

Hard Probes 2018: International Conference on Hard & Electromagnetic Probes of High-Energy Nuclear Collisions

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(TALK)

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Resolving the Gluon Saturation Issue - Small-x Physics with the LHeC

Tuesday 2 October 2018 10:00 (20 minutes)

The Large Hadron-electron Collider LHeC is a proposed upgrade of the LHC. An energy recovery linac would provide 60 GeV electrons to collide with the proton and nuclear beams from the HL-LHC and, eventually, with those from the HE-LHC and the FCC-hh. Working concurrently with the pp, pPb or PbPb LHC modes, it will provide ep (ePb) collisions in the TeV regime with luminosities $\sim 10^{34}(10^{33}) \text{ cm}^{-2}\text{s}^{-1}$ to achieve integrated luminosities $\sim 1 \text{ ab}^{-1}$ (10 fb^{-1}) in ten years. With a huge extension of the kinematical coverage with respect to HERA, down to $x \sim 10^{-6}$ in the perturbative region for the LHeC, it offers the possibility to establish the existence of the novel non-linear regime of QCD expected at small x . In this talk we discuss the opportunities that non-diffractive measurements at the LHeC offer for determining: (i) the small- x partonic structure of protons; (ii) the eventual breaking of the standard picture based on fixed-order perturbation theory and; (iii) the mechanism, linear or non-linear, for such breaking. For the latter, the use of both proton and nuclear beams should be crucial. This information would be very important for understanding the small system puzzle observed in pp and pPb collisions at the LHC.

Summary

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