.2	
4729.223	4.7711^{o}	3.5	2.1502	3.5	4729.236	54.1		-1.6	
4729.549	5.1507	2.5	2.5301^{o}	2.5	4729.560	18.3		-1.6	
4733.337	2.6186	3.5	0.0000^{o}	3.5	4733.330^{n}	48548.0		-1.0	-1.3
4741.113	5.1443	2.5	2.5301^{o}	2.5	4741.112	98.4		-0.9	
4744.330	4.7963^{o}	4.5	2.1838	4.5	4744.337	77.3		-1.4	
4750.216	5.5024	4.5	2.8931^{o}	3.5	4750.245^{b}	85.7		-0.6	
4750.244	5.4289	5.5	2.8197^{o}	6.5	4750.245^{b}	89.8		-0.6	
4751.172	4.7590^{o}	4.5	2.1502	3.5	4751.172	91.7		-1.4	
4754.591	4.6826^{o}	4.5	2.0757	3.5	4754.582^{n}	151.0		-1.2	-1.4
4757.096	5.0539^{o}	3.5	2.4484	4.5	4757.089	22.1		-1.7	
4768.655	5.3265^{o}	5.5	2.7273	5.5	4768.632	31.6		-1.2	
4774.142	5.6150^{o}	5.5	3.0188	4.5	4774.159	82.9		-0.5	
4775.460	5.4349	6.5	2.8394^{o}	6.5	4775.460	32.0		-1.1	
4779.686	4.7769^{o}	5.5	2.1838	4.5	4779.689	114.6		-1.3	
4780.710	4.7936^{o}	3.5	2.2010	2.5	4780.712^{c}	25.4		-1.9	
4790.629	4.7375^{o}	3.5	2.1502	3.5	4790.637	109.4		-1.3	
4798.105	5.4813^{o}	7.5	2.8980	6.5	4798.099	28.2		-1.1	
4798.634	5.4881	3.5	2.9051^{o}	2.5	4798.642	39.5		-0.9	
4804.268	5.5482	3.5	2.9682^{o}	4.5	4804.267	20.2		-1.1	
4805.498	5.2743^{o}	5.5	2.6951	4.5	4805.492	37.0		-1.2	
4807.470	5.3752	4.5	2.7969^{o}	5.5	4807.475^{bc}	1114.0		0.4	
4807.477	4.6185^{o}	8.5	2.0403	8.5	4807.475^{bc}	1114.0	-0.8	-0.4	
4808.679	4.5101^{o}	4.5	1.9326	5.5	4808.668^{n}	1398.9		-0.5	-0.9
4811.612	4.6517^{o}	3.5	2.0757	3.5	4811.637^{bc}	53.1		-1.7	
4811.650	5.3556	5.5	2.7796^{o}	4.5	4811.637^{bc}	50.3		-1.0	
4813.496	5.0234^{o}	4.5	2.4484	4.5	4813.483^{n}	208.8		-0.7	-1.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4821.598	4.7544^{o}	5.5	2.1838	4.5	4821.596	34.9		-1.8	
4822.591	4.7711^{o}	3.5	2.2010	2.5	4822.615	36.3		-1.7	
4823.599	4.9051^{o}	5.5	2.3355	4.5	4823.574	80.6		-1.3	
4824.468	5.5879^{o}	4.5	3.0188	4.5	4824.479	12.6		-1.3	
4828.067	4.7313^{o}	5.5	2.1641	6.5	4828.069	122.6		-1.3	
4828.962	4.6071^{o}	7.5	2.0403	8.5	4828.975	1054.9	-0.7	-0.5	
4835.749	4.1897^{o}	5.5	1.6266	4.5	4835.753	1867.7	-0.9	-0.7	
4844.590	4.4910^{o}	6.5	1.9326	5.5	4844.581^{n}	733.9		-0.7	-1.1
4846.884	4.8948^{o}	5.5	2.3375	5.5	4846.873^{n}	101.1		-1.2	-1.0
4851.757	4.9267^{o}	0.5	2.3720	1.5	4851.747^{n}	269.1		-0.7	-0.5
4853.492	4.7375^{o}	3.5	2.1838	4.5	4853.490	168.0		-1.1	
4856.667	5.2794^{o}	5.5	2.7273	5.5	4856.665	29.2		-1.3	
4861.869	4.6517^{o}	3.5	2.1023	3.5	4861.868^{bc}	28.4		-2.0	
4861.881	5.7356	5.5	3.1863^{o}	4.5	4861.868^{bc}	28.4		-0.8	
4864.996	5.4528	3.5	2.9051^{o}	2.5	4864.992^{c}	15.0		-1.4	
4870.365	4.9169^{o}	2.5	2.3720	1.5	4870.359^{n}	210.3		-0.8	-0.6
4874.566	5.9370^{o}	7.5	3.3942	6.5	4874.590	35.9		-0.4	
4879.194	4.8948^{o}	5.5	2.3544	5.5	4879.199^{b}	241.5	-0.7	-0.8	
4879.222	3.6278	3.5	1.0875^{o}	2.5	4879.199^{b}	241.8		-2.2	
4883.677	4.9100^{o}	1.5	2.3720	1.5	4883.669^{n}	162.2		-0.9	-0.6
4887.341	5.1547^{o}	4.5	2.6186	3.5	4887.340^{n}	29.7		-1.4	-1.1
4887.637	5.3556	5.5	2.8197^{o}	6.5	4887.635^{bc}	54.4		-0.9	
4887.669	5.5285^{o}	6.5	2.9926	6.5	4887.635^{bc}	53.9		-0.7	
4891.043	5.5024	4.5	2.9682^{o}	4.5	4891.031	220.7		-0.1	
4899.679	4.6937^{o}	7.5	2.1641	6.5	4899.671^{n}	31.4		-1.9	-2.0
4901.621	5.0587	3.5	2.5301^{o}	2.5	4901.625^{b}	105.4		-0.9	
4901.655	5.2237^{o}	3.5	2.6951	4.5	4901.625^{b}	104.0	-0.6	-0.8	
4902.811	5.4879^{o}	3.5	2.9598	3.5	4902.816^{b}	19.5		-1.2	
4902.813	4.8656^{o}	4.5	2.3375	5.5	4902.816^{b}	19.5	-1.8	-1.9	
4905.066	5.2220^{o}	5.5	2.6951	4.5	4905.068	22.9		-1.4	
4907.269	4.8802^{o}	5.5	2.3544	5.5	4907.272^{b}	143.7		-1.0	
4907.289	5.1494^{o}	2.5	2.6236	2.5	4907.272^{b}	143.7		-0.7	
4907.552	4.4582^{o}	6.5	1.9326	5.5	4907.551	264.3		-1.2	
4909.736	4.4178^{o}	8.5	1.8933	7.5	4909.730^{n}	1259.4		-0.6	-1.0
4917.077	4.8752^{o}	4.5	2.3544	5.5	4917.067^{n}	35.8		-1.6	-1.1
4923.825	4.8548^{o}	6.5	2.3375	5.5	4923.818^{n}	1146.9		-0.1	-0.0
4927.730	4.8873^{o}	1.5	2.3720	1.5	4927.723^{n}	213.1		-0.8	-0.6
4928.449	5.4377	2.5	2.9228^{o}	1.5	4928.451^{b}	65.3		-0.7	
4928.461	5.4377	2.5	2.9228^{o}	1.5	4928.451^{b}	67.0		-0.7	
4933.373	4.6148^{o}	3.5	2.1023	3.5	4933.368	31.4		-2.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4942.638	5.4305	1.5	2.9228^o	1.5	4942.629	45.7		-0.9	
4948.352	4.6689^o	5.5	2.1641	6.5	4948.343^n	421.6		-0.8	-1.1
4949.846	4.5444^o	7.5	2.0403	8.5	4949.830^n	48.1		-1.8	-2.1
4959.857	5.2786	4.5	2.7796^o	4.5	4959.845^c	29.8		-1.2	
4960.163	4.6826^o	4.5	2.1838	4.5	4960.156^n	34.5		-1.8	-1.9
4964.675	5.1916^o	5.5	2.6951	4.5	4964.661^n	14.8		-1.6	-1.4
4966.880	5.2811	5.5	2.7856^o	5.5	4966.886	21.3		-1.4	
4971.259	4.9169^o	2.5	2.4237	2.5	4971.256^n	413.9		-0.5	-0.3
4973.953	4.8464^o	5.5	2.3544	5.5	4973.959^b	49.3		-1.5	
4973.989	5.3819^o	5.5	2.8900	5.5	4973.959^b	47.1		-0.9	
4978.898	4.9131^o	3.5	2.4237	2.5	4978.903	675.4		-0.3	
4985.129	4.9100^o	1.5	2.4237	2.5	4985.121^n	93.5		-1.1	-0.8
5001.025	5.2981	7.5	2.8197^o	6.5	5001.017^c	90.7		-0.7	
5001.586	4.9272^o	4.5	2.4491	3.5	5001.579	319.7		-0.6	
5002.195	5.2748	6.5	2.7969^o	5.5	5002.197^c	40.1		-1.1	
5004.308	4.5791^o	3.5	2.1023	3.5	5004.307^c	148.7		-1.3	
5007.086	5.3148	5.5	2.8394^o	6.5	5007.086	44.8		-1.0	
5010.239	5.0924^o	2.5	2.6186	3.5	5010.249^b	117.8		-0.8	
5010.247	5.0039	3.5	2.5301^o	2.5	5010.249^b	130.4		-0.9	
5016.270	4.8429^o	1.5	2.3720	1.5	5016.271	12.9		-2.1	
5018.740	5.1969^o	6.5	2.7273	5.5	5018.734	50.7		-1.1	
5021.123	4.6326^o	6.5	2.1641	6.5	5021.113^n	483.9		-0.7	-1.1
5023.594	5.6274^o	6.5	3.1601	5.5	5023.622	28.0		-0.9	
5024.890	4.7842^o	6.5	2.3176	7.5	5024.882^n	148.4		-1.1	-1.3
5027.058	4.8200^o	5.5	2.3544	5.5	5027.070^n	12.0		-2.1	-1.7
5030.255	4.9131^o	3.5	2.4491	3.5	5030.257	183.4		-0.8	
5041.211	5.2981	7.5	2.8394^o	6.5	5041.208^c	33.1		-1.1	
5043.503	4.6216^o	5.5	2.1641	6.5	5043.497^n	428.9		-0.8	-0.9
5045.385	5.4249	4.5	2.9682^o	4.5	5045.409^b	221.4		-0.2	
5045.412	4.9051^o	5.5	2.4484	4.5	5045.409^b	221.2		-0.8	
5055.235	4.3844^o	4.5	1.9326	5.5	5055.232	39.5		-2.1	
5060.898	2.4491	3.5	0.0000^o	3.5	5060.890^n	14040.4		-1.7	-1.9
5062.253	2.4484	4.5	0.0000^o	3.5	5062.243^n	711.1		-3.0	-2.7
5064.523	4.8958^o	4.5	2.4484	4.5	5064.525	17.5		-1.9	
5065.820	4.7842^o	6.5	2.3375	5.5	5065.852^b	258.9	-1.0	-0.8	
5065.880	4.8958^o	4.5	2.4491	3.5	5065.852^b	266.8		-0.7	
5066.670	4.8948^o	5.5	2.4484	4.5	5066.662^n	1428.5		0.1	0.1
5067.460	4.8696^o	2.5	2.4237	2.5	5067.461	50.2		-1.4	
5067.925	4.8948^o	3.5	2.4491	3.5	5067.925	19.4	-1.9	-1.8	
5068.890	4.4856^o	7.5	2.0403	8.5	5068.882^n	222.8		-1.2	-1.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5070.440	4.8936^{o}	2.5	2.4491	3.5	5070.480^{b}	90.8		-1.1	
5070.501	5.5069	5.5	3.0625^{o}	4.5	5070.480^{b}	91.8		-0.5	
5072.422	4.8926^{o}	3.5	2.4491	3.5	5072.412^{n}	460.9		-0.4	-0.4
5073.519	4.6071^{o}	7.5	2.1641	6.5	5073.510^{n}	649.0		-0.6	-0.9
5075.822	4.8903^{o}	4.5	2.4484	4.5	5075.825	138.0		-1.0	
5076.360	5.2811	5.5	2.8394^{o}	6.5	5076.361^{b}	381.8		-0.1	
5076.363	5.1443	2.5	2.7027^{o}	1.5	5076.361^{b}	381.8		-0.2	
5076.391	4.5173^{o}	3.5	2.0757	3.5	5076.361^{b}	380.0		-0.9	
5077.185	4.8903^{o}	4.5	2.4491	3.5	5077.187^{c}	569.0		-0.4	
5078.180	5.2604	5.5	2.8197^{o}	6.5	5078.182	86.9		-0.8	
5081.729	5.5024	4.5	3.0633^{o}	3.5	5081.720	49.1		-0.7	
5083.201	4.5886^{o}	4.5	2.1502	3.5	5083.193	17.7		-2.2	
5085.089	4.9675	2.5	2.5301^{o}	2.5	5085.088^{b}	491.0		-0.3	
5085.093	4.8865^{o}	3.5	2.4491	3.5	5085.088^{b}	493.5		-0.4	
5088.884	4.7711^{o}	3.5	2.3355	4.5	5088.874^{bc}	220.6		-0.9	
5088.885	4.7731^{o}	4.5	2.3375	5.5	5088.874^{bc}	220.6	-1.0	-0.9	
5101.126	4.7842^{o}	6.5	2.3544	5.5	5101.124^{n}	94.5		-1.2	-1.3
5103.384	4.9588	3.5	2.5301^{o}	2.5	5103.393	31.6		-1.5	
5107.532	4.8752^{o}	4.5	2.4484	4.5	5107.521^{n}	486.8		-0.4	-0.2
5111.690	5.3846^{o}	2.5	2.9598	3.5	5111.714^{bc}	97.9		-0.6	
5111.693	5.5190	6.5	3.0943^{o}	5.5	5111.714^{bc}	97.9		-0.4	
5113.969	2.4237	2.5	0.0000^{o}	3.5	5113.961^{n}	5554.7		-2.1	-2.2
5118.612	4.7590^{o}	4.5	2.3375	5.5	5118.602^{c}	20.4		-1.9	
5123.365	4.8429^{o}	1.5	2.4237	2.5	5123.370	39.7		-1.5	
5124.514	4.7731^{o}	4.5	2.3544	5.5	5124.508^{n}	32.5		-1.7	-1.7
5127.818	4.8656^{o}	4.5	2.4484	4.5	5127.814	28.2	-1.6	-1.7	
5134.283	4.8625^{o}	4.5	2.4484	4.5	5134.263^{n}	28.9		-1.7	-1.4
5135.502	4.3461^{o}	4.5	1.9326	5.5	5135.494^{n}	43.9		-2.1	-2.0
5142.547	4.9403	3.5	2.5301^{o}	2.5	5142.545^{c}	108.1		-1.0	
5147.704	4.5101^{o}	4.5	2.1023	3.5	5147.696^{n}	159.5		-1.3	-1.4
5149.599	5.3752	4.5	2.9682^{o}	4.5	5149.603	12.5		-1.5	
5154.034	4.5886^{o}	4.5	2.1838	4.5	5154.035	24.8		-2.0	
5160.055	4.7375^{o}	3.5	2.3355	4.5	5160.047	68.8		-1.4	
5160.538	3.4893	1.5	1.0875^{o}	2.5	5160.541^{b}	123.3		-2.6	
5160.539	5.0254^{o}	3.5	2.6236	2.5	5160.541^{b}	123.3		-0.8	
5168.926	4.8464^{o}	5.5	2.4484	4.5	5168.930^{b}	74.8		-1.3	
5168.963	5.0930^{o}	4.5	2.6951	4.5	5168.930^{b}	75.8	-0.7	-1.0	
5169.681	5.5228	1.5	3.1253^{o}	1.5	5169.679	54.7		-0.6	
5174.617	4.7129^{o}	6.5	2.3176	7.5	5174.596	74.2	-1.6	-1.4	
5177.694	5.1735	4.5	2.7796^{o}	4.5	5177.684	87.7		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5182.678	5.0943	0.5	2.7027^{o}	1.5	5182.676	149.1		-0.7	
5185.244	3.4778	2.5	1.0875^{o}	2.5	5185.239^{n}	273.3		-2.2	-1.8
5185.970	5.1173^{o}	6.5	2.7273	5.5	5185.973	10.6		-1.8	
5190.674	5.1735	4.5	2.7856^{o}	5.5	5190.645	44.0		-1.1	
5191.801	5.3556	5.5	2.9682^{o}	4.5	5191.788	19.2		-1.3	
5193.951	5.4377	2.5	3.0513^{o}	2.5	5193.950^{b}	21.9		-1.1	
5193.964	5.4377	2.5	3.0513^{o}	2.5	5193.950^{b}	22.2		-1.1	
5199.106	4.9141	1.5	2.5301^{o}	2.5	5199.099^{n}	121.6		-1.0	-0.7
5206.367	4.5447^{o}	5.5	2.1641	6.5	5206.366	43.7		-1.8	
5206.601	5.7327	4.5	3.3521^{o}	3.5	5206.575	13.5		-1.0	
5207.126	4.5444^{o}	7.5	2.1641	6.5	5207.116^{n}	157.5		-1.3	-1.4
5212.647	4.2711^{o}	6.5	1.8933	7.5	5212.642^{n}	187.6		-1.5	-1.5
5213.374	4.4178^{o}	8.5	2.0403	8.5	5213.368^{n}	3840.7		-0.0	-0.4
5215.440	5.1735	4.5	2.7969^{o}	5.5	5215.442^{c}	48.9		-1.1	
5218.034	4.7129^{o}	6.5	2.3375	5.5	5218.030	170.9	-1.2	-1.0	
5226.300	4.8200^{o}	5.5	2.4484	4.5	5226.305	15.1	-2.3	-2.0	
5228.178	4.7842^{o}	6.5	2.4135	6.5	5228.183	60.0	-1.6	-1.4	
5231.892	5.3752	4.5	3.0061^{o}	3.5	5231.916^{bc}	51.9		-0.8	
5231.924	4.8181^{o}	2.5	2.4491	3.5	5231.916^{bc}	51.6		-1.4	
5232.396	5.7772^{o}	6.5	3.4084	5.5	5232.381^{c}	9.1		-1.1	
5233.051	4.3011^{o}	5.5	1.9326	5.5	5233.050	158.2		-1.5	
5239.607	5.3843^{o}	3.5	3.0188	4.5	5239.637^{b}	21.1		-1.2	
5239.641	5.4813^{o}	7.5	3.1157	7.5	5239.637^{b}	19.7		-1.1	
5241.941	5.3706	2.5	3.0061^{o}	3.5	5241.932	14.7		-1.4	
5248.545	5.4249	4.5	3.0633^{o}	3.5	5248.544	13.3		-1.3	
5255.500	4.7129^{o}	6.5	2.3544	5.5	5255.501^{c}	48.5	-1.8	-1.6	
5262.252	4.8045^{o}	2.5	2.4491	3.5	5262.250^{c}	13.4		-2.0	
5267.545	5.5190	6.5	3.1660^{o}	7.5	5267.540	25.5		-1.0	
5270.247	5.6298^{o}	3.5	3.2780	3.5	5270.267	38.1		-0.7	
5274.710	4.6674^{o}	6.5	2.3176	7.5	5274.710	154.3	-1.5	-1.1	
5276.945	4.2814^{o}	5.5	1.9326	5.5	5276.946	44.4		-2.1	
5282.385	5.2515	1.5	2.9051^{o}	2.5	5282.423^{b}	18.7		-1.4	
5282.422	5.0415^{o}	5.5	2.6951	4.5	5282.423^{b}	19.1		-1.6	
5291.143	5.0452	1.5	2.7027^{o}	1.5	5291.142	351.2		-0.3	
5294.316	5.5274	4.5	3.1863^{o}	4.5	5294.323	308.7		0.1	
5294.797	4.7544^{o}	5.5	2.4135	6.5	5294.786	19.0		-1.9	
5295.362	5.4349	6.5	3.0943^{o}	5.5	5295.361	33.2		-0.9	
5296.548	4.5042^{o}	5.5	2.1641	6.5	5296.549^{c}	58.9		-1.7	
5298.225	5.3455	4.5	3.0061^{o}	3.5	5298.187	4336.9			
5300.200	4.2711^{o}	6.5	1.9326	5.5	5300.190^{n}	1212.2		-0.7	-0.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5302.698	4.8675	2.5	2.5301^o	2.5	5302.689	171.7		-0.8	
5311.004	5.3020	4.5	2.9682^o	4.5	5310.998^b	34.7		-1.0	
5311.039	5.2947^o	2.5	2.9610	1.5	5310.998^b	35.5		-1.0	
5311.865	4.6689^o	5.5	2.3355	4.5	5311.859	34.3	-2.0	-1.8	
5312.266	4.4973^o	7.5	2.1641	6.5	5312.258^n	553.8		-0.7	-1.0
5314.178	5.2809^o	4.5	2.9485	4.5	5314.196	6.2		-1.8	
5321.876	5.0317	2.5	2.7027^o	1.5	5321.891^b	25.2		-1.5	
5321.924	5.1547^o	4.5	2.8257	3.5	5321.891^b	24.5	-1.2	-1.4	
5323.009	4.7769^o	5.5	2.4484	4.5	5323.005^c	23.9		-1.8	
5323.827	4.6826^o	4.5	2.3544	5.5	5323.823^n	201.2		-1.0	-1.0
5324.598	4.2211^o	7.5	1.8933	7.5	5324.590^n	211.1		-1.5	-1.6
5327.851	4.5101^o	4.5	2.1838	4.5	5327.841^n	23.6		-2.1	-2.0
5345.719	5.5977	3.5	3.2791^o	2.5	5345.755^c	150.5		-0.1	
5347.653	4.7313^o	5.5	2.4135	6.5	5347.651	52.6		-1.5	
5349.445	5.2768^o	4.5	2.9598	3.5	5349.459	70.3		-0.8	
5354.043	4.2083^o	6.5	1.8933	7.5	5354.048^b	888.1		-0.8	
5354.044	5.7234^o	5.5	3.4084	5.5	5354.048^b	888.1		0.8	
5358.779	4.6674^o	6.5	2.3544	5.5	5358.767^n	31.8		-1.8	-1.8
5364.356	4.7590^o	4.5	2.4484	4.5	5364.357	35.4		-1.6	
5365.141	5.1072	6.5	2.7969^o	5.5	5365.141	153.9		-0.6	
5368.766	4.9272^o	4.5	2.6186	3.5	5368.774^c	20.8		-1.7	
5372.999	5.0925	4.5	2.7856^o	5.5	5372.990^c	27.0		-1.4	
5382.043	3.9295^o	3.5	1.6266	4.5	5382.040	60.7		-2.3	
5386.736	4.6185^o	8.5	2.3176	7.5	5386.736	74.4	-1.9	-1.5	
5387.191	5.6950^o	7.5	3.3942	6.5	5387.206^c	16.1		-0.9	
5390.461	4.7129^o	6.5	2.4135	6.5	5390.455^n	55.1		-1.5	-1.6
5391.910	4.1921^o	6.5	1.8933	7.5	5391.919	166.3		-1.6	
5398.204	5.6298^o	3.5	3.3337	4.5	5398.246	34.3		-0.7	
5402.717	4.4582^o	6.5	2.1641	6.5	5402.715	162.6		-1.3	
5408.637	5.4073^o	7.5	3.1157	7.5	5408.631	20.5		-1.1	
5413.725	4.6071^o	7.5	2.3176	7.5	5413.716^n	593.8		-0.6	-0.9
5414.109	5.4778^o	2.5	3.1884	3.5	5414.094	13.9		-1.2	
5416.259	4.7375^o	3.5	2.4491	3.5	5416.259	11.5		-2.1	
5421.665	4.6216^o	5.5	2.3355	4.5	5421.659^n	21.3		-2.0	-2.1
5423.565	4.3877^o	3.5	2.1023	3.5	5423.555^c	14.4		-2.4	
5426.502	4.6216^o	5.5	2.3375	5.5	5426.496^n	39.3		-1.7	-1.7
5426.981	4.9025^o	3.5	2.6186	3.5	5426.965^b	7.3		-2.1	
5426.984	5.2900	4.5	3.0061^o	3.5	5426.965^b	7.3		-1.7	
5431.094	5.3455	4.5	3.0633^o	3.5	5431.085	14.4		-1.4	
5434.119	5.3434	3.5	3.0625^o	4.5	5434.162	16.5		-1.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5435.648	4.6937^o	7.5	2.4135	6.5	5435.634^n	136.5		-1.1	-1.4
5436.971	5.0653	6.5	2.7856^o	5.5	5436.970^c	117.1	-0.7	-0.8	
5437.782	5.2476	3.5	2.9682^o	4.5	5437.785	6.6		-1.8	
5439.561	5.0059^o	6.5	2.7273	5.5	5439.549^c	17.1		-1.7	
5440.746	4.6326^o	6.5	2.3544	5.5	5440.742^n	25.7		-1.9	-2.1
5446.453	4.2083^o	6.5	1.9326	5.5	5446.454^c	353.2		-1.2	
5462.798	5.4349	6.5	3.1660^o	7.5	5462.794	49.3		-0.7	
5464.149	5.0653	6.5	2.7969^o	5.5	5464.146	188.4	-0.5	-0.5	
5465.292	4.9706	1.5	2.7027^o	1.5	5465.310	53.5		-1.2	
5468.274	5.1095^o	3.5	2.8428	2.5	5468.311^b	26.4		-1.3	
5468.302	5.1597	3.5	2.8931^o	3.5	5468.311^b	27.1		-1.3	
5470.959	5.6677	5.5	3.4021^o	4.5	5470.917	51.4		-0.4	
5472.696	5.4289	5.5	3.1641^o	5.5	5472.721^b	51.4		-0.7	
5472.736	4.9675	2.5	2.7027^o	1.5	5472.721^b	51.3		-1.2	
5473.081	5.1547^o	4.5	2.8900	5.5	5473.075^n	14.7		-1.5	-1.3
5474.449	5.1869	2.5	2.9228^o	1.5	5474.454	19.5		-1.4	
5476.105	5.3259	5.5	3.0625^o	4.5	5476.103	22.9		-1.2	
5479.738	5.3252	3.5	3.0633^o	3.5	5479.719	9.5		-1.5	
5485.644	4.1921^o	6.5	1.9326	5.5	5485.645	246.4		-1.4	
5491.367	4.1897^o	5.5	1.9326	5.5	5491.362^n	37.0		-2.2	-2.5
5495.617	4.6689^o	5.5	2.4135	6.5	5495.608^n	78.1		-1.4	-1.5
5501.095	4.5886^o	4.5	2.3355	4.5	5501.099	25.1		-1.9	
5506.076	4.5886^o	4.5	2.3375	5.5	5506.074^c	79.0		-1.4	
5506.497	5.0938^o	3.5	2.8428	2.5	5506.499	16.5		-1.6	
5517.732	5.0319	6.5	2.7856^o	5.5	5517.742	8.8		-1.9	
5528.348	5.0216	5.5	2.7796^o	4.5	5528.344	509.9		-0.1	
5535.196	5.1443	2.5	2.9051^o	2.5	5535.193^c	41.1		-1.1	
5538.343	4.1706^o	5.5	1.9326	5.5	5538.340^c	109.7		-1.8	
5545.670	4.7651	2.5	2.5301^o	2.5	5545.667	18.3		-1.9	
5547.809	4.5886^o	4.5	2.3544	5.5	5547.820^b	24.6		-1.9	
5547.812	4.6826^o	4.5	2.4484	4.5	5547.820^b	24.6	-2.1	-1.8	
5549.124	5.4199	5.5	3.1863^o	4.5	5549.130	18.4		-1.1	
5549.440	4.6826^o	4.5	2.4491	3.5	5549.427^n	14.0		-2.1	-1.9
5549.663	5.3587	1.5	3.1253^o	1.5	5549.667	25.9		-1.1	
5554.115	5.3259	5.5	3.0943^o	5.5	5554.106	17.3		-1.3	
5566.000	3.8534^o	5.5	1.6266	4.5	5565.991^n	2876.4		-0.7	-1.1
5571.606	5.3887	4.5	3.1641^o	5.5	5571.589	26.7		-1.0	
5575.132	5.2745	3.5	3.0513^o	2.5	5575.136	17.6		-1.3	
5581.337	5.6150^o	5.5	3.3942	6.5	5581.357^{bc}	315.8		0.3	
5581.368	4.7508	1.5	2.5301^o	2.5	5581.357^{bc}	315.3		-0.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5583.262	5.1684^o	5.5	2.9485	4.5	5583.248	37.0	-1.1	-1.1	
5586.685	5.2811	5.5	3.0625^o	4.5	5586.643^c	23.6		-1.2	
5592.157	5.4944^o	4.5	3.2780	3.5	5592.146	62.1		-0.5	
5598.213	5.5478^o	5.5	3.3337	4.5	5598.190	16.4		-1.0	
5606.638	4.7408	1.5	2.5301^o	2.5	5606.625	136.8		-1.0	
5613.229	4.6216^o	5.5	2.4135	6.5	5613.233^b	97.1	-1.4	-1.3	
5613.260	5.5117^o	3.5	3.3036	4.5	5613.233^b	88.0		-0.3	
5615.503	4.5447^o	5.5	2.3375	5.5	5615.505	5.6		-2.6	
5618.171	5.1547^o	4.5	2.9485	4.5	5618.167	11.9	-1.5	-1.6	
5620.545	5.1735	4.5	2.9682^o	4.5	5620.539	15.7		-1.5	
5622.724	5.1969^o	6.5	2.9926	6.5	5622.721	95.9		-0.7	
5631.404	2.2010	2.5	0.0000^o	3.5	5631.395^n	30359.4		-1.5	-1.5
5632.896	4.9031	2.5	2.7027^o	1.5	5632.905	60.6		-1.2	
5635.624	5.0925	4.5	2.8931^o	3.5	5635.628	16.4		-1.5	
5636.312	5.1916^o	5.5	2.9926	6.5	5636.268	15.9	-1.2	-1.4	
5641.288	4.7272	2.5	2.5301^o	2.5	5641.266	32.3		-1.6	
5642.585	3.2841	1.5	1.0875^o	2.5	5642.586^n	746.2		-1.9	-1.7
5644.063	5.1012	3.5	2.9051^o	2.5	5644.072	20.4		-1.4	
5645.400	4.9752	5.5	2.7796^o	4.5	5645.401	631.2		-0.1	
5650.433	4.6071^o	7.5	2.4135	6.5	5650.425^n	144.5		-1.1	-1.3
5654.828	4.0852^o	6.5	1.8933	7.5	5654.840	72.8		-2.0	
5658.300	3.2780	3.5	1.0875^o	2.5	5658.290^n	1498.3		-1.6	-1.4
5658.919	4.5447^o	5.5	2.3544	5.5	5658.917	65.2		-1.5	
5660.829	5.1494^o	2.5	2.9598	3.5	5660.834^b	62.5		-0.9	
5660.835	4.9752	5.5	2.7856^o	5.5	5660.834^b	62.8		-1.1	
5670.262	4.2883^o	4.5	2.1023	3.5	5670.274^b	10.9		-2.6	
5670.262	4.8045^o	2.5	2.6186	3.5	5670.274^b	10.9		-2.0	
5675.837	2.1838	4.5	0.0000^o	3.5	5675.826^n	58668.3		-1.2	-1.2
5683.592	4.2211^o	7.5	2.0403	8.5	5683.583^n	481.2		-1.0	-1.3
5690.303	4.9752	5.5	2.7969^o	5.5	5690.302	58.2		-1.1	
5702.004	5.4528	3.5	3.2791^o	2.5	5701.992	29.5		-0.9	
5702.744	4.4910^o	6.5	2.3176	7.5	5702.731^n	74.0		-1.5	-1.7
5703.498	4.6216^o	5.5	2.4484	4.5	5703.489^n	41.9		-1.6	-1.6
5704.331	5.1916^o	5.5	3.0188	4.5	5704.329	11.9	-1.3	-1.5	
5704.906	4.5101^o	4.5	2.3375	5.5	5704.898^n	25.8		-2.0	-2.0
5705.265	4.9521	5.5	2.7796^o	4.5	5705.260	44.0		-1.2	
5712.424	4.2721^o	4.5	2.1023	3.5	5712.424	140.9	-1.9	-1.5	
5715.791	4.0618^o	8.5	1.8933	7.5	5715.784^n	1388.2		-0.7	-1.1
5717.103	4.4856^o	7.5	2.3176	7.5	5717.097^n	278.9		-1.0	-1.2
5720.558	4.5042^o	5.5	2.3375	5.5	5720.561	18.5		-2.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5728.461	4.2394^{o}	2.5	2.0757	3.5	5728.467	21.3		-2.3	
5738.927	5.4289	5.5	3.2692^{o}	5.5	5738.923^{c}	14.7		-1.2	
5742.688	4.2607^{o}	3.5	2.1023	3.5	5742.691	34.6		-2.1	
5749.720	4.5101^{o}	4.5	2.3544	5.5	5749.723^{b}	36.4	-2.1	-1.8	
5749.753	5.4249	4.5	3.2692^{o}	5.5	5749.723^{b}	36.8		-0.8	
5750.289	4.9752	5.5	2.8197^{o}	6.5	5750.289^{c}	14.0		-1.7	
5751.129	4.9521	5.5	2.7969^{o}	5.5	5751.134^{c}	11.2		-1.8	
5752.444	5.2171	5.5	3.0625^{o}	4.5	5752.447	18.1		-1.3	
5753.850	5.4879^{o}	3.5	3.3337	4.5	5753.854	14.3		-1.1	
5755.496	5.5478^{o}	5.5	3.3942	6.5	5755.516^{b}	80.0		-0.3	
5755.521	4.4910^{o}	6.5	2.3375	5.5	5755.516^{b}	80.2	-1.8	-1.5	
5758.012	4.0852^{o}	6.5	1.9326	5.5	5758.024	1216.7		-0.8	
5760.210	3.2392	2.5	1.0875^{o}	2.5	5760.203	969.3	-1.7	-1.8	
5762.502	5.3150	6.5	3.1641^{o}	5.5	5762.503	16.2		-1.3	
5762.998	5.3148	5.5	3.1641^{o}	5.5	5763.000^{b}	47.4		-0.8	
5763.034	5.4199	5.5	3.2692^{o}	5.5	5763.000^{b}	48.6		-0.7	
5767.532	5.3150	6.5	3.1660^{o}	7.5	5767.528^{c}	15.0		-1.3	
5772.738	4.6772	2.5	2.5301^{o}	2.5	5772.724	18.7		-1.9	
5790.764	4.7590^{o}	4.5	2.6186	3.5	5790.762	30.5		-1.6	
5791.468	4.5886^{o}	4.5	2.4484	4.5	5791.497^{b}	16.3		-2.1	
5791.537	5.0452	1.5	2.9051^{o}	2.5	5791.496^{b}	19.6		-1.5	
5793.243	4.5886^{o}	4.5	2.4491	3.5	5793.243	22.8		-1.9	
5796.676	5.3191^{o}	2.5	3.1809	2.5	5796.715^{b}	17.1		-1.2	
5796.713	4.3392^{o}	1.5	2.2010	2.5	5796.716^{b}	19.3		-2.3	
5799.837	4.2394^{o}	2.5	2.1023	3.5	5799.861^{bc}	106.2		-1.6	
5799.871	4.3011^{o}	5.5	2.1641	6.5	5799.861^{bc}	106.7		-1.6	
5801.137	4.4910^{o}	6.5	2.3544	5.5	5801.140^{c}	17.0	-2.5	-2.1	
5808.346	5.0938^{o}	3.5	2.9598	3.5	5808.300	37.4		-1.1	
5811.384	5.3191	4.5	3.1863^{o}	4.5	5811.400^{c}	3159.0			
5822.992	5.3148	5.5	3.1863^{o}	4.5	5822.990	9.4		-1.5	
5830.390	5.2900	4.5	3.1641^{o}	5.5	5830.381	22.0		-1.1	
5833.470	5.1173^{o}	6.5	2.9926	6.5	5833.476	16.1		-1.5	
5834.943	5.0925	4.5	2.9682^{o}	4.5	5834.941	28.3		-1.2	
5841.386	4.2721^{o}	4.5	2.1502	3.5	5841.374^{n}	11.8		-2.5	-2.4
5891.649	4.4582^{o}	6.5	2.3544	5.5	5891.653	8.7		-2.5	
5895.634	2.1023	3.5	0.0000^{o}	3.5	5895.626^{n}	52955.4		-1.3	-1.6
5899.479	3.1884	3.5	1.0875^{o}	2.5	5899.475	217.3	-2.1	-2.5	
5901.575	4.4178^{o}	8.5	2.3176	7.5	5901.566^{n}	684.9		-0.6	-0.8
5908.404	5.2638	6.5	3.1660^{o}	7.5	5908.409^{c}	37.1		-0.9	
5909.188	5.2576^{o}	6.5	3.1601	5.5	5909.186	13.3		-1.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5912.582	5.2604	5.5	3.1641^o	5.5	5912.582	111.7		-0.4	
5916.039	4.9851^o	4.5	2.8900	5.5	5916.016^n	42.5		-1.2	-1.4
5916.427	4.7977	2.5	2.7027^o	1.5	5916.416	23.2		-1.6	
5916.894	5.2811	5.5	3.1863^o	4.5	5916.894	34.8		-0.9	
5920.854	3.1809	2.5	1.0875^o	2.5	5920.847	40.0	-3.0	-3.2	
5922.621	4.8200^o	5.5	2.7273	5.5	5922.610^n	6.6		-2.2	-1.8
5928.412	5.1095^o	3.5	3.0188	4.5	5928.456^b	61.9		-0.9	
5928.457	4.5042^o	5.5	2.4135	6.5	5928.456^b	63.5		-1.5	
5931.357	5.3688	3.5	3.2791^o	2.5	5931.346	13.4		-1.2	
5934.882	4.4239^o	3.5	2.3355	4.5	5934.886	78.3		-1.5	
5935.900	3.9814^o	7.5	1.8933	7.5	5935.901	1484.7		-0.7	
5948.156	4.4973^o	7.5	2.4135	6.5	5948.155	53.7	-1.9	-1.6	
5953.567	4.7769^o	5.5	2.6951	4.5	5953.555	15.8		-1.8	
5967.738	5.0254^o	3.5	2.9485	4.5	5967.786^b	12.6		-1.6	
5967.796	4.2607^o	3.5	2.1838	4.5	5967.786^b	12.4		-2.5	
5970.314	4.7711^o	3.5	2.6951	4.5	5970.306	11.3		-2.0	
5971.263	2.0757	3.5	0.0000^o	3.5	5971.252^n	6555.7		-2.2	-2.2
5972.393	4.9733^o	6.5	2.8980	6.5	5972.394	42.9		-1.2	
5981.732	4.4856^o	7.5	2.4135	6.5	5981.734	140.2	-1.4	-1.2	
6001.697	4.5953	2.5	2.5301^o	2.5	6001.698	56.7		-1.5	
6009.923	4.7651	2.5	2.7027^o	1.5	6009.911^c	23.8		-1.6	
6011.787	3.9943^o	4.5	1.9326	5.5	6011.834^b	21.4		-2.6	
6011.857	4.5101^o	4.5	2.4484	4.5	6011.835^b	18.4	-2.4	-2.0	
6016.025	4.2105^o	3.5	2.1502	3.5	6016.018	10.1		-2.6	
6025.433	4.2211^o	7.5	2.1641	6.5	6025.423^n	265.0		-1.2	-1.2
6037.280	5.2171	5.5	3.1641^o	5.5	6037.278	16.1		-1.3	
6043.070	5.1763	2.5	3.1253^o	1.5	6043.064	10.7		-1.5	
6044.186	5.4528	3.5	3.4021^o	4.5	6044.170^b	10.0		-1.3	
6044.188	5.3844^o	4.5	3.3337	4.5	6044.170^b	10.0		-1.3	
6054.521	5.3150	6.5	3.2679^o	6.5	6054.537^b	17.8		-1.2	
6054.536	5.1414	6.5	3.0943^o	5.5	6054.537^b	17.8		-1.3	
6054.551	4.9403	3.5	2.8931^o	3.5	6054.537^b	19.2		-1.5	
6063.167	4.2083^o	6.5	2.1641	6.5	6063.180	65.0		-1.8	
6067.407	5.3950	3.5	3.3521^o	3.5	6067.398	14.1		-1.2	
6086.851	4.8159	5.5	2.7796^o	4.5	6086.852	14.2		-1.8	
6111.775	4.1921^o	6.5	2.1641	6.5	6111.774	11.3		-2.6	
6115.493	4.2105^o	3.5	2.1838	4.5	6115.488^b	5.8		-2.9	
6115.499	4.8696^o	2.5	2.8428	2.5	6115.488^b	6.1		-2.1	
6118.881	4.1897^o	5.5	2.1641	6.5	6118.877	248.6	-1.4	-1.2	
6131.531	4.0618^o	8.5	2.0403	8.5	6131.524^n	440.7		-1.1	-1.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6160.720	5.2811	5.5	3.2692^o	5.5	6160.722^c	33.8		-0.9	
6167.930	4.2105^o	3.5	2.2010	2.5	6167.917	41.3		-2.0	
6169.025	5.3613	2.5	3.3521^o	3.5	6169.025	18.3		-1.1	
6170.805	4.3461^o	4.5	2.3375	5.5	6170.798^n	10.1		-2.5	-2.2
6177.253	5.4149^o	4.5	3.4084	5.5	6177.261^b	68.5		-0.4	
6177.263	4.1706^o	5.5	2.1641	6.5	6177.261^b	68.5		-1.8	
6179.052	5.1700	5.5	3.1641^o	5.5	6179.026	19.7		-1.2	
6196.600	4.4239^o	3.5	2.4237	2.5	6196.605^c	6.7		-2.5	
6197.105	4.8429^o	1.5	2.8428	2.5	6197.104^c	6.8		-2.1	
6203.922	4.0736^o	2.5	2.0757	3.5	6203.927	11.5		-2.7	
6209.223	4.6148^o	3.5	2.6186	3.5	6209.210	15.8		-2.0	
6209.950	5.2638	6.5	3.2679^o	6.5	6209.953	17.0		-1.2	
6211.451	5.2745	3.5	3.2791^o	2.5	6211.448^c	18.4		-1.2	
6274.419	5.1414	6.5	3.1660^o	7.5	6274.420	11.8		-1.5	
6277.517	4.6772	2.5	2.7027^o	1.5	6277.497	29.1		-1.6	
6279.574	4.6689^o	5.5	2.6951	4.5	6279.559^n	5.4		-2.3	-2.2
6288.760	4.1212^o	3.5	2.1502	3.5	6288.768	6.4		-2.9	
6291.646	4.5886^o	4.5	2.6186	3.5	6291.647^c	13.3		-2.0	
6299.969	4.9272^o	4.5	2.9598	3.5	6299.970	50.7		-1.1	
6312.191	4.3011^o	5.5	2.3375	5.5	6312.196	29.6		-2.0	
6344.752	4.2711^o	6.5	2.3176	7.5	6344.752	108.1	-1.7	-1.5	
6352.659	4.0268^o	2.5	2.0757	3.5	6352.641	92.0		-1.8	
6362.908	5.2171	5.5	3.2692^o	5.5	6362.912	8.2		-1.5	
6367.878	4.0222^o	4.5	2.0757	3.5	6367.882	55.9		-2.0	
6369.487	4.2814^o	5.5	2.3355	4.5	6369.489^c	10.7		-2.5	
6375.348	4.8926^o	3.5	2.9485	4.5	6375.375^b	17.5	-1.4	-1.6	
6375.393	5.2963	4.5	3.3521^o	3.5	6375.375^b	18.1		-1.1	
6412.770	4.8926^o	3.5	2.9598	3.5	6412.765^n	6.2		-2.0	-1.5
6416.319	4.8802^o	5.5	2.9485	4.5	6416.329	41.9		-1.2	
6426.643	5.1095^o	3.5	3.1809	2.5	6426.631	6.9		-1.7	
6433.604	4.6216^o	5.5	2.6951	4.5	6433.646^b	7.8	-2.4	-2.2	
6433.647	5.3349^o	4.5	3.4084	5.5	6433.646^b	7.7		-1.4	
6436.068	5.1067^o	3.5	3.1809	2.5	6436.044	6.4		-1.8	
6438.101	4.2607^o	3.5	2.3355	4.5	6438.105	54.9		-1.8	
6440.537	4.9306	4.5	3.0061^o	3.5	6440.540^b	29.3		-1.3	
6440.556	4.0268^o	2.5	2.1023	3.5	6440.540^b	29.3		-2.3	
6452.730	3.8534^o	5.5	1.9326	5.5	6452.717^n	27.5		-2.5	-2.3
6454.941	4.1212^o	3.5	2.2010	2.5	6454.950	32.0		-2.1	
6456.200	4.0222^o	4.5	2.1023	3.5	6456.200	47.3		-2.1	
6460.279	4.9141	1.5	2.9955^o	0.5	6460.249	1627.0	0.7	0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6463.405	4.2721^o	4.5	2.3544	5.5	6463.405	52.5	-2.2	-1.8	
6465.811	5.3191	4.5	3.4021^o	4.5	6465.797	3.0		-1.8	
6466.783	4.2711^o	6.5	2.3544	5.5	6466.774^n	17.4		-2.2	-2.2
6480.184	5.3148	5.5	3.4021^o	4.5	6480.181^b	16.4		-1.1	
6480.214	4.9752	5.5	3.0625^o	4.5	6480.181^b	16.1		-1.5	
6483.974	5.0924^o	2.5	3.1809	2.5	6483.980	11.4		-1.5	
6494.572	4.9272^o	4.5	3.0188	4.5	6494.574	25.5		-1.3	
6519.777	5.0819^o	1.5	3.1809	2.5	6519.775	32.7		-1.1	
6551.189	3.9943^o	4.5	2.1023	3.5	6551.170	19.0		-2.5	
6555.477	4.2083^o	6.5	2.3176	7.5	6555.470^b	12.0		-2.5	
6555.510	5.4044	3.5	3.5137^o	3.5	6555.470^b	12.3		-1.1	
6566.271	4.3011^o	5.5	2.4135	6.5	6566.268	136.5		-1.3	
6572.816	4.9131^o	3.5	3.0274	2.5	6572.798	8.1		-1.8	
6604.962	4.0268^o	2.5	2.1502	3.5	6604.947	802.1		-0.8	
6610.331	4.2105^o	3.5	2.3355	4.5	6610.314^c	54.1		-1.8	
6612.335	4.1921^o	6.5	2.3176	7.5	6612.336	6.3		-2.7	
6615.524	5.7651	3.5	3.8916^o	4.5	6615.562^b	6.1		-1.0	
6615.560	5.1414	6.5	3.2679^o	6.5	6615.562^b	5.9		-1.7	
6616.823	4.6588	4.5	2.7856^o	5.5	6616.787^b	15.6		-1.8	
6616.836	5.5069	5.5	3.6337^o	4.5	6616.787^b	15.6		-0.9	
6621.416	4.0222^o	4.5	2.1502	3.5	6621.425	31.3		-2.2	
6627.256	5.1095^o	3.5	3.2392	2.5	6627.231	15.3		-1.3	
6635.526	4.2814^o	5.5	2.4135	6.5	6635.524	27.0		-2.0	
6637.270	5.3453^o	2.5	3.4778	2.5	6637.260^b	18.7		-1.0	
6637.279	5.1067^o	3.5	3.2392	2.5	6637.260^b	18.7		-1.2	
6637.280	4.8948^o	3.5	3.0274	2.5	6637.260^b	18.7	-1.6	-1.5	
6641.593	4.8936^o	2.5	3.0274	2.5	6641.591	9.4		-1.8	
6642.558	5.0319	6.5	3.1660^o	7.5	6642.559	5.5		-1.9	
6650.840	3.9393^o	2.5	2.0757	3.5	6650.853^c	42.3		-2.2	
6657.100	5.3755	4.5	3.5137^o	3.5	6657.083^b	27.8		-0.8	
6657.120	4.6588	4.5	2.7969^o	5.5	6657.083^b	27.9		-1.6	
6657.726	4.0119^o	3.5	2.1502	3.5	6657.713	168.4		-1.5	
6658.630	4.8802^o	5.5	3.0188	4.5	6658.633^c	94.5		-0.8	
6659.028	4.5886^o	4.5	2.7273	5.5	6659.026	9.6		-2.1	
6663.990	4.8873^o	1.5	3.0274	2.5	6663.999	10.6	-1.6	-1.7	
6684.537	4.1897^o	5.5	2.3355	4.5	6684.537^n	31.2		-2.0	-2.1
6692.930	4.2239^o	0.5	2.3720	1.5	6692.938	75.8		-1.6	
6726.340	5.0819^o	1.5	3.2392	2.5	6726.324	15.6		-1.3	
6742.112	4.0222^o	4.5	2.1838	4.5	6742.122	8.0		-2.8	
6744.983	4.1921^o	6.5	2.3544	5.5	6744.993	4.2		-2.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6754.274	4.1706^o	5.5	2.3355	4.5	6754.267	11.6		-2.5	
6757.970	4.7272	2.5	2.8931^o	3.5	6757.954	1.9		-2.6	
6761.471	4.7262	4.5	2.8931^o	3.5	6761.454^c	3.4		-2.4	
6761.783	4.1706^o	5.5	2.3375	5.5	6761.781	3.6		-3.0	
6777.941	5.1067^o	3.5	3.2780	3.5	6777.916	16.3		-1.3	
6779.761	4.0119^o	3.5	2.1838	4.5	6779.746	811.9		-0.8	
6782.002	4.8464^o	5.5	3.0188	4.5	6782.007	42.0		-1.2	
6783.427	3.9295^o	3.5	2.1023	3.5	6783.422	5.8		-3.0	
6788.518	4.0268^o	2.5	2.2010	2.5	6788.503	46.5		-2.0	
6805.178	5.2992^o	3.5	3.4778	2.5	6805.228^b	8.7		-1.3	
6805.226	5.1735	4.5	3.3521^o	3.5	6805.228^b	8.7		-1.5	
6831.093	5.0924^o	2.5	3.2780	3.5	6831.089	27.8		-1.1	
6835.491	3.8890^o	3.5	2.0757	3.5	6835.501	15.7		-2.6	
6844.267	4.0119^o	3.5	2.2010	2.5	6844.248	717.8		-0.8	
6845.768	3.9943^o	4.5	2.1838	4.5	6845.748	678.0		-0.9	
6852.228	4.6517^o	3.5	2.8428	2.5	6852.232^c	3.6		-2.4	
6854.139	5.0924^o	2.5	3.2841	1.5	6854.112	26.7		-1.1	
6856.876	4.2211^o	7.5	2.4135	6.5	6856.868^n	36.1		-1.9	-1.7
6856.924	5.1597	3.5	3.3521^o	3.5	6856.877^b	37.4		-0.8	
6865.570	4.4239^o	3.5	2.6186	3.5	6865.579	4.5		-2.6	
6897.677	5.6298^o	3.5	3.8329	4.5	6897.706^b	4.2		-1.3	
6897.690	3.9807^o	5.5	2.1838	4.5	6897.706^b	4.2		-3.1	
6915.843	5.1443	2.5	3.3521^o	3.5	6915.840	9.8		-1.4	
6937.364	3.8890^o	3.5	2.1023	3.5	6937.376	32.8		-2.3	
6971.783	4.9031	2.5	3.1253^o	1.5	6971.797	3.4		-2.1	
6992.787	4.9588	3.5	3.1863^o	4.5	6992.801	2.1		-2.3	
6994.461	5.5071^o	6.5	3.7350	6.5	6994.484^b	8.4		-1.1	
6994.505	4.6772	2.5	2.9051^o	2.5	6994.484^b	8.6		-2.0	
6997.369	5.1735	4.5	3.4021^o	4.5	6997.363	4.8		-1.7	
7010.782	5.6677	5.5	3.8997^o	4.5	7010.785	18.8		-0.5	
7012.152	4.0852^o	6.5	2.3176	7.5	7012.173	16.9		-2.4	
7017.896	5.0452	1.5	3.2791^o	2.5	7017.889	14.5		-1.4	
7039.608	6.1451	3.5	4.3844^o	4.5	7039.655	16.3		-0.1	
7067.392	5.0216	5.5	3.2679^o	6.5	7067.447	4.4		-1.9	
7101.697	4.7408	1.5	2.9955^o	0.5	7101.692^c	3.0		-2.4	
7106.136	4.0618^o	8.5	2.3176	7.5	7106.139	35.3	-2.3	-2.0	
7108.051	3.9078^o	5.5	2.1641	6.5	7108.056^b	6.6		-2.9	
7108.107	4.7711^o	3.5	3.0274	2.5	7108.056^b	6.4		-2.0	
7145.907	3.8369^o	4.5	2.1023	3.5	7145.918	5.7		-3.1	
7152.047	4.1815^o	4.5	2.4484	4.5	7152.072	6.0		-2.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7198.395	5.3556	5.5	3.6337^{o}	4.5	7198.441	6.1		-1.3	
7214.172	4.9100^{o}	1.5	3.1919	2.5	7214.173^{bc}	7.3	-1.4	-1.8	
7214.201	5.1925^{o}	4.5	3.4744	4.5	7214.174^{bc}	7.6	-1.3	-1.4	
7231.297	4.9025^{o}	3.5	3.1884	3.5	7231.278^{c}	7.8		-1.7	
7257.716	3.8916^{o}	4.5	2.1838	4.5	7257.727^{b}	12.3		-2.7	
7257.766	5.5478^{o}	5.5	3.8400	5.5	7257.727^{b}	11.9		-0.8	
7272.614	3.9053^{o}	1.5	2.2010	2.5	7272.635	113.9		-1.7	
7273.926	4.1277^{o}	2.5	2.4237	2.5	7273.940	10.1		-2.5	
7281.809	4.5953	2.5	2.8931^{o}	3.5	7281.820	3.9		-2.4	
7282.854	4.8903^{o}	4.5	3.1884	3.5	7282.840	3.4		-2.1	
7284.303	4.0736^{o}	2.5	2.3720	1.5	7284.317	19.8		-2.2	
7287.862	4.8926^{o}	3.5	3.1919	2.5	7287.853^{n}	2.5		-2.2	-1.5
7293.364	4.7508	1.5	3.0513^{o}	2.5	7293.351	2.1		-2.5	
7301.775	4.1212^{o}	3.5	2.4237	2.5	7301.784	7.1		-2.6	
7325.173	4.0641^{o}	1.5	2.3720	1.5	7325.181	5.3		-2.8	
7327.583	4.9706	1.5	3.2791^{o}	2.5	7327.632	2.6		-2.1	
7331.619	4.6588	4.5	2.9682^{o}	4.5	7331.579	9.5		-1.9	
7332.300	4.7538	3.5	3.0633^{o}	3.5	7332.316	2.8		-2.3	
7332.804	5.0925	4.5	3.4021^{o}	4.5	7332.798	1.9		-2.1	
7336.844	4.3844^{o}	4.5	2.6951	4.5	7336.875^{b}	20.0		-1.9	
7336.874	3.8534^{o}	5.5	2.1641	6.5	7336.875^{b}	21.1	-2.9	-2.5	
7337.650	5.2244	4.5	3.5352^{o}	4.5	7337.666^{c}	5.7		-1.5	
7342.181	4.6564	3.5	2.9682^{o}	4.5	7342.161	5.0		-2.2	
7362.715	3.8337^{o}	3.5	2.1502	3.5	7362.725	11.0		-2.8	
7379.159	4.9588	3.5	3.2791^{o}	2.5	7379.156^{c}	1.8		-2.3	
7381.020	4.7735	4.5	3.0943^{o}	5.5	7381.013	4.0		-2.1	
7387.872	4.8696^{o}	2.5	3.1919	2.5	7387.883^{b}	9.4		-1.7	
7387.886	4.9169^{o}	2.5	3.2392	2.5	7387.883^{b}	9.3	-1.4	-1.6	
7396.017	4.7272	2.5	3.0513^{o}	2.5	7395.987	2.5		-2.4	
7409.858	4.1212^{o}	3.5	2.4484	4.5	7409.868	22.5		-2.1	
7411.375	4.7977	2.5	3.1253^{o}	1.5	7411.359	3.4		-2.2	
7417.227	4.6772	2.5	3.0061^{o}	3.5	7417.178	12.7		-1.7	
7432.174	4.0222^{o}	4.5	2.3544	5.5	7432.186	87.8		-1.6	
7448.424	4.7265	3.5	3.0625^{o}	4.5	7448.374	11.1		-1.7	
7452.229	4.9668^{o}	3.5	3.3036	4.5	7452.245^{b}	3.0		-2.0	
7452.301	4.7265	3.5	3.0633^{o}	3.5	7452.245^{b}	3.2		-2.3	
7481.081	3.9943^{o}	4.5	2.3375	5.5	7481.070	504.0		-0.9	
7490.212	4.0268^{o}	2.5	2.3720	1.5	7490.186	375.4		-1.0	
7497.832	3.8369^{o}	4.5	2.1838	4.5	7497.771	4.5		-3.1	
7503.703	4.8159	5.5	3.1641^{o}	5.5	7503.725	4.0		-2.1	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7507.299	4.8429^o	1.5	3.1919	2.5	7507.312	18.5		-1.4	
7512.333	4.0736^o	2.5	2.4237	2.5	7512.342	6.6		-2.7	
7526.149	5.3819^o	5.5	3.7350	6.5	7526.142	3.9		-1.5	
7526.890	4.5447^o	5.5	2.8980	6.5	7526.854	5.0		-2.3	
7545.730	4.9267^o	0.5	3.2841	1.5	7545.775^b	124.4	-0.3	-0.5	
7545.775	3.2692^o	5.5	1.6266	4.5	7545.775^b	126.5		-2.3	
7558.304	4.3426	2.5	2.7027^o	1.5	7558.318^b	1157.5		-0.1	
7558.333	3.9943^o	4.5	2.3544	5.5	7558.318^b	1135.9		-0.5	
7580.602	5.1095^o	3.5	3.4744	4.5	7580.541	27.1		-0.9	
7591.532	3.8337^o	3.5	2.2010	2.5	7591.545	2.2		-3.4	
7593.720	5.1067^o	3.5	3.4744	4.5	7593.692^c	35.9		-0.8	
7594.822	4.7262	4.5	3.0943^o	5.5	7594.822	11.7		-1.7	
7621.676	3.9807^o	5.5	2.3544	5.5	7621.699^b	5.9		-2.8	
7621.701	4.8181^o	2.5	3.1919	2.5	7621.699^b	5.7		-1.9	
7623.609	4.6772	2.5	3.0513^o	2.5	7623.614	3.8		-2.2	
7629.844	5.1597	3.5	3.5352^o	4.5	7629.892^b	10.2		-1.3	
7629.866	4.0736^o	2.5	2.4491	3.5	7629.892^b	10.2		-2.5	
7629.929	4.9025^o	3.5	3.2780	3.5	7629.892^b	10.3		-1.6	
7633.993	4.9272^o	4.5	3.3036	4.5	7633.989	2.5		-2.1	
7653.414	5.0216	5.5	3.4021^o	4.5	7653.405	1.2		-2.4	
7661.170	3.9899^o	1.5	2.3720	1.5	7661.189	6.7		-2.7	
7666.256	4.9272^o	4.5	3.3105	3.5	7666.271	23.2		-1.2	
7676.592	5.0924^o	2.5	3.4778	2.5	7676.566	2.4		-2.0	
7677.014	4.6071^o	7.5	2.9926	6.5	7677.015	2.6	-2.7	-2.5	
7696.750	4.7046	4.5	3.0943^o	5.5	7696.723	11.9		-1.7	
7701.439	4.7735	4.5	3.1641^o	5.5	7701.421	47.6		-1.0	
7731.530	4.0268^o	2.5	2.4237	2.5	7731.520	326.2		-1.0	
7764.366	4.6588	4.5	3.0625^o	4.5	7764.327	4.8		-2.1	
7775.504	3.9295^o	3.5	2.3355	4.5	7775.506	8.9		-2.7	
7778.273	4.9272^o	4.5	3.3337	4.5	7778.298	20.1		-1.2	
7782.346	5.0819^o	1.5	3.4893	1.5	7782.321	20.3		-1.0	
7785.510	4.9025^o	3.5	3.3105	3.5	7785.503^c	25.7		-1.1	
7785.893	4.2105^o	3.5	2.6186	3.5	7785.868	19.4		-2.0	
7803.926	4.0119^o	3.5	2.4237	2.5	7803.908	33.7		-2.0	
7818.346	4.8958^o	4.5	3.3105	3.5	7818.363	3.3		-2.0	
7829.212	4.8936^o	2.5	3.3105	3.5	7829.216	4.7		-1.9	
7833.940	4.8926^o	3.5	3.3105	3.5	7833.958	2.1	-2.1	-2.2	
7845.306	4.8903^o	4.5	3.3105	3.5	7845.342	7.2		-1.7	
7856.078	4.0268^o	2.5	2.4491	3.5	7856.113^c	96.2		-1.5	
7876.085	4.0222^o	4.5	2.4484	4.5	7876.104^c	6.0		-2.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7893.185	3.9078^o	5.5	2.3375	5.5	7893.205	1.3		-3.5	
7899.128	5.1095^o	3.5	3.5404	3.5	7899.073^c	8.0		-1.4	
7901.065	4.9025^o	3.5	3.3337	4.5	7901.065^b	5.4		-1.8	
7901.073	5.2984^o	2.5	3.7296	2.5	7901.065^b	5.4		-1.3	
7913.372	5.1067^o	3.5	3.5404	3.5	7913.324	12.9		-1.2	
7913.815	3.9899^o	1.5	2.4237	2.5	7913.839	5.8		-2.8	
7918.059	6.1445	2.5	4.5791^o	3.5	7918.072^b	11.8		-0.1	
7918.103	5.0924^o	2.5	3.5271	2.5	7918.072^b	11.7		-1.2	
7922.130	4.6588	4.5	3.0943^o	5.5	7922.065^c	2.3		-2.4	
7927.512	4.0119^o	3.5	2.4484	4.5	7927.487	241.1		-1.1	
7930.837	4.0119^o	3.5	2.4491	3.5	7930.819^c	573.9		-0.7	
7934.470	5.7327	4.5	4.1706^o	5.5	7934.469^{bc}	3.6		-1.0	
7934.500	4.7262	4.5	3.1641^o	5.5	7934.469^{bc}	3.6		-2.2	
7934.885	4.8958^o	4.5	3.3337	4.5	7934.897	5.0		-1.8	
7940.156	4.8948^o	5.5	3.3337	4.5	7940.152^c	3.7	-1.9	-2.0	
7949.618	4.8696^o	2.5	3.3105	3.5	7949.638	2.1		-2.2	
7962.656	4.8903^o	4.5	3.3337	4.5	7962.682	3.7		-2.0	
7971.488	4.8585^o	3.5	3.3036	4.5	7971.545^b	6.1	-1.7	-1.8	
7971.561	5.0819^o	1.5	3.5271	2.5	7971.545^b	5.8		-1.5	
7978.433	3.8890^o	3.5	2.3355	4.5	7978.461	5.0		-2.9	
8014.775	4.8802^o	5.5	3.3337	4.5	8014.798	57.0		-0.8	
8017.908	3.9943^o	4.5	2.4484	4.5	8017.884	616.7		-0.7	
8021.309	3.9943^o	4.5	2.4491	3.5	8021.298	5.4		-2.8	
8034.231	4.8464^o	5.5	3.3036	4.5	8034.250	3.7		-2.0	
8045.816	4.7046	4.5	3.1641^o	5.5	8045.820^c	1.5		-2.5	
8048.671	4.7262	4.5	3.1863^o	4.5	8048.668	1.0		-2.7	
8061.404	3.1641^o	5.5	1.6266	4.5	8061.396	8.4		-3.5	
8068.703	2.6236	2.5	1.0875^o	2.5	8068.693^n	11.8		-4.0	-3.4
8140.391	5.2576^o	6.5	3.7350	6.5	8140.345	28.8		-0.6	
8178.809	4.2105^o	3.5	2.6951	4.5	8178.788	3.4		-2.7	
8194.194	4.8464^o	5.5	3.3337	4.5	8194.214^b	53.2		-0.8	
8194.277	5.5069	5.5	3.9943^o	4.5	8194.214^b	52.8		-0.1	
8197.104	5.4199	5.5	3.9078^o	5.5	8197.139	2.9		-1.4	
8201.132	4.6755	4.5	3.1641^o	5.5	8201.096	5.4		-2.0	
8225.634	3.8444^o	5.5	2.3375	5.5	8225.666	2.3		-3.3	
8245.848	4.8553	3.5	3.3521^o	3.5	8245.793	3.8		-1.9	
8276.583	4.1212^o	3.5	2.6236	2.5	8276.583	9.0		-2.4	
8294.525	3.9078^o	5.5	2.4135	6.5	8294.532	13.0		-2.4	
8323.164	4.6755	4.5	3.1863^o	4.5	8323.144	3.7		-2.1	
8341.021	4.7651	2.5	3.2791^o	2.5	8340.998	11.3		-1.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8445.094	5.3674	4.5	3.8997^o	4.5	8445.160	4.5		-1.3	
8604.092	3.8890^o	3.5	2.4484	4.5	8604.120	4.5		-2.9	
8607.798	3.8534^o	5.5	2.4135	6.5	8607.814	15.1	-2.8	-2.4	
8833.116	4.0268^o	2.5	2.6236	2.5	8833.085	3.1		-2.9	
8959.545	4.2814^o	5.5	2.8980	6.5	8959.586	8.8		-2.1	
9017.313	3.2679^o	6.5	1.8933	7.5	9017.316^b	151.3		-2.0	
9017.360	5.0023^o	2.5	3.6278	3.5	9017.316^b	141.9		-0.1	
9038.177	4.7735	4.5	3.4021^o	4.5	9038.190	8.3		-1.6	
9220.123	5.4848	4.5	4.1405^o	3.5	9220.106	22959.3			
9271.416	4.8505	4.5	3.5137^o	3.5	9271.353	79.1		-0.5	
9910.210	4.2105^o	3.5	2.9598	3.5	9910.220	94.9		-1.0	
10127.289	5.1317	4.5	3.9078^o	5.5	10127.307	29.4		-0.5	
10182.005	5.4894	5.5	4.2721^o	4.5	10181.942	647.2			

