

The study of gamma/phi_3-sensitive hadronic decays at LHCb

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The relative abundances of the three decay modes $B^0 \rightarrow DK$, $B^0 \rightarrow D\pi$ and $B_s \rightarrow Ds\pi$ produced in 7 TeV pp collisions at the LHC are determined from data corresponding to an integrated luminosity of $\sim 35 \text{ pb}^{-1}$. The relative branching ratio of $B^0 \rightarrow DK$ with respect to $B^0 \rightarrow D\pi$ is found to be $\mathcal{B}(B^0 \rightarrow DK) = (2.01 \pm 0.18 \text{ stat} \pm 0.12 \text{ syst}) \times 10^{-4}$. The ratio of fragmentation fractions f_s/f_d is determined through the relative abundances of $B^0 \rightarrow DK$ and $B^0 \rightarrow D\pi$ with respect to $B_s \rightarrow Ds\pi$, leading to $f_s/f_d = 0.253 \pm 0.017 \pm 0.018 \pm 0.020$, where the uncertainties are respectively statistical, systematic, and theoretical.

Using a large data sample accumulated at a centre-of-mass energy $\sqrt{s} = 7 \text{ TeV}$ with the CERN LHCb experiment, we study the decays $B^\pm \rightarrow DK^\pm$ where the neutral D meson decays into two track final states. These measurements are sensitive to the value of the CKM Unitarity

Triangle angle gamma.

Using data collected by the LHCb detector we reconstruct a sample of the main charmless charged two-body B hadron decay modes, namely

$B^0 \rightarrow \pi^+\pi^-$, $B^0 \rightarrow K^+\pi^-$, $B_s^0 \rightarrow K^+K^-$, $B_s^0 \rightarrow \pi^+K^-$, $\Lambda_b \rightarrow pK^-$ and $\Lambda_b \rightarrow p\pi^-$.

We provide preliminary values of the direct $\mathcal{CP}$ asymmetries in the $B^0 \rightarrow K^+\pi^-$ and $B_s^0 \rightarrow \pi^+K^-$ decays, of the relative branching fractions and of the $B_s^0 \rightarrow K^+K^-$ lifetime. We also discuss the prospects for the measurement of time-dependent CP violation in the $B^0 \rightarrow \pi^+\pi^-$ and $B_s^0 \rightarrow K^+K^-$ decays.

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