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Exploring the heavy meson distribution amplitudes from lattice QCD

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We present a method to compute lightcone distribution amplitudes (LCDAs) of heavy meson within heavy quark effective theory (HQET). Our method utilizes quasi distribution amplitudes (quasi-DAs) with a large momentum component P^z. We point out that by sequentially integrating out P^z and m_H, one can disentangle different dynamical scales. Integrating out P^z allows to connect quasi-DAs to QCD LCDAs, and then integrating out m_H enables to relate QCD LCDAs to HQET LCDAs. To verify this proposal, we make use of lattice QCD simulation on a lattice ensemble with spacing $a = 0.05187$fm. The preliminary findings for HQET LCDAs qualitatively align with phenomenological models. Using a recent model for HQET LCDAs, we also fit the first inverse moment λ_B^{-1} and the result is consistent with the experimentally constrain from $B \to \gamma\ell\nu_\ell$. This agreement demonstrates the promise of our method in providing first-principle predictions for heavy meson LCDAs.

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