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Nucleon transverse momentum-dependent parton distributions from domain wall fermion calculations at 297 MeV pion mass

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Lattice QCD calculations of transverse momentum-dependent parton distributions (TMDs) in a nucleon are performed based on a definition of TMDs via hadronic matrix elements of quark bilocal operators containing staple-shaped gauge connections. A parametrization of the matrix elements in terms of invariant amplitudes serves to cast them in the Lorentz frame preferred for the lattice calculation. Using a RBC/UKQCD domain wall fermion ensemble corresponding to a pion mass of 297 MeV, on a lattice with spacing 0.084 fm, selected TMD observables are accessed and compared to previous explorations at heavier pion masses on coarser lattices.

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