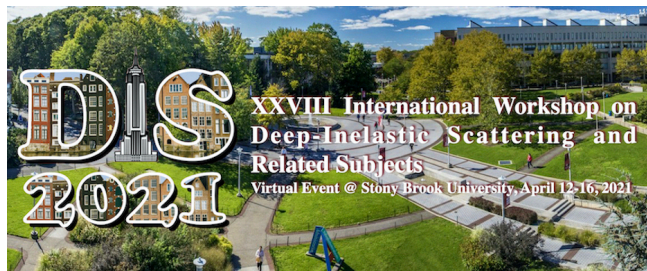


XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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Transverse Single-Spin Asymmetries of Midrapidity Direct Photons and Neutral Mesons at PHENIX

Tuesday, 13 April 2021 09:43 (18 minutes)

The experimental observation of strikingly large transverse single-spin asymmetries (TSSAs) revealed that there were significant spin-momentum correlations present in hadronic collisions, both within nucleons and the process of hadronization. TSSA measurements have allowed for the development of both transverse momentum dependent and collinear twist-3 descriptions of these nonperturbative spin-momentum correlations. Results are presented for the TSSAs of direct photons, neutral pions, and eta mesons for $|\eta| < 0.35$ from $p^\uparrow + p$ collisions with $\sqrt{s} = 200$ GeV at PHENIX. As hadrons, π^0 and η mesons are sensitive to both initial- and final-state effects and at midrapidity probe the dynamics of gluons along with a mix of quark flavors. Because direct photon production does not include hadronization, the direct photon TSSA is only sensitive to initial-state effects and at midrapidity provides a clean probe of the gluon dynamics in transversely polarized protons. All three of these results will help constrain the collinear twist-3 trigluon correlation function as well as the gluon Sivers function, improving our knowledge of spin-dependent gluon dynamics in QCD.

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