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Moments of proton GPDs from the OPE of nonlocal quark bilinears up to NNLO

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We present a lattice QCD determination of Mellin moments of unpolarized generalized parton distributions (GPDs) of the proton from an analysis of the quasi-GPD matrix elements within the short-distance factorization framework. We perform our calculation on an N_f=2+1+1 twisted mass fermions ensemble with a clover improvement at lattice spacing $a = 0.093$ fm and a pion mass of $m_\pi = 260$ MeV. Focusing on the zero-skewness case, the quasi-GPDs are calculated from the γ_0 definition, as well as a recently proposed Lorentz-invariant definition. We utilize data on both symmetric and asymmetric kinematic frames, which allows us to obtain the Mellin moments for several values of the momentum transfer, $-t$, in the range 0.17 to 2.77 GeV^2. We use the ratio scheme for GPDs, i.e. renormalization group invariant ratios with leading-twist factorization formula and perturbatively calculated matching coefficients up to the next-next-to-leading order (NNLO) to extract Mellin moments of GPDs.

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