

Interpreting the $R(D)$ and $R(D^*)$ anomalies within a singlet-triplet vector leptoquark model

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The long-standing deviations observed in the ratios $R(D)$ and $R(D^*)$, which probe lepton flavor universality in semileptonic B meson decays, have motivated extensive studies of new physics scenarios. In this work, we explore an explanation based on a singlet-triplet vector leptoquark model, featuring both U_1 and U_3 states. We perform a comprehensive fit to the most recent experimental data on $R(D)$ and $R(D^*)$, including constraints from other flavor observables. Our analysis identifies regions of parameter space where the model provides a simultaneous description of the anomalies while remaining consistent with current bounds. We further discuss the complementarity of low-energy flavor measurements and direct searches at the LHC in probing this framework.

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