

Physics opportunities at the future eRHIC

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Abstract

The 2015 nuclear physics long-range plan endorsed the realization of an electron-ion collider as the next large construction project after FRIB. eRHIC, the Brookhaven realization of the electron-ion collider with its high luminosity ($> 10^{33} \text{cm}^{-2} \text{s}^{-1}$), wide kinematic reach in center-of-mass-energy (45 GeV to 145 GeV) and high lepton and proton beam polarization provides an unprecedented opportunity to reach new frontiers in our understanding of the spin and dynamic structure of nucleons. This presentation will highlight several key measurements which will provide definite answers to the following questions: How are the sea quarks and gluons, and their spins, distributed in space and momentum inside the nucleon? How are these quark and gluon distributions correlated with overall nucleon properties, such as spin direction? What is the role of the orbital motion of sea quarks and gluons in building up the nucleon spin?