Introduction

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(on behalf of the Area 2 Conveners)

Nov 22 2021
Activity Area 2: Prediction 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.
Activity Area 2 Meetings

First meeting focused on overview of existing tools and calculations. Agenda [HERE](#) and shown below:

- **14:00 → 14:10** Introduction
  - area2-intro-141220...

- **14:10 → 14:25** SMEFTsim
  - Speaker: Ilaria Brivio (University of Heidelberg)
  - Ilaria.mp4, slides_SMEFTsim...

- **14:25 → 14:40** SMEFT@NLO
  - Speaker: Ken Mimasu (King's College London)
  - Ken.mp4, Mimasu_SMEFTat...

- **14:40 → 14:55** EFT in MadGraph5_aMC@NLO
  - Speaker: Olivier Mattelaer (ULouvain)
  - EFT_MG5.pdf, Olivier.mp4

- **14:55 → 15:10** EFT in JHUGen
  - Speaker: Heshy Roskes (Johns Hopkins University (US))
  - EFT tools in the JH...

- **15:10 → 15:25** EFT in Sherpa
  - Speakers: Marek Schoenherr (University of Durham (GB)), Marek Schoenherr (University of Durham)
  - Marek.mp4, SherpaEFT.pdf

- **15:25 → 15:40** EFT in VBFNLO
  - Speaker: Dieter Zeppenfeld
  - Dieter.mp4, Zeppenfeld-A2EFT...

- **15:40 → 16:00** Break

- [10m](#)
- [15m](#)
- [15m](#)
- [15m](#)
- [15m](#)
- [10m](#)
- [20m](#)
Activity Area 2 Meetings

First meeting focused on overview of existing tools and calculations. Agenda [HERE](#) and shown below:

- **16:00 → 16:15** EFT in Powheg
  - Speaker: Simone Alioli (Universita & INFN, Milano-Bicocca (IT))
  - [LHC_EFT_WG_14.mp4](#) [Simone.mp4](#)

- **16:15 → 16:45** Review of NLO predictions in the SMEFT
  - Speaker: Ben Pecjak (IPPP Durham)
  - [Ben.mp4](#) [LHC_WG.pdf](#)

- **16:45 → 17:05** ATLAS: wishlist/feedback on tools, and experience with SMEFT event reweighting
  - Speaker: Dr Carsten Daniel Burgard (Deutsches Elektronen-Synchrotron (DE))
  - [Carsten.mp4](#) [slides](#)

- **17:05 → 17:25** CMS: wishlist/feedback on tools, and experience with SMEFT event reweighting
  - Speaker: Jonathon Mark Langford (Imperial College (GB))
  - [cms_lhceftwg_201.mp4](#) [Jonathon.mp4](#)
Today talks will be on recent studies performed within CMS and ATLAS

Dedicated meeting planned for Jan 31st on other recent studies

if you have performed comparisons, validations, performance studies of existing tools, please contact one of us:

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