Contribution ID: **43** Contribution code: **GPA22-15** Type: **not specified**

Studying the Neutron Star Equation of State with the CBM Experiment at FAIR

Thursday 8 December 2022 10:00 (30 minutes)

The Nuclear Equation of State (EoS) at suprasaturation densities and its importance in determining Neutron Star properties has been the focus of several experimental and theoretical activities worldwide. This truely multi-messenger effort spans all the way from the nuclear theory calculations based on Chiral Effective Field Theory all the way to astrophysical measurements of the neutron stars and their collisions. Complementary information from Heavy-Ion Collisions (HIC) provide a means to study EoS inside the laboratory in controlled conditions, therefore represent another crucial source of information.

This contribution will give an overview of diverse sources of information that can be used to infer the properties of dense nuclear matter, namely nuclear theory, astrophysical data, and heavy-ion collisions. A special emphasis will be placed on HIC's pivotal role in constraining the dense-matter EOS at around twice nuclear saturation density over the past two decades. Moreover, as an outlook, an introduction to the Compressed Baryonic Matter (CBM) experiment at the Facility for Antiproton and Ion Research (FAIR) will be given as it continues the HIC effort to higher densities, with the experiment expecting data-taking in 2028-29.

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