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B-meson anomalies and Higgs physics in flavored $U(1)'$ model

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We consider a simple extension of the Standard Model with flavor-dependent $U(1)'$, that has been proposed to explain some of B-meson anomalies recently reported at LHCb. The $U(1)'$ charge is chosen as a linear combination of anomaly-free $B_3 - L_3$ and $L_\mu - L_\tau$. In this model, the flavor structure in the SM is restricted due to flavor-dependent $U(1)'$ charges, in particular, quark mixings are induced by a small vacuum expectation value of the extra Higgs doublet. As a result, it is natural to get sizable flavor-violating Yukawa couplings of heavy Higgs bosons involving the bottom quark. In this article, we focus on the phenomenology of the Higgs sector of the model including extra Higgs doublet and singlet scalars. We impose various bounds on the extended Higgs sector from Higgs and electroweak precision data, B-meson mixings and decays as well as unitarity and stability bounds, then discuss the productions and decays of heavy Higgs bosons at the LHC.

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