Contribution ID: **7**   Type: **not specified**

Experimental falsification of SMEFT

Thursday 20 October 2022 14:30 (20 minutes)

Vector Boson Scattering is central to our understanding of the Electroweak Symmetry Breaking Mechanism. Corrections to the Standard Model are conventionally studied in Standard Model Effective Field Theory (SMEFT). However, SMEFT can be cast in the form of the more general Higgs Effective Field Theory (HEFT). We expose the SMEFT-induced correlations on the coefficients of HEFT that, if found to generate tension with future data, would lead to the experimental falsification of the SMEFT framework. These correlations in VBF couplings are derived from the necessary symmetric point and analyticity of the SMEFT Lagrangian that allows the construction of the SMEFT expansion (as laid out by other groups), and properties at that point of the Higgs-flare function $\mathcal{F}(h)$ coupling Goldstone and Higgs bosons. We present amplitudes for VBF ($W_L W_L \rightarrow n \times h$) at the TeV scale, and show how SMEFT produces a theory prediction on cross-section ratios that does not depend on the specific value of the relevant Wilson coefficient (allowing direct experimental falsification of SMEFT).

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Session Classification: Selected topics on VBF and related