

## SYNERGIES TOWARDS THE FUTURE STANDARD MODEL

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## Two-loop renormalisation of the 2HDM and phenomenological applications

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Understanding the renormalisation structure of extended Higgs sectors at higher orders is essential for obtaining precise and reliable theoretical predictions. In this work, we focus on the renormalization of the two-Higgs-doublet model (2HDM), and present a consistent renormalisation scheme for its scalar sector at two loops. A particular emphasis is placed on the treatment of the mixing angles near the alignment limit, which is especially subtle and can have significant impact on physical observables. As a non-trivial application of our framework, we compute the leading two-loop corrections to the trilinear Higgs couplings  $\lambda_{hhh}$  and  $\lambda_{hhH}$ , which are relevant for single- and double-Higgs production at current and future colliders.

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