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## Theoretical concepts and measurement prospects for BSM trilinear couplings: a case study for scalar top quarks

*Monday 21 August 2023 18:10 (15 minutes)*

Following the potential discovery of new heavy particles at the LHC or a future collider, it will be crucial to determine their properties and the nature of the underlying Physics. Of particular interest is the possibility of Beyond-the-Standard-Model (BSM) scalar trilinear couplings.

In this talk, I will consider as a specific example the scalar top (stop) trilinear coupling parameter, which controls the stop–stop–Higgs interaction, in the Minimal Supersymmetric Standard Model and I will discuss possible strategies for its experimental determination. I will show that the best prospects for determining the stop trilinear coupling arise from its quantum effects entering the prediction for the mass of the SM-like Higgs boson in comparison to the measured value. Importantly, the Higgs-boson mass exhibits a high sensitivity to the stop trilinear coupling even for heavy masses of the non-standard particles.

Next, I will review different renormalisation prescriptions for the stop trilinear coupling, and their impact in the context of Higgs-boson mass calculations. I will show that a mixed renormalisation scheme is preferred in view of the present level of accuracy of this calculation, and I will clarify the source of potentially large logarithms that cannot be resummed with standard renormalisation group methods.

### Collaboration / Activity

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