

2024 Meeting on Lattice Parton Physics from Large Momentum Effective Theory (LaMET2024)



Contribution ID: 21

Type: **not specified**

Lattice QCD calculation of the pion distribution amplitude with domain wall fermions at physical pion mass

Monday 12 August 2024 09:25 (25 minutes)

We present a direct lattice QCD calculation of the x -dependence of the pion distribution amplitude (DA), which is performed using the quasi-DA in large momentum effective theory on a domain-wall fermion ensemble at physical quark masses and spacing $a \approx 0.084$ fm. The bare quasi-DA matrix elements are renormalized in the hybrid scheme and matched to $\overline{\text{MS}}$ with a subtraction of the leading renormalon in the Wilson-line mass. For the first time, we include threshold resummation in the perturbative matching onto the light-cone DA, which resums the large logarithms in the soft gluon limit at next-to-next-to-leading log. The resummed results show controlled scale-variation uncertainty within the range of momentum fraction $x \in [0.25, 0.75]$ at the largest pion momentum $P_z \approx 1.85$ GeV. In addition, we apply the same analysis to quasi-DAs from a highly-improved-staggered-quark ensemble at physical pion mass and $a = 0.076$ fm. By comparison we find with 2σ confidence level that the DA obtained from chiral fermions is flatter and lower near $x = 0.5$.

Authors: BOYLE, Peter; ZHANG, Rui

Co-authors: Mr BOLLWEG, Dennis; BAKER, Ethan; CLOET, Ian; PETRECZKY, Peter; MUKHERJEE, Swagato; GAO, Xiang (Argonne National Lab); ZHAO, Yong

Presenter: ZHANG, Rui

Session Classification: Presentations