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A study of TMD evolution effect on $\cos 2\phi$ azimuthal asymmetry in a back-to-back J/ψ -jet production at the EIC

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A back-to-back semi-inclusive $J/\psi + jet$ production is a promising process to study gluon transverse momentum distribution (TMDs) at the future electron-ion collider (EIC). A back-to-back configuration allows a higher transverse momentum for J/ψ . We present an extension of a previous work where we studied $\cos 2\phi$ azimuthal asymmetry within the TMD factorization framework. We present the effect of TMD evolution on the asymmetry in two approaches that differ in the parameterization of the perturbative tails of the TMDs and the non-perturbative factors. We found that the asymmetry increases with the total outgoing transverse momentum, however, it decreases with the transverse momentum of J/ψ or the jet. We investigated the uncertainty coming from the parameterizations of the non-perturbative Sudakov factors in the larger b_T region, which we found to be sensitive to the contributions from the non-perturbative region, influencing the asymmetry significantly.

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