Table A.24: Measured wavelengths (λ_o) and intensities of Tm II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3761.332	3.2953	3.0	0.0000^o	4.0	3761.350	1511.9
3761.914	3.2948	4.0	0.0000^o	4.0	3761.935^b	1210.0
3761.960	6.6221^o	2.0	3.3274	3.0	3761.935^b	1100.8
3778.063	5.7016^o	5.0	2.4210	6.0	3778.065	1531.2
3786.996	7.7413^o	3.0	4.4684	3.0	3787.023^c	329.7
3795.759	3.2948	4.0	0.0294^o	3.0	3795.768^b	2172.4
3795.778	7.8364^o	3.0	4.5711	3.0	3795.768^b	2170.3
3832.905	6.6128^o	5.0	3.3790	4.0	3832.877	1932.4
3848.020	3.2210	3.0	0.0000^o	4.0	3848.023	3851.0
3861.858	6.3953^o	4.0	3.1858	4.0	3861.874^b	90.6
3861.881	7.5770^o	4.0	4.3676	5.0	3861.874^b	90.6
3881.258	7.9371^o	3.0	4.7436	3.0	3881.273^c	142.6
3883.440	3.2210	3.0	0.0294^o	3.0	3883.449	354.0
3890.522	3.1858	4.0	0.0000^o	4.0	3890.524	108.6
3900.783	4.2647	3.0	1.0873^o	2.0	3900.792^c	153.8
3901.995	6.6812^o	2.0	3.5047	3.0	3902.014	343.4
3913.619	6.7470^o	4.0	3.5800	5.0	3913.630^c	150.0
3929.577	4.2647	3.0	1.1106^o	3.0	3929.585	126.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3944.155	7.2384[o]	5.0	4.0959	5.0	3944.127	100.5
3956.919	7.3971[o]	4.0	4.2647	3.0	3956.889[c]	112.4
3958.097	3.1315	3.0	0.0000[o]	4.0	3958.103	430.0
3968.661	7.2043[o]	5.0	4.0811	6.0	3968.631	66.5
3976.657	7.3517[o]	4.0	4.2349	5.0	3976.683[c]	147.5
3977.051	8.0626[o]	3.0	4.9461	3.0	3977.054	105.2
3987.975	6.7389[o]	3.0	3.6309	2.0	3987.994	82.0
3995.582	3.1315	3.0	0.0294[o]	3.0	3995.587[c]	53.9
3996.511	3.1014	5.0	0.0000[o]	4.0	3996.515	852.8
3999.877	6.0624[o]	6.0	2.9637	6.0	3999.883	97.1
4009.895	7.5518[o]	5.0	4.4608	6.0	4009.890[b]	85.8
4009.916	6.9512[o]	5.0	3.8602	4.0	4009.889[b]	78.5
4019.884	7.1973[o]	7.0	4.1139	7.0	4019.911	69.5
4022.608	7.5421[o]	6.0	4.4608	6.0	4022.605[c]	25.3
4034.363	7.0057[o]	5.0	3.9335	5.0	4034.354	28.3
4039.988	6.3953[o]	4.0	3.3274	3.0	4039.969	400.2
4055.822	6.3513[o]	4.0	3.2953	3.0	4055.816[c]	1574.0
4062.006	6.9872[o]	3.0	3.9358	3.0	4062.023[c]	75.6
4086.784	7.5013[o]	3.0	4.4684	3.0	4086.780[c]	27.9
4089.197	6.6619[o]	3.0	3.6309	2.0	4089.191[c]	23.5
4092.659	5.9754[o]	6.0	2.9469	5.0	4092.638[c]	62.7
4112.623	6.6619[o]	3.0	3.6481	3.0	4112.634	49.6
4132.692	5.4201[o]	7.0	2.4210	6.0	4132.708[c]	38.4
4137.474	6.7599[o]	5.0	3.7642	6.0	4137.505[c]	42.1
4140.603	7.7008[o]	7.0	4.7074	6.0	4140.609[b]	27.6
4140.631	7.5994[o]	2.0	4.6060	2.0	4140.609[b]	31.6
4158.613	5.9274[o]	5.0	2.9469	5.0	4158.602[c]	713.7
4159.542	5.4201[o]	7.0	2.4403	8.0	4159.551	13.6
4168.754	7.2380[o]	3.0	4.2647	3.0	4168.737[c]	91.4
4173.091	7.6775[o]	6.0	4.7074	6.0	4173.119[b]	31.8
4173.101	6.7674[o]	4.0	3.7972	5.0	4173.119[b]	31.8
4173.143	6.7343[o]	5.0	3.7642	6.0	4173.119[b]	29.4
4192.297	7.7401[o]	2.0	4.7836	3.0	4192.326[c]	66.7
4193.520	7.3232[o]	4.0	4.3676	5.0	4193.512[c]	31.0
4199.918	2.9512	4.0	0.0000[o]	4.0	4199.921	444.0
4206.004	2.9469	5.0	0.0000[o]	4.0	4206.012	110.7
4211.956	6.7470[o]	4.0	3.8043	3.0	4211.955[c]	10.8
4216.878	7.4705[o]	5.0	4.5312	4.0	4216.853[c]	37.2
4221.434	7.6435[o]	5.0	4.7074	6.0	4221.443[c]	29.2
4236.930	5.9082[o]	8.0	2.9829	8.0	4236.945[c]	14.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4245.902	7.6553^o	5.0	4.7361	5.0	4245.932	21.3
4257.216	6.3331^o	5.0	3.4217	6.0	4257.181	24.4
4283.000	7.7536^o	3.0	4.8596	2.0	4283.018	41.4
4287.436	6.7389^o	3.0	3.8479	3.0	4287.440^c	15.3
4289.383	6.3953^o	4.0	3.5057	5.0	4289.366	33.6
4297.045	6.2331^o	5.0	3.3487	4.0	4297.010^c	98.5
4307.761	7.6001^o	3.0	4.7229	4.0	4307.751	27.7
4315.606	7.3517^o	4.0	4.4797	3.0	4315.635^c	19.7
4318.393	7.8364^o	3.0	4.9662	2.0	4318.401^c	664.5
4320.922	7.7223^o	7.0	4.8537	6.0	4320.928	27.5
4330.054	7.6185^o	4.0	4.7561	4.0	4330.077	22.4
4337.593	7.1809^o	3.0	4.3234	4.0	4337.622^c	56.3
4345.841	5.8032^o	5.0	2.9512	4.0	4345.867^{bc}	286.2
4345.884	7.3317^o	2.0	4.4797	3.0	4345.867^b	293.4
4347.865	6.7343^o	5.0	3.8835	6.0	4347.838^c	115.2
4355.689	7.5893^o	4.0	4.7436	3.0	4355.682^c	62.6
4366.291	7.7785^o	3.0	4.9398	4.0	4366.288^c	47.3
4367.884	5.2780^o	8.0	2.4403	8.0	4367.890	21.6
4369.380	7.2043^o	5.0	4.3676	5.0	4369.375	66.7
4374.194	6.1283^o	3.0	3.2948	4.0	4374.179	10.9
4375.967	7.7785^o	3.0	4.9461	3.0	4375.992^c	29.0
4378.284	7.3123^o	7.0	4.4813	6.0	4378.302^c	40.8
4403.669	7.2830^o	3.0	4.4684	3.0	4403.653^c	29.7
4414.801	7.1809^o	3.0	4.3734	2.0	4414.803^c	13.4
4415.056	6.6619^o	3.0	3.8546	2.0	4415.087^b	65.1
4415.064	6.9482^o	3.0	4.1408	3.0	4415.087^b	65.1
4422.300	7.7264^o	5.0	4.9237	6.0	4422.302^c	72.8
4434.318	7.5313^o	4.0	4.7361	5.0	4434.289	21.8
4435.706	6.1733^o	4.0	3.3790	4.0	4435.674	27.0
4436.318	7.4533^o	3.0	4.6594	4.0	4436.324^c	65.9
4442.091	7.7301^o	4.0	4.9398	4.0	4442.057^c	33.6
4458.044	7.1349^o	3.0	4.3546	4.0	4458.063^c	80.8
4460.017	6.6626^o	7.0	3.8835	6.0	4459.987	143.3
4467.958	6.6221^o	2.0	3.8479	3.0	4467.986^c	535.8
4478.827	7.4734^o	4.0	4.7060	3.0	4478.812^c	37.0
4481.246	7.6001^o	3.0	4.8343	3.0	4481.275^b	721.3
4481.275	2.7659	4.0	0.0000^o	4.0	4481.275^{bc}	733.8
4493.687	7.8364^o	3.0	5.0782	4.0	4493.680	11.4
4496.282	6.7599^o	5.0	4.0032	6.0	4496.259	15.5
4503.456	7.0057^o	5.0	4.2535	4.0	4503.484^c	118.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4520.650	7.4252^{o}	4.0	4.6834	4.0	4520.635^{c}	41.6
4529.384	2.7659	4.0	0.0294^{o}	3.0	4529.384	101.4
4532.131	6.4787^{o}	4.0	3.7439	5.0	4532.158^{c}	2340.6
4534.674	6.7739^{o}	8.0	4.0406	7.0	4534.639	17.6
4546.640	7.4095^{o}	3.0	4.6834	4.0	4546.652^{b}	27.4
4546.658	6.6619^{o}	3.0	3.9358	3.0	4546.652^{b}	27.5
4546.661	7.1589^{o}	4.0	4.4328	3.0	4546.652^{b}	27.5
4548.077	6.6088^{o}	7.0	3.8835	6.0	4548.102^{c}	373.9
4548.607	7.0983^{o}	3.0	4.3734	2.0	4548.597^{c}	1287.3
4550.464	6.6821^{o}	6.0	3.9583	5.0	4550.491	16.4
4553.374	7.6774^{o}	5.0	4.9554	5.0	4553.391^{c}	93.5
4563.678	7.1973^{o}	7.0	4.4813	6.0	4563.657	27.0
4571.889	6.5713^{o}	4.0	3.8602	4.0	4571.902^{c}	148.1
4573.700	7.4160^{o}	3.0	4.7060	3.0	4573.701^{c}	46.2
4575.343	6.6425^{o}	4.0	3.9335	5.0	4575.318^{c}	51.3
4576.288	5.6596^{o}	4.0	2.9512	4.0	4576.317^{c}	22.5
4578.835	6.6619^{o}	3.0	3.9550	4.0	4578.796	48.5
4590.687	7.6553^{o}	5.0	4.9554	5.0	4590.652^{c}	291.7
4596.597	7.5518^{o}	5.0	4.8554	4.0	4596.630^{bc}	956.3
4596.656	7.7003^{o}	4.0	5.0038	3.0	4596.630^{b}	966.1
4626.324	5.3582^{o}	4.0	2.6790	3.0	4626.327	44.8
4626.564	2.6790	3.0	0.0000^{o}	4.0	4626.563	49.6
4634.317	7.5099^{o}	3.0	4.8354	2.0	4634.303^{b}	755.0
4634.330	4.8596	2.0	2.1851^{o}	2.0	4634.303^{bc}	747.6
4644.559	6.1733^{o}	4.0	3.5047	3.0	4644.581^{bc}	374.2
4644.566	7.1809^{o}	3.0	4.5122	2.0	4644.581^{b}	374.2
4646.807	7.5058^{o}	4.0	4.8384	4.0	4646.818^{b}	41.4
4646.852	7.3902^{o}	5.0	4.7229	4.0	4646.818^{b}	41.8
4657.104	7.5994^{o}	2.0	4.9380	2.0	4657.096	21.0
4669.392	6.6128^{o}	5.0	3.9583	5.0	4669.381	45.1
4705.405	7.3902^{o}	5.0	4.7561	4.0	4705.442^{c}	275.8
4724.239	7.2830^{o}	3.0	4.6594	4.0	4724.266^{c}	6829.5
4727.841	6.7615^{o}	3.0	4.1399	4.0	4727.839	35.0
4780.684	6.6221^{o}	2.0	4.0294	2.0	4780.712^{c}	25.4
4807.495	7.6001^{o}	3.0	5.0220	2.0	4807.475^{c}	1124.2
4808.638	7.4160^{o}	3.0	4.8384	4.0	4808.676^{c}	1401.1
4811.612	6.9395^{o}	6.0	4.3635	7.0	4811.637^{c}	53.1
4826.982	6.0512^{o}	5.0	3.4834	6.0	4826.982	22.8
4831.912	7.5205^{o}	6.0	4.9554	5.0	4831.912	36.9
4861.909	7.4533^{o}	3.0	4.9040	3.0	4861.868^{c}	29.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4865.032	6.3139^o	3.0	3.7662	4.0	4864.992^c	15.2
4870.386	7.0057^o	5.0	4.4608	6.0	4870.367^c	210.3
4880.989	7.2830^o	3.0	4.7436	3.0	4880.989	26.1
4887.676	6.3331^o	5.0	3.7972	5.0	4887.635^c	54.4
4904.432	7.0983^o	3.0	4.5711	3.0	4904.413	541.9
4927.712	7.4533^o	3.0	4.9380	2.0	4927.731^c	212.7
4943.693	6.8176^o	7.0	4.3104	8.0	4943.676	27.4
4959.873	7.3343^o	2.0	4.8354	2.0	4959.845^c	29.8
4960.142	7.5770^o	4.0	5.0782	4.0	4960.165^c	41.3
4965.199	7.6001^o	3.0	5.1038	4.0	4965.176	34.6
4970.870	4.9144^o	7.0	2.4210	6.0	4970.867	27.5
4980.680	5.4354^o	5.0	2.9469	5.0	4980.683	31.0
4985.136	6.5897^o	3.0	4.1034	2.0	4985.129^c	93.5
4989.323	5.4550^o	6.0	2.9708	7.0	4989.321	37.9
4996.847	6.6544^o	4.0	4.1739	4.0	4996.849	46.9
5001.016	6.5596^o	5.0	4.0811	6.0	5001.017^c	90.7
5002.157	6.4329^o	3.0	3.9550	4.0	5002.197^c	36.6
5004.300	6.5727^o	6.0	4.0959	5.0	5004.307^c	151.0
5009.767	4.9144^o	7.0	2.4403	8.0	5009.768	125.9
5014.555	5.4354^o	5.0	2.9637	6.0	5014.553	43.0
5034.218	4.8945^o	6.0	2.4324	7.0	5034.218	114.1
5041.212	5.9421^o	6.0	3.4834	6.0	5041.208^c	33.1
5042.153	7.6553^o	5.0	5.1971	6.0	5042.188^b	79.2
5042.203	6.9395^o	6.0	4.4813	6.0	5042.188^b	82.3
5060.419	5.4201^o	7.0	2.9708	7.0	5060.422	51.3
5068.894	6.0934^o	4.0	3.6481	3.0	5068.890^c	222.8
5077.222	7.1246^o	3.0	4.6834	4.0	5077.187^c	567.9
5088.891	7.4395^o	4.0	5.0038	3.0	5088.874^c	220.6
5111.688	7.1322^o	6.0	4.7074	6.0	5111.714^b	97.9
5111.745	6.6895^o	4.0	4.2647	3.0	5111.712^{bc}	71.9
5114.546	5.2780^o	8.0	2.8546	8.0	5114.548	35.7
5118.629	7.4095^o	3.0	4.9880	2.0	5118.602^c	20.2
5128.294	6.9482^o	3.0	4.5312	4.0	5128.282	29.6
5135.541	6.4541^o	6.0	4.0406	7.0	5135.503^c	42.6
5142.555	6.7389^o	3.0	4.3287	3.0	5142.545^c	108.1
5215.418	7.6070^o	5.0	5.2305	5.0	5215.442^c	48.5
5231.956	6.1733^o	4.0	3.8043	3.0	5231.916^c	54.8
5232.378	7.2830^o	3.0	4.9142	4.0	5232.381^c	9.1
5255.500	6.8397^o	5.0	4.4813	6.0	5255.501^c	48.5
5262.261	7.5058^o	4.0	5.1504	5.0	5262.250^c	13.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5296.579	6.4541^o	6.0	4.1139	7.0	5296.549^c	59.0
5305.864	4.9424^o	5.0	2.6063	5.0	5305.865	47.0
5322.984	5.6596^o	4.0	3.3311	5.0	5323.005^c	24.1
5324.623	6.9872^o	3.0	4.6594	4.0	5324.598^c	215.4
5345.729	6.6821^o	6.0	4.3635	7.0	5345.755^c	150.5
5346.495	4.7392^o	6.0	2.4210	6.0	5346.494	95.7
5368.791	7.5058^o	7.0	5.1971	6.0	5368.774^c	20.8
5373.006	4.7392^o	6.0	2.4324	7.0	5372.990^c	26.8
5387.173	7.5313^o	4.0	5.2305	5.0	5387.206^c	16.1
5389.846	6.2331^o	5.0	3.9335	5.0	5389.812	23.1
5398.490	4.9880	2.0	2.6921^o	3.0	5398.448	25.0
5423.531	6.5727^o	6.0	4.2874	5.0	5423.556^c	12.0
5436.936	6.7389^o	3.0	4.4592	4.0	5436.970^c	117.3
5439.581	6.7470^o	4.0	4.4684	3.0	5439.549^c	17.9
5440.768	6.2331^o	5.0	3.9550	4.0	5440.750^c	25.8
5446.418	7.6435^o	5.0	5.3678	4.0	5446.454^c	352.3
5495.649	6.3513^o	4.0	4.0959	5.0	5495.616^c	78.2
5506.100	7.7223^o	7.0	5.4712	8.0	5506.075^c	90.8
5535.153	7.6070^o	5.0	5.3678	4.0	5535.193^c	39.3
5538.385	6.0925^o	2.0	3.8546	2.0	5538.341^c	79.4
5552.924	6.9395^o	6.0	4.7074	6.0	5552.944	12.0
5556.442	7.2345^o	4.0	5.0038	3.0	5556.475	125.4
5562.787	4.7361	5.0	2.5080^o	5.0	5562.765	11485.5
5579.836	7.4095^o	3.0	5.1882	3.0	5579.817	87.0
5581.331	5.1882	3.0	2.9675^o	3.0	5581.357^c	313.8
5586.649	6.5290^o	7.0	4.3104	8.0	5586.643^c	24.6
5701.002	4.8991	2.0	2.7249^o	2.0	5701.018	26.0
5703.464	6.7792^o	3.0	4.6060	2.0	5703.498^c	42.0
5715.778	6.4919^o	3.0	4.3234	4.0	5715.792^c	1389.0
5721.915	7.1697^o	6.0	5.0036	6.0	5721.884	10.6
5738.887	7.2380^o	3.0	5.0782	4.0	5738.923^c	15.0
5744.820	6.0934^o	4.0	3.9358	3.0	5744.826	13.9
5750.249	4.9398	4.0	2.7843^o	4.0	5750.289^c	12.9
5751.172	7.1697^o	6.0	5.0146	6.0	5751.134^c	11.9
5767.536	7.4705^o	5.0	5.3215	6.0	5767.528^c	15.0
5799.872	5.9032^o	5.0	3.7662	4.0	5799.861^c	106.7
5801.124	7.1246^o	3.0	4.9880	2.0	5801.140^c	17.0
5806.980	6.9124^o	6.0	4.7780	6.0	5806.974	6.2
5811.355	6.7389^o	3.0	4.6060	2.0	5811.400^c	3156.9
5908.423	7.1246^o	3.0	5.0268	3.0	5908.409^c	37.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6009.862	4.8467	5.0	2.7843^o	4.0	6009.911^c	23.5
6102.713	7.1349^o	3.0	5.1038	4.0	6102.713	11.6
6110.770	6.5596^o	5.0	4.5312	4.0	6110.810	6.9
6160.750	6.1733^o	4.0	4.1614	3.0	6160.721^c	28.5
6170.850	5.9421^o	6.0	3.9335	5.0	6170.806	10.4
6196.603	6.5713^o	4.0	4.5711	3.0	6196.605^c	6.7
6197.114	6.4329^o	3.0	4.4328	3.0	6197.104^c	6.8
6211.403	4.9424^o	5.0	2.9469	5.0	6211.448^c	17.4
6291.621	6.0512^o	5.0	4.0811	6.0	6291.647^c	13.1
6369.484	4.9554	5.0	3.0094^o	5.0	6369.489^c	10.7
6452.761	6.4919^o	3.0	4.5711	3.0	6452.725^c	27.5
6517.062	7.0057^o	5.0	5.1038	4.0	6517.044	22.7
6610.317	5.4550^o	6.0	3.5800	5.0	6610.314^c	46.7
6650.815	6.3450^o	7.0	4.4813	6.0	6650.853^c	43.5
6653.737	5.4427	5.0	3.5798^o	4.0	6653.685	7.6
6658.638	5.9754^o	6.0	4.1139	7.0	6658.633^c	94.5
6761.489	6.7792^o	3.0	4.9461	3.0	6761.454^c	3.5
6852.203	6.6626^o	7.0	4.8537	6.0	6852.232^c	2.7
7101.737	6.7599^o	5.0	5.0146	6.0	7101.691^c	2.5
7214.128	6.6221^o	2.0	4.9040	3.0	7214.173^c	7.2
7231.244	6.6812^o	2.0	4.9671	1.0	7231.278^c	7.5
7310.418	4.9424^o	5.0	3.2469	5.0	7310.433	15.8
7337.724	6.7674^o	4.0	5.0782	4.0	7337.666^c	5.6
7379.163	4.6471	2.0	2.9675^o	3.0	7379.156^c	1.8
7474.672	6.0934^o	4.0	4.4351	5.0	7474.715	5.2
7520.980	6.6626^o	7.0	5.0146	6.0	7521.023	1.1
7593.663	6.4919^o	3.0	4.8596	2.0	7593.692^c	35.9
7654.990	3.8043	3.0	2.1851^o	2.0	7654.986	1.7
7660.374	6.9395^o	6.0	5.3215	6.0	7660.336	31.1
7785.504	6.0512^o	5.0	4.4592	4.0	7785.503^c	25.7
7856.125	6.4919^o	3.0	4.9142	4.0	7856.113^c	95.2
7876.080	6.2331^o	5.0	4.6594	4.0	7876.104^c	6.0
7899.043	6.5727^o	6.0	5.0036	6.0	7899.073^b	8.1
7899.136	6.5089^o	5.0	4.9398	4.0	7899.073^{bc}	7.4
7922.121	6.4787^o	4.0	4.9142	4.0	7922.065^c	2.3
7930.819	6.5897^o	3.0	5.0268	3.0	7930.819^c	578.9
7934.445	6.0934^o	4.0	4.5312	4.0	7934.469^c	3.6
7940.142	6.5727^o	6.0	5.0117	7.0	7940.152^c	3.7
8045.760	4.2655	2.0	2.7249^o	2.0	8045.820^c	1.6
10080.799	6.2331^o	5.0	5.0036	6.0	10080.855	253.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]

Table A.25: Measured wavelengths (λ_o) and intensities of Yb I spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3815.205	5.6924	2.0	2.4437^o	2.0	3815.211	1920.5
3882.070	5.6365	3.0	2.4437^o	2.0	3882.070	253.4
3890.767	6.0606	2.0	2.8749^o	2.0	3890.784^c	118.0
3926.732	6.0314	3.0	2.8749^o	2.0	3926.724	68.6
3949.562	6.2070^o	1.0	3.0688	2.0	3949.587	146.0
3957.061	6.2010^o	1.0	3.0688	2.0	3957.060	61.3
3961.979	5.3591	2.0	2.2307^o	1.0	3961.981	815.4
3979.097	5.5586	1.0	2.4437^o	2.0	3979.092	267.2
3998.432	5.5436	3.0	2.4437^o	2.0	3998.432	31.7
4007.352	5.9679	2.0	2.8749^o	2.0	4007.351	11320.5
4058.405	5.9290	2.0	2.8749^o	2.0	4058.412	712.3
4063.453	5.4940	2.0	2.4437^o	2.0	4063.459	16104.0
4082.992	5.9106	3.0	2.8749^o	2.0	4082.989	3065.2
4097.906	5.8996	1.0	2.8749^o	2.0	4097.901^c	51.8
4101.334	6.0909^o	1.0	3.0688	2.0	4101.324	28.8
4121.904	6.0758^o	1.0	3.0688	2.0	4121.904	461.5
4125.535	5.8793	2.0	2.8749^o	2.0	4125.539	195.5
4134.728	6.1057	2.0	3.1080^o	1.0	4134.737^c	73.9
4163.505	6.1101^o	4.0	3.1331	3.0	4163.512	13.2
4171.214	6.0402^o	1.0	3.0688	2.0	4171.223	49.2
4172.417	6.0068^o	2.0	3.0362	1.0	4172.420	2072.3
4197.871	6.0606	2.0	3.1080^o	1.0	4197.873	1014.0
4204.198	6.1543	5.0	3.2061^o	5.0	4204.201	307.6
4205.780	6.0550	1.0	3.1080^o	1.0	4205.791	81.9
4211.818	6.0116^o	3.0	3.0688	2.0	4211.823	7015.9
4219.243	6.0707^o	2.0	3.1331	3.0	4219.247	4202.0
4252.941	5.9831^o	1.0	3.0688	2.0	4252.943	12.3
4257.351	5.9801^o	2.0	3.0688	2.0	4257.354	155.6
4271.798	5.9703^o	3.0	3.0688	2.0	4271.790	1492.1
4272.107	6.1074	4.0	3.2061^o	5.0	4272.102	1968.4
4292.074	5.9958	1.0	3.1080^o	1.0	4292.083^b	84.3
4292.088	5.7627	3.0	2.8749^o	2.0	4292.083^b	89.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4294.475	5.7611	2.0	2.8749^o	2.0	4294.477	39.3
4300.983	6.0879	4.0	3.2061^o	5.0	4300.979	3601.2
4305.485	6.0849	5.0	3.2061^o	5.0	4305.484	277.3
4305.963	6.0116^o	3.0	3.1331	3.0	4305.962	39780.8
4313.154	6.0068^o	2.0	3.1331	3.0	4313.153	165.9
4333.908	5.9679	2.0	3.1080^o	1.0	4333.906	1127.0
4336.425	5.9914^o	2.0	3.1331	3.0	4336.422	3835.9
4344.766	5.8890^o	1.0	3.0362	1.0	4344.760	989.4
4350.009	5.8855^o	2.0	3.0362	1.0	4349.991	61.5
4352.947	5.9805^o	3.0	3.1331	3.0	4352.944	8083.9
4353.567	5.9801^o	2.0	3.1331	3.0	4353.559	1994.9
4356.665	6.0511	6.0	3.2061^o	5.0	4356.668	1864.9
4361.639	5.8779^o	0.0	3.0362	1.0	4361.633	304.8
4368.674	5.9703^o	3.0	3.1331	3.0	4368.670	214.6
4377.524	5.8676^o	2.0	3.0362	1.0	4377.520	7592.2
4394.972	5.8890^o	1.0	3.0688	2.0	4394.966	648.0
4400.337	5.8855^o	2.0	3.0688	2.0	4400.325	225.6
4410.228	5.9435^o	4.0	3.1331	3.0	4410.231	1329.7
4411.104	6.2414^o	1.0	3.4315	2.0	4411.097	5840.4
4430.212	5.8339^o	2.0	3.0362	1.0	4430.213	29375.0
4461.714	5.6529	1.0	2.8749^o	2.0	4461.711	39.0
4478.265	6.1543	5.0	3.3865^o	6.0	4478.260	47.1
4488.276	5.6365	3.0	2.8749^o	2.0	4488.275	12202.9
4503.201	5.8855^o	2.0	3.1331	3.0	4503.188	530.6
4520.159	5.1858	3.0	2.4437^o	2.0	4520.155	337.2
4529.869	4.9669	2.0	2.2307^o	1.0	4529.869	33353.4
4532.694	5.8676^o	2.0	3.1331	3.0	4532.692	200.6
4563.961	5.1595	1.0	2.4437^o	2.0	4563.962	56626.8
4567.380	4.9444	2.0	2.2307^o	1.0	4567.376	6889.7
4573.542	6.1416^o	1.0	3.4315	2.0	4573.554	48.5
4582.694	6.1074	4.0	3.4027^o	3.0	4582.691	1246.2
4582.922	5.9106	4.0	3.2061^o	5.0	4582.919	2037.6
4585.629	6.1057	2.0	3.4027^o	3.0	4585.630	191.1
4593.368	6.0849	5.0	3.3865^o	6.0	4593.368	157.9
4615.938	6.0879	4.0	3.4027^o	3.0	4615.932	1031.6
4618.478	5.5586	1.0	2.8749^o	2.0	4618.479	17.3
4629.819	5.7133^o	0.0	3.0362	1.0	4629.818	551.4
4630.518	5.7129^o	1.0	3.0362	1.0	4630.518	31.4
4651.667	6.0511	6.0	3.3865^o	6.0	4651.669	3685.3
4656.972	5.6977^o	2.0	3.0362	1.0	4656.968	20881.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4659.783	6.1543	5.0	3.4943[o]	4.0	4659.791	33.8
4664.526	6.0887[o]	1.0	3.4315	2.0	4664.560[b]	107.8
4664.570	5.7260[o]	2.0	3.0688	2.0	4664.560[b]	108.1
4666.735	5.7247[o]	1.0	3.0688	2.0	4666.723	2736.1
4671.703	5.7611	2.0	3.1080[o]	1.0	4671.702	72.3
4677.434	6.0364	6.0	3.3865[o]	6.0	4677.433	169.2
4679.622	5.7566	2.0	3.1080[o]	1.0	4679.619	36.4
4684.270	6.0487	4.0	3.4027[o]	3.0	4684.272	7662.0
4687.588	5.7129[o]	1.0	3.0688	2.0	4687.590	4875.1
4696.279	6.0707[o]	2.0	3.4315	2.0	4696.289	224.6
4702.351	6.1302	3.0	3.4943[o]	4.0	4702.352	427.6
4704.885	6.1302	3.0	3.4958[o]	2.0	4704.886	941.2
4709.336	5.8380	5.0	3.2061[o]	5.0	4709.329	90.3
4714.701	5.6977[o]	2.0	3.0688	2.0	4714.699	4612.6
4717.375	5.5024	3.0	2.8749[o]	2.0	4717.372	60.8
4743.353	6.1074	4.0	3.4943[o]	4.0	4743.355	583.8
4751.785	6.1028	3.0	3.4943[o]	4.0	4751.784	1001.0
4757.556	5.7132	0.0	3.1080[o]	1.0	4757.556	83.9
4778.978	6.0879	4.0	3.4943[o]	4.0	4778.978	467.8
4784.536	6.0849	5.0	3.4943[o]	4.0	4784.541	178.3
4795.826	5.6924	2.0	3.1080[o]	1.0	4795.824[c]	309.8
4812.919	6.0068[o]	2.0	3.4315	2.0	4812.918[c]	2484.3
4819.591	5.9583	5.0	3.3865[o]	6.0	4819.586	50.2
4830.705	5.7719	6.0	3.2061[o]	5.0	4830.704	1875.4
4831.298	5.6017[o]	1.0	3.0362	1.0	4831.290	3764.1
4831.911	5.9679	2.0	3.4027[o]	3.0	4831.910	2041.9
4832.985	5.6977[o]	2.0	3.1331	3.0	4832.981	580.9
4841.913	5.9914[o]	2.0	3.4315	2.0	4841.900	163.9
4849.034	5.4310	1.0	2.8749[o]	2.0	4849.034	113.2
4857.539	5.9831[o]	1.0	3.4315	2.0	4857.538	120.7
4870.292	5.6529	1.0	3.1080[o]	1.0	4870.276	44.7
4885.441	6.0314	3.0	3.4943[o]	4.0	4885.440	120.9
4888.175	6.0314	3.0	3.4958[o]	2.0	4888.172	47.1
4893.458	5.6017[o]	1.0	3.0688	2.0	4893.451	1451.0
4906.330	5.9290	2.0	3.4027[o]	3.0	4906.329[c]	115.2
4912.362	4.9669	2.0	2.4437[o]	2.0	4912.359	15166.6
4918.119	5.9229	4.0	3.4027[o]	3.0	4918.107	529.9
4919.598	5.9060	5.0	3.3865[o]	6.0	4919.593	307.9
4931.947	5.6211	2.0	3.1080[o]	1.0	4931.949	8834.0
4942.245	5.9106	4.0	3.4027[o]	3.0	4942.241	613.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4956.506	4.9444	2.0	2.4437^o	2.0	4956.500	959.6
4957.834	5.9958	1.0	3.4958^o	2.0	4957.812	52.8
4970.410	5.9894	1.0	3.4958^o	2.0	4970.410^c	229.0
4974.149	4.9355	1.0	2.4437^o	2.0	4974.150	5747.4
4989.559	5.3591	2.0	2.8749^o	2.0	4989.560	109.9
5004.781	5.8793	2.0	3.4027^o	3.0	5004.786	51.1
5013.737	5.9679	2.0	3.4958^o	2.0	5013.739	59.6
5019.689	5.6753	4.0	3.2061^o	5.0	5019.684	3294.8
5043.706	5.8890^o	1.0	3.4315	2.0	5043.703	363.0
5055.930	5.8380	5.0	3.3865^o	6.0	5055.935	27.0
5063.607	5.8793^o	1.0	3.4315	2.0	5063.598	18.6
5069.143	5.8316	6.0	3.3865^o	6.0	5069.139	19809.0
5076.751	5.5494	2.0	3.1080^o	1.0	5076.749	17796.9
5080.977	5.9338	3.0	3.4943^o	4.0	5080.980	1069.4
5082.580	6.1302	3.0	3.6915^o	4.0	5082.579^c	346.0
5083.935	5.9338	3.0	3.4958^o	2.0	5083.956	306.7
5086.451	5.8683^o	1.0	3.4315	2.0	5086.448	27.3
5090.765	5.6408	4.0	3.2061^o	5.0	5090.773	52.7
5100.085	5.8330	4.0	3.4027^o	3.0	5100.073	155.9
5119.295	5.4573^o	1.0	3.0362	1.0	5119.296	160.7
5126.794	5.4864^o	2.0	3.0688	2.0	5126.790	4188.5
5129.687	5.9106	3.0	3.4943^o	4.0	5129.683	461.2
5130.515	6.1074	4.0	3.6915^o	4.0	5130.510	86.3
5132.702	5.9106	3.0	3.4958^o	2.0	5132.699	169.2
5139.534	5.9060	5.0	3.4943^o	4.0	5139.534	1636.5
5140.104	5.9071	1.0	3.4958^o	2.0	5140.107^c	27.8
5140.381	6.1028	3.0	3.6915^o	4.0	5140.376^c	123.9
5156.292	5.8996	1.0	3.4958^o	2.0	5156.299	97.1
5168.295	5.2731	2.0	2.8749^o	2.0	5168.294	144.5
5172.218	6.0879	4.0	3.6915^o	4.0	5172.213	45.7
5175.456	5.4311^o	2.0	3.0362	1.0	5175.453	276.5
5178.729	6.0849	5.0	3.6915^o	4.0	5178.729	132.9
5182.757	5.4995	2.0	3.1080^o	1.0	5182.759	3450.8
5193.849	5.2613	1.0	2.8749^o	2.0	5193.839	5767.2
5194.755	5.4940	2.0	3.1080^o	1.0	5194.754	4295.9
5195.205	5.4938	1.0	3.1080^o	1.0	5195.211	71.8
5196.831	6.1302	3.0	3.7451^o	3.0	5196.834	23.2
5214.956	5.4129^o	1.0	3.0362	1.0	5214.952	575.7
5221.607	5.8695	2.0	3.4958^o	2.0	5221.608	59.1
5227.257	5.4073^o	0.0	3.0362	1.0	5227.274^b	14575.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5227.284	5.5773	4.0	3.2061[o]	5.0	5227.274[b]	14579.8
5230.307	6.1543	5.0	3.7845[o]	5.0	5230.299	23.4
5246.852	5.4311[o]	2.0	3.0688	2.0	5246.854	444.4
5250.802	6.1057	2.0	3.7451[o]	3.0	5250.809	120.6
5258.164	6.0487	4.0	3.6915[o]	4.0	5258.169	791.4
5266.967	5.4864[o]	2.0	3.1331	3.0	5266.942	15.5
5271.469	5.9290	2.0	3.5777[o]	1.0	5271.473[c]	1103.6
5275.587	5.7522	3.0	3.4027[o]	3.0	5275.584	1886.7
5290.580	6.0879	4.0	3.7451[o]	3.0	5290.578	104.3
5297.151	6.0314	3.0	3.6915[o]	4.0	5297.146[c]	107.9
5299.859	5.8330	4.0	3.4943[o]	4.0	5299.849	1828.2
5323.100	5.3972[o]	1.0	3.0688	2.0	5323.096[c]	349.7
5335.493	5.4310	1.0	3.1080[o]	1.0	5335.496	49.8
5348.213	5.7490[o]	1.0	3.4315	2.0	5348.200[c]	416.1
5351.286	5.3850[o]	2.0	3.0688	2.0	5351.284	17052.2
5380.540	6.0487	4.0	3.7451[o]	3.0	5380.547	652.9
5385.288	5.8793	2.0	3.5777[o]	1.0	5385.293	372.0
5387.993	6.0849	5.0	3.7845[o]	5.0	5387.998[c]	125.1
5390.627	5.3681[o]	3.0	3.0688	2.0	5390.630	11114.6
5393.760	5.4311[o]	2.0	3.1331	3.0	5393.764[c]	7829.7
5402.009	5.7260[o]	2.0	3.4315	2.0	5401.994	197.3
5403.076	5.3628[o]	3.0	3.0688	2.0	5403.082	8485.2
5404.912	5.7247[o]	1.0	3.4315	2.0	5404.895	856.5
5408.345	5.8695	2.0	3.5777[o]	1.0	5408.350	200.1
5413.201	5.6924	2.0	3.4027[o]	3.0	5413.198	39.4
5425.452	5.1595	1.0	2.8749[o]	2.0	5425.455	82.7
5432.905	5.7129[o]	1.0	3.4315	2.0	5432.899	253.8
5441.263	5.4840	4.0	3.2061[o]	5.0	5441.262	206.9
5454.009	5.6753	4.0	3.4027[o]	3.0	5454.006	4314.9
5468.385	6.0511	6.0	3.7845[o]	5.0	5468.393	164.8
5469.357	5.6977[o]	2.0	3.4315	2.0	5469.349	433.9
5489.635	5.7522	3.0	3.4943[o]	4.0	5489.636	81.4
5493.088	5.7522	3.0	3.4958[o]	2.0	5493.089	915.9
5504.028	6.0364	6.0	3.7845[o]	5.0	5504.030	364.1
5505.497	5.2875[o]	2.0	3.0362	1.0	5505.491	40546.7
5506.122	5.3591	2.0	3.1080[o]	1.0	5506.119	924.9
5524.551	5.6301	5.0	3.3865[o]	6.0	5524.549	7435.5
5527.810	5.9338	3.0	3.6915[o]	4.0	5527.811	52.7
5538.020	5.6408	4.0	3.4027[o]	3.0	5538.024	88.7
5545.815	5.3681[o]	3.0	3.1331	3.0	5545.814	885.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5548.803	5.6365	3.0	3.4027^o	3.0	5548.797	131.6
5585.431	5.9106	4.0	3.6915^o	4.0	5585.431	612.6
5587.260	5.6211	2.0	3.4027^o	3.0	5587.260	144.4
5642.444	5.6924	2.0	3.4958^o	2.0	5642.448	45.6
5663.220	5.9338	3.0	3.7451^o	3.0	5663.219	132.0
5683.094	5.6753	4.0	3.4943^o	4.0	5683.096	692.4
5688.492	5.7566	2.0	3.5777^o	1.0	5688.488	369.9
5693.658	6.2304^o	1.0	4.0535	1.0	5693.689^c	12.8
5701.930	5.9583	5.0	3.7845^o	5.0	5701.930	261.7
5723.713	5.9106	4.0	3.7451^o	3.0	5723.716	470.6
5724.592	5.2731	2.0	3.1080^o	1.0	5724.593	320.3
5727.475	5.2972^o	2.0	3.1331	3.0	5727.476	55.8
5745.803	5.6529	1.0	3.4958^o	2.0	5745.795	1824.6
5749.906	5.9401	5.0	3.7845^o	5.0	5749.910^c	1024.1
5755.891	5.2614	0.0	3.1080^o	1.0	5755.885	2397.5
5771.609	6.2010^o	1.0	4.0535	1.0	5771.656^c	219.1
5773.827	5.5494	2.0	3.4027^o	3.0	5773.822	649.8
5774.338	5.8380	5.0	3.6915^o	4.0	5774.339^b	483.8
5774.369	5.6408	4.0	3.4943^o	4.0	5774.339^b	484.4
5786.093	5.6365	3.0	3.4943^o	4.0	5786.095	261.8
5787.867	5.8330	4.0	3.6915^o	4.0	5787.856	482.8
5789.627	5.5436	3.0	3.4027^o	3.0	5789.620	34.5
5789.929	5.6365	3.0	3.4958^o	2.0	5789.934	1934.1
5796.090	5.9229	4.0	3.7845^o	5.0	5796.085	33.7
5810.662	4.3638	2.0	2.2307^o	1.0	5810.662	756.3
5829.629	5.9106	4.0	3.7845^o	5.0	5829.631	128.3
5831.814	5.6211	2.0	3.4958^o	2.0	5831.819	289.1
5834.581	5.8695	2.0	3.7451^o	3.0	5834.589	173.2
5842.439	5.9060	5.0	3.7845^o	5.0	5842.438	79.3
5861.124	5.6924	2.0	3.5777^o	1.0	5861.128	18.2
5911.336	5.4995	2.0	3.4027^o	3.0	5911.353	5.3
5925.451	5.1998	0.0	3.1080^o	1.0	5925.448	424.0
5936.488	5.8330	4.0	3.7451^o	3.0	5936.481^c	286.3
5950.648	5.5773	4.0	3.4943^o	4.0	5950.647	1037.5
5955.333	5.4840	4.0	3.4027^o	3.0	5955.333	690.3
5958.687	4.9550	3.0	2.8749^o	2.0	5958.680	1564.1
5959.315	5.5114^o	3.0	3.4315	2.0	5959.313	581.2
5972.730	5.6529	1.0	3.5777^o	1.0	5972.718	68.9
5989.327	4.9444	2.0	2.8749^o	2.0	5989.318	1504.6
6004.515	4.9392	2.0	2.8749^o	2.0	6004.513	323.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6008.439	5.5586	1.0	3.4958[o]	2.0	6008.433	91.5
6014.949	5.7522	3.0	3.6915[o]	4.0	6014.951	497.2
6035.720	5.8380	5.0	3.7845[o]	5.0	6035.716	173.7
6048.441	5.5436	3.0	3.4943[o]	4.0	6048.438	2635.1
6054.560	5.8316	6.0	3.7845[o]	5.0	6054.564	1663.2
6059.225	5.4321	6.0	3.3865[o]	6.0	6059.227	3262.1
6065.724	5.6211	2.0	3.5777[o]	1.0	6065.729	154.1
6087.448	6.0116[o]	3.0	3.9755	3.0	6087.454	14.8
6101.831	6.0068[o]	2.0	3.9755	3.0	6101.836	21.5
6111.285	4.2588	0.0	2.2307[o]	1.0	6111.268[c]	2698.4
6118.282	5.4573[o]	1.0	3.4315	2.0	6118.283	2507.7
6194.839	5.4323[o]	3.0	3.4315	2.0	6194.839	279.3
6198.672	5.4311[o]	2.0	3.4315	2.0	6198.681	9.6
6210.568	4.4395	3.0	2.4437[o]	2.0	6210.573	103.3
6236.540	5.7719	6.0	3.7845[o]	5.0	6236.546	170.9
6247.990	5.6753	4.0	3.6915[o]	4.0	6247.990	472.1
6255.420	5.4129[o]	1.0	3.4315	2.0	6255.419	50.0
6257.024	6.2397[o]	1.0	4.2588	0.0	6257.027[b]	8.3
6257.033	5.5586	1.0	3.5777[o]	1.0	6257.027[b]	8.4
6286.242	5.5494	2.0	3.5777[o]	1.0	6286.240	901.3
6297.940	5.9435[o]	4.0	3.9755	3.0	6297.928	41.2
6322.553	5.0292[o]	1.0	3.0688	2.0	6322.550	87.7
6344.960	5.3850[o]	2.0	3.4315	2.0	6344.961	826.2
6365.039	5.6924	2.0	3.7451[o]	3.0	6364.996	824.4
6372.707	5.6365	3.0	3.6915[o]	4.0	6372.703	620.7
6393.750	5.6301	5.0	3.6915[o]	4.0	6393.751	259.5
6417.900	5.3628[o]	3.0	3.4315	2.0	6417.918	6543.5
6433.465	5.9801[o]	2.0	4.0535	1.0	6433.468	4.1
6468.177	5.4940	2.0	3.5777[o]	1.0	6468.183	220.8
6550.683	5.8676[o]	2.0	3.9755	3.0	6550.645	85.9
6553.349	5.6365	3.0	3.7451[o]	3.0	6553.349	233.8
6555.151	5.6753	4.0	3.7845[o]	5.0	6555.149	306.7
6592.476	5.9336[o]	1.0	4.0535	1.0	6592.483	16.7
6607.058	5.6211	2.0	3.7451[o]	3.0	6607.068	749.5
6626.730	5.2731	2.0	3.4027[o]	3.0	6626.734	135.1
6687.830	5.4310	1.0	3.5777[o]	1.0	6687.843	20.7
6692.416	5.5436	3.0	3.6915[o]	4.0	6692.418	202.1
6749.402	4.9444	2.0	3.1080[o]	1.0	6749.390	193.4
6753.004	5.8890[o]	1.0	4.0535	1.0	6753.033	100.3
6765.237	5.5773	4.0	3.7451[o]	3.0	6765.243	100.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6765.677	5.8855^o	2.0	4.0535	1.0	6765.668	20.2
6768.696	4.9392	2.0	3.1080^o	1.0	6768.696^c	2848.4
6777.208	5.3232	5.0	3.4943^o	4.0	6777.221^c	398.6
6782.159	4.9355	1.0	3.1080^o	1.0	6782.168^c	247.3
6788.727	5.8793^o	1.0	4.0535	1.0	6788.742	5.3
6869.545	5.5494	2.0	3.7451^o	3.0	6869.552	62.5
6891.921	5.5436	3.0	3.7451^o	3.0	6891.927	23.0
6913.705	5.5773	4.0	3.7845^o	5.0	6913.704	112.6
6951.382	5.1858	3.0	3.4027^o	3.0	6951.383	29.6
6958.105	5.3591	2.0	3.5777^o	1.0	6958.107	372.6
6973.567	5.2731	2.0	3.4958^o	2.0	6973.582	7.0
7020.171	5.2613	1.0	3.4958^o	2.0	7020.173	672.5
7108.985	4.7797^o	2.0	3.0362	1.0	7108.984	65.2
7152.402	5.7343^o	3.0	4.0013	4.0	7152.394	6.4
7293.029	5.4840	4.0	3.7845^o	5.0	7293.043	2.3
7305.222	4.7329^o	1.0	3.0362	1.0	7305.206	1202.4
7310.275	5.7490^o	1.0	4.0535	1.0	7310.280	2.3
7310.677	5.2731	2.0	3.5777^o	1.0	7310.687	151.8
7313.054	4.7636^o	1.0	3.0688	2.0	7313.036	2517.6
7327.861	5.1858	3.0	3.4943^o	4.0	7327.865	148.8
7361.912	5.2613	1.0	3.5777^o	1.0	7361.911	106.9
7411.155	5.7260^o	2.0	4.0535	1.0	7411.157	112.4
7419.195	6.1101^o	4.0	4.4395	3.0	7419.179	3.1
7467.610	5.7133^o	0.0	4.0535	1.0	7467.636	2.9
7469.429	5.7129^o	1.0	4.0535	1.0	7469.467	9.5
7596.218	5.3232	5.0	3.6915^o	4.0	7596.270	77.0
7637.289	5.5984^o	2.0	3.9755	3.0	7637.311	6.8
7679.912	5.3591	2.0	3.7451^o	3.0	7679.919	55.5
7734.523	4.6387^o	1.0	3.0362	1.0	7734.527	61.1
7758.041	5.0292^o	1.0	3.4315	2.0	7758.038	1019.7
7834.638	5.9435^o	4.0	4.3615	5.0	7834.662^c	2.0
7895.074	4.6387^o	1.0	3.0688	2.0	7895.096	1357.9
7922.378	4.4395	3.0	2.8749^o	2.0	7922.385	3100.7
8039.851	4.9444	2.0	3.4027^o	3.0	8039.838	40.4
8042.924	5.9805^o	3.0	4.4395	3.0	8042.910	2.3
8055.110	5.3232	5.0	3.7845^o	5.0	8055.124	8.1
8069.986	5.5114^o	3.0	3.9755	3.0	8070.003	11.4
8091.733	3.9755	3.0	2.4437^o	2.0	8091.728	361.4
8111.695	5.2731	2.0	3.7451^o	3.0	8111.726	31.6
8208.010	5.5114^o	3.0	4.0013	4.0	8208.018	10.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8294.863	5.1858	3.0	3.6915^o	4.0	8294.842	21.5
8317.424	5.7490^o	1.0	4.2588	0.0	8317.455	7.6
8325.173	4.3638	2.0	2.8749^o	2.0	8325.197	175.3
8603.548	5.1858	3.0	3.7451^o	3.0	8603.519	6.0
8829.229	5.4573^o	1.0	4.0535	1.0	8829.265	20.9
8997.621	5.4311^o	2.0	4.0535	1.0	8997.656	778.0
9104.118	4.9392	2.0	3.5777^o	1.0	9104.169	96.6
9117.684	5.4129^o	1.0	4.0535	1.0	9117.692	129.2
9128.492	4.9355	1.0	3.5777^o	1.0	9128.511	14.1
9155.350	5.4073^o	0.0	4.0535	1.0	9155.340	32.3
9304.365	4.7636^o	1.0	3.4315	2.0	9304.314^c	3008.7
9524.368	4.7329^o	1.0	3.4315	2.0	9524.374	169.6
9799.987	4.4709	4.0	3.2061^o	5.0	9800.018	1308.2

Table A.26: Measured wavelengths (λ_o) and intensities of Yb II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3854.222	9.8668	2.5	6.6509^o	3.5	3854.220	137.0
3855.881	11.4408^o	1.5	8.2263	2.5	3855.895	161.5
3890.814	9.7715	2.5	6.5859^o	2.5	3890.785^c	91.9
3892.788	8.7970	2.5	5.6130^o	3.5	3892.820	88.3
3911.290	11.1106^o	2.5	7.9417	2.5	3911.275	3964.8
3913.350	6.7327	0.5	3.5654^o	1.5	3913.357	99.9
3916.790	11.9495^o	5.5	8.7851	4.5	3916.814	69.8
4005.247	11.3209^o	3.5	8.2263	2.5	4005.237	29.7
4033.049	9.0868	5.5	6.0136^o	5.5	4033.065	115.3
4041.377	11.8639^o	3.5	8.7970	2.5	4041.344	46.1
4056.147	6.6212	2.5	3.5654^o	1.5	4056.149	267.5
4058.628	11.5013^o	3.5	8.4474	2.5	4058.633	228.0
4060.336	11.7260^o	3.5	8.6734	4.5	4060.323	203.1
4064.760	8.6300	2.5	5.5807^o	2.5	4064.783	134.3
4065.562	10.1284	3.5	7.0797^o	3.5	4065.576	35.4
4079.172	11.2648^o	2.5	8.2263	2.5	4079.169	91.6
4090.667	11.5544^o	3.5	8.5244	3.5	4090.635	32.0
4092.630	11.5273^o	3.5	8.4988	4.5	4092.637	17.9
4093.629	11.8639^o	3.5	8.8361	2.5	4093.645^b	13.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4093.673	11.6374[o]	2.5	8.6097	1.5	4093.645[b]	9.9
4097.874	6.9895	2.5	3.9649[o]	3.5	4097.901[c]	51.8
4119.463	5.8555[o]	0.5	2.8467	1.5	4119.462	150.3
4127.322	10.8342[o]	3.5	7.8311	4.5	4127.347	24.7
4134.478	6.5633	1.5	3.5654[o]	1.5	4134.493	17.9
4134.724	8.4474	2.5	5.4498[o]	2.5	4134.737[c]	73.9
4135.095	7.3101	5.5	4.3127[o]	5.5	4135.098	348.5
4138.127	9.2975	1.5	6.3023[o]	1.5	4138.148	34.5
4155.075	8.6037	3.5	5.6207[o]	4.5	4155.106	33.7
4157.480	10.4928[o]	2.5	7.5116	1.5	4157.511	38.8
4170.102	7.5692	3.5	4.5969[o]	2.5	4170.110	44.3
4190.303	7.6093	2.5	4.6513[o]	3.5	4190.298	205.9
4202.441	10.9080	2.5	7.9586[o]	1.5	4202.433	11.9
4213.948	10.6497[o]	2.5	7.7084	1.5	4213.969	28.2
4230.187	7.8123	1.5	4.8822[o]	0.5	4230.182	29.5
4233.462	12.0135[o]	5.5	9.0857	4.5	4233.443	175.8
4234.549	8.5477	4.5	5.6207[o]	4.5	4234.532	31.6
4245.262	9.8696	1.5	6.9500[o]	2.5	4245.254	10.1
4252.516	7.5116	1.5	4.5969[o]	2.5	4252.516	97.0
4254.777	6.6603	4.5	3.7472[o]	4.5	4254.775	33.9
4255.764	6.6597	3.5	3.7472[o]	4.5	4255.764[b]	147.1
4255.770	8.8973	1.5	5.9849[o]	2.5	4255.764[b]	147.3
4258.737	11.7074[o]	1.5	8.7970	2.5	4258.741	328.9
4273.339	6.9895	2.5	4.0891[o]	1.5	4273.330	174.5
4280.226	11.7260[o]	3.5	8.8302	3.5	4280.260	462.7
4281.051	9.7715	2.5	6.8763[o]	3.5	4281.072	19.8
4295.024	8.4988	4.5	5.6130[o]	3.5	4295.028[b]	2358.6
4295.040	8.2263	2.5	5.3405[o]	1.5	4295.028[b]	2359.2
4316.963	6.6603	4.5	3.7892[o]	5.5	4316.953	1134.3
4335.387	11.7563[o]	1.5	8.8973	1.5	4335.351	18.2
4337.589	11.1094[o]	4.5	8.2519	3.5	4337.600	170.2
4339.079	7.9296	3.5	5.0730[o]	4.5	4339.081	103.8
4340.674	9.5064	2.5	6.6509[o]	3.5	4340.705	40.0
4354.810	11.5196[o]	4.5	8.6734	4.5	4354.793	40.2
4370.807	7.5895	4.5	4.7537[o]	4.5	4370.812	59.0
4387.311	11.6553[o]	3.5	8.8302	3.5	4387.297	37.0
4392.815	7.7038	0.5	4.8822[o]	0.5	4392.806[b]	86.1
4392.835	9.7715	2.5	6.9500[o]	2.5	4392.806[b]	88.4
4402.296	7.5692	3.5	4.7537[o]	4.5	4402.303	41.4
4402.602	8.3321	1.5	5.5168[o]	2.5	4402.606	245.3

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4434.175	6.5633	1.5	3.7681[o]	1.5	4434.158	25.8
4435.684	11.6304[o]	3.5	8.8361	2.5	4435.677	824.9
4465.653	10.9080	2.5	8.1324[o]	1.5	4465.640	26.7
4484.451	6.5112	5.5	3.7472[o]	4.5	4484.453	10.9
4487.259	7.9296	3.5	5.1674[o]	2.5	4487.259	99.4
4493.954	7.8311	4.5	5.0730[o]	4.5	4493.958	46.8
4515.162	6.0627	3.5	3.3176[o]	2.5	4515.160	1189.1
4553.586	6.5112	5.5	3.7892[o]	5.5	4553.575	979.0
4597.967	7.3470	2.5	4.6513[o]	3.5	4597.993	26.7
4598.356	6.6603	4.5	3.9649[o]	3.5	4598.357	864.2
4604.492	9.7715	2.5	7.0797[o]	3.5	4604.475	87.9
4617.838	11.5202[o]	3.5	8.8361	2.5	4617.844	77.5
4670.585	5.6706[o]	1.5	3.0168	2.5	4670.590	95.8
4680.134	9.6022	3.5	6.9539[o]	4.5	4680.136	40.9
4681.673	11.3209[o]	3.5	8.6734	4.5	4681.662	34.2
4683.811	6.6597	3.5	4.0134[o]	2.5	4683.810	478.3
4688.523	6.7327	0.5	4.0891[o]	1.5	4688.528	97.3
4712.785	8.6956	6.5	6.0656[o]	7.5	4712.785	33.6
4722.177	8.6097	1.5	5.9849[o]	2.5	4722.157	217.6
4746.677	8.3583	4.5	5.7471[o]	4.5	4746.673	20.5
4786.613	6.5112	5.5	3.9217[o]	6.5	4786.611[b]	10955.7
4786.624	8.4988	4.5	5.9094[o]	4.5	4786.611[b]	10955.7
4795.805	10.2770	2.5	7.6925[o]	3.5	4795.825[c]	313.8
4812.941	11.7074[o]	1.5	9.1321	1.5	4812.918[c]	2485.6
4818.369	7.3261	3.5	4.7537[o]	4.5	4818.368	40.5
4820.240	6.1368	2.5	3.5654[o]	1.5	4820.244	965.7
4841.159	6.7327	0.5	4.1724[o]	0.5	4841.164	116.4
4848.447	9.5064	2.5	6.9500[o]	2.5	4848.459[b]	40.0
4848.459	7.3101	5.5	4.7537[o]	4.5	4848.459[b]	39.5
4850.837	8.4231	3.5	5.8680[o]	2.5	4850.813	135.4
4851.148	5.5718[o]	1.5	3.0168	2.5	4851.151	291.6
4861.301	11.5013[o]	3.5	8.9517	3.5	4861.316	20.8
4878.824	10.4414[o]	4.5	7.9009	4.5	4878.854	20.8
4906.348	9.2451	4.5	6.7188[o]	5.5	4906.329[c]	112.5
4917.041	7.4030	1.5	4.8822[o]	0.5	4917.027	17.2
4937.203	7.1618	4.5	4.6513[o]	3.5	4937.230[b]	824.0
4937.220	7.8311	4.5	5.3207[o]	5.5	4937.230[b]	822.7
4942.744	6.6603	4.5	4.1527[o]	3.5	4942.740	59.0
4944.077	6.6597	3.5	4.1527[o]	3.5	4944.074[b]	353.4
4944.086	11.5927[o]	4.5	9.0857	4.5	4944.074[b]	353.4

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4965.377	11.3570[o]	2.5	8.8608	2.5	4965.405[b]	23.8
4965.433	10.3945	1.5	7.8984[o]	0.5	4965.405[b]	24.0
4970.438	9.4437	2.5	6.9500[o]	2.5	4970.410[c]	225.6
5002.976	10.9975[o]	5.5	8.5200	6.5	5002.973	36.5
5009.521	6.5633	1.5	4.0891[o]	1.5	5009.520	830.2
5014.461	7.8123	1.5	5.3405[o]	1.5	5014.461	98.3
5021.131	6.6212	2.5	4.1527[o]	3.5	5021.133	122.5
5041.603	8.1290	0.5	5.6706[o]	1.5	5041.615	190.1
5045.797	11.5422[o]	5.5	9.0857	4.5	5045.823	58.6
5062.928	7.8979	2.5	5.4498[o]	2.5	5062.927	140.0
5067.286	6.7327	0.5	4.2867[o]	1.5	5067.284	730.6
5082.568	9.4437	2.5	7.0050[o]	3.5	5082.579[c]	346.0
5106.239	8.4474	2.5	6.0201[o]	3.5	5106.229	148.4
5135.979	6.5112	5.5	4.0979[o]	4.5	5135.975	387.3
5140.101	11.8550[o]	3.5	9.4437	2.5	5140.107[c]	27.8
5140.408	7.9919	1.5	5.5807[o]	2.5	5140.376[c]	123.5
5147.022	7.1618	4.5	4.7537[o]	4.5	5147.031	23.7
5167.748	11.5422[o]	5.5	9.1437	4.5	5167.780	58.9
5173.069	6.6597	3.5	4.2637[o]	2.5	5173.071	31.6
5180.355	6.9895	2.5	4.5969[o]	2.5	5180.353	13.1
5184.162	6.5633	1.5	4.1724[o]	0.5	5184.158	287.0
5200.540	7.3470	2.5	4.9637[o]	3.5	5200.547	32.5
5226.169	7.7038	0.5	5.3321[o]	0.5	5226.163	41.2
5232.529	9.2451	4.5	6.8763[o]	3.5	5232.561	14.2
5234.298	9.0868	5.5	6.7188[o]	5.5	5234.265	456.4
5240.502	6.1124	4.5	3.7472[o]	4.5	5240.503	124.6
5244.621	7.7038	0.5	5.3405[o]	1.5	5244.617	77.7
5246.341	10.4928[o]	2.5	8.1303	3.5	5246.379	11.8
5253.465	8.0835	4.5	5.7242[o]	4.5	5253.446	159.6
5257.487	6.6212	2.5	4.2637[o]	2.5	5257.489	550.3
5271.465	9.6022	3.5	7.2510[o]	4.5	5271.473[c]	1103.6
5279.544	6.6603	4.5	4.3127[o]	5.5	5279.533	819.2
5297.177	11.1760[o]	3.5	8.8361	2.5	5297.145[c]	127.1
5300.904	8.3583	4.5	6.0201[o]	3.5	5300.936[b]	83.8
5300.943	6.9895	2.5	4.6513[o]	3.5	5300.936[b]	84.4
5309.313	6.6212	2.5	4.2867[o]	1.5	5309.310	25.5
5323.134	11.8550[o]	3.5	9.5266	2.5	5323.096[c]	351.0
5335.159	6.1124	4.5	3.7892[o]	5.5	5335.146	2152.3
5347.213	6.6597	3.5	4.3417[o]	4.5	5347.205	1838.3
5348.186	10.2159	1.5	7.8984[o]	0.5	5348.200[c]	417.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5352.954	6.0627	3.5	3.7472[o]	4.5	5352.952	2793.7
5356.556	11.6919[o]	3.5	9.3779	3.5	5356.544	12.4
5357.076	6.6603	4.5	4.3466[o]	3.5	5357.081	25.0
5358.641	6.6597	3.5	4.3466[o]	3.5	5358.638	959.5
5365.408	8.4988	4.5	6.1887[o]	4.5	5365.394	6.2
5368.243	9.5818	1.5	7.2729[o]	2.5	5368.270[b]	205.8
5368.278	7.9296	3.5	5.6207[o]	4.5	5368.270[b]	204.8
5384.481	10.9975[o]	5.5	8.6956	6.5	5384.457	16.1
5387.989	11.5979[o]	2.5	9.2975	1.5	5387.998[c]	125.1
5389.846	6.5633	1.5	4.2637[o]	2.5	5389.847	309.3
5393.739	11.3213[o]	2.5	9.0233	3.5	5393.764[c]	7829.8
5395.742	7.9296	3.5	5.6324[o]	3.5	5395.736	61.8
5399.717	7.8123	1.5	5.5168[o]	2.5	5399.718	151.6
5414.263	9.4865	4.5	7.1973[o]	5.5	5414.262	21.2
5426.819	10.4164	2.5	8.1324[o]	1.5	5426.857[b]	72.1
5426.875	8.4492	5.5	6.1652[o]	6.5	5426.858[b]	67.3
5431.177	8.3583	4.5	6.0762[o]	3.5	5431.146	12.2
5440.549	8.0492	4.5	5.7710[o]	5.5	5440.540	10.8
5449.277	6.6212	2.5	4.3466[o]	3.5	5449.282	1059.8
5457.437	7.9417	2.5	5.6706[o]	1.5	5457.442	12.7
5471.184	7.8979	2.5	5.6324[o]	3.5	5471.175	162.9
5478.503	7.2261	2.5	4.9637[o]	3.5	5478.511	464.2
5486.552	7.8398	2.5	5.5807[o]	2.5	5486.555	15.6
5501.377	7.3261	3.5	5.0730[o]	4.5	5501.339	1825.7
5502.636	11.6304[o]	3.5	9.3779	3.5	5502.669	22.8
5513.008	11.1456[o]	1.5	8.8973	1.5	5512.980	159.0
5547.171	7.4030	1.5	5.1686[o]	1.5	5547.171[b]	196.3
5547.178	8.4231	3.5	6.1887[o]	4.5	5547.171[b]	197.6
5572.536	7.3916	3.5	5.1674[o]	2.5	5572.539	34.0
5581.057	9.9770[o]	3.5	7.7561	2.5	5581.056	20.8
5581.954	9.1705	3.5	6.9500[o]	2.5	5581.968	394.9
5588.466	6.6603	4.5	4.4424[o]	5.5	5588.462	1107.6
5602.274	9.5818	1.5	7.3693[o]	2.5	5602.298	62.1
5607.358	7.8311	4.5	5.6207[o]	4.5	5607.358	8.7
5620.201	7.9296	3.5	5.7242[o]	4.5	5620.199	145.4
5627.896	8.0703	3.5	5.8680[o]	2.5	5627.906	7.7
5631.503	8.8608	2.5	6.6598[o]	2.5	5631.466	5.8
5637.830	6.5112	5.5	4.3127[o]	5.5	5637.821	64.8
5651.988	5.9402	3.5	3.7472[o]	4.5	5651.995	878.8
5674.306	7.7561	2.5	5.5718[o]	1.5	5674.313	19.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5683.591	7.9279	5.5	5.7471[o]	4.5	5683.591	15.0
5686.539	7.3470	2.5	5.1674[o]	2.5	5686.534	96.7
5693.710	7.9919	1.5	5.8150[o]	0.5	5693.689[c]	12.5
5710.749	8.8302	3.5	6.6598[o]	2.5	5710.770	15.4
5713.739	7.8398	2.5	5.6706[o]	1.5	5713.735	26.7
5717.262	9.1705	3.5	7.0025[o]	4.5	5717.280	7.3
5729.996	11.4082[o]	4.5	9.2451	4.5	5730.007[b]	25.4
5730.012	8.1767	4.5	6.0136[o]	5.5	5730.007[b]	25.4
5730.022	9.9754[o]	2.5	7.8123	1.5	5730.007[b]	25.3
5735.749	11.1843[o]	4.5	9.0233	3.5	5735.735	36.7
5735.769	8.0703	3.5	5.9094[o]	4.5	5735.742	38.5
5737.095	11.2473[o]	4.5	9.0868	5.5	5737.094[b]	9.1
5737.105	11.5273[o]	3.5	9.3669	2.5	5737.094[b]	9.1
5749.898	8.2318	2.5	6.0762[o]	3.5	5749.910[c]	1024.1
5767.210	8.0703	3.5	5.9212[o]	3.5	5767.205	12.8
5771.651	6.1124	4.5	3.9649[o]	3.5	5771.656[c]	219.1
5786.571	9.4627	3.5	7.3207[o]	4.5	5786.596	34.2
5813.582	7.7038	0.5	5.5718[o]	1.5	5813.567	4.5
5819.410	7.9009	4.5	5.7710[o]	5.5	5819.412	60.0
5837.136	6.1368	2.5	4.0134[o]	2.5	5837.140[b]	721.7
5837.167	11.5013[o]	3.5	9.3779	3.5	5837.140[b]	720.9
5897.211	8.1673	6.5	6.0656[o]	7.5	5897.205	37.9
5898.773	8.3583	4.5	6.2571[o]	5.5	5898.765	16.2
5908.350	6.0627	3.5	3.9649[o]	3.5	5908.349	94.0
5936.502	10.0679	4.5	7.9800[o]	4.5	5936.481[c]	286.3
5969.590	11.5979[o]	2.5	9.5216	1.5	5969.541	4.8
5985.341	7.4030	1.5	5.3321[o]	0.5	5985.346[b]	39.6
5985.362	10.2770	2.5	8.2062[o]	1.5	5985.346[b]	39.5
6007.410	8.2519	3.5	6.1887[o]	4.5	6007.392	31.6
6020.550	7.2261	2.5	5.1674[o]	2.5	6020.551	13.4
6040.784	7.6648	3.5	5.6130[o]	3.5	6040.784	6.6
6052.894	6.1368	2.5	4.0891[o]	1.5	6052.891	65.1
6056.462	7.7936	5.5	5.7471[o]	4.5	6056.469	8.8
6111.226	11.6304[o]	3.5	9.6022	3.5	6111.268[c]	2652.4
6122.990	6.6212	2.5	4.5969[o]	2.5	6122.988	29.7
6152.571	6.1124	4.5	4.0979[o]	4.5	6152.575	195.2
6169.563	6.6603	4.5	4.6513[o]	3.5	6169.556	330.5
6171.638	6.6597	3.5	4.6513[o]	3.5	6171.630	15.2
6190.782	8.1673	6.5	6.1652[o]	6.5	6190.782	10.5
6208.101	8.2536	5.5	6.2571[o]	5.5	6208.095	6.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6236.142	7.9417	2.5	5.9542^o	1.5	6236.153	10.4
6260.793	8.0453	7.5	6.0656^o	7.5	6260.783	14.9
6274.779	5.9402	3.5	3.9649^o	3.5	6274.782	568.2
6345.743	7.4030	1.5	5.4498^o	2.5	6345.724	39.0
6355.388	9.0868	5.5	7.1365^o	6.5	6355.376	12.7
6360.151	10.0812	2.5	8.1324^o	1.5	6360.194	8.5
6427.620	7.7561	2.5	5.8278^o	1.5	6427.633	7.7
6432.727	5.9402	3.5	4.0134^o	2.5	6432.732	93.3
6463.119	10.1239	2.5	8.2062^o	1.5	6463.155^b	19.1
6463.161	7.6648	3.5	5.7471^o	4.5	6463.155^b	19.5
6498.802	7.5778	0.5	5.6706^o	1.5	6498.762	58.4
6523.194	7.6711	6.5	5.7710^o	5.5	6523.215	3.6
6585.419	7.3916	3.5	5.5095^o	3.5	6585.416^b	33.7
6585.419	7.7936	5.5	5.9115^o	6.5	6585.416^b	33.7
6617.060	6.1368	2.5	4.2637^o	2.5	6617.062	18.2
6699.364	6.1368	2.5	4.2867^o	1.5	6699.359	23.0
6727.568	7.5895	4.5	5.7471^o	4.5	6727.617^b	112.4
6727.577	11.3488^o	3.5	9.5064	2.5	6727.617^b	112.4
6727.609	5.9402	3.5	4.0979^o	4.5	6727.617^b	112.5
6745.225	7.3470	2.5	5.5095^o	3.5	6745.222	10.6
6768.709	8.7851	4.5	6.9539^o	4.5	6768.696^c	2859.4
6777.266	8.5477	4.5	6.7188^o	5.5	6777.221^c	399.5
6782.209	11.6378^o	4.5	9.8102	4.5	6782.168^c	248.4
6785.118	8.1290	0.5	6.3023^o	1.5	6785.126	2.1
6790.760	11.3118^o	3.5	9.4865	4.5	6790.794^b	5.0
6790.810	8.8302	3.5	7.0050^o	3.5	6790.794^b	4.9
6802.459	7.5692	3.5	5.7471^o	4.5	6802.464	7.2
6864.243	9.0030	5.5	7.1973^o	5.5	6864.258	2.9
6889.589	6.0627	3.5	4.2637^o	2.5	6889.587	6.9
6911.108	10.2159	1.5	8.4225^o	2.5	6911.109	5.0
6953.607	11.5927^o	4.5	9.8102	4.5	6953.657	9.2
6963.061	8.7851	4.5	7.0050^o	3.5	6963.082^b	2.9
6963.104	7.7936	5.5	6.0136^o	5.5	6963.082^b	2.9
6968.720	7.3916	3.5	5.6130^o	3.5	6968.737	1.8
6977.660	7.2261	2.5	5.4498^o	2.5	6977.661	7.1
6981.983	7.3470	2.5	5.5718^o	1.5	6981.979^b	11.2
6982.036	11.3570^o	2.5	9.5818	1.5	6981.979^b	11.1
6993.304	9.0233	3.5	7.2510^o	4.5	6993.310	3.4
6999.875	6.1124	4.5	4.3417^o	4.5	6999.877	25.0
7043.784	7.6711	6.5	5.9115^o	6.5	7043.779	23.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
7053.819	8.7771	5.5	7.0199^o	5.5	7053.788	2.8
7222.707	6.0627	3.5	4.3466^o	3.5	7222.703	4.2
7251.527	7.2261	2.5	5.5168^o	2.5	7251.533	10.0
7342.305	7.6093	2.5	5.9212^o	3.5	7342.294	4.3
7377.361	11.6553^o	3.5	9.9752	3.5	7377.392	4.4
7377.736	7.2930	2.5	5.6130^o	3.5	7377.731	2.8
7384.521	9.0868	5.5	7.4083^o	5.5	7384.492	1.7
7389.215	9.0857	4.5	7.4083^o	5.5	7389.195	2.3
7393.346	7.3470	2.5	5.6706^o	1.5	7393.356	4.2
7422.147	6.1124	4.5	4.4424^o	5.5	7422.142	5.7
7513.366	8.8608	2.5	7.2111^o	1.5	7513.333	1.4
7514.614	11.1760^o	3.5	9.5266	2.5	7514.644	9.4
7541.097	7.5116	1.5	5.8680^o	2.5	7541.141	2.9
7582.921	4.6513^o	3.5	3.0168	2.5	7582.935^b	3.5
7582.979	11.5013^o	3.5	9.8668	2.5	7582.935^b	3.6
7636.121	9.5818	1.5	7.9586^o	1.5	7636.097	1.6
7803.669	9.4867	1.5	7.8984^o	0.5	7803.648	21.3
7825.507	8.3583	4.5	6.7744^o	4.5	7825.445	5.1
7834.620	11.1843^o	4.5	9.6022	3.5	7834.662^c	2.0
7904.820	9.5266	2.5	7.9586^o	1.5	7904.796	6.2
8007.832	9.5064	2.5	7.9586^o	1.5	8007.790	8.0
8049.024	6.1368	2.5	4.5969^o	2.5	8049.052	2.1
8053.434	7.3101	5.5	5.7710^o	5.5	8053.442	10.9
8063.034	7.8911	1.5	6.3539^o	2.5	8063.028	0.8
8109.754	11.8639^o	3.5	10.3355	3.5	8109.819	18.6
8157.425	8.5244	3.5	7.0050^o	3.5	8157.370	1.6
8280.607	8.6300	2.5	7.1332^o	3.5	8280.613	7.1
8559.791	8.7410^o	2.5	7.2930	2.5	8559.843	18.3
8968.545	11.5979^o	2.5	10.2159	1.5	8968.558	8.0
9304.361	7.9919	1.5	6.6598^o	2.5	9304.314^c	3008.7
9760.393	4.2867^o	1.5	3.0168	2.5	9760.420	63.1

