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PRIOR - Proton Microscope for FAIR

Wednesday, 24 September 2014 18:00 (30 minutes)

High energy proton microscopy (HEPM) is an emerging diagnostic technique which provides unique capabilities in penetrating radiography including the combination of high spatial resolution and accuracy of density reconstruction inside volumes and in situ environments. Since the proton beam is composed of charged particles, the beam may be focused with magnetic lenses to form images of the object far away from the interaction region. Therefore HEPM makes possible quantitative measurements of material densities under extreme conditions of temperature and pressure, providing this way an ideal probe for the high energy density physics research at FAIR.

Recently the PRIOR (Proton Microscope for FAIR) facility has been constructed and successfully commissioned at GSI by an international team of scientists from GSI, IPCP, ITEP, LANL and TUD using a 4.5 GeV proton beam from the SIS-18 synchrotron. PRIOR will allow for a significant step forward in spatial resolution (10 - 20 μm). At FAIR, PRIOR will be one of the key experiments of the HEDgeHOB collaboration. It will take full advantage of the intense 10 GeV proton beam from the SIS-100 synchrotron in order to further increase the spatial and temporal resolution of the dynamic density measurements. The current status of the PRIOR project will be discussed along with the results of the recent static and dynamic experiments.

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