

Constraining new physics with charmless $B \rightarrow M_1 M_2$ decays in QCD factorisation

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CP asymmetries and branching ratios in QCD and QED penguin dominated charmless $B \rightarrow M_1 M_2$ decays can provide important constraints on non-standard effects. We use current experimental data and discuss the impact of future Belle II measurements of the systems $B_{(d,s)} \rightarrow (K \pi, K \eta', K K, \pi \pi)$ and $B \rightarrow (K \rho, K \phi, K \omega, \pi K^*)$ to explore new physics scenarios mediated by Z-penguin and dipole operators including complementary constraints from $b \rightarrow s$ ($\gamma, \text{gluon}, e\ell^+ e\ell^-$). The large QCD model dependence that arises in the framework of QCD factorisation at sub-leading order from weak annihilation contributions is accounted for by the inclusion of the according phenomenological parameter into the fit in addition to new physics parameters. We discuss also the fit results of the phenomenological parameter in the Standard Model.

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