

# Higgs 2020



## Report of Contributions

Contribution ID: 1

Type: **not specified**

# Experimental overview of Higgs physics (25'+5')

*Monday, 26 October 2020 17:30 (30 minutes)*

**Presenter:** OLSEN, Jim (Princeton University (US))

**Session Classification:** Plenary

Contribution ID: 2

Type: **not specified**

# The Higgs boson and the understanding of the Universe (25'+5')

*Monday, 26 October 2020 18:00 (30 minutes)*

**Presenter:** MURAYAMA, Hitoshi (University of California Berkeley (US))

**Session Classification:** Plenary

Contribution ID: 3

Type: **not specified**

## Highlights of ATLAS experimental results (25'+5')

*Monday, 26 October 2020 13:00 (30 minutes)*

**Presenter:** MORLEY, Anthony (CERN)

**Session Classification:** Plenary

Contribution ID: 4

Type: **not specified**

## Highlights of CMS experimental results (25'+5')

*Monday, 26 October 2020 13:30 (30 minutes)*

**Presenter:** Dr VISCHIA, Pietro (Universite Catholique de Louvain (UCL) (BE))

**Session Classification:** Plenary

Contribution ID: 5

Type: **not specified**

## Welcome Presentation (25'+5')

*Monday, 26 October 2020 12:30 (30 minutes)*

**Presenter:** MERIDIANI, Paolo (Sapienza Universita e INFN, Roma I (IT))

**Session Classification:** Plenary

Contribution ID: 6

Type: **not specified**

## Theory predictions for SM Higgs (25'+5')

*Monday, 26 October 2020 14:20 (30 minutes)*

**Presenter:** DE FLORIAN, Daniel (Laboratorio de Fisica Teorica Departamento de Fisica)

**Session Classification:** Plenary

Contribution ID: 7

Type: **not specified**

## Precision measurements of Higgs mass, width and CP properties (25'+5')

*Monday, 26 October 2020 15:20 (30 minutes)***Presenter:** VAN DE KLUNDERT, Merijn (Deutsches Elektronen-Synchrotron (DE))**Session Classification:** Plenary



Contribution ID: 8

Type: **not specified**

## Precision measurements of Higgs rates and differential cross sections (25'+5')

*Monday, 26 October 2020 14:50 (30 minutes)***Presenter:** DAO, Valerio (CERN)**Session Classification:** Plenary

Contribution ID: 9

Type: **not specified**

## Measurements Higgs decays to muons, taus and charm (25'+5')

*Monday, 26 October 2020 16:10 (30 minutes)***Presenter:** MARINI, Andrea Carlo (Massachusetts Inst. of Technology (US))**Session Classification:** Plenary

Contribution ID: 10

Type: **not specified**

## Measurements of associate VH production (incl. H- $\rightarrow$ bb) (25'+5')

*Monday, 26 October 2020 16:40 (30 minutes)***Presenter:** Dr MASTROLORENZO, Luca (Rheinisch Westfaelische Tech. Hoch. (DE))**Session Classification:** Plenary

Contribution ID: **11**

Type: **not specified**

## **Measurements of Higgs VBF production (25'+5')**

*Tuesday, 27 October 2020 16:40 (30 minutes)*

**Presenter:** LIANG, Zhijun (Chinese Academy of Sciences (CN))

**Session Classification:** Plenary

Contribution ID: 12

Type: **not specified**

## **Measurements of associate VH production (incl. H->bb)**

**Session Classification:** Plenary

Contribution ID: 13

Type: **not specified**

## Theory predictions for HH and combinations with single Higgs

**Presenter:** JONES, Stephen Philip (CERN)

**Session Classification:** Plenary

Contribution ID: 14

Type: **not specified**

## Searches for diHiggs (incl projections) I

**Session Classification:** Plenary

Contribution ID: 15

Type: **not specified**

## **Searches for diHiggs (incl projections) at ATLAS**

**Session Classification:** Plenary



Contribution ID: 16

Type: **not specified**

## Predictions for Higgs self-coupling

**Session Classification:** Plenary

Contribution ID: 17

Type: **not specified**

## Non-SM Higgs, experiment (searches for BSM Higgs)

Contribution ID: **18**

Type: **not specified**

## **Searches for BSM Higgs (25'+5')**

*Wednesday, 28 October 2020 16:30 (30 minutes)*

**Presenter:** MARTINEZ OUTSCHOORN, Verena Ingrid (University of Massachusetts (US))

**Session Classification:** Plenary

Contribution ID: **19**

Type: **not specified**

## **Non-SM Higgs, new perspectives (25'+5')**

*Wednesday, 28 October 2020 16:00 (30 minutes)*

25' (5' discussion)

