

Distribution amplitudes from lattice QCD

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We present the first lattice QCD calculation of the distribution amplitudes of longitudinally and transversely polarized vector mesons K^* and ϕ using large momentum effective theory. We use the clover fermion action on three ensembles with 2+1+1 flavors of highly improved staggered quarks (HISQ) action, generated by MILC collaboration, at physical pion mass and $\{0.06, 0.09, 0.12\}$ fm lattice spacings, and choose three different hadron momenta $P_z = \{1.29, 1.72, 2.15\}$ GeV. The resulting lattice matrix elements are nonperturbatively renormalized in a hybrid scheme proposed recently. Also an extrapolation to the continuum and infinite momentum limit is carried out. We find that while the longitudinal distribution amplitudes tend to be close to the asymptotic form, the transverse ones deviate rather significantly from the asymptotic form. Our final results provide crucial ab initio theory inputs for analyzing pertinent exclusive processes.

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