APR20-2020-020187

Abstract for an Invited Paper
for the APR20 Meeting of
the American Physical Society

An Electron-Ion Collider: Physics Challenges and Opportunities

SILVIA DALLA TORRE, CERN

The electron-ion collider, proposed by the US nuclear physicists and supported by a wide international community dedicated to hadron physics studies is, since recently, an approved project hosted at the Brookhaven National Laboratory. The collider is a world-wide unique facility dedicated to a long-standing mission: understanding QCD. Its goal is answering to central questions as the emerging of the nucleon properties, mass and spin, from the dynamics of the QCD partons, their three-dimensional structure and the properties of the nuclear systems with high gluon density. These investigations are possible thanks to the availability of polarized electron beams, polarized light nuclear beams and a variety of heavy nuclear beams, the tunable centre of mass energy from 20 to 140 GeV and the high luminosity up to 1034 cm-2s-1 . The time scale for the first physics run is of ten years from now. Intense preparatory activity is now ongoing. The project, its scientific potential and unique opportunities are discussed.