

# CP violation of the neutral Higgs boson in a THDM and MSSM

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## Abstract content

### Summary

The THDM is constructed by adding an extra Higgs doublet to the SM, yielding three neutral Higgs physical states rather than one,  $\phi^0_{\{1,2,3\}}$ . On the other hand for SUSY theories, in the superpotential, the minimal content of Higgs doublets is two, in order to give mass to both type of fermions and avoid anomalies. This model is the Minimal Supersymmetric Standard Model, MSSM. At leading order the CP conserving requirement implies that from the three neutral Higgs states, there would be two scalars, which are CP-even:  $h_0, H_0$  and one pseudoscalar which is CP-odd:  $A_0$ . However, radiative corrections to these Higgs states could violate the CP symmetry. For the two models given above we show the complex couplings as sources of this CP non-invariance ending on neutral Higgs states coming from mixing of scalar and pseudoscalar states that give rise to a non-Hermitian mass matrix. We also present the consequences of having an exact degeneracy on the two heavier states in this non-Hermitian scheme.

**Presenter(s) :** Dr. GOMEZ-BOCK, Melina (IFUNAM)

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