

A critical look at hadronic $b \rightarrow s$ penguin modes

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CKM mechanism of a single CP-violating phase has been confirmed by various B decay data over the decade. Yet, the existence of new physics effects can not be ruled out.

In this context,

we consider the branching ratios and CP asymmetries in two theoretically clean modes, namely in $B \rightarrow f_0(980)K_S$ and $B \rightarrow \phi K_S$ decays, to the end of determining the deviation of time dependent CP asymmetry from $\sin(2\beta)$ arising from Standard

Model physics. We use the QCD factorization framework for the decay amplitudes and employ a parameter scan to probe a broad range of theoretical models, exploring variations in the inputs at the 3σ level and the ill-known $\mathcal{O}(1/M_B)$ corrections with 100% uncertainty. The excursions in time dependent CP

asymmetry from

$\sin(2\beta)$ are under sufficient theoretical control to enable the interpretation

of experimental results of much higher precision.

Authors: DUTTA, Rupak (University of Kentucky); Prof. GARDNER, Susan (University of Kentucky)

Presenter: DUTTA, Rupak (University of Kentucky)

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