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Lensing Mechanism Meets Small-x Physics: Single Transverse Spin Asymmetry in $p^{\uparrow}+p$ and $p^{\uparrow}+A$ Collisions[1] MELVIN SANTIAGO, YURI KOVCHEGOV, Ohio State Univ - Columbus — We calculate the single transverse spin asymmetry in polarized proton-proton and polarized proton-nucleus collisions (A_N) generated by a partonic lensing mechanism. The polarized proton is considered in the quark-diquark model while its interaction with the unpolarized target is calculated using the small-x/saturation approach. The phase required for the asymmetry is caused by a final-state gluon exchange between the quark and diquark, as is standard in the lensing mechanism of Brodsky, Hwang and Schmidt. The expression we obtain for the asymmetry A_N of the produced quarks has the following properties:(i) The asymmetry is generated by the dominant elastic scattering contribution and $1/N_c^2$ suppressed inelastic contribution;(ii) The asymmetry grows or oscillates with the produced quark's transverse momentum p_T until the momentum reaches the saturation scale Q_s, and then only falls off as $1/p_T$ for larger momenta;(iii) The asymmetry decreases with increasing atomic number A of the target for p_T below or near Q_s, but is independent of A for p_T significantly above Q_s. We discuss how these properties may be qualitatively consistent with data published by the PHENIX collaboration and with preliminary data reported reported by the STAR collaboration.

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