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Factorization and Resummation for Massive Quark Effects in Exclusive Drell-Yan

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Transverse momentum spectra at hadron colliders are nowadays studied at an unprecedented precision in theory and experiment. Within the framework of Soft-Collinear Effective Theory we discuss how to incorporate massive bottom/charm quark effects in the resummed cross section for Drell-Yan at small q_T . These can e.g. play an important role in W-mass measurements at the LHC. At NNLL' order, i.e. including matrix elements at $\mathcal{O}(\alpha_s^2)$ and NNLL resummation, one has to account for both heavy quark initiated (primary) corrections to the hard scattering process as well as secondary radiation effects. The theoretical description depends on the hierarchy between the involved scales, ranging from the decoupling limit for large masses to the massless limit for small masses, and involves quark mass dependent beam functions/TMDs and soft functions in between. The rapidity divergences for $q_T \sim m_Q$ are affected by the quark mass and we also discuss the resulting evolution which resums the associated rapidity logarithms.

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