

The absolute maximum and detailed phenomenology of the muon magnetic moment in the 2HDM

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We investigated the muon $g-2$ in the two-Higgs doublet model (2HDM), employing the recent full two-loop computation and making comprehensive use of experimental constraints from Higgs and flavour physics. In the talk we present the result of detailed analysis in the flavour-aligned 2HDM and characterize the parameter regions possible to explain the current 3σ deviation. Particularly we present the absolute maximum of the muon $g-2$ in the 2HDM as a function of the lightest Higgs mass.

We focus on the light CP odd neutral Higgs Boson A , and show that large lepton Yukawa couplings can enhance the muon $g-2$ in this mass region. We present in detail the maximum possible Yukawa couplings to leptons and quarks of a light A allowed by the LHC and B-Physics results. As a result we find that an overall maximum of 45×10^{-10} for the muon $g-2$ and large top and tau Yukawa couplings are possible in the parameter region $20 < M_A < 100$ GeV in the 2HDM.

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