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**Longitudinal Double Spin Asymmetry and Cross Section for  $\eta$  production at mid-rapidity in polarized p+p collisions at  $\sqrt{s_{NN}} = 200$  GeV** JOSEPH SEELE, University of Colorado at Boulder, PHENIX COLLABORATION — Longitudinal double spin asymmetries,  $A_{LL}$ , measured for inclusive hadron production in polarized proton-proton collisions at high energies have been shown to be sensitive to the gluon helicity distribution,  $\Delta g$ . A recent measurement of the longitudinal double spin asymmetry for neutral pion production at RHIC by the PHENIX experiment (Phys. Rev. Lett. 93, 202002 (2004)) has provided a significant constraint on the gluon helicity distribution of the nucleon. The extraction of  $\Delta g$  from these data depends on the experimental knowledge of the relevant fragmentation functions. However, the measurement of  $A_{LL}$  for different hadrons with independent experimental uncertainties and different fragmentation functions will further constrain the uncertainties present in global analyses of data. The measurement of the longitudinal double spin asymmetry for  $\eta$  production will provide such a constraint. The PHENIX spectrometer has been used to measure the production of  $\eta$  particles at mid-rapidity ( $|\eta| < 0.35$ ). The results for the  $A_{LL}$  and cross section for  $\eta$  production in polarized p+p collision at  $\sqrt{s_{NN}} = 200$  GeV at RHIC will be presented.

Prefer Oral Session  
 Prefer Poster Session

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