**Presenter:** CRAIG, Nathaniel (UC Santa Barbara)

**Session Classification:** Plenary

Contribution ID: 20

Type: **not specified**

## Searches for exotic Higgs decays (25'+5')

*Wednesday, 28 October 2020 17:30 (30 minutes)*

**Presenter:** MAIER, Benedikt (Massachusetts Inst. of Technology (US))

**Session Classification:** Plenary

Contribution ID: 21

Type: **not specified**

## **Non-SM Higgs signatures (25'+5')**

*Wednesday, 28 October 2020 17:00 (30 minutes)*

**Presenter:** SHELTON, Jessie (Yale University)

**Session Classification:** Plenary

Contribution ID: 22

Type: **not specified**

## Progress in EFTs for Higgs Physics

**Presenter:** RIVA, Francesco (Universite de Geneve (CH))

**Session Classification:** Plenary

Contribution ID: 23

Type: **not specified**

## Experimental inputs to global fits

**Session Classification:** Plenary



Contribution ID: 24

Type: **not specified**

## Experiment: PDF

**Session Classification:** Plenary

Contribution ID: 25

Type: **not specified**

## Global fits

**Presenter:** PINTO EBOLI, Oscar Jose (Federal University of of Rio de Janeiro (BR))

**Session Classification:** Plenary

Contribution ID: 26

Type: **not specified**

## **New experimental analysis techniques (25'+5')**

*Friday, 30 October 2020 12:30 (30 minutes)*

**Presenter:** CRANMER, Kyle Stuart (New York University (US))

**Session Classification:** Plenary

Contribution ID: 27

Type: **not specified**

## **Theory perspective on new analysis and theoretical techniques (25'+5')**

*Friday, 30 October 2020 13:00 (30 minutes)*

**Presenter:** KLING, Felix (SLAC)

**Session Classification:** Plenary

Contribution ID: 28

Type: **not specified**

## Monte Carlo challenges for the future (25'+5')

*Friday, 30 October 2020 13:30 (30 minutes)*

**Presenter:** HOECHE, Stefan (Fermilab)

**Session Classification:** Plenary

Contribution ID: 29

Type: **not specified**

## **Prospect for Higgs physics at Future Colliders - Theory perspective (25'+5')**

*Friday, 30 October 2020 15:00 (30 minutes)*

**Presenter:** REINA, Laura (Florida State University (US))

**Session Classification:** Plenary

Contribution ID: 30

Type: **not specified**

## **Prospect for Higgs physics at Future Colliders - Experimental perspective (25'+5')**

*Friday, 30 October 2020 14:00 (30 minutes)*

**Presenter:** VERNIERI, Caterina (SLAC National Accelerator Laboratory (US))

**Session Classification:** Plenary

Contribution ID: 31

Type: **not specified**

## **Experimental prospects for Higgs Physics in future LHC Runs (25'+5')**

*Friday, 30 October 2020 15:30 (30 minutes)*

**Presenter:** SAVARD, Pierre (University of Toronto (CA))

**Session Classification:** Plenary



Contribution ID: 32

Type: **not specified**

## Closing remarks

*Friday, 30 October 2020 16:30 (20 minutes)*

**Presenter:** PLEHN, Tilman

**Session Classification:** Plenary

Contribution ID: 33

Type: **not specified**

## Experimental inputs to PDF fits (25'+5')

*Tuesday, 27 October 2020 17:40 (30 minutes)*

**Presenter:** AMOROSO, Simone (Deutsches Elektronen-Synchrotron (DE))

**Session Classification:** Plenary

Contribution ID: 41

Type: **not specified**

## Measurements of associate top-Higgs production modes (25'+5')

*Tuesday, 27 October 2020 17:10 (30 minutes)***Presenter:** BOTTA, Valeria (Deutsches Elektronen-Synchrotron (DE))**Session Classification:** Plenary

Contribution ID: 42

Type: **not specified**

## Searches for diHiggs (incl projections) II

**Session Classification:** Plenary

Contribution ID: 43

Type: **not specified**

## **An outlook on physics with the Higgs boson (25'+5')**

*Friday, 30 October 2020 16:00 (30 minutes)*

**Presenter:** GROJEAN, Christophe (DESY (Hamburg) and Humboldt University (Berlin))

**Session Classification:** Plenary

Contribution ID: 44

Type: **EFT Session**

## geoSMEFT and applications

We develop the geometric formulation of the Standard Model Effective Field Theory (SMEFT). Using this approach we derive all-orders results in the vev expansion relevant for studies of electroweak precision and Higgs data, as reported in <https://arxiv.org/pdf/2001.01453.pdf>. Then using this formalism we report the first exact formalism to sub-leading order in the vev expansion as applied to Higgs data as reported in <https://arxiv.org/abs/2007.00565>.

**Primary author:** TROTT, Michael Robert (University of Copenhagen (DK))

Contribution ID: 45

Type: **not specified**

## **Predictions for Higgs Self Coupling (25'+5')**

**Session Classification:** Plenary

Contribution ID: 46

Type: **not specified**

## Searches for diHiggs I (25'+5')

*Thursday, 29 October 2020 14:20 (30 minutes)*

**Presenter:** BROST, Elizabeth (Brookhaven National Laboratory (US))

**Session Classification:** Plenary



Contribution ID: 47

Type: **not specified**

## Searches for diHiggs II (25'+5')

*Thursday, 29 October 2020 14:50 (30 minutes)*

**Presenter:** BETHANI, Agni (Universite Catholique de Louvain (UCL) (BE))

**Session Classification:** Plenary

Contribution ID: 48

Type: **not specified**

## Theory Predictions for HH and Combinations with Single Higgs (25'+5')

*Thursday, 29 October 2020 15:20 (30 minutes)*

**Presenter:** JONES, Stephen Philip (CERN)

**Session Classification:** Plenary

Contribution ID: 49

Type: **not specified**

## Progress in EFT for Higgs physics (25'+5')

*Thursday, 29 October 2020 16:30 (30 minutes)*

**Presenter:** RIVA, Francesco (Universite de Geneve (CH))

**Session Classification:** Plenary

Contribution ID: 50

Type: **not specified**

## Experimental Inputs to EFT Fits (25'+5')

*Thursday, 29 October 2020 17:00 (30 minutes)*

**Presenter:** FALKE, Saskia (CERN)

**Session Classification:** Plenary

Contribution ID: 51

Type: **not specified**

## Global Fits (25'+5')

*Thursday, 29 October 2020 17:30 (30 minutes)*

**Presenter:** PINTO EBOLI, Oscar Jose (Federal University of Rio de Janeiro (BR))

**Session Classification:** Plenary

Contribution ID: 52

Type: **Yukawa Session**

## Higgs prospects with LHCb and its upgrades

Thanks to the excellent vertex reconstruction system, the LHCb detector has demonstrated its capabilities in the identification of b- and c-jets.

The LHCb upgrades could be used to measure the  $H \rightarrow b\bar{b}$  production in a region complementary to ATLAS and CMS, and to search for the  $H \rightarrow c\bar{c}$  decay.

In this talk the jet heavy flavour tagging algorithm used at LHCb is reviewed, and measurements with b- and c-jets are presented.

Moreover the LHCb sensitivity to the  $H \rightarrow b\bar{b}$  and  $H \rightarrow c\bar{c}$  observations is discussed, and prospects on the forward Higgs physics in the future LHC data taking periods are given.

