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Hadro-production of Z-bosons in the Parton Branching Approach to TMDs

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Transverse Momentum Dependent (TMD) parton distributions obtained from the Parton Branching (PB) method are combined with next-to-leading-order (NLO) calculations of Drell-Yan (DY) production. We apply the MC-at-NLO method for the hard process calculation and matching with the PB TMDs. We compute predictions for the transverse momentum, rapidity and phi-* spectra of Z bosons. We find that the theoretical uncertainties of the predictions are dominated by the renormalization and factorization scale dependence, while the impact of TMD uncertainties is moderate. The theoretical predictions agree well, within uncertainties, with measurements at the Large Hadron Collider (LHC). In particular, we study the region of lowest transverse momenta at the LHC, and comment on its sensitivity to nonperturbative TMD contributions.

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