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Two-body hadronic weak decays of bottomed hadrons

The structure of light diquarks plays a crucial role in the formation of exotic hadrons beyond the conventional quark model, especially in their line shapes of bottomed hadron decays. We study the two-body hadronic weak decays of bottomed baryons and bottomed mesons to probe the light diquark structure and pin down the quark-quark correlations in the diquark picture. We find that the light diquark does not favor a compact structure. For instance, the isoscalar diquark $[ud]$ in Λ_b^0 can be easily split and rearranged to form $\Sigma_c^{(*)}\bar{D}^{(*)}$ via the color-suppressed transition. This provides a hint that the hidden charm pentaquark states produced in Λ_b^0 decays could be the $\Sigma_c^{(*)}\bar{D}^{(*)}$ hadronic molecular candidates.This quantitative study resolves the apparent conflicts between the production mechanism and molecular nature of these P_c states observed in experiment.

Field of Research

Hadrons

Experiment/Theory

Theory

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