

Unify the SU(3) Topological Diagram and Irreducible Representation Amplitudes for B Decays

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Flavor SU(3) analysis of B meson charmless hadronic two light pseudoscalar decays can be formulated in two different ways. One is to construct the SU(3) irreducible representation amplitude (IRA) according to effective Hamiltonian transformation properties, and the other is to draw the topological diagrams (TDA). We first point out that previous analyses of TDA and IRA approaches do not match in several aspects, in particular a few SU(3) independent amplitudes have been overlooked in the TDA approach. This has caused confusions in the past and sometimes resulted in incorrect interpretation of data. We then demonstrate that only if these amplitudes are included, a consistent and unified picture can be obtained. With the new TDA amplitudes, all charmless hadronic decays of heavy meson must have nonzero direct CP symmetries as already predicted by the IRA approach. In addition to their notable impact on CP asymmetry, the new amplitudes are also important to extract new physics information.

E-mail

hexg@phys.ntu.edu.tw

Primary author: Prof. HE, XIAO-GANG (NTU/SJTU)

Presenter: Prof. HE, XIAO-GANG (NTU/SJTU)

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