Higgs 2023, Nov 27 - Dec 2 2023, Beijing

Report of Contributions

Contribution ID: **2** Type: **not specified**

Unfolded differential Higgs boson measurements at LHC

Monday, 27 November 2023 11:00 (25 minutes)

You are

Presenter: SCULAC, Toni

Session Classification: Precision

Contribution ID: **3** Type: **not specified**

ATLAS wildcard: Searches with H->tautau with ATLAS

Monday, 27 November 2023 14:00 (25 minutes)

You are

Primary author: DE MARIA, Antonio

Presenter: DE MARIA, Antonio

Session Classification: Precision

Contribution ID: **5** Type: **not specified**

CMS wildcard: Latest combined Higgs boson measurements from CMS

Monday, 27 November 2023 14:30 (25 minutes)

You are

Presenter: LAI, Yihui (University of Maryland)

Session Classification: Precision

Contribution ID: **6** Type: **not specified**

State of the art of precision SM Higgs calculations and future prospects

Monday, 27 November 2023 11:30 (25 minutes)

You are

Presenter: CHEN, Xuan (Shandong University)

Session Classification: Precision

Contribution ID: **7** Type: **not specified**

ttH @ NNLO

Monday, 27 November 2023 15:00 (25 minutes)

You are

Primary authors: DEVOTO, Simone; DEVOTO, Simone

Presenters: DEVOTO, Simone; DEVOTO, Simone

Session Classification: Precision

Contribution ID: **8** Type: **not specified**

Precision MCs for Higgs: Status of MCs for Higgs & New developments

Monday, 27 November 2023 12:00 (25 minutes)

You are

Presenter: ALIOLI, Simone (Milan-Bicocca University and INFN)

Session Classification: Precision

Contribution ID: **9** Type: **not specified**

Measurements of third generation Higgs boson Yukawa couplings

Monday, 27 November 2023 16:00 (25 minutes)

You are

Primary authors: PALMER, Chris; PALMER, Chris

Presenters: PALMER, Chris; PALMER, Chris

Session Classification: Precision

Contribution ID: **10** Type: **not specified**

Probing second generation Yukawa couplings and rare decays

Monday, 27 November 2023 17:00 (25 minutes)

You are

Presenter: SCHOPF, Elisabeth

Session Classification: Precision

Contribution ID: **11** Type: **not specified**

tt+b-jets and ttW as ttH backgrounds

Monday, 27 November 2023 16:30 (25 minutes)

You are

Presenter: JEZO, Tomas

Session Classification: Precision

Contribution ID: **12** Type: **not specified**

Di-Higgs searches, status and future prospects: non-resonant

Tuesday, 28 November 2023 14:30 (25 minutes)

You are

Presenter: VALENTE, Marco

Session Classification: Di-Higgs

Contribution ID: **13** Type: **not specified**

Di-Higgs searches, status and future prospects: resonant

Tuesday, 28 November 2023 16:00 (25 minutes)

You are

Presenter: STEGGEMANN, Jan (EFFL and ETH Zurich)

Session Classification: Di-Higgs

Contribution ID: **14** Type: **not specified**

Backgrounds in Di-Higgs: 4b

Tuesday, 28 November 2023 15:00 (25 minutes)

You are

Presenters: ROGULJIC, Matej (Johns Hopkins University (JHU)); HARTMAN, Nicole

Session Classification: Di-Higgs

Contribution ID: **15** Type: **not specified**

Charting the Higgs self-coupling boundaries

Tuesday, 28 November 2023 14:00 (25 minutes)

You are

Presenter: DURIEUX, Gauthier (CERN)

Session Classification: Di-Higgs

Contribution ID: **16** Type: **not specified**

Higgs potential / phase transition

Tuesday, 28 November 2023 16:30 (25 minutes)

You are

Presenter: WANG, Yikun

Session Classification: Di-Higgs

Contribution ID: **17** Type: **not specified**

Di-Higgs: EFT beyond SMEFT

Tuesday, 28 November 2023 17:00 (25 minutes)

You are

Presenter: SUTHERLAND, David (University of Glasgow)

Session Classification: Di-Higgs

Contribution ID: **28** Type: **not specified**

Physics prospects for HL-LHC

Friday, 1 December 2023 14:00 (25 minutes)

You are

Presenter: QU, Huilin (CERN)

Session Classification: Future (incl. colliders)

Contribution ID: **29** Type: **not specified**

Dark Higgs searches (dedicated LLP detectors, e.g. FASER, SHiP, Mathusla, CODEX-b…)

Friday, 1 December 2023 14:30 (25 minutes)

You are

Primary author: TORRÓ PASTOR, Emma

Presenter: TORRÓ PASTOR, Emma

Session Classification: Future (incl. colliders)

Contribution ID: **30** Type: **not specified**

Physics prospects for future colliders: e+e- Higgs factories (CEPC, ILC, FCC-ee)

Friday, 1 December 2023 15:00 (25 minutes)

You are

Presenter: RUAN, Manqi (IHEP)

Session Classification: Future (incl. colliders)

Contribution ID: **31** Type: **not specified**

Physics prospects for future colliders: FCC-hh / muon collider and others e.g. CLIC TeV stages

