

A Flavor Specific 2HDM and Flavor Anomalies

The $3.1\sigma R_K$ anomaly after Moriond 2021 and $3.3\sigma \Delta a_\mu$ from Fermilab Muon g-2 Experiment implicate that the lepton flavor universality violation (LFUV) may play a role in the exploration of new physics. Aiming at solving these flavor anomalies both in quark and lepton sectors, a specific Two-Higgs Doublet Model (2HDM) with particular U(1) gauge symmetry, which is designed to get rid of the redundancy in generic 2HDM-III Yukawa couplings, is proposed and investigated. Among three additional new particles in the flavor gauged 2HDM, FCNC processes can be induced by heavy neutral scalar and Z' only in down-type quark sector, which provide solutions to anomalies in $b \rightarrow s\ell\bar{\ell}$ and anomalous magnetic dipole moment (AMDM) for leptons. The charged Higgs, on the other hand, explains anomalies in $b \rightarrow c\ell\nu$ processes.

In this work, combining the latest experimental results of $R_{(K,K^*)}$ and $B_s \rightarrow \mu^+\mu^-$, the bounds of Wilson coefficients C_9^ℓ and C_s^ℓ emerged in FG2HDM, which are lepton flavor specific, can be obtained for the first time. By taking into account the FNAL muon g-2 new result with two-loop level full theoretical calculation, we can get the allowed parameter space of this UV-complete model.

Presentation type

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