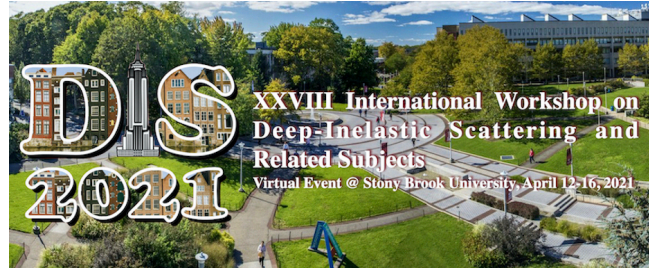


# XXVIII International Workshop on Deep-Inelastic Scattering and Related Subjects



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## Transverse Spin Dependent Azimuthal Correlations of Charged hadrons(s) in $p^\uparrow + p$ Collisions at $\sqrt{s} = 200$ GeV

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The transversity distribution function,  $h_1^q(x)$ , a leading twist parton distribution function, is a fundamental component of the spin structure of the nucleon.  $h_1^q(x)$  describes the distributions of transversely polarized quarks inside a transversely polarized nucleon, where  $x$  is the longitudinal momentum fraction of the proton carried by quark  $q$ . It is loosely constrained by global fits. Being chiral odd,  $h_1^q(x)$  can be accessed only when it is coupled with another chiral-odd partner, such as the spin-dependent Collins fragmentation function (FF) or the interference fragmentation function (IFF), which serves as a quark polarimeter. In transversely polarized proton-proton ( $p^\uparrow p$ ) collisions, the resulting azimuthal correlation between the spin of the fragmenting quark and the final state single charged hadron in jets (involving Collins FF) or di-hadron (involving IFF) can be measured, which are sensitive to quark transversity. The STAR experiment at RHIC has previously measured IFF asymmetries for  $\pi^+\pi^-$  pairs using  $p^\uparrow p$  collision data from 2006 at  $\sqrt{s} = 200$  GeV ( $\int Ldt = 1.8 \text{ pb}^{-1}$ ) and from 2011 at  $\sqrt{s} = 500$  GeV ( $\int Ldt = 25 \text{ pb}^{-1}$ ) and Collins asymmetries for charged pions within jets from 2011 at  $\sqrt{s} = 500$  GeV. Non-zero IFF and Collins asymmetries were reported which are consistent with predictions based on global analyses of  $e^+e^-$  and SIDIS data. In 2012 and 2015, STAR collected  $\sim 14 \text{ pb}^{-1} \sim 48 \text{ pb}^{-1}$  of  $p^\uparrow p$  data at  $\sqrt{s} = 200$  GeV, respectively. These datasets provide the most precise measurements of the Collins and IFF asymmetries in  $p^\uparrow p$  collisions at  $\sqrt{s} = 200$  GeV to date, especially at the quark momentum fractions  $0.1 < x < 0.4$ . We will present preliminary results for Collins asymmetries of identified pions, kaons, and protons in jets based on 2012 and 2015  $p^\uparrow p$  datasets and the status update for IFF asymmetries based on 2015  $p^\uparrow p$  dataset at  $\sqrt{s} = 200$  GeV.

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