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Spontaneous CP violation and μ–τ symmetry in two-Higgs-doublet models with flavour conservation

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In multi-Higgs-doublet models, the simultaneous requirement that (i) CP violation only arises spontaneously, (ii) there are no tree level scalar flavour changing couplings and (iii) the fermion mixing matrix is CP violating, can only be achieved in a very specific way. A general approach on the question is presented stressing new clarifying insights. In the quark sector, that possibility is not viable on phenomenological grounds while in the lepton sector it is highly interesting and leads to viable models with μ–τ symmetric PMNS matrices. Models with Dirac or Majorana (in a type I seesaw scenario) neutrinos, including phenomenological implications, are analysed.

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