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Transverse momentum dependent factorization in the target fragmentation region at small-x

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We consider the differential cross-section for single-inclusive jet production with transverse momentum $P_\perp$ in Deep Inelastic Scattering (DIS) at small Bjorken x_{Bj}, mediated by a virtual photon with virtuality Q^2. We focus on the kinematic regime where the jet is produced in the target fragmentation hemisphere of the Breit frame, and with $P_\perp \ll Q$. For a longitudinally polarised photon, we demonstrate that this cross section is not power of $P_\perp/Q$ suppressed and we derive a factorized expression in terms of transverse momentum dependent (TMD) quark and gluon fracture functions. Our formula, valid at next-to-leading order in α_s at small x, is akin to the Altarelli-Martinelli identity for the longitudinal DIS structure-function. Numerical estimates show that the quark TMD fracture function is the most sensitive to saturation effects in large nuclei.

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