

Abstract Submitted
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An Opportunity for a Future Forward Jet Single Spin Asymmetry Measurements in $p+p$ Collisions at RHIC¹ XIAODONG JIANG, Los Alamos National Lab — We explored possible measurements of transverse single spin asymmetries (SSA) in forward jet productions at RHIC, in transversely polarized $p + p$ collisions. Forward jets produced in $p + p$ carry a non-vanishing SSA, as observed by the AnDY experiment at RHIC. Although jet SSA is at 10^{-3} level, it was interpreted due to cancellations of opposite sign contributions from valence up and down-quarks. This left-right bias in $p + p$ collision originates from a correlation between parton's transverse-momentum and the nucleon's transverse spin (Sivers effect), in co-linear twist-3 factorization framework, it can be related to the first moment of the Sivers distribution measured in semi-inclusive DIS. Gauge invariance predicts that the Sivers distribution is process-dependent, and the asymmetries of jet production in $p+p$ receive opposite sign contributions compared to those in semi-inclusive DIS. Through simulation studies, we show that valence quark contributions to jet production can be effectively flavor-enhanced with additional requirements on jet properties. Taking RHIC proposed new large acceptance jet-detector as an example, we show that with additional forward coverage, future jet SSA measurements at RHIC can be used to access valence quark Sivers effect at high-x.

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Xiaodong Jiang
Los Alamos National Lab

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