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Direct CP violation searches using prompt 2-body charm decays at LHCb

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A search for direct CP violation in the up-type quark sector is performed using pp collision data, corresponding to an integrated luminosity of 3fb^{-1}, collected using the LHCb detector at centre-of-mass energies of 7 and 8 TeV.

The difference between the CP asymmetries in $D^0 \to K^-K^+$ and $D^0 \to \pi^-\pi^+$ decays, $\Delta A_{CP} \equiv A_{CP}(K^-K^+) - A_{CP}(\pi^-\pi^+)$ is a measurement of direct CP-violation in the charm sector. This measurement, which has been performed multiple times at different experiments with ever increasing data samples, has triggered a lot of interest in recent years. After the analysis of the first 0.6/fb of data taken in 2011 by LHCb, the world average of ΔA_{CP} was showing a 3.5σ deviation from the naive SM expectation of zero. A confirmation of a CP asymmetry of this magnitude would likely indicate contributions from physics beyond the Standard model.

A new measurement of ΔA_{CP} using all prompt D^0 decays during Run 1 was performed by LHCb. A value of $\Delta A_{CP} = [-0.10 \pm 0.08\,(\text{stat}) \pm 0.03\,(\text{syst})]\%$, was determined.

Summary

The results from the latest measurement of ΔA_{CP} using all prompt D^0 decays recorded by LHCb during Run 1 is presented.

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