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$\cos 2\phi$ asymmetry in almost back-to-back production of J/ψ and jet at EIC and effect of TMD evolution

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A back-to-back semi-inclusive J/ψ -jet production is a promising process to study gluon transverse momentum distribution (TMD) at the future electron-ion collider. 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 for this process. We present and compare the effect of TMD evolution on the asymmetry, in two approaches that differ in the parametrization of the perturbative tails of the TMDs and the nonperturbative factors. We show that the asymmetry depends on the parametrizations of the nonperturbative Sudakov factors in the larger b_T region and on the perturbative part of the evolution kernel. We use nonrelativistic QCD to estimate the J/ψ production and show the effect of using different long-distance matrix element sets. Overall, the asymmetry after incorporating TMD evolution is small, but increases with the transverse momentum imbalance of the J/ψ -jet pair.

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