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Neutral B -meson and D -meson mixing bag parameters from $2 + 1$ flavor lattice QCD

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We compute hadronic matrix elements for neutral B -meson mixing in the Standard Model and beyond as well as the corresponding operators for the short-distance contribution to D -meson mixing. On the same sets of gauge ensembles, we calculate the leptonic decay constants for the B - and D -meson systems. The matrix elements are computed with asqtad light quarks and clover heavy quarks in the Fermilab interpretation. We use the MILC asqtad gauge ensembles at four lattice spacings between 0.11 fm and 0.043 fm. We review the matrix element calculations and report on the determination of the bag parameters. The bag parameters are computed by combining the mixing matrix elements and the decay constant results in a bootstrap process which accounts for correlations from both statistics and the dominant systematic errors. Some systematic effects, such as discretization errors, and quark mass tunings, tend to cancel in ratios.

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