First outline of the WG activities and targets

(larger # of *'s reflects higher level of priority)

1. EFT Formalism

The starting point for the calculations and fits: what operators, what bases, what perturbation orders, how to combine operators of different dimensions, what constraints to be put in the EFT bases preparation, practical considerations in connection to experimental analyses, flavour and symmetry assumptions. The following issues will be discussed:

- SMEFT bases/notation/normalization/input schemes, etc (***): common conventions, consistency checks among the experiments and streamlining translations among conventions will be required, before any combination is considered. These will be defined on a case by case basis, depending on the specific set of observables included in a given combination.
- Assumptions about the flavour symmetries, and other symmetries like CP
- Definition of scenarios, also for the purposes of doing fit with limited data, and as benchmarks for the presentation of experimental results
- Truncation, quadratic dependences, double insertions, dimension eight contributions, uncertainty prescription, EFT validity (information required from experiments to ensure validity at the interpretation stage) (**)
- TH constraints (unitarity, positivity, etc.) and incorporation into fit results (**)
- Consideration of beyond-SMEFT EFT frameworks, where relevant

2. Predictions and tools

Addressing all issues of how to simulate EFT and generate events; understanding of the limitations of the models and agreements on the way to proceed in the EFT publications and calculations. Identification and estimation of all relevant theory systematics, and calculation in a form which is usable in likelihood fits by the experimental community; investigation of matters related to the computational limitations in the events production for experimental analyses.

- Guidance
    - Availability (analytic & numeric), usage, assumptions, uncertainties, interplay of tools (**)
    - Reweighting techniques to reduce the full detector simulation sample size (and validation of those techniques) (***)
    - Higher-order corrections in SM couplings (**)
- Deliverables
    - Cross-validation at tree and loop levels (**)
    - Common MC generation and/or settings across experiments

    - Observable calculations (including e.g. fiducial cross-sections, see Area 3.) and analytical parameterizations (also to NLO), comparisons between tools, uncertainties (**)
    - Tools to relate parameters, measured quantities, etc
- Specific theory developments
    - Recommendations for the treatment of unstable particles (combining EFT dependence in production, total width, and decay; treatment in MC tools) (**)
    - EFT in PDFs, alpha_s, shower and hadronization (*) [leave to pheno papers]
    - etc.

3. Experimental measurements and observables

How observables relate to operators, which measurements are important for a given operator or set of operators, differential/fiducial measurements vs. dedicated ones, identification of optimal observables, machine learning, re-interpretation vs. static, presentation of results: covariance, multi-D likelihood, etc., compatibility with global fits (i.e. assumptions used in deriving measurement and reporting results).

- Study observable, channel, process sensitivities and complementarities (***)
    - Experimental targets: survey of the sensitive channels and corresponding operators
    - Differential distributions, optimal observables, including machine learning, and dedicated EFT measurements, spin density matrices, EFT-optimized fiducial regions, amplitude analyses, angular distributions (e.g. for CP), pseudo observables, etc.
    - Agreement across experiments (for fiducial regions in particular)
    - What observables are most sensitive to new physics? Exploit energy growing effects, non-interferences, and other TH knowledge
    - Expected uncertainties: sys. or stat. dominated
- Analysis strategies & experimental outputs, also with a view at legacy measurements and their possible reinterpretation (***)
    - Dedicated EFT extractions by collaborations
    - Differential measurements and the best choice of observables for re-interpretation.
    - Presentation of measurements: cross sections, correlations/covariance, multi-D likelihood, etc…
    - Experimental systematics related to EFT (e.g. accounting for detector effects)
    - Detector effects: unfolding, forward folding, efficiency maps, recasting through reweighting, etc.
    - EFT in backgrounds: final-state driven instead of sig-bgd, statistical model (***)

4. Fits and related systematics

Discussion on issues which are either generic, i.e. they don't depend on specific final states, or that concern the interpretation, preparation and performance of global fits of ATLAS, CMS, LHCb

results, together with additional existing measurements, future projections, experimental systematics related to EFT.

- Experimental EFT fits: ATLAS+CMS+... combination of H+EW+Top (***)
- Inputs and outputs, fitting procedures and tools (***)
    - Practical considerations of limited time and experimental input
    - Fitting benchmarks for synchronisation
    - Comparisons of input information between experimental results
    - Compare fits: experimental/theory, among different groups
    - Consideration of common WG fit, framework and/or approaches (**)
- Comparison to, and inclusion of, non-LHC constraints (LEP, Tevatron, flavor, g-2, EDM, etc.) in fits and/or to set priorities among targeted measurements/operators and in sensitivity optimization (***)
- Theoretical systematics, and their correlations (see Area 2.) (***)
- Experimental systematics, and their correlations (see Area 3.) (***)
- Presentation of EFT Fits: multi-D likelihoods, covariance, flat directions, etc… (***)
- Projections of EFT fit constraining power (**)

5. Benchmark scenarios from UV models

Determination of expected numerical EFT effects from models and constraints on models from expected or obtained EFT fits...

- Matching to specific models, BSM-driven subsets of operators, benchmarks beyond SMEFT, incl. non-linear EFT (**)
- Comparison of EFT constraints vs. direct BSM searches beyond EFT (**)