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Sudakov suppression and gluon saturation at NLO

Sunday 25 September 2022 18:00 (20 minutes)

We study inclusive dijet production in deep inelastic scattering at NLO within the Color Glass Condensate Effective Field Theory. We begin by studying this process in general small-x kinematics where we: (i) show that the differential cross-section is infrared and collinear safe, (ii) demonstrate the factorization of large energy/rapidity logarithms which can then be resummed via JIMWLK renormalization, and (iii) compute explicit expressions for the impact factor.

We then specialize in the transverse back-to-back kinematics where this process is sensitive to unpolarized and linearly polarized parts of the Weizsäcker-Williams (WW) gluon distribution. We extract from the impact factor the large Sudakov double and single logarithms at finite Nc. We show that small-x and Sudakov resummation can be performed simultaneously provided that the small-x evolution of the WW distribution, formulated in terms of the projectile rapidity, is amended by a kinematic constraint that imposes lifetime ordering of successive gluon emissions. We also comment on non-logarithmically enhanced terms in the impact factor that can break TMD factorization at NLO in the saturation regime.

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