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CP-violation and renormalization group effects in the Higgs alignment limit of the MSSM

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The current experimental data of New-Physics searches have excluded the simplest scenarios of the minimal supersymmetry (SUSY). At the same time, the Minimal Supersymmetric Standard model (MSSM) in general remains a possible candidate as the Standard Model extension. We propose a phenomenological scenario with nonstandard regime of softly broken SUSY-parameters ("regime of large A , μ "). For such a regime, radiative corrections to the dimension-six operators that inevitably arise at the loop level of effective Higgs potential decomposition become considerable. The Higgs alignment limit valid for the general Two-Higgs Doublet Model (THDM) with all possible CP-violating sources is investigated: it is shown that two different parametric scenarios, I and II, can be realized. The corresponding CP-violating effects are evaluated. It is found that the renormalization group improvement of radiative corrections refines predictions for the mass of the SM-like Higgs boson by about 2% for the Higgs alignment limit I and by about 9% for the Higgs alignment limit II.

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