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The Electron-Ion Collider: an overview

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Electron-hadron colliders are the ultimate tool for high-precision quantum chromodynamics studies and for probing the internal structure of hadrons. The Hadron Electron Ring Accelerator HERA (DESY, Hamburg, Germany) was the first and up to now only electron-hadron collider ever operated (1991-2007). In 2019 the U.S. Department of Energy initiated the Electron-Ion Collider (EIC) project, the next electron-hadron collider currently under construction at BNL (Upton, NY) in partnership with JLab (Newport News, VA). The EIC builds on the infrastructure of the current Relativistic Heavy Ion Collider (RHIC) complex at BNL. The EIC will collide 5 to 18 GeV polarized electrons with 41 to 275 GeV polarized protons, polarized light ions with energies up to 166 GeV/u, and unpolarized heavy ions up to 110 GeV/u. The EIC is a high-luminosity collider designed to provide 10^34 cm−2 s−1 at 105 GeV center-of-mass energy collisions between electrons and protons. The project scope includes one colliding region with its detector but two colliding regions are feasible. This talk will give an overview of the EIC design, main technological challenges and timeline.

In-person participation

Yes

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