

Unintegrated gluon distributions and k_t -factorization in forward hadron production in DIS and pA collisions

Two different forms of unintegrated gluon distributions have been widely used in the literature to describe small- x phenomena. On one hand, the Weizsacker-Williams distribution explicitly counts the number of gluons per state in a physical gauge but does not seem to be related to any known observables. On the other hand, the unintegrated gluon distribution defined as the Fourier transform of the color dipole cross section appears naturally in gluon production cross sections but has no partonic interpretation. We show that the Weizsacker-Williams distribution can be probed in a dijet production process in DIS whereas the Fourier transform of the color dipole appears in photon-jet production in pA collisions. More complicated processes involving two particle production can be described with an effective k_t -factorization where each specific process requires a new gluon distribution built from the two basic ones through convolution.

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