

Higgs and Effective Field Theory - HEFT 2020

Report of Contributions

Contribution ID: 1

Type: **not specified**

Top-Higgs interplay

Wednesday, April 15, 2020 9:30 AM (30 minutes)

The top Yukawa coupling can be probed using different physics process at the LHC (ttH, tH, 4-tops, etc.). The latest results on this together with global interpretations with other top (or Higgs) processes will be presented.

Presenter: Dr MORENO LLACER, Maria (Univ. of Valencia and CSIC (ES))

Contribution ID: 2

Type: **not specified**

Top quark electroweak interactions at high energy

Wednesday, April 15, 2020 10:00 AM (30 minutes)

Presenter: MIMASU, Ken (Université Catholique de Louvain)

Contribution ID: 3

Type: **not specified**

Top-Higgs in the EFT: towards a global interpretation

Wednesday, April 15, 2020 10:30 AM (30 minutes)

Presenter: VRYONIDOU, Eleni (CERN)

Contribution ID: 4

Type: **not specified**

SMEFT at NLO

Wednesday, April 15, 2020 11:30 AM (30 minutes)

Presenter: DEGRANDE, Celine Catherine A

Contribution ID: 5

Type: **not specified**

Resonance Lagrangians and HEFT

Wednesday, April 15, 2020 12:00 PM (30 minutes)

Some results on the contribution from resonances to the HEFT low-energy couplings up to NLO are discussed in this talk

Presenter: SANZ-CILLERO, Juan José (Universidad Complutense de Madrid)

Contribution ID: 6

Type: **not specified**

EWPO in the SMEFT at NLO

Wednesday, April 15, 2020 12:30 PM (30 minutes)

Presenter: GIARDINO, Pier Paolo (IFT)

Contribution ID: 7

Type: **not specified**

Constraining the Higgs-gauge couplings through differential SMEFT analyses

Wednesday, April 15, 2020 2:30 PM (30 minutes)

In this talk, I will focus on the measurements of the Higgs couplings to the electroweak bosons, in the context of an effective field theory. I will also discuss the possibility of strongly constraining the couplings affecting the charged triple gauge boson vertices upon studying the Zh and Wh channels in the boosted Higgs regime. Finally, I will discuss the prospects of disentangling the various tensor structures in the hZZ/hWW vertices upon considering the full analytical structure of the Zh/Wh production and using the full angular information to resurrect the interference terms, using the method of moments technique. The various angular structures will thus be utilised differentially in order to maximise sensitivity to such anomalous couplings.

Presenter: BANERJEE, Shankha (University of Durham (GB))

Contribution ID: **8**

Type: **not specified**

SMEFT anomalous dimensions from the S-matrix

Wednesday, April 15, 2020 3:00 PM (30 minutes)

Presenter: RIEMBAU, Marc (Université de Genève)

Contribution ID: 9

Type: **not specified**

The dimension-8 SMEFT for Higgs and electroweak physics

Wednesday, April 15, 2020 3:30 PM (30 minutes)

In this talk I will discuss how dimension 8 effects can be systematically studied in Higgs and electroweak physics. After presenting a full list of dimension 8 operators that correct these processes, we will discuss how they connect to observables. The effects from these operators can be classified into two categories, (1) those arising from new contributions to vertex structures already present in the dimension-6 lagrangian and (2) those arising from completely new vertex structures that can lead to novel kinematical signatures or final states. We will focus on the former category, i.e. pseudo-observables that can get contributions from both dimension-6 and 8 operators, where it is especially hard to disentangle the dimension 8 contribution from the dominant dimension 6 one. To isolate such dimension-8 effects, we need to test correlations between pseudo-observables that exist at the dimension-6 level. Dimension 8 effects arise as a violation of these correlations. We provide some examples about how well these correlation violations can be measured and how these can translate into bounds on dimension-8 operators.

Presenter: GUPTA, Sandeepan (IPPP, Durham University)

Contribution ID: **10**

Type: **not specified**

A momentum representation for loop computations in Gravity

Wednesday, April 15, 2020 5:30 PM (30 minutes)

We extend the covariant derivative expansion (CDE) to gravity.

