Contribution ID: **35** Type: **Talk**

Cosmic matter in the laboratory - Investigating neutron star core densities with FAIR

Wednesday 8 May 2019 10:20 (20 minutes)

The Facility for Antiproton and Ion Research, FAIR, is presently being constructed adjacent to the existing accelerator complex of the GSI Helmholtz Centre for Heavy Ion Research at Darmstadt/Germany, expanding the research goals and technical possibilities substantially. The worldwide unique accelerator and experimental facilities of FAIR will open the way for a broad spectrum of unprecedented fore-front research supplying a large variety of experiments in hadron, nuclear, atomic and plasma physics as well as biomedical and material science which will be briefly described in this presentation. Emphasis will be put on the investigation of the highest baryon densities accessible in the laboratory by relativistic nucleus-nucleus collision at FAIR energies, probing strongly interacting matter under extreme conditions as we expect inside neutron stars.

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Track Classification: STARS