

# Understanding $b \rightarrow c\tau\nu$ mediated baryonic decays in SMEFT

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We study the interrelation among the  $B$  decays mediated by  $b \rightarrow c\ell\nu_\ell$ ,  $b \rightarrow s\nu_\ell\nu_\ell$  and  $b \rightarrow s\ell\ell$  ( $\ell = e, \mu, \tau$ ) quark level transitions in the context of six-dimensional SMEFT operators such as  $Q_{\ell q}^{(3)}$ ,  $Q_{\ell edq}$ ,  $Q_{\ell equ}^{(1)}$ ,  $Q_{\ell equ}^{(3)}$ ,  $Q_{\phi q}^{(3)}$  and  $Q_{\ell q}^{(1)}$ . We constraint the new physics parameter space using the current experimental observations of the observables  $R_D$ ,  $R_{D^*}$ ,  $P_\tau(D)$ ,  $P_\tau(D^*)$ ,  $F_L(D^*)$ ,  $\mathcal{B}(B_0 \rightarrow K^*\nu\nu)$ ,  $\mathcal{B}(B \rightarrow K^+\nu\nu)$ ,  $\mathcal{B}(B \rightarrow K^+\tau^+\tau^-)$  and  $\mathcal{B}(B_s \rightarrow \tau^+\tau^-)$ . We then explore the impact of the new physics couplings on several observables such as the branching ratio, forward-backward asymmetry, longitudinal polarisation asymmetry, convexity parameter, and the lepton flavor non-universality observable of  $\Sigma_b \rightarrow \Sigma_c^{(*)}\tau^-\bar{\nu}_\tau$  and  $\Xi_b \rightarrow \Xi_c\tau^-\bar{\nu}_\tau$  processes.

## Track type

Flavour Physics

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