Friday, 1 December 2023 16:00 (25 minutes)

You are

Presenter: CESAROTTI, Cari

Session Classification: Future (incl. colliders)

Contribution ID: **32** Type: **not specified**

Status of R&D for future accelerators and detectors

Friday, 1 December 2023 16:30 (25 minutes)

You are

Presenter: MARCHIORI, Giovanni (APC Paris - CNRS/IN2P3)

Session Classification: Future (incl. colliders)

Contribution ID: **33** Type: **not specified**

Physics prospects for future colliders and overall outlook

Friday, 1 December 2023 17:00 (10 minutes)

You are

Presenters: WULZER, Andrea; WULZER, Andrea

Session Classification: Future (incl. colliders)

Contribution ID: **37** Type: **not specified**

Registration (start at 14:00-18:00 on Nov. 26 Sunday afternoon)

Monday, 27 November 2023 09:00 (40 minutes)

You are

Session Classification: Registration (start at 14:00-18:00 on Nov. 26 Sunday afternoon)

Contribution ID: **38** Type: **not specified**

Welcome speech

Monday, 27 November 2023 09:40 (10 minutes)

You are

Presenter: CAO, Jun (IHEP)

Session Classification: Welcome and Opening

Contribution ID: **39** Type: **not specified**

Precision Higgs boson measurements at LHC

Monday, 27 November 2023 10:00 (25 minutes)

You are

Presenter: YANG, Hongtao (USTC)

Session Classification: Precision

Contribution ID: **40** Type: **not specified**

Visit to HEPS

Saturday, 2 December 2023 09:00 (8h 30m)

Contribution ID: **42** Type: **Parallel session**

Two-loop Electroweak corrections to gg -> HH and gg -> Hg

Tuesday, 28 November 2023 09:00 (15 minutes)

We consider the next-to-leading order electroweak corrections to the Higgs boson pair and Higgs plus jet productions in gluon fusion. This requires the computation of two-loop four-point amplitudes with massive internal particles such as top quarks, Higgs and gauge bosons. We perform analytic calculations both in the high-energy and large top-quark mass limits. In particular, we show that our high energy expansion can even yield precise results above $p_t \approx 120$ GeV. The technical challenges are described and results for the virtual corrections are presented.

You are

non-PhD student

Primary authors: Dr ZHANG, Hantian (Karlsruhe Institute of Technology); Dr DAVIES, Joshua (Sussex University); Dr SCHÖNWALD, Kay (University of Zurich); Prof. STEINHAUSER, Matthias (Karlsruhe Institute of Technology)

Co-author: Dr GO, Mishima (Tohoku University)

Presenter: Dr ZHANG, Hantian (Karlsruhe Institute of Technology)

Session Classification: Parallel: Di-Higgs

Contribution ID: **45** Type: **Parallel session**

Application of the jet charge in electroweak and Higgs physics

Thursday, 30 November 2023 11:20 (15 minutes)

Quarks and gluons produced in high-energy particle collisions hadronize before their electric charge can be directly measured. However, information about the electric charge is embedded in the resulting collimated sprays of hadrons known as jets. One jet observable sensitive to the electric charge of quarks and gluons is the momentum-weighted charge sum constructed from charged-particle tracks in a jet, which is called jet charge. In this talk, I will discuss the possible application of the jet charge in the electroweak and Higgs physics.

You are

non-PhD student

Primary author: Prof. YAN, Bin (IHEP)

Presenter: Prof. YAN, Bin (IHEP)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **46** Type: **Parallel session**

3HDM with a CP symmetry of order 4: a phenomenological update

Thursday, 30 November 2023 11:20 (15 minutes)

Unsatisfied with model-building opportunities offered by the 2HDM or singlet extensions, many researchers turn to more elaborate Higgs sectors. 3HDMs offer to a bSM model-builder many novel options absent in the 2HDM. One of them is CP4, the CP symmetry of order 4, physically distinct from the usual CP. Imposing CP4 on the 3HDM leads to remarkable connections between the scalar and Yukawa sectors and unavoidably generates tree-level flavor-changing neutral couplings (FCNC). In this talk, I will report on our study of whether and how FCNCs can be sufficiently suppressed in the CP4 3HDM to agree with neutral meson oscillation parameters. Out of the eight possible CP4 Yukawa sectors, only two scenarios are found to be compatible with the K, B, Bs and, in particular, D-meson oscillation constraints. I will present the results of a parameter space scan which produced benchmark models with intriguing phenomenology.

You are

non-PhD student

Primary author: Prof. IVANOV, Igor (SYSU, School of Physics and Astronomy)

Presenter: Prof. IVANOV, Igor (SYSU, School of Physics and Astronomy)

Session Classification: Parallel: BSM

Contribution ID: **47** Type: **Parallel session**

Lepton flavor violation in CP4 3HDM

Thursday, 30 November 2023 11:40 (15 minutes)

CP4 3HDM is a three-Higgs-doublet model based on the CP symmetry of order 4 (CP4) without any accidental symmetries. Imposing CP4 leads to remarkable connections between the scalar and Yukawa sectors and unavoidably generates tree-level Lepton Flavor-Violation (LFV). It remains unclear whether LFV can be sufficiently suppressed in the CP4 3HDM. Here we explore which CP4-invariant scenarios can agree with LFV Higgs decays and charged lepton flavor violation transitions mediated by new Higgs bosons.

