Branching ration measurements of decays of $B \rightarrow J/\psi\ \eta\ K$ and $B^- \rightarrow D^0\ K^-$ with $D^0 \rightarrow \pi^+\ \pi^-\ \pi^0$

Results of two different analyses on B meson properties are presented with BABAR experimental data collected at Stanford Linear Accelerated Center. BABAR experiment is an international collaboration experiment with 10 countries and over 70 institutes involved. This experiment enables scientists to investigate the matter-antimatter asymmetry in nature.

With 90×10^6 $B\bar{B}$ events, at the $\Upsilon(4S)$ resonance, the branching ratio for $B^- \rightarrow J/\psi\ \eta\ K^-$ is $[10.8 \pm 2.6\ (stat.) \pm 2.7(syst.)] \times10^{-5}$; for $B^0 \rightarrow J/\psi\ \eta\ K^0_S$, it is $[8.4 \pm 2.6(stat.) \pm 2.7(syst.)]\times10^{-6}$. The measurement helps to elucidate the property of the "newly" discovered particle X(3872), though it is not conclusive. The upper limit is set for the decay chain $B^- \rightarrow X(3872)\ K^- \rightarrow J/\psi\ \eta\ K^-$, at 90% confidence level, the branching ratio for this decay is $< 7.7\times10^{-6}$.

For the decay chain of $B^- \rightarrow D^0/\bar{D}^0\ K^- \rightarrow \pi^+\ \pi^-\ \pi^0\ K^-$, it can be used to extract the unitarity angle γ, a weak charge conjugation and space parity violation phase, through the interference of the decay product of D^0 and $\bar{D}^0$ to $\pi^+\ \pi^-\ \pi^0$. We have developed the essential techniques to control the high background due to the reconstruction of π^0 and measured the branching ratio and the decay rate asymmetry for this decay chain.
The branching ratio for this decay chain is $[5.5 \pm 1.0(stat.) \pm 0.7(syst.)] \times10^{-6}$ and the decay rate asymmetry is $0.02 \pm 0.16(stat.) \pm 0.03(syst.)$, with about 229×10^6 BB events.