

2022 Meeting on Lattice Parton Physics from Large Momentum Effective Theory (LaMET2022)



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Unpolarized Transverse-Momentum-Dependent Parton Distributions from Lattice QCD: II

Friday, December 2, 2022 9:50 AM (25 minutes)

We present a first calculation of the unpolarized proton's isovector transverse-momentum-dependent parton distribution functions (TMDPDFs) from lattice QCD, which are essential to predict observables of multi-scale, semi-inclusive processes in the standard model. We use a $N_f = 2 + 1 + 1$ MILC ensemble with valence clover fermions on a highly improved staggered quark sea (HISQ), and compute the quark momentum distributions in large-momentum protons on the lattice. The state-of-the-art techniques in renormalization and extrapolation in correlation distance on the lattice are adopted. The one-loop contributions in the perturbative matching kernel to the light-cone TMDPDFs are taken into account, and the dependence on the pion mass and hadron momentum is explored. The final results are compared with those from recent global analyses.

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Session Classification: Session I