- 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

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5 Abstract

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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), $H_1^{\triangleleft,q}$, 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.