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Preface

The XXVIIth International Conference on Ultrarelativistic Nucleus–Nucleus Collisions, Quark Matter 2018, was held at Lido di Venezia, Italy, on 13–19 May 2018. The conference was organised by INFN (Italian Institute for Nuclear Physics), with the participation of several Italian universities. QM2018 counted a record number of 850 participants from 35 countries, including a large number of graduate students and young scientists. The focus of the Quark Matter conference series is on the fundamental understanding of strongly-interacting matter at extreme conditions of high temperature and density, as formed in ultrarelativistic nucleus–nucleus collisions. In these conditions, which also characterised the early Universe, matter appears as a Quark–Gluon Plasma, with quarks and gluons not confined within hadrons. The scientific topics addressed by Quark Matter 2018 were: QCD at high temperature; initial state physics and approach to thermal equilibrium; correlations and fluctuations; collective dynamics; chirality, vorticity and polarisation effects; jet modifications; heavy flavour and quarkonium; electromagnetic and weak probes; high baryon density, search for the critical point and astrophysical implications; collectivity in small systems; theoretical developments; future facilities and instrumentation.

The conference programme started with a Student Day with introductory lectures for about 400 students and young postdocs. The plenary sessions opened with a keynote talk by Prof. Giorgio Parisi on Quantum Chromodynamics and the Quark–Gluon Plasma, followed by presentations of the highlights from the six large Collaborations at the LHC and at RHIC. The first-day plenary programme was completed by a selection of focus talks on current hot topics, like dense QCD matter in astrophysical objects and the collective effects in small systems viewed by pQCD-based event generators. Topical parallel sessions and the poster session covered the following five half days of the conference. For the first time at Quark Matter, the number of sessions being held in parallel was increased from four to five. The final three days were allocated to plenary presentations. There were over 660 communications in total, including 34 invited plenary talks, 229 parallel talks, 10 plenary talks for the best-poster presentations, and 389 posters.

The conference highlighted many new results in experiment and theory. Representatives from thirteen experimental Collaborations (ALICE, ATLAS, BM@N, CBM, CMS, HADES, J-PARC-HI, LHCb, MPD, NA61/SHINE, PHENIX, sPHENIX, and STAR) presented new results or future plans from all heavy-ion facilities worldwide. The LHC Collaborations reported new measurements on collective dynamics and hard probes of hot and dense strongly-interacting matter, studied in detail from small to large colliding systems using pp, p–Pb, Pb–Pb and, for the first time, Xe–Xe collisions. The RHIC Collaborations presented new results on rare probes measured

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in Au–Au collisions and first results on collective effects in small systems using p–Au, d–Au and ^{3}He–Au collisions. On the theory side, steady progress was reported on the development of a comprehensive description of the entire evolution of heavy-ion collisions, from the initial stages to the hydrodynamic evolution and hadronization of the system, as well as of the in-medium interactions of the various types of probes. During the last day of the conference young scientists were presented with the 2018 Zimanyi Nuclear Theory Medal and the Elsevier Young Scientist Awards for the best experimental talks.

The financial contributions from many Italian and international organisations supported the participation of about 300 young scientists. The Organizing Committee is grateful for the support received from INFN (Italy), CAEN Tool for Discovery, Cambridge University Press, Central China Normal University (China), Centro Fermi (Italy), the European Organization for Nuclear Research (CERN, Switzerland), the National Institute of Nuclear and Particle Physics (CNRS, France), Elsevier Publishing, the ExtreMe Matter Institute (EMMI) and the GSI Helmholtz Centre for Heavy Ion Research (Germany), Institute of Physics Publishing, the International Union of Pure and Applied Physics, JINR Dubna (Russian Federation), the National Research Foundation and iThemba LABS (South Africa), the Netherlands Organisation for Scientific Research NWO (The Netherlands), the RIKEN-BNL research center (Japan), the Shanghai Institute of Applied Physics within the Chinese Academy of Sciences (China), Società Italiana di Fisica (Italy), Springer Publishing, Tsinghua University (China), Universidad National Autonoma de Mexico (Mexico), Politecnico di Bari (Italy), Università degli Studi di Bari (Italy), Università degli Studi di Brescia (Italy), Università degli Studi di Cagliari (Italy), Università degli Studi di Catania (Italy), Università degli Studi di Firenze (Italy), Università degli Studi di Padova (Italy), Università degli Studi di Torino (Italy), Università degli Studi di Trieste (Italy).

The scientific and organizational success of Quark Matter 2018 was the result of the work of many people. We thank the International Advisory Committee for providing valuable advice for the scientific programme. We warmly thank the members of the Organizing Committee, the team of secretaries, technical and administrative support staff, and our student helpers for ensuring that all aspects of the meeting were handled smoothly and efficiently. A special acknowledgement goes to the secretariat coordinators, Rossana Chiaratti and Pina Salente of INFN-Padova, for their efficiency and dedication before and during the conference.

More information about the conference, including all oral and poster presentations, is available at https://qm2018.infn.it. The next International Conference on Ultrarelativistic Nucleus–Nucleus Collisions, Quark Matter 2019, will be held in Wuhan, China, on 4–9 November 2019.

Federico Antinori
Andrea Dainese
Paolo Giubellino
Vincenzo Greco
Maria Paola Lombardo
Enrico Scomparin (managing editor)