DNP13-2013-020051

Abstract for an Invited Paper
for the DNP13 Meeting of
the American Physical Society

Electron Ion Collider: The next QCD frontier

ABHAY DESHPANDE, Stony Brook University (SUNY)

While QCD is certainly the correct theory of Strong Interactions, our understanding of it remains far from complete. The precise role gluons and sea quarks play in QCD in terms of the internal structure and dynamics of hadrons and nuclei is not known. The Relativistic Heavy Ion Collider (RHIC) with its high-energy polarized proton and heavy ion beams, and the 12 GeV upgraded CEBAF with the fixed target experiments in Hall A, B, C and D at the Jefferson Lab will explore and advance many aspects of QCD studies in the valence quark region the next few years. A high-energy, high-luminosity polarized electron-ion collider (EIC) will be needed to explore the gluon dominated regions in the nuclei. Its high luminosity will be critical to study (a) the three dimensional position and momentum structure of the nucleons including its spin and (b) precision electro-weak physics resulting in sensitivity to phenomena beyond the Standard Model. Two proposals for the EIC are being considered in the US: one each at BNL and at Jefferson Laboratory. Preliminary ideas are being developed in China for a polarized electron-proton/light ion collider. I will review these proposals of the EIC, and comment on the physics opportunities they present to the nuclear science communities around the world in the next decade.