

Global fits to $b \rightarrow c\tau\bar{\nu}_\tau$ transitions

Wednesday, 27 November 2019 12:00 (1 hour)

We perform a general model-independent analysis of $b \rightarrow c\tau\bar{\nu}_\tau$ transitions, including measurements of \mathcal{R}_D , \mathcal{R}_{D^*} , their q^2 differential distributions, the recently measured longitudinal D^* polarization $F_L^{D^*}$, and constraints from the $B_c \rightarrow \tau\bar{\nu}_\tau$ lifetime, each of which has significant impact on the fit. A global fit to a general set of Wilson coefficients of an effective low-energy Hamiltonian is presented, the solutions of which are interpreted in terms of hypothetical new-physics mediators. From the obtained results we predict selected $b \rightarrow c\tau\bar{\nu}_\tau$ observables, such as the baryonic transition $\Lambda_b \rightarrow \Lambda_c\tau\bar{\nu}_\tau$, the ratio $\mathcal{R}_{J/\psi}$, the forward-backward asymmetries $cal A_{FB}^{D^{(*)}}$, the τ polarization asymmetries $\mathcal{P}_\tau^{D^{(*)}}$, and the longitudinal D^* polarization fraction $F_L^{D^*}$. The latter shows presently a slight tension with any new-physics model, such that an improved measurement could have an important impact.

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