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Nucleon TMDs from Lattice QCD

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We present a lattice QCD calculation of transverse momentum dependent parton distribution functions (TMDs) of protons using staple-shaped Wilson lines. For time-reversal odd observables, we calculate the generalized Sivers and Boer-Mulders transverse momentum shifts in SIDIS and DY cases, and for T even observables we calculate the transversity related to the tensor charge and the generalized wormgear shift. The calculation is done on two different $n_f = 2 + 1$ ensembles: domain-wall fermion (DWF) with lattice spacing 0.084 fm and pion mass of 297 MeV, and clover fermion with lattice spacing 0.114 fm and pion mass of 317 MeV. The results from those two different discretizations are consistent with each other.

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