

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**

4 Babu Pokhrel for the STAR Collaboration
 Temple University, Philadelphia, PA, USA

5 **Abstract**

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