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Gauge-invariant TMD factorization for Drell-Yan hadronic tensor at small x

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The Drell-Yan process is studied in the framework of TMD factorization in the Sudakov region $s \gg Q^2 \gg q_\perp^2$ corresponding to recent LHC experiments with Q^2 of order of mass of Z-boson and transverse momentum of DY pair $\sim$ few tens GeV. The Drell-Yan hadronic tensors are calculated with $\frac{1}{Q^2}$ accuracy, first at the tree level and then with the double-log accuracy. It is demonstrated that in the leading order in N_c the higher-twist quark-quark-gluon TMDs reduce to leading-twist TMDs due to QCD equation of motion. The resulting tensor for unpolarized hadrons is EM gauge-invariant and depends on two leading-twist TMDs: f_1 responsible for total DY cross section, and Boer-Mulders function $h_1^\perp$. The corresponding qualitative and semi-quantitative predictions for angular coefficients of Z-boson production seem to agree with LHC data at corresponding kinematics.

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