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Structure functions for inclusive and diffractive DIS at future EICs

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We present predictions for proton and nuclear structure functions using numerical solutions to the Balistky-Kovchegov equation with the collinearly improved kernel and including the impact-parameter dependence. Two different approaches to the nuclear case are studied: a solution obtained using a newly proposed type of initial condition which represent the given nucleus and the solutions based on an initial condition representing a proton coupled to a Glauber-Gribov prescription to obtain dipole-nucleus amplitudes. We study the influence from the different energy evolutions of these two approaches in the nuclear structure functions and calculate the nuclear suppression factors that lead to the predictions for the energy dependence of nuclear shadowing. We also apply this approach to obtain the predictions for proton and nuclear diffractive structure functions. We compare our predictions with the available data and also with the results obtained using the IP-Sat and b-CGC models for the dipole-proton amplitude. We demonstrate that the contribution of the diffractive events is enhanced in nuclear collisions and that the study of the ratio between the nuclear and proton predictions will be useful to discriminate among different models. These studies are therefore of interest for future measurement at the currently planned electron-ion colliders, which can allow us to constrain the description of QCD dynamics in parton densities.

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