Table A.27: Measured wavelengths (λ_o) and intensities of Lu I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz}	E_{up}	J_{up}	E_{low}	J_{low}	λ_o	I	log gf		
[Å]	[eV]		[eV]		[Å]	[a.u.]	Casc.	Boltz.	NIST-ASD
3841.194	3.4740^o	2.5	0.2472	2.5	3841.188^n	12585.4		-0.5	-0.5
4054.450	3.5698	0.5	0.5128^o	0.5	4054.454^n	3730.0		-0.8	-1.0
4124.724	3.9319	2.5	0.9269^o	1.5	4124.715^n	8738.2		0.3	0.1
4154.094	3.9106	1.5	0.9269^o	1.5	4154.062^n	617.5		-0.9	-0.8
4262.716	5.3133^o	1.5	2.4056	2.5	4262.725	50.3		0.5	
4265.976	5.3111^o	3.5	2.4056	2.5	4265.958	39.6		0.4	
4271.035	5.4123^o	2.5	2.5103	3.5	4271.060	152.3			
4281.018	5.4055^o	4.5	2.5103	3.5	4281.031	797.7			
4427.119	5.3739	1.5	2.5742^o	0.5	4427.107	38.0		0.5	
4430.455	5.2032^o	3.5	2.4056	2.5	4430.466	154.3		0.8	
4437.550	5.3673	1.5	2.5742^o	0.5	4437.561	19.9		0.2	
4464.366	5.4042	1.5	2.6278^o	1.5	4464.358	118.7			
4480.200	3.0137^o	1.5	0.2472	2.5	4480.175	260.0	-3.1	-2.8	
4480.200	3.0137^o	1.5	0.2472	2.5	4480.169^n	326.8		-2.7	-3.0
4494.586	5.3913^o	3.5	2.6336	4.5	4494.566	21.4		0.3	
4518.556	2.7430^o	1.5	0.0000	1.5	4518.556^n	552642.2		0.1	-0.6
4591.029	5.0370^o	2.5	2.3372	1.5	4591.054	26.1		-0.2	
4689.772	3.5698	0.5	0.9269^o	1.5	4689.773^n	186.0		-1.9	-2.1
4716.692	2.6278^o	1.5	0.0000	1.5	4716.682^n	1684.1		-2.6	-2.8
4785.385	5.3452	1.5	2.7551^o	2.5	4785.420^c	54.2		0.7	
4795.927	5.4114^o	3.5	2.8270	2.5	4795.899	32.5		0.6	
4815.037	2.5742^o	0.5	0.0000	1.5	4815.044^n	17495.4		-1.6	-2.2
4832.657	5.3918^o	1.5	2.8270	2.5	4832.685	50.1		0.8	
5001.141	2.9912	0.5	0.5128^o	0.5	5001.133^n	16888.5		-0.9	-0.6
5134.033	4.5749	0.5	2.1607^o	1.5	5134.021	158.6		-0.1	
5168.664	4.5587	1.5	2.1607^o	1.5	5168.656	95.2		-0.3	
5206.490	2.6278^o	1.5	0.2472	2.5	5206.482^n	2667.6		-2.2	-2.4
5304.422	4.8699	3.5	2.5332^o	3.5	5304.390	230.2		0.6	
5402.565	2.2942^o	2.5	0.0000	1.5	5402.557^n	116645.3		-1.1	-1.5
5736.539	2.1607^o	1.5	0.0000	1.5	5736.525^n	31804.4		-1.9	-1.5
5775.396	4.6794	2.5	2.5332^o	3.5	5775.369	267.9		0.5	
5800.565	3.0637	2.5	0.9269^o	1.5	5800.557	1314.8		-1.6	
5970.260	4.8616^o	2.5	2.7856	1.5	5970.231	10.6		-0.5	
5997.132	4.8699	3.5	2.8031^o	4.5	5997.108	401.8			
6004.487	2.9912	0.5	0.9269^o	1.5	6004.484^n	7369.0		-1.0	-0.3
6345.340	4.8699	3.5	2.9166^o	3.5	6345.308	213.5		0.8	
6477.680	2.1607^o	1.5	0.2472	2.5	6477.681^n	427.9		-3.6	-2.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	log gf Boltz.	NIST-ASD
6772.345	5.4000^o	1.5	3.5698	0.5	6772.313	17.5		0.8	
7393.554	5.3881^o	1.5	3.7117	1.5	7393.600	110.4			
8382.105	2.4056	2.5	0.9269^o	1.5	8382.071	163.7		-3.2	
8508.112	4.3734	2.5	2.9166^o	3.5	8508.088	191.9		0.3	

Table A.28: Measured wavelengths (λ_o) and intensities of Lu II spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4785.433	4.7390^o	1.0	2.1489	2.0	4785.420^c	53.6
5476.675	4.0236^o	2.0	1.7604	3.0	5476.699	6087.7
6159.888	6.0420^o	3.0	4.0298	4.0	6159.933	45.5
6235.329	6.0176^o	4.0	4.0298	4.0	6235.354	19.1
6242.306	5.8153^o	2.0	3.8297	3.0	6242.334	32.3
7125.828	5.5691^o	3.0	3.8297	3.0	7125.855	7.7

Table A.29: Measured wavelengths (λ_o) and intensities of Hf I spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	log gf Boltz.	NIST-ASD
3765.556	4.1064^o	2.0	0.8149	1.0	3765.553	6649.9		-1.2	
3766.699	6.0740	2.0	2.7834^o	2.0	3766.725	1175.3		0.5	
3777.650	3.2810^o	1.0	0.0000	2.0	3777.664^n	143151.2		-0.9	-0.9
3795.368	5.0686	3.0	1.8029^o	3.0	3795.351	474.8		-1.1	
3800.363	3.2614^o	3.0	0.0000	2.0	3800.373^n	78620.4		-1.1	-1.4
3811.775	3.5438^o	3.0	0.2922	3.0	3811.785^n	16560.8		-1.5	-1.3
3815.541	5.0381	2.0	1.7897^o	2.0	3815.561	321.9		-1.3	
3819.349	4.9924^o	2.0	1.7472	1.0	3819.367^b	342.5		-1.3	
3819.377	6.1524	4.0	2.9072^o	3.0	3819.367^b	305.5		0.0	
3820.723	3.8103^o	4.0	0.5663	4.0	3820.734^n	82934.6		-0.4	-0.5
3821.216	5.8359^o	3.0	2.5923	2.0	3821.193	2237.5		0.5	
3830.013	4.9833^o	2.0	1.7472	1.0	3830.024	1848.5		-0.6	
3849.178	3.9191^o	2.0	0.6991	2.0	3849.190^n	47677.8		-0.5	-0.6

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
3854.353	5.6695	2.0	2.4537^{o}	2.0	3854.372	268.2		-0.6	
3858.306	3.5046^{o}	2.0	0.2922	3.0	3858.319^{n}	44021.2		-1.1	-1.0
3860.904	5.4297^{o}	4.0	2.2194	5.0	3860.921^{b}	345.3		-0.8	
3860.906	4.3241^{o}	3.0	1.1138	2.0	3860.921^{b}	345.3		-2.1	
3882.523	5.1356^{o}	3.0	1.9432	3.0	3882.534	803.9		-0.8	
3889.356	3.8859^{o}	3.0	0.6991	2.0	3889.367^{n}	7629.1		-1.3	-1.4
3892.471	5.6380	1.0	2.4537^{o}	2.0	3892.490	149.1		-0.9	
3899.930	3.1782^{o}	2.0	0.0000	2.0	3899.935^{n}	118700.5		-1.0	-1.3
3903.928	6.2478	4.0	3.0729^{o}	4.0	3903.907	234.7		0.1	
3906.887	4.9754	2.0	1.8029^{o}	3.0	3906.900	378.2		-1.3	
3909.182	5.6244	3.0	2.4537^{o}	2.0	3909.195	358.7		-0.5	
3910.837	6.1004^{o}	1.0	2.9311	1.0	3910.853^{bc}	160.8		-0.3	
3910.876	6.5191^{o}	4.0	3.3498	5.0	3910.853^{bc}	154.7		0.2	
3919.422	6.5191^{o}	4.0	3.3567	4.0	3919.431	2219.8			
3926.433	4.4625^{o}	5.0	1.3058	4.0	3926.446	3137.4		-1.0	
3927.580	4.9833^{o}	2.0	1.8276	2.0	3927.592	482.8		-1.2	
3931.372	3.7190^{o}	3.0	0.5663	4.0	3931.377^{n}	15582.4		-1.2	-1.1
3939.035	3.9615^{o}	1.0	0.8149	1.0	3939.045	3849.6		-1.5	
3940.346	3.9604^{o}	2.0	0.8149	1.0	3940.356	107.3		-3.1	
3943.068	4.9331	2.0	1.7897^{o}	2.0	3943.065	166.6		-1.7	
3949.499	5.1422	3.0	2.0039^{o}	2.0	3949.513	161.3		-1.4	
3950.779	6.1234^{o}	5.0	2.9861	5.0	3950.788	196.8		-0.1	
3951.172	6.2714^{o}	3.0	3.1345	3.0	3951.177	681.9		0.6	
3951.813	3.4286^{o}	3.0	0.2922	3.0	3951.824^{n}	52359.9		-1.0	-1.2
3957.027	5.3919	3.0	2.2596^{o}	4.0	3957.037	304.8		-0.9	
3959.707	4.9331	2.0	1.8029^{o}	3.0	3959.706	57.8		-2.1	
3963.779	5.7256	3.0	2.5987^{o}	4.0	3963.807	46.5		-1.3	
3964.947	6.1989	3.0	3.0729^{o}	4.0	3964.966^{c}	114.3		-0.3	
3973.479	3.4115^{o}	4.0	0.2922	3.0	3973.488^{n}	26218.6		-1.4	-1.7
3981.155	4.9030	1.0	1.7897^{o}	2.0	3981.162	76.3		-2.0	
3988.702	6.0389	2.0	2.9315^{o}	3.0	3988.690	32.8		-1.0	
3992.757	3.9191^{o}	2.0	0.8149	1.0	3992.770	251.6	-2.8	-2.7	
4004.388	4.2091^{o}	3.0	1.1138	2.0	4004.394	372.1		-2.2	
4011.503	4.3956^{o}	3.0	1.3058	4.0	4011.512	158.3		-2.3	
4015.672	5.8700	3.0	2.7834^{o}	2.0	4015.686	56.9		-1.0	
4022.834	4.8707	1.0	1.7897^{o}	2.0	4022.847	123.5		-1.9	
4024.917	6.1524	4.0	3.0729^{o}	4.0	4024.927	522.7		0.3	
4026.466	5.9612^{o}	3.0	2.8829	4.0	4026.446	101.0		-0.6	
4032.259	3.3660^{o}	2.0	0.2922	3.0	4032.266^{n}	7362.9		-1.9	-1.7
4038.378	6.1421	5.0	3.0729^{o}	4.0	4038.389	80.1		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4048.667	4.8511	3.0	1.7897^o	2.0	4048.694	787.7		-1.1	
4050.878	3.6260^o	4.0	0.5663	4.0	4050.884^n	3852.7		-1.9	-2.1
4053.243	6.1924^o	4.0	3.1345	3.0	4053.253	105.7		-0.3	
4057.436	5.3042	1.0	2.2494^o	1.0	4057.453	288.5		-1.0	
4060.084	6.4026^o	6.0	3.3498	5.0	4060.095	22.8		-0.7	
4062.836	4.3536	2.0	1.3029^o	2.0	4062.845	6501.7		-0.8	
4064.884	4.9924^o	2.0	1.9432	3.0	4064.896	35.9		-2.2	
4066.211	4.8511	3.0	1.8029^o	3.0	4066.219	2022.4		-0.7	
4067.829	5.2964	2.0	2.2494^o	1.0	4067.840	702.5		-0.6	
4068.258	5.9538	4.0	2.9072^o	3.0	4068.267	155.8		-0.4	
4072.717	5.6356^o	3.0	2.5923	2.0	4072.704	2489.4		0.4	
4074.761	5.9733	2.0	2.9315^o	3.0	4074.791	232.3		-0.2	
4077.804	5.8230	3.0	2.7834^o	2.0	4077.815	75.8		-0.9	
4087.941	5.0359	1.0	2.0039^o	2.0	4087.955	748.0		-0.9	
4094.930	6.4383	5.0	3.4115^o	4.0	4094.952	21.5		-0.7	
4095.491	5.8098	2.0	2.7834^o	2.0	4095.514	43.5		-1.1	
4097.972	6.0975	5.0	3.0729^o	4.0	4097.990	67.2		-0.6	
4104.229	3.7190^o	3.0	0.6991	2.0	4104.234^n	2215.1		-2.0	-1.9
4105.584	5.0229	2.0	2.0039^o	2.0	4105.609	143.0		-1.6	
4105.809	4.7567	0.0	1.7379^o	1.0	4105.814	371.1		-1.5	
4106.543	4.3241^o	3.0	1.3058	4.0	4106.551	569.1		-1.9	
4111.107	5.7101	2.0	2.6952^o	1.0	4111.113	153.2		-0.7	
4115.874	5.2904	4.0	2.2790^o	3.0	4115.880	312.9		-0.9	
4118.883	4.7472	2.0	1.7379^o	1.0	4118.892	299.3		-1.6	
4125.058	5.9358^o	1.0	2.9311	1.0	4125.076^c	21.7		-1.3	
4125.878	5.5964^o	2.0	2.5923	2.0	4125.894	24.1		-1.6	
4127.629	6.0757	4.0	3.0729^o	4.0	4127.623	429.1		0.2	
4138.910	4.1085^o	1.0	1.1138	2.0	4138.915	32.7		-3.3	
4141.721	4.1064^o	2.0	1.1138	2.0	4141.728	98.9		-2.9	
4144.219	5.5895	3.0	2.5987^o	4.0	4144.252	113.9		-1.0	
4145.753	3.6888^o	2.0	0.6991	2.0	4145.757^n	7451.4		-1.5	-1.8
4152.167	6.2337	5.0	3.2486^o	5.0	4152.175	616.9		0.6	
4155.348	5.2424	4.0	2.2596^o	4.0	4155.356	119.5		-1.4	
4161.240	6.0515	3.0	3.0729^o	4.0	4161.210^c	116.7		-0.4	
4162.703	3.5438^o	3.0	0.5663	4.0	4162.711^n	5097.2		-1.8	-1.8
4171.246	4.9754	2.0	2.0039^o	2.0	4171.263	42.7		-2.2	
4174.340	3.2614^o	3.0	0.2922	3.0	4174.348^n	107387.5		-0.9	-1.1
4175.657	6.3343	1.0	3.3660^o	2.0	4175.646	845.3		0.8	
4193.167	5.2211	1.0	2.2651^o	0.0	4193.174	43.9		-1.8	
4207.062	3.6452^o	2.0	0.6991	2.0	4207.088	553.0	-2.9	-2.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4209.743	4.7472	2.0	1.8029^o	3.0	4209.753	2693.5		-0.6	
4210.586	5.8359^o	3.0	2.8922	2.0	4210.598	110.8		-0.7	
4214.863	5.5176^o	2.0	2.5769	1.0	4214.875	58.8		-1.3	
4221.767	5.2148	3.0	2.2790^o	3.0	4221.774	86.5		-1.5	
4224.677	5.8410	3.0	2.9072^o	3.0	4224.647	57.9		-0.9	
4231.192	4.9333	1.0	2.0039^o	2.0	4231.199	205.2		-1.5	
4238.828	4.7516^o	2.0	1.8276	2.0	4238.820	813.6		-1.1	
4247.996	5.9907	3.0	3.0729^o	4.0	4248.019	29.2		-1.0	
4251.510	5.1749	3.0	2.2596^o	4.0	4251.521	84.0		-1.6	
4256.644	6.1732	3.0	3.2614^o	3.0	4256.668	23.7		-0.9	
4269.247	4.2091^o	3.0	1.3058	4.0	4269.257	911.2		-1.7	
4276.295	5.2904	4.0	2.3919^o	3.0	4276.312	102.2		-1.3	
4287.253	4.6290	1.0	1.7379^o	1.0	4287.263	584.4		-1.4	
4294.777	3.1782^o	2.0	0.2922	3.0	4294.783^n	68289.1		-1.1	-1.5
4295.415	5.1050^o	4.0	2.2194	5.0	4295.426	67.4		-1.8	
4296.448	3.5694^o	1.0	0.6846	0.0	4296.452^n	1711.0		-2.2	-2.1
4303.652	5.7872	4.0	2.9072^o	3.0	4303.659	113.6		-0.7	
4306.162	5.8098	2.0	2.9315^o	3.0	4306.163	57.0		-1.0	
4314.354	5.4715	5.0	2.5987^o	4.0	4314.370	33.3		-1.6	
4318.131	3.5694^o	1.0	0.6991	2.0	4318.138^n	4142.1		-1.9	-1.7
4325.481	6.0436	3.0	3.1782^o	2.0	4325.447	326.7		0.1	
4328.126	6.1252	2.0	3.2614^o	3.0	4328.140	21.1		-1.0	
4328.848	5.1422	3.0	2.2790^o	3.0	4328.861	19.5		-2.2	
4330.277	3.4286^o	3.0	0.5663	4.0	4330.285^n	15005.1		-1.5	-1.7
4333.856	5.1094	2.0	2.2494^o	1.0	4333.865	79.0		-1.7	
4349.741	5.9224	5.0	3.0729^o	4.0	4349.750	272.7		-0.1	
4351.805	6.3920	3.0	3.5438^o	3.0	4351.769	85.7		-0.0	
4353.363	4.8511	3.0	2.0039^o	2.0	4353.367	262.2		-1.5	
4355.247	5.9804^o	4.0	3.1345	3.0	4355.264	21.4		-1.2	
4356.306	3.4115^o	4.0	0.5663	4.0	4356.313^n	54382.5		-0.9	-1.3
4357.002	3.5438^o	3.0	0.6991	2.0	4357.008^n	1292.1		-2.4	-2.3
4365.379	4.6290	1.0	1.7897^o	2.0	4365.384	636.1		-1.3	
4376.587	5.7242^o	2.0	2.8922	2.0	4376.588	28.8		-1.3	
4404.125	6.0757	4.0	3.2614^o	3.0	4404.138	26.6		-0.9	
4411.925	6.2230	2.0	3.4137^o	1.0	4411.949	31.4		-0.7	
4412.383	5.0686	3.0	2.2596^o	4.0	4412.389	29.0		-2.1	
4416.181	5.7381	4.0	2.9315^o	3.0	4416.191	225.4		-0.4	
4417.902	3.5046^o	2.0	0.6991	2.0	4417.908^n	10804.3		-1.5	-1.5
4418.247	3.9191^o	2.0	1.1138	2.0	4418.250^n	2702.3		-1.6	-1.7
4418.602	5.0381	2.0	2.2330^o	2.0	4418.606	28.5		-2.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4422.243	4.1086^o	3.0	1.3058	4.0	4422.252	498.6		-2.1	
4437.437	5.3919	3.0	2.5987^o	4.0	4437.464	39.2		-1.6	
4438.036	3.4774^o	1.0	0.6846	0.0	4438.040^n	16113.7		-1.3	-1.4
4443.752	4.5921	2.0	1.8029^o	3.0	4443.763	52.5		-2.5	
4448.091	5.0359	1.0	2.2494^o	1.0	4448.103	55.7		-1.9	
4453.744	5.1749	3.0	2.3919^o	3.0	4453.759	25.9		-2.0	
4454.831	5.6190^o	4.0	2.8367	3.0	4454.796	25.5		-1.5	
4457.344	3.0729^o	4.0	0.2922	3.0	4457.353	53133.0	-1.4	-1.3	
4461.176	3.4774^o	1.0	0.6991	2.0	4461.182^n	12947.0		-1.4	-1.5
4473.043	5.7025	3.0	2.9315^o	3.0	4473.063	86.8		-0.9	
4473.315	5.0359	1.0	2.2651^o	0.0	4473.323	93.4		-1.6	
4485.227	6.1295	2.0	3.3660^o	2.0	4485.256^b	39.0		-0.7	
4485.251	6.0248	2.0	3.2614^o	3.0	4485.256^b	35.5		-0.8	
4490.558	5.9383	3.0	3.1782^o	2.0	4490.584^c	45.4		-0.8	
4492.156	5.0381	2.0	2.2790^o	3.0	4492.170	140.5		-1.5	
4499.649	3.5694^o	1.0	0.8149	1.0	4499.655^n	1368.1		-2.3	-2.1
4506.659	5.1422	3.0	2.3919^o	3.0	4506.671	61.6		-1.7	
4517.070	5.0229	2.0	2.2790^o	3.0	4517.084	54.7		-1.9	
4518.293	4.7472	2.0	2.0039^o	2.0	4518.298	603.0		-1.2	
4520.587	5.8655	1.0	3.1236^o	1.0	4520.594	70.9		-0.7	
4524.732	6.4281	3.0	3.6888^o	2.0	4524.725^c	38.3		-0.3	
4525.930	4.5283	3.0	1.7897^o	2.0	4525.935	80.7		-2.3	
4530.134	5.9142	2.0	3.1782^o	2.0	4530.144	22.0		-1.2	
4531.144	5.8699^o	2.0	3.1345	3.0	4531.150	337.4		-0.0	
4540.931	3.4286^o	3.0	0.6991	2.0	4540.938^n	38150.3		-1.0	-1.3
4541.701	3.4137^o	1.0	0.6846	0.0	4541.707^n	2338.7		-2.2	-2.3
4543.007	5.1202	2.0	2.3919^o	3.0	4543.015	109.9		-1.4	
4546.898	4.9754	2.0	2.2494^o	1.0	4546.925^b	78.5		-1.8	
4546.962	5.8359^o	3.0	3.1100	2.0	4546.926^b	80.7		-0.7	
4553.769	3.5367^o	0.0	0.8149	1.0	4553.778	5954.1		-1.7	
4559.742	5.5017	2.0	2.7834^o	2.0	4559.755	52.6		-1.3	
4565.937	3.4137^o	1.0	0.6991	2.0	4565.939^n	36595.7		-1.0	-1.3
4590.533	4.9331	2.0	2.2330^o	2.0	4590.545	907.6		-0.8	
4596.682	4.9754	2.0	2.2790^o	3.0	4596.703	22.7		-2.3	
4597.935	5.6272	4.0	2.9315^o	3.0	4597.945	308.3		-0.4	
4603.520	5.9538	4.0	3.2614^o	3.0	4603.547	93.0		-0.5	
4608.090	3.5046^o	2.0	0.8149	1.0	4608.095^n	6222.4		-1.7	-1.7
4612.296	5.8655	1.0	3.1782^o	2.0	4612.288	23.2		-1.2	
4613.212	5.8649	2.0	3.1782^o	2.0	4613.215	26.3		-1.1	
4614.180	5.8098	2.0	3.1236^o	1.0	4614.169	179.9		-0.4	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4629.074	4.6208^o	4.0	1.9432	3.0	4629.068	41.0		-2.5	
4630.604	5.0686	3.0	2.3919^o	3.0	4630.614	298.8		-1.1	
4632.041	3.9788	1.0	1.3029^o	2.0	4632.049	164.0		-2.7	
4633.964	4.9399	0.0	2.2651^o	0.0	4633.991	22869.1		0.7	
4636.520	5.9347	2.0	3.2614^o	3.0	4636.513	21.2		-1.1	
4642.237	4.9030	1.0	2.2330^o	2.0	4642.245	653.3		-0.9	
4647.472	3.3660^o	2.0	0.6991	2.0	4647.444	622.4	-2.6	-2.8	
4648.330	5.1202	2.0	2.4537^o	2.0	4648.332	135.4		-1.3	
4652.242	6.0757	4.0	3.4115^o	4.0	4652.242	45.6		-0.6	
4655.189	3.4774^o	1.0	0.8149	1.0	4655.195^n	31193.8		-1.0	-1.1
4661.746	6.0248	2.0	3.3660^o	2.0	4661.779	12.9		-1.2	
4669.239	3.9604^o	4.0	1.3058	4.0	4669.247	1667.5		-1.7	
4669.974	4.9331	2.0	2.2790^o	3.0	4669.940	42.3		-2.1	
4670.936	6.2230	2.0	3.5694^o	1.0	4670.952^b	78.7		-0.2	
4670.942	4.9030	1.0	2.2494^o	1.0	4670.952^b	78.7		-1.8	
4673.174	5.3475	0.0	2.6952^o	1.0	4673.185	80.6		-1.3	
4683.933	5.0381	2.0	2.3919^o	3.0	4683.944	289.7		-1.1	
4686.368	5.9570^o	4.0	3.3122	3.0	4686.394^b	52.9		-0.7	
4686.392	5.8230	3.0	3.1782^o	2.0	4686.394^b	48.5		-0.9	
4691.444	6.0080	2.0	3.3660^o	2.0	4691.421	364.7		0.2	
4698.427	5.3332	2.0	2.6952^o	1.0	4698.439	43.8		-1.5	
4699.005	4.8707	1.0	2.2330^o	2.0	4699.012	2490.1		-0.4	
4708.851	5.4715	5.0	2.8393^o	5.0	4708.856	270.0		-0.6	
4709.766	5.8098	2.0	3.1782^o	2.0	4709.727	126.0		-0.5	
4712.210	5.2290	4.0	2.5987^o	4.0	4712.218	124.7		-1.2	
4721.007	5.5176^o	2.0	2.8922	2.0	4721.006	16.5		-1.7	
4735.488	5.4008	1.0	2.7834^o	2.0	4735.526^b	961.0		-0.1	
4735.524	3.9203	2.0	1.3029^o	2.0	4735.527^b	884.1		-2.0	
4738.577	4.3536	2.0	1.7379^o	1.0	4738.580^b	873.1		-1.4	
4738.610	5.7993^o	3.0	3.1837	4.0	4738.580^b	869.5		0.3	
4739.820	2.9072^o	3.0	0.2922	3.0	4739.829	3271.1		-2.7	
4743.214	6.1570	3.0	3.5438^o	3.0	4743.200	78.9		-0.3	
4748.407	5.7339	0.0	3.1236^o	1.0	4748.430	47.9		-1.0	
4757.609	3.7190^o	3.0	1.1138	2.0	4757.612^n	1415.0		-2.0	-1.9
4769.377	3.4137^o	1.0	0.8149	1.0	4769.382^n	493.8		-2.8	-2.8
4773.716	3.2810^o	1.0	0.6846	0.0	4773.720^n	8186.1		-1.8	-1.7
4774.903	5.4351	4.0	2.8393^o	5.0	4774.914	340.4		-0.5	
4782.740	4.8511	3.0	2.2596^o	4.0	4782.746	3914.0		-0.2	
4783.397	5.9572	3.0	3.3660^o	2.0	4783.427	621.8		0.4	
4789.140	5.9003^o	3.0	3.3122	3.0	4789.126	298.3		0.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4791.581	5.6597	3.0	3.0729^o	4.0	4791.588	456.9		-0.1	
4795.973	5.0381	2.0	2.4537^o	2.0	4795.984	194.8		-1.2	
4800.039	5.0359	1.0	2.4537^o	2.0	4800.055	69.9		-1.7	
4800.498	3.2810^o	1.0	0.6991	2.0	4800.505^n	58548.8		-0.9	-1.0
4805.069	5.9455	2.0	3.3660^o	2.0	4805.073^b	27.6		-1.0	
4805.097	5.0998^o	0.0	2.5203	0.0	4805.073^b	26.4		-2.0	
4811.139	5.1749	3.0	2.5987^o	4.0	4811.145	446.7		-0.7	
4813.495	3.6888^o	2.0	1.1138	2.0	4813.502^n	39.4		-3.6	-3.4
4817.256	6.0016	2.0	3.4286^o	3.0	4817.221^c	134.0		-0.2	
4818.830	4.8511	3.0	2.2790^o	3.0	4818.836	1290.1		-0.6	
4834.200	4.3536	2.0	1.7897^o	2.0	4834.202	889.5		-1.4	
4837.235	3.2614^o	3.0	0.6991	2.0	4837.242^n	19527.7		-1.4	-1.7
4838.792	6.0389	2.0	3.4774^o	1.0	4838.782	310.7		0.2	
4858.411	3.3660^o	2.0	0.8149	1.0	4858.413^n	2464.4		-2.2	-2.0
4859.234	4.3536	2.0	1.8029^o	3.0	4859.234	4215.6		-0.7	
4860.941	5.9785	4.0	3.4286^o	3.0	4860.963	41.2		-0.7	
4861.506	4.4927^o	3.0	1.9432	3.0	4861.505	15.4		-3.0	
4863.278	4.3383	1.0	1.7897^o	2.0	4863.280	2068.9		-1.1	
4863.649	5.8098	2.0	3.2614^o	3.0	4863.651	14.4		-1.4	
4875.914	4.6208^o	4.0	2.0787	4.0	4875.882	14.4		-2.9	
4877.584	4.9331	2.0	2.3919^o	3.0	4877.593	2238.8		-0.3	
4887.185	6.0729	1.0	3.5367^o	0.0	4887.201	20.2		-0.9	
4889.934	3.8406^o	5.0	1.3058	4.0	4889.938^n	405.9		-2.4	-2.5
4890.752	6.0389	2.0	3.5046^o	2.0	4890.762	2351.3			
4896.341	3.6452^o	2.0	1.1138	2.0	4896.348^n	891.4		-2.3	-2.5
4901.362	5.8098	2.0	3.2810^o	1.0	4901.362	38.4		-1.0	
4903.058	5.4351	4.0	2.9072^o	3.0	4903.064	102.9		-1.0	
4906.172	6.1524	4.0	3.6260^o	4.0	4906.190	21.2		-0.8	
4910.102	4.5283	3.0	2.0039^o	2.0	4910.103^b	434.5		-1.5	
4910.122	5.7025	3.0	3.1782^o	2.0	4910.103^b	432.0		-0.0	
4915.302	4.9754	2.0	2.4537^o	2.0	4915.310	422.7		-0.9	
4925.205	5.5895	3.0	3.0729^o	4.0	4925.218	27.2		-1.4	
4926.187	6.1421	5.0	3.6260^o	4.0	4926.196	62.9		-0.3	
4926.588	5.8726^o	5.0	3.3567	4.0	4926.601	19.0		-1.2	
4928.191	6.0589	3.0	3.5438^o	3.0	4928.204	14.1		-1.1	
4932.254	5.2964	2.0	2.7834^o	2.0	4932.252	14.6		-2.0	
4943.414	4.7567	0.0	2.2494^o	1.0	4943.422	189.7		-1.6	
4944.800	3.0729^o	4.0	0.5663	4.0	4944.805^n	282.3		-3.5	-3.6
4947.330	4.3329^o	2.0	1.8276	2.0	4947.331	76.0		-2.5	
4948.941	3.8103^o	4.0	1.3058	4.0	4948.947^n	2294.1		-1.6	-1.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
4951.157	6.0080	2.0	3.5046^o	2.0	4951.148	25.7		-0.9	
4962.379	4.7472	2.0	2.2494^o	1.0	4962.384	503.7		-1.1	
4975.252	2.7834^o	2.0	0.2922	3.0	4975.257^n	51409.9		-1.6	-1.9
4994.788	6.0254	3.0	3.5438^o	3.0	4994.769	261.5		0.2	
4999.200	4.9331	2.0	2.4537^o	2.0	4999.192	39.1		-2.0	
4999.703	3.1782^o	2.0	0.6991	2.0	4999.703^n	669.8		-2.9	-3.0
5000.531	5.5516	4.0	3.0729^o	4.0	5000.533	91.2		-0.9	
5018.181	5.0686	3.0	2.5987^o	4.0	5018.188	1445.0		-0.3	
5021.110	5.2519	3.0	2.7834^o	2.0	5021.118	181.9		-0.9	
5021.735	4.7472	2.0	2.2790^o	3.0	5021.742^b	254.6		-1.4	
5021.783	6.1570	3.0	3.6888^o	2.0	5021.742^b	252.9		0.3	
5023.070	4.2147^o	2.0	1.7472	1.0	5023.076	92.1		-2.5	
5025.893	3.2810^o	1.0	0.8149	1.0	5025.898^n	261.4		-3.2	-2.9
5029.611	5.2166^o	2.0	2.7523	3.0	5029.626	29.5		-1.8	
5034.905	4.2893^o	1.0	1.8276	2.0	5034.908	35.4		-2.8	
5040.199	4.8511	3.0	2.3919^o	3.0	5040.206	62.9		-1.9	
5044.179	6.4187	2.0	3.9615^o	1.0	5044.218	34.4		-0.2	
5047.438	3.5694^o	1.0	1.1138	2.0	5047.443^n	4441.1		-1.6	-1.4
5055.933	5.9953	4.0	3.5438^o	3.0	5055.948	13.4		-1.1	
5069.800	5.7258	2.0	3.2810^o	1.0	5069.805	26.7		-1.2	
5076.278	6.1305	1.0	3.6888^o	2.0	5076.270	12.8		-1.0	
5081.762	3.1236^o	1.0	0.6846	0.0	5081.768	132.8		-3.7	
5086.951	4.5153^o	5.0	2.0787	4.0	5086.962	75.8		-2.2	
5090.877	3.7376	2.0	1.3029^o	2.0	5090.883	174.9		-2.8	
5100.630	3.5438^o	3.0	1.1138	2.0	5100.636^n	739.5		-2.4	-2.2
5101.664	5.8410	3.0	3.4115^o	4.0	5101.678	130.3		-0.3	
5111.139	5.1202	2.0	2.6952^o	1.0	5111.138	79.6		-1.4	
5112.123	3.1236^o	1.0	0.6991	2.0	5112.132	7777.9		-1.9	
5136.148	6.2714^o	3.0	3.8582	2.0	5136.188^b	154.5		0.3	
5136.185	3.7190^o	3.0	1.3058	4.0	5136.185^n	154.2		-2.9	-2.5
5139.456	6.3721	3.0	3.9604^o	2.0	5139.469	1292.1			
5148.012	5.5176^o	2.0	3.1100	2.0	5148.048	23.2		-1.5	
5157.939	5.2424	4.0	2.8393^o	5.0	5157.955	1442.1		-0.0	
5158.700	5.5126^o	3.0	3.1100	2.0	5158.667	41.1		-1.2	
5164.150	4.9924^o	2.0	2.5923	2.0	5164.170	23.3		-2.1	
5170.167	4.8511	3.0	2.4537^o	2.0	5170.175	1035.0		-0.6	
5173.161	4.6290	1.0	2.2330^o	2.0	5173.171	64.8		-2.1	
5182.895	5.1749	3.0	2.7834^o	2.0	5182.904	20.5		-1.9	
5184.291	3.5046^o	2.0	1.1138	2.0	5184.293^n	210.9		-3.0	-2.7
5186.820	5.2290	4.0	2.8393^o	5.0	5186.824	249.5		-0.8	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5191.449	5.8649	2.0	3.4774^o	1.0	5191.460	748.8		0.5	
5196.610	6.3054^o	3.0	3.9203	2.0	5196.598	11.6		-0.8	
5199.535	4.4625^o	5.0	2.0787	4.0	5199.547	125.2		-2.0	
5200.864	5.2904	4.0	2.9072^o	3.0	5200.874	50.1		-1.4	
5204.547	4.2091^o	3.0	1.8276	2.0	5204.587	1078.8		-1.4	
5208.832	4.6290	1.0	2.2494^o	1.0	5208.842	103.1		-1.9	
5222.431	5.2563^o	3.0	2.8829	4.0	5222.430	22.0		-1.8	
5225.228	4.3153^o	4.0	1.9432	3.0	5225.230	16.2		-3.1	
5240.424	2.9315^o	3.0	0.5663	4.0	5240.428^n	76.6		-4.1	-3.6
5242.484	6.2834	3.0	3.9191^o	2.0	5242.498	182.8		0.4	
5243.455	4.6290	1.0	2.2651^o	0.0	5243.460	209.3		-1.6	
5243.981	3.4774^o	1.0	1.1138	2.0	5243.986^n	5562.1		-1.6	-1.3
5244.669	3.1782^o	2.0	0.8149	1.0	5244.674^n	1487.6		-2.5	-2.6
5247.029	5.4351	4.0	3.0729^o	4.0	5247.050^c	522.6		-0.2	
5258.737	5.6380	1.0	3.2810^o	1.0	5258.748	45.6		-1.0	
5275.035	4.3536	2.0	2.0039^o	2.0	5275.036	676.2		-1.4	
5290.803	4.5921	2.0	2.2494^o	1.0	5290.814	80.5		-2.0	
5292.771	5.1785^o	2.0	2.8367	3.0	5292.778^b	55.4		-1.5	
5292.794	6.1234^o	5.0	3.7816	4.0	5292.778^b	55.3		-0.3	
5294.862	2.9072^o	3.0	0.5663	4.0	5294.871	17816.5		-1.8	
5304.174	5.1202	2.0	2.7834^o	2.0	5304.180	47.7		-1.6	
5307.802	5.2424	4.0	2.9072^o	3.0	5307.813	191.6		-0.9	
5309.677	4.3383	1.0	2.0039^o	2.0	5309.682	550.3		-1.5	
5338.390	5.2290	4.0	2.9072^o	3.0	5338.420	108.6		-1.1	
5354.716	5.4715	5.0	3.1568^o	6.0	5354.715	1342.2		0.3	
5357.354	5.2447^o	2.0	2.9311	1.0	5357.368	17.4		-1.9	
5368.511	3.1236^o	1.0	0.8149	1.0	5368.519	334.6		-3.2	
5373.854	2.5987^o	4.0	0.2922	3.0	5373.860^n	47241.6		-1.7	-1.9
5376.298	5.4008	1.0	3.0954^o	0.0	5376.307	28.2		-1.5	
5383.023	5.1855^o	3.0	2.8829	4.0	5383.035	86.1		-1.3	
5389.331	3.4137^o	1.0	1.1138	2.0	5389.339^n	3824.4		-1.8	-1.8
5404.457	4.7472	2.0	2.4537^o	2.0	5404.457	283.7		-1.3	
5426.345	5.5964^o	2.0	3.3122	3.0	5426.358	16.6		-1.5	
5433.720	4.1086^o	3.0	1.8276	2.0	5433.722	12.8		-3.4	
5434.968	3.0954^o	0.0	0.8149	1.0	5434.980	58.6		-4.0	
5435.774	4.9754	2.0	2.6952^o	1.0	5435.780	129.6		-1.3	
5439.698	5.8224	2.0	3.5438^o	3.0	5439.685	35.5		-0.8	
5445.079	5.9953	4.0	3.7190^o	3.0	5445.048	185.1		0.1	
5452.908	2.8393^o	5.0	0.5663	4.0	5452.919	32961.7		-1.6	
5463.300	4.5283	3.0	2.2596^o	4.0	5463.299	2886.8		-0.5	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5465.713	5.1749	3.0	2.9072^o	3.0	5465.715	92.5		-1.2	
5502.158	5.1356^o	3.0	2.8829	4.0	5502.146	379.8		-0.6	
5502.626	5.0359	1.0	2.7834^o	2.0	5502.635	33.9		-1.8	
5503.291	3.3660^o	2.0	1.1138	2.0	5503.287^n	139.8		-3.3	-3.0
5510.114	2.2494^o	1.0	0.0000	2.0	5510.124	2338.5		-3.4	
5510.441	4.5283	3.0	2.2790^o	3.0	5510.447	557.0		-1.2	
5517.083	5.6126	1.0	3.3660^o	2.0	5517.126	298.4		-0.2	
5520.013	4.2494	3.0	2.0039^o	2.0	5520.030	78.9		-2.4	
5530.267	5.0780^o	2.0	2.8367	3.0	5530.274	65.3		-1.5	
5531.337	3.9788	1.0	1.7379^o	1.0	5531.350	24.0		-3.3	
5532.348	5.8098	2.0	3.5694^o	1.0	5532.311	133.4		-0.3	
5538.019	4.9333	1.0	2.6952^o	1.0	5538.025	579.9		-0.7	
5538.273	3.5438^o	3.0	1.3058	4.0	5538.276^n	891.4		-2.2	-2.0
5541.914	4.3153^o	4.0	2.0787	4.0	5541.924	38.3		-2.6	
5550.601	2.2330^o	2.0	0.0000	2.0	5550.609^n	82661.2		-1.9	-1.8
5552.119	2.9315^o	3.0	0.6991	2.0	5552.124^n	46006.0		-1.3	-1.4
5555.449	4.9833^o	2.0	2.7523	3.0	5555.405	40.4		-1.8	
5569.624	5.9142	2.0	3.6888^o	2.0	5569.625	751.5		0.6	
5575.168	5.6347	5.0	3.4115^o	4.0	5575.182	8.1		-1.7	
5575.853	5.4715	5.0	3.2486^o	5.0	5575.862	539.1		-0.1	
5598.307	6.3721	3.0	4.1581^o	2.0	5598.293	36.8		-0.1	
5600.197	3.9604^o	2.0	1.7472	1.0	5600.217	42.3		-3.0	
5600.761	5.1202	2.0	2.9072^o	3.0	5600.763	98.5		-1.2	
5613.262	2.9072^o	3.0	0.6991	2.0	5613.271	19633.3		-1.7	
5614.006	4.9030	1.0	2.6952^o	1.0	5614.013	355.1		-0.9	
5620.192	6.4201	2.0	4.2147^o	2.0	5620.149	1441.7			
5628.297	5.1094	2.0	2.9072^o	3.0	5628.307	132.8		-1.1	
5633.455	4.5921	2.0	2.3919^o	3.0	5633.466	41.3		-2.2	
5639.485	5.7025	3.0	3.5046^o	2.0	5639.525	9.3		-1.5	
5644.665	5.8410	3.0	3.6452^o	2.0	5644.678	26.0		-0.9	
5662.987	5.1202	2.0	2.9315^o	3.0	5662.971	43.9		-1.6	
5664.495	6.0740	2.0	3.8859^o	3.0	5664.514	1902.5			
5668.706	5.4351	4.0	3.2486^o	5.0	5668.719	42.4		-1.2	
5679.545	3.9203	2.0	1.7379^o	1.0	5679.553	337.4		-2.2	
5685.368	6.1004^o	1.0	3.9203	2.0	5685.390	17.3		-0.7	
5688.112	5.2519	3.0	3.0729^o	4.0	5688.118	7.3		-2.2	
5697.240	4.8707	1.0	2.6952^o	1.0	5697.244	14.9		-2.3	
5702.093	5.4351	4.0	3.2614^o	3.0	5702.103	33.9		-1.3	
5706.659	3.9191^o	2.0	1.7472	1.0	5706.658	9.1	-3.8	-3.7	
5713.253	5.2424	4.0	3.0729^o	4.0	5713.263	244.6		-0.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5719.172	3.2810^o	1.0	1.1138	2.0	5719.178^n	11892.0		-1.4	-1.1
5729.671	4.1064^o	2.0	1.9432	3.0	5729.675	20.0		-3.1	
5734.121	2.4537^o	2.0	0.2922	3.0	5734.123	213.2		-4.2	
5734.497	5.0686	3.0	2.9072^o	3.0	5734.507	81.3		-1.3	
5744.207	6.0436	3.0	3.8859^o	3.0	5744.223^b	6.5		-1.2	
5744.212	6.1181	3.0	3.9604^o	4.0	5744.223^b	6.5		-1.1	
5758.931	5.8410	3.0	3.6888^o	2.0	5758.939	13.0		-1.2	
5765.362	4.9333	1.0	2.7834^o	2.0	5765.372	151.4		-1.2	
5765.954	4.9331	2.0	2.7834^o	2.0	5765.962	75.6		-1.5	
5771.390	3.2614^o	3.0	1.1138	2.0	5771.399^n	38.5		-3.9	-3.3
5780.204	6.0635	2.0	3.9191^o	2.0	5780.195	8.6		-1.1	
5796.313	4.5921	2.0	2.4537^o	2.0	5796.325	54.9		-2.1	
5797.747	4.7301^o	1.0	2.5923	2.0	5797.748	3477.2		-0.1	
5802.859	4.2147^o	4.0	2.0787	4.0	5802.865	85.8		-2.4	
5808.424	3.9615^o	1.0	1.8276	2.0	5808.430	75.0		-2.7	
5811.274	3.9604^o	2.0	1.8276	2.0	5811.280	57.1		-2.8	
5817.466	3.9203	2.0	1.7897^o	2.0	5817.471	910.3		-1.7	
5817.917	5.3919	3.0	3.2614^o	3.0	5817.897	22.5		-1.5	
5838.892	3.4286^o	3.0	1.3058	4.0	5838.900^n	493.4		-2.6	-2.5
5844.883	4.3536	2.0	2.2330^o	2.0	5844.891	9.5		-3.1	
5845.860	3.8582	2.0	1.7379^o	1.0	5845.870	1826.0		-1.5	
5847.762	4.9030	1.0	2.7834^o	2.0	5847.774	126.8		-1.3	
5849.675	5.1050^o	4.0	2.9861	5.0	5849.690^b	87.9		-1.2	
5849.718	6.1524	4.0	4.0335^o	3.0	5849.690^b	88.0		0.1	
5858.345	5.0229	2.0	2.9072^o	3.0	5858.355	43.9		-1.6	
5883.614	5.2166^o	2.0	3.1100	2.0	5883.657^b	177.1		-0.8	
5883.648	5.0381	2.0	2.9315^o	3.0	5883.657^b	176.7		-1.0	
5886.315	3.4115^o	4.0	1.3058	4.0	5886.318^n	317.6		-2.8	-2.6
5887.444	4.3383	1.0	2.2330^o	2.0	5887.449	30.0		-2.6	
5890.459	4.3536	2.0	2.2494^o	1.0	5890.462	534.2		-1.4	
5896.624	6.0635	2.0	3.9615^o	1.0	5896.637^b	132.6		0.1	
5896.627	5.1749	3.0	3.0729^o	4.0	5896.637^b	132.6		-1.0	
5922.934	5.7379	3.0	3.6452^o	2.0	5922.953	4.0		-1.8	
5926.460	5.0229	2.0	2.9315^o	3.0	5926.474	83.4		-1.3	
5933.681	6.0080	2.0	3.9191^o	2.0	5933.695^b	419.3		0.6	
5933.688	4.3383	1.0	2.2494^o	1.0	5933.695^b	418.7		-1.5	
5938.127	4.8707	1.0	2.7834^o	2.0	5938.137	19.3		-2.2	
5946.507	2.7834^o	2.0	0.6991	2.0	5946.516	37.8	-4.7	-4.5	
5959.559	5.2635^o	4.0	3.1837	4.0	5959.558	4.9		-2.3	
5974.280	4.3536	2.0	2.2790^o	3.0	5974.283	692.5		-1.2	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
5974.721	4.5283	3.0	2.4537^o	2.0	5974.726	508.3		-1.2	
5976.813	5.2519	3.0	3.1782^o	2.0	5976.767	34.5		-1.4	
5978.659	4.3383	1.0	2.2651^o	0.0	5978.662	365.7		-1.5	
5980.260	5.2563^o	3.0	3.1837	4.0	5980.273	7.6		-2.1	
5983.381	5.9907	3.0	3.9191^o	2.0	5983.387	7.0		-1.2	
5986.604	5.7156	1.0	3.6452^o	2.0	5986.614	15.0		-1.2	
5992.082	3.8582	2.0	1.7897^o	2.0	5992.111	3.1		-4.2	
5992.958	4.9754	2.0	2.9072^o	3.0	5992.968	107.0		-1.3	
6004.178	3.1782^o	2.0	1.1138	2.0	6004.188^n	215.3		-3.2	-3.0
6015.357	3.8502	3.0	1.7897^o	2.0	6015.363	67.1		-2.9	
6021.763	3.8859^o	3.0	1.8276	2.0	6021.788^n	193.6		-2.4	-2.5
6033.942	5.9733	2.0	3.9191^o	2.0	6033.931	4.3		-1.4	
6039.703	5.3332	2.0	3.2810^o	1.0	6039.717	7.9		-2.0	
6040.374	4.7472	2.0	2.6952^o	1.0	6040.373	16.4		-2.4	
6043.264	5.1855^o	3.0	3.1345	3.0	6043.233	4543.3		0.6	
6054.167	3.8502	3.0	1.8029^o	3.0	6054.169	733.2		-1.8	
6064.258	4.9754	2.0	2.9315^o	3.0	6064.274	7.8		-2.4	
6070.593	5.2904	4.0	3.2486^o	5.0	6070.600	3.9		-2.3	
6091.367	5.4008	1.0	3.3660^o	2.0	6091.376	13.0		-1.6	
6092.440	3.3373	1.0	1.3029^o	2.0	6092.447	54.9		-3.6	
6098.670	2.5987^o	4.0	0.5663	4.0	6098.677^n	6922.3		-2.4	-2.3
6106.097	4.1086^o	3.0	2.0787	4.0	6106.111	7.2		-3.5	
6118.144	4.9331	2.0	2.9072^o	3.0	6118.152	31.5		-1.8	
6140.453	3.7565	0.0	1.7379^o	1.0	6140.469	1269.0		-1.7	
6141.780	5.9785	4.0	3.9604^o	4.0	6141.752	38.5		-0.5	
6148.681	5.8262	4.0	3.8103^o	4.0	6148.694	4.1		-1.6	
6152.941	5.6597	3.0	3.6452^o	2.0	6152.958	5.0		-1.7	
6157.715	5.9733	2.0	3.9604^o	2.0	6157.721	71.1		-0.2	
6168.657	3.3122	3.0	1.3029^o	2.0	6168.666	144.9		-3.2	
6192.473	4.9331	2.0	2.9315^o	3.0	6192.476	40.3		-1.7	
6198.457	3.7376	2.0	1.7379^o	1.0	6198.465	165.8		-2.6	
6207.460	5.1749	3.0	3.1782^o	2.0	6207.467	11.0		-2.0	
6207.968	5.1202	2.0	3.1236^o	1.0	6207.964	5.2		-2.4	
6209.421	2.6952^o	1.0	0.6991	2.0	6209.427^n	530.6		-3.4	-3.1
6210.680	5.0686	3.0	3.0729^o	4.0	6210.690	152.7		-1.0	
6211.999	4.2147^o	4.0	2.2194	5.0	6212.008	89.8		-2.2	
6216.790	5.2424	4.0	3.2486^o	5.0	6216.801	115.0		-0.9	
6229.099	4.2494	3.0	2.2596^o	4.0	6229.120	114.8		-2.1	
6236.505	5.3442^o	3.0	3.3567	4.0	6236.511	2.3		-2.4	
6237.353	5.4008	1.0	3.4137^o	1.0	6237.318	6.6		-1.9	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6238.583	2.2790^o	3.0	0.2922	3.0	6238.594	1696.1		-3.4	
6241.816	5.1094	2.0	3.1236^o	1.0	6241.829	9.2		-2.1	
6258.793	5.2290	4.0	3.2486^o	5.0	6258.799	26.8		-1.5	
6271.363	4.8593^o	3.0	2.8829	4.0	6271.354	4.3		-2.8	
6275.492	5.9355	1.0	3.9604^o	2.0	6275.504	5.3		-1.3	
6276.415	3.9788	1.0	2.0039^o	2.0	6276.434	9.7		-3.5	
6296.280	2.7834^o	2.0	0.8149	1.0	6296.285^n	13.5		-4.8	-4.2
6300.128	2.2596^o	4.0	0.2922	3.0	6300.143	124.2		-4.5	
6310.732	5.1422	3.0	3.1782^o	2.0	6310.750	14.0		-1.9	
6311.843	4.7472	2.0	2.7834^o	2.0	6311.850	63.2		-1.7	
6313.391	5.3919	3.0	3.4286^o	3.0	6313.407	18.2		-1.5	
6318.323	4.3536	2.0	2.3919^o	3.0	6318.328	70.6		-2.2	
6338.099	3.2614^o	3.0	1.3058	4.0	6338.109^n	862.7		-2.4	-2.2
6340.713	4.0335^o	3.0	2.0787	4.0	6340.725	3.3		-3.9	
6377.534	5.0780^o	2.0	3.1345	3.0	6377.541	1.8		-2.8	
6380.188	3.8859^o	3.0	1.9432	3.0	6380.194^n	327.8		-2.1	-1.9
6381.554	6.1570	3.0	4.2147^o	4.0	6381.569^b	2.9		-1.3	
6381.612	6.1570	3.0	4.2147^o	2.0	6381.569^b	2.8		-1.3	
6382.743	5.9023	4.0	3.9604^o	4.0	6382.702	23.5		-0.7	
6383.689	3.6888^o	2.0	1.7472	1.0	6383.699^n	43.1		-3.2	-3.0
6386.219	2.2330^o	2.0	0.2922	3.0	6386.223^n	9077.0		-2.7	-2.3
6387.260	5.0359	1.0	3.0954^o	0.0	6387.273	5.0		-2.5	
6388.920	5.2211	1.0	3.2810^o	1.0	6388.922	12.2		-1.8	
6406.540	3.7376	2.0	1.8029^o	3.0	6406.550	35.4		-3.2	
6409.512	4.6290	1.0	2.6952^o	1.0	6409.512	81.9		-1.7	
6418.016	5.1094	2.0	3.1782^o	2.0	6418.032	10.1		-2.1	
6423.420	4.5283	3.0	2.5987^o	4.0	6423.426	11.7		-2.7	
6429.453	5.7381	4.0	3.8103^o	4.0	6429.464	5.7		-1.5	
6456.956	4.8511	3.0	2.9315^o	3.0	6456.965	58.2		-1.6	
6481.553	5.0359	1.0	3.1236^o	1.0	6481.569	3.7		-2.6	
6485.427	6.3737	5.0	4.4625^o	5.0	6485.385	1.5		-1.3	
6492.543	6.1181	3.0	4.2091^o	3.0	6492.550	1.4		-1.6	
6507.115	5.9383	3.0	4.0335^o	3.0	6507.167	54.8		-0.3	
6523.908	4.3536	2.0	2.4537^o	2.0	6523.912	11.6		-2.9	
6536.552	5.4008	1.0	3.5046^o	2.0	6536.520	10.8		-1.6	
6546.283	6.0515	3.0	4.1581^o	2.0	6546.244	65.6		-0.0	
6552.920	3.7190^o	3.0	1.8276	2.0	6552.923	15.4	-3.4	-3.6	
6556.476	5.0686	3.0	3.1782^o	2.0	6556.485	66.2		-1.3	
6567.672	5.3919	3.0	3.5046^o	2.0	6567.684	11.5		-1.6	
6569.448	5.9953	4.0	4.1086^o	3.0	6569.420	178.3		0.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6572.266	5.2519	3.0	3.3660^o	2.0	6572.287	1.5		-2.7	
6576.977	4.3383	1.0	2.4537^o	2.0	6576.989^b	2.1		-3.6	
6577.005	5.7993^o	3.0	3.9148	4.0	6576.989^b	2.1		-1.8	
6578.150	5.9907	3.0	4.1064^o	2.0	6578.170	0.9		-2.0	
6585.807	5.9907	3.0	4.1086^o	3.0	6585.813	2.4		-1.5	
6587.225	3.9604^o	4.0	2.0787	4.0	6587.241	702.9		-1.6	
6590.113	5.1422	3.0	3.2614^o	3.0	6590.131	7.7		-2.1	
6590.766	5.8410	3.0	3.9604^o	2.0	6590.788	2.9		-1.6	
6592.936	5.7302^o	3.0	3.8502	3.0	6592.926	139.1		-0.1	
6595.497	5.2166^o	2.0	3.3373	1.0	6595.506	2.5		-2.5	
6596.662	4.7618^o	3.0	2.8829	4.0	6596.705	3.5		-2.9	
6616.181	4.9833^o	2.0	3.1100	2.0	6616.205	2.3		-2.8	
6616.653	5.1855^o	3.0	3.3122	3.0	6616.672	1.8		-2.7	
6639.734	6.0248	2.0	4.1581^o	2.0	6639.749	1125.6			
6657.508	5.2904	4.0	3.4286^o	3.0	6657.513	7.5		-1.9	
6659.412	3.6888^o	2.0	1.8276	2.0	6659.418	139.4	-2.9	-2.6	
6668.127	5.1202	2.0	3.2614^o	3.0	6668.179^b	3.0		-2.5	
6668.168	5.5964^o	2.0	3.7376	2.0	6668.179^b	3.1		-1.9	
6669.344	5.3954^o	2.0	3.5369	1.0	6669.364	4.7		-2.0	
6671.276	4.9924^o	2.0	3.1345	3.0	6671.297	5.0		-2.4	
6678.831	5.3332	2.0	3.4774^o	1.0	6678.846	4.1		-2.1	
6691.651	5.7381	4.0	3.8859^o	3.0	6691.665	7.0		-1.4	
6693.499	4.9754	2.0	3.1236^o	1.0	6693.514	8.6		-2.2	
6708.325	4.8338^o	4.0	2.9861	5.0	6708.332	4.1		-2.7	
6713.480	3.8502	3.0	2.0039^o	2.0	6713.491	1420.5		-1.4	
6716.016	4.6290	1.0	2.7834^o	2.0	6716.024	16.3		-2.4	
6739.220	5.1202	2.0	3.2810^o	1.0	6739.226	2.9		-2.5	
6744.002	4.9333	1.0	3.0954^o	0.0	6744.002	3.2		-2.7	
6756.157	6.0436	3.0	4.2091^o	3.0	6756.173	687.0			
6763.708	5.5516	4.0	3.7190^o	3.0	6763.713	3.4		-1.9	
6767.266	3.1345	3.0	1.3029^o	2.0	6767.280	102.7		-3.4	
6767.857	5.8649	2.0	4.0335^o	3.0	6767.911^b	1.8		-1.8	
6767.914	5.4008	1.0	3.5694^o	1.0	6767.911^b	1.8		-2.4	
6769.917	5.2424	4.0	3.4115^o	4.0	6769.934	41.3		-1.2	
6779.127	5.1094	2.0	3.2810^o	1.0	6779.141	2.2		-2.6	
6793.982	5.6347	5.0	3.8103^o	4.0	6794.005	3.1		-1.8	
6801.780	3.5694^o	1.0	1.7472	1.0	6801.788	3.1	-4.2	-4.4	
6818.939	2.9315^o	3.0	1.1138	2.0	6818.954^n	16653.2		-1.4	-1.1
6826.548	4.7472	2.0	2.9315^o	3.0	6826.555	51.5		-1.7	
6833.751	5.2424	4.0	3.4286^o	3.0	6833.706	14.2		-1.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
6849.209	4.9333	1.0	3.1236^o	1.0	6849.264	33.3		-1.7	
6850.045	4.9331	2.0	3.1236^o	1.0	6850.052	52.4		-1.5	
6851.326	5.4351	4.0	3.6260^o	4.0	6851.332^b	4.8		-1.9	
6851.364	6.3480	4.0	4.5389^o	3.0	6851.332^b	4.8		-0.8	
6852.910	4.5921	2.0	2.7834^o	2.0	6852.922	8.1		-2.7	
6857.024	4.9030	1.0	3.0954^o	0.0	6857.034	14.2		-2.1	
6858.752	3.8859^o	3.0	2.0787	4.0	6858.756^n	774.2		-1.6	-1.4
6874.889	1.8029^o	3.0	0.0000	2.0	6874.906	639.9		-4.2	
6884.539	5.2290	4.0	3.4286^o	3.0	6884.551	5.9		-2.0	
6889.817	3.5369	1.0	1.7379^o	1.0	6889.828	28.7		-3.4	
6896.537	4.9754	2.0	3.1782^o	2.0	6896.550	3.1		-2.6	
6911.400	2.9072^o	3.0	1.1138	2.0	6911.411	3156.3		-2.2	
6926.208	3.5367^o	0.0	1.7472	1.0	6926.220	232.8		-2.5	
6926.769	5.3332	2.0	3.5438^o	3.0	6926.777	4.4		-2.0	
6947.535	4.6208^o	4.0	2.8367	3.0	6947.540	7.2		-2.7	
6952.852	5.5017	2.0	3.7190^o	3.0	6952.876	3.7		-1.9	
6976.201	5.0381	2.0	3.2614^o	3.0	6976.220	9.4		-2.1	
6979.604	3.7190^o	3.0	1.9432	3.0	6979.619	201.0	-2.3	-2.4	
6981.605	4.8707	1.0	3.0954^o	0.0	6981.617	24.3		-1.9	
7002.931	5.1073^o	1.0	3.3373	1.0	7002.959	3.5		-2.4	
7010.678	4.9226^o	1.0	3.1546	0.0	7010.697	5.3		-2.4	
7014.282	3.0729^o	4.0	1.3058	4.0	7014.292	50.1	-3.9	-3.8	
7019.229	5.3919	3.0	3.6260^o	4.0	7019.250	15.3		-1.4	
7027.338	5.3332	2.0	3.5694^o	1.0	7027.392^b	958.2		0.3	
7027.437	5.9785	4.0	4.2147^o	4.0	7027.392^b	957.2			
7035.161	3.8406^o	5.0	2.0787	4.0	7035.179	127.5	-2.5	-2.4	
7048.891	3.4963	2.0	1.7379^o	1.0	7048.912	7.8		-4.0	
7052.658	3.5046^o	2.0	1.7472	1.0	7052.668^n	42.3		-3.3	-2.4
7054.053	5.0381	2.0	3.2810^o	1.0	7054.070	20.2		-1.7	
7061.896	5.1050^o	4.0	3.3498	5.0	7061.913^b	42.6		-1.3	
7061.954	4.9333	1.0	3.1782^o	2.0	7061.913^b	40.0		-1.5	
7062.842	4.9331	2.0	3.1782^o	2.0	7062.859^b	83.1		-1.2	
7062.853	5.0359	1.0	3.2810^o	1.0	7062.859^b	83.1		-1.1	
7089.447	5.2447^o	2.0	3.4963	2.0	7089.503	10.1		-1.8	
7093.836	3.5369	1.0	1.7897^o	2.0	7093.846	115.2		-2.8	
7096.359	5.3919	3.0	3.6452^o	2.0	7096.377	2.9		-2.1	
7100.544	3.6888^o	2.0	1.9432	3.0	7100.560	267.5	-2.5	-2.3	
7114.824	5.7025	3.0	3.9604^o	4.0	7114.851	2.3		-1.8	
7115.681	5.0229	2.0	3.2810^o	1.0	7115.698^b	36.2		-1.5	
7115.689	3.5694^o	1.0	1.8276	2.0	7115.698^b	36.0	-3.1	-3.3	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7118.369	5.5516	4.0	3.8103^o	4.0	7118.379	7.1		-1.5	
7119.518	3.9604^o	4.0	2.2194	5.0	7119.524	2116.2		-1.0	
7120.791	4.3329^o	2.0	2.5923	2.0	7120.815^b	4.4		-3.2	
7120.846	5.0780^o	2.0	3.3373	1.0	7120.815^b	4.6		-2.3	
7144.079	6.0733^o	0.0	4.3383	1.0	7144.115	7.3		-0.9	
7144.433	5.5931^o	3.0	3.8582	2.0	7144.475	6.4		-1.5	
7157.947	3.8103^o	4.0	2.0787	4.0	7157.970	11.9	-3.5	-3.4	
7181.150	6.0589	3.0	4.3329^o	2.0	7181.206	17.0		-0.5	
7185.982	4.9030	1.0	3.1782^o	2.0	7185.998^b	15.3		-2.0	
7186.009	4.8593^o	3.0	3.1345	3.0	7185.998^b	15.3		-2.0	
7196.081	4.5591^o	2.0	2.8367	3.0	7196.106	2.4		-3.2	
7205.078	5.2166^o	2.0	3.4963	2.0	7205.089	4.3		-2.1	
7216.536	5.8262	4.0	4.1086^o	3.0	7216.552	2.2		-1.7	
7231.570	4.9754	2.0	3.2614^o	3.0	7231.581	12.2		-2.0	
7233.108	5.1422	3.0	3.4286^o	3.0	7233.125^b	7.6		-2.0	
7233.120	3.9788	1.0	2.2651^o	0.0	7233.125^b	7.6		-3.4	
7258.217	5.9570^o	4.0	4.2494	3.0	7258.208	6.0		-1.1	
7262.586	3.4963	2.0	1.7897^o	2.0	7262.600	224.2		-2.5	
7265.171	6.0389	2.0	4.3329^o	2.0	7265.187	1148.2			
7281.516	4.5389^o	3.0	2.8367	3.0	7281.531	8.0		-2.7	
7319.235	3.4963	2.0	1.8029^o	3.0	7319.250	26.0		-3.5	
7321.799	2.3919^o	3.0	0.6991	2.0	7321.815	1465.8		-3.1	
7322.922	4.8707	1.0	3.1782^o	2.0	7322.936	4.1		-2.6	
7337.930	5.1855^o	3.0	3.4963	2.0	7337.948	1.1		-2.7	
7339.296	4.5810^o	1.0	2.8922	2.0	7339.320	2.2		-3.2	
7355.282	5.2290	4.0	3.5438^o	3.0	7355.227	21.2		-1.4	
7356.192	4.5921	2.0	2.9072^o	3.0	7356.241	37.4		-1.9	
7365.357	3.6260^o	4.0	1.9432	3.0	7365.379	136.9	-2.5	-2.6	
7390.726	3.5046^o	2.0	1.8276	2.0	7390.740^n	470.1		-2.2	-1.6
7398.123	5.9907	3.0	4.3153^o	4.0	7398.154	8.1		-0.9	
7399.270	6.0080	2.0	4.3329^o	2.0	7399.253	3.7		-1.2	
7408.974	4.8511	3.0	3.1782^o	2.0	7408.983	4.6		-2.5	
7409.497	5.3919	3.0	3.7190^o	3.0	7409.518	17.4		-1.3	
7414.640	4.9331	2.0	3.2614^o	3.0	7414.664	2.1		-2.8	
7416.425	5.9953	4.0	4.3241^o	3.0	7416.457	3.3		-1.2	
7423.631	2.7834^o	2.0	1.1138	2.0	7423.638^n	444.9		-3.1	-2.9
7437.601	3.4137^o	1.0	1.7472	1.0	7437.610^n	789.0		-2.1	-1.6
7444.254	6.2337	5.0	4.5687^o	4.0	7444.263	4.0		-0.9	
7463.912	4.5921	2.0	2.9315^o	3.0	7463.929	89.9		-1.5	
7488.178	3.9148	4.0	2.2596^o	4.0	7488.183	50.6		-2.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
7543.420	4.3383	1.0	2.6952^o	1.0	7543.423	14.4		-2.6	
7556.376	3.7190^o	3.0	2.0787	4.0	7556.387^n	238.9		-2.2	-1.6
7564.243	4.6247^o	6.0	2.9861	5.0	7564.253	713.2		-0.6	
7577.023	3.9148	4.0	2.2790^o	3.0	7577.030	633.9		-1.5	
7582.459	4.6208^o	4.0	2.9861	5.0	7582.480	6.0		-2.7	
7592.974	4.5153^o	5.0	2.8829	4.0	7593.013	186.4		-1.3	
7599.181	5.1749	3.0	3.5438^o	3.0	7599.235	13.2		-1.6	
7608.559	3.3762^o	0.0	1.7472	1.0	7608.571^b	729.2		-2.1	
7608.563	5.5895	3.0	3.9604^o	2.0	7608.571^b	729.2		0.6	
7612.583	5.9435	3.0	4.3153^o	4.0	7612.616^b	162.7		0.4	
7612.609	2.9311	1.0	1.3029^o	2.0	7612.616^b	165.0		-3.3	
7624.394	2.9315^o	3.0	1.3058	4.0	7624.420^n	53203.6		-0.8	-0.6
7654.051	5.9435	3.0	4.3241^o	3.0	7654.044	19.0		-0.5	
7656.402	3.3660^o	2.0	1.7472	1.0	7656.410	11.1	-3.7	-3.9	
7664.290	5.7258	2.0	4.1086^o	3.0	7664.303	23.7		-0.7	
7668.426	5.2424	4.0	3.6260^o	4.0	7668.440	3.8		-2.1	
7671.928	5.1202	2.0	3.5046^o	2.0	7671.937	2.9		-2.3	
7740.173	2.9072^o	3.0	1.3058	4.0	7740.181	9938.9		-1.5	
7741.604	3.4286^o	3.0	1.8276	2.0	7741.611	60.7	-3.4	-3.1	
7743.572	3.5438^o	3.0	1.9432	3.0	7743.584^n	100.4		-2.7	-2.0
7744.034	4.4927^o	3.0	2.8922	2.0	7744.060	6.3		-2.8	
7773.106	5.4351	4.0	3.8406^o	5.0	7773.118	2.9		-1.9	
7789.527	5.5516	4.0	3.9604^o	4.0	7789.527	2.7		-1.8	
7790.903	3.8103^o	4.0	2.2194	5.0	7790.904^n	788.1		-1.5	-1.1
7796.799	4.8707	1.0	3.2810^o	1.0	7796.835^b	12.8		-2.0	
7796.816	4.4726^o	4.0	2.8829	4.0	7796.835^b	12.8		-2.5	
7814.567	3.4137^o	1.0	1.8276	2.0	7814.574^n	624.1		-2.1	-1.5
7846.569	4.4625^o	5.0	2.8829	4.0	7846.605	139.9		-1.4	
7862.775	5.1202	2.0	3.5438^o	3.0	7862.788	9.6		-1.8	
7882.139	5.7872	4.0	4.2147^o	4.0	7882.142	181.5		0.3	
7888.540	3.8502	3.0	2.2790^o	3.0	7888.562	24.1		-3.0	
7938.045	3.5046^o	2.0	1.9432	3.0	7938.059^n	564.5		-2.0	-1.4
7976.827	3.3567	4.0	1.8029^o	3.0	7976.857	52.7		-3.2	
7994.738	2.2494^o	1.0	0.6991	2.0	7994.784	22898.4		-1.9	
8010.592	3.6260^o	4.0	2.0787	4.0	8010.599^n	126.2		-2.5	-2.1
8056.470	3.3660^o	2.0	1.8276	2.0	8056.478	474.0	-2.0	-2.2	
8060.446	6.3715	4.0	4.8338^o	4.0	8060.431	5.9		-0.4	
8080.252	2.2330^o	2.0	0.6991	2.0	8080.266	2100.1	-2.9	-3.0	
8080.965	2.8367	3.0	1.3029^o	2.0	8080.976	285.8		-3.1	
8136.630	5.2424	4.0	3.7190^o	3.0	8136.577	10.4		-1.6	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8139.103	3.9148	4.0	2.3919^o	3.0	8139.134	12.4		-3.1	
8165.454	5.6244	3.0	4.1064^o	2.0	8165.413	8.5		-1.2	
8173.889	4.1086^o	3.0	2.5923	2.0	8173.908	112.4		-1.9	
8174.910	5.1422	3.0	3.6260^o	4.0	8174.898	17.6		-1.5	
8217.875	6.1004^o	1.0	4.5921	2.0	8217.835	4.6		-0.8	
8248.827	3.7816	4.0	2.2790^o	3.0	8248.838^b	247.8		-2.0	
8248.829	5.9953	4.0	4.4927^o	3.0	8248.838^b	247.8		0.8	
8338.006	5.8194	1.0	4.3329^o	2.0	8338.074	10.2		-0.8	
8339.353	4.6208^o	4.0	3.1345	3.0	8339.393	41.7		-1.7	
8344.243	3.4286^o	3.0	1.9432	3.0	8344.246^n	943.5		-1.8	-1.6
8380.042	5.0229	2.0	3.5438^o	3.0	8380.074	11.9		-1.7	
8382.968	4.3153^o	4.0	2.8367	3.0	8382.994	16.0		-2.5	
8451.703	3.9203	2.0	2.4537^o	2.0	8451.713	58.3		-2.4	
8453.123	5.6244	3.0	4.1581^o	2.0	8453.131^b	286.4		0.4	
8453.132	4.8161^o	5.0	3.3498	5.0	8453.131^b	286.4		-0.6	
8454.021	4.7472	2.0	3.2810^o	1.0	8454.008	13.1		-2.0	
8459.997	3.5438^o	3.0	2.0787	4.0	8460.017^n	583.7		-1.9	-1.3
8475.383	4.2147^o	4.0	2.7523	3.0	8475.416	14.6		-2.6	
8497.533	3.7376	2.0	2.2790^o	3.0	8497.546	42.9		-2.8	
8508.154	4.2091^o	3.0	2.7523	3.0	8508.168	12.5		-2.7	
8550.127	6.2834	3.0	4.8338^o	4.0	8550.110^b	9.5		-0.3	
8550.181	4.7618^o	3.0	3.3122	3.0	8550.110^b	9.4		-2.1	
8551.820	2.7523	3.0	1.3029^o	2.0	8551.886	8.2		-4.7	
8603.314	4.3329^o	2.0	2.8922	2.0	8603.290	7.2		-2.8	
8640.031	2.2494^o	1.0	0.8149	1.0	8640.058	14159.2		-2.1	
8644.318	3.2614^o	3.0	1.8276	2.0	8644.337	11.6	-4.1	-3.9	
8658.233	4.9754	2.0	3.5438^o	3.0	8658.243	7.6		-1.9	
8664.194	5.8262	4.0	4.3956^o	3.0	8664.219	4.1		-1.2	
8673.872	4.5389^o	3.0	3.1100	2.0	8673.867	11.2		-2.3	
8700.988	5.7574	2.0	4.3329^o	2.0	8700.973	6.8		-1.0	
8711.200	3.3660^o	2.0	1.9432	3.0	8711.242	579.2	-1.8	-2.0	
8715.584	4.3536	2.0	2.9315^o	3.0	8715.517	36.4		-2.0	
8825.229	4.5389^o	3.0	3.1345	3.0	8825.244	8.1		-2.4	
8828.780	5.1855^o	3.0	3.7816	4.0	8828.816	11.2		-1.5	
8836.227	6.3861	2.0	4.9833^o	2.0	8836.159	131.5			
8843.223	5.4351	4.0	4.0335^o	3.0	8843.161	9.5		-1.3	
8925.095	6.3721	3.0	4.9833^o	2.0	8925.110	14.3		0.1	
8952.149	3.9615^o	1.0	2.5769	1.0	8952.144	20.7		-2.7	
8958.921	3.9604^o	2.0	2.5769	1.0	8958.923	103.5		-2.0	
8976.642	3.1837	4.0	1.8029^o	3.0	8976.674^c	109.4		-3.0	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	NIST-ASD
8994.800	4.2147^o	4.0	2.8367	3.0	8994.811	36.5		-2.2	
8999.569	5.8700	3.0	4.4927^o	3.0	8999.568	257.0		0.7	
9004.739	3.1236^o	1.0	1.7472	1.0	9004.760	2785.2		-1.6	
9033.927	3.1100	2.0	1.7379^o	1.0	9033.962^b	21.3		-3.8	
9033.971	5.9003^o	3.0	4.5283	3.0	9033.963^b	21.9		-0.3	
9138.203	4.1086^o	3.0	2.7523	3.0	9138.259	112.1		-1.8	
9177.241	3.1782^o	2.0	1.8276	2.0	9177.259	1357.1	-2.2	-1.8	
9182.138	3.4286^o	3.0	2.0787	4.0	9182.161^n	3230.2		-1.2	-0.8
9193.289	3.0954^o	0.0	1.7472	1.0	9193.319	3222.5		-1.6	
9216.860	3.1345	3.0	1.7897^o	2.0	9216.908	32.1		-3.5	
9295.635	3.3373	1.0	2.0039^o	2.0	9295.631	69.8		-2.9	
9299.961	3.4115^o	4.0	2.0787	4.0	9299.944^n	509.9		-2.0	-1.6
9308.289	3.1345	3.0	1.8029^o	3.0	9308.284	68.8		-3.2	
9325.146	4.3153^o	4.0	2.9861	5.0	9325.209	215.4		-1.2	
9346.322	4.2091^o	3.0	2.8829	4.0	9346.363	363.5		-1.1	
9498.812	2.0039^o	2.0	0.6991	2.0	9498.863	242.5		-4.0	
9563.261	3.1236^o	1.0	1.8276	2.0	9563.307	5218.7		-1.3	
9697.665	2.3919^o	3.0	1.1138	2.0	9697.686	156.7		-3.7	
9863.758	5.5895	3.0	4.3329^o	2.0	9863.830	2660.8			
10397.458	3.4115^o	4.0	2.2194	5.0	10397.517	4112.7		-0.9	

