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Exploring Sivers Effects in SIDIS Vector Meson Production

We investigate the Sivers asymmetry in the production of vector mesons, specifically ρ^0 and K^*, in SIDIS processes in the TMD factorization framework. By employing the Sivers function extracted from pion and kaon production data, we calculate the transverse single-spin asymmetry for ρ^0 production and compare it with recent COMPASS measurements. Our results align well with the experimental data, supporting the universality of the Sivers function across different final-state hadrons within current uncertainties. Additionally, we provide predictions for the Sivers asymmetries of ρ^0 and K^* mesons at the kinematics of EIC and EicC. While two kind of parametrizations of the Sivers function describe COMPASS data equally well, they yield distinct predictions at EIC and EicC, indicating that future high-precision data will better constrain the Sivers function and nucleon spin structure.

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