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Lattice QCD calculation of pion and kaon distribution amplitudes with domain wall and HISQ fermions at physical pion mass

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We present the first direct lattice QCD calculation of the x-dependent pion distribution amplitudes on domain wall gauge ensembles at physical pion mass. We use the large momentum effective theory to directly calculate the x-dependence of meson DAs with several recently developed self-consistent precision control methods. We perform a leading renormalon resummation to remove linear corrections in $1/P_z$, and resum the renormalization group logarithms to include higher order large log terms at small quark momenta xP_z and anti-quark momenta $(1-x)P_z$. Such techniques guarantee the precision of our calculation in mid-x region. Finally, constraining with short-distance factorization analysis, we are able to model the endpoint regions of DA more reliably in all region. Measurements of both pion and kaon DAs on HISQ ensembles at physical pion mass are also analyzed for comparison, from which we examine the chiral symmetry breaking effect on meson DAs.

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