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Bjorken x weighted Energy-Energy Correlators from the Target Fragmentation Region to the Current Fragmentation Region

we explore the Bjorken x weighted EEC in DIS from the TFR to CFR. In both regions, a factorization theorem can be derived with SCET, based on which the logarithms can be resummed to all orders in α_s. The singular distributions can be derived from the factorized formula, which are compared against the full fixed-order QCD calculations up to NLO. Additionally, we present the resummation results up to NLL in the TFR and N^3LL in the TMD region. In the extremely small angle limit, the free hadron gas model is introduced to investigate the non-perturbative distribution. We compared our predictions to partonic PYTHIA simulations. Between the hadron gas phase region and the perturbative resummation region, a transition phase is observed. The non-perturbative and hadronization effects in the TMD region were investigated by considering non-perturbative form factors extracted from the semi-inclusive hadron production in DIS. Incorporating these non-perturbative models, we also presented the comparison of our predictions to PYTHIA simulations.

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