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Charmless Two-body Baryonic $B_{u,d,s}$ Decays

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We study charmless two-body baryonic B decays using the topological amplitude approach.

We extend a previous work to include all ground state octet and decuplet final states with full topological amplitudes. Relations on rates and CP asymmetries are obtained.

With the long awaited $\bar{B}^0 \rightarrow p\bar{p}$ data, we can finally extract information on the topological amplitudes and predict rates of other modes.

We point out some modes that will cascadedly decay to all charged final states and have large decay rates.

We find that the $\bar{B}^0 \rightarrow p\bar{p}$ mode is the most accessible one among octet-anti-octet final states in the $\Delta S = 0$ transition.

The predicted $\bar{B}_s^0 \rightarrow p\bar{p}$ rate is several order smaller than the present experimental result.

The analysis presented in this work can be systematically improved when more measurements on decay rates become available.

The smallness of the $\bar{B}^0 \rightarrow p\bar{p}$ rate is studied as well. We point out that for a given tree operator O_i , the contribution from its Fiertz transformed operator, tends to cancel the internal W -emission amplitude induced from O_i .

This explains why most previous model calculations predicted too large rates as the above consideration was not taken into account.

additional information

This abstract combines two recent works:

1. Charmless Two-body Baryonic $B_{u,d,s}$ Decays Revisited, by C.-K. Chua, published in Phys. Rev. D89 (2014) 5, 056003,
2. Smallness of Tree-dominated Charmless Two-body Baryonic B Decay Rates , by H.-Y. Cheng and C.-K. Chua, Phys. Rev. D91 (2015) 3, 036003.

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