

Mapping the SMEFT to UV models for four-fermion operators

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The top-down matching of specific scenarios for new physics onto the Standard Model Effective Field Theory (SMEFT) is well-understood and easy to automatise.

The inverse approach, however, the bottom-up matching of the SMEFT to UV models and in particular a systematic exploration of these discoverable UV models is more difficult.

I will present a diagrammatic technique for the automated construction of a complete (under certain, well specified assumptions) set of possible UV models that produce specific groups of SMEFT operators.

The focus lies on generating models which only contribute to 4F operators at one-loop order and not at tree-level, since these models can contain relatively light particles that could be discovered at the LHC in direct searches and lead to an interesting interplay between indirect SMEFT and direct collider searches.

To avoid stable charged relics these models will contain either so-called exotics, particles that couple linearly to a pair of SM particles, or electrically neutral possible DM candidates.

Examples for minimal models for 4F operators will be discussed for both options, as well as their matching to the SMEFT and their role in the interplay between direct and indirect searches at the LHC.

PhD Student

yes

Primary author: ESSER, Fabian

Presenter: ESSER, Fabian

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