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# Role of Right-handed Neutrinos in $B_c^+ \to B_s \bar{\mu} \nu$

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We perform a model-independent study of $c \to s\mu\nu$ mediated transitions to analyze the new physics effects in the presence of right-handed neutrinos. We have adopted the effective field theory approach and write the low-energy effective Hamiltonian including all possible dimension-six operators. The Wilson coefficients introduced through low energy effective Hamiltonian encode all NP that can enter in $c \to s$ transition at the dimension-six operator level. These Wilson coefficients are determined through a $\chi^2$ fit by using the Miniut package to available experimental data of leptonic $D_s^+ \to \bar{\mu}\nu$ and semileptonic decays $D^0 \to K^- \bar{\mu}\nu$, $D^+ \to \bar{K^0}\bar{\mu}\nu$ and $D^0 \to K^{*-}\bar{\mu}\nu$, $D^+ \to \bar{K^{*0}}\bar{\mu}\nu$, $D_s^+ \to \phi\bar{\mu}\nu$. The differential decay width of $B_c^+ \to B_s\bar{\mu}\nu$ is derived to investigate the role of right-handed neutrinos in the search for new physics through the three-body decay process. We also make the predictions of $q^2$ spectra for the mode $B_c^+ \to B_s\bar{\mu}\nu$ to inspect the effect of the allowed new physics in $c \to s$ sector through right-handed neutrinos to motivate the future measurements.

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