

Nucleon and nuclear PDFs, from HERA to EIC

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The discovery of the pointlike constituents of the proton inspired massive experimental efforts to use deep inelastic scattering (DIS) to understand the partonic structure of hadrons. Early experiments were performed at fixed-target facilities, which made important findings but were limited in accessible kinematics. The Hadron-Electron Ring Accelerator (HERA), operated at DESY between 1991-2007, pioneered high-energy DIS as the first facility to collide electron (and positron) beams with proton beams at center of mass energies up to 320 GeV. The data from HERA revolutionized our understanding of the proton's internal structure, and continue to provide critical constraints on global analyses of parton distribution functions (PDFs) of the proton. The electron-ion collider (EIC), under development at Brookhaven National Laboratory, will succeed HERA as a next-generation DIS collider facility. The EIC will facilitate fully polarized collisions between electrons and protons, at lower center of mass energies but two orders of magnitude higher luminosity than HERA. Further, the EIC will allow collisions with ions, ranging from deuterium and helium to heavy nuclei such as lead. This talk will discuss our evolving understanding of the partonic structure of nucleons and nuclei, from the lasting legacy of HERA to the projected impact of the EIC.

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