Next-to-leading order perturbative QCD for global analysis of Nuclear Parton Distributions

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Measurements of deep inelastic scattering in nuclei show that the quark distributions in heavy nuclei are not simply the sum of the quark distributions of the constituent proton and neutron, as one might expect for a weakly bound system. This modification of the quark distributions in nuclei is known as the EMC effect. In this work, we perform the global QCD analysis of nuclear parton distribution functions (NPDFs) at the next-to-leading order perturbative QCD and their uncertainties using nuclear hard process data from deep inelastic l+A scattering and the Drell-Yan (DY) process in p+A collisions. We take into account the asymmetry of sea quark distributions in our analysis. The uncertainties of the nuclear PDFs are estimated by the Hessian method. Our results for nuclear parton distribution functions are in good agreement with the available theoretical models.

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