¹ Measurements of Transverse Spin Dependent $\pi^+\pi^-$ Azimuthal Correlation ² Asymmetry and Unpolarized $\pi^+\pi^-$ Cross Section in *pp* Collisions at $\sqrt{s} = 200$ ³ GeV at STAR

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Abstract

The transversity distribution function, $h_1^q(x)$, encapsulates the transverse spin structure of the 6 proton at the leading twist, where x represents the longitudinal momentum fraction carried by the 7 quark q. Extracting $h_1^q(x)$ poses a formidable challenge due to its chiral-odd nature. Measurements 8 of final-state dihadron pairs in transversely polarized proton-proton $(p^{\uparrow}p)$ collisions directly probe 9 the collinear quark transversity through its coupling with a chiral-odd interference fragmentation 10 function (IFF), $H_1^{\triangleleft,q}$. This coupling leads to an experimentally measurable azimuthal correlation 11 asymmetry, A_{UT} . Therefore, precise knowledge of the IFF and unpolarized dihadron fragmentation 12 functions are necessary to achieve a model-independent extraction of $h_1^q(x)$ from these measurements. 13 Obtaining these fragmentation functions requires measuring the unpolarized dihadron cross section in 14 pp collisions, which is crucial for constraining the gluon fragmentation function. In this presentation, 15 we will share preliminary results on A_{UT} using $p^{\uparrow}p$ data collected in 2015, and the unpolarized cross 16 section using pp data collected in 2012 for $\pi^+\pi^-$ pairs at $\sqrt{s} = 200$ GeV by the STAR experiment. 17