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Sivers Asymmetry in πN Drell-Yan process at COMPASS within TMD factorization

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We study the differential cross section in the unpolarized $\pi^- N$ Drell-Yan process, using transverse momentum dependent factorization up to next-to-logarithmic order of QCD and extract the nonperturbative Sudakov form factor for the pion in the evolution formalism of the unpolarized TMD distribution function, by fitting the experimental data collected by the E615 Collaboration at Fermilab. With the extracted Sudakov factor, we investigate the Sivers asymmetry in the pion-induced single polarized Drell-Yan process in the theoretical framework of the transverse momentum dependent factorization up to next-to-leading logarithmic order of QCD. Within the TMD evolution formalism of parton distribution functions, the extracted nonperturbative Sudakov form factor for the pion distribution functions as well as the one for the Sivers function of the proton are applied to numerically estimate the Sivers asymmetry in the $\pi^- p$ Drell-Yan at the kinematics of the COMPASS at CERN.

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