You are

PhD student

Primary author: LIU, Bei (Sun Yat-Sen (Zhongshan) University)

Co-author: IVANOV, Igor (SYSU, School of Physics and Astronomy)

Presenter: LIU, Bei (Sun Yat-Sen (Zhongshan) University)

Session Classification: Parallel: BSM

Track Classification: Di-Higgs & BSM & EFT

Contribution ID: **48** Type: **Poster session**

The Decay $A^0 \to hZ^*$ in the Inverted Hierarchy and the Production for A^0 at the LHC in Normal Hierarchy in 2HDM (cancelled)

Wednesday, 29 November 2023 15:00 (15 minutes)

Searches are being carried out at the Large Hadron Collider (LHC) for the decay of the CP-odd scalar (A^0) in Two-Higgs-Doublet Models (2HDMs) with Natural Flavour Conservation (NFC) in the channel $A^0 \to h^0 Z^*$ (with $m_{h^0} = 125GeV$ and Z on-shell). In the absence of any signal, limits on the parameter space of $[tan\beta, cos(\beta - \alpha), m_{A^0}]$in each 2HDM are derived form $m_{A^0} > 225GeV$. In this work we consider the scenario of inverted hierarchy with $m_{h^0} < 125GeV$ and $m_{H^0} = 125GeV$ in which the decay $A^0 \to h^0 Z^*$ (i.e. including the case of an off-shell Z) can have a large branching ratio in the 2HDM (Type I) for $m_{A^0} < 225GeV$. We calculate the signal cross section $\sigma(gg \to A^0) \times BR(A^0 \to h^0 Z^{()*)}) \times BR(h^0 \to b\bar{b})$ in the 2HDM (Type I) with NFC and compare its magnitude with the cross section for the case of normal hierarchy ($m_{h^0} = 125GeV$) that is currently being searched for at the LHC. For the experimentally unexplored region $m_{A^0} < 225GeV$ it is shown that the above cross section for signal events in the scenario of inverted hierarchy can be of the order of a few picobarns. Such sizeable cross sections are several orders of magnitude larger than the cross sections for the case of normal hierarchy, thus motivating an extension of the ongoing searches for $A^0 \to h^0 Z^*$ to probe the scenario of inverted hierarchy.

You are

PhD student

Primary author: ALANAZI, Sarah

Presenter: ALANAZI, Sarah

Session Classification: Parallel: BSM

Contribution ID: **49** Type: **Parallel session**

The Higgs->bb/cc/gg measurement at CEPC

Friday, 1 December 2023 09:20 (15 minutes)

Accurately measuring the properties of the Higgs boson is one of the core physics objectives of the Circular Electron Positron Collider (CECP). As a Higgs factory, the CEPC is expected to operate at a centre-of-mass energy of 240 GeV, deliver an integrated luminosity of 20 inverse ab, and produce four million Higgs bosons according to the Snowmass report. Combining measurements of the LLH, vvH, and qqH channels, we conclude that the signal strength of Higgs->bb/cc/gg can be measured with a relative accuracy of 0.14%/2.13%/0.82% (relative statistical uncertainty only). We analyze the dependence of the expected accuracies on the critical detector performances: Color Singlet Identification (CSI) for the qqH channel and flavor tagging for both vvH and qqH channels. Compared to the baseline CEPC detector performance, ideal flavor tagging can increase the Higgs->bb/cc/gg signal strength accuracy by 2%/63%/13% in the vvH channel and 35%/122%/181% in the qqH channel. A strong dependence between the CSI performance and anticipated accuracies in the qqH channel is identified. The relevant systematic uncertainties are also discussed.

You are

non-PhD student

Primary author: 朱, 永峰

Presenter: 朱, 永峰

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **50** Type: **Parallel or Poster session**

One class of non-abelian 4HDM symmetry

Thursday, 30 November 2023 12:00 (15 minutes)

Multi-Higgs-doublet models equipped with global symmetry groups, either exact or softly broken, offer a rich framework for constructions beyond the Standard Model and lead to remarkable phenomenological consequences. Knowing all the symmetry options within each class of models can guide its phenomenological exploration, as confirmed by the vast literature on the two- and three-Higgs-doublet models. Here, we begin a systematic study of finite non-abelian symmetry groups which can be imposed on the scalar sector of the four-Higgs-doublet model (4HDM) without leading to accidental symmetries. In this work, we derive the full list of such non-abelian groups available in the 4HDM that can be constructed as extensions of cyclic groups by their automorphism groups. This list is remarkably restricted but it contains cases which have not been previously studied. Since the methods we develop may prove useful for other classes of models, we present them in a pedagogical manner.

