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Transverse Single Spin Asymmetries of charged hadron from p+p and p+Au collisions in PHENIX

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Transverse single-spin asymmetries (TSSA) of light hadron production from $p^{\uparrow}+p$ collisions provide valuable information on the spin structure of the nucleon. TSSA in the process $p^{\uparrow}+p \to h+X$ has been described in terms of twist-3 spin-dependent three-parton correlation functions, or twist-3 fragmentation functions in the QCD collinear factorization approach. In addition, studying the TSSA for inclusive hadron production in $p^{\uparrow}+A$ collisions can give new insight on the underlying mechanism because different contributions to the TSSA are affected differently by the saturation effect in large nuclei. We will report a recent study on the TSSA of charged hadron production at forward and backward ($1.4 < |\eta| < 2.4$) rapidity over the the transverse momentum range of $1.25 < p_T < 7.0$ GeV/c and Feynman-x range of $-0.2 < x_F < 0.2$ from $p^{\uparrow}+p$ and $p^{\uparrow}$+Au collisions at $\sqrt{s_{NN}} = 200$ GeV in the PHENIX experiment at RHIC. Nonzero A_N is observed in $p+p$ while surprisingly smaller A_N is measured in p+Au.

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