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New approach to QCD factorization

Abstract: We show that both the k_T - and collinear factorization for DIS structure functions can be obtained by consecutive reductions of the more general factorization of the Compton scattering amplitude.

Each of these reductions is an approximation valid under certain assumptions.

In particular, the transition to the k_T -factorization is possible when the virtualities of the partons connecting the perturbative and non-perturbative blobs are originated by the transverse momenta.

Then, if the unintegrated parton distributions in k_T -factorization have a sharp maximum in k_\perp , the k_T factorization can be reduced to the collinear factorization.

Our analysis makes possible to predict a general form for the fits for parton distributions in k_T -factorization.

Besides, we exclude

the use of the singular factors x^{-a} (with $a > 0$) in the fits

representing the initial quark and gluon distributions contributing to the

DIS structure functions in the framework of both k_T - and collinear factorizations.

Author: ERMOLAEV, Boris (IFMO Inst. of Fine Mechanics and Optics)

Presenter: ERMOLAEV, Boris (IFMO Inst. of Fine Mechanics and Optics)

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