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Equation-of-state studies with CBM (perspectives) and RHIC data

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The investigation of the nuclear equation of state (EoS) has been fundamental to the exploration of the QCD phase diagram at non-zero baryonic densities. This has garnered multi-messenger interest from nuclear theory, astrophysics, and heavy-ion collisions, especially due to its potential synergy with astrophysical objects and events, such as binary neutron mergers. At densities greater than twice the nuclear saturation density ($\rho > 2\rho_{sat}$), the nuclear EoS is primarily constrained by astrophysical observations. Therefore, heavy-ion collisions at corresponding energies ($E_{beam} \approx 2 - 10$ AGeV), accessible at the currently operating Relativistic Heavy Ion Collider (RHIC) and forthcoming Facility for Antiproton and Ion Research (FAIR), offer a complementary source to study the nuclear EoS. This contribution will talk about the EoS perspectives with the flagship heavy-ion collision experiments at aforementioned facilities, namely the Solenoidal Tracker at RHIC (STAR) and Compressed Baryonic Matter (CBM) at FAIR.

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