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T-odd Leading-Twist Quark TMDs at Small x

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We study the small-x asymptotics of the flavor non-singlet T-odd leading-twist quark transverse momentum dependent parton distributions (TMDs), the Sivers and Boer-Mulders functions. While the leading eikonal small-x asymptotics of the quark Sivers function is given by the spin-dependent odderon, we are interested in revisiting the sub-eikonal correction considered by us earlier. We first simplify the expressions for both TMDs at small Bjorken x and then construct small-x evolution equations for the resulting operators in the large- N_c limit, with N_c the number of quark colors. For both TMDs, the evolution equations resum all powers of the double-logarithmic parameter $\alpha_s \ln^2(1/x)$, where α_s is the strong coupling constant, which is assumed to be small. Solving these evolution equations numerically (for the Sivers function) and analytically (for the Boer-Mulders function) we arrive at the following leading small-x asymptotics of these TMDs at large N_c : \begin{align}

h_1^{perp \, \textrm{NS}} (x \ll 1, k_T^2) & = C (x, k_T^2) \left($\frac{1}{x} \right)^{-1}. \$

The functions $C_O(x, k_T^2)$, $C_1(x, k_T^2)$, and $C(x, k_T^2)$ can be readily obtained in our formalism: they are mildly *x*-dependent and do not strongly affect the power-of-*x* asymptotics shown above. The function C_O , along with the 1/x factor, arises from the odderon exchange. For the sub-eikonal contribution to the quark Sivers function (the term with C_1), our result shown above supersedes the one obtained in our previous work due to the new contributions identified recently.

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