

## Resolution of $R_D$ - $R_{D^*}$ puzzle

One of the exciting results in flavor physics in recent times is the  $R_D/R_{D^*}$  puzzle. The measurements of these flavor ratios performed by the B-factory experiments, BaBar and Belle, and the LHCb experiment are about  $4\sigma$  away from the Standard Model expectation. These measurements indicate that the mechanism of  $b \rightarrow c\tau\bar{\nu}$  decay is not identical to that of  $b \rightarrow c(\mu/e)\bar{\nu}$ . This charge lepton universality violation is particularly intriguing because these decays occur at tree level in the Standard Model. In particular, we expect a moderately large new physics contribution to  $b \rightarrow c\tau\bar{\nu}$ . The different types new physics amplitudes, which can explain the  $R_D/R_{D^*}$  puzzle, have been identified previously. In this letter, we show that the polarization fractions of  $\tau$  and  $D^*$  and the angular asymmetries  $A_{FB}$  and  $A_{LT}$  in  $B \rightarrow D^*\tau\bar{\nu}$  decay have the capability to uniquely identify the Lorentz structure of the new physics. A measurement of these four observables will lead to such an identification.

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