Table A.30: Measured wavelengths (λ_o) and intensities of Hf II spectral lines. Meaning of symbols is given in Table A.3.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[49]
3762.507	7.2465^o	3.5	3.9522	4.5	3762.517	1647.1			
3793.379	3.6457	2.5	0.3783	2.5	3793.383^n	11730.2		-1.2	-1.1
3823.522	6.7810^o	2.5	3.5393	2.5	3823.525	948.6			
3849.501	5.4156^o	2.5	2.1958	3.5	3849.530	793.9		-0.1	
3864.740	6.6916^o	3.5	3.4845	4.5	3864.750	165.4		0.8	
3877.098	6.0665^o	3.5	2.8696	4.5	3877.107	486.4		0.5	
3880.817	3.6457	2.5	0.4519	1.5	3880.821^n	3604.8		-1.7	-1.5
3882.227	6.9858^o	1.5	3.7932	1.5	3882.225	115.4		1.0	
3883.767	4.8633	1.5	1.6720	2.5	3883.769^n	1609.4		-0.5	-1.0
3894.704	9.1331	2.5	5.9507^o	1.5	3894.672	279.9			
3910.877	6.5521^o	0.5	3.3828	1.5	3910.853^c	154.7		0.6	
3918.094	3.6153	0.5	0.4519	1.5	3918.096^n	14762.7		-1.1	-1.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	$\log gf$ Casc.	Boltz.	[49]
3923.902	4.7607	0.5	1.6020	1.5	3923.911^n	2609.5		-0.4	-0.9
3933.190	6.5341^o	2.5	3.3828	1.5	3933.198	136.3		0.5	
3933.651	4.1876	3.5	1.0367	4.5	3933.657^n	719.4		-1.7	-1.8
3935.632	5.3027^o	1.5	2.1534	2.5	3935.649	97.6		-1.2	
3945.332	7.2055^o	2.5	4.0639	2.5	3945.347	283.4			
3964.941	5.3367^o	0.5	2.2106	1.5	3964.966^c	114.3		-1.0	
3985.567	8.6146	2.5	5.5048^o	3.5	3985.588	116.8			
3996.006	3.4800^o	1.5	0.3783	2.5	3995.999	94.1	-3.3	-3.4	
3996.796	4.7731	3.5	1.6720	2.5	3996.792^n	60.9		-2.0	-1.6
4016.402	9.3979	2.5	6.3119^o	2.5	4016.424	30.0			
4020.251	4.8633	1.5	1.7803	1.5	4020.263^n	97.2		-1.7	-2.1
4029.164	4.5727	3.5	1.4965	2.5	4029.170^n	294.8		-1.6	-1.7
4047.959	6.8982^o	4.5	3.8362	5.5	4047.961	393.0			
4050.459	10.3065	4.5	7.2465^o	3.5	4050.483	237.3			
4080.436	3.6457	2.5	0.6081	2.5	4080.441^n	1545.3		-2.0	-1.5
4093.155	3.4800	1.5	0.4519	1.5	4093.163^n	13540.7		-1.2	-1.2
4113.564	4.5096	1.5	1.4965	2.5	4113.567^n	937.0		-1.1	-1.4
4125.083	6.4892^o	3.5	3.4845	4.5	4125.075^c	26.1		-0.2	
4127.789	4.7830^o	2.5	1.7803	1.5	4127.805	559.1		-1.0	
4137.457	8.9464	1.5	5.9507^o	1.5	4137.481	42.1			
4138.670	6.5341^o	2.5	3.5393	2.5	4138.651	42.2		0.1	
4161.225	9.3182	1.5	6.3396^o	1.5	4161.210^c	116.7			
4162.405	5.1337^o	3.5	2.1559	4.5	4162.415	427.7		-0.7	
4166.944	8.7612	2.5	5.7867^o	1.5	4166.928	18.2			
4194.751	9.5668	1.5	6.6120^o	0.5	4194.768	446.7			
4232.426	5.2714^o	1.5	2.3429	1.5	4232.425	469.9		-0.4	
4245.845	5.4156^o	2.5	2.4963	2.5	4245.860	72.5		-1.1	
4249.333	4.6971	1.5	1.7803	1.5	4249.341^n	157.7		-1.6	-1.4
4252.596	8.7612	2.5	5.8466^o	3.5	4252.584	1051.6			
4262.742	4.5096	1.5	1.6020	1.5	4262.736^n	230.1		-1.7	-1.9
4269.698	4.7731	3.5	1.8702	3.5	4269.701^n	133.4		-1.6	-1.4
4272.862	4.5727	3.5	1.6720	2.5	4272.855^n	2473.3		-0.6	-1.0
4319.509	4.7607	0.5	1.8912	0.5	4319.528^n	83.0		-1.8	-2.1
4320.681	5.0221^o	2.5	2.1534	2.5	4320.686	621.4		-0.6	
4327.523	4.7343	4.5	1.8702	3.5	4327.520^n	38.5		-2.1	-2.4
4334.640	5.7290	5.5	2.8696	4.5	4334.634^n	94.1		-0.5	-0.6
4336.658	5.5408^o	3.5	2.6827	3.5	4336.662	697.3		0.1	
4350.516	5.7186^o	4.5	2.8696	4.5	4350.513	802.9		0.4	
4370.949	4.3322	2.5	1.4965	2.5	4370.824^n	5685.4		-0.5	-1.2
4392.128	8.7612	2.5	5.9392^o	2.5	4392.110	219.6			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	Casc.	$\log gf$ Boltz.	[49]
4417.358	4.6971	1.5	1.8912	0.5	4417.366[n]	428.4		-1.1	-1.0
4486.131	4.2594	2.5	1.4965	2.5	4486.137[n]	496.1		-1.6	-1.6
4486.630	6.8264[o]	2.5	4.0639	2.5	4486.627	67.9		0.7	
4490.580	5.4428[o]	2.5	2.6827	3.5	4490.584[c]	44.2		-1.2	
4524.699	6.6916[o]	3.5	3.9522	4.5	4524.725[c]	38.2		0.3	
4533.163	4.2307	1.5	1.4965	2.5	4533.170[n]	527.1		-1.6	-1.7
4541.291	4.5096	1.5	1.7803	1.5	4541.294[n]	359.6		-1.4	-1.7
4570.683	6.2511[o]	1.5	3.5393	2.5	4570.659	42.4		-0.2	
4573.788	4.8633	1.5	2.1534	2.5	4573.793[n]	254.7		-1.1	-1.6
4586.243	4.5727	3.5	1.8702	3.5	4586.242[n]	99.7		-1.9	-2.0
4599.450	6.1793[o]	4.5	3.4845	4.5	4599.444	102.4		0.1	
4605.777	4.1876	3.5	1.4965	2.5	4605.778[n]	373.0		-1.8	-1.9
4613.717	6.6387[o]	4.5	3.9522	4.5	4613.738	179.2		1.0	
4615.436	8.7612	2.5	6.0758[o]	2.5	4615.412	14.3			
4622.705	5.1776[o]	2.5	2.4963	2.5	4622.709	188.9		-0.8	
4640.116	5.5408[o]	3.5	2.8696	4.5	4640.127	143.1		-0.5	
4659.223	4.3322	2.5	1.6720	2.5	4659.207[n]	34.3		-2.6	-2.4
4664.138	4.2594	2.5	1.6020	1.5	4664.133[n]	1739.3		-1.0	-1.2
4675.454	6.1793[o]	4.5	3.5283	3.5	4675.461	23.7		-0.5	
4688.488	9.4246	1.5	6.7810[o]	2.5	4688.458	23140.6			
4699.718	5.1337[o]	3.5	2.4963	2.5	4699.724	139.5		-1.0	
4714.997	4.2307[o]	1.5	1.6020	1.5	4714.991	12.5	-3.2	-3.1	
4719.112	4.1083	0.5	1.4818	0.5	4719.113[n]	1622.5		-1.2	-1.7
4731.360	4.7731	3.5	2.1534	2.5	4731.371[n]	149.7		-1.4	-1.3
4754.797	8.9464	1.5	6.3396[o]	1.5	4754.813	42.6			
4760.580	5.9507[o]	1.5	3.3471	0.5	4760.563	17.3		-0.9	
4790.707	4.7830[o]	2.5	2.1958	3.5	4790.729	160.7		-1.3	
4807.132	4.7343	4.5	2.1559	4.5	4807.128[n]	322.9		-1.1	-1.7
4807.925	7.2055[o]	2.5	4.6275	1.5	4807.931	23.2		0.8	
4817.206	5.2557	4.5	2.6827	3.5	4817.218[n]	135.1		-0.8	-1.0
4820.079	9.3979	2.5	6.8264[o]	2.5	4820.075	83.8			
4834.767	7.2055[o]	2.5	4.6418	3.5	4834.782	23.3		0.8	
4843.990	4.2307	1.5	1.6720	2.5	4843.991[n]	124.8		-2.1	-2.1
4860.512	4.7607	0.5	2.2106	1.5	4860.525[n]	20.2		-2.2	-2.5
4891.521	9.1331	2.5	6.5992[o]	3.5	4891.500	5949.5			
4907.347	5.0221[o]	2.5	2.4963	2.5	4907.311	41.2		-1.6	
4926.996	4.1876	3.5	1.6720	2.5	4926.987[n]	68.6		-2.4	-2.2
4934.462	4.1138	2.5	1.6020	1.5	4934.455[n]	460.0		-1.7	-1.6
4945.378	4.1083	0.5	1.6020	1.5	4945.371[n]	86.0		-2.4	-2.3
4982.984	8.9464	1.5	6.4590[o]	0.5	4983.016	31.2			

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[49]
4999.678	4.2594	2.5	1.7803	1.5	4999.703^n	672.0		-1.3	-1.8
5040.833	3.9406	1.5	1.4818	0.5	5040.818^n	1149.4		-1.5	-1.4
5058.164	4.2307	1.5	1.7803	1.5	5058.169^n	47.9		-2.5	-2.3
5060.401	8.7612	2.5	6.3119^o	2.5	5060.398	127.9			
5071.201	3.9406^o	1.5	1.4965	2.5	5071.194	98.7	-2.5	-2.5	
5075.923	4.1138	2.5	1.6720	2.5	5075.916^n	82.2		-2.4	-2.1
5076.624	9.1331	2.5	6.6916^o	3.5	5076.653	17.6			
5115.284	8.6741	1.5	6.2511^o	1.5	5115.243	196.1			
5128.504	4.5727	3.5	2.1559	4.5	5128.505^n	163.9		-1.5	-1.6
5187.735	4.2594	2.5	1.8702	3.5	5187.749^n	3623.4		-0.5	-1.7
5247.037	8.6741	1.5	6.3119^o	2.5	5247.050^c	522.6			
5260.434	4.5096	1.5	2.1534	2.5	5260.433^n	145.8		-1.6	-1.5
5264.947	4.6971	1.5	2.3429	1.5	5264.808^n	82.1		-1.6	-1.2
5269.578	9.1331	2.5	6.7810^o	2.5	5269.546	55374.5			
5298.044	4.2307	1.5	1.8912	0.5	5298.046^n	681.2		-1.3	-1.3
5299.847	3.9406^o	1.5	1.6020	1.5	5299.842	68.2	-2.6	-2.6	
5346.275	5.8466^o	3.5	3.5283	3.5	5346.283	36.9		-0.5	
5415.231	8.7612	2.5	6.4724^o	2.5	5415.208	887.5			
5444.045	4.7731	3.5	2.4963	2.5	5444.051^n	38.1		-1.8	-1.4
5524.347	4.1138	2.5	1.8702	3.5	5524.349^n	148.6		-2.0	-1.7
5658.787	5.7186^o	4.5	3.5283	3.5	5658.825	315.5		0.3	
5673.572	6.8264^o	2.5	4.6418	3.5	5673.560	21.4		0.5	
5732.772	8.7612	2.5	6.5992^o	3.5	5732.731	27.3			
5767.190	3.6457	2.5	1.4965	2.5	5767.204^n	70.2		-2.9	-2.3
5809.525	3.6153^o	0.5	1.4818	0.5	5809.507	71.8	-2.9	-2.9	
5831.508	8.6146	2.5	6.4892^o	3.5	5831.553	11.0			
5842.226	4.3322	2.5	2.2106	1.5	5842.233^n	54.1		-2.1	-1.6
5969.369	4.5727^o	3.5	2.4963	2.5	5969.332	21.7	-2.5	-2.2	
5988.682	8.7612	2.5	6.6916^o	3.5	5988.689	25.7			
6008.580	8.1386	2.5	6.0758^o	2.5	6008.568	55.8			
6047.980	3.9406^o	1.5	1.8912	0.5	6048.005	11.0	-3.2	-3.2	
6135.105	5.5048^o	3.5	3.4845	4.5	6135.113	16.4		-1.1	
6135.685	4.2307	1.5	2.2106	1.5	6135.703^n	5.6		-3.2	-2.9
6156.273	3.6153^o	0.5	1.6020	1.5	6156.266	10.1	-3.7	-3.7	
6202.878	3.4800^o	1.5	1.4818	0.5	6202.875	3.6	-4.2	-4.3	
6222.789	4.1876^o	3.5	2.1958	3.5	6222.815	15.6	-2.8	-2.7	
6248.924	3.4800^o	1.5	1.4965	2.5	6248.948	209.3	-2.4	-2.5	
6279.844	3.6457	2.5	1.6720	2.5	6279.824^n	46.0		-2.9	-2.4
6337.773	5.3027^o	1.5	3.3471	0.5	6337.758	15.9		-1.3	
6512.612	4.1138^o	2.5	2.2106	1.5	6512.628	1.7	-3.6	-3.7	

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]	log gf Casc.	Boltz.	[49]
6557.923	4.5727	3.5	2.6827	3.5	6557.918^n	25.3		-2.0	-1.7
6565.774	4.2307^o	1.5	2.3429	1.5	6565.764	3.0	-3.4	-3.3	
6567.370	5.4156^o	2.5	3.5283	3.5	6567.396	6.4		-1.5	
6584.530	5.7186^o	4.5	3.8362	5.5	6584.564	3.6		-1.4	
6644.582	3.6457	2.5	1.7803	1.5	6644.602^n	132.9		-2.4	-1.7
6647.056	4.7343^o	4.5	2.8696	4.5	6647.043	72.7	-1.8	-1.3	
6839.616	8.5931	1.5	6.7810^o	2.5	6839.601	9.8			
6980.895	3.6457	2.5	1.8702	3.5	6980.915^n	105.6		-2.4	-1.7
7164.521	3.9406^o	1.5	2.2106	1.5	7164.463	65.7	-2.2	-2.2	
7277.647	4.5727^o	3.5	2.8696	4.5	7277.654	11.8	-2.5	-2.2	
7328.660	4.1876^o	3.5	2.4963	2.5	7328.666	7.0	-3.0	-2.9	
7663.087	4.1138	2.5	2.4963	2.5	7663.104^n	9.6		-2.8	-2.2
7757.912	3.9406	1.5	2.3429	1.5	7757.911^n	30.9		-2.5	-1.9
7766.482	9.5855	3.5	7.9896^o	3.5	7766.527	51.2			
7801.513	3.4800^o	1.5	1.8912	0.5	7801.555	13.8	-3.3	-3.4	
8236.142	4.1876^o	3.5	2.6827	3.5	8236.144	8.7	-2.7	-2.6	
8305.952	3.6457^o	2.5	2.1534	2.5	8305.938	2632.4	-0.7	-0.8	
8801.175	9.3979	2.5	7.9896^o	3.5	8801.218	2.8			
8976.614	9.3979	2.5	8.0171^o	2.5	8976.674^c	109.7			

Table A.31: Measured wavelengths (λ_o) and intensities of Re I spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3766.245	6.6862^o	0.5	3.3952	0.5	3766.270	3809.8
3895.397	5.2062^o	0.5	2.0243	1.5	3895.421	29.0
3917.266	5.2246^o	4.5	2.0605	4.5	3917.282	142.9
3929.839	4.9166^o	4.5	1.7626	3.5	3929.845	429.2
3961.033	4.8433^o	2.5	1.7142	1.5	3961.030	172.2
3962.102	6.4933^o	3.5	3.3650	3.5	3962.131	43.3
3967.396	5.8715^o	3.5	2.7474	4.5	3967.413	67.1
3981.779	7.0781^o	3.5	3.9653	3.5	3981.763	66.6
4022.959	5.6203^o	2.5	2.5393	1.5	4022.970	22.0
4028.518	5.9475^o	2.5	2.8708	2.5	4028.522	16.0
4037.491	4.9502^o	1.5	1.8803	0.5	4037.489	37.2
4061.857	4.9184^o	2.5	1.8669	3.5	4061.868	14.8
4081.427	5.0611^o	2.5	2.0243	1.5	4081.427	58.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4089.919	4.8433^o	2.5	1.8128	2.5	4089.919	7.6
4138.534	4.9502^o	1.5	1.9552	2.5	4138.500	20.5
4146.234	5.4018^o	2.5	2.4124	2.5	4146.217	46.7
4157.252	6.5533^o	3.5	3.5719	3.5	4157.270	22.0
4159.921	6.3470^o	4.5	3.3675	4.5	4159.910	10.3
4170.387	4.6862^o	0.5	1.7142	1.5	4170.400	65.7
4188.774	6.3265^o	4.5	3.3675	4.5	4188.794	51.7
4200.472	6.5226^o	3.5	3.5719	3.5	4200.455	259.6
4201.724	6.3149^o	2.5	3.3650	3.5	4201.715	432.8
4221.074	4.3726^o	2.5	1.4362	2.5	4221.079	899.4
4241.151	5.0597^o	0.5	2.1372	0.5	4241.164	33.3
4241.388	5.0595^o	1.5	2.1372	0.5	4241.388	88.2
4279.178	6.7970^o	2.5	3.9005	1.5	4279.211	73.9
4291.651	4.8433^o	2.5	1.9552	2.5	4291.652^b	16.7
4291.668	4.7008^o	1.5	1.8128	2.5	4291.652^b	16.3
4396.803	4.8433^o	2.5	2.0243	1.5	4396.795	38.3
4402.602	4.6822^o	3.5	1.8669	3.5	4402.591	29.1
4415.824	4.6738^o	2.5	1.8669	3.5	4415.821	187.5
4475.080	4.9184^o	2.5	2.1487	3.5	4475.074	257.1
4513.311	5.2814	3.5	2.5351^o	3.5	4513.283	288.9
4516.610	6.3216	3.5	3.5774^o	2.5	4516.607	104.9
4523.874	6.3216	3.5	3.5818^o	3.5	4523.873	24.2
4530.888	5.4830^o	4.5	2.7474	4.5	4530.916	27.1
4545.166	4.6822^o	3.5	1.9552	2.5	4545.168	72.2
4580.666	4.1420^o	2.5	1.4362	2.5	4580.654	94.7
4592.492	6.2376^o	3.5	3.5387	3.5	4592.526^b	854.5
4592.532	6.5653^o	1.5	3.8665	2.5	4592.526^b	854.1
4621.386	5.3818^o	3.5	2.6997	3.5	4621.386	34.3
4662.478	4.3726^o	2.5	1.7142	1.5	4662.470	35.8
4681.883	6.6126^o	3.5	3.9653	3.5	4681.910^b	71.1
4681.890	7.3482	2.5	4.7008^o	1.5	4681.910^b	71.1
4752.103	5.6365^o	3.5	3.0283	2.5	4752.114	56.3
4821.151	4.5952^o	1.5	2.0243	1.5	4821.120	183.9
4886.983	6.6625^o	3.5	4.1263	2.5	4886.987	46.7
4908.571	4.6738^o	2.5	2.1487	3.5	4908.558	13.7
4915.024	5.0611^o	2.5	2.5393	1.5	4915.017	41.3
4923.911	4.2799^o	3.5	1.7626	3.5	4923.919	487.4
4935.845	5.3819^o	1.5	2.8708	2.5	4935.830	632.6
4946.021	4.9184^o	2.5	2.4124	2.5	4946.032	58.0
4946.726	4.3726^o	2.5	1.8669	3.5	4946.722	232.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4952.291	5.3736^o	1.5	2.8708	2.5	4952.280	63.6
5019.991	6.6625^o	3.5	4.1935	3.5	5020.031	11.3
5058.550	4.1644^o	1.5	1.7142	1.5	5058.552	158.5
5068.797	5.4736^o	1.5	3.0283	2.5	5068.780	16.4
5121.555	6.4414^o	3.5	4.0213	2.5	5121.554	58.8
5155.750	5.9427^o	3.5	3.5387	3.5	5155.765	478.4
5168.646	7.3482	2.5	4.9502^o	1.5	5168.656	297.6
5199.907	5.4490^o	2.5	3.0653	3.5	5199.894	20.8
5209.089	4.1420^o	2.5	1.7626	3.5	5209.079	4101.3
5271.001	5.2814	3.5	2.9299^o	4.5	5270.967	308.4
5278.242	4.3726^o	2.5	2.0243	1.5	5278.250	186.9
5321.494	5.0766^o	3.5	2.7474	4.5	5321.487	19.9
5369.800	4.0224^o	0.5	1.7142	1.5	5369.789	170.2
5462.521	5.6365^o	3.5	3.3675	4.5	5462.499	72.7
5521.839	7.3482	2.5	5.1035^o	3.5	5521.798	11.2
5532.697	4.9400^o	3.5	2.6997	3.5	5532.689	92.8
5667.904	4.1420^o	2.5	1.9552	2.5	5667.888	108.1
5711.421	4.9502^o	1.5	2.7800	1.5	5711.417	9.0
5791.596	4.1644^o	1.5	2.0243	1.5	5791.601	19.7
5834.323	3.5818^o	3.5	1.4573	4.5	5834.336	153.8
5924.421	6.0574^o	3.5	3.9653	3.5	5924.437	21.3
6114.209	4.1644^o	1.5	2.1372	0.5	6114.201	33.6
6321.903	5.5424	2.5	3.5818^o	3.5	6321.912	30.0
6378.282	7.1494	1.5	5.2062^o	0.5	6378.252	25.3
6592.532	5.4619	2.5	3.5818^o	3.5	6592.510	20.9
6761.192	4.3726^o	2.5	2.5393	1.5	6761.211	3.2
6829.967	3.5774^o	2.5	1.7626	3.5	6829.961	26.0
6876.685	5.6953^o	3.5	3.8929	4.5	6876.684	5.8
6971.534	3.5907^o	1.5	1.8128	2.5	6971.546	10.6
7101.975	5.8715^o	3.5	4.1263	2.5	7101.936	1.6
7384.063	4.9184^o	2.5	3.2398	1.5	7384.024	1.0
7548.716	5.3366^o	2.5	3.6947	2.5	7548.690	0.9
7560.602	6.3216	3.5	4.6822^o	3.5	7560.551	4.8
7797.594	7.1319^o	2.5	5.5424	2.5	7797.577	195.6
8293.722	5.3874^o	4.5	3.8929	4.5	8293.786	1.9
8357.593	4.0224^o	0.5	2.5393	1.5	8357.580	5.6
8513.438	5.6953^o	3.5	4.2394	4.5	8513.455	1.9
9307.774	5.2246^o	4.5	3.8929	4.5	9307.836	8.9

Table A.32: Measured wavelengths (λ_o) and intensities of Os I spectral lines. Meaning of symbols is given in Table A.1.

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3782.200	3.7928^o	4.0	0.5157	3.0	3782.207	11583.1
3790.110	5.1111^o	5.0	1.8409	4.0	3790.119	1218.6
3827.141	6.0425	4.0	2.8039^o	4.0	3827.149	154.4
3836.064	4.3150^o	4.0	1.0839	4.0	3836.058	713.4
3849.978	4.8032^o	2.0	1.5838	2.0	3849.985	714.7
3853.442	5.4069^o	2.0	2.1904	1.0	3853.448	124.8
3857.086	3.7291^o	2.0	0.5157	3.0	3857.096^b	1014.5
3857.086	6.1871^o	3.0	2.9736	3.0	3857.096^b	1014.5
3876.770	4.5647^o	5.0	1.3676	4.0	3876.768	1414.0
3881.857	4.4533^o	1.0	1.2604	2.0	3881.860	971.7
3886.754	4.8032^o	2.0	1.6142	1.0	3886.755	97.3
3894.658	5.6488^o	3.0	2.4664	4.0	3894.663	114.0
3895.180	5.0693^o	2.0	1.8873	2.0	3895.176	143.9
3900.392	3.5175^o	3.0	0.3398	2.0	3900.394	800.3
3901.714	4.2606^o	5.0	1.0839	4.0	3901.708	217.0
3918.746	4.8199^o	1.0	1.6570	2.0	3918.753	37.3
3922.030	4.7440^o	3.0	1.5838	2.0	3922.029	26.5
3926.764	5.5630^o	3.0	2.4066	2.0	3926.768	75.2
3929.997	4.9952^o	6.0	1.8414	6.0	3929.998	144.9
3931.518	4.5633^o	3.0	1.4107	3.0	3931.521	92.4
3938.596	4.2309^o	3.0	1.0839	4.0	3938.596	2106.8
3939.560	4.8032^o	2.0	1.6570	2.0	3939.556	166.6
3949.783	4.7523^o	2.0	1.6142	1.0	3949.780^b	114.2
3949.797	6.8672	3.0	3.7291^o	2.0	3949.780^b	114.2
3952.766	4.8827^o	3.0	1.7471	3.0	3952.770	144.5
3955.373	5.0209^o	1.0	1.8873	2.0	3955.394	28.8
3958.250	4.5420^o	2.0	1.4107	3.0	3958.251	26.5
3960.482	6.1413^o	5.0	3.0117	5.0	3960.503^b	116.0
3960.499	5.4730^o	3.0	2.3435	3.0	3960.503^b	112.0
3960.530	6.2377^o	2.0	3.1082	2.0	3960.503^b	113.5
3961.008	4.9700^o	4.0	1.8409	4.0	3961.010	601.9
3964.955	3.4658^o	2.0	0.3398	2.0	3964.955	1703.4
3975.441	4.7016^o	2.0	1.5838	2.0	3975.429	103.3
3977.218	5.7241^o	2.0	2.6077	1.0	3977.229^b	3540.9
3977.228	3.7541^o	5.0	0.6377	5.0	3977.229^b	3540.9
3979.367	6.8689	5.0	3.7541^o	5.0	3979.352	84.4
3988.623	5.5140^o	1.0	2.4066	2.0	3988.618	27.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
3994.933	5.7438[o]	3.0	2.6412	2.0	3994.934	43.7
3996.802	3.1011[o]	3.0	0.0000	4.0	3996.804	399.7
3998.933	5.5658[o]	4.0	2.4664	4.0	3998.936	57.7
4001.339	6.6447	2.0	3.5471[o]	2.0	4001.319	29.9
4003.488	5.0041[o]	4.0	1.9082	3.0	4003.482	152.1
4004.025	4.5062[o]	2.0	1.4107	3.0	4004.021	321.7
4010.698	6.6129[o]	3.0	3.5225	2.0	4010.716	51.1
4013.384	6.2615[o]	4.0	3.1732	3.0	4013.353	86.4
4015.037	4.7440[o]	3.0	1.6570	2.0	4015.041	68.4
4018.259	4.7416[o]	1.0	1.6570	2.0	4018.258	183.1
4029.328	6.8689	5.0	3.7928[o]	4.0	4029.324[b]	32.9
4029.348	6.8026[o]	2.0	3.7265	2.0	4029.324[b]	29.4
4029.614	5.9674[o]	4.0	2.8916	4.0	4029.626	37.2
4032.922	6.0470[o]	2.0	2.9736	3.0	4032.908	26.3
4035.082	6.2458[o]	5.0	3.1741	4.0	4035.068	25.3
4036.449	5.4398[o]	5.0	2.3691	4.0	4036.446	42.1
4037.830	3.7845[o]	1.0	0.7149	1.0	4037.833	164.5
4048.028	6.7884[o]	2.0	3.7265	2.0	4048.052[b]	174.2
4048.054	4.9700[o]	4.0	1.9082	3.0	4048.052[b]	164.5
4050.560	6.2331[o]	4.0	3.1732	3.0	4050.563	12.5
4051.435	5.0693[o]	2.0	2.0100	1.0	4051.430	68.9
4055.503	5.6752[o]	3.0	2.6189	3.0	4055.480	7932.2
4056.346	5.4247[o]	4.0	2.3691	4.0	4056.348	13.7
4061.613	5.3951[o]	3.0	2.3435	3.0	4061.605	21.4
4066.316	4.4157[o]	3.0	1.3676	4.0	4066.311	66.8
4066.697	5.8517	5.0	2.8039[o]	4.0	4066.690	1085.3
4071.835	6.2181[o]	3.0	3.1741	4.0	4071.818	17.2
4073.615	6.0163[o]	4.0	2.9736	3.0	4073.609	18.9
4074.676	4.8827[o]	3.0	1.8409	4.0	4074.673	673.3
4075.346	5.9329[o]	4.0	2.8916	4.0	4075.349	18.2
4083.976	7.3499	3.0	4.3150[o]	4.0	4083.998	45.8
4088.437	4.9189[o]	2.0	1.8873	2.0	4088.436	89.4
4096.049	5.3951[o]	3.0	2.3691	4.0	4096.047	11.3
4098.104	4.7715[o]	3.0	1.7471	3.0	4098.106	87.5
4100.288	4.1068[o]	3.0	1.0839	4.0	4100.291	183.3
4105.442	6.5078[o]	4.0	3.4888	3.0	4105.428	27.7
4111.024	5.9886[o]	3.0	2.9736	3.0	4111.017	44.5
4114.567	5.9033[o]	3.0	2.8909	2.0	4114.578	41.1
4119.995	5.6273[o]	4.0	2.6189	3.0	4119.965	19.3
4124.603	4.4157[o]	3.0	1.4107	3.0	4124.597	247.0

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4127.317	5.8940[o]	2.0	2.8909	2.0	4127.317	18.1
4128.957	3.5175[o]	3.0	0.5157	3.0	4128.966	3404.3
4131.040	5.4069[o]	2.0	2.4066	2.0	4131.056[b]	66.6
4131.051	5.6416[o]	2.0	2.6412	2.0	4131.056[b]	67.1
4132.027	6.4654	2.0	3.4658[o]	2.0	4132.024	9.9
4137.841	4.8827[o]	3.0	1.8873	2.0	4137.842	779.5
4147.332	5.3951[o]	3.0	2.4066	2.0	4147.324	52.8
4153.371	6.4968	3.0	3.5126[o]	4.0	4153.354	50.4
4158.783	4.7274[o]	4.0	1.7471	3.0	4158.776	114.7
4159.965	4.5633[o]	3.0	1.5838	2.0	4159.967	129.7
4160.269	6.4968	3.0	3.5175[o]	3.0	4160.263	36.9
4160.903	5.3854[o]	2.0	2.4066	2.0	4160.888	25.7
4165.737	6.4641[o]	3.0	3.4888	3.0	4165.755[b]	8.9
4165.765	5.2444[o]	1.0	2.2690	0.0	4165.756[b]	10.7
4172.544	4.5848[o]	1.0	1.6142	1.0	4172.542[b]	716.9
4172.548	4.2309[o]	3.0	1.2604	2.0	4172.542[b]	716.9
4175.622	4.0523[o]	4.0	1.0839	4.0	4175.614	1573.3
4182.451	5.3326[o]	3.0	2.3691	4.0	4182.449	45.7
4189.906	4.5420[o]	2.0	1.5838	2.0	4189.900	1067.8
4192.635	5.2998[o]	4.0	2.3435	3.0	4192.643	45.5
4195.149	4.7016[o]	2.0	1.7471	3.0	4195.140	60.2
4202.069	4.7274[o]	4.0	1.7778	5.0	4202.068	959.0
4204.559	6.4654	2.0	3.5175[o]	3.0	4204.556	25.2
4205.225	4.3150[o]	4.0	1.3676	4.0	4205.226	46.8
4211.853	5.8517	5.0	2.9090[o]	5.0	4211.853	2054.4
4213.863	6.0425	4.0	3.1011[o]	3.0	4213.851	334.0
4215.160	4.6875[o]	3.0	1.7471	3.0	4215.153	100.5
4218.848	5.5457[o]	1.0	2.6077	1.0	4218.841	52.1
4226.532	4.8199[o]	1.0	1.8873	2.0	4226.517	130.6
4233.462	4.5848[o]	1.0	1.6570	2.0	4233.460	311.2
4235.934	5.3326[o]	3.0	2.4066	2.0	4235.933	44.1
4241.527	4.7000[o]	4.0	1.7778	5.0	4241.525	26.3
4251.151	6.4044[o]	2.0	3.4888	3.0	4251.170[b]	33.3
4251.180	6.6447	2.0	3.7291[o]	2.0	4251.170[b]	34.1
4252.538	5.3810[o]	5.0	2.4664	4.0	4252.534	48.9
4264.749	4.5633[o]	3.0	1.6570	2.0	4264.746[b]	322.0
4264.751	5.5140[o]	1.0	2.6077	1.0	4264.746[b]	322.0
4269.363	4.7440[o]	3.0	1.8409	4.0	4269.363	83.5
4269.612	5.2465[o]	3.0	2.3435	3.0	4269.614	203.0
4270.785	5.2457[o]	4.0	2.3435	3.0	4270.788	39.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4277.155	5.2596^o	1.0	2.3617	0.0	4277.147	193.8
4281.372	4.8032^o	2.0	1.9082	3.0	4281.375	74.1
4284.249	4.2606^o	5.0	1.3676	4.0	4284.243	9.5
4285.903	4.5062^o	2.0	1.6142	1.0	4285.898	677.7
4293.948	4.7274^o	4.0	1.8409	4.0	4293.950	2210.1
4296.223	4.5420^o	2.0	1.6570	2.0	4296.218	172.7
4299.695	5.2444^o	1.0	2.3617	0.0	4299.685^b	30.7
4299.703	7.3360	2.0	4.4533^o	1.0	4299.685^b	30.7
4308.876	5.2457^o	4.0	2.3691	4.0	4308.870	106.7
4311.032	6.3639^o	4.0	3.4888	3.0	4311.024	651.8
4317.591	6.0448^o	4.0	3.1741	4.0	4317.580	14.0
4319.341	4.4533^o	1.0	1.5838	2.0	4319.338	122.9
4326.255	4.7523^o	2.0	1.8873	2.0	4326.255	628.1
4328.677	4.7715^o	3.0	1.9082	3.0	4328.678	1824.5
4332.906	5.8342^o	3.0	2.9736	3.0	4332.908	26.6
4338.758	4.7440^o	3.0	1.8873	2.0	4338.749	208.6
4351.525	5.1918^o	3.0	2.3435	3.0	4351.521	335.1
4354.461	4.1068^o	3.0	1.2604	2.0	4354.461	66.1
4365.684	4.4533^o	1.0	1.6142	1.0	4365.679	2603.2
4370.662	4.7440^o	3.0	1.9082	3.0	4370.661	394.3
4376.879	7.5194	4.0	4.6875^o	3.0	4376.898^b	45.9
4376.904	5.4730^o	3.0	2.6412	2.0	4376.898^b	50.0
4391.077	5.1918^o	3.0	2.3691	4.0	4391.074^b	107.8
4391.081	6.4654	2.0	3.6428^o	3.0	4391.074^b	107.8
4394.872	4.2309^o	3.0	1.4107	3.0	4394.873	11198.7
4396.297	5.4383^o	4.0	2.6189	3.0	4396.311	68.1
4397.265	4.5658^o	4.0	1.7471	3.0	4397.256	512.8
4400.587	6.8689	5.0	4.0523^o	4.0	4400.570	176.9
4402.746	6.3278	4.0	3.5126^o	4.0	4402.732	329.7
4404.216	4.7016^o	2.0	1.8873	2.0	4404.211	130.5
4411.131	4.8199^o	1.0	2.0100	1.0	4411.123	71.5
4420.468	2.8039^o	4.0	0.0000	4.0	4420.467	158200.9
4432.417	4.4533^o	1.0	1.6570	2.0	4432.412	472.8
4437.521	4.8032^o	2.0	2.0100	1.0	4437.512	24.3
4445.687	4.5658^o	4.0	1.7778	5.0	4445.688	77.6
4447.358	4.5647^o	5.0	1.7778	5.0	4447.356	819.5
4458.334	5.2465^o	3.0	2.4664	4.0	4458.339^b	41.3
4458.342	7.3434	2.0	4.5633^o	3.0	4458.339^b	41.3
4462.300	5.3854^o	2.0	2.6077	1.0	4462.291	44.0
4479.809	4.3506^o	2.0	1.5838	2.0	4479.804	297.2

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4480.341	5.3854^o	2.0	2.6189	3.0	4480.347	16.8
4484.149	6.8709	4.0	4.1068^o	3.0	4484.138	38.0
4484.765	4.0241^o	2.0	1.2604	2.0	4484.762	1794.3
4488.594	3.1011^o	3.0	0.3398	2.0	4488.601	1506.5
4490.217	6.8672	3.0	4.1068^o	3.0	4490.208	24.3
4492.225	4.5062^o	2.0	1.7471	3.0	4492.224	28.0
4495.277	5.6488^o	3.0	2.8916	4.0	4495.270	27.3
4500.729	5.3951^o	3.0	2.6412	2.0	4500.726	29.2
4504.037	5.0209^o	1.0	2.2690	0.0	4504.024	10.1
4518.893	5.1120^o	3.0	2.3691	4.0	4518.881	46.6
4519.867	4.7523^o	2.0	2.0100	1.0	4519.861	31.4
4520.315	5.1111^o	5.0	2.3691	4.0	4520.310	50.1
4524.867	4.1068^o	3.0	1.3676	4.0	4524.863	127.2
4529.679	4.3506^o	2.0	1.6142	1.0	4529.673^b	133.2
4529.683	6.4654	2.0	3.7291^o	2.0	4529.673^b	134.9
4548.659	4.5658^o	4.0	1.8409	4.0	4548.660	603.6
4550.077	5.7358^o	4.0	3.0117	5.0	4550.067	21.4
4550.408	4.5647^o	5.0	1.8409	4.0	4550.411	2497.5
4551.295	4.5647^o	5.0	1.8414	6.0	4551.295	947.7
4579.042	5.1732^o	4.0	2.4664	4.0	4579.043	52.9
4595.044	6.3402	3.0	3.6428^o	3.0	4595.032	100.5
4597.157	4.1068^o	3.0	1.4107	3.0	4597.157	287.7
4605.031	4.7016^o	2.0	2.0100	1.0	4605.019	51.1
4616.785	4.0523^o	4.0	1.3676	4.0	4616.777	581.4
4631.829	4.5633^o	3.0	1.8873	2.0	4631.824	1032.0
4638.618	5.5630^o	3.0	2.8909	2.0	4638.625	35.1
4641.846	3.7541^o	5.0	1.0839	4.0	4641.834	105.2
4657.801	5.8342^o	3.0	3.1732	3.0	4657.810	22.8
4663.824	4.5658^o	4.0	1.9082	3.0	4663.819	588.7
4674.012	5.2596^o	1.0	2.6077	1.0	4674.026	14.9
4692.066	4.0523^o	4.0	1.4107	3.0	4692.055	91.2
4705.943	4.5420^o	2.0	1.9082	3.0	4705.926	28.0
4721.287	5.7994^o	3.0	3.1741	4.0	4721.274	18.0
4734.381	7.3895	2.0	4.7715^o	3.0	4734.405^b	74.8
4734.399	3.1337^o	2.0	0.5157	3.0	4734.405^b	74.8
4738.049	5.7241^o	2.0	3.1082	2.0	4738.040	55.5
4743.891	4.8032^o	2.0	2.1904	1.0	4743.885^b	199.4
4743.897	6.6650	3.0	4.0523^o	4.0	4743.885^b	199.4
4748.438	6.8709	4.0	4.2606^o	5.0	4748.425	130.0
4752.169	6.8689	5.0	4.2606^o	5.0	4752.147	116.7

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
4763.125	7.3895	2.0	4.7873^o	1.0	4763.097	148.5
4781.501	5.5658^o	4.0	2.9736	3.0	4781.529	27.5
4788.392	7.3325	2.0	4.7440^o	3.0	4788.397	10618.7
4793.993	3.1011^o	3.0	0.5157	3.0	4793.995	29989.9
4807.079	7.3499	3.0	4.7715^o	3.0	4807.083	21.1
4813.785	4.4157^o	3.0	1.8409	4.0	4813.776	37.9
4815.478	4.2309^o	3.0	1.6570	2.0	4815.477	175.4
4815.948	6.3278	4.0	3.7541^o	5.0	4815.933	131.0
4826.665	4.3150^o	4.0	1.7471	3.0	4826.652	39.6
4843.885	3.6428^o	3.0	1.0839	4.0	4843.872	185.6
4864.002	5.4398^o	5.0	2.8916	4.0	4863.988	20.8
4878.524	5.6488^o	3.0	3.1082	2.0	4878.519	62.5
4882.274	6.9544	2.0	4.4157^o	3.0	4882.292	34.9
4899.231	6.0425	4.0	3.5126^o	4.0	4899.210	136.3
4910.476	3.7845^o	1.0	1.2604	2.0	4910.468	38.2
4912.609	4.1068^o	3.0	1.5838	2.0	4912.603	106.0
4935.828	4.7016^o	2.0	2.1904	1.0	4935.818	40.7
4942.957	4.4157^o	3.0	1.9082	3.0	4942.943	69.6
4968.908	5.3854^o	2.0	2.8909	2.0	4968.910	22.0
5012.548	6.4968	3.0	4.0241^o	2.0	5012.529	36.9
5020.894	7.0333	4.0	4.5647^o	5.0	5020.890	32.4
5021.685	7.3872	3.0	4.9189^o	2.0	5021.701	8.6
5031.834	4.3506^o	2.0	1.8873	2.0	5031.824	97.4
5034.170	5.2596^o	1.0	2.7975	1.0	5034.162	34.4
5039.108	4.8032^o	2.0	2.3435	3.0	5039.106	128.7
5072.889	4.4533^o	1.0	2.0100	1.0	5072.876	90.5
5074.794	4.3506^o	2.0	1.9082	3.0	5074.787	36.0
5079.095	4.0241^o	2.0	1.5838	2.0	5079.087	108.0
5103.499	3.5126^o	4.0	1.0839	4.0	5103.489	875.7
5110.823	3.7928^o	4.0	1.3676	4.0	5110.814	117.8
5123.361	4.2606^o	5.0	1.8414	6.0	5123.366	18.4
5124.338	3.1337^o	2.0	0.7149	1.0	5124.347	206.4
5134.903	6.6447	2.0	4.2309^o	3.0	5134.881	11.8
5145.562	4.7523^o	2.0	2.3435	3.0	5145.559	21.2
5149.737	4.3150^o	4.0	1.9082	3.0	5149.725	266.1
5168.953	7.1694	3.0	4.7715^o	3.0	5168.982^b	38.3
5168.988	5.2888^o	2.0	2.8909	2.0	5168.982^b	43.4
5171.723	4.8032^o	2.0	2.4066	2.0	5171.721	24.8
5178.496	7.2762	3.0	4.8827^o	3.0	5178.503	41.3
5180.245	5.5658^o	4.0	3.1732	3.0	5180.248	6.5

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5182.289	5.5658^o	4.0	3.1741	4.0	5182.293	19.9
5183.614	6.9544	2.0	4.5633^o	3.0	5183.613	20.7
5193.529	3.7541^o	5.0	1.3676	4.0	5193.520	37.8
5202.637	3.6428^o	3.0	1.2604	2.0	5202.627	1283.2
5203.238	3.7928^o	4.0	1.4107	3.0	5203.225	44.8
5236.171	4.0241^o	2.0	1.6570	2.0	5236.158	11.8
5255.823	4.7274^o	4.0	2.3691	4.0	5255.821	38.4
5265.132	5.2457^o	4.0	2.8916	4.0	5265.124	37.8
5283.917	4.7523^o	2.0	2.4066	2.0	5283.904	22.5
5295.672	4.3506^o	2.0	2.0100	1.0	5295.669	35.7
5298.797	5.8517	5.0	3.5126^o	4.0	5298.768	26.4
5302.580	4.7440^o	3.0	2.4066	2.0	5302.567	18.0
5336.222	4.2309^o	3.0	1.9082	3.0	5336.221	70.2
5352.269	4.5062^o	2.0	2.1904	1.0	5352.255	33.8
5362.901	4.9189^o	2.0	2.6077	1.0	5362.896	12.9
5376.804	4.0523^o	4.0	1.7471	3.0	5376.782	53.9
5379.324	6.8689	5.0	4.5647^o	5.0	5379.291	17.0
5386.918	5.1918^o	3.0	2.8909	2.0	5386.906	19.7
5416.349	6.0425	4.0	3.7541^o	5.0	5416.328	908.9
5416.678	2.8039^o	4.0	0.5157	3.0	5416.681	662.1
5417.514	6.3402	3.0	4.0523^o	4.0	5417.495	32.9
5419.711	5.3951^o	3.0	3.1082	2.0	5419.711	22.9
5441.823	4.7440^o	3.0	2.4664	4.0	5441.812	28.4
5443.310	4.0241^o	2.0	1.7471	3.0	5443.293	783.9
5447.759	3.6428^o	3.0	1.3676	4.0	5447.758^b	24.6
5447.783	7.3872	3.0	5.1120^o	3.0	5447.758^b	25.7
5449.378	4.0523^o	4.0	1.7778	5.0	5449.361	16.7
5453.397	5.2465^o	3.0	2.9736	3.0	5453.375	24.6
5457.303	2.9090^o	5.0	0.6377	5.0	5457.291	185.2
5470.008	4.1068^o	3.0	1.8409	4.0	5469.982^b	75.2
5470.014	6.4968	3.0	4.2309^o	3.0	5469.982^b	75.9
5477.267	4.4533^o	1.0	2.1904	1.0	5477.254	33.3
5481.829	4.7274^o	4.0	2.4664	4.0	5481.828	22.9
5491.259	3.5175^o	3.0	1.2604	2.0	5491.247	37.6
5504.866	5.4247^o	4.0	3.1732	3.0	5504.853	14.0
5509.329	6.0425	4.0	3.7928^o	4.0	5509.304	33.1
5523.535	5.8517	5.0	3.6078^o	6.0	5523.526	839.3
5529.563	4.8827^o	3.0	2.6412	2.0	5529.531	13.6
5546.836	6.4654	2.0	4.2309^o	3.0	5546.808	19.0
5548.813	5.4069^o	2.0	3.1732	3.0	5548.813	20.8

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
5552.887	3.6428^o	3.0	1.4107	3.0	5552.873	64.7
5560.618	6.6447	2.0	4.4157^o	3.0	5560.610	29.7
5572.014	5.3326^o	3.0	3.1082	2.0	5572.019	16.5
5580.614	5.3951^o	3.0	3.1741	4.0	5580.643^b	28.7
5580.673	6.3278	4.0	4.1068^o	3.0	5580.642^b	30.6
5584.445	4.1068^o	3.0	1.8873	2.0	5584.438	403.0
5587.742	5.1918^o	3.0	2.9736	3.0	5587.724	15.9
5620.065	5.9319^o	3.0	3.7265	2.0	5620.087^b	1202.1
5620.100	3.4658^o	2.0	1.2604	2.0	5620.087^b	1201.8
5632.068	3.7845^o	1.0	1.5838	2.0	5632.064	17.1
5637.410	4.1068^o	3.0	1.9082	3.0	5637.413	12.4
5637.766	4.5420^o	2.0	2.3435	3.0	5637.755	11.8
5642.565	4.5658^o	4.0	2.3691	4.0	5642.556	42.4
5645.257	4.5647^o	5.0	2.3691	4.0	5645.246	40.7
5674.390	4.4533^o	1.0	2.2690	0.0	5674.374	18.5
5678.161	6.9544	2.0	4.7715^o	3.0	5678.147	8.4
5680.891	6.4968	3.0	4.3150^o	4.0	5680.872	107.4
5709.363	6.8709	4.0	4.7000^o	4.0	5709.349	39.7
5711.118	3.7845^o	1.0	1.6142	1.0	5711.086	4.6
5714.758	6.8689	5.0	4.7000^o	4.0	5714.720	10.1
5721.931	2.8039^o	4.0	0.6377	5.0	5721.926	4937.1
5731.083	4.5062^o	2.0	2.3435	3.0	5731.065	14.6
5739.720	5.3326^o	3.0	3.1732	3.0	5739.704	11.2
5765.048	3.5175^o	3.0	1.3676	4.0	5765.035	151.6
5780.799	4.0523^o	4.0	1.9082	3.0	5780.785	132.5
5800.582	4.0241^o	2.0	1.8873	2.0	5800.567	293.9
5806.775	6.9544	2.0	4.8199^o	1.0	5806.738	8.0
5830.981	5.2998^o	4.0	3.1741	4.0	5830.943	7.6
5857.747	4.0241^o	2.0	1.9082	3.0	5857.736	1281.1
5860.655	3.7291^o	2.0	1.6142	1.0	5860.632^b	99.8
5860.662	6.4654	2.0	4.3506^o	2.0	5860.632^b	99.8
5894.593	6.6447	2.0	4.5420^o	2.0	5894.578	13.0
5896.759	3.5126^o	4.0	1.4107	3.0	5896.747	9.3
5908.954	5.8517	5.0	3.7541^o	5.0	5908.947	4.6
5996.002	6.3278	4.0	4.2606^o	5.0	5995.980	99.0
6015.778	4.7016^o	2.0	2.6412	2.0	6015.769	9.4
6227.708	6.0425	4.0	4.0523^o	4.0	6227.686	52.8
6241.710	3.6428^o	3.0	1.6570	2.0	6241.695	14.9
6274.952	6.9705	5.0	4.9952^o	6.0	6274.935	18.4
6286.826	4.3150^o	4.0	2.3435	3.0	6286.808	8.9

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
6447.667	5.6488^o	3.0	3.7265	2.0	6447.666	7.4
6448.108	7.0333	4.0	5.1111^o	5.0	6448.100	15.8
6538.296	3.6428^o	3.0	1.7471	3.0	6538.271	27.9
6576.832	3.7928^o	4.0	1.9082	3.0	6576.821	12.4
6615.418	6.8689	5.0	4.9952^o	6.0	6615.379	5.3
6616.552	3.1337^o	2.0	1.2604	2.0	6616.545	27.3
6661.784	3.5175^o	3.0	1.6570	2.0	6661.770	15.3
6729.561	3.7291^o	2.0	1.8873	2.0	6729.545	66.1
6806.623	3.7291^o	2.0	1.9082	3.0	6806.607	21.0
6841.783	6.0425	4.0	4.2309^o	3.0	6841.734	1.1
6878.710	3.6428^o	3.0	1.8409	4.0	6878.710	8.6
6956.002	6.0425	4.0	4.2606^o	5.0	6955.971	16.1
6984.944	4.4157^o	3.0	2.6412	2.0	6984.947^b	9.1
6984.968	3.7845^o	1.0	2.0100	1.0	6984.947^b	9.3
7054.854	5.2457^o	4.0	3.4888	3.0	7054.837	4.3
7060.659	3.6428^o	3.0	1.8873	2.0	7060.638	35.6
7122.832	7.3031	3.0	5.5630^o	3.0	7122.852	4.0
7145.538	3.6428^o	3.0	1.9082	3.0	7145.516	50.7
7149.903	3.1011^o	3.0	1.3676	4.0	7149.894	66.8
7184.096	6.4968	3.0	4.7715^o	3.0	7184.054	6.6
7206.333	2.8039^o	4.0	1.0839	4.0	7206.306	44.2
7209.966	3.7291^o	2.0	2.0100	1.0	7209.938	14.8
7211.484	3.4658^o	2.0	1.7471	3.0	7211.451	6.3
7332.084	3.1011^o	3.0	1.4107	3.0	7332.045	2.3
7375.048	4.0241^o	2.0	2.3435	3.0	7375.041	11.6
7407.958	4.5647^o	5.0	2.8916	4.0	7407.945	5.4
7583.617	7.3096	3.0	5.6752^o	3.0	7583.666	2.0
7602.967	7.3838	3.0	5.7536^o	2.0	7602.964^b	89.7
7602.984	3.5175^o	3.0	1.8873	2.0	7602.964^b	89.4
7618.971	6.0425	4.0	4.4157^o	3.0	7618.940	4.5
7673.539	4.5062^o	2.0	2.8909	2.0	7673.558	2.3
7701.494	3.5175^o	3.0	1.9082	3.0	7701.498	19.2
7716.987	7.3499	3.0	5.7438^o	3.0	7716.929	7.6
7790.024	5.8517	5.0	4.2606^o	5.0	7790.001	3.0
7831.312	6.4654	2.0	4.8827^o	3.0	7831.303	2.6
7862.941	7.3434	2.0	5.7670^o	1.0	7862.959	17.2
7901.640	6.3402	3.0	4.7715^o	3.0	7901.613	2.8
7957.339	3.4658^o	2.0	1.9082	3.0	7957.318	10.4
8041.339	2.9090^o	5.0	1.3676	4.0	8041.314	16.4
8157.459	3.1337^o	2.0	1.6142	1.0	8157.428	13.1

Continued from previous page

λ_{Ritz} [Å]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [Å]	I [a.u.]
8168.657	3.1011^o	3.0	1.5838	2.0	8168.638	2.0
8178.701	3.7845^o	1.0	2.2690	0.0	8178.687	1.0
8308.299	6.6650	3.0	5.1732^o	4.0	8308.287	4.4
8514.163	3.4658^o	2.0	2.0100	1.0	8514.123	8.0
8629.399	2.8039^o	4.0	1.3676	4.0	8629.411	24.4
8751.106	4.0241^o	2.0	2.6077	1.0	8751.095	32.6
8938.739	7.3325	2.0	5.9459^o	3.0	8938.806^b	15.2
8938.851	3.1337^o	2.0	1.7471	3.0	8938.806^b	15.7
9153.689	3.1011^o	3.0	1.7471	3.0	9153.673	6.3
10113.913	3.1337^o	2.0	1.9082	3.0	10113.864	99.9

A.3 GIANO-B infrared lines

Table A.33: Measured wavelengths (λ_o), uncertainty on measured wavelengths (σ_{λ_o}) and peak intensities ofLa I infrared spectral lines. Energy level classification is reported as follow: λ_{Ritz} - Ritz wavelength of the transition; E_{up} - energy of the upper level in eV; J_{up} - J of the upper level; E_{low} - energy of the lower level in eV; J_{low} - J of the lower level. A superscript to observed wavelengths indicates a blend (b), a coincidence with a transition of the corresponding ionised state (c). In the machine readable table, full information about the energy levels is reported.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
944.0916	1.6440^o	1.5	0.3308	1.5	944.0950	0.0005	3544.7
946.4424	2.2065^o	1.5	0.8966	0.5	946.4463^b	0.0005	1178.0
946.4427	4.2194	3.5	2.9094^o	4.5	946.4463^b	0.0005	1178.0
947.2370	3.9946	3.5	2.6857^o	3.5	947.2409	0.0005	30.0
947.7094	2.3065^o	3.5	0.9983	3.5	947.7124	0.0005	96.8
947.9607	4.0285^o	2.5	2.7206	3.5	947.9651	0.0005	28.1
948.7702	3.9580	4.5	2.6512^o	4.5	948.7744	0.0005	144.7
954.3896	2.5041^o	0.5	1.2050	1.5	954.3921	0.0006	83.3
954.4689	2.2511^o	2.5	0.9522	2.5	954.4738	0.0006	725.4
956.3330	2.2251^o	2.5	0.9287	1.5	956.3355	0.0006	187.7
957.3070	3.9808	3.5	2.6857^o	3.5	957.3073	0.0006	33.2
958.5936	3.4039^o	3.5	2.1106	3.5	958.6029	0.0006	42.1
964.3499	3.3962^o	2.5	2.1106	3.5	964.3511	0.0008	93.7
965.9689	4.7598	3.5	3.4764^o	3.5	965.9764^{bc}	0.0008	30.3
965.9773	4.4101	3.5	3.1266^o	2.5	965.9764^{bc}	0.0008	30.6
970.2362	2.2065^o	1.5	0.9287	1.5	970.2390	0.0009	373.4
970.9161	2.4820^o	1.5	1.2050	1.5	970.9199	0.0009	108.4
971.2057	3.8508	3.5	2.5742^o	3.5	971.2082	0.0009	137.6
973.9762	2.2251^o	2.5	0.9522	2.5	973.9794	0.0009	645.9
977.4950	2.2205^o	3.5	0.9522	2.5	977.4973	0.0007	91.1
977.7847	3.5388^o	3.5	2.2708	4.5	977.7823	0.0007	38.3
985.1207	3.5651	2.5	2.3065^o	3.5	985.1295^b	0.0007	121.4
985.1411	3.7405	1.5	2.4820^o	1.5	985.1295^b	0.0007	121.0
985.5275	3.8582	2.5	2.6002^o	2.5	985.5300^b	0.0007	64.9
985.5275	4.3686	5.5	3.1106^o	4.5	985.5300^b	0.0007	64.9
986.5325	1.6900^o	2.5	0.4333	3.5	986.5360	0.0007	29.3
988.4010	2.2065^o	1.5	0.9522	2.5	988.4003	0.0009	267.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
992.3500	4.4667	0.5	3.2173^o	1.5	992.3608^b	0.0009	760.2
992.3619	2.1780^o	0.5	0.9287	1.5	992.3608^b	0.0009	759.8
996.8500	3.3543^o	4.5	2.1106	3.5	996.8519	0.0009	21.5
997.2436	4.8255	0.5	3.5822^o	0.5	997.2430	0.0009	447.2
998.3996	3.7634	2.5	2.5216^o	2.5	998.3997	0.0009	47.7
999.1257	2.7821^o	1.5	1.5412	1.5	999.1275	0.0009	28.1
1000.8467	3.3639^o	3.5	2.1251	4.5	1000.8471	0.0010	40.5
1006.9581	3.4676^o	1.5	2.2363	1.5	1006.9558	0.0010	27.5
1011.9921	4.1852	3.5	2.9600^o	2.5	1011.9924^b	0.0010	21.8
1012.0023	4.4906	3.5	3.2655^o	2.5	1011.9924^b	0.0010	21.5
1013.3612	3.4937^o	5.5	2.2702	5.5	1013.3658	0.0010	59.8
1015.7553	2.0899^o	2.5	0.8693	2.5	1015.7557	0.0007	248.4
1018.0490	3.9808	3.5	2.7630^o	4.5	1018.0480	0.0007	52.3
1018.7417	2.7582^o	0.5	1.5412	1.5	1018.7421	0.0007	81.4
1022.2691	3.9366^o	1.5	2.7238	2.5	1022.2655^b	0.0007	27.3
1022.2754	4.1728	1.5	2.9600^o	2.5	1022.2655^b	0.0007	27.3
1027.7714	4.2611	1.5	3.0548^o	1.5	1027.7694^b	0.0007	48.4
1027.7714	3.5343^o	2.5	2.3279	2.5	1027.7694^b	0.0007	48.4
1028.4289	3.4764^o	3.5	2.2708	4.5	1028.4217	0.0009	35.4
1032.0887	3.8870	2.5	2.6857^o	3.5	1032.0907	0.0009	16.0
1033.5180	3.8508	3.5	2.6512^o	4.5	1033.5163	0.0009	28.5
1034.0021	3.8582	2.5	2.6591^o	3.5	1034.0017	0.0009	47.4
1034.6751	4.1848	4.5	2.9865^o	3.5	1034.6646	0.0009	19.9
1035.2009	2.4027^o	2.5	1.2050	1.5	1035.1997^b	0.0009	355.5
1035.2053	4.5616	3.5	3.3639^o	3.5	1035.1997^b	0.0009	355.5
1036.0594	2.7821^o	1.5	1.5854	2.5	1036.0603^b	0.0009	177.2
1036.0719	4.0756	2.5	2.8790^o	3.5	1036.0603^b	0.0009	178.1
1037.5392	3.9580	4.5	2.7630^o	4.5	1037.5392	0.0009	16.0
1041.2556	3.2655^o	2.5	2.0748	1.5	1041.2506	0.0009	18.0
1045.3770	2.8273^o	2.5	1.6413	3.5	1045.3782	0.0011	130.9
1046.4586	4.3406	1.5	3.1558^o	0.5	1046.4658^b	0.0011	165.3
1046.4647	2.8892^o	3.5	1.7044	4.5	1046.4658^b	0.0011	165.3
1047.8084	4.4006	1.5	3.2173^o	1.5	1047.8053	0.0011	142.9
1048.5785	3.7039	1.5	2.5216^o	2.5	1048.5780	0.0011	19.0
1048.9415	3.9026^o	2.5	2.7206	3.5	1048.9382	0.0011	24.8
1055.5400	2.8790^o	3.5	1.7044	4.5	1055.5416	0.0011	109.7
1071.4163	3.7573	2.5	2.6002^o	2.5	1071.4207	0.0010	22.7
1074.2731	3.4243^o	4.5	2.2702	5.5	1074.2743	0.0010	169.9
1093.8382	3.7077	2.5	2.5742^o	3.5	1093.8376	0.0013	17.8
1095.5139	2.2530^o	1.5	1.1213	0.5	1095.5159	0.0013	522.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1100.4271	1.9960[o]	3.5	0.8693	2.5	1100.4285	0.0013	57.8
1125.8966	3.1760[o]	0.5	2.0748	1.5	1125.8905	0.0007	23.0
1134.2292	3.3639[o]	3.5	2.2708	4.5	1134.2237	0.0007	42.2
1137.6902	2.0184[o]	1.5	0.9287	1.5	1137.6920	0.0007	46.2
1144.2708	3.7692	3.5	2.6857[o]	3.5	1144.2819[b]	0.0007	55.9
1144.2852	3.3543[o]	4.5	2.2708	4.5	1144.2819[b]	0.0007	55.4
1145.0006	3.2079[o]	5.5	2.1251	4.5	1145.0083[b]	0.0007	90.5
1145.0032	4.5653	4.5	3.4825[o]	4.5	1145.0083[b]	0.0007	90.3
1145.9515	2.2205[o]	3.5	1.1386	2.5	1145.9543	0.0007	489.0
1149.0476	3.9580	4.5	2.8790[o]	3.5	1149.0486	0.0007	28.2
1154.6736	2.6591[o]	3.5	1.5854	2.5	1154.6736	0.0007	17.7
1159.9986	3.9580	4.5	2.8892[o]	3.5	1159.9967	0.0007	41.6
1160.9692	2.2065[o]	1.5	1.1386	2.5	1160.9696	0.0007	158.5
1171.1667	2.7630[o]	4.5	1.7044	4.5	1171.1656	0.0014	43.6
1178.3798	2.0504[o]	3.5	0.9983	3.5	1178.3797	0.0014	287.9
1183.0244	2.2530[o]	1.5	1.2050	1.5	1183.0257	0.0014	56.3
1183.6225	3.3754[o]	1.5	2.3279	2.5	1183.6237	0.0014	28.8
1187.7400	1.9960[o]	3.5	0.9522	2.5	1187.7419	0.0009	267.4
1188.9538	2.0899[o]	2.5	1.0471	1.5	1188.9524	0.0009	182.8
1211.3225	3.8508	3.5	2.8273[o]	2.5	1211.3223	0.0010	25.5
1218.0955	2.6591[o]	3.5	1.6413	3.5	1218.0971	0.0010	166.8
1221.7589	1.8841[o]	2.5	0.8693	2.5	1221.7630[b]	0.0010	342.4
1221.7820	2.6002[o]	2.5	1.5854	2.5	1221.7630[b]	0.0010	342.5
1227.6450	2.6512[o]	4.5	1.6413	3.5	1227.6451	0.0011	19.9
1239.7734	3.1106[o]	4.5	2.1106	3.5	1239.7762	0.0011	52.7
1246.5781	3.0548[o]	1.5	2.0602	0.5	1246.5736	0.0016	12.5
1247.9535	1.9222[o]	2.5	0.9287	1.5	1247.9532	0.0016	266.8
1252.5081	3.1099[o]	3.5	2.1200	2.5	1252.4977	0.0016	12.8
1253.7918	2.5742[o]	3.5	1.5854	2.5	1253.7895	0.0016	65.1
1265.1630	3.0548[o]	1.5	2.0748	1.5	1265.1512	0.0016	56.5
1278.1675	1.9222[o]	2.5	0.9522	2.5	1278.1678	0.0014	20.4
1280.2458	3.0884[o]	1.5	2.1200	2.5	1280.2351	0.0014	20.5
1299.2056	1.8236[o]	1.5	0.8693	2.5	1299.2085	0.0021	18.5
1306.7845	2.4899[o]	1.5	1.5412	1.5	1306.7830	0.0021	113.2
1309.4620	2.6512[o]	4.5	1.7044	4.5	1309.4620	0.0021	320.8
1317.8042	2.4820[o]	1.5	1.5412	1.5	1317.8060	0.0017	55.6
1321.6028	4.4769	2.5	3.5388[o]	3.5	1321.6027	0.0017	16.0
1322.1217	3.2079[o]	5.5	2.2702	5.5	1322.1282	0.0017	176.7
1324.3549	2.5216[o]	2.5	1.5854	2.5	1324.3525	0.0017	256.1
1326.2811	3.0548[o]	1.5	2.1200	2.5	1326.2694	0.0018	59.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1328.9236	2.5742^o	3.5	1.6413	3.5	1328.9231	0.0018	262.6
1333.8046	3.6533^o	3.5	2.7238	2.5	1333.8056	0.0012	34.5
1337.3430	1.8236^o	1.5	0.8966	0.5	1337.3458	0.0012	96.0
1370.6937	2.4899^o	1.5	1.5854	2.5	1370.6897	0.0019	31.8
1385.3487	1.8236^o	1.5	0.9287	1.5	1385.3483	0.0010	66.2
1403.6683	3.9808	3.5	3.0976^o	2.5	1403.6763	0.0010	17.6
1408.4652	2.5216^o	2.5	1.6413	3.5	1408.4645	0.0015	37.0
1446.9372	2.9171^o	0.5	2.0602	0.5	1446.9287	0.0012	13.5
1455.0238	3.0884^o	1.5	2.2363	1.5	1455.0231	0.0012	22.8
1476.2662	1.8870^o	0.5	1.0471	1.5	1476.2636	0.0013	150.6
1511.8872	4.6709^o	3.5	3.8508	3.5	1511.8905	0.0019	11.7
1516.9912	2.4027^o	2.5	1.5854	2.5	1516.9846	0.0019	16.2
1520.3899	4.2830	1.5	3.4676^o	1.5	1520.3751	0.0018	14.3
1543.3695	3.7634	2.5	2.9600^o	2.5	1543.3537	0.0019	16.5
1567.3416	5.0721^o	3.5	4.2810	2.5	1567.3483	0.0011	13.3
1569.8331	2.4942^o	5.5	1.7044	4.5	1569.8344	0.0011	73.7
1581.4405	2.0138^o	4.5	1.2299	4.5	1581.4409	0.0011	17.9
1608.4747	3.7573	2.5	2.9865^o	3.5	1608.4767	0.0012	19.8
1611.8945	2.8892^o	3.5	2.1200	2.5	1611.8740	0.0012	25.7
1618.2620	1.9960^o	3.5	1.2299	4.5	1618.2670	0.0015	85.8
1625.3027	3.7692	3.5	3.0064^o	4.5	1625.3015	0.0015	42.8
1629.6757	2.9971^o	1.5	2.2363	1.5	1629.6715	0.0015	11.3
1630.8478	3.7573	2.5	2.9971^o	1.5	1630.8273	0.0015	12.8
1641.1361	3.8353	4.5	3.0799^o	5.5	1641.1310	0.0015	39.2
1647.6880	2.8273^o	2.5	2.0748	1.5	1647.6711	0.0015	15.5
1680.3613	1.6900^o	2.5	0.9522	2.5	1680.3572	0.0014	11.9
1697.5084	2.3717^o	4.5	1.6413	3.5	1697.5129	0.0015	65.9
1719.2422	2.3065^o	3.5	1.5854	2.5	1719.2336	0.0016	43.7
1741.6111	4.7065^o	2.5	3.9946	3.5	1741.6315^b	0.0014	27.6
1741.6320	2.2530^o	1.5	1.5412	1.5	1741.6315^b	0.0014	27.9
1746.3097	2.2511^o	2.5	1.5412	1.5	1746.3072	0.0014	22.8
1753.0881	2.7821^o	1.5	2.0748	1.5	1753.0747	0.0015	10.5
1753.4908	4.3604	4.5	3.6533^o	3.5	1753.5002	0.0015	15.5
1765.3167	1.8236^o	1.5	1.1213	0.5	1765.3125	0.0028	65.4
1770.0224	1.7476^o	0.5	1.0471	1.5	1770.0246	0.0029	102.0
1812.7367	2.2251^o	2.5	1.5412	1.5	1812.7381	0.0014	30.2
1818.6877	4.3881	2.5	3.7064^o	3.5	1818.6737	0.0014	26.6
1845.4100	3.8511	0.5	3.1792^o	1.5	1845.3980	0.0014	47.9
1924.2204	3.9946	3.5	3.3503^o	2.5	1924.2194	0.0015	1764.5
1943.6837	2.7630^o	4.5	2.1251	4.5	1943.6853	0.0020	28.3