**Primary authors:** RICCIARDI, Stefania (Science and Technology Facilities Council STFC (GB)); LHCb COLLABORATION; SESTINI, Lorenzo (Universita e INFN, Padova (IT))

**Presenter:** LHCb COLLABORATION

**Session Classification:** Parallel

Contribution ID: 53

Type: **EFT Session**

## Putting SMEFT Fits to Work

The Standard Model Effective Field Theory (SMEFT) provides a consistent framework for comparing precision measurements at the LHC to the Standard Model (SM). The observation of statistically significant non-zero SMEFT coefficients would correspond to physics beyond the SM (BSM) of some sort. A more difficult question to answer is what, if any, detailed information about the nature of the underlying high scale model can be obtained from these measurements (the “Higgs Inverse Problem”). In this work, we consider the patterns of SMEFT coefficients in five example models and discuss the assumptions inherent in using global fits to make BSM conclusions. As a by-product of our study, we present an up-dated global fit to SMEFT coefficients including some NLO corrections in the SMEFT theory.

**Primary authors:** Dr HOMILLER, Samuel (Harvard); DAWSON, Sally (BNL); LANE, Samuel (University of Kansas)

**Presenter:** Dr HOMILLER, Samuel (Harvard)

Contribution ID: 57

Type: Yukawa Session

## Correlating $h \rightarrow \mu + \mu^-$ to the Anomalous Magnetic Moment of the Muon via Leptoquarks

Recently, both ATLAS and CMS measured the decay  $h \rightarrow \mu + \mu^-$ , finding a signal strength with respect to the Standard Model (SM) expectation of  $1.2 \pm 0.6$  and  $1.19^{+0.41+0.17}_{-0.39-0.16}$ , respectively. This measurement is particularly interesting in the context of the existing hints for lepton flavor universality violation (LFUV), since their new physics explanations could be tested in this decay mode. Especially the anomalous magnetic moment of the muon ( $a_\mu$ ), where a  $3.7\sigma$  deviation from the SM theory prediction was observed, is promising since like  $h \rightarrow \mu + \mu^-$  it is a chirality changing transition. Leptoquarks are prime candidates to explain the hints for LFUV, in particular regarding  $a_\mu$ , as they can generate an  $m_t/m_\mu$  enhanced contribution. In this letter we calculate and examine the correlations between  $h \rightarrow \mu + \mu^-$  and  $a_\mu$  by studying three distinct scenarios. We find that in two of them effects of several percent are predicted, which could be tested by future precision measurements. The third scenario even displays an enhancement of  $\text{Br}[h \rightarrow \mu + \mu^-]$  by more than 50% if one aims at an explanation of  $a_\mu$  at the  $2\sigma$  level. Hence, the new ATLAS and CMS measurements already provide important constraints on the parameter space of the model.

**Primary author:** CRIVELLIN, Andreas (Universitaet Zuerich (CH))

**Session Classification:** Parallel



Contribution ID: 58

Type: **EFT Session**

## Controlling uncertainties of the IAM dispersive unitary extension of EFTs

Effective Field Theories (EFTs) constructed, in the spirit of Chiral Perturbation Theory (ChPT), as derivative expansions in powers of momentum, are a controllable approximation to strong dynamics as long as the energy of the interacting particles remains small. However, deviations quickly build up due to the energy-polynomial expansion not respecting unitarity. This limits their predictive power towards new physics at a higher scale if small separations from the Standard Model are found at the LHC or elsewhere. Unitarized chiral perturbation theory techniques have been devised to extend the reach of the EFT to regimes where partial waves are saturating unitarity, but their uncertainties have hitherto not really been addressed: they are often successful in describing hadron data a posteriori, but their predictive power in the face of new physics has not been well delimited. Here we take one of the best known of them, the Inverse Amplitude Method (IAM), and we attempt to quantify the systematic uncertainties introduced by the method. We compare its hadron ChPT and its electroweak sector Higgs EFT applications. We find that the uncertainty of the IAM at the mass of the first resonance encountered in a partial-wave is of the same order of the starting uncertainty of the EFT at threshold energies, so that its unitarized extension should a priori expected to be reasonably successful provided a check for so-called CDD poles (zeroes of the partial wave amplitude) is carried out and, if they appear near the resonance region, the IAM is adequately modified to take them into account.

**Primary authors:** SALAS-BERNÁRDEZ, Alexandre (Universidad Complutense de Madrid); LLANES-ESTRADA, Felipe J.; OLLER, José Antonio (Universidad de Murcia)

**Presenter:** SALAS-BERNÁRDEZ, Alexandre (Universidad Complutense de Madrid)

Contribution ID: 61

Type: **EFT Session**

## JHU generator framework: new features for Higgs boson studies

The JHU generator framework includes an event generator of anomalous HVV and Hff interactions of the Higgs boson in production and decay and a MELA library for matrix element analysis. This framework allows constraints on dimension-six operators of an effective field theory from a joint analysis of on-shell and off-shell production of the Higgs boson and of triple and quartic gauge boson interactions. Gluon fusion, vector boson fusion, and associated production with a vector boson are considered. Potential contributions from new states are included. Associated production with one or two top quarks and gluon fusion process allow access to the CP structure of Yukawa interactions. Practical applications to the EFT analysis of the current and future LHC datasets are discussed.

**Primary authors:** GRITSAN, Andrei (Johns Hopkins University (US)); SARICA, Ulascan (Univ. of California Santa Barbara (US)); XIAO, Meng (ZJU - Zhejiang University (CN)); ROSKES, Heshy (Johns Hopkins University (US)); SCHULZE, Markus Christian (Humboldt-Universität zu Berlin); ZHOU, Yaofu (J)

Contribution ID: 63

Type: **Precision Session**

## Combined resummation for Higgs transverse momentum distribution

We present new phenomenological studies of the impact of a recently suggested formalism that simultaneously resums logarithmic contributions that are enhanced at small  $p_T$  and large  $x$ . This formalism relies on the combination of a so-called threshold-improved transverse momentum and threshold resummation which allows for a systematic improvement of the transverse momentum resummation that is valid in the entire range of  $p_T$ . As a phenomenological application, we consider the Higgs boson production at LHC where we show that threshold-improved transverse momentum resummation leads to faster perturbative convergence at small- $p_T$  while the inclusion of threshold resummation improves the agreement with fixed-order calculations.

