

54th International Symposium on Multiparticle Dynamics (ISMD 2026)

17 August 2026 - 21 August 2026

Scientific Programme

1. Hot and Dense QCD Matter

Hot and dense QCD matter concerns theoretical and experimental studies of strongly interacting systems under extreme conditions, as explored in high-energy hadronic and nuclear collisions. This topic includes investigations of particle production, energy transport, hadronization, and medium-related effects in complex final states, as well as comparisons among different physical interpretations and modeling approaches. It is intended to provide a broad forum for discussing how the strong nuclear force manifests itself in dense collision environments, without restricting the discussion to any single dynamical picture.

2. Hadron Structure: PDFs, Small-x and Large-x Physics

Hadron structure refers to the internal properties and distributions of quarks and gluons that make up hadrons. Understanding hadron structure is crucial for explaining the dynamics of strong interactions in particle physics. The three major research topics within hadron structure focus on: Parton Distribution Functions (PDF's), small-x physics, large-x physics.

3. Hadron Spectroscopy, Exotic States, and Heavy Quark Physics

Hadron spectroscopy is the study of the properties, structure, and excitation spectra of hadrons. It aims to understand how the strong nuclear force binds quarks into conventional and exotic states, and how these states appear in experimental observables and complex final states. Heavy quark physics plays an important role in this effort, providing sensitive probes of hadron formation, quark confinement, and strong-interaction dynamics over a wide range of energy scales.

4. BSM and New Developments in High Energy Physics and Nuclear Physics

BSM and new developments in high energy physics and nuclear physics include theoretical and experimental studies that extend or challenge current descriptions of fundamental interactions. Within the context of ISMD, this topic is particularly relevant where new ideas intersect with the physics of strong interactions, hadronic matter, and complex final states. It also provides a forum for emerging directions, novel methods, and interdisciplinary connections among particle, nuclear, and related communities.

5. Cosmic Rays and Astroparticle Physics

Cosmic rays and astroparticle physics explore high-energy particles and their interactions in astrophysical environments. These topics are relevant to ISMD because they involve strong-interaction processes, hadronic production mechanisms, and complex final states that connect astrophysical observations with particle and nuclear physics. Studies in this area help deepen our understanding of particle production, propagation, and interaction dynamics in nature at the highest accessible energies.

6. Detectors and Methods for High Energy Physics and Nuclear Physics

Detectors and methods for high energy physics and nuclear physics concern the experimental and analytical tools used to study strong interactions and complex final states. Advances in instrumentation, data acquisition, event reconstruction, and analysis techniques are essential

for precision measurements and for the interpretation of increasingly detailed data. This topic also highlights the shared methods that connect particle, nuclear, and astroparticle physics communities.

7. Collectivity and Multiple Scattering

Collectivity and multiple scattering concern the origin of correlations and other structures observed in complex final states in high-energy collisions. Collectivity is understood here in a broad sense, including correlations associated with jets, flows, and other possible mechanisms, while multiple scattering refers more generally to the role of repeated interactions in particle production and event structure. This topic is intended to accommodate different experimental and theoretical approaches to correlated phenomena across hadronic and nuclear collision systems.

8. Multiparticle Correlations and Fluctuations

Multiparticle correlations and fluctuations are important tools for studying particle production and the dynamics of complex final states in high-energy collisions. Correlations among final-state particles can reveal information about the interplay of strong-interaction mechanisms, while event-by-event fluctuations provide additional sensitivity to the underlying dynamics of the system. These observables are relevant across particle and nuclear physics and play a central role in connecting data with theoretical descriptions of strong-interaction phenomena.

9. Forward and Diffractive Physics and Photon-Induced Processes

Forward and diffractive physics and photon-induced processes probe important aspects of strong interactions in kinematic regions that are especially sensitive to reaction dynamics and hadronic structure. Forward physics focuses on particle production close to the beam direction, while diffractive physics studies interactions characterized by rapidity gaps and limited breakup of the incoming particles, where the confinement scale can play an important role. Photon-induced processes provide complementary access to hadronic and nuclear phenomena, contributing to the broader ISMD goal of understanding the implications of the strong nuclear force and the origin of complex final states.