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1952.0704	2.2205^o	3.5	1.5854	2.5	1952.0675	0.0020	22.8
1975.1175	4.3682^o	2.5	3.7405	1.5	1975.0961	0.0020	19.8
2092.4661	4.8575^o	2.5	4.2650	2.5	2092.4599	0.0011	10.3
2109.6735	4.2941	4.5	3.7064^o	3.5	2109.6740	0.0015	64.3
2321.8233	2.6591^o	3.5	2.1251	4.5	2321.8479	0.0009	34.0

Table A.34: Measured wavelengths and intensities of La II infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
965.9689	2.2100^o	4.0	0.9265	4.0	965.9764^c	0.0008	30.3
1095.7883	2.0580^o	4.0	0.9265	4.0	1095.7766	0.0013	169.5
1136.2926	2.3427^o	2.0	1.2516	2.0	1136.3004^b	0.0007	40.1

Table A.35: Measured wavelengths and intensities of Pr I infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
941.1933	2.5469^o	3.5	1.2297	3.5	941.1986	0.0005	34.9
945.4754	3.2006^o	4.5	1.8892	5.5	945.4790^b	0.0005	30.3
945.4798	2.8282^o	5.5	1.5169	5.5	945.4789^b	0.0005	30.6
945.4825	2.6672	3.5	1.3559^o	4.5	945.4789^b	0.0005	30.7
945.7231	2.2570^o	5.5	0.9460	6.5	945.7301^b	0.0005	15.3
945.7311	3.3258^o	5.5	2.0148	6.5	945.7301^b	0.0005	15.1
946.2896	1.4809	5.5	0.1707^o	5.5	946.2915^c	0.0005	53.7
946.4463	2.3415^o	4.5	1.0316	4.5	946.4515	0.0005	229.5
947.3564	2.3105	4.5	1.0018^o	5.5	947.3680	0.0005	15.2
947.6742	3.2339^o	4.5	1.9256	4.5	947.6837^b	0.0005	16.7
947.6948	2.8251^o	6.5	1.5169	5.5	947.6840^b	0.0005	17.2
947.7029	3.1382^o	6.5	1.8300	5.5	947.6841^b	0.0005	17.3
948.3509	4.0547^o	4.5	2.7474	3.5	948.3398	0.0005	11.6
949.6478	2.7044^o	5.5	1.3989	5.5	949.6467^b	0.0005	37.4
949.6613	3.2114^o	6.5	1.9059	6.5	949.6466^b	0.0005	37.8

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
951.1707	3.4032^o	5.5	2.0997	5.5	951.1919	0.0006	10.5
953.2570	3.1306^o	5.5	1.8300	5.5	953.2564	0.0006	12.7
954.3679	2.5288^o	4.5	1.2297	3.5	954.3756	0.0006	13.3
957.1869	3.3258^o	5.5	2.0305	5.5	957.1950	0.0006	14.6
957.7342	3.0411^o	7.5	1.7466	6.5	957.7424	0.0006	27.6
958.2390	3.1288^o	6.5	1.8350	7.5	958.2509^b	0.0006	18.6
958.2675	2.8107^o	6.5	1.5169	5.5	958.2509^b	0.0006	19.6
958.5155	3.2114^o	6.5	1.9179	5.5	958.5235	0.0006	12.4
958.6064	4.0547^o	4.5	2.7614	3.5	958.6003	0.0006	57.1
959.7288	1.8350	7.5	0.5432^o	7.5	959.7355	0.0006	29.7
960.0292	2.5822	6.5	1.2907^o	6.5	960.0263	0.0006	22.3
961.1725	1.6428	6.5	0.3529^o	6.5	961.1790	0.0006	25.1
961.4506	3.1469^o	6.5	1.8574	5.5	961.4468	0.0006	52.2
962.5501	2.3708	5.5	1.0828^o	6.5	962.5462	0.0006	11.7
962.7002	2.5786	6.5	1.2907^o	6.5	962.7017	0.0006	17.4
967.4314	1.4522	4.5	0.1707^o	5.5	967.4358	0.0009	59.5
971.7172	2.3476^o	5.5	1.0717	4.5	971.7211	0.0009	96.5
972.0865	2.3708	5.5	1.0954^o	5.5	972.0821	0.0009	29.5
972.1867	2.6619^o	5.5	1.3867	4.5	972.1740	0.0009	35.2
974.9744	3.9337^o	5.5	2.6621	5.5	974.9828	0.0009	11.2
975.6612	3.1012^o	3.5	1.8305	4.5	975.6534	0.0007	10.4
977.7838	2.5520^o	5.5	1.2840	4.5	977.7877	0.0007	25.8
979.2449	2.5568	6.5	1.2907^o	6.5	979.2472^b	0.0007	8.7
979.2641	3.0239^o	6.5	1.7579	5.5	979.2445^b	0.0007	10.2
980.6556	3.2791^o	6.5	2.0148	6.5	980.6661	0.0007	16.4
980.8836	4.0547^o	4.5	2.7907	4.5	980.8963	0.0007	172.3
981.4458	2.5566	4.5	1.2933^o	5.5	981.4554^b	0.0007	11.8
981.4506	1.6162	5.5	0.3529^o	6.5	981.4554^b	0.0007	11.8
981.8090	2.5605^o	7.5	1.2977	7.5	981.8081	0.0007	31.6
982.8580	3.9410^o	5.5	2.6796	5.5	982.8461	0.0007	76.3
982.9961	2.5341^o	6.5	1.2729	6.5	982.9965	0.0007	35.1
983.1121	2.8773^o	5.5	1.6162	5.5	983.1209	0.0007	48.2
983.8433	2.3318^o	5.5	1.0717	4.5	983.8437	0.0007	54.9
987.5305	3.1811^o	4.5	1.9256	4.5	987.5169^c	0.0007	8.5
989.5278	2.3476^o	5.5	1.0946	5.5	989.5297	0.0009	40.6
994.5113	2.7275^o	6.5	1.4809	5.5	994.4998	0.0009	12.8
995.3012	2.3948^o	6.5	1.1491	5.5	995.3031^{bc}	0.0009	10.9
995.3220	3.1757^o	6.5	1.9300	5.5	995.3031^{bc}	0.0009	10.8
997.5829	3.4900	5.5	2.2472^o	4.5	997.5634	0.0009	8.1
1003.7641	3.2339^o	4.5	1.9987	5.5	1003.7747	0.0010	10.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1004.2470	2.7275^o	6.5	1.4929	6.5	1004.2463	0.0010	11.6
1006.2701	2.9899^o	6.5	1.7579	5.5	1006.2815	0.0010	12.4
1008.4925	2.5217^o	6.5	1.2923	6.5	1008.4918^c	0.0010	18.6
1009.4596	1.3989	5.5	0.1707^o	5.5	1009.4621	0.0010	74.7
1010.8219	3.3263^o	4.5	2.0997	5.5	1010.8354^b	0.0010	48.2
1010.8331	2.5106^o	5.5	1.2840	4.5	1010.8354^b	0.0010	48.3
1011.7556	2.2570^o	5.5	1.0316	4.5	1011.7595	0.0010	217.6
1012.8900	2.5217^o	6.5	1.2977	7.5	1012.8921	0.0010	14.4
1013.2328	2.9105^o	5.5	1.6868	4.5	1013.2313	0.0010	7.6
1019.8587	2.2472^o	4.5	1.0316	4.5	1019.8606	0.0007	289.2
1021.5402	2.9274^o	5.5	1.7137	4.5	1021.5376	0.0007	10.9
1025.7652	3.1343^o	5.5	1.9256	4.5	1025.7627	0.0007	29.7
1026.8807	2.6409^o	5.5	1.4336	6.5	1026.8806	0.0007	11.9
1030.4179	3.1469^o	6.5	1.9437	6.5	1030.4244	0.0009	1311.7
1034.5391	2.3476^o	5.5	1.1491	5.5	1034.5432	0.0009	7.0
1036.9550	2.4685^o	5.5	1.2729	6.5	1036.9560	0.0009	7.1
1039.0290	3.2791^o	6.5	2.0858	6.5	1039.0371	0.0009	21.0
1039.3303	2.5156	6.5	1.3228^o	7.5	1039.3452	0.0009	8.4
1040.2060	2.6848^o	7.5	1.4929	6.5	1040.2006	0.0009	6.7
1042.9954	2.6409^o	5.5	1.4522	4.5	1042.9927	0.0011	7.5
1045.9978	2.2570^o	5.5	1.0717	4.5	1045.9987	0.0011	44.4
1046.7456	2.4685^o	5.5	1.2840	4.5	1046.7524	0.0011	8.8
1047.8007	1.3539	4.5	0.1707^o	5.5	1047.8048	0.0011	1858.2
1048.0532	2.7992^o	5.5	1.6162	5.5	1048.0504	0.0011	10.4
1048.2653	3.1382^o	6.5	1.9555	6.5	1048.2679^c	0.0011	66.3
1049.7244	2.6619^o	5.5	1.4809	5.5	1049.7271	0.0011	9.7
1051.7658	3.1343^o	5.5	1.9555	6.5	1051.7466	0.0011	10.4
1052.9907	2.7894	7.5	1.6120^o	7.5	1053.0021	0.0011	12.4
1053.2624	2.9467^o	5.5	1.7696	4.5	1053.2591	0.0011	11.7
1053.4921	2.5288^o	4.5	1.3519	5.5	1053.4961	0.0011	33.4
1054.1351	2.4685^o	5.5	1.2923	6.5	1054.1350	0.0011	10.1
1054.4630	1.1758	5.5	0.0000^o	4.5	1054.4608	0.0011	16.0
1059.8385	2.5217^o	6.5	1.3519	5.5	1059.8530^{bc}	0.0009	56.9
1059.8508	2.5469^o	3.5	1.3771	2.5	1059.8530^{bc}	0.0009	57.1
1061.3807	2.3978^o	4.5	1.2297	3.5	1061.3855	0.0009	104.7
1061.5238	2.8145	8.5	1.6465^o	8.5	1061.5213	0.0009	5.6
1062.6067	2.2496	5.5	1.0828^o	6.5	1062.5905	0.0009	5.6
1063.8852	2.5520^o	5.5	1.3867	4.5	1063.8830	0.0009	13.5
1065.4892	2.3933^o	4.5	1.2297	3.5	1065.4933^c	0.0009	166.7
1066.2936	3.0418^o	5.5	1.8791	6.5	1066.2859^c	0.0009	11.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1066.6610	3.2621^{o}	5.5	2.0997	5.5	1066.6726^{bc}	0.0009	67.3
1066.6644	2.2570^{o}	5.5	1.0946	5.5	1066.6726^{bc}	0.0009	66.7
1068.4035	2.8624^{o}	4.5	1.7020	5.5	1068.4108	0.0009	20.6
1068.7380	2.6409^{o}	5.5	1.4809	5.5	1068.7518	0.0009	5.3
1069.0614	3.3258^{o}	5.5	2.1660	5.5	1069.0745^{b}	0.0009	13.6
1069.0842	2.2551	4.5	1.0954^{o}	5.5	1069.0744^{b}	0.0009	13.3
1070.2490	2.3318^{o}	5.5	1.1734	6.5	1070.2510	0.0009	30.3
1071.4232	1.5101	5.5	0.3529^{o}	6.5	1071.4206	0.0010	291.4
1075.2665	2.6052^{o}	5.5	1.4522	4.5	1075.2669	0.0010	17.7
1079.6781	3.3185^{o}	5.5	2.1702	6.5	1079.6869	0.0010	6.5
1079.9113	3.4032^{o}	5.5	2.2551	4.5	1079.9243^{b}	0.0010	64.4
1079.9276	2.3476^{o}	5.5	1.1995	5.5	1079.9243^{b}	0.0010	62.7
1081.4271	2.8484^{o}	6.5	1.7020	5.5	1081.4401^{b}	0.0010	17.4
1081.4505	3.3258^{o}	5.5	2.1793	5.5	1081.4403^{b}	0.0010	16.9
1082.7339	2.6619^{o}	5.5	1.5169	5.5	1082.7393	0.0010	13.4
1083.2100	2.6614^{o}	6.5	1.5169	5.5	1083.2109	0.0010	7.9
1083.6948	3.2243^{o}	4.5	2.0802	5.5	1083.6965^{c}	0.0010	7.5
1088.2139	2.6322^{o}	6.5	1.4929	6.5	1088.2259^{c}	0.0013	34.0
1092.1084	2.5341^{o}	6.5	1.3989	5.5	1092.1098^{b}	0.0013	15.3
1092.1084	3.0411^{o}	7.5	1.9059	6.5	1092.1098^{b}	0.0013	15.3
1093.4650	3.1568^{o}	5.5	2.0229	5.5	1093.4885	0.0013	16.4
1098.1071	2.9467^{o}	5.5	1.8176	5.5	1098.1131^{bc}	0.0013	5.3
1098.1119	2.9274^{o}	5.5	1.7984	5.5	1098.1118^{bc}	0.0013	4.8
1099.2103	1.4809	5.5	0.3529^{o}	6.5	1099.2079	0.0013	65.7
1099.8112	3.9410^{o}	5.5	2.8137	4.5	1099.8263	0.0013	14.0
1102.8994	2.7044^{o}	5.5	1.5803	4.5	1102.8974	0.0008	9.2
1103.1281	2.5106^{o}	5.5	1.3867	4.5	1103.1304	0.0008	4.9
1106.9122	3.0259^{o}	5.5	1.9059	6.5	1106.9035	0.0008	5.1
1107.1267	2.5187^{o}	5.5	1.3989	5.5	1107.1244	0.0008	5.0
1111.5533	2.6322^{o}	6.5	1.5169	5.5	1111.5547	0.0008	20.2
1112.5017	2.8282^{o}	5.5	1.7137	4.5	1112.5054	0.0008	5.2
1112.8583	3.9337^{o}	5.5	2.8197	5.5	1112.8633	0.0008	11.4
1117.1924	2.9274^{o}	5.5	1.8176	5.5	1117.1858	0.0008	4.7
1117.7156	2.3933^{o}	4.5	1.2840	4.5	1117.7223	0.0008	34.7
1123.3898	2.2997	7.5	1.1960^{o}	7.5	1123.3770	0.0007	5.2
1127.3106	2.5520^{o}	5.5	1.4522	4.5	1127.3102	0.0007	19.6
1130.0342	2.5009	5.5	1.4038^{o}	5.5	1130.0442^{bc}	0.0007	14.2
1130.0418	2.3948^{o}	6.5	1.2977	7.5	1130.0438^{bc}	0.0007	14.0
1131.8850	3.1568^{o}	5.5	2.0614	6.5	1131.8745	0.0007	5.6
1132.6234	1.0946	5.5	0.0000^{o}	4.5	1132.6220	0.0007	20.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1137.7587	3.3508^o	4.5	2.2611	5.5	1137.7662	0.0007	5.6
1142.0310	3.0411^o	7.5	1.9555	6.5	1142.0303	0.0007	5.1
1142.5320	2.5187^o	5.5	1.4336	6.5	1142.5361	0.0007	9.6
1143.6701	2.9899^o	6.5	1.9059	6.5	1143.6694	0.0007	5.5
1143.8389	2.1793	5.5	1.0954^o	5.5	1143.8400	0.0007	14.9
1144.2106	2.2570^o	5.5	1.1734	6.5	1144.2250	0.0007	37.1
1145.8087	3.1679^o	5.5	2.0858	6.5	1145.8036	0.0007	7.6
1146.0372	2.4685^o	5.5	1.3867	4.5	1146.0297	0.0007	8.1
1146.3079	2.8282^o	5.5	1.7466	6.5	1146.2987^c	0.0007	7.6
1147.3100	1.4336	6.5	0.3529^o	6.5	1147.3119^c	0.0007	65.6
1148.7743	2.7992^o	5.5	1.7199	5.5	1148.7723	0.0007	6.0
1151.3230	2.0997	5.5	1.0229^o	4.5	1151.3299^c	0.0007	4.5
1156.2685	3.4704^o	6.5	2.3982	5.5	1156.2688	0.0007	8.6
1156.8946	1.0717	4.5	0.0000^o	4.5	1156.8957	0.0007	24.8
1157.2065	2.4752	4.5	1.4038^o	5.5	1157.2014	0.0007	4.5
1157.4436	2.5520^o	5.5	1.4809	5.5	1157.4403^b	0.0007	5.5
1157.4610	3.3263^o	4.5	2.2551	4.5	1157.4403^b	0.0007	5.7
1159.1193	2.4685^o	5.5	1.3989	5.5	1159.1274^b	0.0007	6.5
1159.1273	3.4704^o	6.5	2.4008	7.5	1159.1270^b	0.0007	6.1
1162.4528	2.7992^o	5.5	1.7326	4.5	1162.4511	0.0007	6.6
1165.7484	2.3476^o	5.5	1.2840	4.5	1165.7544^b	0.0007	26.5
1165.7620	2.8331^o	5.5	1.7696	4.5	1165.7544^b	0.0007	27.1
1166.5576	3.1679^o	5.5	2.1051	6.5	1166.5568	0.0007	6.1
1166.8448	2.1580	5.5	1.0954^o	5.5	1166.8396	0.0007	5.8
1167.1158	3.3174^o	5.5	2.2551	4.5	1167.1071	0.0007	9.0
1170.8971	2.7044^o	5.5	1.6456	4.5	1170.8902	0.0014	6.7
1183.2443	2.3318^o	5.5	1.2840	4.5	1183.2485^b	0.0014	16.3
1183.2583	2.3769	9.5	1.3291^o	8.5	1183.2484^b	0.0014	15.8
1183.6799	3.3174^o	5.5	2.2700	5.5	1183.6843	0.0014	5.8
1185.3763	1.3989	5.5	0.3529^o	6.5	1185.3809	0.0014	45.0
1186.0877	3.1450^o	5.5	2.0997	5.5	1186.1011	0.0014	12.9
1188.6140	3.0418^o	5.5	1.9987	5.5	1188.6079^b	0.0009	19.2
1188.6211	2.8369^o	5.5	1.7938	4.5	1188.6079^b	0.0009	19.2
1190.3841	2.5568	6.5	1.5153^o	6.5	1190.4010	0.0009	7.1
1204.0432	2.5106^o	5.5	1.4809	5.5	1204.0439	0.0009	11.3
1204.1896	2.7992^o	5.5	1.7696	4.5	1204.1886	0.0009	7.9
1205.0501	1.1995	5.5	0.1707^o	5.5	1205.0473	0.0009	119.7
1205.2578	2.0305	5.5	1.0018^o	5.5	1205.2697	0.0009	5.4
1209.8804	3.5852	6.5	2.5605^o	7.5	1209.8759^b	0.0010	9.5
1209.8818	2.6409^o	5.5	1.6162	5.5	1209.8759^b	0.0010	9.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1218.7884	2.5341^o	6.5	1.5169	5.5	1218.7831	0.0010	20.5
1219.8320	2.6619^o	5.5	1.6456	4.5	1219.8324^c	0.0010	5.3
1226.1619	3.0259^o	5.5	2.0148	6.5	1226.1707^b	0.0011	5.8
1226.1739	2.3978^o	4.5	1.3867	4.5	1226.1710^b	0.0011	5.6
1228.6174	3.0239^o	6.5	2.0148	6.5	1228.6071	0.0011	25.0
1231.6606	2.3933^o	4.5	1.3867	4.5	1231.6574	0.0011	8.3
1233.2098	2.7992^o	5.5	1.7938	4.5	1233.2040	0.0011	4.9
1233.5171	1.1758	5.5	0.1707^o	5.5	1233.5142	0.0011	47.7
1241.2815	3.1568^o	5.5	2.1580	5.5	1241.2745^b	0.0011	13.7
1241.2846	2.2896	7.5	1.2907^o	6.5	1241.2744^b	0.0011	13.8
1242.1882	2.6409^o	5.5	1.6428	6.5	1242.1798	0.0011	5.7
1242.3703	2.5132	5.5	1.5153^o	6.5	1242.3412	0.0011	7.5
1245.4479	0.9955	4.5	0.0000^o	4.5	1245.4406^c	0.0011	192.9
1252.8126	2.3415^o	4.5	1.3519	5.5	1252.8125	0.0016	32.7
1270.7368	2.8331^o	5.5	1.8574	5.5	1270.7350^b	0.0014	9.8
1270.7433	2.8107^o	6.5	1.8350	7.5	1270.7350^b	0.0014	9.8
1277.7120	2.2611	5.5	1.2907^o	6.5	1277.7139	0.0014	14.6
1279.2697	3.2243^o	4.5	2.2551	4.5	1279.2783^b	0.0014	8.6
1279.2746	2.7992^o	5.5	1.8300	5.5	1279.2783^b	0.0014	8.6
1283.7827	3.9410^o	5.5	2.9752	6.5	1283.7939	0.0014	9.8
1293.9306	2.4145	5.5	1.4563^o	6.5	1293.9245	0.0021	15.0
1296.5477	2.8863^o	4.5	1.9300	5.5	1296.5590	0.0021	35.5
1306.3221	3.9337^o	5.5	2.9846	6.5	1306.3321	0.0021	10.2
1311.7094	2.3318^o	5.5	1.3867	4.5	1311.7160	0.0017	30.3
1312.7770	0.9444	3.5	0.0000^o	4.5	1312.7732	0.0017	7.8
1319.7957	1.2923	6.5	0.3529^o	6.5	1319.7943	0.0017	34.6
1320.0065	2.4040	6.5	1.4648^o	7.5	1320.0123	0.0017	8.8
1322.9928	2.8107^o	6.5	1.8735	5.5	1322.9860	0.0017	6.8
1323.1959	2.2661	7.5	1.3291^o	8.5	1323.1962	0.0017	14.2
1332.2870	2.9950^o	7.5	2.0644	7.5	1332.2770	0.0018	8.1
1342.0855	1.9256	4.5	1.0018^o	5.5	1342.0694	0.0013	36.7
1348.5267	2.0148	6.5	1.0954^o	5.5	1348.5526	0.0013	8.7
1349.9722	2.6052^o	5.5	1.6868	4.5	1349.9953^b	0.0013	20.1
1350.0014	2.3769	9.5	1.4585^o	8.5	1349.9953^b	0.0013	20.4
1363.0645	1.9924	6.5	1.0828^o	6.5	1363.0556^b	0.0019	8.5
1363.0682	3.1757^o	6.5	2.2661	7.5	1363.0555^b	0.0019	8.4
1363.8583	2.1051	6.5	1.1960^o	7.5	1363.8514	0.0019	17.8
1368.3634	2.7044^o	5.5	1.7984	5.5	1368.3632	0.0019	7.1
1370.7925	3.4262	5.5	2.5217^o	6.5	1370.8076^b	0.0019	9.8
1370.7963	3.2041^o	6.5	2.2997	7.5	1370.8077^b	0.0019	10.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1370.8357	3.1614	6.5	2.2570^o	5.5	1370.8077^b	0.0019	10.1
1370.8395	2.1051	6.5	1.2007^o	6.5	1370.8077^b	0.0019	10.1
1372.5310	3.4553	5.5	2.5520^o	5.5	1372.5231^b	0.0019	10.4
1372.5310	1.9987	5.5	1.0954^o	5.5	1372.5231^b	0.0019	10.4
1372.5404	2.6052^o	5.5	1.7020	5.5	1372.5231^b	0.0019	10.4
1373.3698	1.9256	4.5	1.0229^o	4.5	1373.3573^{bc}	0.0019	8.7
1373.3755	3.4184^o	5.5	2.5156	6.5	1373.3573^{bc}	0.0019	8.7
1376.0401	1.0717	4.5	0.1707^o	5.5	1376.0411	0.0019	244.7
1377.6989	2.3769	9.5	1.4770^o	9.5	1377.6886^b	0.0019	10.3
1377.7160	3.4032^o	5.5	2.5033	4.5	1377.6888^b	0.0019	10.5
1384.7577	2.2472^o	4.5	1.3519	5.5	1384.7560	0.0010	12.2
1391.4979	2.2137	8.5	1.3228^o	7.5	1391.4974	0.0010	29.4
1392.4299	1.4336	6.5	0.5432^o	7.5	1392.4274	0.0010	191.3
1395.2625	2.1793	5.5	1.2907^o	6.5	1395.2615	0.0010	23.3
1401.5319	2.2137	8.5	1.3291^o	8.5	1401.5253	0.0010	10.4
1413.9412	2.1702	6.5	1.2933^o	5.5	1413.9405	0.0015	11.7
1418.3190	3.4262	5.5	2.5520^o	5.5	1418.3155	0.0015	9.1
1420.6402	1.9555	6.5	1.0828^o	6.5	1420.6304	0.0015	23.3
1423.2525	2.1939	8.5	1.3228^o	7.5	1423.2503	0.0015	18.7
1425.5025	1.9652	6.5	1.0954^o	5.5	1425.4763	0.0015	8.3
1432.6627	2.0614	6.5	1.1960^o	7.5	1432.6522	0.0012	28.2
1433.7514	2.1939	8.5	1.3291^o	8.5	1433.7402	0.0012	11.5
1441.4892	2.5469^o	3.5	1.6868	4.5	1441.5068^b	0.0012	11.6
1441.4955	3.3508^o	4.5	2.4907	5.5	1441.5068^b	0.0012	11.7
1441.5121	1.9555	6.5	1.0954^o	5.5	1441.5068^b	0.0012	11.7
1449.5485	3.3740	6.5	2.5187^o	5.5	1449.5586	0.0012	71.7
1450.7577	0.8546	5.5	0.0000^o	4.5	1450.7513	0.0012	9.2
1453.4609	3.5552^o	4.5	2.7022	4.5	1453.4625	0.0012	9.7
1464.4869	2.8453^o	5.5	1.9987	5.5	1464.4959^b	0.0013	746.5
1464.5019	1.1995	5.5	0.3529^o	6.5	1464.4959^b	0.0013	746.6
1469.6265	2.0397	7.5	1.1960^o	7.5	1469.6231	0.0013	94.1
1477.7357	2.0397	7.5	1.2007^o	6.5	1477.7258	0.0013	103.7
1484.5429	1.9179	5.5	1.0828^o	6.5	1484.5344	0.0013	10.4
1503.1627	0.9955	4.5	0.1707^o	5.5	1503.1527	0.0019	1534.0
1505.1401	2.3007	8.5	1.4770^o	9.5	1505.1332	0.0019	62.7
1506.7616	1.1758	5.5	0.3529^o	6.5	1506.7551	0.0019	30.4
1514.2292	2.0148	6.5	1.1960^o	7.5	1514.2196	0.0019	106.6
1520.9796	0.9858	6.5	0.1707^o	5.5	1520.9717	0.0018	99.0
1527.3495	2.1051	6.5	1.2933^o	5.5	1527.3442	0.0018	14.7
1528.6406	2.1402	7.5	1.3291^o	8.5	1528.6342	0.0018	315.9

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1530.0767	2.8251[o]	6.5	2.0148	6.5	1530.0884[b]	0.0018	1729.9
1530.1025	0.8103	3.5	0.0000[o]	4.5	1530.0884[b]	0.0018	1727.4
1536.7262	2.7992[o]	5.5	1.9924	6.5	1536.7078	0.0019	91.2
1540.6113	2.2611	5.5	1.4563[o]	6.5	1540.6231[b]	0.0019	15.4
1540.6350	2.2570[o]	5.5	1.4522	4.5	1540.6232[b]	0.0019	14.8
1546.2762	2.5217[o]	6.5	1.7199	5.5	1546.2634[b]	0.0019	22.9
1546.2810	2.2788	8.5	1.4770[o]	9.5	1546.2634[b]	0.0019	23.0
1557.1473	1.1491	5.5	0.3529[o]	6.5	1557.1507	0.0011	124.6
1561.8118	3.5552[o]	4.5	2.7614	3.5	1561.8241[b]	0.0011	24.0
1561.8313	1.8892	5.5	1.0954[o]	5.5	1561.8241[b]	0.0011	24.4
1565.9794	3.1899[o]	4.5	2.3982	5.5	1565.9933[b]	0.0011	36.9
1566.0064	1.9924	6.5	1.2007[o]	6.5	1565.9932[b]	0.0011	37.1
1567.8896	1.8735	5.5	1.0828[o]	6.5	1567.8785	0.0011	633.2
1570.4282	2.0802	5.5	1.2907[o]	6.5	1570.4159	0.0011	57.3
1583.9527	3.9410[o]	5.5	3.1583	4.5	1583.9707[b]	0.0011	96.1
1583.9752	0.7827	5.5	0.0000[o]	4.5	1583.9707[b]	0.0011	96.0
1599.0892	0.9460	6.5	0.1707[o]	5.5	1599.0905	0.0012	22.3
1606.1341	2.3769	9.5	1.6050[o]	9.5	1606.1189	0.0012	670.7
1611.9698	1.9652	6.5	1.1960[o]	7.5	1611.9517	0.0012	70.7
1612.3831	3.3258[o]	5.5	2.5568	6.5	1612.3895	0.0012	14.1
1621.7312	1.9652	6.5	1.2007[o]	6.5	1621.7172	0.0015	22.1
1632.4532	2.8453[o]	5.5	2.0858	6.5	1632.4631[b]	0.0015	683.3
1632.4718	1.9555	6.5	1.1960[o]	7.5	1632.4631[b]	0.0015	683.5
1641.7099	2.2137	8.5	1.4585[o]	8.5	1641.7061	0.0015	740.5
1642.4838	1.9555	6.5	1.2007[o]	6.5	1642.4749	0.0015	98.5
1656.5342	3.5968	6.5	2.8484[o]	6.5	1656.5213[b]	0.0014	59.6
1656.5369	3.3263[o]	4.5	2.5778	3.5	1656.5213[b]	0.0014	59.6
1659.2498	1.8300	5.5	1.0828[o]	6.5	1659.2399[c]	0.0014	67.3
1671.7739	3.2041[o]	6.5	2.4625	5.5	1671.7753[b]	0.0014	64.4
1671.7795	2.0644	7.5	1.3228[o]	7.5	1671.7753[b]	0.0014	64.5
1674.2146	2.3769	9.5	1.6364[o]	10.5	1674.1985	0.0014	2080.5
1675.9767	2.0305	5.5	1.2907[o]	6.5	1675.9625[b]	0.0014	74.6
1675.9823	3.2621[o]	5.5	2.5223	4.5	1675.9625[b]	0.0014	74.6
1678.4409	2.0614	6.5	1.3228[o]	7.5	1678.4353	0.0014	23.1
1682.8529	2.2137	8.5	1.4770[o]	9.5	1682.8417	0.0014	1189.9
1686.0933	2.1939	8.5	1.4585[o]	8.5	1686.0832	0.0015	245.6
1687.7922	1.8300	5.5	1.0954[o]	5.5	1687.7800	0.0015	14.8
1693.2822	2.0229	5.5	1.2907[o]	6.5	1693.2737	0.0015	58.3
1699.7957	1.9300	5.5	1.2007[o]	6.5	1699.7904	0.0015	47.7
1717.3662	0.7219	4.5	0.0000[o]	4.5	1717.3553	0.0016	287.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1729.4007	2.0397	7.5	1.3228^o	7.5	1729.3950	0.0014	1183.8
1729.5472	3.1117	5.5	2.3948^o	6.5	1729.5054	0.0014	912.0
1732.1056	3.2678	5.5	2.5520^o	5.5	1732.1179	0.0014	147.8
1732.6188	1.7984	5.5	1.0828^o	6.5	1732.6159	0.0014	478.7
1744.9266	2.0397	7.5	1.3291^o	8.5	1744.9118	0.0014	4949.5
1751.1816	1.9987	5.5	1.2907^o	6.5	1751.1663	0.0014	21.5
1763.7618	3.1288^o	6.5	2.4259	7.5	1763.7588^b	0.0028	62.0
1763.7649	1.7984	5.5	1.0954^o	5.5	1763.7589^b	0.0028	62.0
1777.6514	2.0202	7.5	1.3228^o	7.5	1777.6434	0.0029	42.9
1782.0388	2.3007	8.5	1.6050^o	9.5	1782.0340	0.0029	189.9
1791.4983	2.0148	6.5	1.3228^o	7.5	1791.4936	0.0029	193.7
1794.0599	2.0202	7.5	1.3291^o	8.5	1794.0393	0.0029	136.6
1815.1423	1.8791	6.5	1.1960^o	7.5	1815.1367	0.0014	3015.0
1818.8697	2.1402	7.5	1.4585^o	8.5	1818.8695	0.0014	568.9
1820.1244	1.9719	5.5	1.2907^o	6.5	1820.1133	0.0014	326.1
1827.0914	1.9719	5.5	1.2933^o	5.5	1827.0834	0.0014	87.0
1827.5288	1.8791	6.5	1.2007^o	6.5	1827.5173	0.0014	1311.8
1836.5810	1.7579	5.5	1.0828^o	6.5	1836.5753	0.0014	3113.1
1842.5504	3.0047	6.5	2.3318^o	5.5	1842.5363^b	0.0014	806.0
1842.5504	1.8735	5.5	1.2007^o	6.5	1842.5363^b	0.0014	806.0
1851.5398	1.9924	6.5	1.3228^o	7.5	1851.5281	0.0016	814.6
1871.6147	1.7579	5.5	1.0954^o	5.5	1871.6133	0.0016	1648.2
1877.6487	1.9831	7.5	1.3228^o	7.5	1877.6419	0.0017	47.1
1885.4015	1.7530	4.5	1.0954^o	5.5	1885.3988	0.0017	321.1
1913.1433	0.8187	6.5	0.1707^o	5.5	1913.1429	0.0015	40.3
1920.3515	2.3476^o	5.5	1.7020	5.5	1920.3752	0.0015	27.7
1921.5803	1.6681	3.5	1.0229^o	4.5	1921.5671	0.0015	265.2
1926.9531	2.9752	6.5	2.3318^o	5.5	1926.9505^b	0.0015	124.9
1926.9605	2.0997	5.5	1.4563^o	6.5	1926.9505^b	0.0015	124.9
1945.9569	3.3174^o	5.5	2.6803	6.5	1945.9627^b	0.0020	179.5
1945.9720	1.7199	5.5	1.0828^o	6.5	1945.9622^b	0.0020	195.4
1945.9910	3.1469^o	6.5	2.5098	5.5	1945.9620^b	0.0020	201.6
1959.0327	0.9858	6.5	0.3529^o	6.5	1959.0228	0.0020	1367.3
1959.4089	1.9555	6.5	1.3228^o	7.5	1959.4080	0.0020	70.7
1965.0033	3.3185^o	5.5	2.6876	5.5	1965.0027	0.0020	133.2
1969.4926	2.0858	6.5	1.4563^o	6.5	1969.4824^b	0.0020	245.0
1969.4964	3.1583	4.5	2.5288^o	4.5	1969.4824^b	0.0020	245.0
1976.7612	1.9179	5.5	1.2907^o	6.5	1976.7524	0.0021	199.7
1984.9816	1.9179	5.5	1.2933^o	5.5	1984.9730	0.0021	100.9
1985.3481	1.7199	5.5	1.0954^o	5.5	1985.3474	0.0021	164.2

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1996.3148	1.4038^o	5.5	0.7827	5.5	1996.3412^b	0.0024	259.8
1996.3387	3.1343^o	5.5	2.5132	5.5	1996.3412^b	0.0024	254.6
1996.3626	2.0858	6.5	1.4648^o	7.5	1996.3411^b	0.0024	249.7
2005.1774	1.7137	4.5	1.0954^o	5.5	2005.1732	0.0024	44.4
2010.3250	2.5605^o	7.5	1.9437	6.5	2010.3097	0.0025	58.3
2024.4103	3.1341	5.5	2.5217^o	6.5	2024.3936^b	0.0025	109.0
2024.4144	3.1255^o	4.5	2.5130	3.5	2024.3936^b	0.0025	109.0
2025.6693	2.6322^o	6.5	2.0202	7.5	2025.6739^b	0.0025	1667.0
2025.6734	0.7827	5.5	0.1707^o	5.5	2025.6739^b	0.0025	1666.5
2036.6599	3.4369	6.5	2.8282^o	5.5	2036.6750^b	0.0025	106.6
2036.6848	2.2137	8.5	1.6050^o	9.5	2036.6750^b	0.0025	106.7
2054.8480	0.6034	5.5	0.0000^o	4.5	2054.8496	0.0011	103.9
2066.3164	2.6614^o	6.5	2.0614	6.5	2066.3354^c	0.0011	32.1
2187.8295	1.8574	5.5	1.2907^o	6.5	2187.8289	0.0022	136.0
2197.9036	1.8574	5.5	1.2933^o	5.5	2197.9047	0.0022	107.5
2249.0762	0.7219	4.5	0.1707^o	5.5	2249.0734	0.0001	45.2
2256.2057	0.5495	4.5	0.0000^o	4.5	2256.2003	0.0001	364.8
2308.0989	1.8305	4.5	1.2933^o	5.5	2308.1165^b	0.0009	31.1
2308.1149	3.3740	6.5	2.8369^o	5.5	2308.1164^b	0.0009	30.7

Table A.36: Measured wavelengths and intensities of Pr II infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
943.6758	2.9719	8.0	1.6581^o	8.0	943.6718	0.0005	9.4
946.2904	2.7669	5.0	1.4567^o	6.0	946.2915^c	0.0005	53.7
957.3895	2.3445	5.0	1.0495^o	6.0	957.3981	0.0006	10.1
987.5314	4.1394^o	5.0	2.8840	5.0	987.5169^c	0.0007	8.5
991.4851	1.6222	6.0	0.3717^o	7.0	991.4912	0.0009	13.5
995.3200	2.6649	6.0	1.4193^o	5.0	995.3031^c	0.0009	10.8
1000.0170	4.1678^o	6.0	2.9280	5.0	1000.0287	0.0009	40.6
1005.9573	2.7504	8.0	1.5180^o	7.0	1005.9614	0.0010	29.2
1008.4915	4.2192^o	6.0	2.9899	6.0	1008.4918^c	0.0010	18.6
1022.3444	2.3445	5.0	1.1318^o	4.0	1022.3447	0.0007	6.8
1048.2818	1.3989	6.0	0.2162^o	5.0	1048.2680^c	0.0011	66.7
1049.3741	2.1037	4.0	0.9222^o	5.0	1049.3835	0.0011	9.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1059.8621	4.4010^o	5.0	3.2312	5.0	1059.8530^c	0.0009	57.4
1065.5074	2.4939	6.0	1.3303^o	6.0	1065.4933^c	0.0009	166.6
1066.2686	4.3667^o	5.0	3.2040	5.0	1066.2858^c	0.0009	10.8
1066.6621	1.6704	6.0	0.5080^o	5.0	1066.6726^c	0.0009	66.7
1083.6854	1.7738	7.0	0.6297^o	7.0	1083.6965^c	0.0010	7.6
1088.2459	2.3353	6.0	1.1960^o	6.0	1088.2259^c	0.0013	34.2
1094.5973	2.5483	6.0	1.4157^o	7.0	1094.5970	0.0013	31.6
1098.1083	2.5483	6.0	1.4193^o	5.0	1098.1131^c	0.0013	5.3
1126.5613	2.4650	6.0	1.3645^o	7.0	1126.5516	0.0007	6.1
1130.0482	2.6874	5.0	1.5903^o	6.0	1130.0438^c	0.0007	14.0
1146.2041	4.1460^o	4.0	3.0643	5.0	1146.2107^c	0.0007	8.5
1146.4340	1.2976	5.0	0.2162^o	5.0	1146.4258	0.0007	5.7
1147.2916	2.4451	8.0	1.3645^o	7.0	1147.3119^c	0.0007	65.7
1151.3389	4.1460^o	4.0	3.0691	4.0	1151.3299^c	0.0007	4.6
1175.3298	4.2554^o	4.0	3.2005	4.0	1175.3188	0.0014	24.1
1193.3972	1.0389	5.0	0.0000^o	4.0	1193.3883	0.0009	5.2
1203.1103	1.4022	8.0	0.3717^o	7.0	1203.1162	0.0009	4.9
1219.8395	1.0164	5.0	0.0000^o	4.0	1219.8324^c	0.0010	5.3
1228.9738	1.6386	6.0	0.6297^o	7.0	1228.9650	0.0011	6.6
1245.4277	2.1915	5.0	1.1960^o	6.0	1245.4406^c	0.0011	193.0
1267.5412	1.7738	7.0	0.7957^o	8.0	1267.5459	0.0014	5.5
1276.7430	0.9711	4.0	0.0000^o	4.0	1276.7345	0.0014	12.8
1373.3340	1.8705	8.0	0.9677^o	9.0	1373.3570^c	0.0019	7.7
1383.5526	3.8241^o	5.0	2.9280	5.0	1383.5514	0.0010	9.5
1416.6895	1.6704	6.0	0.7952^o	7.0	1416.6827	0.0015	36.7
1437.3743	1.3706	4.0	0.5080^o	5.0	1437.3713	0.0012	9.0
1440.4573	4.2554^o	4.0	3.3947	5.0	1440.4499	0.0012	43.7
1580.3381	2.2412	7.0	1.4567^o	6.0	1580.3505	0.0011	67.6
1659.2195	1.3952	7.0	0.6480^o	6.0	1659.2399^c	0.0014	67.1
2066.3206	1.3952	7.0	0.7952^o	7.0	2066.3354^{bc}	0.0011	32.1

Table A.37: Measured wavelengths and intensities of Nd I infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
940.6214	3.2270	6.0	1.9089^o	7.0	940.6311^b	0.0005	45.0
940.6266	2.8816	6.0	1.5636^o	7.0	940.6311^b	0.0005	45.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
940.6354	2.4482^o	7.0	1.1301	6.0	940.6310^b	0.0005	45.4
940.6402	3.6339	5.0	2.3159^o	6.0	940.6310^b	0.0005	45.4
941.0539	1.7739^o	6.0	0.4565	7.0	941.0606^c	0.0005	1103.8
941.5312	3.2427^o	7.0	1.9259	8.0	941.5339	0.0005	30.4
942.4399	2.8791	6.0	1.5636^o	7.0	942.4460^c	0.0005	81.1
943.8157	3.0035	4.0	1.6899^o	3.0	943.8238^b	0.0005	49.9
943.8160	3.0472	5.0	1.7336^o	4.0	943.8238^b	0.0005	49.9
944.7517	2.6355	4.0	1.3232^o	4.0	944.7596	0.0005	29.3
945.4571	3.2678	5.0	1.9565^o	6.0	945.4668^c	0.0005	22.9
946.5743	2.7874^o	7.0	1.4776	7.0	946.5669^c	0.0005	26.4
946.9128	1.6027^o	7.0	0.2934	6.0	946.9222^{bc}	0.0005	796.0
946.9176	2.9453^o	6.0	1.6360	6.0	946.9222^{bc}	0.0005	795.0
947.0226	3.1028	7.0	1.7936^o	8.0	947.0276^b	0.0005	107.1
947.0248	3.5621	5.0	2.2530^o	6.0	947.0276^b	0.0005	107.1
947.2662	3.0002	5.0	1.6913^o	5.0	947.2733	0.0005	92.2
947.9007	2.9439^o	7.0	1.6360	6.0	947.9095^c	0.0005	22.6
948.1738	3.9123	5.0	2.6047^o	4.0	948.1772^c	0.0005	21.2
948.4591	2.9603^o	7.0	1.6531	8.0	948.4696^c	0.0005	74.0
948.7220	2.8404	3.0	1.5336^o	3.0	948.7272^c	0.0005	182.4
949.3844	3.0078	7.0	1.7019^o	8.0	949.3714	0.0005	37.6
949.5211	3.5539	5.0	2.2482^o	5.0	949.5319	0.0005	23.5
950.7797	3.4411	6.0	2.1371^o	6.0	950.7834^c	0.0005	31.7
951.4189	2.8816	6.0	1.5785^o	7.0	951.4295^c	0.0006	50.7
952.5862	2.8651	6.0	1.5636^o	7.0	952.5912	0.0006	39.6
953.1774	3.2253	6.0	1.9245^o	5.0	953.1744^c	0.0006	34.2
953.2741	2.8791	6.0	1.5785^o	7.0	953.2809	0.0006	104.0
954.1626	2.8360	6.0	1.5367^o	5.0	954.1660	0.0006	53.2
955.2698	2.8946	4.0	1.5967^o	4.0	955.2776	0.0006	63.8
955.5096	3.0062^o	4.0	1.7087	3.0	955.5195^b	0.0006	28.2
955.5211	3.4411	6.0	2.1436^o	7.0	955.5196^b	0.0006	27.3
955.8498	3.5259	4.0	2.2288^o	3.0	955.8495	0.0006	52.1
956.4421	2.6334	7.0	1.3371^o	8.0	956.4486^c	0.0006	60.5
956.6976	3.1471	7.0	1.8512^o	8.0	956.7085	0.0006	45.1
957.3339	3.5577	4.0	2.2626^o	5.0	957.3457^{bc}	0.0006	23.2
957.3503	3.1638^o	9.0	1.8688	10.0	957.3458^{bc}	0.0006	22.7
957.3534	3.5432	5.0	2.2482^o	5.0	957.3458^{bc}	0.0006	22.7
958.7979	3.2270	6.0	1.9339^o	6.0	958.8037^b	0.0006	50.6
958.7992	3.4988	5.0	2.2057^o	5.0	958.8037^b	0.0006	50.6
959.7995	3.2868^o	9.0	1.9951	10.0	959.8079	0.0006	23.0
960.7438	4.1125	7.0	2.8220^o	7.0	960.7538	0.0006	27.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
961.8826	3.4261	6.0	2.1371^o	6.0	961.8803	0.0006	151.1
962.0898	2.9973^o	4.0	1.7087	3.0	962.1019	0.0006	30.7
962.5213	3.0817	7.0	1.7936^o	8.0	962.5286	0.0006	52.3
964.3272	2.6642^o	4.0	1.3785	3.0	964.3435^b	0.0008	27.0
964.3304	2.8824	3.0	1.5967^o	4.0	964.3435^b	0.0008	27.0
964.3355	2.9965^o	8.0	1.7108	7.0	964.3411^b	0.0008	24.0
965.0791	4.0440	4.0	2.7593^o	5.0	965.0802^c	0.0008	24.8
966.2000	3.1921	6.0	1.9089^o	7.0	966.1996^c	0.0008	63.0
966.3714	1.9089^o	7.0	0.6259	8.0	966.3826^c	0.0008	1219.2
966.4783	2.9937	6.0	1.7109^o	7.0	966.4833	0.0008	134.3
967.2853	2.8733	5.0	1.5915^o	6.0	967.2906	0.0009	140.0
968.0838	3.5432	5.0	2.2626^o	6.0	968.0929^c	0.0009	96.3
970.0382	2.7427	6.0	1.4646^o	6.0	970.0424	0.0009	1095.7
971.0568	3.2678	5.0	1.9910^o	4.0	971.0590	0.0009	44.7
971.1809	2.8733	5.0	1.5967^o	4.0	971.1924^{bc}	0.0009	25.8
971.1816	3.3948	7.0	2.1182^o	6.0	971.1924^{bc}	0.0009	25.8
971.1954	3.5261	8.0	2.2495^o	7.0	971.1922^{bc}	0.0009	23.9
971.2022	4.0208	2.0	2.7443^o	1.0	971.1922^{bc}	0.0009	23.6
972.4451	4.1700	6.0	2.8951^o	6.0	972.4570^b	0.0009	56.7
972.4643	3.1002	7.0	1.8253^o	7.0	972.4570^b	0.0009	57.3
973.5285	2.8651	6.0	1.5915^o	6.0	973.5325^c	0.0009	210.4
973.9467	3.6567	5.0	2.3837^o	5.0	973.9610	0.0009	78.7
974.3297	2.7673^o	7.0	1.4948	7.0	974.3371^{bc}	0.0009	39.6
974.3318	2.8360	6.0	1.5636^o	7.0	974.3372^{bc}	0.0009	39.9
974.7824	3.1231	8.0	1.8512^o	8.0	974.7919^b	0.0009	408.3
974.8018	3.5813	5.0	2.3094^o	5.0	974.7919^b	0.0009	410.7
975.3623	2.6484	5.0	1.3773^o	5.0	975.3622	0.0007	240.8
975.4632	3.6603	6.0	2.3893^o	7.0	975.4700	0.0007	23.5
976.6893	2.9054^o	5.0	1.6360	6.0	976.6952	0.0007	143.3
977.2555	1.4085^o	4.0	0.1399	5.0	977.2605	0.0007	67.9
977.4682	2.6043^o	5.0	1.3359	6.0	977.4578	0.0007	20.0
977.6642	2.8597	5.0	1.5915^o	6.0	977.6684^b	0.0007	24.6
977.6712	3.7697	6.0	2.5016^o	5.0	977.6684^b	0.0007	25.3
977.9052	2.9697	8.0	1.7019^o	8.0	977.9168	0.0007	448.5
979.7841	2.7860^o	4.0	1.5206	3.0	979.7841	0.0007	23.6
981.3496	2.7593^o	5.0	1.4959	5.0	981.3525^{bc}	0.0007	23.4
981.3516	3.3750	4.0	2.1117^o	4.0	981.3525^{bc}	0.0007	23.4
981.7218	3.4000	6.0	2.1371^o	6.0	981.7254	0.0007	22.4
982.4946	2.9518	4.0	1.6899^o	3.0	982.5041^c	0.0007	54.6
984.1454	3.9427	7.0	2.6830^o	7.0	984.1502^c	0.0007	31.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
984.7360	3.0915^o	9.0	1.8325	8.0	984.7336	0.0007	54.7
984.9199	2.9697	8.0	1.7109^o	7.0	984.9245	0.0007	219.5
985.3624	2.6355	4.0	1.3773^o	5.0	985.3673	0.0007	42.3
985.7596	3.5813	5.0	2.3236^o	4.0	985.7645^{bc}	0.0007	28.6
985.7609	2.7443^o	1.0	1.4865	2.0	985.7645^{bc}	0.0007	29.0
985.7699	3.3948	7.0	2.1371^o	6.0	985.7645^{bc}	0.0007	30.8
985.9162	2.8360	6.0	1.5785^o	7.0	985.9187^c	0.0007	208.2
986.2753	1.5505^o	6.0	0.2934	6.0	986.2850^c	0.0007	4195.2
988.9875	2.3837^o	5.0	1.1301	6.0	988.9841^{bc}	0.0009	39.5
988.9893	2.7182	5.0	1.4646^o	6.0	988.9841^{bc}	0.0009	39.5
991.2439	3.6345	6.0	2.3837^o	5.0	991.2303	0.0009	18.4
992.5522	2.9518	4.0	1.7027^o	3.0	992.5506	0.0009	20.4
993.0730	2.8120	8.0	1.5636^o	7.0	993.0770	0.0009	50.6
994.9270	1.3860^o	6.0	0.1399	5.0	994.9304^c	0.0009	419.7
995.4119	3.2612	6.0	2.0157^o	5.0	995.4001^c	0.0009	19.0
996.2522	2.8360	6.0	1.5915^o	6.0	996.2527^{bc}	0.0009	428.4
996.2542	3.7013	6.0	2.4568^o	5.0	996.2527^{bc}	0.0009	428.4
996.5350	3.3877	8.0	2.1436^o	7.0	996.5387	0.0009	26.1
997.2413	1.5367^o	5.0	0.2934	6.0	997.2440	0.0009	2967.2
998.0376	3.1763	5.0	1.9341^o	4.0	998.0159^c	0.0009	21.3
999.5419	1.2404^o	5.0	0.0000	4.0	999.5449	0.0009	177.6
1004.4759	3.8661	4.0	2.6318^o	3.0	1004.4637	0.0010	29.4
1004.8220	3.0078	7.0	1.7739^o	6.0	1004.8230	0.0010	89.4
1007.3047	3.1554	5.0	1.9245^o	5.0	1007.3170^{bc}	0.0010	4021.8
1007.3144	1.2308^o	3.0	0.0000	4.0	1007.3170^{bc}	0.0010	4022.6
1008.5690	3.3475	7.0	2.1182^o	6.0	1008.5766^{bc}	0.0010	494.3
1008.5718	3.4822	5.0	2.2530^o	6.0	1008.5766^{bc}	0.0010	494.3
1008.5799	2.7182	5.0	1.4889^o	5.0	1008.5766^{bc}	0.0010	493.8
1008.9325	3.8661	4.0	2.6373^o	5.0	1008.9370^{bc}	0.0010	21.9
1008.9353	3.3064	6.0	2.0776^o	5.0	1008.9370^{bc}	0.0010	21.9
1009.1055	3.0026	7.0	1.7739^o	6.0	1009.1131^c	0.0010	37.8
1010.0923	3.0472	5.0	1.8198^o	5.0	1010.0984	0.0010	26.1
1011.9826	2.6355	4.0	1.4104^o	3.0	1011.9925^c	0.0010	132.2
1013.3200	3.8661	4.0	2.6426^o	4.0	1013.3353^{bc}	0.0010	18.3
1013.3206	2.8151	7.0	1.5915^o	6.0	1013.3352^{bc}	0.0010	18.6
1013.7825	3.2270	6.0	2.0040^o	5.0	1013.7784	0.0010	17.5
1015.5593	3.5367	5.0	2.3159^o	6.0	1015.5601	0.0007	114.6
1016.1987	3.4206	6.0	2.2005^o	6.0	1016.1826^c	0.0007	21.4
1017.7249	2.9518	4.0	1.7336^o	4.0	1017.7245^c	0.0007	29.2
1018.6446	3.4701	5.0	2.2530^o	6.0	1018.6505^c	0.0007	61.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1021.3775	1.3537^o	5.0	0.1399	5.0	1021.3811	0.0007	3355.7
1022.3981	2.9213^o	4.0	1.7087	3.0	1022.4089^b	0.0007	63.5
1022.4030	3.0472	5.0	1.8346^o	5.0	1022.4089^b	0.0007	63.7
1022.9095	3.0472	5.0	1.8352^o	4.0	1022.9152	0.0007	105.5
1023.8657	2.5468^o	5.0	1.3359	6.0	1023.8547	0.0007	17.8
1027.5282	2.7025^o	6.0	1.4959	5.0	1027.5313^{bc}	0.0007	19.3
1027.5312	3.9091	6.0	2.7025^o	6.0	1027.5313^{bc}	0.0007	19.3
1031.7286	2.6976^o	4.0	1.4959	5.0	1031.7309^c	0.0009	17.4
1032.6740	1.8265^o	8.0	0.6259	8.0	1032.6744	0.0009	3733.1
1033.3819	3.4623	5.0	2.2626^o	6.0	1033.3884	0.0009	48.7
1033.7457	1.8253^o	7.0	0.6259	8.0	1033.7472	0.0009	284.2
1036.2472	3.1053	8.0	1.9089^o	7.0	1036.2462	0.0009	23.7
1036.6777	3.1831	6.0	1.9872^o	5.0	1036.6802^c	0.0009	21.0
1036.8954	3.1471	7.0	1.9514^o	6.0	1036.9049^b	0.0009	33.7
1036.9095	3.4358	6.0	2.2401^o	5.0	1036.9049^b	0.0009	34.0
1037.0507	4.0003	4.0	2.8048^o	4.0	1037.0591^b	0.0009	24.0
1037.0594	2.7970^o	6.0	1.6015	6.0	1037.0591^b	0.0009	24.0
1037.0637	1.4889^o	5.0	0.2934	6.0	1037.0591^b	0.0009	23.7
1037.4338	3.8435^o	6.0	2.6484	5.0	1037.4447^c	0.0009	33.0
1038.7871	3.2253	6.0	2.0317^o	7.0	1038.7979^{bc}	0.0009	241.9
1038.7897	2.8824	3.0	1.6888^o	2.0	1038.7978^{bc}	0.0009	250.5
1039.9128	4.1125	7.0	2.9202^o	6.0	1039.9173^c	0.0009	38.2
1040.2306	2.8946	4.0	1.7027^o	3.0	1040.2367	0.0009	43.0
1040.7736	2.8864	5.0	1.6952^o	4.0	1040.7770	0.0009	18.1
1040.9918	3.7378	5.0	2.5468^o	5.0	1040.9998	0.0009	18.3
1041.2872	3.1471	7.0	1.9565^o	6.0	1041.2933^b	0.0009	21.3
1041.2935	3.9954	3.0	2.8048^o	4.0	1041.2932^b	0.0009	21.7
1041.3904	2.8857	4.0	1.6952^o	4.0	1041.3955	0.0009	21.9
1042.1960	1.6461^o	6.0	0.4565	7.0	1042.1946	0.0011	220.4
1043.0759	3.5779	6.0	2.3893^o	7.0	1043.0883	0.0011	65.6
1044.3472	2.6517	6.0	1.4646^o	6.0	1044.3480	0.0011	157.8
1045.0057	3.3750	4.0	2.1886^o	4.0	1044.9966^c	0.0011	17.8
1047.7222	1.3232^o	4.0	0.1399	5.0	1047.7267	0.0011	2403.1
1048.0092	2.8857	4.0	1.7027^o	3.0	1048.0128	0.0011	45.0
1048.6734	3.4317	6.0	2.2495^o	7.0	1048.6843^b	0.0011	28.8
1048.6902	2.6334	7.0	1.4512^o	8.0	1048.6844^b	0.0011	28.4
1049.5792	3.7443	5.0	2.5631^o	6.0	1049.5853^b	0.0011	70.9
1049.5990	3.7212^o	5.0	2.5400	5.0	1049.5853^b	0.0011	70.4
1050.9836	2.8824	3.0	1.7027^o	3.0	1050.9891	0.0011	79.0
1051.1653	2.7933^o	5.0	1.6139	4.0	1051.1609	0.0011	104.3

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1051.2586	3.2678	5.0	2.0884^o	5.0	1051.2544	0.0011	23.4
1052.0175	3.3064	6.0	2.1279^o	5.0	1052.0241^{bc}	0.0011	22.2
1052.0225	3.5873	7.0	2.4088^o	6.0	1052.0241^{bc}	0.0011	22.2
1052.0391	3.4411	6.0	2.2626^o	5.0	1052.0241^{bc}	0.0011	22.5
1053.0013	3.4999	4.0	2.3225^o	5.0	1052.9934	0.0011	37.5
1056.1081	2.9937	6.0	1.8198^o	5.0	1056.1124	0.0011	44.7
1056.2882	2.8651	6.0	1.6913^o	5.0	1056.2899^c	0.0009	44.8
1058.6260	1.4646^o	6.0	0.2934	6.0	1058.6344	0.0009	24.9
1060.6414	3.1028	7.0	1.9339^o	6.0	1060.6446^c	0.0009	30.9
1060.7220	2.6334	7.0	1.4646^o	6.0	1060.7261^c	0.0009	200.8
1061.7534	2.7182	5.0	1.5505^o	6.0	1061.7598^b	0.0009	28.8
1061.7539	1.7936^o	8.0	0.6259	8.0	1061.7598^b	0.0009	28.8
1063.3942	3.0904	6.0	1.9245^o	5.0	1063.4018^b	0.0009	18.6
1063.4015	3.6603	6.0	2.4944^o	6.0	1063.4018^b	0.0009	19.0
1064.2164	3.0002	5.0	1.8352^o	4.0	1064.2194	0.0009	56.7
1064.9772	2.7427	6.0	1.5785^o	7.0	1064.9823^b	0.0009	34.0
1064.9814	2.9852^o	8.0	1.8210	9.0	1064.9823^b	0.0009	34.0
1066.2088	2.8857	4.0	1.7229^o	5.0	1066.2182^{bc}	0.0009	314.3
1066.2165	2.6517	6.0	1.4889^o	5.0	1066.2182^{bc}	0.0009	314.3
1066.2305	3.3064	6.0	2.1436^o	7.0	1066.2182^{bc}	0.0009	312.8
1066.3244	2.5400	5.0	1.3773^o	5.0	1066.3268	0.0009	437.8
1067.2704	3.5432	5.0	2.3816^o	4.0	1067.2760^b	0.0009	117.4
1067.2713	2.9518	4.0	1.7901^o	3.0	1067.2760^b	0.0009	117.2
1070.8435	2.7593^o	5.0	1.6015	6.0	1070.8565^b	0.0009	19.6
1070.8520	2.8039	7.0	1.6461^o	6.0	1070.8565^b	0.0009	19.1
1071.6007	3.8595	5.0	2.7025^o	6.0	1071.6103	0.0010	47.2
1081.6031	1.6027^o	7.0	0.4565	7.0	1081.6096	0.0010	3367.1
1082.0546	2.8566^o	6.0	1.7108	7.0	1082.0681^c	0.0010	46.5
1083.0928	2.8360	6.0	1.6913^o	5.0	1083.0951	0.0010	399.1
1083.9584	3.4532	4.0	2.3094^o	5.0	1083.9621^c	0.0010	17.7
1085.4963	2.3745^o	6.0	1.2323	7.0	1085.5036^b	0.0010	18.6
1085.5005	3.5259	4.0	2.3837^o	5.0	1085.5036^b	0.0010	18.6
1085.5150	3.4618	8.0	2.3197^o	9.0	1085.5036^b	0.0010	18.8
1087.8289	3.1554	5.0	2.0157^o	5.0	1087.8421^b	0.0013	36.1
1087.8374	2.8733	5.0	1.7336^o	4.0	1087.8421^b	0.0013	36.1
1091.3623	2.5133	6.0	1.3773^o	5.0	1091.3660^c	0.0013	256.9
1093.3250	3.0904	6.0	1.9565^o	6.0	1093.3283^{bc}	0.0013	41.8
1093.3281	2.9103^o	8.0	1.7764	7.0	1093.3283^{bc}	0.0013	41.6
1094.3853	3.9954	3.0	2.8626^o	4.0	1094.3783	0.0013	36.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1094.7887	2.2626^o	6.0	1.1301	6.0	1094.7955^{bc}	0.0013	30.4
1094.7983	2.6976^o	4.0	1.5652	4.0	1094.7955^{bc}	0.0013	30.8
1095.7670	2.5400	5.0	1.4085^o	4.0	1095.7699	0.0013	468.8
1100.8593	1.1262^o	4.0	0.0000	4.0	1100.8628	0.0013	5714.9
1101.9323	4.2528	6.0	3.1277^o	5.0	1101.9385^b	0.0013	27.0
1101.9349	3.0449	2.0	1.9198^o	3.0	1101.9385^b	0.0013	27.0
1104.9592	1.5785^o	7.0	0.4565	7.0	1104.9623	0.0008	197.2
1108.4435	2.9697	8.0	1.8512^o	8.0	1108.4623^{bc}	0.0008	17.5
1108.4804	2.6976^o	4.0	1.5791	3.0	1108.4623^{bc}	0.0008	18.2
1111.3718	3.3271	7.0	2.2115^o	7.0	1111.3844	0.0008	25.5
1111.7777	3.5577	4.0	2.4425^o	5.0	1111.7777	0.0008	43.3
1112.8276	3.7209	7.0	2.6068^o	7.0	1112.8282^c	0.0008	32.4
1115.7047	3.0002	5.0	1.8889^o	4.0	1115.7071^c	0.0008	26.8
1119.8818	1.5636^o	7.0	0.4565	7.0	1119.8844	0.0007	23.5
1121.3180	2.8566^o	6.0	1.7509	5.0	1121.3226^b	0.0007	19.8
1121.3436	2.3225^o	5.0	1.2168	4.0	1121.3223^b	0.0007	18.9
1123.9410	2.5990^o	5.0	1.4959	5.0	1123.9300	0.0007	18.3
1125.1261	2.6355	4.0	1.5336^o	3.0	1125.1321^b	0.0007	488.2
1125.1349	3.8595	5.0	2.7576^o	5.0	1125.1321^b	0.0007	488.1
1125.9761	2.8120	8.0	1.7109^o	7.0	1125.9769	0.0007	27.0
1126.5554	3.1768	7.0	2.0763^o	7.0	1126.5675^b	0.0007	4261.1
1126.5660	3.7378	5.0	2.6373^o	5.0	1126.5675^b	0.0007	4260.2
1126.5667	1.2404^o	5.0	0.1399	5.0	1126.5675^b	0.0007	4260.2
1131.0161	3.6407	9.0	2.5445^o	9.0	1131.0312	0.0007	18.8
1134.5224	3.4765	6.0	2.3837^o	5.0	1134.5354	0.0007	23.8
1134.7585	1.3860^o	6.0	0.2934	6.0	1134.7607^c	0.0007	1005.1
1136.5669	3.0904	6.0	1.9996^o	6.0	1136.5687	0.0007	41.0
1138.1643	2.9103^o	8.0	1.8210	9.0	1138.1826^c	0.0007	17.8
1140.4909	2.4510^o	4.0	1.3640	3.0	1140.5013^b	0.0007	27.5
1140.4969	2.9216	5.0	1.8346^o	5.0	1140.5013^b	0.0007	27.5
1144.0390	3.0035	4.0	1.9198^o	3.0	1144.0427^{bc}	0.0007	30.7
1144.0510	3.7192^o	3.0	2.6355	4.0	1144.0426^{bc}	0.0007	29.9
1144.0553	3.9123	5.0	2.8286^o	5.0	1144.0426^{bc}	0.0007	29.7
1150.1421	2.9518	4.0	1.8738^o	5.0	1150.1277	0.0007	38.0
1153.5371	3.0904	6.0	2.0157^o	5.0	1153.5416^b	0.0007	18.7
1153.5550	2.8946	4.0	1.8198^o	5.0	1153.5416^b	0.0007	19.0
1154.9625	3.4822	5.0	2.4088^o	6.0	1154.9533	0.0007	32.1
1158.2277	3.7037	8.0	2.6333^o	7.0	1158.2418^b	0.0007	17.3
1158.2490	2.2005^o	6.0	1.1301	6.0	1158.2405^b	0.0007	16.2

