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**Quasi-Classical Origins of Single Transverse Spin Asymmetries**[1]
MATTHEW SIEVERT, YURI KOVCHEGOV, The Ohio State University — We consider semi-inclusive deep inelastic scattering and the Drell-Yan process on a transversely-polarized proton at high energies. We model the small-$x$ wave function of the proton using the McLerran-Venugopalan (MV) model, which has been reasonably successful in describing high-energy proton data. The MV model, originally formulated for a heavy ion with a large number $\sim A$ of independent color charges, is a quasi-classical description that should apply to any dense system of color charges, including a proton at very high energies. Here we incorporate spin dependence into the MV framework and analyze several microscopic scattering channels that lead to the generation of a single transverse spin asymmetry. In particular, we study asymmetries mediated by intrinsic orbital angular momentum, asymmetries produced locally by rescattering on the same constituent, and asymmetries that couple to the odderon. This analysis yields a simple, intuitive, quasi-classical picture in which one can understand understand the famous sign-reversal of the Sivers asymmetry between semi-inclusive deep inelastic scattering and the Drell-Yan process.

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