

Baryons

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Probing neutron-star matter in the laboratory

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The microscopic properties of the strong-interaction matter under extreme conditions of temperature and density is a topic of great current interest. Despite 18 orders of magnitude difference in system size and time, the conditions present in heavy-ion collisions share great overlap with the conditions of the strong-interaction matter in neutron-star mergers. The possibility to form and explore in the laboratory strong-interaction matter under extreme conditions is truly fascinating. Model calculations of the evolution of e.g. temperature and density demonstrate that neutron-star collision regimes can be probed directly at few GeV beam energies. Unravelling the origin of nuclear symmetry energy and its density dependence, understanding the role of the isospin degree of freedom, determining the equation of state of nuclear matter at high density and the presence of a phase transition are among important physics questions. In this talk I will focus on relevant experimental results obtained by the HADES at heavy-ion synchrotron SIS18 in Darmstadt, Germany and will try to establish connections and identify missing links between heavy-ion collisions and collisions involving neutron stars.

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