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Double-Spin Asymmetry in Neutral Pion Production in Longitudinally Polarized $p + p$

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1 Double-Spin Asymmetry in Neutral Pion (π^0)
2 Production in Longitudinally Polarized $p + p$
3 Collisions

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7 Beyond the valence quarks' spin contribution to the total spin of a pro-
8 ton, gluon and sea quark contributions are becoming clear as well. For pro-
9 ton+proton collisions at a center of mass energy of 510 GeV, neutral pion
10 production is dominated by gluon-gluon and gluon-quark scattering. An
11 avenue to constrain the gluon polarization is the asymmetry, A_{LL} , in the
12 production of neutral pions from collisions of longitudinally spin-polarized
13 proton beams. Our experiment was performed with the STAR detector at
14 the Relativistic Heavy Ion Collider (RHIC), unique for its ability to col-
15 lide spin-polarized proton beams. The Endcap Electromagnetic Calorimeter
16 (EEMC) of the STAR detector with its pseudorapidity (η) range between
17 1.09 and 2.00 and full azimuthal coverage measures energies of photons from
18 π^0 decays. We consider the invariant mass of all photon pairs in the EEMC
19 as we identify π^0 candidates. We will present the current status of the anal-
20 ysis of the π^0 A_{LL} as measured by the EEMC at STAR in 2012 data with
center-of-mass energy of 510 GeV.