

Recent measurements of branching fractions and CP asymmetries of charmless hadronic B meson decays at Belle

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Hadronic B decays without a charm quark constitute a powerful probe to search for physics beyond the standard model as well as provide constraints of CP-violation parameters. We report the final measurements from Belle of the branching fraction and CP asymmetry for the decays $B^0 \rightarrow \pi^0 \pi^0$, $B^\pm \rightarrow K+K-\pi^\pm$ and preliminary results for $B \rightarrow KS^0 KS^0 h$ ($h=K, \pi$) and $B^\pm \rightarrow \pi+\pi-\pi^\pm$. All investigations employ the full data sample delivered by the KEKB e^+e^- collider. The $B^0 \rightarrow \pi^0 \pi^0$ measurements enable improved constraints on the angle ϕ_2 of the CKM unitarity triangle. For $B^\pm \rightarrow K+K-\pi^\pm$ we measure CP asymmetry as a function of the invariant-mass of the $K+K^-$ system, where we find strong evidence for large direct CP-violation as well as a large increase in yield at low mass. This measurement challenges conventional theoretical approaches since the result requires a large enhancement in both tree and loop diagrams in the same small region of phase-space. The three-body decay final states $\pi+\pi-\pi^\pm$ and $KS^0 KS^0 h$ ($h=K, \pi$) proceed mostly via flavor-changing neutral currents and are thus sensitive to new physics via enhanced CP-asymmetry due to interference from non-SM amplitudes in loops. The final measurement plays an important role in understanding the B decay dynamics and improving the deviation boundary of $\sin 2\phi_1$ obtained in $b \rightarrow cq\bar{q}$ and $b \rightarrow sq\bar{q}$ decays.

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