Flavored Z' models with protected flavor-changing interactions

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Summary

Recent measurements by the LHCb collaboration reported a $2.6\,\sigma$ deviation with respect to the Standard Model (SM) in the ratio $R_K = B \to K\mu^+\mu^-/B \to Ke^+e^-$. This together with a $2-3\,\sigma$ discrepancy in an angular observable of the decay $B \to K^*\mu^+\mu^-$ yields to an indirect hint of new physics involving lepton-universality violation. A simple explanation to these anomalies can be found in $U'(1)$ gauge extensions of the SM with the following properties:

- Flavor-violating Z' couplings in the down-quark sector.
- Family non-universal couplings in the charged lepton sector.

In this poster I will present a horizontal $U'(1)$ gauge extension with flavor-changing interactions in the down-quark sector proportional to the off-diagonal elements of the quark mixing matrix, resulting in a class of particularly predictive models. Anomaly cancellations require flavor-conserving family-non-universal couplings in the charged-lepton sector. We therefore provide a framework that naturally accommodates the $b \to s$ anomalies. I will focus in the minimal implementation where the matter content is the same as in the SM. Non-minimal implementations extending the lepton sector to accommodate neutrino masses will be briefly commented. The scalar sector of these implementations consists on a two-Higgs-doublet plus singlet model where flavor-violating couplings are also controlled by the quark mixing matrix.

The models described in this poster present a very interesting phenomenology. They will be tested at the next run of LHC and give precise correlations between different observables that allow to clearly distinguish among them and with respect to other Z' implementations.

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