Presenter: ALONSO DE PABLO, Rodrigo (University of Durham (GB))

Contribution ID: 11

Type: **not specified**

Ward Identities for the Standard Model Effective Field Theory

Wednesday, April 15, 2020 5:00 PM (30 minutes)

We derive Ward identities for the standard model effective field theory using the background-field method. The resulting symmetry constraints on the standard model effective field theory are basis independent, and constrain the perturbative and power-counting expansions. A geometric description of the field connections, and real representations for the $SU(2)_L \times U(1)_Y$ generators, underlies the derivation.

Presenter: HELSET, Andreas (Niels Bohr Institute)

Contribution ID: 12

Type: **not specified**

The Geometric SMEFT

Wednesday, April 15, 2020 4:30 PM (30 minutes)

Presenter: MARTIN, Adam (Fermilab)

Contribution ID: **13**

Type: **not specified**

TBA

Contribution ID: **14**

Type: **not specified**

TBA

Presenter: PEREZ-VICTORIA, Manuel

Contribution ID: 15

Type: **not specified**

Low-energy EFT of spontaneously broken BSM theories

Thursday, April 16, 2020 9:30 AM (30 minutes)

Presenter: PEREZ-VICTORIA MORENO DE BARREDA, Manuel Maria (Universidad de Granada (ES))

Contribution ID: 16

Type: **not specified**

The Higgs EFT is a black hole

Thursday, April 16, 2020 10:00 AM (30 minutes)

We consider the question of whether the scalar sector of the Standard Model, and possible deviations from its predicted interactions, are best parametrised by “SMEFT” or “HEFT”. Here “SMEFT” means an effective field theory built out of a Higgs doublet, whose components transform linearly under electroweak symmetries; “HEFT” is built out of a singlet Higgs field and three Goldstones upon which symmetry transformations are non-linearly realised. Ultimately, they are just different coordinate choices for a scalar field space manifold. Drawing heavily on the recent literature, we formulate field redefinition invariant (i.e. geometric) criteria on the analyticity and convergence of the lagrangian, to understand when one must and should use a “HEFT” to parametrise the effects of new physics.

Presenter: SUTHERLAND, Dave

Contribution ID: 17

Type: **not specified**

New results about the "Universal One Loop Effective Action"

Thursday, April 16, 2020 10:30 AM (30 minutes)

I will present new results about the UOLEA which now allow to consider EFTs for which heavy fermions (vector like and chiral) have been integrated out.

Presenter: VUONG, Hoa

Contribution ID: **18**

Type: **not specified**

EFT of Gravity to All Orders

Thursday, April 16, 2020 11:30 AM (30 minutes)

Presenter: SERRA, Javi

Contribution ID: **19**

Type: **not specified**

EFTs and On-shell Amplitudes

Thursday, April 16, 2020 12:00 PM (30 minutes)

Presenter: SAMPAIO MACHADO, Camila (UNESP - Universidade Estadual Paulista (BR))

Contribution ID: 20

Type: **not specified**

Electroweak interactions & beyond: on-shell & bottom up

Thursday, April 16, 2020 12:30 PM (30 minutes)

Presenter: SHADMI, Yael (Technion)

Contribution ID: 21

Type: **not specified**

EFT interpretation of measurements in the top quark sector from ATLAS experiment

Thursday, April 16, 2020 2:30 PM (30 minutes)

Presenter: BARRANCO NAVARRO, Laura (Stockholm University (SE))

Contribution ID: 22

Type: **not specified**

Charm Physics Confronts High-pT Lepton Tails

Thursday, April 16, 2020 3:00 PM (30 minutes)

I present a phenomenological investigation of possible short-distance new physics in (semi)leptonic charmed-meson decays. Using the Standard Model effective field theory, we demonstrate the complementarity with the production of high-pT leptons at the LHC. Our combined analysis of the latest low- and high-energy experimental data shows that much of the room for new physics in charm decays is challenged by the LHC high-pT data.

