

Resolving the Partonic Structure of Nuclei through Energy-Frontier eA Scattering

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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 pPb or PbPb LHC modes, it will provide ePb collisions in the TeV regime with luminosities $\sim 10^{33} \text{ cm}^{-2} \text{ s}^{-1}$ to achieve integrated luminosities $\sim 10 \text{ fb}^{-1}$ in ten years. It will offer a huge extension of the kinematical coverage with respect to the one presently covered by data used in nuclear PDF fits, down to $x \sim 10^{-6}$ in the perturbative region for the LHeC. In this talk we will show the possibilities in such machine for determining the nPDFs with unprecedented precision, in a region of interest for both HL-LHC and future AA colliders, with the possibility of extracting the complete set of PDFs of a single nucleus in a single experiment. Confronting such precision nPDFs with data from nuclear colliders will then set the eventual factorisation breaking effects and allow a more precise characterisation of the properties of the QCD matter produced in such collisions.

Summary

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