

5th General Meeting of the LHC EFT Working Group

Report of Contributions

Contribution ID: 4

Type: **not specified**

Unbinned multivariate observables for global SMEFT analyses from machine learning

Global determinations of the Wilson coefficients of the Standard Model Effective Field Theory (SMEFT) involve the inference of multiple parameters from a global dataset, and are often based on reinterpreting existing binned LHC measurements within the SMEFT framework. Based on our recently developed open-source framework, ML4EFT, we propose a new methodology that can be adopted by experiments in order to present to the community unbinned measurements that are optimised for global SMEFT fits.

Presentation will be

Primary authors: TER HOEVE, Jaco (Nikhef and VU Amsterdam); ROJO, Juan; MADIGAN, Maeve; Dr GOMEZ AMBROSIO, Raquel (Milano Bicocca); Prof. SANZ GONZALEZ, Veronica (Universities of Valencia and Sussex)

Presenter: MADIGAN, Maeve

Contribution ID: 7

Type: **not specified**

Efficient interpolation and practical observables

For binned likelihood fits, a (dimension-6) quadratic EFT parameterization of the bin yield can be represented as a matrix norm. Often, this matrix is low-rank, presenting a possibility for more efficient computation in large fits. Analyzing the eigenspectrum of this matrix may also provide a path towards incremental optimization of binning, providing an intermediate approach to EFT analysis design between STXS-like and optimal observable-based approaches.

Primary author: SMITH, Nick (Fermi National Accelerator Lab. (US))

Presenter: SMITH, Nick (Fermi National Accelerator Lab. (US))

Contribution ID: 8

Type: **not specified**

Introduction

Presenter: GILBERT, Andrew (Northwestern University (US))

Contribution ID: 9

Type: **not specified**

Introduction

Friday 2 December 2022 09:30 (20 minutes)

Presenter: GILBERT, Andrew (Northwestern University (US))

Session Classification: Session 1 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: **10**

Type: **not specified**

Recent ATLAS EFT activities

Friday 2 December 2022 09:55 (20 minutes)

Presenter: ROSSI, Eleonora (University of Oxford (GB))

Session Classification: Session 1 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: **11**

Type: **not specified**

Recent CMS EFT activities

Friday 2 December 2022 10:20 (20 minutes)

Presenter: SANCHEZ CRUZ, Sergio (Universitaet Zuerich (CH))

Session Classification: Session 1 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: 12

Type: **not specified**

Report on the ATLAS+CMS EFT fit exercise

Friday 2 December 2022 11:15 (20 minutes)

Presenter: STAGER, Fabian (University of Zurich (CH))

Session Classification: Session 2 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: 13

Type: **not specified**

Additional proposal for the treatment of EFT truncation, validity and related uncertainties

Friday 2 December 2022 11:40 (10 minutes)

Presenter: COHEN, Tim (CERN)

Session Classification: Session 2 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: 14

Type: **not specified**

Impact of flavour assumptions on EFT interpretations

Presentation will be

Presenter: BRIVIO, Ilaria (University of Zurich)

Session Classification: Session 2 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: 15

Type: **not specified**

Report on BMS/EFT matching activities

Friday 2 December 2022 11:55 (20 minutes)

Presenter: LOHWASSER, Kristin (University of Sheffield (GB))

Session Classification: Session 2 - recordings available here: <https://indico.cern.ch/event/1201401/overview>

Contribution ID: 16

Type: **not specified**

Report on experimental measurements and observables for EFT interpretations

Friday 2 December 2022 13:30 (20 minutes)

Presentation will be

Presenter: GRITSAN, Andrei (Johns Hopkins University (US))

Session Classification: Session 3

Contribution ID: 17

Type: **not specified**

Machine learning observables in EFT interpretations

Friday 2 December 2022 13:55 (15 minutes)

Presenter: SCHOEFBECK, Robert (Hephy Vienna)

Session Classification: Session 3

Contribution ID: **18**

Type: **not specified**

Frameworks and tools for systematic data analysis reinterpretations

Friday 2 December 2022 14:20 (15 minutes)

Presenter: HEINRICH, Lukas Alexander (Technische Universitat Munchen (DE))

Session Classification: Session 3

Contribution ID: 19

Type: **not specified**

Helicity-free techniques for the reweighting of MC Samples

Friday 2 December 2022 14:45 (15 minutes)

Presenter: MATTELAER, Olivier (UCLouvain)

Session Classification: Session 3

Contribution ID: 20

Type: **not specified**

ATLAS-CMS EFT combination

Combination of EFT results from ATLAS and CMS requires a good understanding of underlying physics processes and systematics treatment. We, in the LHCtopWG, explore the fit models that are used in both experiments to approach the EFT combination by preserving a full-likelihood information in the fit. Preliminary results with the first comparisons are presented together with practical challenges that might be considered in the current and/or future activities of the LHC EFT WG. In addition, we give a short summary of an ongoing effort to make common top quark MC samples to be used as basis for comparisons, cross checks and validation across experiments. The idea can be developed further to include EFT, in view of full likelihood combinations.