**Primary author:** RABEMANANJARA, Tanjona Radonirina (INFN - National Institute for Nuclear Physics)

**Presenter:** RABEMANANJARA, Tanjona Radonirina (INFN - National Institute for Nuclear Physics)

**Session Classification:** Parallel

Contribution ID: 64

Type: **EFT Session**

## Constraining SMEFT operators with associated $h\gamma$ production in Weak Boson Fusion

As the search for physics beyond the Standard Model (BSM) continues, the Standard Model Effective Field Theory (SMEFT) has become a useful tool to constrain deviations from the SM in a model-independent way. In this talk we will consider the associated production of a Higgs boson and a photon in weak boson fusion (WBF), with the Higgs boson decaying to a pair of bottom quarks. I will present a cut-based analysis and multivariate techniques to determine the sensitivity of this process to the bottom-Yukawa coupling in the SM and to possible CP-violation mediated by dimension-6 operators in the SMEFT.

**Primary author:** GREGG, Parisa

**Co-authors:** BIEKOETTER, Anke (IPPP Durham); SCHOENHERR, Marek (University of Durham); KRAUSS, Frank Martin (University of Durham (GB))

**Presenter:** GREGG, Parisa

Contribution ID: 65

Type: **Precision Session**

## Bottom quark mass effects in associated $WH$ production with the $H \rightarrow b\bar{b}$ decay through NNLO QCD

We present a computation of next-to-next-to-leading-order (NNLO) QCD corrections to the production of a Higgs boson in association with a  $W$  boson at the LHC followed by the decay of the Higgs boson to a  $b\bar{b}$  pair. At variance with previous NNLO QCD studies of the same process, we treat  $b$  quarks as massive. An important advantage of working with massive  $b$  quarks is that it makes the use of flavor jet algorithms unnecessary and allows us to employ conventional jet algorithms to define  $b$  jets. We compare NNLO QCD descriptions of the associated  $WH(b\bar{b})$  production with massive and massless  $b$  quarks and also contrast them with the results provided by parton showers. We find  $O(5\%)$  differences in fiducial cross sections computed with massless and massive  $b$  quarks. We also observe that much larger differences between massless and massive results, as well as between fixed-order and parton-shower results, can arise in selected kinematic distributions.

**Primary author:** BEHRING, Arnd (Karlsruhe Institute of Technology (KIT))

**Co-authors:** BIZON, Wojciech Jozef; CAOLA, Fabrizio (University of Oxford); MELNIKOV, Kirill (Karlsruhe Institute of Technology (KIT)); RONTSCH, Raoul Horst (CERN)

**Presenter:** BEHRING, Arnd (Karlsruhe Institute of Technology (KIT))

**Session Classification:** Parallel

Contribution ID: 66

Type: **Precision Session**

## Electroweak Couplings of the Higgs Boson at a Multi-TeV Muon Collider

We estimate the expected precision at a multi-TeV muon collider for measuring the Higgs boson couplings with electroweak gauge bosons,  $HVV$  and  $HHVV$  ( $V = W^\pm, Z$ ), as well as the trilinear Higgs self-coupling  $HHH$ . At very high energies both single and double Higgs productions rely on the vector-boson fusion (VBF) topology. The outgoing remnant particles have a strong tendency to stay in the very forward region, leading to the configuration of the “inclusive process” and making it difficult to isolate  $ZZ$  fusion events from the  $WW$  fusion. In the single Higgs channel, we perform a maximum likelihood analysis on  $HWW$  and  $HZZ$  couplings using two categories: the inclusive Higgs production and the 1-muon exclusive signal. In the double Higgs channel, we consider the inclusive production and study the interplay of the trilinear  $HHH$  and the quartic  $VVHH$  couplings, by utilizing kinematic information in the invariant mass spectrum.

**Primary authors:** WANG, Xing (University of Pittsburgh); HAN, Tao (University of Pittsburgh); LIU, Da (UC, Davis); LOW, Ian

**Presenter:** WANG, Xing (University of Pittsburgh)

**Session Classification:** Parallel

Contribution ID: 80

Type: **Precision Session**

## **Fiducial and differential Higgs cross sections (except for Higgs transverse momentum)**

**Session Classification:** Parallel

Contribution ID: 81

Type: **Precision Session**

## **[ATLAS+CMS] Differential Higgs cross section as a function of $p_T$ (15'+5')**

*Tuesday, 27 October 2020 12:30 (20 minutes)*

**Presenter:** FONTANESI, Elisa (Universita e INFN, Bologna (IT))

**Session Classification:** Parallel



Contribution ID: 82

Type: **Precision Session**

## **Fixed Order Predictions for Higgs Boson Production at Large Transverse Momentum (15'+5')**

*Tuesday, 27 October 2020 12:50 (20 minutes)***Primary author:** LINDERT, Jonas (University of Sussex)**Presenter:** LINDERT, Jonas (University of Sussex)**Session Classification:** Parallel

Contribution ID: 83

Type: **Precision Session**

## **Event Generation for Higgs Boson Production at Large Transverse Momentum (15'+5')**

*Tuesday, 27 October 2020 13:10 (20 minutes)*

**Presenter:** VRYONIDOU, Eleni

**Session Classification:** Parallel

Contribution ID: 84

Type: **Precision Session**

**Higgs production (combination and selected  
per-channel results - VBF  $H \rightarrow WW$ ,  $VHbb$  particularly  
interesting. No STXS)**

