

# Signatures of complex new physics in $b \rightarrow c \tau \bar{\nu}$ anomalies

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Recent measurements of  $R_D-R_{D^*}$  by Belle collaboration are in agreement with the Standard Model predictions. After inclusion of these measurements, the tension between global average and the SM prediction has reduced to  $3.1\sigma$ . Assuming the new physics Wilson coefficients to be complex, we do a global fit to present  $b \rightarrow c \tau \bar{\nu}$  data. We find that there are only two (three) allowed solutions respecting the upper limit of  $\mathcal{B}(B_c \rightarrow \tau \bar{\nu})$  to be 30% (60%). We calculate the predictions of  $\tau$  polarization fraction and forward-backward asymmetry in  $B \rightarrow D \tau \bar{\nu}$  and forward-backward asymmetry in  $B \rightarrow D^* \tau \bar{\nu}$  for each new physics solution. Further we determine the predictions for CP violating triple product asymmetries in  $B \rightarrow D^* \tau \bar{\nu}$  decay for the allowed solutions. We find that one of the three asymmetries can be enhanced only up to 2 – 3% due to presence of two of the three new physics solutions.

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**Secondary track (number)**

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