You are

non-PhD student

Primary authors: IVANOV, Igor (SYSU, School of Physics and Astronomy); SHAO, Jiazhen

Presenter: SHAO, Jiazhen

Session Classification: Parallel: BSM

Contribution ID: **51** Type: **Parallel session**

Interpreting the 95 GeV Higgs Boson within a 2-Higgs Doublet Model

Tuesday, 28 November 2023 11:40 (12 minutes)

We suggest an explanation for and explore the consequences of the excess around 95 GeV in the di-photon and di-tau invariant mass distributions recently reported by the CMS collaboration at the Large Hadron Collider (LHC), together with the discrepancy that has long been observed at the Large Electron-Positron (LEP) collider in the $b\bar{b}$ invariant mass. Interestingly, the most recent findings announced by the ATLAS collaboration do not contradict, or even support, these intriguing observations. Their search in the di-photon final state similarly reveals an excess of events within the same mass range, albeit with a bit lower significance, thereby corroborating and somewhat reinforcing the observations made by CMS. We have found that all three signatures can be explained within the general 2-Higgs Doublet Model (2HDM) Type-III.
We demonstrate that the lightest CP-even Higgs boson in this scenario can explain the excess in all three channels simultaneously, i.e., in the di-photon, di-tau and $b\bar{b}$ mass spectra, while satisfying up-to-date theoretical and experimental constraints. Moreover, the 2HDM Type-III predicts an excess in the $pp \to t\bar{t}H_{\rm SM}$ production channel of the 125 GeV Higgs boson discovered in 2012, with properties (couplings, spin and CP quantum numbers) consistent with those predicted in the Standard Model (SM). This effect is caused by a up to 18\% enhancement of the Yukawa coupling to top
(anti)quarks in comparison to the SM value. Such an effect can be tested soon at the High Luminosity LHC (HL-LHC), which can either discover or exclude the scenario we suggest. This unique characteristic of the 2HDM Type-III makes this scenario with the 95 GeV resonance very attractive for further theoretical and experimental investigations at the (HL-)LHC and future colliders.

You are

PhD student

Primary authors: Prof. BELYAEV, Alexander (School of Physics and Astronomy, University of Southampton, United Kingdom); Prof. BENBRIK, Rachid (Polydisciplinary Faculty, Laboratory of Fundamental and Applied Physics, Cadi Ayyad University, Sidi Bouzid, Safi, Morocco,); BOUKIDI, Mohammed (Cadi Ayyad University); CHAKRABORTI, Manimala (School of Physics and Astronomy, University of Southampton, United Kingdom); Prof. MORETTI, Stefano (School of Physics and Astronomy, University of Southampton, United Kingdom); SEMLALI, Souad (School of Physics and Astronomy, University of Southampton, United Kingdom,)

Presenter: BOUKIDI, Mohammed (Cadi Ayyad University)

Session Classification: Parallel: BSM

Contribution ID: **52** Type: **Parallel session**

Multiple boson production at high-energy muon colliders to probe the Higgs-muon coupling

Friday, 1 December 2023 09:40 (15 minutes)

We discuss the capabilities of a high-energy muon collider of discovering (or constraining) anomalous Yukawa interactions of the muon with the Higgs boson. We use a general approach based on two different Effective-Field-Theory frameworks, HEFT and SMEFT. We analyse a large class of processes involving both multi Higgs and/or vector boson production, both for a 3 and 10 TeV machine. We also discuss bounds due to unitarity arguments from processes with very large multiplicities in the final state and/or large collision energies. Our study provides quantitative statements on the potential of a muon collider for studying in detail the interaction of the Higgs boson with the muon.

You are

non-PhD student

Primary authors: CELADA, Eugenia; PAGANI, Davide (INFN, Bologna); Prof. MALTONI, Fabio; REUTER, Jürgen (DESY); XIE, Keping; KREHER, Nils; HAN, Tao (Univ. of Pittsburgh & TsingHua University); STRIEGEL, Tobias; KILIAN, Wolfgang (University of Siegen); MA, Yang (INFN-Bologna)

Presenter: MA, Yang (INFN-Bologna)

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **53** Type: **Parallel session**

Higgs boson pair production and decay to $b\bar{b}\gamma\gamma$ at NLO in QCD

Wednesday, 29 November 2023 16:15 (12 minutes)

We calculate the total cross-section and differential distributions of Higgs boson pair production and decay to $b\bar{b}\gamma\gamma$ at NLO in QCD.

You are

non-PhD student

Primary authors: ZHAO, Dan (Shandong University); LI, Haitao (SHANDONG UNIVERSITY); WANG, Jian (Shandong University); ZHANG, Xiao (Shandong University); SI, Zongguo (ShanDong University)

Presenter: ZHAO, Dan (Shandong University)

Session Classification: Parallel: Di-Higgs

Contribution ID: **54** Type: **Parallel session**

Charm Yukawa through cH associated production (cancelled)

Tuesday, 28 November 2023 09:00 (15 minutes)

We analyse the cH associated production channel at the LHC and HL-LHC stage, with ML techniques to separate the different yukawa dependent contribution and analyze the respective contribution from the main observable quantitatively. We give sensitivity bound on the charm yukawa absolute value as well as on its possible CP phase.

