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

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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 nuclear parton distribution functions (nPDFs). In a NLO QCD framework, we find the measured nuclear cross-section ratios from the NA3, NA10 and E615 experiments to be largely insensitive to the 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 flavour asymmetry in the valence-quark nuclear modifications. Moreover, using the COMPASS kinematics we present predictions for pion charge difference ratio, a new measurable which could help further constrain this asymmetry.

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