

Next-to-leading order structure function for DIS off a large nucleus

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The high-energy behavior of amplitudes in gauge theories can be reformulated in terms of the evolution of Wilson-line operators. In the leading order this evolution is governed by the non-linear Balitsky-Kovchegov (BK) equation.

In order to see if this equation is relevant for existing or future DIS accelerators (like EIC or LeHC) one needs to know how large are the next-to-leading order (NLO) corrections.

In addition, the NLO corrections define the scale of the running-coupling constant in the BK equation and therefore determine the magnitude of the leading-order cross sections.

To obtain then the structure function for DIS off a large nucleus at the NLO accuracy in α_s ,

we calculate the NLO contribution to the BK equation

and the NLO photon impact factor,

related to the probability of the virtual photon to split in a quark anti-quark pair before scattering off the target.

We obtain for the first time an analytic expression in coordinate space of the NLO photon impact factor.

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