Transverse Spin Dependent Azimuthal Correlations of Charged Pion Pairs in $p^{\uparrow}p$ collisions at $\sqrt{s} = 510$ GeV at STAR

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Abstract

The transversity distribution $h_1^q(x)$ describes transversely polarized quarks inside a transversely polarized nucleon. As $h_1^q(x)$ is chiral-odd, it can only be accessed via a process where it couples to another chiral-odd function, such as the spin-dependent interference fragmentation function (IFF) in $p^{\uparrow}p$ collisions. The coupling of $h_1^q(x)$ and IFF yields an experimentally measurable di-hadron correlation asymmetry, A_{UT}. To access $h_1^q(x)$ at high Q^2, where QCD framework is well understood, precise measurement of A_{UT} at high center-of-mass energy, $\sqrt{s}$, is crucial. Previously, the STAR experiment at RHIC measured non-zero A_{UT} using $p^{\uparrow}p$ data from 2011 at $\sqrt{s} = 500$ GeV with an integrated luminosity of 25 pb^{-1}. In 2017, STAR collected $\sim$ 350 pb^{-1} of $p^{\uparrow}p$ data at $\sqrt{s} = 510$ GeV which will significantly improve the statistical precision of A_{UT} measurement and thus further constrain global fits of $h_1^q(x)$, especially for $0.07 < x < 0.2$. We will give an status update on the A_{UT} measurement in the pseudorapidity region $|\eta| < 1$ for charged pion pairs in the final state, based on the 2017 $p^{\uparrow}p$ dataset.