

Accessing the Gluon Polarization Through the Double-Helicity Asymmetry in Charged Pion Production at PHENIX

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The RHIC spin program with its use of strongly interacting probes provides a unique opportunity that allows the direct study of gluon polarization within the nucleon. Among a variety of experimental channels the double-helicity asymmetry (A_{LL}) of charged pions seems to be an especially interesting probe. Charged pion asymmetry measurements will be an important component in upcoming global analyses, which will allow determination of the gluon polarization over a wide range in x .

Comparison of differential cross section measurements to next-to-leading order (NLO) pQCD calculations has been essential to confirm our understanding of hard scattering at RHIC energies and the applicability of NLO pQCD in interpreting polarized processes. Quark-gluon scattering dominates mid-rapidity pion production at RHIC at transverse momenta above ~ 5 GeV/c. In this kinematic region the favored and unfavored fragmentation functions for each pion species provide relevant information. Relative differences among A_{LL} of positive, neutral, and negative pions at high transverse momentum are sensitive to the sign of Δg . The current status of the charged pion A_{LL} and cross section analyses using PHENIX data from the 2005 polarized proton run at RHIC will be presented.