



Contribution ID: 277

Type: **Talk in Parallel Session at DIS2013**

Physics capabilities at the MEIC at JLab

Wednesday 24 April 2013 17:05 (25 minutes)

The Electron-Ion Collider (EIC) is envisioned as the next-generation US facility for exploring the strong interaction. The Medium-energy EIC (MEIC) is the first stage of the EIC at Jefferson Lab (JLab), designed for mapping the spin- and spatial structure of the quark and gluon sea in the nucleon, understanding the emergence of hadronic matter from color charge, and probing the gluon fields in nuclei. Kinematically, it will on one end connect to the JLab 12 GeV, and on the other with HERA. Achieving these goals requires an accelerator providing high performance over a wide range of energies for polarized protons, deuterons, and other light ions, as well as different species of heavy ions. To fully utilize this capability one needs a full-acceptance detector able to detect all fragments, nuclear or partonic, including spectators, with high resolution, and to provide a wide coverage in $-t$ for recoil baryons from exclusive (diffractive) reactions at all beam energies. The combination of a high luminosity, polarized lepton and ion beams, and detectors fully integrated with the accelerator will make the EIC a quantum leap in our understanding of the fundamental structure of matter.

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Session Classification: WG7: Future experiments

Track Classification: Future experiments