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Equation-of-state (EOS) of Dense Nuclear Matter with CBM-FAIR and STAR-RHIC

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Our current understanding of the dense QCD matter EOS at supra-saturation densities ($> 2\rho_0$) is currently dominated by valuable yet statistically limited astrophysical observations. This density range is particularly interesting, with evidence suggesting the emergence of deconfined quark matter phases, supported by effective QCD models (ChEFT and pQCD calculations) and astrophysical data. Complementary information from heavy-ion collisions and transport codes provides a means to study EOS inside the laboratory in controlled conditions, therefore offering another crucial source of information.

Heavy-ion collisions at CBM-FAIR at the operating Relativistic Heavy Ion Collider (RHIC) and forthcoming Facility for Antiproton and Ion Research (FAIR), offer a complementary source to study the nuclear EOS at intermediate high energies ($\sqrt{s_{NN}} \approx 2.5 - 6$ GeV; Au-Au collisions), which have been touted as optimal for detecting signs of deconfinement. 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.

Auteur principal: AGARWAL, Kshitij (Eberhard Karls Universität Tübingen (DE))

Orateur: AGARWAL, Kshitij (Eberhard Karls Universität Tübingen (DE))