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Charged current b → cτν¯τ anomalies in a general W' boson scenario

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The very recent experimental information obtained from Belle experiment, along with the one accumulated by the BABAR and LHCb experiments have shown the existence of anomalies in the ratios R(D) and R(D ∗) associated with the charged current transition b → cτν¯τ . Although the Belle measurements are in agreement with the SM predictions, the new experimental world averages still exhibit tension. In addition, the D ∗ longitudinal polarization FL(D ∗) related to the channel B → D ∗ τν¯τ observed by the Belle and the ratio R(J/ψ) measured by the LHCb also show discrepancies with their corresponding SM estimations. In this work, we present a model-independent study based on the most general effective Lagrangian that yields to a tree-level effective contribution to the transition b → cτν¯τ induced by a general W0 gauge boson. Instead of considering any specific new physics (NP) realization, we performed an analysis by considering all the different chiral charges to the charm-bottom and τ -ντ interaction terms with a charged W0 boson that explain the anomalies. We present a phenomenological study of parameter space allowed by the new experimental b → cτν¯τ data and with the mono-tau signature pp → τhX + MET at the LHC. For comparison, we include some of the W0 boson NP realizations that have already been studied in the literature

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