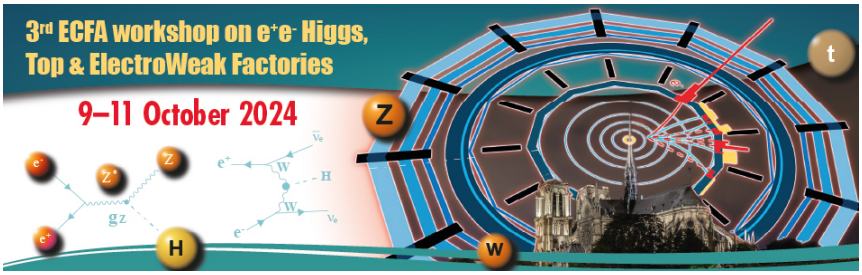

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Sensitivity to detecting New Physics effects first in the trilinear Higgs coupling

Thursday 10 October 2024 12:20 (20 minutes)

The trilinear Higgs coupling (THC) offers a unique opportunity to probe the structure of the Higgs sector and to study the nature of the electroweak phase transition. It provides experimental access to the Higgs potential, the "holy grail"of Particle Physics, and should be a crucial target for future high-energy colliders. Extended Higgs sectors, featuring additional Higgs bosons, can give rise to a Strong First Order Electroweak Phase Transition (SFOEWPT), which could explain the observed baryon asymmetry. The parameter region yielding a SFOEWPT is often correlated with a sizeable deviation of the THC from the prediction of the Standard Model.

In this talk, I will present several examples of realistic Beyond-the-Standard-Model (BSM) scenarios in which large, observable, deviations occur in the THC, while other Higgs properties (e.g. its decay width to two photons or its hZZ coupling) would not exhibit sufficiently large effects to be detected with future precision measurements. For the concrete BSM scenarios investigated here it will be demonstrated that their behaviour under renormalisation-group running and their matching to appropriate EFTs is well compatible with the large effects in the THC. The findings presented here provide a strong motivation for running a future Higgs factory at a centre-of-mass energy of at least 500 GeV, in order to enable the measurement of the trilinear Higgs coupling in the Zhh production process.

Primary authors: Mr VERDURAS SCHAEIDT, Alain (DESY); Prof. WEIGLEIN, Georg (DESY); Dr BAHL, Henning (Heidelberg University); Dr BRAATHEN, Johannes (DESY); Ms RADCHENKO SERDULA, Kateryna (DESY); Dr GABELMANN, Martin (DESY); Prof. HEINEMEYER, Sven (IFT/CSIC Madrid)

Presenter: Dr BRAATHEN, Johannes (DESY)

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