

1 **Transverse Single-Spin Asymmetry for Electromagnetic Jets at Forward Rapidities at**
2 **STAR in $p^\uparrow + p$ Collisions at $\sqrt{s} = 200$ GeV**

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5 **Abstract**

6 There have been various attempts, both experimentally and theoretically, to understand the origin
7 of the unexpectedly large transverse single-spin asymmetries (A_N) for inclusive hadron production
8 at forward rapidity in $p^\uparrow + p$ collisions that persist at high center-of-mass energies. Two proposed
9 potential sources are the twist-3 contributions in the collinear factorization and the transverse-
10 momentum-dependent contributions from either the initial-state quark and gluon Sivers functions
11 or the final-state Collins fragmentation function. In 2015 and 2017, RHIC collected data from
12 transversely polarized pp collisions, which are ideal to further characterize A_N and explore its
13 potential sources. The STAR Forward Meson Spectrometer (FMS) and Endcap Electromagnetic
14 Calorimeter (EEMC), having pseudo-rapidity (η) coverages of 2.6 - 4.2 and 1.1 - 2.0 respectively,
15 can be used to detect photons, neutral pions, and eta mesons. We present an analysis update for
16 A_N of electromagnetic jets in FMS and EEMC using $p^\uparrow + p$ collisions at $\sqrt{s} = 200$ GeV. In this
17 analysis, we explore the dependences of A_N on photon multiplicity inside the jet, jet transverse
18 momentum, and jet energy.