



XXXI International Conference on Ultra-relativistic Nucleus-Nucleus Collisions “Quark Matter 2025”

The XXXI International Conference on Ultra-relativistic Nucleus-Nucleus Collisions “Quark Matter 2025” was held from April 7th to 12th at the Campus Westend of Goethe University Frankfurt am Main. The conference is the largest and most prestigious conference in the field of heavy-ion physics. It is held approximately every 18 months, alternating between locations in Europe, the USA, and Asia. It was initiated in 1980 and serves the field of heavy-ion physics. With around 1.000 participants from around the world, Quark Matter 2025 was also the largest Quark-Matter conference to date.

The objective of the conference was to bring together theoretical and experimental physicists from around the world to discuss the most recent developments in high-energy heavy-ion physics. The focus was on the fundamental understanding of strong-interaction matter under extreme conditions, as formed in ultra-relativistic nucleus-nucleus collisions, as well as in high-multiplicity proton-proton and proton-nucleus collisions.

The field of heavy-ion physics addresses a broad variety of scientific questions, which are most readily addressed by organizing the scientific program in terms of subtopics. These are: Chirality, Collective dynamics & small systems, Correlations & fluctuations, Detectors & future experiments, Electromagnetic probes, Heavy flavor & quarkonia, Initial state of hadronic and electron-ion collisions, Jets, Light and strange flavor physics & nuclei, New theoretical developments, Physics of ultraperipheral collisions, QCD matter in astrophysics, QCD phase diagram & critical point. At Quark Matter 2025, 29 plenary and 200 parallel talks, distributed over 35 parallel sessions, covered these subtopics. In addition, there were nine plenary talks summarizing the results of the experiments ALICE, ATLAS, CMS, HADES, LHCb, NA61, PHENIX, sPHENIX, and STAR at the beginning of the conference, as well an experiment and theory summary talk at the end of the conference. A poster session included approximately 540 posters, and eleven posters presented by early-career researchers were selected for flash talks on the last day of the conference.

The conference provided a comprehensive overview of recent advances in the field. New intriguing results from experiment and theory were presented covering a wide energy range of collision energies from few GeV to few TeV. At the same time, important developments in neighbouring fields, such as astrophysics and cosmology, where strong-interaction matter under extreme conditions plays a prominent role, were presented.

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