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Radiative corrections to Higgs coupling constants in two Higgs doublet models

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We calculate one-loop corrected Yukawa coupling constants hff for the standard model (SM) like Higgs boson h in two Higgs doublet models with the softly-broken Z_2 symmetry. Under the Z_2 symmetry, four types of models with different Yukawa interactions appear. We find that one-loop contributions from extra Higgs bosons change maximally about several % from tree level hff couplings under the constraints from perturbative unitarity and vacuum stability. We find that the pattern of deviations in each type of Yukawa couplings from the SM predictions does not change from tree level predictions with only mixing effects even with maximal radiative corrections. Moreover, when the gauge couplings hVV ($V = W, Z$) are found to be slightly (with a percent level) differ from the SM predictions, the hff couplings also deviate but more largely. Therefore, in such a case, in addition to determining the type of Yukawa couplings, there is a possibility to obtain more information on the extra Higgs bosons by fingerprinting the theory predictions with future precision data for the hff and hVV couplings at the LHC and the ILC.

This talk is based on the paper:

“Radiative corrections to the Yukawa coupling constants in two Higgs doublet models”,

S. Kanemura, M. Kikuchi and K. Yagyu. Phys. Lett. B731 (2014) 27. [arXiv: 1401.0515]

Summary

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