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Measurements of charm mixing and CP violation using $D^0 \rightarrow K \pm \pi \mp$ decays

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Measurements of charm mixing and CP violation parameters from the decay-time-dependent ratio of $D^0 \rightarrow K^+ \pi^-$ to $D^0 \rightarrow K^- \pi^+$ decay rates and the charge-conjugate ratio are reported. The analysis uses $\bar{B} \rightarrow D^{*+} \mu^- X$, and charge-conjugate decays, where $D^{*+} \rightarrow D^0 \pi^+$, and $D^0 \rightarrow K^\mp \pi^\pm$. The pp collision data are recorded by the LHCb experiment at center-of-mass energies $\sqrt{s} = 7$ and 8 TeV corresponding to an integrated luminosity of 3 fb^{-1} . The data are analyzed under three hypotheses: (i) mixing assuming CP symmetry, (ii) mixing assuming no direct CP violation in the Cabibbo-favored or doubly Cabibbo-suppressed decay amplitudes, and (iii) mixing allowing either direct CP violation and/or CP violation in the superpositions of flavor eigenstates defining the mass eigenstates. The data are also combined with those from a previous LHCb study of $D^0 \rightarrow K \pi$ decays from a disjoint set of D^{*+} candidates produced directly in pp collisions. In all cases, the data are consistent with the hypothesis of CP symmetry.

Summary

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