B decays to excited charm mesons

P. Colangelo[a], F. De Fazio[a], N. Paver[b]

[a] *Istituto Nazionale di Fisica Nucleare, Sezione di Bari, Italy*
[b] *Dipartimento di Fisica Teorica, Universitá di Trieste, Italy, and Istituto Nazionale di Fisica Nucleare, Sezione di Trieste, Italy*

The excited $\bar{q}Q$ mesons corresponding to $P-$wave states in the constituent quark model (D^{**}, B^{**}) play an important role from a theoretical point of view, since they represent relevant channels for testing the predictions of the heavy quark effective theory. Such states are also interesting from the experimental side, since, for example, the semileptonic $B \to D^{**}$ transitions could represent a sizeable fraction of the inclusive $B \to X_c \ell \bar{\nu}$, and significantly contribute to the shape of the inclusive lepton energy spectrum.

In the talk, the main aspects of the excited charm and beauty P-wave states are discussed (spectrum and hadronic widths [1, 2]). Moreover, a calculation of the universal Isgur-Wise form factors governing the semileptonic $B \to D^{**} \ell \bar{\nu}$ transitions by QCD sum rules in HQET is described, and the role of $\mathcal{O}(\alpha_s)$ radiative corrections and of $1/m_Q$ corrections is discussed [3].

References

[1] P. Colangelo, F. De Fazio, G. Nardulli, N. Di Bartolomeo, R. Gatto, Phys. Rev. D52 (1995) 6422.

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