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Probing new physics at the LHC with $b\tau\nu$ final states

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The $R_{D^{(*)}}$ anomaly is one of the most intriguing experimental results in particle physics. Experiments as BaBar, Belle and LHCb have measured a consistent tension with the standard model. In this work we study a consequence of different solutions to this tension as a sequential W' boson, EFT and leptoquark. Such models, are not only able to explain the $R_{D^{(*)}}$ anomaly but also to produce distinctive signatures at the LHC. We proposed a search for the signature b, τ, p_T^{miss} maximizing the statistical significance with regard to standard model backgrounds as $W^\pm + \text{jets}$, $Z^0 + \text{jets}$ and $t\bar{t}$. We finally show how the different models require a differentiated selection criteria and the exclusion that can be achieved.

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