**Session Classification:** Parallel

Contribution ID: 85

Type: **Precision Session**

## **Bottom quark mass effects in associated Higgs production at NNLO**

**Presenter:** BEHRING, Arnd (Karlsruhe Institute of Technology (KIT))

**Session Classification:** Parallel

Contribution ID: 86

Type: **Precision Session**

## **Monte-Carlo Uncertainties for Higgs Boson Production in Vector Boson Fusion**

**Session Classification:** Parallel

Contribution ID: 87

Type: **Precision Session**

# Jet Veto Cross Sections for Higgs Boson Production

**Session Classification:** Parallel

Contribution ID: 88

Type: **Yukawa Session**

## Overview Yukawa coupling (15'+5')

*Tuesday, 27 October 2020 12:30 (20 minutes)*

**Presenter:** BISHARA, Fady Adibsamy (DESY)

**Session Classification:** Parallel

Contribution ID: 89

Type: **Yukawa Session**

## Top Yukawa ( $t\bar{t}H/tH$ , $H\rightarrow b\bar{b}$ , $\gamma\gamma$ ) [ATLAS+CMS] (15'+5')

*Thursday, 29 October 2020 12:30 (20 minutes)*

EXP (ATLAS+CMS)

**Presenter:** CONNELLY, Ian Allan (University of Glasgow (GB))**Session Classification:** Parallel



Contribution ID: 90

Type: **Yukawa Session**

## **Top Yukawa ( $t\bar{t}H/tH$ multilepton, $t\bar{t}b\bar{b}$ ) [ATLAS+CMS] (15'+5')**

*Thursday, 29 October 2020 12:50 (20 minutes)*

EXP (ATLAS+CMS)

**Presenter:** RAMON ALVAREZ, Clara (Universidad de Oviedo (ES))

**Session Classification:** Parallel

Contribution ID: 91

Type: **Yukawa Session**

## **Higgs prospects with LHCb and its upgrades (15'+5')**

*Tuesday, 27 October 2020 13:30 (20 minutes)*

**Presenter:** ZULIANI, Davide (Universita e INFN, Padova (IT))

**Session Classification:** Parallel

Contribution ID: 92

Type: **Yukawa Session**

## **CP violation (15'+5')**

*Tuesday, 27 October 2020 14:20 (20 minutes)*

**Presenter:** BROD, Joachim (University of Cincinnati)

**Session Classification:** Parallel

Contribution ID: 93

Type: **Yukawa Session**

## **Tau coupling ( $H \rightarrow \tau\tau$ , CP violation) [ATLAS+CMS] (15'+5')**

*Tuesday, 27 October 2020 14:40 (20 minutes)*

EXP (ATLAS+CMS)

**Presenter:** LOELIGER, Andrew David (University of Wisconsin Madison (US))**Session Classification:** Parallel

Contribution ID: 94

Type: **Yukawa Session**

## $H \rightarrow \mu\mu$ and baryogenesis (15'+5')

*Tuesday, 27 October 2020 15:00 (20 minutes)*

**Presenter:** VIERNIK, Yehonatan (Weizmann)

**Session Classification:** Parallel

Contribution ID: 95

Type: **Yukawa Session**

## $H \rightarrow \mu\mu$ [ATLAS] (15')

*Tuesday, 27 October 2020 15:20 (15 minutes)*

EXP (ATLAS)

**Presenter:** MUSKINJA, Miha (Lawrence Berkeley National Lab. (US))

**Session Classification:** Parallel

Contribution ID: 96

Type: **Yukawa Session**

## $H \rightarrow \mu\mu$ [CMS] (15')

*Tuesday, 27 October 2020 15:35 (15 minutes)*

EXP (CMS)

**Presenter:** RIEGER, Jan Oliver (Hamburg University (DE))

**Session Classification:** Parallel

Contribution ID: 97

Type: **Precision Session**

**[ATLAS+CMS] Higgs production (combination and selected per-channel measurements - VBF H->WW, VHbb particularly interesting. No STXS) (15'+5')**

*Tuesday, 27 October 2020 14:20 (20 minutes)*

**Presenter:** BASSO, Matthew (University of Toronto (CA))

**Session Classification:** Parallel



Contribution ID: 98

Type: **Precision Session**

## **Bottom quark mass effects in associated Higgs production at NNLO (15'+5')**

*Tuesday, 27 October 2020 15:00 (20 minutes)*

**Presenter:** BEHRING, Arnd (Karlsruhe Institute of Technology (KIT))

**Session Classification:** Parallel

Contribution ID: 99

Type: **Yukawa Session****b Yukawa ( $H \rightarrow b\bar{b}$ ) [ATLAS+CMS] (15'+5')***Tuesday, 27 October 2020 12:50 (20 minutes)*

EXP (ATLAS+CMS)

**Presenter:** CAMACHO TORO, Reina Coromoto (Centre National de la Recherche Scientifique (FR))**Session Classification:** Parallel

Contribution ID: **100**

Type: **Precision Session**

## **Monte-Carlo Uncertainties for Higgs Boson Production in Vector Boson Fusion (15'+5')**

*Wednesday, 28 October 2020 13:10 (20 minutes)*

**Presenter:** Dr KARLBERG, Alexander (University of Oxford)

**Session Classification:** Parallel

Contribution ID: **101**

Type: **Precision Session**

# Jet Veto Cross Sections for Higgs Boson Production

*Tuesday, 27 October 2020 15:20 (20 minutes)*

**Presenter:** GANGAL, Shireen

**Session Classification:** Parallel

Contribution ID: **102**

Type: **Yukawa Session**

## **c Yukawa (H>cc) [ATLAS+CMS] (15'+5')**

*Tuesday, 27 October 2020 13:10 (20 minutes)*

EXP (ATLAS+CMS)

**Presenter:** BURKLE, Bjorn (Brown University (US))

**Session Classification:** Parallel

Contribution ID: **103**

Type: **Yukawa Session**

## **Strange-tagging in future colliders (15'+5')**

*Thursday, 29 October 2020 13:10 (20 minutes)*

**Presenter:** SCHLAFFER, Matthias (University of Chicago)

**Session Classification:** Parallel

Contribution ID: 104

Type: Yukawa Session

## Correlating $H \rightarrow \mu^+ \mu^-$ to the Anomalous Magnetic Moment of the Muon via Leptoquarks (15'+5')

*Thursday, 29 October 2020 13:30 (20 minutes)***Presenter:** CRIVELLIN, Andreas (Universitaet Zuerich (CH))**Session Classification:** Parallel

