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Leading q_T/Q corrections for Drell-Yan in TMD factorization

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Abstract

The transverse momentum dependent (TMD) factorization theorem accommodates various types of power corrections. Among them, the least studied are the q_T/Q corrections, which become significant at large values of transverse momentum. These corrections partially originate from higher-twist TMD distributions, which exhibit singularities at small distances. We analyze their structure and propose a decomposition of higher-twist TMD distribution that makes the q_T/Q correction manifest. As a concrete application, we compute the next-to-leading power (NLP) expression for the angular distributions in the Drell-Yan process within the TMD factorization framework and extract the leading q_T/Q correction. We demonstrate that q_T/Q corrections are significant for the angular distributions A_1 and A_3 , in complete agreement with the data.