Presenter: FUENTES-MARTIN, Javier (University of Zurich)

Contribution ID: 23

Type: **not specified**

Effective Higgs couplings and CP properties in the golden channel

Thursday, April 16, 2020 3:30 PM (30 minutes)

Presenter: VEGA-MORALES, Roberto

Contribution ID: 24

Type: **not specified**

Computer tools for EFTs

Thursday, April 16, 2020 4:30 PM (30 minutes)

Presenter: CRIADO ÁLAMO, Juan Carlos (University of Granada)

Contribution ID: 25

Type: **not specified**

Operators, amplitudes, states, and all that

Thursday, April 16, 2020 5:00 PM (30 minutes)

Presenter: HENNING, Brian (U)

Contribution ID: 26

Type: **not specified**

Higgs-Electroweak Chiral Lagrangian: One-Loop Renormalization Group Equations

Thursday, April 16, 2020 5:30 PM (30 minutes)

Presenter: KRAUSE, Claudius (Fermilab)

Contribution ID: 27

Type: **not specified**

Higgs decay to fermions at NLO in SMEFT

Friday, April 17, 2020 9:00 AM (30 minutes)

Presenter: PECJAK, Benjamin (Durham University)

Contribution ID: **28**

Type: **not specified**

The CKM parameters in the SMEFT

Friday, April 17, 2020 9:30 AM (30 minutes)

Presenter: VIRTO, Javier (Universitat de Barcelona)

Contribution ID: 29

Type: **not specified**

Flavour constraints on the flavourless SMEFT

Friday, April 17, 2020 10:00 AM (30 minutes)

Presenter: RENNEN, Sophie (CERN)

Contribution ID: 30

Type: **not specified**

High-energy constraints from low-energy neutrino non-standard interactions

Friday, April 17, 2020 10:30 AM (30 minutes)

Many scenarios of new physics predict the existence of neutrino Non-Standard Interactions, new vector contact interactions between neutrinos and first generation fermions beyond the Standard Model. In this talk we will present model-independent constraints on the Standard Model Effective Field Theory at high energies from bounds on neutrino non-standard interactions derived at low energies. Our analysis explores a large set of new physics scenarios and includes full one-loop running effects below and above the electroweak scale. Our results show that neutrino non-standard interactions already push the scale of new physics beyond the TeV. We also conclude that bounds derived by other experimental probes, in particular by low-energy precision measurements and by charged lepton flavor violation searches, are generally more stringent.

Presenter: TEROL CALVO, Jorge (IFIC (CSIC-Univ València))

Contribution ID: **31**

Type: **not specified**

Probing the SMEFT at CMS

Friday, April 17, 2020 11:30 AM (30 minutes)

Presenter: GROHSJEAN, Alexander Josef (Deutsches Elektronen-Synchrotron (DE))

Contribution ID: 32

Type: **not specified**

Correlating uncertainties within the SMEFT

Friday, April 17, 2020 12:00 PM (30 minutes)

We investigate the impact of correlations between (theoretical and experimental) uncertainties on multi-experiment, multi-observable analyses within the Standard Model Effective Field Theory (SMEFT). To do so, we perform a model-independent analysis of t-channel single top-quark production and top-quark decay data from ATLAS, CMS, CDF and D0. We show quantitatively how the fit changes when different experimental or theoretical correlations are assumed. Assuming no correlations returns a fit in agreement with the Standard Model while a ‘best guess’-ansatz taking into account correlations would show deviations from the SM. At the same time, modelling the impact of higher order SMEFT-corrections the latter turn out to be a subleading source of uncertainty only.

Presenter: BISSMANN, Stefan

Contribution ID: 33

Type: **not specified**

Precision constraints on non-standard EW/Higgs couplings with HEPfit

Friday, April 17, 2020 12:30 PM (30 minutes)

In this talk I present the HEPfit code, a flexible open-source tool to perform statistical tests of the Standard Model or any of its extensions. I will focus the talk on the current capabilities of the code for studies of the electroweak and Higgs sectors. As an example of such capabilities, we consider the case of physics beyond the SM parameterized by the dimension-6 SMEFT, and derive bounds on new physics using current data as well as projections at future particle colliders.

Presenter: DE BLAS, Jorge (University of New Hampshire (US))

Contribution ID: **34**

Type: **not specified**

LHC EFT Working Group Meeting

Friday, April 17, 2020 2:00 PM (3 hours)

Presenters: SANTIAGO, Jose (Universidad de Granada (ES)); MANGANO, Michelangelo (CERN)

Contribution ID: 35

Type: **not specified**

Welcome

Wednesday, April 15, 2020 9:15 AM (15 minutes)