Two theory agreements for SMEFT@LHC

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on top-quark EFT standards [1802.07237]
(LHC TOP WG mandate, 35 signatories)

on SMEFT simulation validation [1906.12310]
(LHC TOP/EW/HXS WGs mandate, 41 signatories)

no details presented here, only the topics addressed

as co-editor, on my own behalf

17 April 2020
LHC EFT WG kickoff meeting

Top-quark EFT agreement

to facilitate and guide experimentalists' use of EFT

(several iterations with feedback from ATLAS and CMS)

- fix reference notation and conventions for operator coefficients
  - simplify the dependence of top processes at the LHC
  - avoid confusion, ease comparisons and combinations
  - made available for MC simulation (now from several UFO models)
    - compute and cross-validate benchmark dependences

- tackle the multi-dimensional challenge gradually
  - define relevant contributions to observables from existing constraints
    - gather indicative limits
  - prioritize the exploration of flavour structures

- discuss global analysis strategies
  - provide an example of re-interpretable approach
  - request experimental outputs, e.g.:
    - both linear and linear+quadratic dim-6
    - as function of the energy probed

[1906.12310]

Validation agreement for SMEFT simulation

from implementation authors
to hep-ex & ph communities

- list existing implementations, with brief introductions by the authors, links and references
- establish a protocol for precise, pairwise and decentralized comparisons
  - sufficiently flexible to apply to a wide diversity of implementations
  - exploiting standard MC formats for information exchange
  - implemented in a `madgraph` plugin for UFO models
- recommend that dictionaries between implementations be made available publicly (e.g. in `rosetta` or `wcxf-python`)
- touch upon a loop-level extension, based on existing MC standards
- list public cross-validations performed, with links and references
  - `dim6top` vs. `smeftsim` and `smeft@nlo` for top operators
  - `recola2` vs. `smeftsim` for bosonic operators

Some discussions left open

- Observable sensitivities and complementarities
- Overall experimental strategy and targets, to identify theory issues and needs

- Prescription for EFT uncertainties
- MC treatment of unstable particles (EFT in production, width & decay)
- Higher orders in SM couplings

- More cross validations of implementations, also to loop level
- More dictionaries between implementations
- More of the outputs requested by theorists in experimental analyses

- Analyses combining sensitivity, globality, re-interpretability
  - Allowing more precise combinations outside collaborations
  - Valuing global constraints over the tightest individual ones?
  - Shifting from highly optimized and independent analyses, difficult to combine, to a more global experimental strategy?
  - Challenging to the signal-vs-bkg mindset in a global picture