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1158.8647	2.6334	7.0	1.5636^o	7.0	1158.8749	0.0007	16.2
1159.3309	3.0035	4.0	1.9341^o	4.0	1159.3376^c	0.0007	26.9
1163.9981	3.8622	5.0	2.7970^o	6.0	1163.9941^c	0.0007	17.0
1166.8655	3.4913	5.0	2.4288^o	4.0	1166.8691	0.0007	23.4
1175.4011	3.8595	5.0	2.8047^o	4.0	1175.4026	0.0014	20.0
1175.5036	3.7976	7.0	2.7429^o	6.0	1175.5030^b	0.0014	16.6
1175.5103	3.8595	5.0	2.8048^o	4.0	1175.5030^b	0.0014	16.6
1175.5130	3.0035	4.0	1.9488^o	4.0	1175.5030^b	0.0014	17.0
1175.5251	2.2870^o	6.0	1.2323	7.0	1175.5031^b	0.0014	17.9
1182.0732	3.4999	4.0	2.4510^o	4.0	1182.0651	0.0014	16.9
1182.4840	3.1921	6.0	2.1436^o	7.0	1182.4966^{bc}	0.0014	18.2
1182.4918	3.1763	5.0	2.1279^o	5.0	1182.4966^{bc}	0.0014	18.2
1183.1491	2.6618^o	5.0	1.6139	4.0	1183.1585^b	0.0014	35.4
1183.1494	3.2762	8.0	2.2283^o	8.0	1183.1585^b	0.0014	35.4
1183.1626	3.8595	5.0	2.8116^o	4.0	1183.1585^b	0.0014	35.5
1183.1701	3.3349	7.0	2.2870^o	6.0	1183.1585^b	0.0014	35.5
1183.4824	3.0472	5.0	1.9996^o	6.0	1183.4837	0.0014	17.8
1183.9707	2.9717	6.0	1.9245^o	5.0	1183.9834^{bc}	0.0014	19.5
1183.9921	3.3342	6.0	2.2870^o	6.0	1183.9834^{bc}	0.0014	19.6
1184.1493	2.6830^o	7.0	1.6360	6.0	1184.1511^b	0.0014	16.9
1184.1507	3.3096	4.0	2.2626^o	5.0	1184.1511^b	0.0014	16.9
1187.7613	3.3064	6.0	2.2626^o	6.0	1187.7742^b	0.0009	276.8
1187.7902	4.1125	7.0	3.0687^o	6.0	1187.7743^b	0.0009	275.8
1194.4500	3.8735	7.0	2.8355^o	6.0	1194.4536^{bc}	0.0009	16.8
1194.4547	3.2874	7.0	2.2495^o	7.0	1194.4534^{bc}	0.0009	16.5
1195.7951	3.6302	6.0	2.5934^o	6.0	1195.7966^{bc}	0.0009	27.5
1195.8019	3.0035	4.0	1.9667^o	4.0	1195.7966^{bc}	0.0009	27.5
1197.2233	3.4261	6.0	2.3905^o	6.0	1197.2341	0.0009	25.2
1201.7831	3.3475	7.0	2.3159^o	6.0	1201.7773^{bc}	0.0009	16.1
1201.7861	3.9474	8.0	2.9158^o	7.0	1201.7773^{bc}	0.0009	16.1
1201.8938	3.0472	5.0	2.0157^o	5.0	1201.8978^{bc}	0.0009	21.9
1201.9026	2.3827^o	9.0	1.3511	8.0	1201.8978^{bc}	0.0009	21.9
1203.1022	2.8651	6.0	1.8346^o	5.0	1203.1066^c	0.0009	65.0
1203.4316	2.2626^o	6.0	1.2323	7.0	1203.4350^c	0.0009	17.6
1214.1783	3.5611^o	5.0	2.5400	5.0	1214.1915^b	0.0010	19.3
1214.1923	3.2612	6.0	2.2401^o	5.0	1214.1912^b	0.0010	20.3
1217.0026	3.5655	6.0	2.5468^o	5.0	1217.0141	0.0010	23.1
1230.0099	3.4822	5.0	2.4743^o	4.0	1230.0134^b	0.0011	18.4
1230.0147	3.0904	6.0	2.0825^o	6.0	1230.0134^b	0.0011	18.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1234.8239	3.7378	5.0	2.7337^{o}	6.0	1234.8377^{b}	0.0011	19.4
1234.8293	3.8908	7.0	2.8867^{o}	6.0	1234.8377^{b}	0.0011	19.3
1236.1124	2.7139	6.0	1.7109^{o}	7.0	1236.1237^{b}	0.0011	16.3
1236.1233	2.9518	4.0	1.9488^{o}	4.0	1236.1237^{b}	0.0011	16.3
1240.0640	3.6482^{o}	5.0	2.6484	5.0	1240.0790^{b}	0.0011	29.0
1240.0851	3.4358	6.0	2.4360^{o}	5.0	1240.0790^{b}	0.0011	29.1
1241.5274	3.2612	6.0	2.2626^{o}	6.0	1241.5284^{c}	0.0011	33.3
1242.9302	2.8864	5.0	1.8889^{o}	4.0	1242.9266^{bc}	0.0011	16.1
1242.9463	3.9427	7.0	2.9453^{o}	6.0	1242.9262^{bc}	0.0011	16.9
1243.8100	2.8857	4.0	1.8889^{o}	4.0	1243.8142^{c}	0.0011	17.6
1246.4253	1.4512^{o}	8.0	0.4565	7.0	1246.4251	0.0016	415.9
1252.6913	2.9937	6.0	2.0040^{o}	5.0	1252.6953^{c}	0.0016	41.1
1252.9998	2.4854^{o}	4.0	1.4959	5.0	1253.0013^{b}	0.0016	22.1
1253.0152	3.4749	3.0	2.4854^{o}	4.0	1253.0013^{b}	0.0016	22.2
1253.3260	3.9954	3.0	3.0062^{o}	4.0	1253.3132^{c}	0.0016	15.5
1255.4573	2.9216	5.0	1.9341^{o}	4.0	1255.4566	0.0016	17.8
1256.9445	3.1921	6.0	2.2057^{o}	5.0	1256.9535^{b}	0.0016	277.4
1256.9509	3.7378	5.0	2.7514^{o}	5.0	1256.9535^{b}	0.0016	276.9
1256.9514	1.1262^{o}	4.0	0.1399	5.0	1256.9535^{b}	0.0016	276.9
1259.5672	2.9216	5.0	1.9373^{o}	5.0	1259.5736^{b}	0.0016	24.3
1259.5802	3.4411	6.0	2.4568^{o}	5.0	1259.5736^{b}	0.0016	24.4
1262.2830	3.5154	7.0	2.5332^{o}	6.0	1262.2929	0.0016	104.0
1271.2808	2.8824	3.0	1.9071^{o}	2.0	1271.2888	0.0014	119.0
1273.4936	3.7783	3.0	2.8048^{o}	4.0	1273.5025^{bc}	0.0014	18.6
1273.5001	2.3094^{o}	5.0	1.3359	6.0	1273.5025^{bc}	0.0014	18.6
1277.4898	2.4482^{o}	7.0	1.4776	7.0	1277.4816	0.0014	20.9
1283.5702	2.6746^{o}	3.0	1.7087	3.0	1283.5849^{bc}	0.0014	31.9
1283.5802	2.8857	4.0	1.9198^{o}	3.0	1283.5849^{bc}	0.0014	32.0
1283.8717	3.1028	7.0	2.1371^{o}	6.0	1283.8743	0.0014	35.9
1285.1492	3.0472	5.0	2.0825^{o}	6.0	1285.1672	0.0014	29.7
1285.3289	3.9106	4.0	2.9460^{o}	3.0	1285.3356	0.0014	16.8
1288.0229	3.0904	6.0	2.1279^{o}	5.0	1288.0406^{b}	0.0021	24.8
1288.0450	2.8824	3.0	1.9198^{o}	3.0	1288.0406^{b}	0.0021	24.6
1290.3670	2.8120	8.0	1.8512^{o}	8.0	1290.3870^{b}	0.0021	21.9
1290.3839	3.1231	8.0	2.1623^{o}	8.0	1290.3870^{b}	0.0021	21.7
1290.9337	3.3349	7.0	2.3745^{o}	6.0	1290.9389^{bc}	0.0021	30.4
1290.9341	2.6517	6.0	1.6913^{o}	5.0	1290.9389^{bc}	0.0021	30.4
1292.0147	3.4765	6.0	2.5169^{o}	5.0	1292.0159^{b}	0.0021	30.5
1292.0309	3.5432	5.0	2.5837^{o}	6.0	1292.0158^{b}	0.0021	31.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1293.2614	3.5577	4.0	2.5990^{o}	5.0	1293.2557^{c}	0.0021	17.9
1293.7027	2.0884^{o}	5.0	1.1301	6.0	1293.7261^{b}	0.0021	24.8
1293.7143	3.7013	6.0	2.7429^{o}	6.0	1293.7261^{b}	0.0021	24.8
1293.7548	3.7443	5.0	2.7860^{o}	4.0	1293.7261^{b}	0.0021	25.4
1298.9918	3.5367	5.0	2.5822^{o}	5.0	1298.9792	0.0021	19.5
1300.6332	2.6484	5.0	1.6952^{o}	4.0	1300.6464^{bc}	0.0021	17.1
1300.6513	2.0040^{o}	5.0	1.0508	5.0	1300.6464^{bc}	0.0021	17.2
1301.5276	3.3271	7.0	2.3745^{o}	6.0	1301.5435^{b}	0.0021	35.5
1301.5407	4.0440	4.0	3.0914^{o}	5.0	1301.5435^{b}	0.0021	35.5
1301.5407	1.5785^{o}	7.0	0.6259	8.0	1301.5435^{b}	0.0021	35.5
1302.8571	2.7025^{o}	6.0	1.7509	5.0	1302.8626^{b}	0.0021	16.8
1302.8615	2.8857	4.0	1.9341^{o}	4.0	1302.8626^{b}	0.0021	16.8
1305.4041	2.5133	6.0	1.5636^{o}	7.0	1305.4067^{b}	0.0021	22.9
1305.4179	3.1554	5.0	2.2056^{o}	4.0	1305.4066^{b}	0.0021	23.1
1306.5322	2.8360	6.0	1.8871^{o}	6.0	1306.5333^{b}	0.0021	40.4
1306.5335	3.5157	6.0	2.5668^{o}	6.0	1306.5333^{b}	0.0021	40.4
1306.9857	1.2420^{o}	7.0	0.2934	6.0	1306.9928	0.0021	960.7
1308.0919	2.9518	4.0	2.0040^{o}	5.0	1308.1059^{c}	0.0021	81.4
1308.5593	3.4608^{o}	6.0	2.5133	6.0	1308.5652^{b}	0.0021	15.8
1308.5674	2.0776^{o}	5.0	1.1301	6.0	1308.5652^{b}	0.0021	15.7
1309.2457	1.2404^{o}	5.0	0.2934	6.0	1309.2467	0.0021	434.2
1313.6905	2.7182	5.0	1.7744^{o}	5.0	1313.6863	0.0017	33.6
1314.3473	3.4765	6.0	2.5332^{o}	6.0	1314.3538^{b}	0.0017	30.6
1314.3508	2.5400	5.0	1.5967^{o}	4.0	1314.3538^{b}	0.0017	30.7
1317.5198	3.2646	5.0	2.3236^{o}	4.0	1317.5347^{b}	0.0017	18.0
1317.5215	3.8735	7.0	2.9325^{o}	8.0	1317.5347^{b}	0.0017	18.1
1317.5460	3.1763	5.0	2.2354^{o}	5.0	1317.5347^{b}	0.0017	18.0
1318.2018	3.1028	7.0	2.1623^{o}	8.0	1318.2141^{bc}	0.0017	18.0
1318.2124	2.8651	6.0	1.9245^{o}	5.0	1318.2141^{bc}	0.0017	18.1
1318.4764	2.6355	4.0	1.6952^{o}	4.0	1318.4811	0.0017	73.6
1318.5939	1.9910^{o}	4.0	1.0508	5.0	1318.5965^{bc}	0.0017	26.7
1318.6057	3.0774	7.0	2.1371^{o}	6.0	1318.5964^{bc}	0.0017	28.7
1320.0865	2.8733	5.0	1.9341^{o}	4.0	1320.0865	0.0017	15.4
1325.2344	3.0472	5.0	2.1117^{o}	4.0	1325.2361^{c}	0.0018	40.3
1325.6736	2.0653^{o}	6.0	1.1301	6.0	1325.6732^{c}	0.0018	20.1
1325.8065	2.8597	5.0	1.9245^{o}	5.0	1325.8154	0.0018	19.9
1326.2830	2.5133	6.0	1.5785^{o}	7.0	1326.2861	0.0018	36.6
1332.2641	2.9216	5.0	1.9910^{o}	4.0	1332.2655	0.0018	34.0
1333.8048	1.3860^{o}	6.0	0.4565	7.0	1333.8080	0.0012	237.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1341.1082	2.8733	5.0	1.9488^{o}	4.0	1341.1122	0.0013	27.2
1341.4248	3.9285^{o}	9.0	3.0042	8.0	1341.4301^{c}	0.0013	17.4
1343.2757	3.5655	6.0	2.6426^{o}	6.0	1343.2724	0.0013	42.3
1343.7190	3.3064	6.0	2.3837^{o}	5.0	1343.7249^{b}	0.0013	23.9
1343.7223	3.1921	6.0	2.2694^{o}	5.0	1343.7249^{b}	0.0013	23.9
1347.3341	2.5445^{o}	9.0	1.6243	10.0	1347.3348^{c}	0.0013	41.1
1348.9495	2.2056^{o}	4.0	1.2865	5.0	1348.9513^{b}	0.0013	29.1
1348.9506	3.5655	6.0	2.6464^{o}	6.0	1348.9513^{b}	0.0013	29.2
1352.2852	2.8733	5.0	1.9565^{o}	6.0	1352.2883	0.0013	15.8
1372.9015	3.8595	5.0	2.9564^{o}	4.0	1372.9075^{b}	0.0019	1079.6
1372.9015	1.0429^{o}	6.0	0.1399	5.0	1372.9075^{b}	0.0019	1079.6
1372.9182	2.5169^{o}	5.0	1.6139	4.0	1372.9075^{b}	0.0019	1079.4
1380.5727	1.9488^{o}	4.0	1.0508	5.0	1380.5680	0.0020	78.0
1390.6773	4.0003	4.0	3.1088^{o}	5.0	1390.6807^{c}	0.0010	18.6
1391.0295	3.1028	7.0	2.2115^{o}	7.0	1391.0417^{c}	0.0010	17.9
1392.5899	3.8945^{o}	8.0	3.0042	8.0	1392.5921	0.0010	15.3
1394.6974	3.5374^{o}	5.0	2.6484	5.0	1394.6942^{c}	0.0010	24.1
1395.1409	2.0188^{o}	7.0	1.1301	6.0	1395.1391	0.0010	18.6
1395.7379	2.1051^{o}	3.0	1.2168	4.0	1395.7392	0.0010	49.5
1398.4801	1.9373^{o}	5.0	1.0508	5.0	1398.4797^{bc}	0.0010	68.6
1398.4917	4.3229	3.0	3.4363^{o}	4.0	1398.4797^{bc}	0.0010	68.7
1400.0335	2.0157^{o}	5.0	1.1301	6.0	1400.0346	0.0010	40.2
1401.7042	2.3673^{o}	8.0	1.4828	9.0	1401.7090	0.0010	110.7
1403.5817	1.9341^{o}	4.0	1.0508	5.0	1403.5839^{c}	0.0010	49.7
1404.0621	2.7182	5.0	1.8352^{o}	4.0	1404.0522	0.0010	14.3
1412.2481	3.8622	5.0	2.9843^{o}	4.0	1412.2532^{b}	0.0015	31.7
1412.2503	2.8651	6.0	1.9872^{o}	5.0	1412.2532^{b}	0.0015	31.7
1414.7703	3.6339	5.0	2.7576^{o}	5.0	1414.7788	0.0015	14.9
1415.8851	3.0035	4.0	2.1279^{o}	5.0	1415.9010^{bc}	0.0015	66.9
1415.8987	2.2530^{o}	6.0	1.3773	6.0	1415.9010^{bc}	0.0015	66.9
1423.4063	3.5873	7.0	2.7163^{o}	7.0	1423.4317^{bc}	0.0015	36.6
1423.4395	3.7307^{o}	5.0	2.8597	5.0	1423.4317^{bc}	0.0015	37.0
1425.3774	2.2057^{o}	5.0	1.3359	6.0	1425.3773^{c}	0.0015	90.7
1426.3939	2.1557^{o}	5.0	1.2865	5.0	1426.3914	0.0015	17.5
1431.8877	3.5014^{o}	4.0	2.6355	4.0	1431.9049^{bc}	0.0015	38.1
1431.8959	3.0774	7.0	2.2115^{o}	7.0	1431.9049^{bc}	0.0015	38.0
1431.9070	2.9937	6.0	2.1279^{o}	5.0	1431.9049^{bc}	0.0015	37.9
1433.1477	3.6302	6.0	2.7652^{o}	6.0	1433.1277^{c}	0.0012	26.2
1440.1477	3.9091	6.0	3.0482^{o}	5.0	1440.1504	0.0012	23.2
1440.3145	3.6339	5.0	2.7731^{o}	5.0	1440.3182^{b}	0.0012	16.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1440.3164	2.1473^o	4.0	1.2865	5.0	1440.3182^b	0.0012	16.5
1441.0318	2.2115^o	7.0	1.3511	8.0	1441.0281	0.0012	384.9
1444.2884	2.4944^o	6.0	1.6360	6.0	1444.2907	0.0012	20.7
1446.5588	1.9872^o	5.0	1.1301	6.0	1446.5618^c	0.0012	30.0
1451.8955	3.7697	6.0	2.9158^o	7.0	1451.8918	0.0012	19.9
1453.7485	3.0002	5.0	2.1473^o	4.0	1453.7432^b	0.0012	21.8
1453.7546	3.9427	7.0	3.0899^o	6.0	1453.7432^b	0.0012	22.2
1454.3804	3.2270	6.0	2.3745^o	6.0	1454.3863	0.0012	26.5
1455.0155	3.4358	6.0	2.5837^o	6.0	1455.0276^c	0.0012	74.0
1458.3469	2.0825^o	6.0	1.2323	7.0	1458.3522^b	0.0012	27.2
1458.3671	2.9937	6.0	2.1436^o	7.0	1458.3521^b	0.0012	26.0
1459.0033	0.8498^o	5.0	0.0000	4.0	1459.0071^b	0.0012	1111.5
1459.0108	3.8435^o	6.0	2.9937	6.0	1459.0071^b	0.0012	1113.1
1461.1804	2.4482^o	7.0	1.5997	8.0	1461.1995^{bc}	0.0013	18.1
1461.2163	3.4532	4.0	2.6047^o	4.0	1461.1995^{bc}	0.0013	18.2
1463.4702	2.4715^o	10.0	1.6243	10.0	1463.4699	0.0013	64.1
1466.9855	3.5779	6.0	2.7327^o	7.0	1466.9669^c	0.0013	144.1
1469.0220	2.0763^o	7.0	1.2323	7.0	1469.0242	0.0013	26.6
1470.6862	2.4790^o	6.0	1.6360	6.0	1470.6862^b	0.0013	14.5
1470.7003	3.4098	7.0	2.5668^o	6.0	1470.6862^b	0.0013	14.4
1474.1796	2.4425^o	5.0	1.6015	6.0	1474.1739	0.0013	19.4
1476.3560	3.8095^o	8.0	2.9697	8.0	1476.3747^b	0.0013	84.9
1476.3711	2.6334	7.0	1.7936^o	8.0	1476.3747^b	0.0013	84.8
1480.6111	3.7976	7.0	2.9603^o	7.0	1480.5992^c	0.0013	23.6
1481.4540	3.6339	5.0	2.7970^o	6.0	1481.4587^b	0.0013	295.3
1481.4589	2.3197^o	9.0	1.4828	9.0	1481.4587^b	0.0013	295.6
1482.2911	2.8360	6.0	1.9996^o	6.0	1482.2861	0.0013	20.0
1482.4808	1.8871^o	6.0	1.0508	5.0	1482.4787	0.0013	17.2
1488.3781	2.0653^o	6.0	1.2323	7.0	1488.3744	0.0019	387.1
1495.1715	3.6339	5.0	2.8047^o	4.0	1495.1562^c	0.0019	25.8
1502.3953	1.4512^o	8.0	0.6259	8.0	1502.3967^c	0.0019	77.0
1503.7087	3.8595	5.0	3.0350^o	4.0	1503.7124^c	0.0019	231.7
1506.1042	2.2005^o	6.0	1.3773	6.0	1506.1054	0.0019	34.2
1509.8016	3.4567^o	4.0	2.6355	4.0	1509.8027	0.0019	17.3
1522.3900	3.5432	5.0	2.7289^o	4.0	1522.3844	0.0018	14.1
1524.0429	2.3094^o	5.0	1.4959	5.0	1524.0446^b	0.0018	34.4
1524.0476	3.9091	6.0	3.0956^o	7.0	1524.0446^b	0.0018	34.4
1527.2846	3.8595	5.0	3.0477^o	5.0	1527.3063	0.0018	33.5
1527.7247	3.0002	5.0	2.1886^o	4.0	1527.7295	0.0018	40.2
1528.5144	2.1623^o	8.0	1.3511	8.0	1528.5141^c	0.0018	564.8

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1535.8900	1.9373^{o}	5.0	1.1301	6.0	1535.8893	0.0019	1985.5
1536.2371	3.7976	7.0	2.9906^{o}	8.0	1536.2371	0.0019	14.9
1536.4578	3.8095^{o}	8.0	3.0026	7.0	1536.4487^{bc}	0.0019	18.8
1536.4705	3.8661	4.0	3.0592^{o}	4.0	1536.4487^{bc}	0.0019	18.8
1536.6625	2.7327^{o}	7.0	1.9259	8.0	1536.6734	0.0019	16.9
1538.4338	2.5146^{o}	3.0	1.7087	3.0	1538.4362^{bc}	0.0019	35.5
1538.4497	3.9427	7.0	3.1369^{o}	6.0	1538.4362^{bc}	0.0019	35.5
1542.4860	1.9339^{o}	6.0	1.1301	6.0	1542.4867	0.0019	56.1
1544.3987	2.8791	6.0	2.0763^{o}	7.0	1544.4185	0.0019	21.8
1546.0586	3.5894	6.0	2.7874^{o}	7.0	1546.0726^{b}	0.0019	39.7
1546.0727	2.0884^{o}	5.0	1.2865	5.0	1546.0726^{b}	0.0019	39.6
1548.1441	3.4363^{o}	4.0	2.6355	4.0	1548.1436^{b}	0.0019	23.6
1548.1465	2.6333^{o}	7.0	1.8325	8.0	1548.1436^{b}	0.0019	23.6
1564.5432	2.1436^{o}	7.0	1.3511	8.0	1564.5463	0.0011	21.6
1565.4345	2.1279^{o}	5.0	1.3359	6.0	1565.4344	0.0011	43.1
1566.1553	3.5098^{o}	6.0	2.7182	5.0	1566.1622	0.0011	62.6
1567.3502	2.0776^{o}	5.0	1.2865	5.0	1567.3503	0.0011	105.4
1568.7064	2.7163^{o}	7.0	1.9259	8.0	1568.7116^{b}	0.0011	19.0
1568.7069	3.0774	7.0	2.2870^{o}	6.0	1568.7116^{b}	0.0011	19.0
1570.6620	2.7139	6.0	1.9245^{o}	5.0	1570.6507	0.0011	17.3
1576.5105	2.0188^{o}	7.0	1.2323	7.0	1576.5083	0.0011	778.2
1578.2594	1.2420^{o}	7.0	0.4565	7.0	1578.2662	0.0011	85.5
1579.5488	2.2626^{o}	6.0	1.4776	7.0	1579.5497^{b}	0.0011	19.1
1579.5670	3.5888^{o}	6.0	2.8039	7.0	1579.5497^{b}	0.0011	18.8
1580.6303	1.8352^{o}	4.0	1.0508	5.0	1580.6305	0.0011	478.3
1586.3133	2.2056^{o}	4.0	1.4241	4.0	1586.3003	0.0011	36.0
1589.8453	3.1471	7.0	2.3673^{o}	8.0	1589.8441^{c}	0.0011	14.4
1596.3973	2.8651	6.0	2.0884^{o}	5.0	1596.4014^{c}	0.0012	15.3
1598.4011	2.5520^{o}	7.0	1.7764	7.0	1598.4085	0.0012	19.1
1599.1132	2.2530^{o}	6.0	1.4776	7.0	1599.1134	0.0012	98.6
1611.4968	2.7182	5.0	1.9488^{o}	4.0	1611.4868	0.0012	23.0
1612.2425	1.8198^{o}	5.0	1.0508	5.0	1612.2342^{c}	0.0012	36.9
1613.0128	3.7443	5.0	2.9757^{o}	4.0	1613.0056	0.0012	15.1
1615.1144	2.3673^{o}	8.0	1.5997	8.0	1615.1207	0.0015	15.2
1615.8647	1.9996^{o}	6.0	1.2323	7.0	1615.8661^{c}	0.0015	64.9
1617.3135	3.6482^{o}	5.0	2.8816	6.0	1617.2982^{c}	0.0015	56.2
1618.5266	2.9717	6.0	2.2057^{o}	5.0	1618.5415^{b}	0.0015	32.8
1618.5383	2.5169^{o}	5.0	1.7509	5.0	1618.5415^{b}	0.0015	32.8
1622.0369	3.5577	4.0	2.7933^{o}	5.0	1622.0519^{c}	0.0015	29.0
1627.6622	2.7182	5.0	1.9565^{o}	6.0	1627.6652^{bc}	0.0015	18.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1627.6874	3.4988	5.0	2.7371[o]	4.0	1627.6653[bc]	0.0015	18.4
1634.8607	2.3827[o]	9.0	1.6243	10.0	1634.8676[bc]	0.0015	71.1
1634.8728	3.2983[o]	4.0	2.5400	5.0	1634.8676[bc]	0.0015	70.8
1634.8826	3.6345	6.0	2.8761[o]	5.0	1634.8676[bc]	0.0015	71.1
1635.3115	3.5157	6.0	2.7576[o]	5.0	1635.3255[b]	0.0015	231.7
1635.3243	2.2530[o]	6.0	1.4948	7.0	1635.3255[b]	0.0015	232.7
1637.0859	3.5621	5.0	2.8048[o]	4.0	1637.0997[b]	0.0015	15.2
1637.0950	2.3225[o]	5.0	1.5652	4.0	1637.0997[b]	0.0015	15.2
1637.7935	3.1658	7.0	2.4088[o]	6.0	1637.8115[b]	0.0015	1413.0
1637.8104	1.8871[o]	6.0	1.1301	6.0	1637.8115[b]	0.0015	1413.2
1638.0693	2.5332[o]	6.0	1.7764	7.0	1638.0699	0.0015	19.9
1643.5963	1.9712[o]	3.0	1.2168	4.0	1643.5962	0.0015	203.4
1646.8178	3.3884[o]	3.0	2.6355	4.0	1646.8316	0.0015	77.8
1647.1214	3.5813	5.0	2.8286[o]	4.0	1647.1280[b]	0.0015	30.3
1647.1368	2.2626[o]	5.0	1.5099	5.0	1647.1280[b]	0.0015	30.3
1651.8651	2.1279[o]	5.0	1.3773	6.0	1651.8652	0.0014	40.5
1658.0245	2.3837[o]	5.0	1.6360	6.0	1658.0278	0.0014	111.4
1658.5379	3.1763	5.0	2.4288[o]	4.0	1658.5393	0.0014	29.7
1658.9170	3.4988	5.0	2.7514[o]	5.0	1658.9072[c]	0.0014	29.0
1660.6165	3.1554	5.0	2.4088[o]	6.0	1660.6246[b]	0.0014	78.6
1660.6176	2.0825[o]	6.0	1.3359	6.0	1660.6246[b]	0.0014	78.6
1660.6391	2.6355	4.0	1.8889[o]	4.0	1660.6246[b]	0.0014	79.1
1662.9118	2.2283[o]	8.0	1.4828	9.0	1662.9219[b]	0.0014	133.0
1662.9411	3.4618	8.0	2.7163[o]	7.0	1662.9219[b]	0.0014	133.2
1671.6510	2.0776[o]	5.0	1.3359	6.0	1671.6510	0.0014	172.8
1671.9892	2.4715[o]	10.0	1.7300	9.0	1671.9867	0.0014	38.1
1672.8005	2.1051[o]	3.0	1.3640	3.0	1672.8003	0.0014	55.6
1678.4536	2.7427	6.0	2.0040[o]	5.0	1678.4546	0.0014	45.1
1678.7089	3.5432	5.0	2.8047[o]	4.0	1678.7268[b]	0.0014	16.0
1678.7224	2.3745[o]	6.0	1.6360	6.0	1678.7272[b]	0.0014	16.3
1682.0201	3.6587[o]	6.0	2.9216	5.0	1681.9982	0.0014	29.1
1684.1266	2.8733	5.0	2.1371[o]	6.0	1684.1433[b]	0.0014	14.7
1684.1439	2.3893[o]	7.0	1.6531	8.0	1684.1432[b]	0.0014	14.8
1689.4412	2.2115[o]	7.0	1.4776	7.0	1689.4381[c]	0.0015	15.0
1693.7546	1.9488[o]	4.0	1.2168	4.0	1693.7549[c]	0.0015	67.1
1694.6631	3.4532	4.0	2.7216[o]	3.0	1694.6421[c]	0.0015	19.5
1699.6686	2.0653[o]	6.0	1.3359	6.0	1699.6671	0.0015	140.2
1700.4093	3.6345	6.0	2.9054[o]	5.0	1700.4147[b]	0.0015	92.5
1700.4096	2.0157[o]	5.0	1.2865	5.0	1700.4147[b]	0.0015	92.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1700.4316	3.5577	4.0	2.8286^{o}	4.0	1700.4148^{b}	0.0015	87.4
1705.3503	2.7427	6.0	2.0157^{o}	5.0	1705.3552	0.0015	41.5
1707.8005	2.8733	5.0	2.1473^{o}	4.0	1707.8042	0.0015	17.9
1709.0695	2.2354^{o}	5.0	1.5099	5.0	1709.0728	0.0015	47.7
1709.3339	3.5539	5.0	2.8286^{o}	5.0	1709.3337	0.0015	55.6
1709.7068	2.0763^{o}	7.0	1.3511	8.0	1709.7061^{b}	0.0015	217.8
1709.7191	3.0448	9.0	2.3197^{o}	9.0	1709.7061^{b}	0.0015	217.6
1713.3133	3.0472	5.0	2.3236^{o}	4.0	1713.3101^{b}	0.0015	847.0
1713.3148	1.7744^{o}	5.0	1.0508	5.0	1713.3101^{b}	0.0015	847.0
1719.6508	2.3225^{o}	5.0	1.6015	6.0	1719.6545	0.0016	16.6
1719.9291	3.6339	5.0	2.9131^{o}	6.0	1719.9096	0.0016	58.8
1721.9285	2.3197^{o}	9.0	1.5997	8.0	1721.9253	0.0016	59.1
1728.0012	3.5535^{o}	5.0	2.8360	6.0	1728.0305^{bc}	0.0014	17.0
1728.0203	2.0040^{o}	5.0	1.2865	5.0	1728.0305^{bc}	0.0014	17.1
1728.0579	3.5965^{o}	7.0	2.8791	6.0	1728.0306^{bc}	0.0014	17.1
1728.5182	1.9341^{o}	4.0	1.2168	4.0	1728.5223	0.0014	169.6
1735.6805	2.6484	5.0	1.9341^{o}	4.0	1735.6761	0.0014	65.6
1735.9818	2.3673^{o}	8.0	1.6531	8.0	1735.9937^{bc}	0.0014	38.3
1736.0129	2.7182	5.0	2.0040^{o}	5.0	1735.9937^{bc}	0.0014	38.5
1741.1335	2.5445^{o}	9.0	1.8325	8.0	1741.1418	0.0014	38.6
1743.4737	2.0884^{o}	5.0	1.3773	6.0	1743.4774	0.0014	324.9
1746.4387	0.8498^{o}	5.0	0.1399	5.0	1746.4461^{b}	0.0014	66.9
1746.4662	2.7139	6.0	2.0040^{o}	5.0	1746.4461^{b}	0.0014	66.7
1746.7661	3.7140^{o}	9.0	3.0042	8.0	1746.7846^{b}	0.0014	29.4
1746.7841	2.2057^{o}	5.0	1.4959	5.0	1746.7845^{b}	0.0014	28.6
1746.9547	3.1002	7.0	2.3905^{o}	6.0	1746.9665^{bc}	0.0014	116.2
1746.9638	2.3236^{o}	4.0	1.6139	4.0	1746.9665^{bc}	0.0014	116.2
1746.9657	2.2056^{o}	4.0	1.4959	5.0	1746.9665^{bc}	0.0014	116.2
1746.9849	3.4532	4.0	2.7435^{o}	5.0	1746.9664^{bc}	0.0014	116.9
1756.8548	2.2005^{o}	6.0	1.4948	7.0	1756.8574	0.0015	88.6
1759.8356	1.9910^{o}	4.0	1.2865	5.0	1759.8355^{c}	0.0015	55.8
1763.6451	4.0003	4.0	3.2973^{o}	5.0	1763.6613^{b}	0.0028	742.6
1763.6666	1.9198^{o}	3.0	1.2168	4.0	1763.6613^{b}	0.0028	742.9
1767.2750	1.9339^{o}	6.0	1.2323	7.0	1767.2761	0.0029	424.6
1769.5332	1.9872^{o}	5.0	1.2865	5.0	1769.5350	0.0029	22.5
1770.5790	2.0776^{o}	5.0	1.3773	6.0	1770.5809	0.0029	549.8
1772.2050	2.6484	5.0	1.9488^{o}	4.0	1772.2044	0.0029	33.7
1776.0806	2.4715^{o}	10.0	1.7734	11.0	1776.0796^{c}	0.0029	4568.0
1783.0229	2.3197^{o}	9.0	1.6243	10.0	1783.0240	0.0029	7657.2
1786.9297	3.5535^{o}	5.0	2.8597	5.0	1786.9117	0.0029	28.8

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1789.8562	2.1886^o	4.0	1.4959	5.0	1789.8659^{bc}	0.0029	20.1
1789.8854	3.3544	6.0	2.6618^o	5.0	1789.8658^{bc}	0.0029	20.3
1797.6439	3.4411	6.0	2.7514^o	5.0	1797.6549^b	0.0029	374.9
1797.6546	1.8198^o	5.0	1.1301	6.0	1797.6549^b	0.0029	375.1
1800.8806	3.3349	7.0	2.6464^o	6.0	1800.8730	0.0029	17.9
1809.9095	2.2056^o	4.0	1.5206	3.0	1809.9039	0.0014	22.1
1810.9561	2.1623^o	8.0	1.4776	7.0	1810.9515	0.0014	103.1
1815.0738	3.5367	5.0	2.8536^o	4.0	1815.0857^{bc}	0.0014	35.7
1815.1060	2.2482^o	5.0	1.5652	4.0	1815.0855^{bc}	0.0014	35.5
1815.7583	1.7336^o	4.0	1.0508	5.0	1815.7540	0.0014	545.8
1820.4130	2.1051^o	3.0	1.4241	4.0	1820.4197	0.0014	26.7
1820.9772	2.6068^o	7.0	1.9259	8.0	1820.9867	0.0014	14.8
1823.8557	3.7697	6.0	3.0899^o	6.0	1823.8701^b	0.0014	44.5
1823.8686	2.0157^o	5.0	1.3359	6.0	1823.8701^b	0.0014	44.2
1824.6387	2.1623^o	8.0	1.4828	9.0	1824.6384^c	0.0014	9954.5
1829.5142	3.5374^o	5.0	2.8597	5.0	1829.5378	0.0014	118.3
1834.7708	2.5445^o	9.0	1.8688	10.0	1834.7665	0.0014	237.5
1844.7026	3.6339	5.0	2.9618^o	6.0	1844.7117^b	0.0014	88.5
1844.7115	1.8889^o	4.0	1.2168	4.0	1844.7117^b	0.0014	88.5
1855.6718	2.0040^o	5.0	1.3359	6.0	1855.6741^b	0.0016	405.3
1855.6928	3.6707^o	7.0	3.0026	7.0	1855.6741^b	0.0016	405.8
1857.0692	2.0188^o	7.0	1.3511	8.0	1857.0685^c	0.0016	10695.8
1857.5366	2.1623^o	8.0	1.4948	7.0	1857.5322	0.0016	25.0
1863.3126	3.4701	5.0	2.8047^o	4.0	1863.2884	0.0016	429.6
1870.7950	3.4913	5.0	2.8286^o	5.0	1870.8219^b	0.0016	37.8
1870.8132	3.5418^o	5.0	2.8791	6.0	1870.8218^b	0.0016	38.2
1871.9980	3.6339	5.0	2.9716^o	5.0	1871.9997^{bc}	0.0016	562.2
1871.9987	1.9488^o	4.0	1.2865	5.0	1871.9997^{bc}	0.0016	562.2
1874.9892	2.6484	5.0	1.9872^o	5.0	1874.9902	0.0016	16.7
1875.3415	2.2626^o	5.0	1.6015	6.0	1875.3575	0.0016	14.7
1879.0914	2.1557^o	5.0	1.4959	5.0	1879.1050	0.0017	35.2
1880.0184	2.1371^o	6.0	1.4776	7.0	1880.0235	0.0017	32.4
1886.5814	3.1053	8.0	2.4482^o	7.0	1886.5858	0.0017	40.8
1888.5477	2.3673^o	8.0	1.7108	7.0	1888.5558^{bc}	0.0017	20.3
1888.5616	3.4000	6.0	2.7435^o	5.0	1888.5558^{bc}	0.0017	20.2
1898.4053	3.6979^o	10.0	3.0448	9.0	1898.4060	0.0015	21.7
1903.1680	2.2530^o	6.0	1.6015	6.0	1903.1702	0.0015	98.8
1907.9367	2.2495^o	7.0	1.5997	8.0	1907.9473	0.0015	152.8
1914.5560	1.9341^o	4.0	1.2865	5.0	1914.5615^b	0.0015	676.0
1914.5861	3.6440	8.0	2.9965^o	8.0	1914.5615^b	0.0015	675.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1918.5190	3.1252	6.0	2.4790[o]	6.0	1918.5337	0.0015	18.3
1918.7181	1.4959	5.0	0.8498[o]	5.0	1918.7544	0.0015	43.2
1924.0034	1.6952[o]	4.0	1.0508	5.0	1924.0036[c]	0.0015	11196.1
1924.2192	3.8095[o]	8.0	3.1652	8.0	1924.2217[b]	0.0015	13111.1
1924.2233	1.7744[o]	5.0	1.1301	6.0	1924.2217[b]	0.0015	13111.1
1924.2359	3.5259	4.0	2.8816[o]	5.0	1924.2217[b]	0.0015	13123.5
1930.2687	2.1371[o]	6.0	1.4948	7.0	1930.2708[b]	0.0015	38.3
1930.2921	3.0904	6.0	2.4482[o]	7.0	1930.2706[b]	0.0015	38.9
1932.3903	3.2253	6.0	2.5837[o]	6.0	1932.4165[b]	0.0015	34.4
1932.3903	3.4532	4.0	2.8116[o]	4.0	1932.4165[b]	0.0015	34.4
1932.4045	2.4626[o]	8.0	1.8210	9.0	1932.4167[b]	0.0015	34.0
1932.4116	2.8039	7.0	2.1623[o]	8.0	1932.4165[b]	0.0015	34.4
1932.8676	2.0188[o]	7.0	1.3773	6.0	1932.8624	0.0015	256.6
1934.8202	3.5621	5.0	2.9213[o]	4.0	1934.8385	0.0015	78.4
1945.3932	2.3673[o]	8.0	1.7300	9.0	1945.3944[b]	0.0020	394.2
1945.4155	3.7802	8.0	3.1429[o]	7.0	1945.3944[b]	0.0020	391.8
1957.2268	2.8864	5.0	2.2530[o]	6.0	1957.2505[b]	0.0020	42.2
1957.2417	2.2694[o]	5.0	1.6360	6.0	1957.2506[b]	0.0020	41.7
1959.7384	4.1700	6.0	3.5374[o]	5.0	1959.7546	0.0020	35.8
1959.8797	3.5539	5.0	2.9213[o]	4.0	1959.8880	0.0020	47.3
1960.4376	2.4088[o]	6.0	1.7764	7.0	1960.4422	0.0020	82.8
1965.8721	2.3816[o]	4.0	1.7509	5.0	1965.8761[bc]	0.0020	30.5
1965.8926	3.5539	5.0	2.9233[o]	6.0	1965.8761[bc]	0.0020	30.4
1967.3592	3.5432	5.0	2.9131[o]	6.0	1967.3571[c]	0.0020	20.4
1968.4171	3.4449[o]	7.0	2.8151	7.0	1968.4149[c]	0.0020	15.2
1972.0354	3.4749	3.0	2.8462[o]	3.0	1972.0574[b]	0.0020	16.0
1972.0416	2.2283[o]	8.0	1.5997	8.0	1972.0574[b]	0.0020	16.1
1978.3900	2.2626[o]	5.0	1.6360	6.0	1978.3835	0.0021	110.4
1978.5893	2.2626[o]	6.0	1.6360	6.0	1978.5959[c]	0.0021	36.3
1984.9698	3.4532	4.0	2.8286[o]	5.0	1984.9465	0.0021	44.3
1987.3549	2.8864	5.0	2.2626[o]	6.0	1987.3701	0.0021	17.2
1997.8308	1.9565[o]	6.0	1.3359	6.0	1997.8250	0.0024	132.6
2004.2763	2.1051[o]	3.0	1.4865	2.0	2004.2842[b]	0.0024	36.9
2004.3020	3.0002	5.0	2.3816[o]	4.0	2004.2837[b]	0.0024	37.6
2006.3050	2.1279[o]	5.0	1.5099	5.0	2006.3155	0.0025	20.2
2007.0572	1.8346[o]	5.0	1.2168	4.0	2007.0502[c]	0.0025	78.5
2013.5305	3.4518[o]	5.0	2.8360	6.0	2013.5618[bc]	0.0025	113.6
2013.5557	2.1117[o]	4.0	1.4959	5.0	2013.5618[bc]	0.0025	113.7
2013.5638	3.3750	4.0	2.7593[o]	5.0	2013.5618[bc]	0.0025	113.2

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
2013.5909	3.5261	8.0	2.9103^{o}	8.0	2013.5618^{bc}	0.0025	113.2
2024.7858	3.2640^{o}	7.0	2.6517	6.0	2024.7831	0.0025	79.9
2026.3227	2.2115^{o}	7.0	1.5997	8.0	2026.3167	0.0025	1304.3
2029.6182	2.0885^{o}	7.0	1.4776	7.0	2029.6174	0.0025	102.8
2031.1580	2.2635^{o}	7.0	1.6531	8.0	2031.1623^{c}	0.0025	82.6
2032.5005	2.2115^{o}	7.0	1.6015	6.0	2032.4885	0.0025	49.7
2032.9749	3.8622	5.0	3.2523^{o}	4.0	2032.9849^{b}	0.0025	75.9
2032.9819	1.9872^{o}	5.0	1.3773	6.0	2032.9848^{b}	0.0025	76.0
2036.3517	2.8946	4.0	2.2857^{o}	4.0	2036.3766^{bc}	0.0025	27.2
2036.3986	3.4204	4.0	2.8116^{o}	4.0	2036.3766^{bc}	0.0025	26.6
2049.8398	2.0825^{o}	6.0	1.4776	7.0	2049.8414	0.0011	554.0
2054.8096	3.4473	7.0	2.8440^{o}	7.0	2054.8308	0.0011	214.2
2057.0655	3.1658	7.0	2.5631^{o}	6.0	2057.0661^{b}	0.0011	1178.9
2057.0705	2.4715^{o}	10.0	1.8688	10.0	2057.0661^{b}	0.0011	1180.1
2058.1455	1.8889^{o}	4.0	1.2865	5.0	2058.1551	0.0011	2497.2
2060.3675	2.1117^{o}	4.0	1.5099	5.0	2060.3747^{b}	0.0011	228.4
2060.3985	3.5607^{o}	4.0	2.9589	3.0	2060.3747^{b}	0.0011	228.3
2061.4102	1.9373^{o}	5.0	1.3359	6.0	2061.4162^{b}	0.0011	1046.3
2061.4421	3.3342	6.0	2.7327^{o}	7.0	2061.4162^{b}	0.0011	1047.5
2062.0385	3.5577	4.0	2.9564^{o}	4.0	2062.0024	0.0011	31.4
2063.5214	3.7443	5.0	3.1435^{o}	6.0	2063.5248	0.0011	38.1
2064.4253	1.8871^{o}	6.0	1.2865	5.0	2064.4327	0.0011	478.6
2065.4133	3.3877	8.0	2.7874^{o}	7.0	2065.4163	0.0011	17.7
2070.7972	3.4179	7.0	2.8192^{o}	6.0	2070.7850	0.0011	18.9
2078.9238	2.2495^{o}	7.0	1.6531	8.0	2078.9299	0.0011	101.5
2088.3087	2.0885^{o}	7.0	1.4948	7.0	2088.3062^{c}	0.0011	16.2
2092.4722	2.0884^{o}	5.0	1.4959	5.0	2092.4663	0.0011	84.9
2106.1544	1.9245^{o}	5.0	1.3359	6.0	2106.1470	0.0015	1196.6
2109.6717	2.0653^{o}	6.0	1.4776	7.0	2109.6768	0.0015	495.4
2117.3458	3.5374^{o}	5.0	2.9518	4.0	2117.3757^{b}	0.0015	28.3
2117.3893	3.4712^{o}	3.0	2.8857	4.0	2117.3757^{b}	0.0015	28.3
2119.6289	3.2874	7.0	2.7025^{o}	6.0	2119.6364	0.0015	34.5
2119.8239	1.9488^{o}	4.0	1.3640	3.0	2119.8284^{b}	0.0015	34.8
2119.8288	3.6805	8.0	3.0956^{o}	7.0	2119.8283^{b}	0.0015	36.7
2132.1371	2.0763^{o}	7.0	1.4948	7.0	2132.1434^{c}	0.0015	30.4
2132.6691	2.5445^{o}	9.0	1.9632	9.0	2132.6650	0.0015	186.4
2137.0403	3.2983^{o}	4.0	2.7182	5.0	2137.0724^{b}	0.0015	67.7
2137.0745	3.5539	5.0	2.9738^{o}	6.0	2137.0726^{b}	0.0015	66.0
2137.0955	4.1045	9.0	3.5244^{o}	8.0	2137.0726^{b}	0.0015	65.6
2140.7574	3.4608^{o}	6.0	2.8816	6.0	2140.7843^{b}	0.0015	36.8

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
2140.7826	1.9565[o]	6.0	1.3773	6.0	2140.7843[b]	0.0015	36.9
2143.0715	2.0884[o]	5.0	1.5099	5.0	2143.0758[c]	0.0015	109.4
2166.7914	2.8816	6.0	2.3094[o]	5.0	2166.8036	0.0021	18.3
2173.1557	2.0653[o]	6.0	1.4948	7.0	2173.1558[c]	0.0021	2419.7
2176.0683	2.2057[o]	5.0	1.6360	6.0	2176.0702	0.0021	186.0
2178.3246	3.3750	4.0	2.8059[o]	3.0	2178.3150[c]	0.0022	34.6
2179.4650	3.6603	6.0	3.0914[o]	5.0	2179.4799[c]	0.0022	17.7
2183.6960	3.4542[o]	4.0	2.8864	5.0	2183.7133	0.0022	26.8
2184.1720	2.0776[o]	5.0	1.5099	5.0	2184.1734	0.0022	58.5
2186.7014	1.9910[o]	4.0	1.4241	4.0	2186.7071[b]	0.0022	40.2
2186.7110	3.2646	5.0	2.6976[o]	4.0	2186.7072[b]	0.0022	39.9
2201.6941	1.9872[o]	5.0	1.4241	4.0	2201.6990	0.0022	29.4
2202.7635	2.8864	5.0	2.3236[o]	4.0	2202.7942[b]	0.0022	179.6
2202.8135	3.4206	6.0	2.8577[o]	5.0	2202.7943[b]	0.0022	179.4
2203.6741	2.1623[o]	8.0	1.5997	8.0	2203.6763[c]	0.0022	1274.3
2213.9529	1.9373[o]	5.0	1.3773	6.0	2213.9487	0.0022	1188.4
2230.4819	1.9198[o]	3.0	1.3640	3.0	2230.4634	0.0001	36.7
2231.2225	3.5558[o]	6.0	3.0002	5.0	2231.2475	0.0001	16.2
2232.2126	3.9084	7.0	3.3530[o]	8.0	2232.2342[b]	0.0001	65.9
2232.2505	2.0653[o]	6.0	1.5099	5.0	2232.2342[b]	0.0001	66.5
2249.2745	1.8871[o]	6.0	1.3359	6.0	2249.2783[b]	0.0001	23.6
2249.3074	3.9954	3.0	3.4442[o]	4.0	2249.2785[b]	0.0001	23.4
2256.6156	2.5445[o]	9.0	1.9951	10.0	2256.6203[b]	0.0001	272.4
2256.6430	3.7013	6.0	3.1519[o]	6.0	2256.6203[b]	0.0001	272.0
2259.8344	1.8352[o]	4.0	1.2865	5.0	2259.8435[b]	0.0001	512.5
2259.8513	3.8945[o]	8.0	3.3459	9.0	2259.8435[b]	0.0001	513.8
2259.8691	3.7317[o]	5.0	3.1831	6.0	2259.8435[b]	0.0001	515.2
2265.6471	1.9245[o]	5.0	1.3773	6.0	2265.6466[c]	0.0001	586.7
2269.6380	2.3673[o]	8.0	1.8210	9.0	2269.6493	0.0001	248.7
2279.3488	2.1436[o]	7.0	1.5997	8.0	2279.3525	0.0001	74.4
2303.4251	3.4486	8.0	2.9103[o]	8.0	2303.4419[b]	0.0009	56.1
2303.4750	3.3948	7.0	2.8566[o]	6.0	2303.4419[b]	0.0009	56.1
2305.9513	3.2593	2.0	2.7216[o]	3.0	2305.9145	0.0009	32.1
2318.1181	2.3673[o]	8.0	1.8325	8.0	2318.1352	0.0009	71.8
2324.9926	3.2270	6.0	2.6937[o]	5.0	2325.0198[b]	0.0009	31.9
2325.0115	1.8198[o]	5.0	1.2865	5.0	2325.0200[b]	0.0009	30.9
2325.0423	3.8095[o]	8.0	3.2762	8.0	2325.0199[b]	0.0009	31.3
2345.8193	3.5259	4.0	2.9973[o]	4.0	2345.8386[c]	0.0009	16.4
2374.0000	3.4039[o]	6.0	2.8816	6.0	2374.0345[b]	0.0027	19.7
2374.0000	3.9106	4.0	3.3884[o]	3.0	2374.0345[b]	0.0027	19.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
2374.0315	2.4482^o	7.0	1.9259	8.0	2374.0345^b	0.0027	19.9
2374.0597	3.8726	8.0	3.3504^o	7.0	2374.0345^b	0.0027	19.7
2375.3037	1.9996^o	6.0	1.4776	7.0	2375.3053	0.0027	108.1
2377.0970	3.4913	5.0	2.9698^o	4.0	2377.0982	0.0027	25.9
2390.8311	3.2325^o	5.0	2.7139	6.0	2390.8523	0.0027	16.0
2412.5615	3.5621	5.0	3.0482^o	5.0	2412.5863^b	0.0027	190.1
2412.5819	2.3827^o	9.0	1.8688	10.0	2412.5863^b	0.0027	190.5
2413.1082	2.0097^o	4.0	1.4959	5.0	2413.1152^b	0.0027	18.2
2413.1123	3.5157	6.0	3.0019^o	7.0	2413.1152^b	0.0027	18.2
2417.4741	3.3279^o	6.0	2.8151	7.0	2417.4684	0.0027	19.9

Table A.38: Measured wavelengths and intensities of Nd II infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
941.0556	4.7648	3.5	3.4473^o	3.5	941.0606^c	0.0005	1104.6
942.4476	4.9144	8.5	3.5989^o	8.5	942.4460^c	0.0005	80.6
945.4560	5.6122	5.5	4.3008^o	6.5	945.4692^{bc}	0.0005	24.4
945.4696	2.9115^o	7.5	1.6002	7.5	945.4693^b	0.0005	24.5
945.6770	1.3747^o	5.5	0.0636	4.5	945.6791^b	0.0005	31.2
945.6895	2.6335^o	2.5	1.3225	3.5	945.6790^b	0.0005	31.2
946.0541	2.5921^o	5.5	1.2816	6.5	946.0597	0.0005	472.9
946.5627	2.6664^o	5.5	1.3566	5.5	946.5669^c	0.0005	25.7
946.9316	3.2134^o	6.5	1.9041	7.5	946.9222^c	0.0005	793.6
947.4757	4.6865	4.5	3.3779^o	5.5	947.4808^b	0.0005	170.1
947.4888	5.1710	5.5	3.8625^o	6.5	947.4808^b	0.0005	170.3
947.9155	4.5677	4.5	3.2598^o	3.5	947.9095^c	0.0005	21.3
948.1666	4.5768	4.5	3.2693^o	3.5	948.1770^{bc}	0.0005	21.9
948.1823	4.6252	3.5	3.3176^o	4.5	948.1772^b	0.0005	21.2
948.4730	4.8209	4.5	3.5137^o	4.5	948.4696^{bc}	0.0005	72.7
948.4800	4.1745	5.5	2.8674^o	5.5	948.4696^b	0.0005	70.5
948.7229	2.7174^o	4.5	1.4106	3.5	948.7272^c	0.0005	181.4
949.8480	2.6546^o	3.5	1.3493	4.5	949.8479	0.0005	23.5
950.7740	5.2241	4.5	3.9201^o	4.5	950.7834^{bc}	0.0005	31.9
950.7826	4.6400	4.5	3.3360^o	3.5	950.7834^b	0.0005	31.7
951.4159	4.1745	5.5	2.8714^o	5.5	951.4295^{bc}	0.0006	50.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
951.4161	5.2325	4.5	3.9293^o	4.5	951.4295^b	0.0006	50.7
951.4417	4.7648	3.5	3.4617^o	4.5	951.4295^b	0.0006	50.7
953.1771	2.8985^o	5.5	1.5978	5.5	953.1744^c	0.0006	34.2
954.8394	4.7691	7.5	3.4706^o	8.5	954.8294	0.0006	22.3
956.4442	5.5275	6.5	4.2312^o	5.5	956.4486^{bc}	0.0006	61.0
956.4472	5.0660	7.5	3.7697^o	7.5	956.4486^b	0.0006	61.0
956.5801	4.6658	5.5	3.3698^o	4.5	956.5911	0.0006	53.6
957.2528	4.8733	4.5	3.5781^o	5.5	957.2568^c	0.0006	66.7
957.3386	5.1491	4.5	3.8540^o	5.5	957.3457	0.0006	22.8
960.5304	4.6400	4.5	3.3493^o	4.5	960.5312^b	0.0006	34.2
960.5336	2.3347^o	4.5	1.0440	4.5	960.5312^b	0.0006	34.2
960.5345	5.2896	3.5	3.9988^o	4.5	960.5312^b	0.0006	34.2
961.0990	3.2642^o	6.5	1.9742	6.5	961.0902	0.0006	782.4
965.0772	4.6408	3.5	3.3562^o	4.5	965.0802^c	0.0008	24.8
965.7422	4.6205	7.5	3.3367^o	7.5	965.7465	0.0008	70.6
966.0968	2.8801^o	4.5	1.5968	3.5	966.1118^{bc}	0.0008	32.8
966.1061	3.2575^o	5.5	1.9742	6.5	966.1118^b	0.0008	32.8
966.1150	5.5912	3.5	4.3079^o	3.5	966.1116^b	0.0008	31.8
966.1915	2.9822^o	4.5	1.6990	4.5	966.1996	0.0008	63.1
966.3951	5.1423	4.5	3.8594^o	3.5	966.3826^c	0.0008	1220.6
967.0259	4.5643	6.5	3.2822^o	7.5	967.0255	0.0009	60.1
967.4810	4.3559	5.5	3.0744^o	4.5	967.4852^b	0.0009	21.6
967.4838	5.3296	5.5	4.0481^o	5.5	967.4853^b	0.0009	22.3
968.0819	2.8985^o	5.5	1.6178	5.5	968.0929^c	0.0009	96.2
971.2843	5.2964	8.5	4.0200^o	7.5	971.2846^{bc}	0.0009	46.4
971.2863	4.5281	5.5	3.2517^o	4.5	971.2846^b	0.0009	46.4
971.8480	2.7115^o	6.5	1.4358	6.5	971.8533	0.0009	19.9
973.5331	5.0492	4.5	3.7756^o	3.5	973.5325^c	0.0009	210.6
973.6612	5.2896	3.5	4.0163^o	3.5	973.6581	0.0009	44.8
974.1144	5.0631	3.5	3.7903^o	3.5	974.1058	0.0009	21.8
974.3479	4.8733	4.5	3.6008^o	4.5	974.3371^c	0.0009	39.6
974.5856	2.2051^o	3.5	0.9329	3.5	974.5911	0.0009	35.9
975.0999	3.3629^o	6.5	2.0914	7.5	975.1136	0.0009	28.5
976.4476	3.1478^o	4.5	1.8781	5.5	976.4571	0.0007	37.2
979.2936	5.4466	4.5	4.1805^o	5.5	979.2903	0.0007	113.1
981.3430	4.5739	4.5	3.3105^o	3.5	981.3524^c	0.0007	24.0
982.5045	4.9758	8.5	3.7139^o	7.5	982.5041^{bc}	0.0007	54.0
982.5070	3.2822^o	7.5	2.0204	8.5	982.5041^b	0.0007	53.7
983.0174	5.0492	4.5	3.7879^o	3.5	982.9998	0.0007	32.0
983.4123	5.5840	2.5	4.3233^o	2.5	983.3970	0.0007	18.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
984.1420	4.6865	4.5	3.4267^o	3.5	984.1502^c	0.0007	31.7
985.1392	4.4017	6.5	3.1432^o	5.5	985.1290	0.0007	602.9
985.6810	1.9999^o	8.5	0.7421	7.5	985.6881^c	0.0007	18.0
986.0000	4.5281	5.5	3.2707^o	4.5	986.0089^c	0.0007	32.3
986.2906	4.6598	6.5	3.4028^o	7.5	986.2850^{bc}	0.0007	4191.6
986.2949	4.9052	4.5	3.6482^o	5.5	986.2850^b	0.0007	4191.6
988.9842	4.6697	4.5	3.4161^o	4.5	988.9841^{bc}	0.0009	39.6
988.9866	2.8714^o	5.5	1.6178	5.5	988.9841^b	0.0009	39.5
993.6072	5.2162	4.5	3.9685^o	3.5	993.6158	0.0009	21.8
994.9189	5.1733	9.5	3.9271^o	8.5	994.9304^c	0.0009	420.1
995.4201	4.5260	6.5	3.2805^o	6.5	995.4002^c	0.0009	18.4
996.2423	5.1423	4.5	3.8978^o	5.5	996.2527^c	0.0009	427.4
996.8013	2.9760^o	4.5	1.7322	4.5	996.7990^b	0.0009	25.4
996.8072	5.0631	3.5	3.8193^o	3.5	996.7990^b	0.0009	25.4
998.0264	2.2179^o	9.5	0.9756	8.5	998.0155^{bc}	0.0009	18.6
998.0264	4.4919	5.5	3.2496^o	6.5	998.0155^b	0.0009	18.6
1000.5578	4.6865	4.5	3.4473^o	3.5	1000.5571	0.0009	53.5
1007.3106	1.7810^o	5.5	0.5502	5.5	1007.3170^c	0.0010	4022.6
1008.2744	5.0631	3.5	3.8334^o	3.5	1008.2749	0.0010	29.6
1008.5759	4.5677	4.5	3.3384^o	4.5	1008.5766^c	0.0010	493.9
1008.6950	2.8714^o	5.5	1.6423	4.5	1008.6809	0.0010	20.0
1008.9314	5.5275	6.5	4.2986^o	7.5	1008.9370^{bc}	0.0010	21.9
1008.9356	2.7508^o	4.5	1.5220	5.5	1008.9369^b	0.0010	22.2
1009.1296	4.5943	5.5	3.3657^o	6.5	1009.1130^c	0.0010	37.5
1011.9819	4.8733	4.5	3.6482^o	5.5	1011.9925^{bc}	0.0010	132.2
1012.0049	2.4497^o	4.5	1.2246	4.5	1011.9925^b	0.0010	131.8
1013.3324	4.1745	5.5	2.9510^o	6.5	1013.3352^c	0.0010	19.4
1015.2882	5.1877	4.5	3.9666^o	4.5	1015.2817	0.0007	19.5
1016.1796	4.7656	5.5	3.5456^o	5.5	1016.1828^{bc}	0.0007	20.0
1016.1925	4.6598	6.5	3.4398^o	6.5	1016.1826^b	0.0007	20.8
1017.7242	2.4428^o	5.5	1.2246	4.5	1017.7245^c	0.0007	29.2
1018.6527	4.6408	3.5	3.4237^o	2.5	1018.6505^c	0.0007	61.2
1018.8747	1.6882^o	7.5	0.4714	7.5	1018.8736^b	0.0007	73.9
1018.8757	4.7094	4.5	3.4926^o	4.5	1018.8736^b	0.0007	73.6
1023.3189	1.9561^o	3.5	0.7445	4.5	1023.3314^b	0.0007	192.1
1023.3335	4.5677	4.5	3.3562^o	4.5	1023.3314^b	0.0007	190.9
1024.2313	5.1710	5.5	3.9605^o	4.5	1024.2418	0.0007	30.7
1027.5354	2.9745^o	6.5	1.7679	6.5	1027.5314^c	0.0007	18.7
1031.1549	5.2162	4.5	4.0139^o	5.5	1031.1451	0.0009	28.5
1031.7245	4.1777	5.5	2.9760^o	4.5	1031.7309^c	0.0009	17.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1032.2693	5.5275	6.5	4.3264^{o}	7.5	1032.2720	0.0009	26.4
1033.9551	2.7993^{o}	6.5	1.6002	7.5	1033.9467	0.0009	17.2
1034.0802	5.3575	3.5	4.1586^{o}	2.5	1034.0902	0.0009	17.5
1036.6750	4.5521	4.5	3.3562^{o}	4.5	1036.6802^{c}	0.0009	21.0
1037.4579	2.0545^{o}	6.5	0.8594	5.5	1037.4447^{c}	0.0009	32.8
1038.8035	4.6408	3.5	3.4473^{o}	3.5	1038.7978^{c}	0.0009	254.2
1039.9143	4.5768	4.5	3.3846^{o}	3.5	1039.9173^{c}	0.0009	38.2
1045.0074	4.5643	6.5	3.3779^{o}	5.5	1044.9966^{c}	0.0011	17.8
1050.8596	5.1710	5.5	3.9912^{o}	4.5	1050.8430	0.0011	18.8
1052.0175	4.6743	7.5	3.4958^{o}	6.5	1052.0241^{bc}	0.0011	22.2
1052.0220	4.7648	3.5	3.5863^{o}	4.5	1052.0241^{b}	0.0011	22.2
1052.4588	4.6400	4.5	3.4620^{o}	5.5	1052.4607	0.0011	32.9
1054.5122	5.6601	7.5	4.4844^{o}	7.5	1054.5034^{b}	0.0011	26.9
1054.5147	5.1423	4.5	3.9666^{o}	4.5	1054.5034^{b}	0.0011	26.9
1055.8820	4.5521	4.5	3.3779^{o}	5.5	1055.8878	0.0011	115.3
1056.2874	4.5739	4.5	3.4002^{o}	4.5	1056.2899^{c}	0.0009	44.8
1060.7373	4.1745	5.5	3.0057^{o}	6.5	1060.7261^{c}	0.0009	203.0
1064.5977	4.8372	8.5	3.6726^{o}	7.5	1064.6054	0.0009	73.7
1065.2861	5.5840	2.5	4.4202^{o}	3.5	1065.3012^{b}	0.0009	17.7
1065.3088	5.1491	4.5	3.9853^{o}	5.5	1065.3006^{b}	0.0009	18.8
1065.7408	4.7094	4.5	3.5461^{o}	4.5	1065.7385	0.0009	33.2
1066.2203	2.9760^{o}	4.5	1.8132	5.5	1066.2182^{c}	0.0009	313.1
1069.6263	4.9470	2.5	3.7879^{o}	3.5	1069.6347	0.0009	27.1
1077.9294	4.5768	4.5	3.4267^{o}	3.5	1077.9318	0.0010	37.1
1082.0543	4.9470	2.5	3.8012^{o}	2.5	1082.0681^{c}	0.0010	46.5
1083.9633	4.5465	6.5	3.4028^{o}	7.5	1083.9621^{bc}	0.0010	17.5
1083.9709	5.1710	5.5	4.0272^{o}	4.5	1083.9621^{b}	0.0010	17.5
1091.3766	3.2274^{o}	7.5	2.0914	7.5	1091.3660^{bc}	0.0013	257.4
1091.3778	4.6514	5.5	3.5154^{o}	6.5	1091.3660^{b}	0.0013	257.3
1093.3397	4.5768	4.5	3.4429^{o}	5.5	1093.3283^{bc}	0.0013	41.3
1093.3437	2.9472^{o}	4.5	1.8132	5.5	1093.3283^{b}	0.0013	41.3
1094.7873	5.1152	2.5	3.9827^{o}	3.5	1094.7955^{c}	0.0013	30.4
1095.9114	1.6815^{o}	4.5	0.5502	5.5	1095.9240	0.0013	23.0
1099.8970	2.4497^{o}	4.5	1.3225	3.5	1099.9175^{b}	0.0013	17.1
1099.9104	3.1014^{o}	5.5	1.9742	6.5	1099.9173^{b}	0.0013	16.5
1108.4527	4.5521	4.5	3.4336^{o}	3.5	1108.4623^{bc}	0.0008	17.7
1108.4803	4.6598	6.5	3.5413^{o}	6.5	1108.4623^{b}	0.0008	18.2
1112.8292	4.5281	5.5	3.4140^{o}	4.5	1112.8282^{bc}	0.0008	31.6
1112.8323	2.9922^{o}	5.5	1.8781	5.5	1112.8282^{b}	0.0008	31.6
1115.7028	2.5630^{o}	4.5	1.4518	4.5	1115.7071^{c}	0.0008	26.8

