

Determining the Longitudinal Double-Spin Asymmetry (A_{LL}) for η Production from STAR 2013 Endcap Calorimeter Data

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The Solenoidal Tracker at RHIC (STAR), located at Brookhaven National Laboratory, uses longitudinally polarized proton-proton collisions to study the gluon spin contribution to the known proton spin. One method is to measure the longitudinal double-spin asymmetry (A_{LL}) in the production of η mesons from the longitudinally polarized proton-proton collisions at $\sqrt{s} = 510$ GeV. The η mesons that are produced from the collision quickly decay (in about 5.0×10^{-19} s) into two photons that are detected using the Endcap Electromagnetic Calorimeter (EEMC, $1.09 < \eta < 2.00$). The EEMC determines the energies and positions of the incoming photons. With the data from the EEMC, we can calculate the invariant mass of the photon pairs and produce a two-photon invariant mass spectrum. This spectrum is fitted with a Gaussian function to represent the η mesons plus a third-order polynomial function to describe the background photon pairs. The total number of η mesons is then obtained by integrating the fitted Gaussian function. The asymmetry is calculated using the number of η mesons resulting from the collisions of protons with different spin alignments. The status of the analysis of the 2013 dataset to measure the η meson A_{LL} will be presented.