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Weak decay of beauty baryons in quark-diquark model

Weak decay of beauty baryons in quark-diquark model

The weak decays of Λ_b provide valuable information of the CKM parameter Vcb, fragmentation and hadronisation within the framework of quantum chromodynamics. Recently, LHCb has reported Branching ratios for non-leptonic decay $\Lambda_b^0 \to \Lambda_c^+\pi^- = 4.3 \pm 0.51 \times 10^{-3}$. This experimental measurement generates great theoretical interests in semi-leptonic decays of heavy flavour baryons. In the present study, for the description of the Λ_b baryon, we employ the quark-diquark model with two body color coulomb plus power potential. The model parameters are fixed using the hyperfine mass splitting for each choice of the potential exponent ν, choice of running strong coupling constant α_s and with different quark mass parameters m_Q. These extracted spectroscopic parameters are used to compute decay widths of the non-leptonic and semi-leptonic decays of Λ_b baryon. The results for branching ratios of non-leptonic decays $\Lambda_b \to \Lambda_c^+\pi^- = 4.91 \times 10^{-3}$ and semileptonic decay widths $\Lambda_b \to X_c l \nu_l = 6.13 \times 10^{10} s^{-1}$ are in good agreement with the predictions with the recent experimental results.

Preferred Track

Open Heavy Flavors

Collaboration

Other

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