

# Measurement of transverse single-spin asymmetries for dijet production in polarized $p+p$ collisions at $\sqrt{s} = 200$ GeV at STAR

Scott Wissink, on behalf of the STAR collaboration  
Indiana University, Center for Exploration of Energy and Matter

Aug 10 2021

## Abstract

We report a new measurement of transverse single-spin asymmetries for pair-production of jets in collisions of transversely polarized protons at  $\sqrt{s} = 200$  GeV with data taken in 2012 and 2015 at STAR. In this measurement we probe, at high  $Q^2$ , correlations between the transverse spin ( $\vec{S}$ ) of a proton, moving in the longitudinal ( $\vec{p}$ ) direction, and the transverse momenta of partons ( $\vec{k}_T$ ) within the proton. A non-zero correlation – the Sivers effect – results in a spin-dependent shift in the dijet azimuthal opening angle away from  $180^\circ$ . The corresponding  $\langle k_T \rangle$  is then calculated based on a simple kinematic model. By using charge-tagging of the jets to enhance either  $u$ - or  $d$ -quark contributions, we see a non-zero Sivers effect for the first time in dijet production in high-energy proton collisions. The individual parton contributions ( $u$ ,  $d$ , gluon+sea) to the measured  $\langle k_T \rangle$  are extracted through a matrix inversion of the charge-sorted  $\langle k_T \rangle$  data. Preliminary results and status of the analysis will be presented.