

Possible large CP violation in charmed Lambda_b decays

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We propose that the cascade decay $\Lambda_b \rightarrow D(\rightarrow K^+\pi^-)N(\rightarrow p\pi^-)$ may serve as the discovery channel for baryonic CP violation. This decay chain is contributed by dominantly the amplitudes with the intermediate D state as D^0 or \bar{D}^0 . The large weak phase between the two kinds of amplitudes suggests the possibility of significant CP violation. While the presence of undetermined strong phases may complicate the dependence of CP asymmetry, our phenomenological analysis demonstrates that CP violation remains prominent across a broad range of strong phases. The mechanism also applies to similar decay modes such as $\Lambda_b \rightarrow D(\rightarrow K^+K^-)\Lambda$. Considering the anticipated luminosity of LHCb, we conclude that these decay channels offer a promising opportunity to uncover CP violation in the baryon sector.

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