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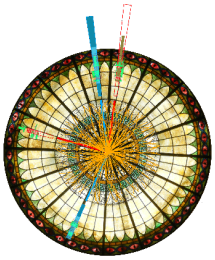

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Transverse single-spin asymmetries in pion and photon production from proton-proton collisions

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Transverse single-spin asymmetries (TSSAs), denoted A_N, in single-inclusive hard scattering processes are fundamental observables to test perturbative QCD that have been around for almost 40 years. However, many open issues remain as to the origin of TSSAs. Currently two theoretical formalisms are widely used: collinear twist-3 (CT3) factorization and the Generalized Parton Model (GPM). We discuss our work in this area using the framework of the former, including recent calculations of pion and direct photon production in proton-proton collisions. We show how the TSSA for pp -> \pi X could mainly come from fragmentation, which could allow for a resolution of the "sign-mismatch" between the Qiu-Sterman (QS) function and the Sivers function. This study also shows a simultaneous description of spin/azimuthal asymmetries in pp, SIDIS, and e+e- is possible. For A_N in pp -> \gamma X, we demonstrate how this reaction can allow for a "clean" extraction of the QS function, test the process dependence of the Sivers function, and distinguish between the CT3 and GPM approaches. Given the progress that has been made so far, continued experimental and theoretical work could finally allow us to understand this longstanding problem.

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