You are

non-PhD student

Primary author: QIAN, Zhuoni (Hangzhou Normal University)

Presenter: QIAN, Zhuoni (Hangzhou Normal University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **55** Type: **Parallel session**

Higgs decay to quarkonia and the Yukawa couplings

Tuesday, 28 November 2023 10:00 (15 minutes)

We propose to test the charm (and bottom) quark Yukawa coupling at the HL-LHC and future hadron colliders with the Higgs boson decay to quarkonia via the fragmentation mechanism. Using the non-relativistic quantum chromodynamics (NRQCD), we study the quarkonia production via SM Higgs decay through both the color-singlet and color-octet channels. Our study provides quantitative statements on the potential of determining the charm (and bottom) quark Yukawa coupling at hadron colliders.

You are

non-PhD student

Primary author: Dr MA, Yang (INFN-Bologna)

Co-authors: Prof. ALISON, John (Carnegie Mellon University); HAN, Tao (Univ. of Pittsburgh & TsingHua University); Mr LIU, Chuyuan (Carnegie Mellon University); Dr TAN, Xiaoze (Fudan University)

Presenter: Dr MA, Yang (INFN-Bologna)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **56** Type: **Parallel session**

Jet veto resummation for Higgs+jet production with NNLL'+NNLO uncertainties

Wednesday, 29 November 2023 14:40 (15 minutes)

I will present predictions for jet veto resummation in the Higgs+jet process with NNLL'+NNLO uncertainties. These are an important input to facilitate comparison of theory with data via the Simplified Template Cross Section (STXS) framework. The resummation has been achieved in the framework of soft-collinear effective theory, using an extension of a factorisation theorem first studied by Liu and Petriello. I will discuss the novel features of our study, including the importance of power corrections and the use of theory nuisance parameters to estimate the effect of missing higher order terms.

You are

non-PhD student

Primary author: LIM, Matthew (University of Sussex)

Co-authors: Dr TACKMANN, Frank (DESY); Dr CAL, Pedro (DESY); Dr WAALEWIJN, Wouter (Nikhef); Dr SCOTT, Darren (MPI Munich)

Presenter: LIM, Matthew (University of Sussex)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **57** Type: **Parallel session**

Theoretical indications on a new scalar boson near 0.5 TeV

Friday, 1 December 2023 11:20 (15 minutes)

Assuming that the Higgs potential arises from a strong BSM sector and that this sector lies in the same universality class as non-perturbative QCD, we show that several model approaches to strongly coupled field dynamics (AdS/QCD, Nambu-Jona-Lasinio model, spectral sum rules) indicate on a possible existence of a Higgs-like scalar particle h' with the mass near 0.5 TeV. We suggest also that the recently observed resonance H(650) can be naturally interpreted as an enhancement due to the hh'-threshold, where h is the standard Higgs boson.

You are

non-PhD student

Primary author: AFONIN, Sergei (Saint Petersburg State University)

Presenter: AFONIN, Sergei (Saint Petersburg State University)

Session Classification: Parallel: BSM

Contribution ID: **58** Type: **Parallel session**

Electroweak corrections to Higgs pair production in gluon fusion

Tuesday, 28 November 2023 09:20 (12 minutes)

We calculate the next-to-leading order electroweak corrections proportional to the Higgs trilinear self-coupling for Higgs boson pair production in gluon fusion.

You are

PhD student

Primary authors: LI, Haitao (SHANDONG UNIVERSITY); WANG, Jian (Shandong University); ZHAO, Dan (Shandong University); SI, Zongguo (ShanDong University); ZHANG, xiao (Shandong University)

Presenter: ZHANG, xiao (Shandong University)

Session Classification: Parallel: Di-Higgs

Contribution ID: **59** Type: **Parallel session**

Electroweak strongly-coupled scenarios, heavy resonances and oblique parameters

Friday, 1 December 2023 11:00 (15 minutes)

It has been confirmed experimentally the existence of a mass gap between Standard Model and eventual New Physics states. Consequently, the use of effective approaches to search for signals of Physics Beyond the Standard Model is very engaging. We consider a non-linear realizations of the electroweak symmetry breaking, where the Higgs is a singlet with free couplings and the SM fields are also coupled to heavy bosonic resonances. A next-to-leading-order determination of the oblique S and T parameters is given here. The comparison between our estimations and the experimental values allows us to constrain resonance masses to be above the TeV scale, $M_R > 3$ TeV, in agreement with our previous analysis, where we computed these observables with a less general approach.

You are

non-PhD student

Primary author: ROSELL, Ignasi (Universidad CEU Cardenal Herrera)

Co-authors: PICH, Antonio (Universitat de Valencia & IFIC); SANZ-CILLERO, Juan Jose (Universidad Complutense de Madrid)

Presenter: ROSELL, Ignasi (Universidad CEU Cardenal Herrera)

Session Classification: Parallel: BSM

Contribution ID: **60** Type: **Parallel session**

Search for Higgs decay to charm quark pair at LHCb

Tuesday, 28 November 2023 11:15 (15 minutes)

LHCb is a spectrometer that covers the forward region of proton-proton collisions, in the pseudo rapidity range from 2 to 5. Thanks to its excellent vertex reconstruction system, it has already demonstrated its capability to identify heavy flavour jets. Moreover, the c-jet identification (c-tagging) is a crucial ingredient for the search of H->cc at LHCb. In this talk, the c-tagging algorithms used at LHCb will be illustrated, as well as new methods based on machine learning techniques that exploits the jet substructure. The prospects on the search for H->cc in future upgrades will be given.

