

1 Azimuthal Transverse Single-Spin Asymmetries of Charged 2 Pions Within Jets from Polarized pp Collisions at $\sqrt{s} = 200$ 3 GeV

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6 **Abstract**

7 A complete understanding of the nucleon spin structure requires the knowledge of un-
8 polarized parton distribution functions, helicity distribution functions, and the transversity
9 distributions. Transversity, which describes the transverse spin structure of quarks in a
10 transversely polarized proton, is the most difficult to probe and is still quite unconstrained
11 in global analyses. It is chiral-odd and can only be accessed through channels that couple
12 to another chiral-odd distribution like the Collins fragmentation function or the interference
13 fragmentation function. Recently, STAR reported the first measurements of Collins asym-
14 metries from jet + π^\pm production in polarized proton+proton collisions at $\sqrt{s} = 500$ GeV
15 and 200 GeV based on the data taken during the years 2011 and 2012. These results probe
16 higher momentum scales ($Q^2 \sim 960$ GeV² for 500 GeV and ~ 170 GeV² for 200 GeV) than
17 the measurements from semi-inclusive deep inelastic scattering (SIDIS, $Q^2 < 20$ GeV²) and
18 enable the test of the evolution, universality and factorization breaking in the transverse mo-
19 mentum dependent (TMD) formalisms. New preliminary results for the Collins asymmetry
20 from 2015 proton+proton collisions at $\sqrt{s} = 200$ GeV with a much larger sample size and
21 improved analysis procedures that lead to smaller systematic uncertainties will be presented.