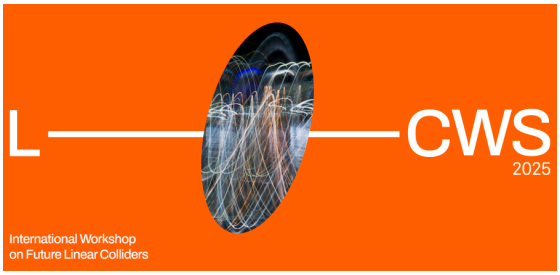

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Precise predictions for trilinear Higgs couplings in extended scalar sectors with anyH3

Tuesday 21 October 2025 11:30 (20 minutes)

A central goal of future collider experiments is to probe the shape of the Higgs potential. This requires access to trilinear scalar couplings, and in particular the self-coupling of the detected Higgs boson. While this coupling is fixed in the Standard Model (SM), it can be significantly modified in many Beyond the Standard Model (BSM) scenarios, which are often linked to solutions of open problems such as the matter-antimatter asymmetry of the Universe.
Indeed, in models with extended scalar sectors, radiative corrections involving the additional scalars can drastically alter the trilinear coupling of the detected Higgs as well as with BSM trilinear couplings. In turn, this has a strong impact on calculations of physical processes.
Precise theory predictions are therefore critical for interpreting precision Higgs measurements and identifying indirect signs of new physics.
To address this need, I will present the newest version of the public tool anyH3, which can now compute all trilinear scalar couplings at the full one-loop level in arbitrary renormalisable theories, incorporating full momentum dependence and allowing a flexible renormalisation scheme choice. This enables accurate general automated predictions in a wide range of BSM scenarios. I will also discuss the new module anyHH, which enables calculations of di-Higgs production at the (HL-)LHC, and ongoing developments such as a link of anyH3 to Madgraph.

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