

Nuclear corrections in neutrino–nucleus DIS and their compatibility with global NPDF analysis

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We perform a global χ^2 -analysis of nuclear parton distribution functions using data from charged current neutrino-nucleus deep-inelastic scattering (DIS), charged-lepton-nucleus DIS, and the Drell-Yan (DY) process. We show that the nuclear corrections in ν -A DIS are not compatible with the predictions derived from l^+ -A DIS and DY data. We quantify this result using a hypothesis-testing criterion based on the χ^2 distribution which we apply to the total χ^2 as well as to the χ^2 of the individual data sets. We find that it is not possible to accommodate the data from ν -A and l^+ -A DIS by an acceptable combined fit. Our result has strong implications for the extraction of both nuclear and proton parton distribution functions using combined neutrino and charged-lepton data sets.

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