Contribution ID: **339**   Type: **Invited Talk**

Constraining the nuclear matter equation of state at supra-normal densities

Saturday, 2 December 2023 11:15 (25 minutes)

Understanding the equation of state (EOS) of asymmetric nuclear matter is of fundamental importance and underpins our knowledge of many aspects of nuclear physics and astrophysics. It governs the behaviour of cosmological events like of type II supernova explosions and neutron star mergers, and the properties neutron stars, as well as the characteristics of neutron rich nuclei and the process of heavy-ion reactions. Heavy ion-reactions at incident energies of several hundredths of MeV/u are the only means to study nuclear matter characteristics at supra-normal densities in the laboratory. Whereas a multitude of existing experimental observables is constraining the nuclear matter equation of state at densities below ground state density, the experimental data at supra-normal densities are still limited. Bayesian inference is used to combine data from astrophysical multi-messenger observations of neutron stars and from heavy-ion collisions with microscopic nuclear theory calculations to improve our understanding of dense matter. However, very few experimental data from heavy ion reactions exist at supra-saturation densities i.e. $r » 2r0$ and above.

The talk will present the status on the experimental constraints from heavy-ion collisions on the properties of asymmetric nuclear matter and the future perspectives at GSI/FAIR.

Attendance Type

In-person

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Session Classification: Session 10

Track Classification: Invited Talks