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1134.7453	2.5284^o	6.5	1.4358	6.5	1134.7607^c	0.0007	1003.1
1138.1912	4.5768	4.5	3.4876^o	5.5	1138.1834^c	0.0007	17.1
1140.9510	4.7094	4.5	3.6228^o	4.5	1140.9577	0.0007	20.6
1144.0332	4.1777	5.5	3.0940^o	6.5	1144.0427^{bc}	0.0007	30.7
1144.0398	4.5281	5.5	3.4444^o	5.5	1144.0427^b	0.0007	30.7
1159.3376	4.5399	5.5	3.4705^o	5.5	1159.3376^{bc}	0.0007	26.8
1159.3403	2.5598^o	6.5	1.4904	5.5	1159.3376^b	0.0007	26.8
1160.9979	2.0435^o	9.5	0.9756	8.5	1161.0048^b	0.0007	21.7
1161.0061	5.1491	4.5	4.0812^o	4.5	1161.0048^b	0.0007	21.7
1162.4041	5.1819	4.5	4.1153^o	5.5	1162.3946	0.0007	54.7
1163.9865	4.5021	6.5	3.4369^o	6.5	1163.9941^c	0.0007	17.4
1182.4951	2.0241^o	8.5	0.9756	8.5	1182.4966^c	0.0014	18.2
1183.9826	2.2466^o	3.5	1.1995	2.5	1183.9834^{bc}	0.0014	19.6
1184.0001	2.2756^o	2.5	1.2285	3.5	1183.9834^b	0.0014	19.7
1185.4100	5.0395	2.5	3.9936^o	2.5	1185.4194	0.0014	22.9
1194.4470	2.5284^o	6.5	1.4904	5.5	1194.4536^c	0.0009	16.8
1195.7975	4.1612	6.5	3.1244^o	5.5	1195.7966^c	0.0009	27.5
1201.7685	4.8388	7.5	3.8071^o	7.5	1201.7773^{bc}	0.0009	16.2
1201.7692	2.4423^o	4.5	1.4106	3.5	1201.7773^b	0.0009	16.2
1201.8978	2.9430^o	7.5	1.9115	6.5	1201.8978^{bc}	0.0009	21.9
1201.8985	4.5021	6.5	3.4705^o	5.5	1201.8978^b	0.0009	21.9
1203.1043	4.9299	4.5	3.8994^o	4.5	1203.1066^c	0.0009	65.0
1203.4417	4.5739	4.5	3.5437^o	5.5	1203.4345^{bc}	0.0009	17.2
1203.4462	2.8140^o	5.5	1.7838	6.5	1203.4345^b	0.0009	17.2
1213.3184	2.0658^o	3.5	1.0440	4.5	1213.3290	0.0010	15.0
1230.4936	4.7979	4.5	3.7903^o	3.5	1230.4812	0.0011	18.4
1235.8387	4.9026	3.5	3.8994^o	4.5	1235.8283	0.0011	14.9
1241.5335	4.5399	5.5	3.5413^o	6.5	1241.5284^{bc}	0.0011	33.0
1241.5412	4.4017	6.5	3.4031^o	6.5	1241.5284^b	0.0011	33.0
1242.9192	2.6398^o	3.5	1.6423	4.5	1242.9271^c	0.0011	15.2
1243.8066	4.9758	8.5	3.9790^o	7.5	1243.8141^c	0.0011	17.9
1252.6996	5.1200	2.5	4.1303^o	3.5	1252.6953^c	0.0016	41.1
1253.3237	1.5487^o	5.5	0.5595	6.5	1253.3132^c	0.0016	15.5
1255.2446	1.6681^o	7.5	0.6804	6.5	1255.2453	0.0016	19.0
1258.1861	2.3347^o	4.5	1.3493	4.5	1258.1812	0.0016	20.8
1265.8092	4.6520	8.5	3.6726^o	7.5	1265.7784	0.0016	14.7
1272.4662	2.3844^o	7.5	1.4101	7.5	1272.4565^b	0.0014	20.8
1272.4735	2.5921^o	5.5	1.6178	5.5	1272.4566^b	0.0014	21.1
1273.5106	3.0649^o	6.5	2.0914	7.5	1273.5025^c	0.0014	18.7
1279.3049	2.0131^o	5.5	1.0440	4.5	1279.3197^b	0.0014	69.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1279.3108	4.5943	5.5	3.6251^o	5.5	1279.3197^b	0.0014	69.6
1281.2431	4.7979	4.5	3.8302^o	3.5	1281.2350	0.0014	16.9
1283.3256	2.0468^o	1.5	1.0807	1.5	1283.3273	0.0014	29.9
1283.5858	4.3661	5.5	3.4002^o	4.5	1283.5849^c	0.0014	32.0
1290.9406	4.6743	7.5	3.7139^o	7.5	1290.9389^c	0.0021	30.4
1292.8181	5.1176	2.5	4.1586^o	2.5	1292.8324	0.0021	36.2
1293.2520	2.0991^o	2.5	1.1404	3.5	1293.2557^c	0.0021	17.9
1300.6418	4.8733	4.5	3.9201^o	4.5	1300.6464^c	0.0021	17.2
1304.1248	5.1819	4.5	4.2312^o	5.5	1304.1387^b	0.0021	45.6
1304.1510	5.4466	4.5	4.4959^o	3.5	1304.1387^b	0.0021	45.2
1305.0484	4.5281	5.5	3.5781^o	5.5	1305.0494	0.0021	25.1
1308.1061	2.2517^o	10.5	1.3039	10.5	1308.1059^c	0.0021	81.3
1318.2178	4.7088	2.5	3.7683^o	3.5	1318.2141^c	0.0017	17.9
1318.5897	2.5825^o	3.5	1.6423	4.5	1318.5965^c	0.0017	26.3
1325.2168	3.0434^o	7.5	2.1079	7.5	1325.2361^c	0.0018	40.1
1325.6727	4.5677	4.5	3.6325^o	4.5	1325.6732^{bc}	0.0018	20.1
1325.6894	2.8878^o	9.5	1.9526	9.5	1325.6732^b	0.0018	20.0
1328.1821	4.4419	4.5	3.5085^o	4.5	1328.1685	0.0018	24.4
1341.4419	5.5275	6.5	4.6032^o	5.5	1341.4303^c	0.0013	16.7
1347.3239	4.1777	5.5	3.2575^o	5.5	1347.3348^c	0.0013	41.2
1360.7553	4.9026	3.5	3.9915^o	2.5	1360.7423^b	0.0019	16.5
1360.7566	5.1423	4.5	4.2312^o	5.5	1360.7423^b	0.0019	16.5
1363.5440	4.5768	4.5	3.6676^o	5.5	1363.5329	0.0019	16.3
1366.8709	2.0435^o	9.5	1.1364	9.5	1366.8709	0.0019	93.0
1383.5124	4.6865	4.5	3.7903^o	3.5	1383.5273	0.0010	14.5
1387.6718	5.6416	7.5	4.7481^o	6.5	1387.6884	0.0010	19.0
1390.6629	4.8209	4.5	3.9293^o	4.5	1390.6806^c	0.0010	18.3
1391.0586	2.3014^o	8.5	1.4101	7.5	1391.0417^c	0.0010	18.3
1394.6894	2.3014^o	8.5	1.4124	9.5	1394.6944^{bc}	0.0010	22.7
1394.6968	4.7979	4.5	3.9090^o	5.5	1394.6942^b	0.0010	24.1
1394.7015	4.9052	4.5	4.0163^o	3.5	1394.6941^b	0.0010	24.3
1394.7079	5.4404	4.5	4.5515^o	3.5	1394.6939^b	0.0010	25.0
1396.7661	2.0241^o	8.5	1.1364	9.5	1396.7675	0.0010	29.8
1398.4749	4.4919	5.5	3.6054^o	5.5	1398.4797^c	0.0010	68.6
1403.5797	2.3191^o	5.5	1.4358	6.5	1403.5839^c	0.0010	49.7
1415.9001	2.1041^o	3.5	1.2285	3.5	1415.9010^c	0.0015	66.9
1421.2681	1.8479^o	8.5	0.9756	8.5	1421.2670	0.0015	136.2
1423.4268	1.8466^o	7.5	0.9756	8.5	1423.4317^c	0.0015	36.9
1425.3705	5.1152	2.5	4.2453^o	2.5	1425.3773^c	0.0015	90.8
1427.8269	4.3559	5.5	3.4876^o	5.5	1427.8337^b	0.0015	29.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1427.8320	1.5487^o	5.5	0.6804	6.5	1427.8337^b	0.0015	29.6
1427.8491	4.9299	4.5	4.0616^o	5.5	1427.8337^b	0.0015	29.6
1431.9221	4.6697	4.5	3.8039^o	3.5	1431.9050^c	0.0015	37.7
1433.1134	5.2599	2.5	4.3948^o	1.5	1433.1278^{bc}	0.0012	25.4
1433.1298	1.6880^o	6.5	0.8229	7.5	1433.1278^b	0.0012	25.6
1437.7783	1.7217^o	4.5	0.8594	5.5	1437.7800	0.0012	15.1
1446.5625	2.7115^o	6.5	1.8545	7.5	1446.5618^c	0.0012	30.0
1455.0174	2.9115^o	7.5	2.0594	8.5	1455.0276^{bc}	0.0012	74.0
1455.0248	4.6400	4.5	3.7879^o	3.5	1455.0276^b	0.0012	74.0
1455.0269	1.4023^o	4.5	0.5502	5.5	1455.0276^b	0.0012	74.0
1458.5243	4.7094	4.5	3.8594^o	3.5	1458.5463^b	0.0012	67.5
1458.5445	1.5946^o	3.5	0.7445	4.5	1458.5463^b	0.0012	67.2
1461.2000	1.5289^o	5.5	0.6804	6.5	1461.1995^c	0.0013	18.1
1462.1219	1.5283^o	6.5	0.6804	6.5	1462.1233	0.0013	64.8
1466.9640	1.6681^o	7.5	0.8229	7.5	1466.9668^c	0.0013	144.9
1475.0970	2.2529^o	8.5	1.4124	9.5	1475.0958	0.0013	27.1
1479.2906	4.3996	7.5	3.5615^o	6.5	1479.3063^b	0.0013	42.8
1479.3096	4.9299	4.5	4.0918^o	5.5	1479.3063^b	0.0013	41.3
1480.5813	4.5768	4.5	3.7395^o	5.5	1480.5992^{bc}	0.0013	23.7
1480.6041	4.7979	4.5	3.9605^o	4.5	1480.5992^b	0.0013	23.7
1495.1393	2.0538^o	4.5	1.2246	4.5	1495.1566^c	0.0019	27.1
1502.3948	5.2662	2.5	4.4409^o	2.5	1502.3967^{bc}	0.0019	77.0
1502.4117	4.8733	4.5	4.0481^o	5.5	1502.3967^b	0.0019	76.8
1503.7130	1.3747^o	5.5	0.5502	5.5	1503.7124^c	0.0019	231.7
1507.0777	4.8733	4.5	4.0506^o	4.5	1507.0694	0.0019	61.5
1508.1148	4.8388	7.5	4.0167^o	6.5	1508.1413^b	0.0019	14.1
1508.1250	1.5025^o	6.5	0.6804	6.5	1508.1413^b	0.0019	14.1
1527.5280	4.1745	5.5	3.3629^o	6.5	1527.5190	0.0018	15.1
1528.5168	5.4036	5.5	4.5925^o	4.5	1528.5141^c	0.0018	564.8
1528.8521	4.6408	3.5	3.8299^o	2.5	1528.8664^b	0.0018	57.5
1528.8638	1.4913^o	6.5	0.6804	6.5	1528.8664^b	0.0018	57.7
1528.8813	5.3717	3.5	4.5608^o	2.5	1528.8664^b	0.0018	57.7
1536.4264	4.5643	6.5	3.7574^o	7.5	1536.4487^{bc}	0.0019	18.8
1536.4512	4.1698	6.5	3.3629^o	6.5	1536.4487^b	0.0019	18.8
1537.2329	5.3575	3.5	4.5510^o	4.5	1537.2358^b	0.0019	53.6
1537.2341	2.0705^o	7.5	1.2640	8.5	1537.2358^b	0.0019	53.6
1538.4178	4.6252	3.5	3.8193^o	3.5	1538.4362^c	0.0019	35.5
1540.6516	1.8854^o	2.5	1.0807	1.5	1540.6670	0.0019	14.1
1541.9891	4.6697	4.5	3.8657^o	4.5	1541.9791	0.0019	20.9

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1565.8384	2.3366^o	8.5	1.5448	8.5	1565.8399	0.0011	19.2
1589.8150	4.7588	7.5	3.9790^o	7.5	1589.8441^c	0.0011	14.7
1591.6635	1.3291^o	5.5	0.5502	5.5	1591.6693	0.0011	40.9
1593.7037	5.1152	2.5	4.3372^o	3.5	1593.7111	0.0012	31.5
1596.4087	2.0991^o	2.5	1.3225	3.5	1596.4014^c	0.0012	15.2
1598.2317	1.8969^o	6.5	1.1211	7.5	1598.2340	0.0012	48.3
1605.8014	1.5166^o	3.5	0.7445	4.5	1605.8036^b	0.0012	29.5
1605.8195	5.6785	7.5	4.9064^o	6.5	1605.8036^b	0.0012	29.3
1606.1432	4.9417^o	7.5	4.1698	6.5	1606.1322	0.0012	20.0
1612.2284	5.1200	2.5	4.3510^o	3.5	1612.2342^c	0.0012	37.0
1615.8809	5.1493	1.5	4.3820^o	0.5	1615.8661^c	0.0015	64.9
1617.2934	5.1176	2.5	4.3510^o	3.5	1617.2982^c	0.0015	56.2
1622.0692	2.5598^o	6.5	1.7955	7.5	1622.0517^c	0.0015	28.5
1626.6484	1.7478^o	5.5	0.9857	6.5	1626.6514	0.0015	46.0
1627.6519	5.1819	4.5	4.4202^o	3.5	1627.6651^c	0.0015	17.8
1630.8239	1.6196^o	4.5	0.8594	5.5	1630.8249	0.0015	86.3
1634.8698	5.4404	4.5	4.6821^o	3.5	1634.8676^c	0.0015	70.8
1636.3131	5.1176	2.5	4.3599^o	2.5	1636.2935	0.0015	20.4
1638.7398	2.3014^o	8.5	1.5448	8.5	1638.7407	0.0015	31.2
1651.4963	2.4497^o	4.5	1.6990	4.5	1651.4883	0.0014	16.2
1655.4825	4.7094	4.5	3.9605^o	4.5	1655.4909	0.0014	17.1
1658.9236	2.2766^o	5.5	1.5292	6.5	1658.9072^c	0.0014	29.0
1662.4283	4.6658	5.5	3.9201^o	4.5	1662.4481	0.0014	45.5
1681.1710	4.5677	4.5	3.8302^o	3.5	1681.1530	0.0014	86.7
1689.4603	4.7588	7.5	4.0250^o	7.5	1689.4380^c	0.0015	14.9
1693.7712	5.2662	2.5	4.5342^o	3.5	1693.7549^c	0.0015	67.1
1694.6323	5.0395	2.5	4.3079^o	3.5	1694.6420^c	0.0015	19.6
1728.0320	2.4497^o	4.5	1.7322	4.5	1728.0305^c	0.0014	17.1
1735.9957	4.7648	3.5	4.0506^o	4.5	1735.9937^c	0.0014	38.3
1746.9904	5.3296	5.5	4.6199^o	6.5	1746.9664^c	0.0014	117.4
1759.8353	4.2908	4.5	3.5863^o	4.5	1759.8355^c	0.0015	55.8
1762.8725	5.1710	5.5	4.4677^o	4.5	1762.8711^b	0.0028	25.4
1762.8918	4.3996	7.5	3.6963^o	6.5	1762.8711^b	0.0028	25.3
1776.0617	4.5521	4.5	3.8540^o	5.5	1776.0796^c	0.0029	4569.1
1789.8591	4.6408	3.5	3.9482^o	3.5	1789.8659^c	0.0029	20.1
1790.4077	1.6681^o	7.5	0.9756	8.5	1790.4085	0.0029	18.5
1813.6395	2.2128^o	5.5	1.5292	6.5	1813.6405	0.0014	15.0
1815.0747	1.8545	7.5	1.1714^o	7.5	1815.0857^c	0.0014	35.7
1824.6410	4.6400	4.5	3.9605^o	4.5	1824.6384^c	0.0014	9954.5
1833.0042	2.4183^o	4.5	1.7419	5.5	1833.0182	0.0014	14.3

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1857.0861	4.7979	4.5	4.1303^o	3.5	1857.0685^c	0.0016	10701.0
1872.0264	4.1777	5.5	3.5154^o	6.5	1871.9997^c	0.0016	562.3
1888.5492	2.0131^o	5.5	1.3566	5.5	1888.5558^c	0.0017	20.3
1924.0149	5.3780	5.5	4.7336^o	4.5	1924.0036^c	0.0015	11171.5
1936.1665	2.2371^o	4.5	1.5968	3.5	1936.1838	0.0015	50.3
1944.7368	4.6514	5.5	4.0139^o	5.5	1944.7366^b	0.0020	35.4
1944.7440	1.6815^o	4.5	1.0440	4.5	1944.7365^b	0.0020	35.9
1961.5566	4.5521	4.5	3.9201^o	4.5	1961.5569	0.0020	260.8
1965.8512	4.2908	4.5	3.6601^o	4.5	1965.8761^c	0.0020	30.4
1967.3673	5.1423	4.5	4.5121^o	3.5	1967.3571^c	0.0020	20.4
1967.5376	1.3747^o	5.5	0.7445	4.5	1967.5437^b	0.0020	59.5
1967.5461	4.9144	8.5	4.2843^o	7.5	1967.5437^b	0.0020	58.8
1968.4284	5.3780	5.5	4.7481^o	6.5	1968.4149^c	0.0020	15.4
1978.6077	4.3661	5.5	3.7395^o	5.5	1978.5958^{bc}	0.0021	36.6
1978.6210	4.9299	4.5	4.3033^o	3.5	1978.5958^b	0.0021	36.7
1997.1740	1.7810^o	5.5	1.1602	5.5	1997.1877^b	0.0024	49.2
1997.2199	5.0356	7.5	4.4149^o	7.5	1997.1875^b	0.0024	50.3
2001.7736	5.0395	2.5	4.4202^o	3.5	2001.7638	0.0024	16.0
2007.0568	2.2155^o	4.5	1.5978	5.5	2007.0502^c	0.0025	78.5
2013.5390	1.8403^o	4.5	1.2246	4.5	2013.5618^c	0.0025	113.4
2031.1415	5.2896	3.5	4.6792^o	2.5	2031.1623^c	0.0025	82.5
2036.3530	4.9026	3.5	4.2937^o	2.5	2036.3766^{bc}	0.0025	27.2
2036.3882	2.1308^o	5.5	1.5220	5.5	2036.3766^b	0.0025	26.8
2051.7362	4.6658	5.5	4.0616^o	5.5	2051.7279	0.0011	47.7
2088.2887	4.7714^o	5.5	4.1777	5.5	2088.3062^c	0.0011	16.1
2132.1475	4.4017	6.5	3.8202^o	6.5	2132.1435^c	0.0015	30.7
2143.0921	4.3559	5.5	3.7774^o	6.5	2143.0758^c	0.0015	109.7
2173.1619	5.3169	8.5	4.7464^o	7.5	2173.1558^c	0.0021	2419.7
2178.2924	4.1745	5.5	3.6054^o	5.5	2178.3148^c	0.0022	34.9
2179.4873	4.5677	4.5	3.9988^o	4.5	2179.4799^c	0.0022	17.7
2189.8418	1.2465^o	5.5	0.6804	6.5	2189.8387	0.0022	20.9
2193.8605	2.2510^o	6.5	1.6859	6.5	2193.8475	0.0022	48.7
2203.6528	4.9299	4.5	4.3673^o	5.5	2203.6763^c	0.0022	1274.8
2265.6215	5.1710	5.5	4.6238^o	6.5	2265.6466^c	0.0001	586.8
2345.8374	5.0395	2.5	4.5110^o	2.5	2345.8387^c	0.0009	16.3

Table A.39: Measured wavelengths and intensities of Eu I infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
944.9884	4.8973^o	2.5	3.5853	3.5	944.9877	0.0005	13.7
953.0499	4.8671	4.5	3.5662^o	4.5	953.0549	0.0006	19.9
957.0642	3.9934^o	4.5	2.6980	4.5	957.0696^b	0.0006	21.1
957.0788	5.5654	3.5	4.2700^o	3.5	957.0696^b	0.0006	21.2
957.8535	4.8605	3.5	3.5662^o	4.5	957.8687	0.0006	25.6
961.1475	3.9486^o	3.5	2.6587	2.5	961.1514	0.0006	245.0
962.3342	3.6994	4.5	2.4111^o	5.5	962.3330	0.0006	56.0
967.1694	3.6714	5.5	2.3895^o	4.5	967.1689	0.0009	16.4
976.2155	3.9486^o	3.5	2.6786	3.5	976.2163	0.0007	121.8
991.3210	3.9486^o	3.5	2.6980	4.5	991.3244	0.0009	149.3
1008.7682	3.6185	4.5	2.3895^o	4.5	1008.7665^b	0.0010	22.1
1008.7733	4.7952	3.5	3.5662^o	4.5	1008.7665^b	0.0010	22.1
1016.8492	5.5652	2.5	4.3459^o	3.5	1016.8399^c	0.0007	344.0
1018.1412	3.6185	4.5	2.4008^o	3.5	1018.1393	0.0007	13.4
1023.2566	3.8704^o	3.5	2.6587	2.5	1023.2532	0.0007	1036.9
1025.2383	5.0545^o	4.5	3.8452	5.5	1025.2327	0.0007	31.4
1026.7858	3.6185	4.5	2.4111^o	5.5	1026.7859	0.0007	54.5
1033.6729	4.8591	4.5	3.6597^o	3.5	1033.6818^b	0.0009	35.6
1033.6815	5.0307^o	3.5	3.8312	4.5	1033.6819^b	0.0009	35.5
1036.5261	4.8955^o	5.5	3.6994	4.5	1036.5375	0.0009	26.2
1036.8142	3.5853	3.5	2.3895^o	4.5	1036.8303	0.0009	25.0
1038.4000	5.0545^o	4.5	3.8605	3.5	1038.3919	0.0009	55.1
1040.3521	3.8704^o	3.5	2.6786	3.5	1040.3482	0.0009	1400.6
1046.5659	3.6185	4.5	2.4339^o	4.5	1046.5651	0.0011	102.0
1052.6360	4.9962^o	3.5	3.8184	2.5	1052.6305	0.0011	22.9
1055.5014	3.6185	4.5	2.4439^o	3.5	1055.5019	0.0011	46.4
1055.7990	5.0651^o	4.5	3.8908	4.5	1055.7968	0.0011	18.6
1057.5162	3.5853	3.5	2.4129^o	2.5	1057.5238^b	0.0009	912.3
1057.5251	3.8704^o	3.5	2.6980	4.5	1057.5238^b	0.0009	912.3
1057.5263	4.9962^o	3.5	3.8238	3.5	1057.5238^b	0.0009	912.3
1057.5374	5.5159	2.5	4.3435^o	3.5	1057.5238^b	0.0009	912.6
1064.2623	4.9962^o	3.5	3.8312	4.5	1064.2563	0.0009	9.8
1064.8505	5.5384	4.5	4.3741^o	4.5	1064.8504	0.0009	48.4
1065.4506	5.0545^o	4.5	3.8908	4.5	1065.4358	0.0009	23.9
1069.1814	4.9962^o	3.5	3.8366	2.5	1069.1881	0.0009	68.2
1072.2021	5.1382^o	5.5	3.9819	6.5	1072.2092^b	0.0010	25.6
1072.2032	4.7105^o	3.5	3.5542	2.5	1072.2092^b	0.0010	25.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1072.2216	5.3798	3.5	4.2235[o]	2.5	1072.2094[b]	0.0010	26.6
1074.9278	5.5936	4.5	4.4402[o]	4.5	1074.9387[b]	0.0010	14.6
1074.9348	3.5542	2.5	2.4008[o]	3.5	1074.9387[b]	0.0010	14.7
1078.2345	5.5900	3.5	4.4402[o]	4.5	1078.2469	0.0010	9.5
1086.2457	3.5853	3.5	2.4439[o]	3.5	1086.2529	0.0010	24.7
1087.3619	3.5741	3.5	2.4339[o]	4.5	1087.3661	0.0013	35.9
1087.7380	4.8706[o]	3.5	3.7308	2.5	1087.7403[b]	0.0013	23.2
1087.7380	5.0307[o]	3.5	3.8908	4.5	1087.7403[b]	0.0013	23.2
1087.7428	5.5800	4.5	4.4402[o]	4.5	1087.7403[b]	0.0013	23.2
1092.3721	3.5853	3.5	2.4503[o]	2.5	1092.3818	0.0013	40.5
1095.5086	5.0651[o]	4.5	3.9334	5.5	1095.5131	0.0013	165.1
1097.0109	3.5741	3.5	2.4439[o]	3.5	1097.0160	0.0013	9.8
1103.2596	3.5741	3.5	2.4503[o]	2.5	1103.2644	0.0008	16.2
1116.6647	3.5542	2.5	2.4439[o]	3.5	1116.6698	0.0008	91.6
1117.1637	4.8270[o]	2.5	3.7173	2.5	1117.1743	0.0008	8.2
1121.6534	4.9962[o]	3.5	3.8908	4.5	1121.6476	0.0007	31.2
1126.9917	3.5542	2.5	2.4541[o]	1.5	1126.9989[b]	0.0007	57.2
1126.9929	5.4354	3.5	4.3353[o]	2.5	1126.9989[b]	0.0007	57.2
1130.2768	5.1382[o]	5.5	4.0413	4.5	1130.2810	0.0007	29.7
1142.0492	3.5359	1.5	2.4503[o]	2.5	1142.0478	0.0007	68.1
1146.0320	3.5359	1.5	2.4541[o]	1.5	1146.0322	0.0007	35.3
1149.4372	5.0307[o]	3.5	3.9520	2.5	1149.4440	0.0007	8.5
1150.7387	4.8765[o]	5.5	3.7991	4.5	1150.7411[b]	0.0007	8.6
1150.7414	5.1044	4.5	4.0270[o]	5.5	1150.7411[b]	0.0007	8.6
1166.4855	5.0307[o]	3.5	3.9678	3.5	1166.4900	0.0007	21.0
1182.4370	5.5936	4.5	4.5451[o]	3.5	1182.4501	0.0014	17.8
1182.6118	5.0651[o]	4.5	4.0168	3.5	1182.6096	0.0014	59.4
1196.9296	4.8810[o]	6.5	3.8452	5.5	1196.9431	0.0009	8.1
1210.9763	5.0651[o]	4.5	4.0413	4.5	1210.9722	0.0010	7.0
1214.7923	5.5111	3.5	4.4905[o]	4.5	1214.7691	0.0010	11.1
1222.8302	5.0307[o]	3.5	4.0168	3.5	1222.8343	0.0010	7.0
1249.6126	5.3783	4.5	4.3862[o]	3.5	1249.6322	0.0016	8.8
1253.1815	5.0307[o]	3.5	4.0413	4.5	1253.1832[c]	0.0016	9.0
1257.8506	4.8765[o]	5.5	3.8908	4.5	1257.8593[b]	0.0016	8.4
1257.8632	4.7819	3.5	3.7962[o]	2.5	1257.8588[b]	0.0016	9.8
1257.8806	5.3718	4.5	4.3862[o]	3.5	1257.8582[b]	0.0016	10.8
1263.9940	4.7771	1.5	3.7962[o]	2.5	1263.9749	0.0016	6.3
1265.8596	4.9962[o]	3.5	4.0168	3.5	1265.8543	0.0016	20.8
1278.7887	5.0545[o]	4.5	4.0850	5.5	1278.7765	0.0014	33.3
1286.0496	4.6598[o]	3.5	3.6958	3.5	1286.0329	0.0014	6.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1385.3486	4.5546	2.5	3.6597^o	3.5	1385.3445	0.0010	12.9
1388.1428	5.3686	2.5	4.4754^o	3.5	1388.1605^c	0.0010	68.8
1395.4241	4.8371	4.5	3.9486^o	3.5	1395.4049	0.0010	7.8
1397.0676	5.1109	3.5	4.2235^o	2.5	1397.0758	0.0010	87.1
1422.2789	4.5314	4.5	3.6597^o	3.5	1422.2872	0.0015	6.0
1472.8734	5.0307^o	3.5	4.1889	2.5	1472.8799	0.0013	9.3
1480.9703	5.0651^o	4.5	4.2280	3.5	1480.9850	0.0013	8.8
1483.4704	5.3721	4.5	4.5364^o	3.5	1483.4577	0.0013	11.4
1490.3529	4.8732^o	4.5	4.0413	4.5	1490.3308	0.0019	7.5
1494.0336	5.4414	3.5	4.6116^o	4.5	1494.0297	0.0019	6.6
1494.9113	5.3048	3.5	4.4754^o	3.5	1494.9312	0.0019	10.2
1497.3265	5.1060	6.5	4.2780^o	5.5	1497.3185	0.0019	7.8
1501.7405	5.1691	3.5	4.3435^o	3.5	1501.7301	0.0019	24.5
1570.6995	4.3435^o	3.5	3.5542	2.5	1570.6974	0.0011	7.3
1573.2151	2.6786	3.5	1.8906^o	2.5	1573.2213	0.0011	7.2
1577.2846	2.6980	4.5	1.9119^o	3.5	1577.2780	0.0011	7.4
1592.5824	4.3526^o	4.5	3.5741	3.5	1592.5975	0.0011	8.5
1593.7728	4.3965^o	5.5	3.6185	4.5	1593.7848	0.0012	18.9
1617.0972	2.6786	3.5	1.9119^o	3.5	1617.1017	0.0015	17.5
1642.0038	4.4723^o	2.5	3.7173	2.5	1641.9994	0.0015	8.8
1644.4528	4.7473	3.5	3.9934^o	4.5	1644.4686^b	0.0015	53.7
1644.4664	5.1186	4.5	4.3647^o	5.5	1644.4686^b	0.0015	53.6
1644.4718	2.6980	4.5	1.9441^o	4.5	1644.4686^b	0.0015	53.6
1644.4934	4.5502	3.5	3.7962^o	2.5	1644.4686^b	0.0015	53.7
1649.3784	4.4689^o	1.5	3.7173	2.5	1649.3729	0.0014	6.5
1655.2400	5.2244	2.5	4.4754^o	3.5	1655.2503	0.0014	5.8
1661.6098	4.3647^o	5.5	3.6185	4.5	1661.6069	0.0014	7.2
1687.8492	5.0399^o	3.5	4.3053	4.5	1687.8119	0.0015	21.4
1760.0986	2.6980	4.5	1.9936^o	5.5	1760.0859	0.0015	169.5
1762.9471	4.5736	4.5	3.8704^o	3.5	1762.9824	0.0028	138.2
1794.3947	5.1062^o	3.5	4.4153	3.5	1794.3925	0.0029	15.9
1797.8271	5.1049^o	4.5	4.4153	3.5	1797.8179	0.0029	68.4
1800.7700	4.8765^o	5.5	4.1880	4.5	1800.7557^b	0.0029	1262.6
1800.7797	4.2547	5.5	3.5662^o	4.5	1800.7557^b	0.0029	1265.2
1816.5469	5.1091^o	1.5	4.4266	2.5	1816.5493	0.0014	6.1
1823.7891	4.5502	3.5	3.8704^o	3.5	1823.8302	0.0014	181.0
1824.2316	5.2132	4.5	4.5336^o	4.5	1824.2418^b	0.0014	41.8
1824.2416	5.1062^o	3.5	4.4266	2.5	1824.2418^b	0.0014	41.9
1833.2713	4.6598^o	3.5	3.9835	4.5	1833.2438	0.0014	14.5
1833.6781	4.8765^o	5.5	4.2004	4.5	1833.6885	0.0014	78.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1849.9437	4.8706^o	3.5	4.2004	4.5	1849.9716	0.0016	22.8
1905.7238	5.5159	2.5	4.8653^o	3.5	1905.7182^b	0.0015	8.1
1905.7311	4.4689^o	1.5	3.8184	2.5	1905.7182^b	0.0015	8.1
1915.3639	4.3070	4.5	3.6597^o	3.5	1915.3729	0.0015	119.6
1953.0983	4.8955^o	5.5	4.2607	4.5	1953.1044	0.0020	151.0
1982.5496	4.2850	3.5	3.6597^o	3.5	1982.5539	0.0021	833.0
1983.8082	4.5736	4.5	3.9486^o	3.5	1983.8326	0.0021	17.8
1984.8989	5.0399^o	3.5	4.4153	3.5	1984.9050^b	0.0021	937.1
1984.9304	4.2843	2.5	3.6597^o	3.5	1984.9050^b	0.0021	939.0
2002.3909	4.4402^o	4.5	3.8210	5.5	2002.4044^b	0.0024	11.0
2002.4149	4.8427	3.5	4.2235^o	2.5	2002.4045^b	0.0024	11.1
2013.4701	4.8765^o	5.5	4.2607	4.5	2013.4715	0.0025	8.5
2016.3851	5.5111	3.5	4.8962^o	4.5	2016.3904	0.0025	110.8
2024.2341	4.8955^o	5.5	4.2831	4.5	2024.2405	0.0025	30.8
2026.5437	4.4723^o	2.5	3.8605	3.5	2026.5304	0.0025	44.1
2028.5539	4.8962^o	4.5	4.2850	3.5	2028.5194	0.0025	47.2
2061.1842	4.5502	3.5	3.9486^o	3.5	2061.2100	0.0011	15.4
2062.5914	4.2607	4.5	3.6597^o	3.5	2062.6136	0.0011	1458.6
2074.3832	4.5387^o	2.5	3.9411	1.5	2074.3869	0.0011	483.0
2093.1975	4.6116^o	4.5	4.0193	5.5	2093.2092	0.0011	15.5
2110.2968	4.8706^o	3.5	4.2831	4.5	2110.3222	0.0015	11.1
2116.2678	4.8591	4.5	4.2732^o	4.5	2116.2474	0.0015	71.8
2117.3611	4.8706^o	3.5	4.2850	3.5	2117.3746	0.0015	19.1
2193.5020	4.8706^o	3.5	4.3053	4.5	2193.4844^b	0.0022	37.3
2193.5116	4.3965^o	5.5	3.8312	4.5	2193.4846^b	0.0022	38.0
2277.4115	4.5378	3.5	3.9934^o	4.5	2277.4029^b	0.0001	12.8
2277.4322	4.2040	3.5	3.6597^o	3.5	2277.4029^b	0.0001	12.6
2384.0062	4.7933	4.5	4.2732^o	4.5	2383.9850	0.0027	14.6
2401.5081	4.3741^o	4.5	3.8578	3.5	2401.4849	0.0027	8.4
2408.4546	4.9902	4.5	4.4754^o	3.5	2408.4402	0.0027	13.7
2421.9057	4.7819	3.5	4.2700^o	3.5	2421.9216	0.0027	13.4

Table A.40: Measured wavelengths and intensities of Eu II infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
990.0980	3.3604	3.0	2.1082^o	4.0	990.0985	0.0009	459.2
999.1328	3.3793	2.0	2.1384^o	2.0	999.1355	0.0009	404.2
1002.2269	3.3275	4.0	2.0904^o	5.0	1002.2278	0.0010	656.8
1003.6936	3.3604	3.0	2.1251^o	3.0	1003.6930	0.0010	394.9
1006.8780	3.3793	2.0	2.1479^o	1.0	1006.8763	0.0010	430.9
1014.5692	3.3604	3.0	2.1384^o	2.0	1014.5684	0.0007	93.2
1016.8347	3.3275	4.0	2.1082^o	4.0	1016.8399^c	0.0007	343.9
1031.1798	3.3275	4.0	2.1251^o	3.0	1031.1837	0.0009	77.9
1253.1627	6.1552^o	3.0	5.1659	4.0	1253.1832^c	0.0016	9.2
1361.0738	3.0013	4.0	2.0904^o	5.0	1361.0711	0.0019	269.0
1388.1563	3.0013	4.0	2.1082^o	4.0	1388.1605^c	0.0010	68.9
1415.0296	3.0013	4.0	2.1251^o	3.0	1415.0297	0.0015	12.5
1477.0569	2.9476	3.0	2.1082^o	4.0	1477.0580	0.0013	53.1
1507.5203	2.9476	3.0	2.1251^o	3.0	1507.5256	0.0019	35.0
1532.1890	2.9476	3.0	2.1384^o	2.0	1532.1903^b	0.0018	12.4

Table A.41: Measured wavelengths and intensities of Dy I infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
939.5079	3.2863	5.0	1.9667^o	6.0	939.5101^c	0.0005	12.8
939.9026	3.8589	7.0	2.5398^o	7.0	939.9071^c	0.0005	14.2
940.6117	3.6153	6.0	2.2972^o	7.0	940.6166^c	0.0005	13.0
942.9932	3.8533	5.0	2.5385^o	4.0	942.9999	0.0005	20.2
943.1837	2.4566^o	5.0	1.1421	5.0	943.1909^b	0.0005	88.8
943.1907	4.8502	9.0	3.5357^o	8.0	943.1909^b	0.0005	89.6
943.7230	3.8884	7.0	2.5746^o	7.0	943.7264	0.0005	9.1
944.2773	4.0205	8.0	2.7076^o	9.0	944.2729	0.0005	24.6
945.7955	3.7042	7.0	2.3934^o	6.0	945.7988^b	0.0005	38.7
945.7991	3.2775	7.0	1.9667^o	6.0	945.7988^b	0.0005	38.5
946.9939	3.3287	7.0	2.0195^o	8.0	946.9992	0.0005	1437.4
948.1531	4.3116	10.0	3.0040^o	9.0	948.1569^c	0.0005	9.5
949.5545	3.0870	6.0	1.7813^o	7.0	949.5609^b	0.0005	58.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
949.5639	4.2228	7.0	2.9172^o	6.0	949.5609^b	0.0005	59.2
949.7632	4.7379	6.0	3.4325^o	5.0	949.7734^b	0.0005	151.2
949.7659	2.2434	7.0	0.9380^o	8.0	949.7734^b	0.0005	151.0
949.7786	4.7567	7.0	3.4513^o	7.0	949.7734^b	0.0005	152.0
950.0872	4.6917	8.0	3.3867^o	7.0	950.0768	0.0005	3193.0
950.3680	3.5119	6.0	2.2074^o	5.0	950.3756^c	0.0005	19.8
950.7918	4.8397	9.0	3.5357^o	8.0	950.7747	0.0005	21.0
952.1225	3.8420	6.0	2.5398^o	7.0	952.1282	0.0006	9.1
952.4386	3.0831	6.0	1.7813^o	7.0	952.4421	0.0006	102.1
952.9763	3.5541	5.0	2.2531^o	6.0	952.9812	0.0006	27.1
953.1516	5.7517	7.0	4.4509^o	8.0	953.1632^b	0.0006	100.8
953.1553	4.3137^o	6.0	3.0130	6.0	953.1632^b	0.0006	100.6
953.1600	1.8133^o	8.0	0.5126	7.0	953.1632^b	0.0006	100.5
954.4143	4.5393	6.0	3.2403^o	5.0	954.4204^b	0.0006	106.4
954.4207	3.3560	6.0	2.0570^o	6.0	954.4204^b	0.0006	106.7
954.6781	3.7397	7.0	2.4410^o	8.0	954.6758^c	0.0006	23.6
955.8822	3.5044	5.0	2.2074^o	5.0	955.8872	0.0006	15.6
957.8434	3.6615	7.0	2.3671^o	8.0	957.8509	0.0006	403.2
959.5041	3.2588	5.0	1.9667^o	6.0	959.5099	0.0006	41.1
959.6957	3.6590	7.0	2.3671^o	8.0	959.7037	0.0006	76.6
959.8246	2.3479	7.0	1.0562^o	7.0	959.8281	0.0006	171.6
959.9379	3.9930	9.0	2.7014^o	10.0	959.9437^b	0.0006	13.5
959.9555	4.6627	7.0	3.3711^o	6.0	959.9436^b	0.0006	14.1
960.2237	4.2418^o	7.0	2.9507	7.0	960.2252	0.0006	92.9
960.7532	5.2680	5.0	3.9776^o	6.0	960.7637^b	0.0006	22.6
960.7588	3.8884	7.0	2.5979^o	7.0	960.7637^b	0.0006	22.6
963.0052	4.7200	6.0	3.4325^o	5.0	963.0197^b	0.0008	21.7
963.0200	2.3436	8.0	1.0562^o	7.0	963.0197^b	0.0008	21.7
963.7319	2.8555	8.0	1.5690^o	7.0	963.7371^c	0.0008	82.3
964.0905	3.7896^o	7.0	2.5036	8.0	964.0987^{bc}	0.0008	126.3
964.1073	4.2228	7.0	2.9368^o	6.0	964.0987^{bc}	0.0008	126.2
964.9948	4.6459	5.0	3.3611^o	5.0	965.0056	0.0008	35.4
966.9215	4.1913	7.0	2.9091^o	6.0	966.9251^b	0.0008	2031.3
966.9216	3.3549	8.0	2.0727^o	9.0	966.9251^b	0.0008	2031.3
968.4414	4.6294	8.0	3.3492^o	9.0	968.4505^b	0.0009	4167.1
968.4452	2.8787	9.0	1.5985^o	10.0	968.4505^b	0.0009	4165.4
969.1510	4.1722^o	5.0	2.8930	6.0	969.1565	0.0009	50.0
969.5870	3.6570	5.0	2.3783^o	6.0	969.5974^c	0.0009	26.3
969.7863	3.1623	6.0	1.8839^o	7.0	969.7939	0.0009	13.5
970.1212	3.1619	7.0	1.8839^o	7.0	970.1293	0.0009	30.3

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
970.6015	3.6153	6.0	2.3379^o	7.0	970.6067	0.0009	151.0
970.8370	4.3569	3.0	3.0798^o	4.0	970.8375	0.0009	195.6
971.1038	3.9473	10.0	2.6706^o	9.0	971.1169^b	0.0009	23.3
971.1227	4.0846	6.0	2.8079^o	7.0	971.1166^b	0.0009	23.0
972.0194	3.5767	6.0	2.3012^o	6.0	972.0254	0.0009	81.4
972.8005	3.9451	8.0	2.6706^o	9.0	972.8071	0.0009	13.8
973.3307	5.5156	8.0	4.2418^o	7.0	973.3343	0.0009	77.0
973.4966	3.2538	9.0	1.9803^o	9.0	973.5022^b	0.0009	29.5
973.5127	3.4665	7.0	2.1930^o	7.0	973.5023^b	0.0009	29.8
974.4775	3.8533	5.0	2.5810^o	6.0	974.4844	0.0009	21.6
974.9363	3.3287	7.0	2.0570^o	6.0	974.9379^c	0.0009	145.0
976.5692	3.8589	7.0	2.5893^o	8.0	976.5763^c	0.0007	66.3
977.1748	1.7813^o	7.0	0.5126	7.0	977.1798^b	0.0007	11.0
977.1904	5.1646^o	6.0	3.8959	7.0	977.1798^b	0.0007	10.8
979.2142	4.1599	7.0	2.8937^o	7.0	979.2327^c	0.0007	21.5
980.1398	2.5036	8.0	1.2387^o	9.0	980.1429	0.0007	274.2
980.9625	3.3209	6.0	2.0570^o	6.0	980.9649^b	0.0007	111.0
980.9644	5.3293	7.0	4.0654^o	6.0	980.9649^b	0.0007	111.6
981.9652	3.4700	6.0	2.2074^o	5.0	981.9649	0.0007	13.7
982.5982	4.4317	6.0	3.1699^o	7.0	982.5952	0.0007	24.2
983.8743	4.8520^o	8.0	3.5919	8.0	983.8812^c	0.0007	23.3
985.5149	3.2775	7.0	2.0195^o	8.0	985.5217	0.0007	24.0
986.0625	4.7104	8.0	3.4530^o	8.0	986.0594^c	0.0007	11.7
986.5367	3.7965	7.0	2.5398^o	7.0	986.5481^b	0.0007	100.8
986.5416	3.2762	7.0	2.0195^o	8.0	986.5481^b	0.0007	101.1
986.5523	3.5098	5.0	2.2531^o	6.0	986.5481^b	0.0007	101.3
987.0762	3.2227	5.0	1.9667^o	6.0	987.0788	0.0007	12.9
992.7904	4.1599	7.0	2.9110^o	7.0	992.7806^c	0.0009	23.5
993.7924	3.0289	7.0	1.7813^o	7.0	993.7938	0.0009	95.8
994.7923	3.5842	6.0	2.3379^o	7.0	994.7899	0.0009	22.9
995.2477	2.1837	8.0	0.9380^o	8.0	995.2518	0.0009	65.2
996.1480	2.7333	9.0	1.4887^o	8.0	996.1594^b	0.0009	1436.6
996.1580	2.9178	8.0	1.6732^o	9.0	996.1594^b	0.0009	1437.7
998.2568	5.0580	5.0	3.8160^o	6.0	998.2649^c	0.0009	11.2
998.8992	3.5384	8.0	2.2972^o	7.0	998.9018	0.0009	14.5
999.3724	4.5181^o	7.0	3.2775	7.0	999.3576^b	0.0009	19.6
999.3784	4.7763	7.0	3.5357^o	8.0	999.3576^b	0.0009	19.6
1000.4802	5.3338	5.0	4.0946^o	5.0	1000.4886	0.0009	14.3
1000.7966	4.5057^o	9.0	3.2668	8.0	1000.8036^{bc}	0.0009	116.1
1000.7986	3.5767	6.0	2.3379^o	7.0	1000.8036^{bc}	0.0009	116.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1001.9498	4.1227	9.0	2.8853^o	9.0	1001.9591	0.0010	14.5
1004.3993	5.2900	10.0	4.0557^o	9.0	1004.4100	0.0010	48.6
1005.5709	5.0179	8.0	3.7849^o	7.0	1005.5808^b	0.0010	43.5
1005.5719	4.6041	7.0	3.3711^o	6.0	1005.5808^b	0.0010	43.5
1005.5779	3.6875	11.0	2.4546^o	10.0	1005.5808^b	0.0010	43.3
1005.5901	4.7240^o	9.0	3.4911	9.0	1005.5808^b	0.0010	43.0
1006.4048	4.8474	7.0	3.6155^o	7.0	1006.4018	0.0010	12.6
1007.2126	5.0179	8.0	3.7869^o	8.0	1007.2172^b	0.0010	165.3
1007.2136	4.1913	7.0	2.9604^o	8.0	1007.2172^b	0.0010	165.3
1007.2158	3.0870	6.0	1.8561^o	6.0	1007.2172^b	0.0010	165.3
1007.2198	3.9016	8.0	2.6706^o	9.0	1007.2172^b	0.0010	165.3
1008.3939	3.6841	9.0	2.4546^o	10.0	1008.3904^b	0.0010	14.9
1008.3939	4.8449	7.0	3.6155^o	7.0	1008.3904^b	0.0010	14.9
1008.3959	4.8397	9.0	3.6102^o	9.0	1008.3904^b	0.0010	14.9
1009.2080	3.6831	10.0	2.4546^o	10.0	1009.2119	0.0010	140.9
1009.3659	3.6531	9.0	2.4248^o	9.0	1009.3676	0.0010	12.1
1010.8139	2.8998	8.0	1.6732^o	9.0	1010.8201^b	0.0010	70.7
1010.8178	4.6136	7.0	3.3870^o	8.0	1010.8200^b	0.0010	70.3
1010.8311	4.7425^o	7.0	3.5159	7.0	1010.8200^b	0.0010	70.3
1011.5325	3.5159	7.0	2.2903^o	8.0	1011.5358^b	0.0010	29.5
1011.5458	4.8765	7.0	3.6509^o	6.0	1011.5358^b	0.0010	29.6
1011.5489	4.8846^o	8.0	3.6590	7.0	1011.5358^b	0.0010	29.6
1012.9755	4.6935	6.0	3.4695^o	7.0	1012.9799^b	0.0010	70.7
1012.9773	3.2588	5.0	2.0349^o	4.0	1012.9799^b	0.0010	70.7
1013.2308	5.0955	8.0	3.8718^o	7.0	1013.2287	0.0010	14.8
1013.3375	4.0161	6.0	2.7926^o	5.0	1013.3540^b	0.0010	14.3
1013.3581	3.6800	6.0	2.4566^o	5.0	1013.3540^b	0.0010	14.2
1015.8653	3.6615	7.0	2.4410^o	8.0	1015.8676^b	0.0007	175.9
1015.8699	4.7364^o	8.0	3.5159	7.0	1015.8676^b	0.0007	175.9
1016.7037	4.6890	8.0	3.4695^o	7.0	1016.7050	0.0007	47.8
1017.2785	3.5159	7.0	2.2972^o	7.0	1017.2819	0.0007	27.6
1018.4731	3.5186	5.0	2.3012^o	6.0	1018.4762	0.0007	17.0
1019.9263	3.0289	7.0	1.8133^o	8.0	1019.9298^{bc}	0.0007	704.4
1019.9315	3.3870^o	8.0	2.1715	9.0	1019.9298^{bc}	0.0007	705.0
1020.0595	3.5734^o	7.0	2.3580	8.0	1020.0660^{bc}	0.0007	23.6
1020.0699	4.9198	7.0	3.7044^o	7.0	1020.0660^{bc}	0.0007	24.0
1022.0217	2.8863	8.0	1.6732^o	9.0	1022.0252	0.0007	144.7
1023.0692	4.0557	3.0	2.8439^o	4.0	1023.0555^b	0.0007	25.5
1023.0692	3.4048	7.0	2.1930^o	7.0	1023.0555^b	0.0007	25.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1023.4210	3.8016	4.0	2.5902^o	5.0	1023.4214	0.0007	22.5
1024.4597	5.0179	8.0	3.8077^o	7.0	1024.4521	0.0007	45.7
1025.5937	4.7948	5.0	3.5859^o	4.0	1025.5898	0.0007	17.9
1025.8536	3.5098	5.0	2.3012^o	6.0	1025.8580	0.0007	15.2
1026.0241	3.8790	9.0	2.6706^o	9.0	1026.0268^b	0.0007	50.9
1026.0332	3.9091	6.0	2.7007^o	7.0	1026.0268^b	0.0007	50.9
1026.9787	4.7648	4.0	3.5576^o	3.0	1026.9794	0.0007	18.1
1027.3807	3.6316	8.0	2.4248^o	9.0	1027.3836	0.0007	94.9
1030.4785	3.0870	6.0	1.8839^o	7.0	1030.4814^c	0.0009	73.7
1031.0902	5.0101	6.0	3.8077^o	7.0	1031.0876^c	0.0009	29.2
1032.8071	3.6570	5.0	2.4566^o	5.0	1032.8092	0.0009	48.7
1033.8760	3.0831	6.0	1.8839^o	7.0	1033.8784	0.0009	46.0
1034.2620	4.0840	8.0	2.8853^o	9.0	1034.2610	0.0009	16.0
1036.2018	4.8474	7.0	3.6509^o	6.0	1036.2003^c	0.0009	14.9
1036.9930	2.0697^o	7.0	0.8741	6.0	1037.0048^{bc}	0.0009	19.9
1037.0088	4.8756^o	7.0	3.6800	6.0	1037.0048^{bc}	0.0009	19.8
1037.0131	4.6890	8.0	3.4934^o	8.0	1037.0048^{bc}	0.0009	19.8
1037.0131	3.9354	5.0	2.7399^o	4.0	1037.0048^{bc}	0.0009	19.8
1038.6945	5.1002^o	8.0	3.9065	7.0	1038.7037^{bc}	0.0009	15.3
1038.7161	3.7746	7.0	2.5810^o	6.0	1038.7037^{bc}	0.0009	15.1
1039.9671	4.2556	7.0	3.0634^o	7.0	1039.9680^b	0.0009	46.5
1039.9778	5.0238	6.0	3.8316^o	5.0	1039.9680^b	0.0009	47.6
1041.1905	4.3008	9.0	3.1100^o	9.0	1041.1764	0.0009	13.2
1046.9527	4.3669	7.0	3.1826^o	6.0	1046.9508	0.0011	159.0
1047.6832	4.4502^o	8.0	3.2668	8.0	1047.6895^b	0.0011	14.1
1047.6909	3.5767	6.0	2.3934^o	6.0	1047.6895^b	0.0011	14.0
1047.6909	5.0344^o	8.0	3.8510	8.0	1047.6895^b	0.0011	14.0
1047.6909	5.0202	6.0	3.8368^o	5.0	1047.6895^b	0.0011	14.0
1048.3488	4.0824^o	9.0	2.8998	8.0	1048.3350^{bc}	0.0011	14.0
1048.3510	4.3074	5.0	3.1248^o	4.0	1048.3350^{bc}	0.0011	14.1
1048.7096	2.8555	8.0	1.6732^o	9.0	1048.7107	0.0011	1152.8
1048.9668	4.4358^o	8.0	3.2538	9.0	1048.9781	0.0011	31.9
1049.2761	2.9363	6.0	1.7548^o	5.0	1049.2761	0.0011	390.9
1050.6884	4.8309	5.0	3.6509^o	6.0	1050.6984^b	0.0011	14.8
1050.6917	5.8710	8.0	4.6910^o	9.0	1050.6984^b	0.0011	14.7
1051.8289	3.4318	5.0	2.2531^o	6.0	1051.8299	0.0011	53.8
1052.8410	3.8790	9.0	2.7014^o	10.0	1052.8429^c	0.0011	78.9
1054.0440	3.4665	7.0	2.2903^o	8.0	1054.0451	0.0011	47.3
1055.9517	4.6328^o	7.0	3.4587	8.0	1055.9520^c	0.0011	27.1
1059.7396	5.1307	8.0	3.9608^o	7.0	1059.7316	0.0009	15.3

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1061.1104	3.4587	8.0	2.2903[o]	8.0	1061.1122[b]	0.0009	78.4
1061.1194	3.4028	8.0	2.2344[o]	8.0	1061.1122[b]	0.0009	78.6
1063.7551	3.3492[o]	9.0	2.1837	8.0	1063.7514	0.0009	296.1
1065.9799	3.3560	6.0	2.1930[o]	7.0	1065.9824	0.0009	303.6
1067.4352	3.4587	8.0	2.2972[o]	7.0	1067.4397[b]	0.0009	27.9
1067.4409	4.5779	7.0	3.4165[o]	7.0	1067.4397[b]	0.0009	27.9
1067.4421	3.5767	6.0	2.4153[o]	5.0	1067.4397[b]	0.0009	27.9
1069.8963	2.9721	7.0	1.8133[o]	8.0	1069.9013	0.0009	28.4
1069.9822	3.6153	6.0	2.4566[o]	5.0	1069.9824	0.0009	23.0
1073.4147	2.9363	6.0	1.7813[o]	7.0	1073.4159[c]	0.0010	33.0
1075.9560	4.5015	8.0	3.3492[o]	9.0	1075.9598[b]	0.0010	462.7
1075.9572	3.6875	11.0	2.5352[o]	11.0	1075.9598[b]	0.0010	462.7
1075.9595	4.3702	8.0	3.2179[o]	9.0	1075.9598[b]	0.0010	462.0
1079.1677	3.5159	7.0	2.3671[o]	8.0	1079.1754[b]	0.0010	17.0
1079.1701	5.5156	8.0	4.3668[o]	9.0	1079.1754[b]	0.0010	17.0
1079.1806	4.6240	7.0	3.4751[o]	8.0	1079.1754[b]	0.0010	16.9
1079.3599	4.3666	9.0	3.2179[o]	9.0	1079.3654[bc]	0.0010	59.0
1079.3658	3.3560	6.0	2.2074[o]	5.0	1079.3654[bc]	0.0010	58.8
1082.7854	3.0289	7.0	1.8839[o]	7.0	1082.7893[c]	0.0010	132.2
1089.8731	3.8082	9.0	2.6706[o]	9.0	1089.8770[bc]	0.0013	52.0
1089.8814	4.3075	7.0	3.1699[o]	7.0	1089.8769[bc]	0.0013	52.5
1090.0644	2.9507	7.0	1.8133[o]	8.0	1090.0679	0.0013	54.9
1090.8980	5.0083	7.0	3.8718[o]	7.0	1090.9076[bc]	0.0013	32.8
1090.9058	2.9178	8.0	1.7813[o]	7.0	1090.9076[bc]	0.0013	32.8
1097.5129	3.7235	5.0	2.5939[o]	5.0	1097.5137[bc]	0.0013	18.2
1097.5214	4.5461	7.0	3.4165[o]	7.0	1097.5137[bc]	0.0013	18.0
1097.8262	3.9354	5.0	2.8061[o]	6.0	1097.8281	0.0013	24.8
1098.0335	3.0130	6.0	1.8839[o]	7.0	1098.0391[c]	0.0013	19.6
1099.1898	4.8080[o]	7.0	3.6800	6.0	1099.2012[b]	0.0013	125.0
1099.1970	3.3209	6.0	2.1930[o]	7.0	1099.2012[b]	0.0013	125.1
1099.2079	5.0238	6.0	3.8959[o]	7.0	1099.2012[b]	0.0013	125.2
1099.5342	4.8320	8.0	3.7044[o]	7.0	1099.5264	0.0013	15.7
1105.4732	4.4502[o]	8.0	3.3287	7.0	1105.4743	0.0008	18.1
1106.6293	5.7517	7.0	4.6313[o]	8.0	1106.6343[b]	0.0008	142.1
1106.6329	3.0870	6.0	1.9667[o]	6.0	1106.6344[b]	0.0008	141.9
1107.2983	3.2897	6.0	2.1700[o]	5.0	1107.2890	0.0008	22.6
1107.4541	2.9328	7.0	1.8133[o]	8.0	1107.4601	0.0008	32.9
1107.6434	2.3580	8.0	1.2387[o]	9.0	1107.6478[bc]	0.0008	29.6
1107.6503	4.2188	7.0	3.0995[o]	8.0	1107.6478[bc]	0.0008	29.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1108.2715	4.1227	9.0	3.0040^o	9.0	1108.2726	0.0008	31.6
1108.4828	3.6570	5.0	2.5385^o	4.0	1108.4838^b	0.0008	18.1
1108.4951	5.3179	4.0	4.1994^o	5.0	1108.4837^b	0.0008	17.5
1110.5521	3.0831	6.0	1.9667^o	6.0	1110.5527^b	0.0008	112.0
1110.5521	4.1994^o	5.0	3.0831	6.0	1110.5527^b	0.0008	112.0
1110.9074	4.3116	10.0	3.1955^o	10.0	1110.9087^b	0.0008	32.9
1110.9088	2.9721	7.0	1.8561^o	6.0	1110.9087^b	0.0008	32.9
1112.1838	4.8191	8.0	3.7044^o	7.0	1112.1970^b	0.0008	18.3
1112.1924	4.0654^o	6.0	2.9507	7.0	1112.1969^b	0.0008	18.0
1112.1976	2.7880	10.0	1.6732^o	9.0	1112.1969^b	0.0008	17.8
1113.4357	3.3209	6.0	2.2074^o	5.0	1113.4366^c	0.0008	78.6
1115.3706	2.9249	7.0	1.8133^o	8.0	1115.3745^b	0.0008	53.0
1115.3868	4.6075	6.0	3.4960^o	6.0	1115.3745^b	0.0008	53.1
1116.4677	3.6998	8.0	2.5893^o	8.0	1116.4681	0.0008	18.6
1118.7046	4.0511	8.0	2.9429^o	9.0	1118.7025^{bc}	0.0007	122.7
1118.7096	5.1457	7.0	4.0374^o	7.0	1118.7025^{bc}	0.0007	122.9
1119.3370	3.4048	7.0	2.2972^o	7.0	1119.3384	0.0007	167.9
1121.2070	3.7764	9.0	2.6706^o	9.0	1121.2091^c	0.0007	25.6
1122.0529	2.3436	8.0	1.2387^o	9.0	1122.0538	0.0007	47.3
1122.4781	2.9178	8.0	1.8133^o	8.0	1122.4803	0.0007	133.6
1124.0919	3.3560	6.0	2.2531^o	6.0	1124.0930^b	0.0007	35.6
1124.0931	5.2345	3.0	4.1316^o	4.0	1124.0930^b	0.0007	35.6
1124.1058	5.1457	7.0	4.0428^o	6.0	1124.0930^b	0.0007	35.9
1125.8637	4.1021	9.0	3.0009^o	8.0	1125.8631	0.0007	18.4
1126.6869	3.5252	10.0	2.4248^o	9.0	1126.6879	0.0007	85.1
1128.3001	3.0289	7.0	1.9301^o	8.0	1128.3010^c	0.0007	21.6
1129.0454	4.1021	9.0	3.0040^o	9.0	1129.0432^c	0.0007	28.3
1129.9716	4.5461	7.0	3.4489^o	8.0	1129.9724	0.0007	65.6
1130.4570	3.2897	6.0	2.1930^o	7.0	1130.4600^c	0.0007	134.3
1131.9666	4.9029	6.0	3.8077^o	7.0	1131.9681^c	0.0007	39.3
1132.1379	4.5461	7.0	3.4510^o	7.0	1132.1397	0.0007	58.8
1132.6684	2.9507	7.0	1.8561^o	6.0	1132.6703^b	0.0007	65.0
1132.6747	3.6165	7.0	2.5219^o	8.0	1132.6703^b	0.0007	65.0
1134.0028	4.0654^o	6.0	2.9721	7.0	1134.0132^b	0.0007	488.7
1134.0119	4.0362	8.0	2.9429^o	9.0	1134.0132^b	0.0007	488.6
1134.2569	4.5461	7.0	3.4530^o	8.0	1134.2580^b	0.0007	37.2
1134.2665	4.3016^o	7.0	3.2085	7.0	1134.2580^b	0.0007	36.7
1134.5239	4.4956^o	9.0	3.4028	8.0	1134.5342	0.0007	29.8
1135.2091	3.1619	7.0	2.0697^o	7.0	1135.2068	0.0007	25.2

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1136.6503	4.0511	8.0	2.9604[o]	8.0	1136.6496[c]	0.0007	78.1
1137.5891	3.6800	6.0	2.5902[o]	5.0	1137.6052[bc]	0.0007	30.4
1137.6202	4.5387	7.0	3.4489[o]	8.0	1137.6052[bc]	0.0007	30.7
1138.5983	2.5775	8.0	1.4887[o]	8.0	1138.5986	0.0007	141.8
1139.8116	4.4941[o]	7.0	3.4063	6.0	1139.8132[b]	0.0007	18.5
1139.8160	4.5387	7.0	3.4510[o]	7.0	1139.8132[b]	0.0007	18.5
1140.0390	3.7889	9.0	2.7014[o]	10.0	1140.0467[c]	0.0007	21.4
1140.3003	3.1619	7.0	2.0746[o]	8.0	1140.3035[bc]	0.0007	28.8
1140.3029	3.7746	7.0	2.6873[o]	7.0	1140.3035[bc]	0.0007	28.8
1140.6486	4.9029	6.0	3.8160[o]	6.0	1140.6564[b]	0.0007	19.6
1140.6541	4.8765	7.0	3.7896[o]	7.0	1140.6550[b]	0.0007	19.5
1141.9638	4.5387	7.0	3.4530[o]	8.0	1141.9629	0.0007	19.5
1142.7657	4.0205	10.0	2.9355[o]	11.0	1142.7679	0.0007	112.6
1144.6520	4.0840	8.0	3.0009[o]	8.0	1144.6788[c]	0.0007	20.7
1144.8171	2.8963	7.0	1.8133[o]	8.0	1144.8204[c]	0.0007	178.5
1146.4209	4.0362	8.0	2.9547[o]	8.0	1146.4225[b]	0.0007	182.3
1146.4261	4.8579[o]	10.0	3.7764	9.0	1146.4225[b]	0.0007	182.1
1146.4301	4.6917	8.0	3.6102[o]	9.0	1146.4225[b]	0.0007	182.1
1147.6866	5.1457	7.0	4.0654[o]	6.0	1147.6904[b]	0.0007	21.1
1147.6881	2.9363	6.0	1.8561[o]	6.0	1147.6903[b]	0.0007	21.3
1149.2707	3.9016	8.0	2.8228[o]	8.0	1149.2717[bc]	0.0007	45.3
1149.2787	4.6890	8.0	3.6102[o]	9.0	1149.2717[bc]	0.0007	45.4
1150.4766	4.0205	8.0	2.9429[o]	9.0	1150.4791	0.0007	142.0
1151.4557	2.9328	7.0	1.8561[o]	6.0	1151.4601[b]	0.0007	58.0
1151.4662	3.6165	7.0	2.5398[o]	7.0	1151.4601[b]	0.0007	57.7
1151.6403	4.5461	7.0	3.4695[o]	7.0	1151.6441	0.0007	30.8
1153.3081	3.7764	9.0	2.7014[o]	10.0	1153.3082	0.0007	17.7
1154.2474	2.8555	8.0	1.7813[o]	7.0	1154.2476[c]	0.0007	26.8
1155.2947	3.8657	6.0	2.7926[o]	5.0	1155.3069[b]	0.0007	32.8
1155.3054	3.4665	7.0	2.3934[o]	6.0	1155.3069[b]	0.0007	32.2
1155.4255	2.8863	8.0	1.8133[o]	8.0	1155.4304[b]	0.0007	20.2
1155.4309	4.7239	5.0	3.6509[o]	6.0	1155.4304[b]	0.0007	20.5
1158.0172	3.5252	10.0	2.4546[o]	10.0	1158.0202[c]	0.0007	341.8
1159.0978	3.6590	7.0	2.5893[o]	8.0	1159.1015	0.0007	20.1
1160.0162	2.9249	7.0	1.8561[o]	6.0	1160.0176[b]	0.0007	106.3
1160.0228	4.9406	6.0	3.8718[o]	7.0	1160.0176[b]	0.0007	106.1
1162.1718	2.9507	7.0	1.8839[o]	7.0	1162.1741	0.0007	121.1
1162.6988	3.4911	9.0	2.4248[o]	9.0	1162.7009	0.0007	93.4
1163.2479	4.6680	6.0	3.6022[o]	5.0	1163.2538[bc]	0.0007	117.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1163.2506	4.0205	8.0	2.9547^{o}	8.0	1163.2538^{bc}	0.0007	117.1
1165.4740	4.4111	5.0	3.3473^{o}	4.0	1165.4798^{b}	0.0007	85.9
1165.4781	3.6531	9.0	2.5893^{o}	8.0	1165.4798^{b}	0.0007	86.0
1166.2107	3.6570	5.0	2.5939^{o}	5.0	1166.2152^{b}	0.0007	31.3
1166.2134	4.8520^{o}	8.0	3.7889	9.0	1166.2152^{b}	0.0007	31.3
1167.1744	4.8472	8.0	3.7849^{o}	7.0	1167.1853^{b}	0.0007	41.1
1167.1839	3.0289	7.0	1.9667^{o}	6.0	1167.1853^{b}	0.0007	41.1
1167.4101	3.7327	10.0	2.6706^{o}	9.0	1167.4162^{b}	0.0007	35.3
1167.4278	3.5186	5.0	2.4566^{o}	5.0	1167.4162^{b}	0.0007	35.6
1167.4312	4.5150	7.0	3.4530^{o}	8.0	1167.4162^{b}	0.0007	35.7
1169.8850	4.5461	7.0	3.4863^{o}	6.0	1169.8826	0.0014	32.4
1173.5767	4.7562^{o}	7.0	3.6998	8.0	1173.5832^{b}	0.0014	20.2
1173.5838	1.5690^{o}	7.0	0.5126	7.0	1173.5832^{b}	0.0014	20.0
1173.8178	1.0562^{o}	7.0	0.0000	8.0	1173.8198^{b}	0.0014	83.9
1173.8178	3.8790	9.0	2.8228^{o}	8.0	1173.8198^{b}	0.0014	83.9
1175.4003	3.3560	6.0	2.3012^{o}	6.0	1175.4025	0.0014	107.8
1175.5665	4.5242	7.0	3.4695^{o}	7.0	1175.5629	0.0014	21.6
1175.9297	3.9396	9.0	2.8853^{o}	9.0	1175.9299	0.0014	23.6
1177.9895	2.9363	6.0	1.8839^{o}	7.0	1177.9918	0.0014	38.0
1178.0854	4.5387	7.0	3.4863^{o}	6.0	1178.0818	0.0014	47.0
1178.9130	4.5428^{o}	10.0	3.4911	9.0	1178.9271^{b}	0.0014	329.5
1178.9214	3.9695^{o}	7.0	2.9178	8.0	1178.9271^{b}	0.0014	327.4
1178.9269	3.3419	9.0	2.2903^{o}	8.0	1178.9271^{b}	0.0014	325.9
1179.9716	4.0205	10.0	2.9698^{o}	10.0	1179.9746^{b}	0.0014	143.8
1179.9828	5.0202	6.0	3.9695^{o}	7.0	1179.9746^{b}	0.0014	144.4
1180.4040	2.2890	10.0	1.2387^{o}	9.0	1180.4059^{c}	0.0014	57.3
1181.9590	2.9328	7.0	1.8839^{o}	7.0	1181.9642	0.0014	99.8
1189.6477	4.7635^{o}	7.0	3.7213	6.0	1189.6536^{bc}	0.0009	42.4
1189.6519	2.8555	8.0	1.8133^{o}	8.0	1189.6536^{bc}	0.0009	42.4
1189.6576	3.8884	7.0	2.8462^{o}	6.0	1189.6535^{bc}	0.0009	42.8
1190.9809	2.9249	7.0	1.8839^{o}	7.0	1190.9849	0.0009	112.8
1191.3782	3.6153	6.0	2.5746^{o}	7.0	1191.3937^{b}	0.0009	27.3
1191.3924	4.1227	9.0	3.0820^{o}	10.0	1191.3936^{b}	0.0009	27.4
1191.8980	4.9480	8.0	3.9078^{o}	7.0	1191.9035^{b}	0.0009	35.9
1191.9009	2.8963	7.0	1.8561^{o}	6.0	1191.9035^{b}	0.0009	35.9
1194.7274	3.4048	7.0	2.3671^{o}	8.0	1194.7321	0.0009	22.2
1196.0936	3.4911	9.0	2.4546^{o}	10.0	1196.0946^{c}	0.0009	179.3
1199.0882	2.9178	8.0	1.8839^{o}	7.0	1199.0906^{c}	0.0009	81.9
1199.1889	3.4587	8.0	2.4248^{o}	9.0	1199.1891^{c}	0.0009	85.3

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1201.9361	3.3287	7.0	2.2972^o	7.0	1201.9365	0.0009	34.1
1202.2525	3.7327	10.0	2.7014^o	10.0	1202.2539^b	0.0009	142.5
1202.2569	5.0869	9.0	4.0557^o	9.0	1202.2539^b	0.0009	142.5
1204.6727	3.6998	8.0	2.6706^o	9.0	1204.6723	0.0009	46.2
1206.3075	3.6800	6.0	2.6523^o	6.0	1206.3079	0.0009	32.1
1212.0419	5.3338	5.0	4.3109^o	6.0	1212.0410^c	0.0010	25.9
1214.1522	3.5541	5.0	2.5329^o	4.0	1214.1561^b	0.0010	20.7
1214.1654	4.7425^o	7.0	3.7213	6.0	1214.1562^b	0.0010	20.5
1214.1669	4.5946	6.0	3.5734^o	7.0	1214.1562^b	0.0010	20.5
1215.2219	4.9897	7.0	3.9695^o	7.0	1215.2294^c	0.0010	19.8
1215.4331	4.1021	9.0	3.0820^o	10.0	1215.4334^{bc}	0.0010	18.4
1215.4390	5.5156	8.0	4.4956^o	9.0	1215.4334^{bc}	0.0010	18.4
1215.8838	4.0205	8.0	3.0009^o	8.0	1215.8910^b	0.0010	47.3
1215.9163	3.3209	6.0	2.3012^o	6.0	1215.8910^b	0.0010	47.5
1217.1580	4.1300^o	7.0	3.1114	8.0	1217.1680^b	0.0010	218.2
1217.1669	3.6165	7.0	2.5979^o	7.0	1217.1680^b	0.0010	218.0
1219.2014	3.7042	7.0	2.6873^o	7.0	1219.2120	0.0010	20.0
1219.6133	4.7562^o	7.0	3.7397	7.0	1219.6195^{bc}	0.0010	36.0
1219.6208	4.5523	9.0	3.5357^o	8.0	1219.6196^{bc}	0.0010	35.0
1219.6237	3.4318	5.0	2.4153^o	5.0	1219.6198^{bc}	0.0010	33.3
1221.5264	2.5036	8.0	1.4887^o	8.0	1221.5283^b	0.0010	19.8
1221.5456	3.9112^o	8.0	2.8963	7.0	1221.5283^b	0.0010	19.8
1223.9333	3.4063	6.0	2.3934^o	6.0	1223.9363	0.0010	48.7
1224.6153	2.8963	7.0	1.8839^o	7.0	1224.6173	0.0010	111.6
1225.3611	3.9473	10.0	2.9355^o	11.0	1225.3638^b	0.0010	42.9
1225.3731	4.6627	7.0	3.6509^o	6.0	1225.3638^b	0.0010	42.9
1225.7681	3.4048	7.0	2.3934^o	6.0	1225.7672^b	0.0011	74.6
1225.7816	3.9112^o	8.0	2.8998	8.0	1225.7672^b	0.0011	74.6
1228.2689	3.0289	7.0	2.0195^o	8.0	1228.2708^b	0.0011	220.3
1228.2764	3.8533	5.0	2.8439^o	4.0	1228.2708^b	0.0011	220.3
1229.2986	2.5775	8.0	1.5690^o	7.0	1229.2998^b	0.0011	181.8
1229.3016	4.0374^o	7.0	3.0289	7.0	1229.2998^b	0.0011	182.0
1231.5468	3.6590	7.0	2.6523^o	6.0	1231.5487	0.0011	103.7
1233.4855	2.6784	8.0	1.6732^o	9.0	1233.4886^b	0.0011	67.4
1233.4943	3.9300^o	7.0	2.9249	7.0	1233.4886^b	0.0011	67.6
1234.5283	3.7044^o	7.0	2.7001	7.0	1234.5351^c	0.0011	25.6
1236.6213	3.5919	8.0	2.5893^o	8.0	1236.6209	0.0011	93.1
1251.3421	3.3287	7.0	2.3379^o	7.0	1251.3536^c	0.0016	43.0
1251.8433	3.9451	8.0	2.9547^o	8.0	1251.8495	0.0016	28.0

