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One-loop gauge invariant amplitudes with a space-like gluon in hybrid kT-factorization

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Particle physics has entered an era where high-precision calculations are required to compare theoretical predictions with experimental data. In this talk, I will describe a new method to compute the virtual contributions in k_T-factorization [1,2], called the auxiliary parton method. This method, which was already successfully applied at LO [3] to describe the forward-forward dijet correlations measured by the ATLAS collaboration for proton-proton and proton-lead collision [4], has been extended to the NLO to calculate the virtual [1] and the real corrections [2].

As I will explain, the formalism developed in [1] and [2] is a fundamental step to bridge the gap between the lowest order calculations and the NLO corrections in hybrid k_T-factorization, thus being relevant for a more precise description of the experimental data in the rich field of the so-called small-x physics, such as gluon luminosity saturation and forward jet production.

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