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11TH WORKSHOP
Flavor Symmetries and Consequences in Accelerators and Cosmology

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Anomalies in Hadronic B decays

In this paper, we perform fits to $B \to PP$ decays, where $B = \{B^0, B^+, B_s^0\}$ and the pseudoscalar $P = \{\pi, K\}$, under the assumption of flavor SU(3) symmetry [SU(3)$_F$]. Although the fits to $\Delta S = 0$ or $\Delta S = 1$ decays individually are good, the combined fit is very poor: there is a 3.6σ disagreement with the SU(3)$_F$ limit of the standard model (SM$_{\mathrm{SU(3)_F}}$). One can remove this discrepancy by adding SU(3)$_F$-breaking effects, but 1000\% SU(3)$_F$ breaking is required. The above results are rigorous, group-theoretically – no dynamical assumptions have been made. When one adds an assumption motivated by QCD factorization, the discrepancy with the SM$_{\mathrm{SU(3)_F}}$ grows to 4.4σ.

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