You are

non-PhD student

Primary author: ZULIANI, Davide

Presenter: ZULIANI, Davide

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **61** Type: **Parallel session**

Combined measurements of Higgs boson couplings and cross sections with the ATLAS detector

Wednesday, 29 November 2023 14:00 (15 minutes)

Very detailed measurements of Higgs boson coupling and kinematical properties can be performed using the data collected at LHC up to now, exploiting a variety of final states and production modes, probing different regions of the phase space with increasing precision. These measurements can then be combined to exploit the specific strength of each channel, thus providing the most stringent global measurement of the Higgs properties. This talk presents the latest combination of Higgs boson coupling measurements by the ATLAS experiment, with results presented in terms of production modes, branching fractions and Simplified Template Cross Sections.T he results are based on pp collision data collected at 13 and 13.6 TeV during Run 2 and Run 3 of the LHC. This talk presents the latest combination of Higgs boson coupling measurements by the ATLAS experiment, with results presented in terms of production modes, branching fractions and Simplified Template Cross Sections.

You are

non-PhD student

Primary author: PETERS, Krisztian (DESY)

Presenters: ALVES, Fabio (Nanjing University); ALVES, Fábio (Nanjing University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **62** Type: **Parallel session**

Combined Effective Field Theory interpretation of ATLAS Higgs measurements

Friday, 1 December 2023 09:00 (15 minutes)

This talk presents the interpretation of the ATLAS combined Higgs boson couplings measurements in the context of several models of physics beyond the Standard Model SM). These models include Two-higgs-doublet models, the Minimal Supersymmetric Standard Model, and general descriptions of deviations from SM predictions based on the Standard Model effective field theory framework. The results are based on pp collision data collected at 13 TeV during Run 2 of the LHC.

You are

non-PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: WANG, Yuhao

Session Classification: Parallel: EFT

Contribution ID: **63** Type: **Parallel session**

Measurements and interpretations of Simplified Template Cross Sections and differential and fiducial cross sections in Higgs boson decays to two W bosons with the ATLAS detector

Wednesday, 29 November 2023 15:00 (15 minutes)

The Higgs boson decay to two W bosons provides the largest branching fraction among bosonic decays, and can be used to perform some of the most precise measurements of the Higgs boson production cross sections. This talk presents Higgs boson measurements by the ATLAS experiment in the WW decay channel within the Simplified Template Cross-section (STXS) framework, targeting the gluon-gluon fusion (ggF), vector-boson fusion (VBF) and vector-boson associated production (VH) modes. Higgs boson fiducial and differential cross section measurements targeting both the ggF and VBF modes will also be shown. Interpretations of these results in the context of Standard Model effective field theories will be presented. The results are based on pp collision data collected at 13 TeV during Run 2 of the LHC.

You are

non-PhD student

Primary author: PETERS, Krisztian (DESY)

Presenters: DU, Dongshuo (USTC); DU, Dongshuo (U)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **65** Type: **Parallel session**

Measurement of Higgs boson mass with the ATLAS detector

Wednesday, 29 November 2023 16:20 (15 minutes)

The mass of the Higgs boson is a fundamental parameter of the Standard Model which can be measured most precisely in its decays to four leptons and two photons, which benefit from excellent mass resolution. This talk presents the most recent measurements by the ATLAS experiment in these two channels, using the full Run 2 dataset of pp collisions at the LHC collected at 13 TeV.

You are

non-PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: JIA, Zihang

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **66** Type: **Parallel session**

Measurement of CP properties of the Higgs boson couplings to weak bosons at the ATLAS experiment (15'+5'))

Wednesday, 29 November 2023 17:00 (15 minutes)

While the Standard Model predicts that the Higgs boson is a CP-even scalar, CP-odd contributions to the Higgs boson interactions with vector bosons are presently not strongly constrained. A variety of Higgs boson production processes and decays can be used to study the CP nature of the Higgs boson interactions with vector bosons. This talk presents the most recent CP measurements of such analyses by the ATLAS experiment, based on pp collision data collected at 13 TeV.

You are

non-PhD student

Primary authors: PETERS, Krisztian (DESY); GUO, Fangyi

Presenter: GUO, Fangyi

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **67** Type: **Parallel session**

Measurements of Higgs boson properties in decays to two tau leptons with the ATLAS detector

Thursday, 30 November 2023 09:00 (15 minutes)

Detailed measurements of Higgs boson properties can be performed using its decays into fermions, providing in particular a key window into the nature of the Yukawa interactions. This talk presents the latest measurements by the ATLAS experiment of Higgs boson properties in its delays into pairs of tau leptons, using the full Run 2 pp collision dataset collected at 13 TeV. They include in particular measurements of Simplified Template Cross Sections, differential cross sections, and CP properties, as well as its interpretation within the framework of the Standard Model Effective Field Theories.

