A Measurement of π^0 A_{LL} with the STAR 2013 Endcap Calorimeter Data

Brook Burbridge
Valparaiso University
(For the STAR Collaboration)

Longitudinally polarized protons are collided in the Solenoidal Tracker at RHIC (STAR) located at Brookhaven National Laboratory to study the gluon spin contribution to the spin of the proton. Data have been collected in 2013 at $\sqrt{s}$ = 510 GeV from which the spin-dependent asymmetry of neutral pion (π^0) production, A_{LL}, can be measured. The neutral pions are reconstructed using photons from the π^0 decays detected in the Endcap Electromagnetic Calorimeter (EEMC). The EEMC, covering an intermediate pseudorapidity range of $1.1 < \eta < 2$, is able to measure the energy and position of the electromagnetic showers from incoming photons. From these measurements, the two-photon invariant mass spectrum can be obtained, which is then fitted using a skewed Gaussian function to represent the π^0 signal and a Chebyshev function to characterize the random two-photon background. The total number of π^0s is obtained by integrating the resulting Gaussian peak. The π^0 A_{LL} is calculated from the number of π^0s produced in collisions of protons with different spin alignments. Numerous checks must be carried out to ensure the quality of the very large data set used in this analysis. The current status of the analysis, focusing on the data quality assurance, will be presented.