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**The Double Helicity Asymmetry in Neutral Pion Production at PHENIX and Its Constraint on  $\Delta G$  Through Global Analysis** KIERAN BOYLE, RIKEN-BNL Research Center, PHENIX COLLABORATION — Understanding the gluon spin contribution to the proton spin,  $\Delta G$ , is a primary goal of the RHIC spin program. The abundant production of pions in  $p + p$  collisions, coupled with the PHENIX detector's fine resolution Electromagnetic Calorimeter and high  $p_T$  triggering capabilities, make neutral pions a prime candidate to study the proton spin structure in polarized  $p + p$  collisions at RHIC. Measurements of the double helicity asymmetry,  $A_{LL}$ , in  $\pi^0$  production from 2005 and 2006 were shown to significantly constrain the gluon helicity distribution,  $\Delta G$ , in the proton [1]. With improved luminosity and polarization, the figure of merit for the 2009 data set was a factor of 1.5 better than the previous runs combined. We present the 2009 results for  $\pi^0$   $A_{LL}$ , along with a discussion of the results from inclusion of these data in a recent update of the DSSV global analysis.

[1] D. de Florian, R. Sassot, M. Stratmann, W. Vogelsang (DSSV) Phys.Rev.Lett. 101 (2008) 072001

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