

Determining the Longitudinal Double-Spin Asymmetry (A_{LL}) in π^0 Production from 2013 STAR Endcap Calorimeter Data

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The Solenoidal Tracker at RHIC (STAR) located at Brookhaven National Laboratory uses longitudinally polarized proton-proton (p+p) collisions to study, among other things, the gluon spin contribution to the known proton spin of $\frac{1}{2}\hbar$. The relative contributions to the spin of the proton of various constituent components remain uncertain. Using data from 2013 longitudinally polarized proton-proton collisions at $\sqrt{s} = 510$ GeV we can determine the asymmetry, A_{LL} , of neutral pion (π^0) production. This A_{LL} can be related to the gluon contribution to the spin of the proton. The Endcap Electromagnetic Calorimeter (EEMC, $1.09 < \eta < 2.00$) is used to detect the two photons produced from a π^0 decay, which can be produced in a p+p collision, yielding the energy and location of each photon. Using EEMC measurements, the invariant mass of the photon pairs is calculated, and a two-photon invariant mass spectrum is created. In this spectrum, some photon pairs come from π^0 decays, and some are background, which is mostly due to wrong combinations of photons. The spectrum is fitted with a Skewed Gaussian function to represent the π^0 signal, and a Chebyshev function to represent the background. The total number of π^0 s is determined by integrating the Skewed Gaussian function. The A_{LL} is calculated using the number of π^0 s produced in collisions with different spin alignments. The quality of the large data set must be ensured for its analysis. The status of the analysis, focusing on quality assurance, will be presented.