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Transverse-Spin Dependent Azimuthal Asymmetries in Drell-Yan at COMPASS

The study of transverse-spin dependent azimuthal asymmetries in the Drell-Yan process provides crucial insights into the spin-dependent structure of nucleons. In combination with semi-inclusive deep inelastic scattering, it provides a key test of the restricted universality of transverse-momentum dependent parton distribution functions, which predict that the Sivers and Boer–Mulders functions have opposite signs in these reactions. During the 2015 and 2018 data-taking periods, the COMPASS Collaboration at CERN measured the $\pi^- p \rightarrow \mu^+ \mu^- X$ reaction, using a 190 GeV/*c* pion beam and a transversely polarized NH₃ target. We examined asymmetries in the Drell-Yan process, introducing a novel weighting method that applies powers of the dimuon system's transverse momentum relative to the beam, in this way avoiding the convolution present in conventional asymmetries. This approach enables the direct extraction of specific k_T^2 moments of the transverse-momentum dependent parton distribution functions. The combined results from weighted and unweighted analyses will be presented, focusing on the $M_{\mu\mu}$ mass range of 4–9 GeV/ c^2 .

Secondary track

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