Primary author: SKOVPEN, Kirill (Ghent University (BE))

Presenter: SKOVPEN, Kirill (Ghent University (BE))

Contribution ID: 22

Type: **not specified**

Discussion about SMEFT and HEFT exemplified for Higgs boson pair production

We briefly motivate the linear (SMEFT) and non-linear (HEFT) bottom-up EFT extensions of the Standard Model and demonstrate the difference in organizing the theory for the example of Higgs boson pair production at NLO QCD. Comparing m_{hh} distributions for HEFT and SMEFT for different truncation options of dimension 6 operator contributions, we point out to the pitfalls of a naive translation between the two EFTs.

Primary author: LANG, Jannis

Presenter: LANG, Jannis

Contribution ID: 25

Type: **not specified**

Discussion about SMEFT and HEFT exemplified for HH production

Friday 2 December 2022 15:41 (5 minutes)

Presenter: LANG, Jannis

Session Classification: Discussion session

Contribution ID: 26

Type: **not specified**

Area 1 targets

Friday 2 December 2022 15:51 (5 minutes)

Presenter: BRIVIO, Ilaria (University of Zurich)

Session Classification: Discussion session

Contribution ID: 27

Type: **not specified**

Area 2 (Chair: Robert Schoefbeck)

Session Classification: Discussion session

Contribution ID: 28

Type: **not specified**

HWG activities for the database of SMEFT predictions

Friday 2 December 2022 16:11 (5 minutes)

Presentation will be

Primary author: Mr KNIGHT, Matthew (Imperial College London)

Presenter: Mr KNIGHT, Matthew (Imperial College London)

Session Classification: Discussion session

Contribution ID: 29

Type: **not specified**

Area 2 targets

Friday 2 December 2022 16:16 (5 minutes)

Presentation will be

Presenter: JAFARI, Abideh (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Discussion session

Contribution ID: **30**

Type: **not specified**

Unbinned multivariate observables for global SMEFT analyses from machine learning

Friday 2 December 2022 16:41 (5 minutes)

Co-author: MADIGAN, Maeve

Presenter: TER HOEVE, Jaco (Nikhef and VU Amsterdam)

Session Classification: Discussion session

Contribution ID: **31**

Type: **not specified**

Efficient interpolation and practical observables

Friday 2 December 2022 16:46 (5 minutes)

Presenter: SMITH, Nick (Fermi National Accelerator Lab. (US))

Session Classification: Discussion session

Contribution ID: 32

Type: **not specified**

Area 3 targets

Friday 2 December 2022 16:51 (5 minutes)

Presenter: BIEKOETTER, Anke (IPPP Durham)

Session Classification: Discussion session

Contribution ID: 33

Type: **not specified**

Area 4 targets

Friday 2 December 2022 17:16 (5 minutes)

Presentation will be

Presenter: KEMPSTER, Jacob Julian (University of Sussex (GB))

Session Classification: Discussion session

Contribution ID: 34

Type: **not specified**

Area 5 targets

Friday 2 December 2022 18:01 (5 minutes)

Presenter: LOHWASSER, Kristin (University of Sheffield (GB))

Session Classification: Discussion session

Contribution ID: 35

Type: **not specified**

ATLAS+CMS EFT combination (top)

Friday 2 December 2022 17:21 (10 minutes)

Presenter: SKOVPEN, Kirill (Ghent University (BE))

Session Classification: Discussion session

Contribution ID: **36**

Type: **not specified**

Future EFT plans from the SMP CMS perspective

Friday 2 December 2022 17:31 (10 minutes)

Presentation will be

Presenter: PRESILLA, Matteo (Istituto Nazionale di Fisica Nucleare)

Session Classification: Discussion session

Contribution ID: 37

Type: **not specified**

Area 6 targets

Friday 2 December 2022 18:16 (5 minutes)

Presenter: LOHWASSER, Kristin (University of Sheffield (GB))

Session Classification: Discussion session

Contribution ID: **38**

Type: **not specified**

EFT : Applicabilities and Viabilities

Friday 2 December 2022 15:46 (5 minutes)

Presenter: BISWAS, Tisa (University of Calcutta)

Session Classification: Discussion session