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Higgs-Higgs bound state in 2HDM - A possibility or not?

The possibility of a Higgs-Higgs bound state in the two Higgs doublet model is investigated . Specifically we look for the effect of dimension six operators, generated by new physics at a scale of a few TeV, on the self-couplings of the heavy CP even scalar field in the model. We construct an effective field theory formalism to examine the physics of the Higgs sector. The magnitudes of the attractive and repulsive coupling strengths are compared to estimate the possibility of the formation of the H – H bound state. Another way to check if a bound state is formed or not is from the formation and decay times of the bound state. The possibilities in various types of two Higgs doublet models have been discussed elaborately. The bound state energy has been evaluated and the allowed parameter space has been studied in the linear and non-linear realizations.

Field of contribution

Phenomenology

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Track Classification: Beyond the standard model