on e+e- Higgs/EW/Top Factories, October 5-7, 2022, in Hamburg



Contribution ID: 36

Type: Parallel session talk

Precise predictions for the trilinear Higgs coupling in arbitrary models

Thursday 6 October 2022 16:27 (17 minutes)

The trilinear coupling of the 125-GeV Higgs boson, λ_{hhh} , is one of the most important quantities to investigate in the future. It controls the shape of the Higgs potential, and in turn it determines the strength of the electroweak phase transition. It can also exhibit large deviations from its SM predicition, even in scenarios where New Physics is hidden from direct observation (e.g. scenarios with alignment), and the experimental bounds on it are already sufficiently strong to exclude significant parts of (otherwise unconstrained) parameter spaces of Beyond-the-Standard-Model (BSM) theories. It is therefore crucial to have accurate predictions for λ_{hhh} for the wide range of BSM models currently investigated.

In this talk, I will present a new public tool, providing predictions for λ_{hhh} , expressed in terms of the coupling modifier κ_{λ} , to full one-loop order within arbitrary renormalisable QFTs. This framework allows computing one-, two-, and three-point functions at one loop in an automated way, and furthermore offers a high level of flexibility in the application of pre- or user-defined renormalisation conditions. I will review the main elements of the calculation and demonstrate features of the new program. Finally, I will discuss possible applications and extensions of this tool.

Primary authors: BAHL, Henning (None); BRAATHEN, Johannes (T (Phenomenology)); GABELMANN, Martin (T (Phenomenology)); WEIGLEIN, Georg (T (Phenomenology))

Presenter: GABELMANN, Martin (T (Phenomenology))

Session Classification: WG1: joined HTE & GLOB session

Track Classification: WG1-HTE+GLOB - Physics Potential: Higgs, top and EW joint with Global Interpretations