

Towards a unitary Dalitz plot analysis of three- body hadronic B decays

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Dalitz plot analysis of three-body hadronic final states in B decays should be performed in a unitary approach. A first step towards this goal will be to enforce two-body unitarity. Here we apply this concept to the $K\pi\pi$ channel for the $B \rightarrow K\pi\pi$ decays by using a unitary coupled channel model to describe the kaon-pion interactions. The weak decay amplitudes, derived in QCD factorization, are supplemented by phenomenological contributions to the penguin amplitudes. Strong interaction amplitudes are constrained by chiral symmetry, QCD and experimental data on meson-meson interactions. The strange $K\pi$ scalar and vector form factors, which appear naturally in the factorization approach, are used to calculate the $K\pi$ effective mass and helicity angle distributions, branching ratios, CP asymmetries and the phase difference between the B^0 and anti B^0 decay amplitudes to $K(892)\pi$. *The fit on the parameters of our phenomenological amplitudes lead to a good agreement with the experimental data, particularly for the kaon-pion effective mass distributions. However, our predicted*
 $B^0 \rightarrow K^0(1430)\pi^-\pi^+$, $K^*(1430) \rightarrow K^-\pi^+\pi^+$ branching fraction, equal to $(11.6 \pm 0.6) \cdot 10^{-6}$, is smaller than the results of the Belle and BaBar collaborations, obtained from isobar model analyses. A new parameterization of the S-wave $K\pi$ effective mass distribution, based on the knowledge of the $K\pi$ scalar form factor, is proposed [1]. It can be used in future experimental Dalitz plot analyses.

Reference:

[1] B. El-Bennich, A. Furman, R. Kaminski, L. Lesniak, B. Loiseau, and B. Moussallam, CP violation and pion-kaon interactions in $B \rightarrow K\pi\pi$ decays, arXiv:0902.3645 [hep-ph], accepted for publication in Phys. Rev. D.

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