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Measurements of Charmless B Decays at Belle

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We report the first observation of inclusive $B \rightarrow X_s \eta$ decays using a large sample of B -anti B pairs accumulated at the Upsilon(4S) resonance with the Belle detector at the KEKB asymmetric e^+e^- collider. The X_s system is a charmless inclusive state with unit strangeness, and is reconstructed using a pseudo-inclusive technique from a kaon and up to four pions, of which at most one pion is neutral. We measure a partial branching fraction for $M_{\{X_s\}} < 2.6$ GeV/c² to be $(25.5 \pm 2.7 \text{ (stat)} \pm 1.6 \text{ (syst)}^{+3.8}_{-14.1} \text{ (model)}) \times 10^{-5}$. A significant fraction of this signal occurs in the region $M_{\{X_s\}} > 1.8$ GeV/c², which is beyond the range of all previously measured exclusive contributions to $B \rightarrow X_s \eta$. We also present measurements of the branching fraction and time-dependent CP violation parameters of $B^0 \rightarrow a_1^{+-}(1260) \pi^{+-}$ decays, an updated measurement of the branching fraction and direct CP asymmetry for $B \rightarrow \pi^0 \pi^0$ and the results of a search for the charmless decays $B^+ \rightarrow \rho^+ \omega$, $B^+ \rightarrow \phi \pi^+$ and $B^0 \rightarrow \phi \pi^0$. We present improved measurements of the charmless decay $B \rightarrow \phi \phi K$. We update the branching fractions of $B^{+-} \rightarrow \phi \phi K^{+-}$ and $B^0 \rightarrow \phi \phi K^0$ decays, and the measurement of related decays such as $B^{+-,0} \rightarrow \phi (K^+ K^-) K^{+-,0}$ and $B^{+-,0} \rightarrow (K^+ K^-) (K^+ K^-) K^{+-,0}$. In addition, we also study the charmonium decays related to the $B \rightarrow \phi \phi K$ such as $J/\psi \rightarrow \phi (K^+ K^-)$ and $\eta_c \rightarrow \phi \phi$.

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