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

Thursday, 30 March 2023 14:40 (20 minutes)

The transversity distribution function, $h_1^q(x)$, where x is the longitudinal momentum fraction of the proton carried by quark q, encodes the proton's transverse spin structure at the leading twist. Extraction of $h_1^q(x)$ is difficult because of its chiral-odd nature. However, it can be coupled with a spin-dependent interference fragmentation function (FF), $H_1^{sphericalangle,q}$, which will produce in transversely polarized proton-proton ($p^\uparrow p$) collisions an experimentally measurable azimuthal correlation asymmetry, A_{UT}, between the spin of the fragmenting quark and the final state di-hadron. A model-independent extraction of transversity from these measurements relies on the knowledge of di-hadron FFs, which can be extracted from measurements of the unpolarized di-hadron cross section in pp collisions. We will present preliminary results on A_{UT} for $\pi^+\pi^-$ pairs with $p^\uparrow p$ data at $\sqrt{s} = 200$ GeV taken in 2015, as well as status update on the unpolarized $\pi^+\pi^-$ cross-section measurement with the pp data at $\sqrt{s} = 200$ GeV taken in 2012, at the STAR experiment.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

No

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