Contribution ID: **105**

Type: **Precision Session**

## **[ATLAS+CMS] Combined Higgs measurements STXS and kappas, including kappa interpretations (15'+5')**

*Wednesday, 28 October 2020 12:30 (20 minutes)*

**Presenter:** MUNGO, Davide Pietro (Università degli Studi e INFN Milano (IT))

**Session Classification:** Parallel



Contribution ID: 106

Type: **Precision Session**

**[ATLAS+CMS] Higgs-vector boson CP studies, incl.  
H→4l anomalous couplings and H→ττ VBF CP  
(15'+5')**

*Wednesday, 28 October 2020 12:50 (20 minutes)***Presenter:** KIM, Doyeong (KANSAS STATE UNIVERSITY)**Session Classification:** Parallel

Contribution ID: **107**

Type: **Precision Session**

## **[ATLAS+CMS] Higgs mass measurements (15'+5')**

*Wednesday, 28 October 2020 13:30 (20 minutes)*

**Presenter:** ERRICO, Filippo (University of Florida (US))

**Session Classification:** Parallel

Contribution ID: **108**Type: **Precision Session**

# Projections for Higgs measurements at the HL-LHC (15'+5')

*Wednesday, 28 October 2020 14:20 (20 minutes)***Presenter:** DUTTA, Irene (California Institute of Technology (US))**Session Classification:** Parallel

Contribution ID: **109**

Type: **Precision Session**

## **Parton Distribution Functions for Higgs Physics at the HL-LHC (15'+5')**

*Wednesday, 28 October 2020 14:40 (20 minutes)*

**Presenter:** Dr HARLAND-LANG, Lucian (University of Oxford)

**Session Classification:** Parallel

Contribution ID: **110**

Type: **Precision Session**

## **Electroweak Couplings of the Higgs Boson at a Multi-TeV Muon Collider (15'+5')**

*Wednesday, 28 October 2020 15:00 (20 minutes)*

**Presenter:** WANG, Xing (UC San Diego)

**Session Classification:** Parallel

Contribution ID: 111

Type: **Precision Session**

## **Precision measurements of Higgs boson properties at future ep-em colliders: What are the challenges? (15'+5')**

*Wednesday, 28 October 2020 15:20 (20 minutes)***Presenter:** DURIEUX, Gauthier (CERN)**Session Classification:** Parallel

Contribution ID: 112

Type: **not specified**

## Combined resummation for Higgs transverse momentum distribution (15'+5')

*Tuesday, 27 October 2020 13:30 (20 minutes)***Primary author:** RABEMANANJARA, Tanjona Radonirina (CERN)**Presenters:** RABEMANANJARA, Tanjona Radonirina (INFN - National Institute for Nuclear Physics); RABEMANANJARA, Tanjona Radonirina (CERN)**Session Classification:** Parallel

Contribution ID: 113

Type: **Precision Session**

## **[ATLAS+CMS] Fiducial and differential Higgs cross sections (except for Higgs transverse momentum) (15'+5')**

*Tuesday, 27 October 2020 14:40 (20 minutes)***Primary author:** FASSOULIOTIS, Dimitris (National and Kapodistrian University of Athens (GR))**Presenter:** FASSOULIOTIS, Dimitris (National and Kapodistrian University of Athens (GR))**Session Classification:** Parallel



Contribution ID: 114

Type: HH Session

## Searches for new resonances decaying to HH at CMS (15'+5')

*Tuesday, 27 October 2020 12:30 (20 minutes)***Presenter:** PANWAR, Lata (Indian Institute of science (IN))**Session Classification:** Parallel

Contribution ID: 115

Type: **HH Session**

## Searches for new resonances decaying to HH at ATLAS (15'+5')

*Tuesday, 27 October 2020 12:50 (20 minutes)***Presenter:** ZHANG, Bowen (Nanjing University (CN))**Session Classification:** Parallel

Contribution ID: 116

Type: HH Session

## WBF/GF HH resonances from a phenomenological perspective (15'+5')

*Tuesday, 27 October 2020 13:10 (20 minutes)*

**Presenter:** Dr BARMAN, Rahool Kumar (Indian Association for the Cultivation of Sciences, Kolkata, India)

**Session Classification:** Parallel

Contribution ID: 117

Type: **not specified**

## BSM scenarios with HH resonances (15'+5')

*Tuesday, 27 October 2020 13:30 (20 minutes)*

**Presenters:** MUHLLEITNER, Milada (KIT - Karlsruhe Institute of Technology (DE)); MUHLLEITNER, Milada

**Session Classification:** Parallel

Contribution ID: 118

Type: HH Session

## Searches for non-resonant Higgs pair-production at ATLAS (15'+5')

*Tuesday, 27 October 2020 14:20 (20 minutes)***Presenter:** VEATCH, Jason Robert (Georg August Universitaet Goettingen (DE))**Session Classification:** Parallel

Contribution ID: 119

Type: HH Session

## Searches for non-resonant Higgs pair-production at CMS (15'+5')

*Tuesday, 27 October 2020 14:40 (20 minutes)***Presenter:** MUKHERJEE, Soumya (Tata Inst. of Fundamental Research (IN))**Session Classification:** Parallel

Contribution ID: 120

Type: **HH Session**

## **SM DiHiggs precision shapes (15'+5')**

*Tuesday, 27 October 2020 15:00 (20 minutes)*

**Presenters:** GLAUS, Seraina (E); GLAUS, Seraina (KIT)

**Session Classification:** Parallel

Contribution ID: 121

Type: HH Session

## Non-resonant/EFT Higgs pair phenomenology (15'+5')

*Tuesday, 27 October 2020 15:20 (20 minutes)*

**Presenter:** ZURITA, José Francisco (KIT)

**Session Classification:** Parallel



Contribution ID: 122

Type: HH Session

## Measurement prospects for Higgs pair-production at the HL-LHC (15'+5')

*Thursday, 29 October 2020 12:30 (20 minutes)***Presenter:** NIKOLOPOULOS, Konstantinos (University of Birmingham (GB))**Session Classification:** Parallel

