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The Art of Counting: where to cut-off SMEFT and HEFT in Higgs Pair Production

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In searches for beyond the Standard Model (BSM) Physics, bottom-up effective field theories (EFTs) such as the Standard Model EFT (SMEFT) and Higgs EFT (HEFT) have become crucial theoretical tools. Besides specifying their particle content and the respective symmetries on which the higher-dimensional operators are built, the choice of a power counting in a small parameter is the third necessary ingredient. The latter dictates how the operators are organized and enables us to perform a truncation on Lagrangian and amplitude level, which is essential when computing physical observables. In this work, we discuss the power counting approaches to SMEFT and HEFT and study their application in the context of the Higgs pair production process.

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