DNP13-2013-020075

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

Three-dimensional nucleon structure: Spin, spatial imaging, orbital motion

XIANGDONG JI, University of Maryland/SJTU

Recent theoretical advances in Quantum Chromodynamics make it possible to visualize hadrons as extended systems in relativistic space-time and describe their spin structure, spatial shape, and internal motion in terms of the basic quark and gluon degrees of freedom. Mapping these structures will require a dedicated experimental effort over the next two decades. The Jefferson Lab 12 GeV Upgrade will probe the valence quark component of the nucleon with unprecedented accuracy. A future high-luminosity Electron-Ion Collider (EIC) could open up the region of sea quarks and gluons and definitively determine their role in nucleon structure. In this talk I summarize our theoretical understanding and illustrate the impact of the future facilities on nucleon structure in QCD.