Contribution ID: 123

Type: **HH Session**

## **Prospects for measuring the Higgs self-coupling at future colliders (15'+5')**

*Thursday, 29 October 2020 12:50 (20 minutes)*

**Presenter:** SELVAGGI, Michele (CERN)

**Session Classification:** Parallel

Contribution ID: 124

Type: **HH Session**

## **HL-LHC and Future Collider prospects for HH from a theoretical perspective: extrapolations and other channels (15'+5')**

*Thursday, 29 October 2020 13:10 (20 minutes)*

**Presenters:** BANERJEE, Shankha (CERN); Dr BANERJEE, Shankha (Institute for Particle Physics Phenomenology, Durham University, UK)

**Session Classification:** Parallel

Contribution ID: 125

Type: HH Session

## Triple Higgs and quartic interactions at future colliders (incl. muon colliders) (15'+5')

*Thursday, 29 October 2020 13:30 (20 minutes)***Presenter:** MELE, Barbara (Sapienza Universita e INFN, Roma I (IT))**Session Classification:** Parallel

Contribution ID: 126

Type: **EFT Session**

## Higgs EFT measurements in ATLAS (25' + 5')

*Wednesday, 28 October 2020 12:30 (30 minutes)***Primary author:** MOSER, Brian (Nikhef National institute for subatomic physics (NL))**Presenter:** MOSER, Brian (Nikhef National institute for subatomic physics (NL))**Session Classification:** Parallel

Contribution ID: 127

Type: **EFT Session**

## **Higgs EFT measurements in CMS**

**Session Classification:** Parallel

Contribution ID: 128

Type: **EFT Session**

## **geoSMEFT and applications (15' + 5')**

*Wednesday, 28 October 2020 13:30 (20 minutes)*

**Primary author:** TROTT, Michael Robert (University of Copenhagen (DK))

**Presenter:** TROTT, Michael Robert (University of Copenhagen (DK))

**Session Classification:** Parallel

Contribution ID: **129**

Type: **not specified**

## Discussion (10')

*Wednesday, 28 October 2020 13:50 (10 minutes)*

**Session Classification:** Parallel



Contribution ID: 130

Type: **EFT Session**

## Putting SMEFT Fits to Work (15' + 5')

*Wednesday, 28 October 2020 15:00 (20 minutes)*

**Primary author:** HOMILLER, Samuel (Harvard)

**Presenter:** HOMILLER, Samuel (Harvard)

**Session Classification:** Parallel

Contribution ID: 131

Type: **EFT Session**

## **JHU generator framework: new features for Higgs boson studies (15' + 5')**

*Wednesday, 28 October 2020 15:20 (20 minutes)***Primary author:** SARICA, Ulascan (Univ. of California Santa Barbara (US))**Co-author:** GRITSAN, Andrei (Johns Hopkins University (US))**Presenter:** SARICA, Ulascan (Univ. of California Santa Barbara (US))**Session Classification:** Parallel

Contribution ID: 132

Type: **EFT Session**

## **Constraining SMEFT operators with associated $h\gamma$ production in Weak Boson Fusion**

**Primary author:** GREGG, Parisa**Presenter:** GREGG, Parisa**Session Classification:** Parallel

Contribution ID: 133

Type: **EFT Session**

## Controlling uncertainties of the IAM dispersive unitary extension of EFTs (15' + 5')

*Wednesday, 28 October 2020 14:20 (20 minutes)***Primary author:** SALAS-BERNÁRDEZ, Alexandre (Universidad Complutense de Madrid)**Presenter:** SALAS-BERNÁRDEZ, Alexandre (Universidad Complutense de Madrid)**Session Classification:** Parallel

Contribution ID: **134**

Type: **EFT Session**

## Discussion

**Session Classification:** Parallel

Contribution ID: 135

Type: **BSM Session**

## **Interference effects in heavy Higgs searches (15' + 7')**

*Wednesday, 28 October 2020 13:14 (22 minutes)*

**Presenter:** LIU, Zhen (U of Maryland)

**Session Classification:** Parallel

Contribution ID: 136

Type: **BSM Session**

## **Heavy Higgs in neutral naturalness models (Cancelled)**

*Wednesday, 28 October 2020 13:36 (22 minutes)*

**Session Classification:** Parallel

Contribution ID: 137

Type: **BSM Session**

## **Additional neutral heavy Higgs in fermion decays (mumu, tautau, bb, ttbar) at ATLAS and CMS (15' + 7')**

*Wednesday, 28 October 2020 12:30 (22 minutes)***Presenter:** BARAK, Liron (Tel Aviv University)**Session Classification:** Parallel



Contribution ID: 138

Type: **BSM Session**

## **Additional neutral heavy Higgs in diboson decays (WW, ZZ, gamgam) and $A \rightarrow ZH$ at ATLAS and CMS (15' + 7')**

*Wednesday, 28 October 2020 12:52 (22 minutes)***Presenter:** DUDA, Dominik (Max-Planck-Institut für Physik (DE))**Session Classification:** Parallel

