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Generalized Parton Distribution Functions of the Pion and Kaon from Lattice QCD

We present a first-principles determination of the unpolarized GPDs of the pion and kaon from lattice QCD using a Twisted Mass N_f = 2+1+1 ensemble reproducing a pion mass of 260 MeV, and a kaon mass of 540 MeV. Using boosted meson states and gauge-invariant nonlocal quark bilinears, we compute off-forward matrix elements over a range of meson momenta, momentum transfers t, focusing on zero skewness. In particular, our data incorporate meson momentum up to 2 GeV, and momentum transfer squared up to 2.5 GeV^2. For the reconstruction of the x dependence, we use the Large Momentum Effective Theory (LaMET), which matches the lattice data to the light-cone GPDs. As a byproduct, we also test the validity of the kinematic range by comparing the energy of the meson to the continuum dispersion relation.

Authors: TORSIELLO, Joseph (Temple University); CICHY, Krzysztof (Adam Mickiewicz University); CONSTANTINOU, Martha (Temple University); MILLER, Joshua

Presenter: TORSIELLO, Joseph (Temple University)