The LHeC and FCC-eh Project

Accelerator Design Studies for Deep Inelastic Scattering Physics at Highest Proton Energies

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Abstract

The Large Hadron–Electron Collider is designed to move the physics of deep inelastic scattering to the highest energy and intensity in particle physics. The accelerator will provide electron-proton/nucleus collisions with centre-of-mass energies in the TeV regime and luminosities in the order of 10^{34} cm⁻² s⁻¹. An intense electron beam of 50 GeV energy, accelerated in a novel Energy Recovery Linac, is brought into collision with the 7 TeV proton or ion beam of CERN's Large Hadron Collider. Even higher centre-of-mass energies are in reach combining the foreseen ERL concept with the 50 TeV proton beam of the FCC-hh project. The accelerator concept and the layoput of the interaction region will allow concurrent electron–proton and proton–proton operations. The presentation describes the concepts of the design study and discusses the challenges of the project.