Contribution ID: 139

Type: **BSM Session**

## Composite Higgs models (15' + 7')

*Wednesday, 28 October 2020 15:04 (22 minutes)*

**Presenter:** LIU, Da (UC, Davis)

**Session Classification:** Parallel

Contribution ID: 140

Type: **BSM Session**

## **Additional neutral light Higgs at ATLAS and CMS (15' + 7')**

*Wednesday, 28 October 2020 14:20 (22 minutes)*

**Presenter:** PEREZ ADAN, Danyer (Deutsches Elektronen-Synchrotron (DE))

**Session Classification:** Parallel

Contribution ID: **141**

Type: **BSM Session**

## **Charged Higgs at ATLAS and CMS (15' + 7')**

*Wednesday, 28 October 2020 14:42 (22 minutes)*

**Presenter:** Dr ATTIKIS, Alexandros (University of Cyprus (CY))

**Session Classification:** Parallel

Contribution ID: 142

Type: **BSM Session**

## **Higgs exotic decays (15' + 7')**

*Wednesday, 28 October 2020 15:26 (22 minutes)*

**Presenter:** SHUVE, Brian (Harvey Mudd College)

**Session Classification:** Parallel

Contribution ID: 143

Type: **BSM Session**

## **Xenon1T excess (15' + 7')**

*Thursday, 29 October 2020 12:30 (22 minutes)*

**Presenters:** ROCCHETTI, Arianna; ROCCHETTI, Arianna (University of Freiburg)

**Session Classification:** Parallel

Contribution ID: 144

Type: **BSM Session**

## **DM produced in association with H at ATLAS and CMS (15' + 7')**

*Thursday, 29 October 2020 12:52 (22 minutes)*

**Presenter:** MEEHAN, Samuel Ross (CERN)

**Session Classification:** Parallel

Contribution ID: 145

Type: **BSM Session**

## **Higgs and flavor (15' + 7')**

*Thursday, 29 October 2020 13:36 (22 minutes)*

**Presenter:** HOMILLER, Samuel (Harvard)

**Session Classification:** Parallel



Contribution ID: 146

Type: **BSM Session**

## **LFV, rare decays and invisible Higgs decays at ATLAS and CMS (15' + 7')**

*Thursday, 29 October 2020 13:14 (22 minutes)***Presenter:** SIDDIREDDY, Prasanna Kumar (University of Notre Dame (US))**Session Classification:** Parallel

Contribution ID: 147

Type: **EFT Session**

## **Higgs EFT results from CMS (25' + 5')**

*Wednesday, 28 October 2020 13:00 (30 minutes)*

**Primary author:** SHARMA, Ashish (Indian Institute of Technology Madras (IN))

**Presenter:** SHARMA, Ashish (Indian Institute of Technology Madras (IN))

**Session Classification:** Parallel

Contribution ID: 148

Type: **EFT Session**

## **Constraining SMEFT operators with associated $h\bar{h}$ production in Weak Boson Fusion (15' + 5')**

*Wednesday, 28 October 2020 14:40 (20 minutes)***Primary author:** GREGG, Parisa**Presenter:** GREGG, Parisa**Session Classification:** Parallel

Contribution ID: **149**

Type: **EFT Session**

## **Discussion (10')**

*Wednesday, 28 October 2020 15:40 (10 minutes)*

**Session Classification:** Parallel

Contribution ID: **150**

Type: **not specified**

## H>mumu Discussion

*Tuesday, 27 October 2020 15:50 (10 minutes)*

**Session Classification:** Parallel

Contribution ID: **151**

Type: **not specified**

## Public event

Contribution ID: 152

Type: **not specified**

## **Measurement of the Higgs boson mass in the $H \rightarrow ZZ^* \rightarrow 4l$ decay channel in 13 TeV pp collisions using the ATLAS detector at the LHC**

*Tuesday, 27 October 2020 16:10 (5 minutes)***Presenter:** CIUNGU, Bianca Monica (University of Toronto (CA))**Session Classification:** YSF

Contribution ID: 153

Type: **not specified**

# Observation of the $H \rightarrow WW^*$ production by Vector Boson Fusion in 13 TeV pp collisions with the ATLAS detector at the LHC

*Tuesday, 27 October 2020 16:15 (5 minutes)***Presenter:** JAEGER, Benjamin Paul (Simon Fraser University (CA))**Session Classification:** YSF



Contribution ID: 154

Type: **not specified**

## **Search for a heavy Higgs boson decaying into a Z boson and another heavy Higgs boson in the $llbb$ and $llWW$ final state in 13 TeV pp collision with ATLAS detector**

*Tuesday, 27 October 2020 16:20 (5 minutes)*

**Presenters:** CHAN, Wai Yuen (University of Liverpool (GB)); CHAN, Wai Yuen (University of Liverpool)

**Session Classification:** YSF

Contribution ID: 155

Type: **not specified**

## Measurement of Higgs boson production in the decay channel with a pair of tau leptons

*Thursday, 29 October 2020 16:00 (5 minutes)***Presenter:** HASSANSHAHI, Mohammadhassan (Imperial College (GB))**Session Classification:** YSF

Contribution ID: 156

Type: **not specified**

**Search for the Higgs boson in the associated vector boson production mode where the vector boson decays leptonically and the Higgs boson decays to a pair of bottom quarks**

*Thursday, 29 October 2020 16:05 (5 minutes)***Presenter:** GEDIA, Krunal Bipin (ETH Zurich (CH))**Session Classification:** YSF

Contribution ID: 157

Type: **not specified**

## **MC template-based search for Higgs boson decays into a pair of muons targeting the VBF production channel**

*Thursday, 29 October 2020 16:10 (5 minutes)***Presenter:** KONDRATYEV, Dmitry (Purdue University (US))**Session Classification:** YSF

Contribution ID: **158**

Type: **not specified**

## **Data-driven analyses in the search for the Higgs decay to two muons**

*Thursday, 29 October 2020 16:15 (5 minutes)*

**Presenter:** ZUO, Xunwu (University of Florida (US))

**Session Classification:** YSF

Contribution ID: **159**

Type: **not specified**

## **Tea/discussion break**

Contribution ID: **160**

Type: **not specified**

## **tea/discussion break**

Contribution ID: **162**Type: **not specified**

## **Search for the Higgs boson decaying to a pair of muons in pp collisions at 13 TeV with the ATLAS detector**

*Tuesday, 27 October 2020 16:25 (5 minutes)***Presenter:** CHAN, Jay (University of Wisconsin Madison (US))**Session Classification:** YSF



Contribution ID: **163**

Type: **not specified**

## Discussion

*Tuesday, 27 October 2020 15:40 (20 minutes)*

**Session Classification:** Parallel

Contribution ID: **164**

Type: **not specified**

## Discussion

*Tuesday, 27 October 2020 15:40 (20 minutes)*

**Session Classification:** Parallel

Contribution ID: **165**

Type: **not specified**

## The Higgs boson and more

*Wednesday, 28 October 2020 18:00 (40 minutes)*

**Presenters:** MAIANI, Luciano (Unknown); MAIANI, Luciano (Sapienza Universita e INFN, Roma I (IT))

**Session Classification:** Public Event