

Searching for the Proton's Spin:  
Accessing the Gluon's Polarization with Polarized p+p Collisions  
via Pion Production

by

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Detector experiments on the Relativistic Heavy Ion Collider at BNL, with its use of beams of polarized protons, provides a unique environment of hard scattering between gluons and quarks complementary to that provided by deep inelastic scattering of leptons and nucleons. Polarized proton-proton collisions can directly probe the polarized gluon and anti-quark distributions as the collisions couple the color charges of the participants.

RHIC's measurements of the spin substructure of the proton may contribute to our understanding of how quarks and gluons move inside protons and other particles. In particular, measuring of spin asymmetries of pion species at mid-rapidity are some of the various interesting probes that will form part of the global analysis aiming to determine the gluon polarization over a wide range in  $x$ . In this talk we will discuss pion double longitudinal asymmetries ( $A_{LL}$ ) and their role in RHIC spin experiments which aim to elucidate information on the proton spin structure.