APR10-2009-020116

Abstract for an Invited Paper
for the APR10 Meeting of
the American Physical Society

Nuclear Physics with an Electron-Ion Collider

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An overview is given of the science program with an Electron–Ion Collider (EIC) with CM energies in the range 10^3–10^4 GeV^2, as envisaged by the U.S. and international nuclear physics community and endorsed in the 2007 NSAC Long–Range Plan. It includes precision studies of nucleon structure in QCD (gluon spin, quark flavor decomposition, gluon and sea quark spatial distributions or GPDs, parton orbital motion or TMDs), the fundamental quark/gluon structure of nuclei (nuclear gluons and EMC effect, nuclear quark/gluon radii from coherent scattering, hadronization in the nuclear medium), and the physics of high gluon densities at small x (saturation, Color Glass Condensate). Particular emphasis will be put on demonstrating the unique potential of an EIC for addressing these objectives, and discussing the proposed measurements in the context of the programs at other exisiting and planned facilities (JLab 12 GeV Upgrade, RHIC Spin, CERN COMPASS, LHC). A brief summary of the EIC machine concepts proposed by BNL and JLab and their basic parameters (energies, luminosity) will be presented, as well as the status and directions of the RD effort.