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Nuclear Dynamics probed in Electron-Ion Scattering at TeV Energies

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The Large Hadron-electron Collider LHeC and the Future Circular Collider in electron-hadron mode FCC-eh will provide unique electron-lead collisions with center-of-mass energies in the range 0.8-2.2 TeV, and instantaneous luminosities around $10^{33} \text{ cm}^{-2} \text{ s}^{-1}$ per nucleon that will result in luminous data samples of typically 10 fb^{-1} per nucleon. In this talk, we illustrate the resulting unprecedented opportunity to resolve nuclear structure and dynamics in a hugely extended kinematic range. We present new results on the determination of the lead parton densities in the EPPS16 framework that already includes pPb data from the LHC. We then discuss the possible impact of ePb studies on the search for a new non-linear regime of QCD, those of saturated parton densities. Finally, we show the potential of the study of elastic vector meson production to determine saturation effects and to access the transverse profile of both nucleons and nuclei.

Experimental Collaboration

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