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 trasverse polarization of quarks within a trasversely polarized nucleon, $h_1^q(x)$, 1 can only be accessed through processes involving its coupling with another chiral-odd 2 function, such as the spin-dependent interference fragmentation function (IFF) in po-3 larized proton-proton collisions. The coupling of $h_1^q(x)$ and IFF leads to a measurable 4 azimuthal correlation asymmetry (A_{UT}) of di-hadron pairs in the final state. In pre-5 vious work, the STAR experiment at RHIC measured a non-zero A_{UT} using polarized 6 proton-proton $(p^{\uparrow}p)$ collision data collected in 2011 at $\sqrt{s} = 500$ GeV, with an inte-7 grated luminosity of 25 pb⁻¹. The precise determination of A_{UT} , in conjunction with 8 the measurement of the cross section of unpolarized di-hadron pairs, can help constrain 9 the $h_1^q(x)$ in global analyses. In 2017, the STAR experiment collected a dataset of 10 approximately 350 pb⁻¹ from $p^{\uparrow}p$ collisions at $\sqrt{s} = 510$ GeV. This new dataset will 11 significantly enhance the statistical accuracy of the A_{UT} measurement. In this presen-12 tation, we will provide an update on the analysis of the A_{UT} measurement for pion 13 pairs in the mid-pseudorapidity region from the STAR 2017 $p^{\uparrow}p$ dataset. 14