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1254.2724	4.5242	7.0	3.5357^o	8.0	1254.2847^b	0.0016	25.8
1254.2834	3.2897	6.0	2.3012^o	6.0	1254.2847^b	0.0016	26.1
1254.3967	3.8111	8.0	2.8228^o	8.0	1254.3966	0.0016	21.8
1255.2487	4.0511	8.0	3.0634^o	7.0	1255.2459	0.0016	197.8
1255.8081	3.2775	7.0	2.2903^o	8.0	1255.8154^b	0.0016	40.1
1255.8349	4.9480	8.0	3.9608^o	7.0	1255.8154^b	0.0016	39.9
1255.9927	3.8724	8.0	2.8853^o	9.0	1255.9915	0.0016	21.9
1257.0378	3.5842	6.0	2.5979^o	7.0	1257.0370^b	0.0016	107.0
1257.0378	5.3293	7.0	4.3430^o	8.0	1257.0370^b	0.0016	107.0
1257.2907	5.5156	8.0	4.5295^o	8.0	1257.3000	0.0016	64.1
1261.3044	3.9078^o	7.0	2.9249	7.0	1261.2922^{bc}	0.0016	18.7
1261.3108	4.0840	8.0	3.1010^o	8.0	1261.2922^{bc}	0.0016	18.7
1261.9316	3.6531	9.0	2.6706^o	9.0	1261.9324	0.0016	255.2
1262.9787	3.6831	10.0	2.7014^o	10.0	1262.9814^{bc}	0.0016	166.9
1262.9819	4.7562^o	7.0	3.7746	7.0	1262.9814^{bc}	0.0016	166.9
1265.1070	4.0620	9.0	3.0820^o	10.0	1265.1109	0.0016	58.0
1266.3678	3.2762	7.0	2.2972^o	7.0	1266.3700	0.0014	136.5
1269.5543	3.2668	8.0	2.2903^o	8.0	1269.5547	0.0014	471.8
1271.2716	3.4318	5.0	2.4566^o	5.0	1271.2711^c	0.0014	25.4
1272.3844	3.2716	6.0	2.2972^o	7.0	1272.3861^b	0.0014	97.7
1272.3974	3.9111	5.0	2.9367^o	4.0	1272.3861^b	0.0014	97.6
1273.5868	3.8598^o	7.0	2.8863	8.0	1273.5968	0.0014	355.9
1274.5528	4.0362	8.0	3.0634^o	7.0	1274.5535	0.0014	395.1
1276.0522	5.1629^o	7.0	4.1913	7.0	1276.0580^b	0.0014	46.2
1276.0587	2.8555	8.0	1.8839^o	7.0	1276.0578^b	0.0014	49.6
1276.6273	3.3960	9.0	2.4248^o	9.0	1276.6258	0.0014	27.6
1276.7609	3.7938	8.0	2.8228^o	8.0	1276.7603^b	0.0014	25.0
1276.7609	3.9719	7.0	3.0009^o	8.0	1276.7603^b	0.0014	25.0
1277.6924	3.2716	6.0	2.3012^o	6.0	1277.6927^c	0.0014	32.6
1279.4727	3.7321	6.0	2.7631^o	6.0	1279.4625	0.0014	18.9
1280.0393	3.9041	10.0	2.9355^o	11.0	1280.0437	0.0014	168.2
1282.3785	4.1847	8.0	3.2179^o	9.0	1282.3767	0.0014	27.2
1282.5544	3.7746	7.0	2.8079^o	7.0	1282.5456	0.0014	21.3
1283.2473	3.7889	9.0	2.8228^o	8.0	1283.2510^b	0.0014	28.2
1283.2490	2.9328	7.0	1.9667^o	6.0	1283.2510^b	0.0014	28.2
1285.7470	3.6165	7.0	2.6523^o	6.0	1285.7464	0.0014	84.0
1286.6883	3.2538	9.0	2.2903^o	8.0	1286.6893^b	0.0014	350.6
1286.6883	4.4042	5.0	3.4407^o	4.0	1286.6893^b	0.0014	350.6
1290.2160	3.6316	8.0	2.6706^o	9.0	1290.2178	0.0021	19.7
1293.8904	2.9249	7.0	1.9667^o	6.0	1293.8929^b	0.0021	89.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1293.9004	3.7213	6.0	2.7631[o]	6.0	1293.8929[b]	0.0021	89.3
1295.3854	4.7440	7.0	3.7869[o]	8.0	1295.3921[b]	0.0021	83.3
1295.3871	3.8533	5.0	2.8962[o]	6.0	1295.3921[b]	0.0021	83.3
1295.3890	4.0205	8.0	3.0634[o]	7.0	1295.3921[b]	0.0021	83.3
1296.1208	4.1504	7.0	3.1938[o]	8.0	1296.1226	0.0021	19.3
1301.9460	4.9897	7.0	4.0374[o]	7.0	1301.9478	0.0021	19.9
1302.5820	3.9065	7.0	2.9547[o]	8.0	1302.5826[b]	0.0021	19.7
1302.5837	3.7746	7.0	2.8228[o]	8.0	1302.5826[b]	0.0021	19.7
1302.7432	3.6531	9.0	2.7014[o]	10.0	1302.7444[c]	0.0021	219.5
1306.3869	3.5384	8.0	2.5893[o]	8.0	1306.3860	0.0021	217.1
1310.8857	3.8420	6.0	2.8962[o]	6.0	1310.8857	0.0017	37.8
1311.9141	4.8846[o]	8.0	3.9396	9.0	1311.9300[bc]	0.0017	33.3
1311.9252	2.1837	8.0	1.2387[o]	9.0	1311.9300[bc]	0.0017	33.3
1314.2297	3.9473	10.0	3.0040[o]	9.0	1314.2319[b]	0.0017	22.6
1314.2331	3.4489[o]	8.0	2.5055	9.0	1314.2319[b]	0.0017	22.6
1314.3800	3.0130	6.0	2.0697[o]	7.0	1314.3835	0.0017	56.6
1317.0008	3.3960	9.0	2.4546[o]	10.0	1317.0026[b]	0.0017	74.8
1317.0146	4.5181[o]	7.0	3.5767	6.0	1317.0026[b]	0.0017	74.5
1317.3391	3.9451	8.0	3.0040[o]	9.0	1317.3418[b]	0.0017	46.7
1317.3530	3.8959	7.0	2.9547[o]	8.0	1317.3418[b]	0.0017	46.7
1317.8582	3.3560	6.0	2.4153[o]	5.0	1317.8582[c]	0.0017	20.0
1319.1551	4.7364[o]	8.0	3.7965	7.0	1319.1538[c]	0.0017	20.0
1321.1191	4.0205	10.0	3.0820[o]	10.0	1321.1209	0.0017	73.5
1323.7108	4.8296	7.0	3.8929[o]	6.0	1323.6962	0.0017	27.8
1323.9474	2.9559	9.0	2.0195[o]	8.0	1323.9503[c]	0.0017	97.7
1324.8911	3.8420	6.0	2.9062[o]	5.0	1324.8914[c]	0.0017	52.2
1326.9040	3.9041	10.0	2.9698[o]	10.0	1326.9093	0.0018	50.0
1329.1640	2.1715	9.0	1.2387[o]	9.0	1329.1681	0.0018	47.5
1330.3020	3.8683[o]	5.0	2.9363	6.0	1330.3163[b]	0.0018	90.7
1330.3144	5.1548[o]	6.0	4.2228	7.0	1330.3163[b]	0.0018	91.2
1330.3197	3.5842	6.0	2.6523[o]	6.0	1330.3163[b]	0.0018	91.2
1331.4297	4.0161	6.0	3.0849[o]	5.0	1331.4294[bc]	0.0018	25.7
1331.4374	2.9507	7.0	2.0195[o]	8.0	1331.4293[bc]	0.0018	25.7
1333.6694	4.4256	7.0	3.4960[o]	6.0	1333.6845[bc]	0.0012	30.1
1333.6854	2.8963	7.0	1.9667[o]	6.0	1333.6845[bc]	0.0012	30.1
1337.5672	4.6100[o]	11.0	3.6831	10.0	1337.5826[b]	0.0012	20.0
1337.5690	4.4389[o]	7.0	3.5119	6.0	1337.5826[b]	0.0012	19.8
1337.5797	4.8820	8.0	3.9551[o]	9.0	1337.5826[b]	0.0012	19.8
1339.0376	4.0878[o]	6.0	3.1619	7.0	1339.0395[b]	0.0013	98.2

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1339.0376	3.8111	8.0	2.8853[o]	9.0	1339.0395[b]	0.0013	98.2
1340.7342	4.0258	7.0	3.1010[o]	8.0	1340.7379[b]	0.0013	28.7
1340.7414	4.7136[o]	10.0	3.7889	9.0	1340.7379[b]	0.0013	28.9
1340.7452	4.4111	5.0	3.4863[o]	6.0	1340.7379[b]	0.0013	28.9
1342.6045	4.7104	8.0	3.7869[o]	8.0	1342.6113[b]	0.0013	30.6
1342.6117	3.5044	5.0	2.5810[o]	6.0	1342.6113[b]	0.0013	30.6
1342.6153	3.9523[o]	7.0	3.0289	7.0	1342.6113[b]	0.0013	30.6
1343.3060	3.8082	9.0	2.8853[o]	9.0	1343.3075[b]	0.0013	167.4
1343.3078	5.3587	7.0	4.4358[o]	8.0	1343.3075[b]	0.0013	167.4
1343.9975	4.6100[o]	11.0	3.6875	11.0	1344.0075	0.0013	27.2
1345.0116	4.8993	7.0	3.9776[o]	6.0	1345.0220[b]	0.0013	20.1
1345.0189	3.5119	6.0	2.5902[o]	5.0	1345.0220[b]	0.0013	20.1
1345.7610	3.5919	8.0	2.6706[o]	9.0	1345.7605	0.0013	43.6
1346.2212	4.2418[o]	7.0	3.3209	6.0	1346.2122	0.0013	47.5
1347.6817	2.7333	9.0	1.8133[o]	8.0	1347.6865[c]	0.0013	19.3
1350.1763	3.2085	7.0	2.2903[o]	8.0	1350.1808	0.0013	24.9
1351.8647	5.5156	8.0	4.5985[o]	9.0	1351.8689[b]	0.0013	1203.7
1351.8683	3.3419	9.0	2.4248[o]	9.0	1351.8689[b]	0.0013	1203.0
1357.0270	3.8857[o]	6.0	2.9721	7.0	1357.0351[b]	0.0019	44.3
1357.0344	2.9833	6.0	2.0697[o]	7.0	1357.0351[b]	0.0019	44.2
1360.4332	3.2085	7.0	2.2972[o]	7.0	1360.4368	0.0019	31.0
1361.0016	3.9930	9.0	3.0820[o]	10.0	1361.0032	0.0019	37.1
1363.5607	3.8790	9.0	2.9698[o]	10.0	1363.5639	0.0019	35.1
1367.0465	4.8520[o]	8.0	3.9451	8.0	1367.0615[b]	0.0019	52.4
1367.0742	4.7229	5.0	3.8160[o]	6.0	1367.0615[b]	0.0019	53.5
1367.6392	4.1021	9.0	3.1955[o]	10.0	1367.6393	0.0019	30.3
1369.3865	2.9249	7.0	2.0195[o]	8.0	1369.3901	0.0019	52.2
1371.0049	4.9600	10.0	4.0557[o]	9.0	1371.0038[b]	0.0019	567.5
1371.0053	2.5775	8.0	1.6732[o]	9.0	1371.0038[b]	0.0019	567.5
1373.3170	3.2227	5.0	2.3199[o]	6.0	1373.3175	0.0019	42.4
1373.9076	3.8857[o]	6.0	2.9833	6.0	1373.9158[bc]	0.0019	30.6
1373.9151	2.9721	7.0	2.0697[o]	7.0	1373.9158[bc]	0.0019	30.6
1376.4985	3.9016	8.0	3.0009[o]	8.0	1376.4984[c]	0.0019	29.5
1385.4867	4.7537[o]	7.0	3.8589	7.0	1385.4895[b]	0.0010	57.7
1385.4944	4.8472	8.0	3.9523[o]	7.0	1385.4895[b]	0.0010	57.7
1387.8962	3.2716	6.0	2.3783[o]	6.0	1387.9047[b]	0.0010	40.1
1387.9000	3.4318	5.0	2.5385[o]	4.0	1387.9047[b]	0.0010	40.1
1389.9449	5.4215	8.0	4.5295[o]	8.0	1389.9601[b]	0.0010	425.7
1389.9584	3.3168	10.0	2.4248[o]	9.0	1389.9601[b]	0.0010	425.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1389.9622	3.7849^o	7.0	2.8930	6.0	1389.9601^b	0.0010	425.7
1396.6558	3.8598^o	7.0	2.9721	7.0	1396.6716^b	0.0010	62.1
1396.6744	3.3287	7.0	2.4410^o	8.0	1396.6716^b	0.0010	62.1
1397.0674	3.7965	7.0	2.9091^o	6.0	1397.0765	0.0010	185.5
1397.2257	3.3419	9.0	2.4546^o	10.0	1397.2263	0.0010	828.2
1398.0324	3.7830	5.0	2.8962^o	6.0	1398.0424^b	0.0010	37.0
1398.0559	2.7001	7.0	1.8133^o	8.0	1398.0422^b	0.0010	35.5
1402.2394	3.2775	7.0	2.3934^o	6.0	1402.2407^b	0.0010	193.3
1402.2453	4.8449	7.0	3.9608^o	7.0	1402.2407^b	0.0010	193.2
1404.3149	4.6767^o	8.0	3.7938	8.0	1404.3229^{bc}	0.0010	252.0
1404.3188	3.2762	7.0	2.3934^o	6.0	1404.3229^{bc}	0.0010	252.1
1405.2582	3.7784	6.0	2.8962^o	6.0	1405.2584	0.0010	43.9
1406.5608	3.7042	7.0	2.8228^o	8.0	1406.5583	0.0015	20.4
1409.4790	3.0870	6.0	2.2074^o	5.0	1409.4763	0.0015	167.1
1411.7215	3.2716	6.0	2.3934^o	6.0	1411.7225	0.0015	179.8
1414.6178	4.3460	8.0	3.4695^o	7.0	1414.6232^b	0.0015	30.7
1414.6272	4.5295^o	8.0	3.6531	9.0	1414.6232^b	0.0015	30.7
1415.8430	3.0831	6.0	2.2074^o	5.0	1415.8406	0.0015	244.7
1421.3651	3.7784	6.0	2.9062^o	5.0	1421.3684	0.0015	29.3
1421.9856	3.1918	5.0	2.3199^o	6.0	1421.9853	0.0015	64.6
1426.1207	2.3580	8.0	1.4887^o	8.0	1426.1383^b	0.0015	112.5
1426.1407	3.7784	6.0	2.9091^o	6.0	1426.1383^b	0.0015	112.5
1426.1409	3.4587	8.0	2.5893^o	8.0	1426.1383^b	0.0015	112.5
1428.7980	3.5384	8.0	2.6706^o	9.0	1428.7944	0.0015	199.5
1430.6152	2.9363	6.0	2.0697^o	7.0	1430.6096	0.0015	24.3
1437.9530	3.3168	10.0	2.4546^o	10.0	1437.9548	0.0012	1221.7
1438.6440	4.9238^o	8.0	4.0620	9.0	1438.6531	0.0012	740.2
1440.3784	3.4587	8.0	2.5979^o	7.0	1440.3801	0.0012	119.0
1442.8642	2.3479	7.0	1.4887^o	8.0	1442.8657	0.0012	19.2
1449.8154	5.1548^o	6.0	4.2996	6.0	1449.8217^b	0.0012	42.3
1449.8217	2.9249	7.0	2.0697^o	7.0	1449.8217^b	0.0012	42.3
1449.8343	4.7664	9.0	3.9112^o	8.0	1449.8217^b	0.0012	42.5
1450.0796	4.6627	7.0	3.8077^o	7.0	1450.0972^b	0.0012	27.6
1450.0973	2.3436	8.0	1.4887^o	8.0	1450.0972^b	0.0012	27.5
1450.8040	3.5252	10.0	2.6706^o	9.0	1450.8055^b	0.0012	200.8
1450.8145	4.2737^o	5.0	3.4192	4.0	1450.8055^b	0.0012	200.8
1452.5425	3.6615	7.0	2.8079^o	7.0	1452.5453	0.0012	24.7
1458.1362	2.9249	7.0	2.0746^o	8.0	1458.1360	0.0012	21.5
1463.0771	3.7327	10.0	2.8853^o	9.0	1463.0770	0.0013	27.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1466.1232	3.9091	6.0	3.0634[o]	7.0	1466.1321[b]	0.0013	26.7
1466.1252	3.9451	8.0	3.0995[o]	8.0	1466.1321[b]	0.0013	26.7
1466.9833	2.9178	8.0	2.0727[o]	9.0	1466.9848	0.0013	94.7
1468.8364	4.0620	9.0	3.2179[o]	9.0	1468.8494[b]	0.0013	19.6
1468.8451	3.9451	8.0	3.1010[o]	8.0	1468.8494[b]	0.0013	19.6
1470.3071	2.9178	8.0	2.0746[o]	8.0	1470.3069	0.0013	24.2
1470.7483	3.9300[o]	7.0	3.0870	6.0	1470.7323[c]	0.0013	26.5
1471.7851	4.0362	8.0	3.1938[o]	8.0	1471.7917[b]	0.0013	78.5
1471.7895	3.1623	6.0	2.3199[o]	6.0	1471.7917[b]	0.0013	78.5
1471.7916	4.6313[o]	8.0	3.7889	9.0	1471.7917[b]	0.0013	78.5
1472.3941	3.2668	8.0	2.4248[o]	9.0	1472.3940[c]	0.0013	411.5
1472.5502	4.8027	7.0	3.9608[o]	7.0	1472.5634[b]	0.0013	27.4
1472.5610	3.1619	7.0	2.3199[o]	6.0	1472.5634[b]	0.0013	27.5
1478.6862	3.8082	9.0	2.9698[o]	10.0	1478.6881	0.0013	63.4
1483.4418	4.2228	7.0	3.3870[o]	8.0	1483.4596[b]	0.0013	22.6
1483.4704	4.0946[o]	5.0	3.2588	5.0	1483.4596[b]	0.0013	22.8
1483.8799	4.1847	8.0	3.3492[o]	9.0	1483.8940[b]	0.0013	65.4
1483.8975	4.2418[o]	7.0	3.4063	6.0	1483.8940[b]	0.0013	65.2
1484.6752	3.9451	8.0	3.1100[o]	9.0	1484.6771[b]	0.0013	77.2
1484.6840	4.3016[o]	7.0	3.4665	7.0	1484.6771[b]	0.0013	77.1
1484.6928	4.7429	8.0	3.9078[o]	7.0	1484.6771[b]	0.0013	77.1
1484.6950	4.8181	7.0	3.9830[o]	6.0	1484.6771[b]	0.0013	77.3
1493.0570	2.5036	8.0	1.6732[o]	9.0	1493.0572	0.0019	59.6
1493.6341	2.8998	8.0	2.0697[o]	7.0	1493.6343	0.0019	32.6
1494.5784	3.9396	9.0	3.1100[o]	9.0	1494.5783	0.0019	33.9
1494.9225	3.2227	5.0	2.3934[o]	6.0	1494.9329	0.0019	20.3
1495.4903	3.2538	9.0	2.4248[o]	9.0	1495.4935[bc]	0.0019	176.2
1495.4964	4.6367	8.0	3.8077[o]	7.0	1495.4935[bc]	0.0019	176.2
1501.0800	3.9270	7.0	3.1010[o]	8.0	1501.0749	0.0019	38.5
1502.4603	2.8998	8.0	2.0746[o]	8.0	1502.4614[b]	0.0019	96.2
1502.4806	4.8027	7.0	3.9776[o]	6.0	1502.4614[b]	0.0019	97.4
1505.0087	3.5252	10.0	2.7014[o]	10.0	1505.0083[c]	0.0019	294.3
1505.2443	4.4339	9.0	3.6102[o]	9.0	1505.2566[b]	0.0019	64.6
1505.2579	3.6316	8.0	2.8079[o]	7.0	1505.2566[b]	0.0019	64.7
1506.0128	2.8930	6.0	2.0697[o]	7.0	1506.0129	0.0019	298.1
1508.0795	4.7299	8.0	3.9078[o]	7.0	1508.0960[b]	0.0019	100.8
1508.0909	3.9041	10.0	3.0820[o]	10.0	1508.0960[b]	0.0019	101.4
1508.1091	4.5985[o]	9.0	3.7764	9.0	1508.0960[b]	0.0019	103.0
1509.9012	3.1114	8.0	2.2903[o]	8.0	1509.9005[b]	0.0019	1205.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1509.9105	4.3075	7.0	3.4863[o]	6.0	1509.9005[b]	0.0019	1205.3
1518.2363	2.8863	8.0	2.0697[o]	7.0	1518.2350	0.0018	22.3
1519.0504	4.0878[o]	6.0	3.2716	6.0	1519.0667[b]	0.0018	136.0
1519.0643	3.4063	6.0	2.5902[o]	5.0	1519.0667[b]	0.0018	136.7
1520.9380	3.2085	7.0	2.3934[o]	6.0	1520.9391	0.0018	249.2
1522.0816	3.6998	8.0	2.8853[o]	9.0	1522.0779	0.0018	88.2
1522.7326	3.7746	7.0	2.9604[o]	8.0	1522.7410[b]	0.0018	630.1
1522.7398	3.1114	8.0	2.2972[o]	7.0	1522.7410[b]	0.0018	630.7
1524.1509	3.4028	8.0	2.5893[o]	8.0	1524.1490[b]	0.0018	258.5
1524.1625	4.9857	5.0	4.1722[o]	5.0	1524.1490[b]	0.0018	259.0
1525.9977	3.4063	6.0	2.5939[o]	5.0	1526.0035	0.0018	237.6
1527.3472	4.7200	6.0	3.9082[o]	5.0	1527.3605[bc]	0.0018	155.5
1527.3565	2.8863	8.0	2.0746[o]	8.0	1527.3605[bc]	0.0018	155.6
1529.4683	3.9354	5.0	3.1248[o]	4.0	1529.4905	0.0018	24.9
1532.9218	3.6316	8.0	2.8228[o]	8.0	1532.9212	0.0018	177.4
1533.2602	4.6804	7.0	3.8718[o]	7.0	1533.2620[b]	0.0018	58.8
1533.2626	3.6165	7.0	2.8079[o]	7.0	1533.2620[b]	0.0018	58.8
1533.6341	3.4063	6.0	2.5979[o]	7.0	1533.6372	0.0018	31.6
1534.2977	3.2762	7.0	2.4682[o]	7.0	1534.3155[b]	0.0018	70.6
1534.3189	3.7042	7.0	2.8962[o]	6.0	1534.3155[b]	0.0018	70.6
1536.5161	3.4048	7.0	2.5979[o]	7.0	1536.5157	0.0019	63.6
1536.9624	3.7764	9.0	2.9698[o]	10.0	1536.9687	0.0019	71.2
1538.9730	4.7210	8.0	3.9154[o]	7.0	1538.9859[b]	0.0019	27.6
1538.9872	3.0130	6.0	2.2074[o]	5.0	1538.9859[b]	0.0019	28.1
1540.4143	4.0946[o]	5.0	3.2897	6.0	1540.4221[b]	0.0019	127.9
1540.4238	3.4028	8.0	2.5979[o]	7.0	1540.4221[b]	0.0019	127.8
1541.5779	4.5892	7.0	3.7849[o]	7.0	1541.5986[b]	0.0019	22.1
1541.5827	3.8082	9.0	3.0040[o]	9.0	1541.5986[b]	0.0019	22.1
1544.8835	4.0205	10.0	3.2179[o]	9.0	1544.8854[c]	0.0019	22.0
1551.1933	4.5206[o]	6.0	3.7213	6.0	1551.1955[b]	0.0011	27.6
1551.1957	3.2538	9.0	2.4546[o]	10.0	1551.1955[b]	0.0011	27.6
1555.3744	4.4502[o]	8.0	3.6531	9.0	1555.3886[b]	0.0011	474.8
1555.3865	3.7327	10.0	2.9355[o]	11.0	1555.3886[b]	0.0011	474.8
1555.6212	3.8790	9.0	3.0820[o]	10.0	1555.6231	0.0011	19.3
1555.9771	4.7364[o]	8.0	3.9396	9.0	1555.9583[c]	0.0011	156.7
1557.1366	2.5775	8.0	1.7813[o]	7.0	1557.1340	0.0011	50.2
1559.8604	3.8959	7.0	3.1010[o]	8.0	1559.8606	0.0011	68.4
1563.4870	3.7938	8.0	3.0009[o]	8.0	1563.4858	0.0011	85.5
1566.3645	4.1227	9.0	3.3311[o]	8.0	1566.3637[b]	0.0011	32.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1566.3665	4.6075	6.0	3.8160[o]	6.0	1566.3637[b]	0.0011	32.4
1566.3670	3.9016	8.0	3.1100[o]	9.0	1566.3637[b]	0.0011	33.5
1566.3768	4.8472	8.0	4.0557[o]	9.0	1566.3637[b]	0.0011	33.6
1567.8749	4.1219	8.0	3.3311[o]	8.0	1567.8701	0.0011	21.8
1569.7330	3.0870	6.0	2.2972[o]	7.0	1569.7352[b]	0.0011	62.6
1569.7454	4.7674	7.0	3.9776[o]	6.0	1569.7352[b]	0.0011	63.4
1569.9622	3.4911	9.0	2.7014[o]	10.0	1569.9633	0.0011	230.4
1577.6305	3.0831	6.0	2.2972[o]	7.0	1577.6277	0.0011	57.8
1586.3322	3.3168	10.0	2.5352[o]	11.0	1586.3346	0.0011	1175.5
1594.7542	3.8409	8.0	3.0634[o]	7.0	1594.7500	0.0012	46.3
1600.8786	3.7938	8.0	3.0194[o]	7.0	1600.8920	0.0012	22.2
1602.9186	3.1114	8.0	2.3379[o]	7.0	1602.9209	0.0012	47.5
1609.3134	4.5025[o]	7.0	3.7321	6.0	1609.3031	0.0012	22.3
1614.6481	3.6531	9.0	2.8853[o]	9.0	1614.6453	0.0015	64.5
1617.6099	4.1386	5.0	3.3722[o]	6.0	1617.6037	0.0015	21.1
1617.8664	2.9363	6.0	2.1700[o]	5.0	1617.8663[c]	0.0015	42.0
1619.4280	3.3549	8.0	2.5893[o]	8.0	1619.4238	0.0015	116.4
1620.1757	4.0428[o]	6.0	3.2775	7.0	1620.1825[b]	0.0015	59.6
1620.1810	3.6590	7.0	2.8937[o]	7.0	1620.1825[b]	0.0015	59.6
1636.7496	3.0009[o]	8.0	2.2434	7.0	1636.7580	0.0015	629.7
1637.8112	3.3549	8.0	2.5979[o]	7.0	1637.8043	0.0015	55.3
1644.1176	5.4215	8.0	4.6674[o]	8.0	1644.1318[b]	0.0015	182.6
1644.1311	3.4063	6.0	2.6523[o]	6.0	1644.1318[b]	0.0015	182.2
1644.1419	4.5264	7.0	3.7723[o]	6.0	1644.1318[b]	0.0015	182.0
1644.1500	3.3287	7.0	2.5746[o]	7.0	1644.1318[b]	0.0015	180.8
1647.4112	3.3419	9.0	2.5893[o]	8.0	1647.4187	0.0015	193.9
1648.7530	4.9411	4.0	4.1892[o]	5.0	1648.7746[b]	0.0014	53.9
1648.7747	3.6875	11.0	2.9355[o]	11.0	1648.7746[b]	0.0014	53.8
1649.1173	3.9473	10.0	3.1955[o]	10.0	1649.1177	0.0014	44.7
1658.5563	3.6831	10.0	2.9355[o]	11.0	1658.5637[b]	0.0014	35.8
1658.5701	5.3214	8.0	4.5739[o]	8.0	1658.5637[b]	0.0014	35.8
1658.5728	4.5985[o]	9.0	3.8510	8.0	1658.5637[b]	0.0014	35.8
1661.5960	4.8170	6.0	4.0708[o]	6.0	1661.6144	0.0014	57.5
1665.7200	3.6615	7.0	2.9172[o]	6.0	1665.7334[bc]	0.0014	58.4
1665.7339	3.1114	8.0	2.3671[o]	8.0	1665.7335[bc]	0.0014	58.2
1666.3167	3.9396	9.0	3.1955[o]	10.0	1666.3160[b]	0.0014	83.3
1666.3167	5.1002[o]	8.0	4.3561	7.0	1666.3160[b]	0.0014	83.3
1668.5438	5.0747	5.0	4.3317[o]	6.0	1668.5468	0.0014	21.4
1670.5033	4.5311[o]	8.0	3.7889	9.0	1670.5045[b]	0.0014	55.4

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1670.5256	4.5206[o]	6.0	3.7784	6.0	1670.5044[b]	0.0014	55.4
1671.3297	3.6590	7.0	2.9172[o]	6.0	1671.3334[b]	0.0014	133.6
1671.3381	4.6275	6.0	3.8857[o]	6.0	1671.3334[b]	0.0014	134.5
1674.0660	4.5295[o]	8.0	3.7889	9.0	1674.0603	0.0014	17.6
1676.7408	3.6998	8.0	2.9604[o]	8.0	1676.7395	0.0014	28.4
1680.3334	3.6316	8.0	2.8937[o]	7.0	1680.3307	0.0014	62.0
1680.5367	4.7635[o]	7.0	4.0258	7.0	1680.5456[b]	0.0014	72.3
1680.5452	4.3296[o]	7.0	3.5919	8.0	1680.5456[b]	0.0014	72.2
1680.5452	2.9721	7.0	2.2344[o]	8.0	1680.5456[b]	0.0014	72.2
1690.9916	3.9270	7.0	3.1938[o]	8.0	1690.9927[b]	0.0015	17.4
1690.9973	4.6275	6.0	3.8944[o]	5.0	1690.9927[b]	0.0015	17.3
1693.4170	3.4028	8.0	2.6706[o]	9.0	1693.4168[bc]	0.0015	154.2
1693.4170	5.0368	4.0	4.3047[o]	4.0	1693.4168[bc]	0.0015	154.2
1694.4213	3.0289	7.0	2.2972[o]	7.0	1694.4322[b]	0.0015	23.1
1694.4299	4.2324[o]	4.0	3.5007	4.0	1694.4322[b]	0.0015	23.1
1694.4342	4.1847	8.0	3.4530[o]	8.0	1694.4322[b]	0.0015	23.1
1694.4356	4.7317	5.0	4.0000[o]	5.0	1694.4322[b]	0.0015	23.1
1694.4414	4.9411	4.0	4.2094[o]	4.0	1694.4322[b]	0.0015	23.1
1696.5601	3.3287	7.0	2.5979[o]	7.0	1696.5576[c]	0.0015	33.9
1696.6838	4.5965[o]	7.0	3.8657	6.0	1696.6946[b]	0.0015	18.1
1696.6953	3.3209	6.0	2.5902[o]	5.0	1696.6946[b]	0.0015	18.1
1697.3232	3.5384	8.0	2.8079[o]	7.0	1697.3226	0.0015	71.6
1703.8475	3.0289	7.0	2.3012[o]	6.0	1703.8605	0.0015	17.3
1704.9775	3.9451	8.0	3.2179[o]	9.0	1704.9806	0.0015	55.5
1707.2654	3.8082	9.0	3.0820[o]	10.0	1707.2708[b]	0.0015	80.9
1707.2858	4.2996	6.0	3.5734[o]	7.0	1707.2708[b]	0.0015	81.1
1709.3170	3.3960	9.0	2.6706[o]	9.0	1709.3152[b]	0.0015	54.6
1709.3170	4.6804	9.0	3.9551[o]	9.0	1709.3152[b]	0.0015	54.6
1713.2144	3.6841	9.0	2.9604[o]	8.0	1713.2166	0.0015	19.7
1717.3603	4.7425[o]	7.0	4.0205	8.0	1717.3544[c]	0.0016	18.0
1718.0418	4.2757[o]	4.0	3.5541	5.0	1718.0486[b]	0.0016	18.1
1718.0507	3.9396	9.0	3.2179[o]	9.0	1718.0486[b]	0.0016	18.1
1721.1230	3.6165	7.0	2.8962[o]	6.0	1721.1181[b]	0.0016	55.9
1721.1348	4.6327	7.0	3.9123[o]	6.0	1721.1181[b]	0.0016	55.3
1733.5078	4.6275	6.0	3.9123[o]	6.0	1733.4974	0.0014	22.2
1733.8264	3.2897	6.0	2.5746[o]	7.0	1733.8294[b]	0.0014	27.1
1733.8385	4.5387	7.0	3.8237[o]	6.0	1733.8294[b]	0.0014	27.2
1745.9381	3.8111	8.0	3.1010[o]	8.0	1745.9374	0.0014	24.2
1749.3925	3.2897	6.0	2.5810[o]	6.0	1749.3991[b]	0.0014	44.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1749.3925	4.5025^o	7.0	3.7938	8.0	1749.3991^b	0.0014	44.1
1751.0804	3.5159	7.0	2.8079^o	7.0	1751.0811	0.0014	129.9
1751.7399	3.9016	8.0	3.1938^o	8.0	1751.7374	0.0014	24.9
1762.8072	4.6556	7.0	3.9523^o	7.0	1762.8079^{bc}	0.0028	18.9
1762.8103	2.8963	7.0	2.1930^o	7.0	1762.8079^{bc}	0.0028	18.8
1762.8321	5.1629^o	7.0	4.4596	6.0	1762.8079^{bc}	0.0028	18.7
1763.8489	3.2775	7.0	2.5746^o	7.0	1763.8441	0.0028	19.6
1766.2040	3.7213	6.0	3.0194^o	7.0	1766.2233^b	0.0028	95.8
1766.2228	2.8998	8.0	2.1978^o	9.0	1766.2233^b	0.0028	95.7
1766.2228	4.7674	7.0	4.0654^o	6.0	1766.2233^b	0.0028	95.7
1771.9218	4.6075	6.0	3.9078^o	7.0	1771.9140	0.0029	29.5
1772.8026	4.1504	7.0	3.4510^o	7.0	1772.7995	0.0029	19.5
1775.1049	2.9328	7.0	2.2344^o	8.0	1775.1111	0.0029	81.3
1775.2593	3.6531	9.0	2.9547^o	8.0	1775.2648^c	0.0029	50.5
1775.3948	3.5044	5.0	2.8061^o	6.0	1775.4007	0.0029	41.1
1776.5082	3.9695^o	7.0	3.2716	6.0	1776.4846	0.0029	32.5
1777.0827	3.5938	5.0	2.8962^o	6.0	1777.0884^c	0.0029	21.1
1778.2488	4.3137^o	6.0	3.6165	7.0	1778.2452	0.0029	30.1
1780.9851	3.2863	5.0	2.5902^o	5.0	1780.9891	0.0029	71.3
1783.7270	2.1837	8.0	1.4887^o	8.0	1783.7370	0.0029	23.2
1785.4273	3.7764	9.0	3.0820^o	10.0	1785.4326^b	0.0029	102.1
1785.4528	4.5985^o	9.0	3.9041	10.0	1785.4326^b	0.0029	102.4
1786.0747	3.1623	6.0	2.4682^o	7.0	1786.0784^c	0.0029	51.7
1786.7800	4.7754	8.0	4.0815^o	7.0	1786.7912	0.0029	32.4
1787.3740	3.0870	6.0	2.3934^o	6.0	1787.3626^c	0.0029	63.7
1790.5231	3.2863	5.0	2.5939^o	5.0	1790.5275	0.0029	31.4
1793.2331	4.5150	7.0	3.8237^o	6.0	1793.2452	0.0029	50.0
1794.2176	4.7467	9.0	4.0557^o	9.0	1794.2333	0.0029	18.1
1797.6171	5.1646^o	6.0	4.4749	6.0	1797.6160^b	0.0029	51.3
1797.6203	3.0831	6.0	2.3934^o	6.0	1797.6160^b	0.0029	51.7
1797.7851	3.9123^o	6.0	3.2227	5.0	1797.7935	0.0029	124.0
1800.3388	4.5295^o	8.0	3.8409	8.0	1800.3359^b	0.0029	50.0
1800.3550	5.3214	8.0	4.6328^o	7.0	1800.3359^b	0.0029	49.9
1800.7279	2.8863	8.0	2.1978^o	9.0	1800.7264	0.0029	37.6
1801.4772	4.0946^o	5.0	3.4063	6.0	1801.5027^b	0.0029	89.4
1801.5291	3.2775	7.0	2.5893^o	8.0	1801.5027^b	0.0029	89.5
1802.4123	3.9776^o	6.0	3.2897	6.0	1802.4289^b	0.0029	32.1
1802.4318	4.7240^o	9.0	4.0362	8.0	1802.4288^b	0.0029	32.0
1804.9629	3.2762	7.0	2.5893^o	8.0	1804.9643	0.0014	63.9
1805.7615	3.2085	7.0	2.5219^o	8.0	1805.7565^b	0.0014	249.2

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1805.7615	3.1114	8.0	2.4248[o]	9.0	1805.7565[b]	0.0014	249.2
1807.0569	4.4750[o]	10.0	3.7889	9.0	1807.0440	0.0014	403.8
1807.6972	4.5924[o]	8.0	3.9065	7.0	1807.6967	0.0014	22.9
1814.0096	3.8790	9.0	3.1955[o]	10.0	1814.0140[b]	0.0014	168.1
1814.0228	2.9178	8.0	2.2344[o]	8.0	1814.0140[b]	0.0014	168.1
1814.7075	3.6841	9.0	3.0009[o]	8.0	1814.7124[b]	0.0014	43.2
1814.7174	4.2599[o]	6.0	3.5767	6.0	1814.7124[b]	0.0014	43.2
1814.7272	4.3563[o]	3.0	3.6731	3.0	1814.7124[b]	0.0014	43.1
1819.4290	4.0878[o]	6.0	3.4063	6.0	1819.4515[b]	0.0014	110.2
1819.4488	3.2716	6.0	2.5902[o]	5.0	1819.4515[b]	0.0014	110.1
1822.1209	3.6998	8.0	3.0194[o]	7.0	1822.1222	0.0014	33.1
1824.3082	3.2775	7.0	2.5979[o]	7.0	1824.3118	0.0014	97.4
1829.4044	3.2716	6.0	2.5939[o]	5.0	1829.4052	0.0014	86.9
1838.1339	4.4509[o]	8.0	3.7764	9.0	1838.1624	0.0014	17.7
1844.6271	3.0969	10.0	2.4248[o]	9.0	1844.6231	0.0014	237.2
1853.4616	3.2668	8.0	2.5979[o]	7.0	1853.4610	0.0016	354.7
1855.0535	4.6459	5.0	3.9776[o]	6.0	1855.0521[b]	0.0016	191.5
1855.0535	3.4911	9.0	2.8228[o]	8.0	1855.0521[b]	0.0016	191.5
1857.1965	4.4565[o]	10.0	3.7889	9.0	1857.2013[b]	0.0016	32.7
1857.2275	4.5634	8.0	3.8959[o]	7.0	1857.2012[b]	0.0016	32.8
1864.9758	4.5057[o]	9.0	3.8409	8.0	1864.9905[b]	0.0016	17.3
1864.9862	3.6155[o]	7.0	2.9507	7.0	1864.9905[b]	0.0016	17.1
1865.7656	3.2538	9.0	2.5893[o]	8.0	1865.7681	0.0016	170.3
1868.3417	3.5098	5.0	2.8462[o]	6.0	1868.3486[b]	0.0016	50.7
1868.3452	5.5156	8.0	4.8520[o]	8.0	1868.3486[b]	0.0016	50.7
1872.8766	4.4509[o]	8.0	3.7889	9.0	1872.8761	0.0016	74.8
1873.3713	3.0289	7.0	2.3671[o]	8.0	1873.3923[b]	0.0016	17.0
1873.3819	4.8846[o]	8.0	4.2228	7.0	1873.3922[b]	0.0016	16.9
1873.3889	3.6165	7.0	2.9547[o]	8.0	1873.3923[b]	0.0016	17.0
1873.3924	3.8237[o]	6.0	3.1619	7.0	1873.3923[b]	0.0016	17.0
1873.7504	4.5025[o]	7.0	3.8409	8.0	1873.7674	0.0016	46.9
1874.8324	5.3214	8.0	4.6601[o]	7.0	1874.8426[bc]	0.0016	20.7
1874.8360	4.4502[o]	8.0	3.7889	9.0	1874.8426[bc]	0.0016	20.7
1875.7222	3.7938	8.0	3.1329[o]	7.0	1875.7198	0.0016	45.3
1876.8170	4.5025[o]	7.0	3.8420	6.0	1876.8303	0.0016	15.5
1877.3173	3.4665	7.0	2.8061[o]	6.0	1877.3367[b]	0.0017	116.6
1877.3349	2.9507	7.0	2.2903[o]	8.0	1877.3367[b]	0.0017	116.7
1881.2552	4.9327	6.0	4.2737[o]	5.0	1881.2735	0.0017	134.7
1882.3211	2.7333	9.0	2.0746[o]	8.0	1882.3252	0.0017	133.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1883.6116	4.4991^{o}	8.0	3.8409	8.0	1883.6073^{bc}	0.0017	149.4
1883.6152	3.5044	5.0	2.8462^{o}	6.0	1883.6073^{bc}	0.0017	149.4
1884.1085	2.9483	9.0	2.2903^{o}	8.0	1884.1048	0.0017	114.0
1886.1768	3.9354	5.0	3.2781^{o}	4.0	1886.1941	0.0017	26.9
1888.3601	4.3074	5.0	3.6509^{o}	6.0	1888.3833	0.0017	19.6
1898.0771	4.4941^{o}	7.0	3.8409	8.0	1898.0838	0.0015	41.0
1900.8335	3.6531	9.0	3.0009^{o}	8.0	1900.8329	0.0015	22.6
1901.6577	2.8863	8.0	2.2344^{o}	8.0	1901.6569	0.0015	23.6
1905.1756	3.4587	8.0	2.8079^{o}	7.0	1905.1764^{b}	0.0015	19.5
1905.1974	4.8602	5.0	4.2094^{o}	4.0	1905.1764^{b}	0.0015	19.4
1905.5067	1.5248^{o}	5.0	0.8741	6.0	1905.5244^{bc}	0.0015	63.2
1905.5205	3.7327	10.0	3.0820^{o}	10.0	1905.5244^{bc}	0.0015	62.8
1913.5643	3.5541	5.0	2.9062^{o}	5.0	1913.5716^{c}	0.0015	36.4
1915.1511	3.5842	6.0	2.9368^{o}	6.0	1915.1298	0.0015	69.9
1918.7928	3.3168	10.0	2.6706^{o}	9.0	1918.8047^{b}	0.0015	23.0
1918.8260	3.8533	5.0	3.2071^{o}	6.0	1918.8047^{b}	0.0015	23.3
1923.2803	3.5384	8.0	2.8937^{o}	7.0	1923.2758	0.0015	68.1
1925.5246	4.0161	6.0	3.3722^{o}	6.0	1925.5244^{c}	0.0015	22.4
1926.9234	3.1918	5.0	2.5484^{o}	6.0	1926.9225^{bc}	0.0015	36.6
1926.9382	4.2599^{o}	6.0	3.6165	7.0	1926.9225^{bc}	0.0015	36.6
1930.1219	3.0969	10.0	2.4546^{o}	10.0	1930.1159	0.0015	18.0
1935.7074	3.3419	9.0	2.7014^{o}	10.0	1935.7053	0.0015	35.7
1946.0932	4.9897	7.0	4.3526^{o}	7.0	1946.0834	0.0020	39.7
1949.7092	3.4587	8.0	2.8228^{o}	8.0	1949.7069	0.0020	18.2
1953.6554	3.9523^{o}	7.0	3.3177	8.0	1953.6761^{bc}	0.0020	21.5
1953.6745	2.9249	7.0	2.2903^{o}	8.0	1953.6761^{bc}	0.0020	21.5
1953.6974	4.6041	7.0	3.9695^{o}	7.0	1953.6761^{bc}	0.0020	21.4
1955.3744	3.2863	5.0	2.6523^{o}	6.0	1955.3780^{c}	0.0020	67.7
1965.7449	3.6316	8.0	3.0009^{o}	8.0	1965.7423	0.0020	18.4
1966.5374	3.0870	6.0	2.4566^{o}	5.0	1966.5304	0.0020	34.6
1966.7347	5.0869	9.0	4.4565^{o}	10.0	1966.7388^{b}	0.0020	80.4
1966.7385	2.7001	7.0	2.0697^{o}	7.0	1966.7388^{b}	0.0020	80.4
1966.7501	3.3177	8.0	2.6873^{o}	7.0	1966.7388^{b}	0.0020	80.4
1974.7820	4.9958	3.0	4.3680^{o}	3.0	1974.7584	0.0020	20.9
1978.9480	3.0831	6.0	2.4566^{o}	5.0	1978.9409	0.0021	42.9
1982.0663	4.7482^{o}	10.0	4.1227	9.0	1982.0686^{b}	0.0021	45.7
1982.0702	2.7001	7.0	2.0746^{o}	8.0	1982.0686^{b}	0.0021	45.7
1986.9852	3.2762	7.0	2.6523^{o}	6.0	1986.9860^{b}	0.0021	32.9
1986.9971	4.6601^{o}	7.0	4.0362	8.0	1986.9860^{b}	0.0021	32.8
1997.6228	2.9178	8.0	2.2972^{o}	7.0	1997.6191	0.0024	108.8

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
2002.2906	3.2085	7.0	2.5893^o	8.0	2002.3017^b	0.0024	126.8
2002.3107	4.5150	7.0	3.8959^o	7.0	2002.3014^b	0.0024	126.9
2002.3147	4.6748	10.0	4.0557^o	9.0	2002.3014^b	0.0024	126.9
2010.5312	2.7880	10.0	2.1713^o	10.0	2010.5521^b	0.0025	14.9
2010.5554	4.9317	7.0	4.3150^o	8.0	2010.5520^b	0.0025	14.7
2011.2873	2.9363	6.0	2.3199^o	6.0	2011.2931	0.0025	41.7
2013.1175	4.6319^o	7.0	4.0161	6.0	2013.0997	0.0025	26.3
2014.7601	3.0009^o	8.0	2.3855	9.0	2014.7689^{bc}	0.0025	18.6
2014.7642	3.3168	10.0	2.7014^o	10.0	2014.7689^{bc}	0.0025	18.5
2018.0779	4.0148	7.0	3.4004^o	7.0	2018.0951	0.0025	21.0
2019.5288	3.1623	6.0	2.5484^o	6.0	2019.5372	0.0025	20.7
2020.1612	4.8874	4.0	4.2737^o	5.0	2020.1786^c	0.0025	17.6
2020.5122	3.3287	7.0	2.7151^o	8.0	2020.5079^c	0.0025	41.1
2022.8788	4.7429	8.0	4.1300^o	7.0	2022.8963^b	0.0025	15.5
2022.8869	2.9328	7.0	2.3199^o	6.0	2022.8963^b	0.0025	15.5
2029.3196	4.0428^o	6.0	3.4318	5.0	2029.3470^b	0.0025	18.9
2029.3526	4.3833	5.0	3.7723^o	6.0	2029.3471^b	0.0025	19.1
2029.6862	4.9198	7.0	4.3090^o	8.0	2029.6817	0.0025	24.5
2030.1024	4.4991^o	8.0	3.8884	7.0	2030.0859	0.0025	17.2
2032.3510	4.4509^o	8.0	3.8409	8.0	2032.3530	0.0025	63.3
2034.0624	3.8683^o	5.0	3.2588	5.0	2034.0820^b	0.0025	17.8
2034.0748	2.8998	8.0	2.2903^o	8.0	2034.0820^b	0.0025	17.8
2034.0748	3.8857^o	6.0	3.2762	7.0	2034.0820^b	0.0025	17.8
2034.6584	4.4502^o	8.0	3.8409	8.0	2034.6684	0.0025	16.5
2037.0042	2.6784	8.0	2.0697^o	7.0	2037.0045^b	0.0025	49.4
2037.0250	4.1021	9.0	3.4934^o	8.0	2037.0045^b	0.0025	49.3
2053.4556	2.6784	8.0	2.0746^o	8.0	2053.4587	0.0011	126.0
2059.3166	3.6841	9.0	3.0820^o	10.0	2059.3265^b	0.0011	80.7
2059.3250	4.6675	5.0	4.0654^o	6.0	2059.3265^b	0.0011	80.7
2071.8089	3.4063	6.0	2.8079^o	7.0	2071.8173^c	0.0011	101.4
2076.2395	3.6165	7.0	3.0194^o	7.0	2076.2405	0.0011	50.7
2079.5166	3.2668	8.0	2.6706^o	9.0	2079.5191	0.0011	119.7
2084.2191	3.4028	8.0	2.8079^o	7.0	2084.2116	0.0011	18.5
2107.0908	2.8787	9.0	2.2903^o	8.0	2107.0878	0.0015	306.2
2108.7259	3.5919	8.0	3.0040^o	9.0	2108.7240	0.0015	40.7
2117.3745	4.7664	9.0	4.1808^o	8.0	2117.3757	0.0015	41.2
2125.8865	3.2538	9.0	2.6706^o	9.0	2125.8955	0.0015	27.4
2130.1160	3.4048	7.0	2.8228^o	8.0	2130.1222	0.0015	130.8
2134.7041	3.7746	7.0	3.1938^o	8.0	2134.7106^b	0.0015	12.7
2134.7041	4.6319^o	7.0	4.0511	8.0	2134.7106^b	0.0015	12.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
2136.0629	4.8820	8.0	4.3016^o	7.0	2136.0891	0.0015	14.8
2152.8294	3.7938	8.0	3.2179^o	9.0	2152.8269	0.0015	25.3
2175.8997	3.7397	7.0	3.1699^o	7.0	2175.9017	0.0021	42.3
2177.7667	4.1050	7.0	3.5357^o	8.0	2177.7724^b	0.0022	20.3
2177.7715	3.7830	5.0	3.2137^o	6.0	2177.7724^b	0.0022	20.3
2184.4029	3.5044	5.0	2.9368^o	6.0	2184.4046^b	0.0022	28.4
2184.4077	4.8765	7.0	4.3090^o	8.0	2184.4046^b	0.0022	28.4
2188.1963	2.3479	7.0	1.7813^o	7.0	2188.2039	0.0022	46.8
2193.5838	2.8555	8.0	2.2903^o	8.0	2193.5873^b	0.0022	136.4
2193.5886	5.3214	8.0	4.7562^o	7.0	2193.5873^b	0.0022	136.4
2194.9994	3.5842	6.0	3.0194^o	7.0	2194.9991	0.0022	47.3
2207.2424	3.0969	10.0	2.5352^o	11.0	2207.2439	0.0022	344.3
2209.1441	3.5159	7.0	2.9547^o	8.0	2209.1463	0.0022	40.0
2231.6641	3.5159	7.0	2.9604^o	8.0	2231.6530	0.0001	19.5
2239.1803	2.6234	6.0	2.0697^o	7.0	2239.1804	0.0001	16.3
2240.9566	4.3317^o	6.0	3.7784	6.0	2240.9641	0.0001	18.9
2244.3314	3.2538	9.0	2.7014^o	10.0	2244.3366^b	0.0001	168.1
2244.3364	4.7364^o	8.0	4.1840	7.0	2244.3366^b	0.0001	168.1
2319.0342	2.3479	7.0	1.8133^o	8.0	2319.0460	0.0009	12.6
2332.6281	2.9249	7.0	2.3934^o	6.0	2332.6282^b	0.0009	23.4
2332.6607	4.1417	8.0	3.6102^o	9.0	2332.6282^b	0.0009	23.6
2414.5724	4.7229	5.0	4.2094^o	4.0	2414.6017^b	0.0027	16.9
2414.5957	3.1114	8.0	2.5979^o	7.0	2414.6017^b	0.0027	17.1

Table A.42: Measured wavelengths and intensities of Dy II infrared spectral lines. Meaning of symbols is given in Table A.33.

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
939.5141	5.7834	5.5	4.4638^o	6.5	939.5101^{bc}	0.0005	12.7
939.5167	3.4119	7.5	2.0923^o	7.5	939.5101^b	0.0005	12.7
939.9132	5.0233	7.5	3.7042^o	6.5	939.9071^c	0.0005	14.0
940.6223	4.5102^o	7.5	3.1921	6.5	940.6166^c	0.0005	12.7
943.8771	5.3080	5.5	3.9945^o	6.5	943.8797	0.0005	11.2
948.1495	6.0117	7.5	4.7041^o	7.5	948.1568^c	0.0005	9.2
950.3716	4.3651^o	7.5	3.0605	7.5	950.3756^c	0.0005	19.8
952.6062	3.1421^o	8.5	1.8406	8.5	952.6111^b	0.0006	63.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
952.6196	5.7649	5.5	4.4635^o	4.5	952.6111^b	0.0006	63.7
954.6612	4.0023^o	8.5	2.7036	9.5	954.6759^c	0.0006	23.1
955.6998	3.5028^o	8.5	2.2055	9.5	955.7047	0.0006	230.2
960.4155	5.6783	4.5	4.3874^o	3.5	960.4085	0.0006	9.5
961.7299	5.9555	6.5	4.6664^o	5.5	961.7196	0.0006	16.0
962.3407	4.1783^o	4.5	2.8900	5.5	962.3506^b	0.0006	109.2
962.3447	3.1421^o	8.5	1.8538	7.5	962.3506^b	0.0006	109.2
962.5049	5.3316	7.5	4.0434^o	8.5	962.5110^b	0.0006	13.4
962.5065	5.2390	4.5	3.9509^o	4.5	962.5110^b	0.0006	13.4
963.7393	6.1504	5.5	4.8639^o	6.5	963.7371^c	0.0008	82.3
964.1091	5.8385	7.5	4.5525^o	7.5	964.0987^c	0.0008	126.2
964.4987	4.1754^o	5.5	2.8900	5.5	964.4959	0.0008	14.0
969.5926	4.3846^o	7.5	3.1059	8.5	969.5974^c	0.0009	26.3
971.2441	3.4573^o	7.5	2.1808	8.5	971.2488	0.0009	35.2
973.0059	5.1556	8.5	3.8814^o	7.5	973.0131^b	0.0009	12.2
973.0210	5.6468	5.5	4.3726^o	5.5	973.0130^b	0.0009	11.9
974.6275	6.2054	6.5	4.9333^o	5.5	974.6327	0.0009	93.1
974.9392	5.0837	6.5	3.8120^o	7.5	974.9379^c	0.0009	145.0
976.5721	3.1233^o	7.5	1.8538	7.5	976.5763^c	0.0007	66.3
977.2964	5.3202	4.5	4.0516^o	4.5	977.2967	0.0007	17.6
979.2094	5.5672	5.5	4.3011^o	5.5	979.2327^c	0.0007	21.5
981.3600	6.0360	4.5	4.7727^o	5.5	981.3562	0.0007	13.2
983.8753	5.7305	6.5	4.4704^o	5.5	983.8812^{bc}	0.0007	23.3
983.8869	5.8300	5.5	4.5699^o	4.5	983.8812^b	0.0007	23.2
984.5979	3.1059	8.5	1.8467^o	8.5	984.6061^b	0.0007	30.9
984.6067	4.3651^o	7.5	3.1059	8.5	984.6061^b	0.0007	31.6
986.0581	3.2028^o	7.5	1.9455	6.5	986.0594^c	0.0007	11.6
992.7790	3.9525^o	8.5	2.7036	9.5	992.7806^c	0.0009	23.3
995.3785	3.8120^o	7.5	2.5665	8.5	995.3715	0.0009	11.4
998.2623	3.5028^o	8.5	2.2608	7.5	998.2649^c	0.0009	11.2
1000.7896	5.3202	4.5	4.0814^o	4.5	1000.8036^{bc}	0.0009	116.0
1000.7916	6.0115	6.5	4.7727^o	5.5	1000.8036^b	0.0009	116.0
1006.0969	6.1040	7.5	4.8717^o	6.5	1006.0908	0.0010	19.8
1008.9545	4.4209^o	5.5	3.1921	6.5	1008.9512	0.0010	13.8
1015.6809	3.4014^o	7.5	2.1808	8.5	1015.6829	0.0007	13.8
1019.9253	5.0970	7.5	3.8814^o	7.5	1019.9298^c	0.0007	704.4
1020.0626	3.3735^o	9.5	2.1581	10.5	1020.0660^c	0.0007	23.7
1030.4769	5.1556	8.5	3.9525^o	8.5	1030.4814^c	0.0009	73.7
1031.0855	3.7689^o	7.5	2.5665	8.5	1031.0876^c	0.0009	29.2
1034.1657	3.1800^o	5.5	1.9811	4.5	1034.1559	0.0009	49.6

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1035.5901	6.0689	7.5	4.8717^{o}	6.5	1035.5838	0.0009	14.3
1036.1967	3.7689^{o}	7.5	2.5724	6.5	1036.2003^{bc}	0.0009	14.9
1036.2004	3.4573^{o}	7.5	2.2608	7.5	1036.2003^{b}	0.0009	14.9
1036.2147	4.3226^{o}	4.5	3.1261	4.5	1036.2001^{b}	0.0009	17.2
1037.0034	3.3763^{o}	8.5	2.1808	8.5	1037.0048^{c}	0.0009	19.9
1038.7010	3.3744^{o}	7.5	2.1808	8.5	1038.7037^{c}	0.0009	15.2
1048.3356	3.7551^{o}	6.5	2.5724	6.5	1048.3350^{c}	0.0011	13.9
1048.5643	5.3394	8.5	4.1570^{o}	8.5	1048.5724	0.0011	14.7
1052.6261	3.1233^{o}	7.5	1.9455	6.5	1052.6284	0.0011	155.7
1052.8566	5.4787	6.5	4.3011^{o}	5.5	1052.8429^{c}	0.0011	78.9
1055.9461	3.0147^{o}	8.5	1.8406	8.5	1055.9519^{c}	0.0011	27.6
1067.9254	3.0147^{o}	8.5	1.8538	7.5	1067.9264	0.0009	17.3
1073.4267	6.1324	5.5	4.9774^{o}	5.5	1073.4159^{c}	0.0010	32.9
1079.3563	3.1103	5.5	1.9616^{o}	6.5	1079.3654^{c}	0.0010	59.0
1082.7937	5.5174	9.5	4.3724^{o}	8.5	1082.7893^{c}	0.0010	132.3
1083.8902	3.1421^{o}	8.5	1.9983	9.5	1083.8934^{b}	0.0010	89.1
1083.8910	4.9523	6.5	3.8085^{o}	5.5	1083.8934^{b}	0.0010	89.1
1089.8802	6.0092	5.5	4.8717^{o}	6.5	1089.8769^{c}	0.0013	52.5
1090.8992	5.6321	4.5	4.4956^{o}	4.5	1090.9076^{c}	0.0013	32.8
1097.5021	4.0407^{o}	6.5	2.9111	6.5	1097.5137^{c}	0.0013	18.3
1098.0321	2.3529^{o}	6.5	1.2238	5.5	1098.0391^{c}	0.0013	19.6
1107.6399	2.8981	6.5	1.7788^{o}	5.5	1107.6478^{c}	0.0008	29.6
1113.4320	5.7649	5.5	4.6514^{o}	5.5	1113.4366^{bc}	0.0008	78.5
1113.4370	5.8385	7.5	4.7250^{o}	6.5	1113.4366^{b}	0.0008	78.6
1113.4419	3.6800^{o}	9.5	2.5665	8.5	1113.4366^{b}	0.0008	78.6
1118.7009	5.9462	6.5	4.8380^{o}	6.5	1118.7025^{c}	0.0007	122.7
1121.1969	5.0157	8.5	3.9100^{o}	9.5	1121.2091^{c}	0.0007	25.9
1128.3141	5.0636	5.5	3.9648^{o}	6.5	1128.3010^{c}	0.0007	22.3
1129.0594	5.7305	6.5	4.6324^{o}	5.5	1129.0433^{c}	0.0007	28.3
1130.4672	5.8241	5.5	4.7274^{o}	6.5	1130.4600^{bc}	0.0007	133.7
1130.4749	6.0541	6.5	4.9574^{o}	5.5	1130.4600^{b}	0.0007	133.0
1131.9657	6.0823	5.5	4.9870^{o}	5.5	1131.9681^{c}	0.0007	39.3
1136.6400	5.7232	4.5	4.6324^{o}	5.5	1136.6496^{c}	0.0007	78.2
1137.5814	6.3384	7.5	5.2486^{o}	6.5	1137.6052^{c}	0.0007	30.4
1140.0459	3.7689^{o}	7.5	2.6814	8.5	1140.0467^{c}	0.0007	21.2
1140.3211	4.6962	6.5	3.6090^{o}	7.5	1140.3034^{c}	0.0007	29.0
1144.6533	5.5466	4.5	4.4635^{o}	4.5	1144.6788^{bc}	0.0007	20.7
1144.6782	5.5944	6.5	4.5113^{o}	6.5	1144.6793^{b}	0.0007	20.0
1144.6860	3.6496^{o}	7.5	2.5665	8.5	1144.6794^{b}	0.0007	19.9
1144.8367	6.1594	6.5	5.0765^{o}	5.5	1144.8204^{c}	0.0007	179.5

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1145.7392	5.6321	4.5	4.5500^o	3.5	1145.7407	0.0007	27.8
1149.2853	5.8715	6.5	4.7927^o	7.5	1149.2717^c	0.0007	45.3
1154.2471	2.6455	7.5	1.5714^o	6.5	1154.2476^c	0.0007	26.8
1158.0101	3.6371^o	8.5	2.5665	8.5	1158.0202^c	0.0007	341.8
1163.2506	5.3080	5.5	4.2422^o	5.5	1163.2538^c	0.0007	117.1
1180.4034	5.2431	6.5	4.1927^o	6.5	1180.4059^c	0.0014	57.3
1189.6675	5.2176	5.5	4.1754^o	5.5	1189.6535^c	0.0009	42.9
1196.0950	3.6496^o	7.5	2.6130	7.5	1196.0946^c	0.0009	179.3
1199.0853	3.9321^o	6.5	2.8981	6.5	1199.0906^c	0.0009	81.9
1212.0360	2.8767^o	7.5	1.8538	7.5	1212.0410^{bc}	0.0010	25.9
1212.0548	2.2467^o	5.5	1.2238	5.5	1212.0410^b	0.0010	26.1
1212.7842	3.7643^o	6.5	2.7420	6.5	1212.7774	0.0010	28.5
1215.2270	3.2010^o	8.5	2.1808	8.5	1215.2294^c	0.0010	19.7
1215.4331	5.6321	4.5	4.6121^o	3.5	1215.4334^c	0.0010	18.4
1219.6074	5.3202	4.5	4.3037^o	4.5	1219.6191^c	0.0010	37.9
1234.5283	5.0837	6.5	4.0794^o	5.5	1234.5351^c	0.0011	25.6
1239.4154	3.4119	7.5	2.4116^o	7.5	1239.4074	0.0011	22.4
1245.3897	3.2010^o	8.5	2.2055	9.5	1245.3901	0.0011	50.0
1251.3609	5.4962	5.5	4.5055^o	4.5	1251.3536^c	0.0016	43.2
1261.3060	5.1921	6.5	4.2092^o	7.5	1261.2922^c	0.0016	18.7
1262.9659	4.9464	6.5	3.9648^o	6.5	1262.9814^c	0.0016	166.7
1271.2764	5.2431	6.5	4.2678^o	7.5	1271.2711^c	0.0014	25.4
1277.6891	2.8110^o	7.5	1.8406	8.5	1277.6927^{bc}	0.0014	32.6
1277.6973	3.8814^o	7.5	2.9111	6.5	1277.6927^b	0.0014	32.7
1302.7483	3.5972^o	8.5	2.6455	7.5	1302.7444^c	0.0021	219.5
1311.9124	5.8090	7.5	4.8639^o	6.5	1311.9300^c	0.0017	33.3
1317.8651	5.6321	4.5	4.6914^o	3.5	1317.8582^c	0.0017	19.8
1319.1497	1.5295^o	7.5	0.5896	6.5	1319.1538^c	0.0017	19.9
1321.5993	5.8715	6.5	4.9333^o	5.5	1321.6026	0.0017	19.4
1323.9350	2.8981	6.5	1.9616^o	6.5	1323.9503^{bc}	0.0017	97.6
1323.9527	3.1953^o	6.5	2.2589	6.5	1323.9503^b	0.0017	97.7
1324.8876	5.7997	6.5	4.8639^o	6.5	1324.8914^c	0.0017	52.2
1331.4285	2.8767^o	7.5	1.9455	6.5	1331.4294^c	0.0018	25.7
1333.6819	5.4351	3.5	4.5055^o	4.5	1333.6845^c	0.0012	30.1
1347.6798	5.0157	8.5	4.0958^o	9.5	1347.6865^c	0.0013	19.3
1363.1332	5.6091	5.5	4.6996^o	6.5	1363.1251	0.0019	79.2
1373.9076	5.6233	6.5	4.7210^o	5.5	1373.9158^c	0.0019	30.6
1376.5004	5.4962	5.5	4.5955^o	4.5	1376.4984^c	0.0019	29.5
1392.5792	5.5944	6.5	4.7041^o	7.5	1392.5925	0.0010	27.5
1404.3188	4.7643	7.5	3.8814^o	7.5	1404.3229^c	0.0010	252.1

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
1470.7440	6.0916	6.5	5.2486^o	6.5	1470.7323^{bc}	0.0013	26.5
1470.7505	5.8300	5.5	4.9870^o	5.5	1470.7326^b	0.0013	26.7
1472.3963	5.6321	4.5	4.7901^o	3.5	1472.3940^c	0.0013	411.5
1475.9908	2.7855^o	7.5	1.9455	6.5	1475.9943	0.0013	21.3
1495.4993	4.9833	5.5	4.1543^o	5.5	1495.4935^{bc}	0.0019	176.2
1495.5056	3.4014^o	7.5	2.5724	6.5	1495.4935^b	0.0019	175.9
1505.0132	5.7232	4.5	4.8994^o	4.5	1505.0083^c	0.0019	294.3
1527.3541	4.1034^o	4.5	3.2917	3.5	1527.3605^{bc}	0.0018	155.5
1527.3604	3.4573^o	7.5	2.6455	7.5	1527.3605^b	0.0018	155.4
1544.1488	5.5956	7.5	4.7927^o	7.5	1544.1484	0.0019	29.8
1544.8740	5.3080	5.5	4.5055^o	4.5	1544.8854^c	0.0019	22.1
1555.9698	3.4098^o	6.5	2.6130	7.5	1555.9583^c	0.0011	156.4
1617.8586	2.6130	7.5	1.8467^o	8.5	1617.8663^c	0.0015	41.9
1656.3778	3.7042^o	6.5	2.9557	7.5	1656.3858	0.0014	20.9
1665.7117	5.0837	6.5	4.3394^o	5.5	1665.7334^c	0.0014	58.8
1677.3204	5.6783	4.5	4.9392^o	4.5	1677.3231	0.0014	28.6
1693.4141	5.6091	5.5	4.8770^o	4.5	1693.4168^c	0.0015	154.3
1696.5370	5.4988	4.5	4.7680^o	4.5	1696.5576^{bc}	0.0015	34.6
1696.5428	3.3763^o	8.5	2.6455	7.5	1696.5576^b	0.0015	34.0
1696.5572	5.4167	5.5	4.6859^o	5.5	1696.5576^b	0.0015	33.9
1696.5572	5.5361	7.5	4.8054^o	6.5	1696.5576^b	0.0015	33.9
1717.3721	5.2176	5.5	4.4956^o	4.5	1717.3543^c	0.0016	18.3
1750.7861	6.2943	5.5	5.5862^o	4.5	1750.8001^b	0.0014	32.0
1750.8168	5.3202	4.5	4.6121^o	3.5	1750.8000^b	0.0014	33.4
1757.9265	4.9523	6.5	4.2471^o	6.5	1757.9314	0.0015	41.6
1762.7886	6.0092	5.5	5.3059^o	4.5	1762.8079^c	0.0028	19.0
1775.2593	4.8278	6.5	4.1294^o	5.5	1775.2648^c	0.0029	50.5
1777.0922	5.9462	6.5	5.2486^o	6.5	1777.0884^c	0.0029	21.0
1786.0875	4.6886	7.5	3.9945^o	6.5	1786.0784^c	0.0029	52.2
1787.3740	3.1103	5.5	2.4167^o	6.5	1787.3626^c	0.0029	63.7
1851.5090	5.5466	4.5	4.8770^o	4.5	1851.5297	0.0016	21.7
1874.8606	5.8769	5.5	5.2156^o	5.5	1874.8426^c	0.0016	21.0
1883.6045	5.0233	7.5	4.3651^o	7.5	1883.6073^c	0.0017	149.5
1905.5241	5.0157	8.5	4.3651^o	7.5	1905.5244^c	0.0015	62.8
1913.5753	4.6886	7.5	4.0407^o	6.5	1913.5716^c	0.0015	36.4
1925.5246	4.9833	5.5	4.3394^o	5.5	1925.5244^{bc}	0.0015	22.4
1925.5394	5.7649	5.5	5.1211^o	5.5	1925.5245^b	0.0015	22.1
1926.9393	1.5714^o	6.5	0.9280	6.5	1926.9225^c	0.0015	36.6
1953.6630	5.2992	8.5	4.6645^o	7.5	1953.6761^c	0.0020	21.6
1955.3553	5.7144	4.5	5.0804^o	4.5	1955.3780^c	0.0020	67.7

Continued from previous page

λ_{Ritz} [nm]	E_{up} [eV]	J_{up}	E_{low} [eV]	J_{low}	λ_o [nm]	σ_{λ_o} [nm]	Peak intensity [a.u.]
2014.7642	5.2259	5.5	4.6105^o	5.5	2014.7689^c	0.0025	18.5
2020.2020	5.2242	6.5	4.6105^o	5.5	2020.1786^c	0.0025	17.6
2020.4877	5.2242	6.5	4.6106^o	7.5	2020.5079^c	0.0025	41.3
2071.8218	5.5558	6.5	4.9574^o	5.5	2071.8173^c	0.0011	101.4
2190.0000	5.2176	5.5	4.6514^o	5.5	2189.9707	0.0022	12.4
2384.8533	3.4098^o	6.5	2.8900	5.5	2384.8100	0.0027	19.0