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Aligned two Higgs doublet model and the global fits

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Though the Standard Model (SM) provides a very elegant description of interactions among fundamental particles, there are ample evidences to believe that there exists physics beyond the Standard Model. In particular extending the scalar sector has enough motivation from vacuum stability, electroweak phase transition and various other sectors. Among different such extensions, two Higgs doublet model (2HDM) is the simplest one that preserves the electroweak ρ -parameter. Although flavour changing neutral currents (FCNC) are usually avoided in these models by implementing additional Z_2 symmetry, they still get several severe phenomenological constraints. Conversely, in aligned two Higgs doublet model (A2HDM) FCNCs are avoided by choosing same flavour structure for the Yukawa couplings of the two scalar doublets, and the phenomenological constraints on this model are also weaker. Here, we present a global fit of A2HDM using the package HEPfit, that performs a bayesian analysis on the parameter-space of this model with the help of stability and perturbativity bounds, results for various flavour and electroweak precision observables, and constraints from Higgs searches at the LHC to investigate how much room the current experimental data leave for this model to exist.

Collaboration / Activity

Not Applicable

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