Transverse Spin Dependent Azimuthal Correlations of Charged Kaon Pairs in $p^\uparrow p$ Collisions at $\sqrt{s} = 200$ GeV at STAR

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Abstract

Transversity, $h_1^q(x)$, a leading twist parton distribution function, describes the transverse spin distribution of quarks in a transversely polarized proton. It is a fundamental component of nucleon spin structure and is loosely constrained by global fits. As a chiral odd function, $h_1^q(x)$ can only be accessed when coupled with another chiral odd partner, such as interference fragmentation function (IFF) or Collins fragmentation function. This coupling of $h_1^q(x)$ and IFF leads to a measurable azimuthal correlation asymmetry (A_{UT}) of hadron pairs in final state. The STAR experiment at RHIC has measured non-zero A_{UT} for $\pi^+\pi^-$ in polarized proton-proton ($p^\uparrow p$) collision, using data from 2006 and 2015 at $\sqrt{s} = 200$ GeV and from 2011 and 2017 at $\sqrt{s} = 500/510$ GeV. The precise determination of A_{UT}, along with unpolarized di-hadron cross section in $p^\uparrow p$ collisions, can aid in constraining $h_1^q(x)$ in global analysis. Measurements of di-hadron A_{UT} and cross section with other hadron species provide additional flavor sensitivity; measurements with K^+K^- provide access to $h_1^q(x)$ of strange quarks. We will present an update on A_{UT} and cross section for K^+K^- pairs based on 2015 $p^\uparrow p$ dataset at $\sqrt{s} = 200$ GeV in the mid-pseudorapidity region ($|\eta| < 1$).