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2 Azimuthal transverse single-spin asymmetries of inclusive jets and  
3 hadrons within jets from polarized  $pp$  collisions at  $\sqrt{s} = 510$  GeV

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**Abstract**

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Studies on the origin of transverse single-spin asymmetries have triggered the development of the twist-3 formalism and transverse-momentum-dependent parton distribution functions (TMDs). Measurement of the azimuthal distribution of identified hadrons within a jet in transversely polarized hadronic interactions provides an opportunity to study TMD physics, such as the Collins effect, which involves quark transversity and the Collins fragmentation functions. STAR has published measurements of Collins asymmetries from jet +  $\pi^\pm$  production in transversely polarized  $pp$  collisions at a center-of-mass energy of  $\sqrt{s} = 500$  GeV, based on data taken in 2011 with an integrated luminosity of  $23 \text{ pb}^{-1}$ . This was supplemented by an extensive measurement of azimuthal transverse single-spin asymmetries of inclusive jets and hadrons within jets from transversely polarized  $pp$  collisions at  $\sqrt{s} = 200$  GeV, using data from 2012 and 2015. In 2017, STAR collected a significantly larger  $pp$  dataset with an integrated luminosity of  $350 \text{ pb}^{-1}$  at  $\sqrt{s} = 510$  GeV, which will further improve the precision of the transverse single-spin asymmetry measurements especially at high jet transverse momentum region. In this talk, we will report preliminary results of azimuthal transverse single-spin asymmetries for inclusive jets and charged pions within jets from transversely polarized  $pp$  collisions at  $\sqrt{s} = 510$  GeV that took place in 2017.