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## Predictions for multiple Higgs production: comparing HEFT and SMEFT

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We discuss various aspects of multi-Higgs boson production from longitudinal electroweak (EW) gauge boson scattering in the TeV region as the necessary information to characterise the Flare function,  $F(h)$ , which determines whether the Standard Model EFT (SMEFT) or the Higgs EFT (HEFT -also sometimes referred as the EW Chiral Lagrangian-) is the appropriate description. We analyze various correlations among Higgs couplings that help decide, from experimental data, whether we have a viable SMEFT low-energy scenario. We present an effective field theory study of scattering into states with one, two, three and four Higgs bosons in the final state, in addition to possible extra EW gauge bosons. We show several important cancellations and simplifications which allows us to display these amplitudes in a very compact form. We show that for a growing number of Higgs bosons in the final state, SMEFT leads to an important suppression of the cross sections with a large number of Higgses, while this does not happen for general HEFT low-energy scenarios (which do not accept a SMEFT description). We provide some numerical estimates of these multi-Higgs cross sections based on current experimental bounds. Finally, we show how field redefinitions -or an appropriate choice of the scalar manifold coordinates- can provide a more transparent picture of these processes.

### Abstract

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