

Likelihood analysis of the general 2HDM with Gambit's FlavBit

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We present a likelihood analysis of the general two Higgs doublet model, using the most important currently measured flavour observables, in view of the anomalies in charged current tree-level and neutral current one-loop rare decays of B mesons in $b \rightarrow c\bar{l}\nu$ and $b \rightarrow s\mu^+\mu^-$ transitions, respectively. Our analysis predicts values for $\text{BR}(h \rightarrow \tau\mu)$ between 10^{-2} and 10^{-4} which are within the future sensitivity at the High Luminosity LHC. We also find that the predictions for the $\tau \rightarrow 3\mu$ and $\tau \rightarrow \mu\gamma$ decays are well within the projected limits at the Belle II experiment with a discovery potential for $\text{BR}(\tau \rightarrow 3\mu) \sim 10^{-9}$ and $\text{BR}(\tau \rightarrow \mu\gamma) \sim 10^{-9} - 10^{-8}$. Using the latest measurement of the Fermilab Muon $g - 2$ Collaboration, we also perform a simultaneous fit to the muon anomalous magnetic moment and both observables related to flavour changing currents and leptonic decays of mesons, finding solutions at the 1σ level.

Authors: SIERRA FONSECA, Cristian Felipe (Monash University); BALAZS, Csaba (Monash University); JACOB, Douglas (Monash University); ATHRON, Peter; GONZALO, Tomas (RWTH Aachen)

Presenter: SIERRA FONSECA, Cristian Felipe (Monash University)

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