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The impact of dimension 8 operators on the 2HDM

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One of the usual assumptions in Effective Field Theories (EFTs) is to truncate the expansion with the dimension-6 operators. I discuss the relevance of including operators of dimension-8 in an EFT for the 2 Higgs Doublet Model (2HDM). I present the matching between EFT and 2HDM up to dimension 8, written in terms of well-known bases, considering a generally CP-violating 2HDM. Using the up-to-date Higgs signal strength measurements at the LHC, I convert the constraints on Wilson coefficiens into contraints of the 2HDM. I show that there are processes where dimension-8 operators plays a crucial role, as there simply is no contribution from dimension-6 operators. I also show that, whereas in some cases the inclusion of dimension-6 operators squared is enough to adequately reproduce the full model, in other cases the dimension-8 operators become signicant, without spoiling the validity of the EFT expansion.

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