You are

non-PhD student

Primary author: PAN, Tong

Presenter: PAN, Tong

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **68** Type: **Parallel session**

Measurements of the Higgs boson properties using decays into bottom and charm quark pairs with the ATLAS detector

Tuesday, 28 November 2023 09:20 (15 minutes)

Testing the Yukawa couplings of the Higgs boson with fermions is essential to understanding the origin of fermion masses. Higgs boson decays to quark pairs are an important probe of these couplings, and of properties of the Higgs boson more generally. This talk presents various measurements of Higgs boson decays into two bottom quarks as well as searches for Higgs boson decays into two charm quarks by the ATLAS experiment, using the full Run 2 dataset of pp collisions collected at 13 TeV at the LHC, as well as their combination and interpretation. The results of the search for Higgs boson production associated with a charm quark is also reported.

You are

non-PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: TANASINI, Martino

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **69** Type: **Parallel session**

Property measurements of the Higgs boson production in association with top quark at the ATLAS detector

Thursday, 30 November 2023 09:20 (15 minutes)

The study of Higgs boson production in association with one or two top quarks provides a key window into the properties of the two heaviest fundamental particles in the Standard Model, and in particular into their couplings. This talk presents property measurement of Higgs boson, in particular cross section and CP nature, with tH and ttH production in pp collisions collected at 13 TeV with the ATLAS detector using the full Run 2 dataset of the LHC.

You are

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Primary author: PETERS, Krisztian (DESY)

Presenters: POVEDA, Ximo (IFIC (CSIC-UV)); POVEDA, Ximo (Indiana University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **70** Type: **Parallel session**

Measurement of the Higgs coupling to top quarks with four-top-quark production

Thursday, 30 November 2023 12:15 (12 minutes)

Recent observation of four-top-quark production by ATLAS and CMS has opened a new channel for measurement of the top-Higgs Yukawa coupling yt as the four-top cross-section receives contributions from tree-level diagrams mediated by an off-shell Higgs boson. This measurement compliments constraints placed on yt from top-associated Higgs production and from resolving the loops in gluon-gluon fusion production and diphoton decays of the Higgs boson because the four-top measurement differs significantly in final state and in the modelling assumptions made about the Higgs. This talk will present the measurement of four-top production using data from 140 fb-1 of proton-proton collisions recorded with the ATLAS detector and the interpretation of this measurement as a constraint on yt.

You are

PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: ROBERTS, Ryan

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **71** Type: **Parallel session**

Charming Yukawa coupling of the Higgs boson

Tuesday, 28 November 2023 11:00 (12 minutes)

An important approach to fully understanding the mechanism of fermion mass is the yet-to-observe Yukawa coupling of the Higgs boson to first-generation fermions and to second-generation quarks. Among the searches for these types of coupling, the Higgs boson decay to charm quarks is the most promising mode to investigate. This talk will focus on the latest results of the Higgs boson to charm decay analysis from the ATLAS collaboration, discuss the techniques used to identify charm objects and show the connection between the Higgs Yukawa coupling to the second- and third-generation quarks.

You are

PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: FENG, Zhuoran

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **74** Type: **Parallel session**

Search for dark photons in rare Z boson decays with the ATLAS detector

Tuesday, 28 November 2023 11:55 (12 minutes)

A search for events with a dark photon produced in association with a dark Higgs boson via rare decays of the Standard Model Z boson is presented, using 139 fb of 13 TeV proton-proton collision data recorded by the ATLAS detector at the Large Hadron Collider. The dark Higgs boson decays into a pair of dark photons, and at least two of the three dark photons must each decay into a pair of electrons or muons, resulting in at least two same-flavor opposite-charge lepton pairs in the final state. The data are found to be consistent with the background prediction, and upper limits are set on the dark photon's coupling to the dark Higgs boson times the kinetic mixing between the Standard Model photon and the dark photon. This search explores new parameter space not previously excluded by other experiments.

You are

PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: LIU, Mingyi (USTC)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **75** Type: **Parallel session**

Constraining the Shape of the Higgs Potential Through a Search for Higgs Boson Pairs in the bbtautau Final State with the ATLAS Experiment

Tuesday, 28 November 2023 10:15 (12 minutes)

The discovery of the Higgs boson in 2012 was a triumph for the Standard Model (SM) of particle physics and the mechanism of electroweak symmetry breaking. An essential ingredient to this mechanism is the Higgs potential, which is introduced ad-hoc and assumed to be Mexican-hat shaped in the SM, but cannot be derived from first principles. It is therefore important to probe this shape experimentally. Current measurements of single Higgs boson production only probe the area around minimum of the potential. To determine its precise shape, measurements of processes involving self-couplings of Higgs bosons are needed. In my talk I will present a search for di-Higgs boson production, which is sensitive to the trilinear Higgs boson self coupling, in the final state with two b-jets and two tau-leptons. The search is performed using the proton collision data set collected by the ATLAS experiment during Run 2 of the LHC at a centre of mass energy of 13 TeV. It improves over existing searches in this channel through a refined analysis categorization in combination with improved analysis algorithms. Interpretations of the results are given as constraints on the coupling strength of various Higgs boson self interactions. The results constitute the ATLAS legacy of Run 2 in this particular decay channel.

