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## Approaching first physics in NICA-MPD at JINR

*Wednesday, 6 April 2022 12:50 (20 minutes)*

The Multi-Purpose Detector (MPD) is the first experiment at the NICA Collider, which is in construction at the Joint Institute for Nuclear Research in Dubna. During initial stage of operation the complex

will study collisions of heavy ions in for  $\sqrt{s_{NN}}$  of 4-11 GeV, with Bi+Bi collisions at 9.2 GeV, in particular planned for first run. It is expected that an excited QCD matter with high baryonic density will be created in these collisions. In this talk I will present the general MPD capabilities to study this exotic state of matter.

MPD is an international collaboration consisting of 44 institutions from 13 countries. The construction and commissioning of the detector is planned for 2022 and 2023, with the first data expected in 2023. The status of all subsystem preparations as well as their design performance will be presented. MPD aims to study the phase diagram of QCD matter at maximum baryonic density, determine the nature of the phase transition between the deconfined and hadronic matter and search for the critical end point. The physics programme, with emphasis on potential first physics measurements with initial beams will be discussed and it will be shown how MPD results can be used to characterize the QCD matter created in heavy-ion collisions, including the relevance of these investigations to other physics areas such as astrophysics, particle physics and neutron star composition.

The already existing Baryonic Matter at Nuclotron (BM@N) experiment is being upgraded for measurements of Au+Au collisions up to a kinetic beam energy of 3.8A GeV in order to investigate the equation-of-state and the microscopic degrees-of-freedom of QCD matter at neutron star core densities.

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