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The Beam Spin Asymmetry and T-odd Effects DANIEL BANKS, LEONARD GAMBERG, Penn State University — The focus of this research is to model the internal structure of the nucleon based on its momentum and spin-polarization properties. We focus on the beam-spin asymmetry (BSA) in semi-inclusive deep inelastic scattering. When the produced pion's transverse momentum is on the order of quark intrinsic transverse momentum, TMD factorization suggest that the structure function for the BSA is a momentum convolution integral of transverse momentum dependent (TMD) parton distribution and fragmentation functions. Theoretically there are four possible structure functions. We focus on the naive time reversal odd (T-odd) contribution. Namely, the $g^{\perp}$ TMD PDF which relates the transverse spin polarization and transverse momentum of quarks for the case of an unpolarized nucleon and longitudinally polarized electron beam. We model the BSA in the spectator model framework (L. Gamberg et al., Phys. Rev. D77, 094016 (2008)) and calculate $g^{\perp}$ and extend our earlier numerical work on the BSA for π^+ to results for π^-, π^0, production. We present these new results for the BSA and compare them with the recent results from CLAS, Hall B collaboration at JLAB (M. Aghasyan, H. Avakian et al., Phys. Lett. B704, 397 (2011)).

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