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Unpolarised Generalised Parton Distributions on lattice QCD at physical mass

We present a lattice QCD analysis of unpolarised generalised parton distributions (GPDs) of the proton. Our calculations are done on an ensamble with Nf = 2 + 1 + 1 (degenerate light quarks, strange and charm quarks) twisted mass fermions at physical mass with a clover improvement and lattice spacing a = 0.08 fm. We use Large Momentum Effective Theory (LaMET) to anlayse and match the quasi-GPDs to their light-cone distributions in the asymmetric kinematic frame. Our analysis has been performed with several values of the momentum transfer –t, from 0 to 1.2 GeV^2 at zero-skewness and boost up until 1.7 GeV. We check the convergence in our matched light-cone distributions for large boosts, both in the standard definition and in the Lorentz-Invariant one. We use the quasi-GPDs to define the pseudo-GPDs in order to extract the Mellin moments. We compute and compare them to direct calculations of the moments from lattice QCD as well as to the phenomenology.

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