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Global Analysis of Nuclear Parton Distributions

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We present a new global QCD analysis of nuclear parton distribution functions
and their uncertainties. In addition to the most commonly analyzed data sets
for deep inelastic scattering of charged leptons off nuclei and Drell-Yan di-lepton production, we include also
measurements for neutrino nuclei scattering as well as inclusive pion production in deuteron gold collisions.
The analysis is performed at next-to-leading order accuracy in perturbative QCD in
a general mass variable flavor number scheme, adopting a current set of free nucleon parton distribution functions, defined accordingly, as reference. The emerging picture is one of consistency, where universal nuclear modification factors for each parton flavor reproduce the main features of all data without any significant tension among the different sets.
We use the Hessian method to estimate the uncertainties of the obtained nuclear modification factors and examine critically their range of validity in view of the sparse kinematic coverage of the present data.
We briefly present several applications of our nuclear parton densities in
hard nuclear reactions at BNL-RHIC, CERN-LHC, and a future electron ion collider.

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