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Small-x physics at the Large Hadron-electron Collider at CERN

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The Large Hadron-electron Collider LHeC is a proposed facility at CERN to collide electrons and positrons against the LHC beams at center-of-mass energies around 1 TeV per nucleon, with the aim of studying previously unexplored kinematical regions of the hadron and nuclear wave functions. After a brief physical motivation, I will present the project. Then I will focus on the opportunities for small-x studies, with special attention to the case of lepton-nucleus collisions. I will show the different opportunities for inclusive studies, exclusive and inclusive diffraction, and final states. For each observable, I will discuss the possibilities that it offers to establish the linear or non-linear behavior in small-x evolution, to determine the partonic structure of protons and nuclei at small x, and to investigate the dynamics of QCD branching and of hadronization.

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