

Pion-nucleus Drell-Yan data as a novel constraint for nuclear PDFs

Despite the success of modern nuclear parton distribution functions (nPDFs) in describing nuclear hard-process data, they still suffer from large uncertainties. One of the shortcomings is the lack of data which would constrain the nuclear effects of all parton flavours simultaneously without any a priori assumptions. For example, it has been customary to assume that nuclear modifications for both valence quarks u and d are the same. We have studied the prospects of using the Drell-Yan dilepton process in pion-nucleus collisions as a novel input in the global analysis of nPDFs [1]. In a NLO QCD framework, we find the measured nuclear cross-section ratios from the NA3, NA10 and E615 experiments to be largely independent of pion parton distributions and also compatible with the EPS09 and nCTEQ15 nPDFs. These data sets can thus be included in global nPDF analyses without introducing significant new theoretical uncertainties or tension with the other data. In particular, we explore the constraining power of these data sets on the possible asymmetry of the valence-quark nuclear modifications.

[1] P. Paakkinen, K. J. Eskola, H. Paukkunen, arXiv:1609.07262 [nucl-th], submitted to Phys. Lett. B.

Preferred Track

Initial State Physics and Approach to Equilibrium

Collaboration

Not applicable

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