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## Higgcision in the two-Higgs doublet models

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We perform global fits to the general two-Higgs doublet models (2HDMs) with generalized couplings using the most updated data from ATLAS, CMS, and Tevatron. We include both scenarios with CP-conserving and CP-violating couplings. By relaxing the requirement on the discrete symmetries that are often imposed on the Yukawa couplings in order to prohibit the tree-level flavour changing neutral current (FCNC), we try to see which of the 2HDMs is preferred.

### Summary

We summarized our finding in this work as following:

1. Higgcision in 2HDMs can be parameterised efficiently by using only 4 parameters including the contributions to the Higgs-two photons couplings from the charged Higgs.
2. The chi-square values difference from the fitting among various types of 2HDM are very small.
3.  $\tan\beta$  is constrained to be small.
4. The  $p$ -value for various fits of 2HDMs are worse than that of the standard model (SM).
5. Finally, we emphasis on that future precision measurements of the Higgs coupling to the scalar top-quark bilinear ( $C_u^S$ ) and  $\tan\beta$  may endow us with the discriminating power among various types of 2HDMs especially when  $C_u^S$  deviates from its SM value 1.

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