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Two-loop corrections to the Higgs trilinear coupling in BSM models with classical scale invariance

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The Higgs trilinear coupling can serve as a unique probe to investigate the structure of the Higgs sector and the nature of the electroweak phase transition, and to search for indirect signs of New Physics. At the same time, classical scale invariance (CSI) is an attractive concept for BSM model building, explaining the apparent alignment of the Higgs sector and potentially relating to the hierarchy problem. A particularly interesting feature is that the Higgs trilinear coupling is at one-loop order universally predicted in all CSI models, and deviates by 67% from the (tree-level) SM prediction – making it accessible at the ILC.
In this talk, I will show how this result is modified at two loops. I will present results from the first explicit computation of two-loop corrections to the Higgs trilinear coupling in classically scale-invariant BSM models. Taking as examples an N-scalar model and a CSI variant of a Two-Higgs-Doublet Model, I will show that the inclusion of two-loop effects allows distinguishing different scenarios with CSI, although the requirement of correctly reproducing the known 125-GeV mass of the Higgs boson severely restricts the allowed values of the Higgs trilinear coupling.

Time Zone

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