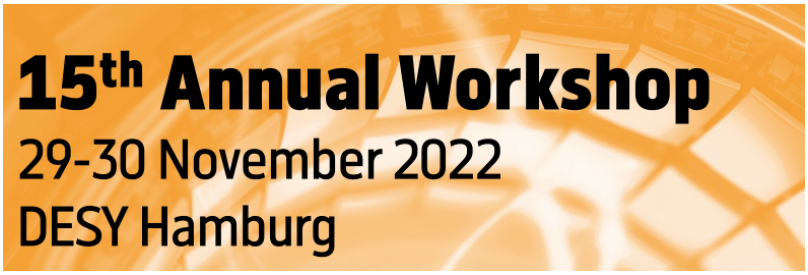

Contribution ID: **4** Type: **not specified**

Precise predictions for the trilinear Higgs coupling in arbitrary models

Tuesday 29 November 2022 11:25 (20 minutes)

The trilinear coupling of the 125-GeV Higgs boson, λ_{hhh}, is crucial quantity to study in the future. It controls the shape of the Higgs potential, away from the electroweak (EW) vacuum, and determines the strength of the EW phase transition. It can also deviate significantly from its SM prediction, even in scenarios where New Physics is hidden from direct observation (e.g. scenarios with alignment), due to non-decoupling effects in radiative corrections from Beyond-the-Standard-Model (BSM) scalars. Meanwhile, the experimental bounds on this coupling are already sufficiently strong to exclude significant parts of (otherwise unconstrained) parameter space of BSM theories. It is therefore crucial to have accurate predictions for λ_{hhh} for the wide range of BSM models that are being investigated.

In this talk, I will present a new public tool, anyH3, providing predictions for the trilinear Higgs coupling, 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 offers additionally 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 computer program. Finally, I will discuss possible applications and extensions of this tool.

Primary author: BRAATHEN, Johannes (T (Phenomenology))

Co-authors: BAHL, Henning (None); GABELMANN, Martin (T (Phenomenology)); WEIGLEIN, Georg (T (Phenomenology))

Presenter: BRAATHEN, Johannes (T (Phenomenology))

Session Classification: Parallel Session