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Energy frontier DIS at CERN: the LHeC and the FCC-eh, PERLE

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Energy-frontier DIS can be realised at CERN through an energy recovery linac that would produce 60 GeV electrons to collide with the HL-LHC or, eventually, with the HE-LHC or the FCC hadron beams. It would deliver lepton-proton/nucleus collisions with center of mass energies in the range 0.8-3.5 TeV per nucleon, and luminosities exceeding 10^{34} (5×10^{32}) $\text{cm}^{-2}\text{s}^{-1}$ in ep (ePb). Such machine would provide a huge physics program, with the highest resolution microscope for hadron structure, rich Higgs, top and precision EW physics, large possibilities for BSM searches, and a unique top-energy nuclear physics facility with eventual access to a new regime of QCD at high partonic densities. All these aspects have strong complementarities with the respective, concurrent pp and AA programs. In this talk we review the LHeC and FCC-eh proposals at CERN, with emphasis on the accelerator and infrastructure aspects. We also review the project of an ERL demonstrator, PERLE, under consideration to be built at LAL Orsay.

Co-authors: ARMESTO PEREZ, Nestor (Universidade de Santiago de Compostela (ES)); ARDUINI, Gianluigi (CERN)

Presenter: ARDUINI, Gianluigi (CERN)

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