

Predictions for CP violation in anti-triplet beauty baryon to charmonium decays

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Motivated by the recent 3.9σ evidence for CP violation from the LHCb collaboration in decays of an anti-triplet beauty baryon to a charmonium, an octet baryon, and a pseudoscalar meson, we perform, for the first time, a systematic analysis of this class of decays within the framework of flavor $SU(3)$ symmetry.

Several predictions for branching ratios and CP violating relations which can be tested in future experiments are found, in particular $\Delta A_{CP} = A_{CP}(\Lambda_b^0 \rightarrow p\pi^- J/\psi) - A_{CP}(\Lambda_b^0 \rightarrow pK^- J/\psi) = A_{CP}(\Lambda_b^0 \rightarrow n\pi^0 J/\psi) - A_{CP}(\Lambda_b^0 \rightarrow (nK_S, nK_L)J/\psi)$. Our results provide guidance to test the availability of $SU(3)$ symmetry and search for possible CP violation effects in this class of decays.

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