You are

PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: MOSER, Brian (CERN)

Session Classification: Parallel: Di-Higgs

Track Classification: Di-Higgs & BSM & EFT

Contribution ID: **76** Type: **Parallel session**

Search for Higgs boson pair production in the b ¯ b γ γ final state from 13 TeV p p collision data with the ATLAS detector

Wednesday, 29 November 2023 16:50 (15 minutes)

A search for di-Higgs boson production in the bbγγ final state is presented, using data collected by the ATLAS experiment during the second data-taking period (Run 2) of the LHC, amounting to an integrated luminosity of 140/fb. Searching for Higgs boson pairs provides an excellent handle for understanding the fundamentals of the Higgs mechanism, and in particular for measuring the trilinear Higgs boson self-coupling λHHH, which is still largely unconstrained. In the new HH ⟶ bbγγ analysis discussed here the two dominant HH production modes (via gluon-gluon Fusion and Vector Boson Fusion) are probed. Moreover, the Vector Boson Fusion production mode constitutes a unique probe to the quartic interaction between two vector bosons and two Higgs bosons (namely, HHVV). This analysis sets upper limits on the di-Higgs production cross-section, and derives exclusion intervals on the Higgs self-coupling λHHH and the strength of the HHVV interaction.

You are

PhD student

Primary author: PETERS, Krisztian (DESY)

Presenter: MAZZEO, Elena

Session Classification: Parallel: Di-Higgs

Track Classification: Di-Higgs & BSM & EFT

Contribution ID: **78** Type: **Parallel session**

Searches for resonances decaying to pairs of bosons in ATLAS

Wednesday, 29 November 2023 17:10 (15 minutes)

Several physics scenarios beyond the Standard Model predict the existence of new particles that can subsequently decay into a pair of bosons. These include pairs of SM-like Higgs bosons (HH) as well as asymmetric decays into two scalars of different masses (SH). This talk summarises ATLAS searches for resonant HH and SH production with LHC Run 2 data. A search for a high-mass Zgamma resonance is also presented.

You are

non-PhD student

Primary author: LUNDBERG, Olof

Presenter: LUNDBERG, Olof

Session Classification: Parallel: Di-Higgs

Contribution ID: **79** Type: **Parallel session**

Searches for singly- and doubly-charged Higgs bosons in ATLAS

Wednesday, 29 November 2023 14:40 (15 minutes)

In the Standard Model, one doublet of complex scalar fields is the minimal content of the Higgs sector in order to achieve spontaneous electroweak symmetry breaking. However, several theories beyond the Standard Model predict a non-minimal Higgs sector and introduce charged scalar fields that do not exist in the Standard Model. As a result, singly- and doubly-charged Higgs bosons would be a unique signature of new physics with a non-minimal Higgs sector. As such, they have been extensively searched for in the ATLAS experiment, using proton-proton collision data at 13 TeV during the LHC Run 2. In this presentation, a summary of the latest experimental results obtained in searches for both singly- and doubly-charged Higgs bosons are presented.

You are

non-PhD student

Primary author: MA, Yanhui (School of Physics , Shandong University)

Presenter: MA, Yanhui (School of Physics , Shandong University)

Session Classification: Parallel: BSM

Contribution ID: **80** Type: **Parallel session**

Searches for additional neutral Higgs bosons in ATLAS

Tuesday, 28 November 2023 11:00 (15 minutes)

The discovery of the Higgs boson with the mass of about 125 GeV completed the particle content predicted by the Standard Model. Even though this model is well established and consistent with many measurements, it is not capable of solely explaining some observations. Many extensions of the Standard Model addressing such shortcomings introduce additional Higgs-like bosons. The current status of searches for additional low- and high-mass neutral Higgs bosons based on the full LHC Run 2 dataset of the ATLAS experiment at 13 TeV are presented.

You are

non-PhD student

Primary author: KRESSE, Tom

Presenter: KRESSE, Tom

Session Classification: Parallel: BSM

Contribution ID: **81** Type: **Parallel session**

Probing the nature of electroweak symmetry breaking with Higgs boson pair-production at ATLAS

Tuesday, 28 November 2023 09:35 (15 minutes)

In the Standard Model, the ground state of the Higgs field is not found at zero but instead corresponds to one of the degenerate solutions minimising the Higgs potential. In turn, this spontaneous electroweak symmetry breaking provides a mechanism for the mass generation of nearly all fundamental particles. While the Standard Model makes a definite prediction for the Higgs boson self-coupling and thereby the shape of the Higgs potential, enhanced rates and modified kinematic properties of Higgs boson pair (HH) production are a smoking-gun signature for new physics. In the case of SUSY, this may appear as new loop contributions in non-resonant HH production or via new scalar resonances decaying to two Higgs bosons. In this talk, the latest searches for Higgs boson pairs by the ATLAS experiment are reported, with emphasis on the results obtained with the full LHC Run 2 dataset at 13 TeV. In the case of non-resonant HH searches, results are interpreted both in terms of sensitivity to the Standard Model and as limits on the Higgs boson self-coupling. Extrapolations of recent HH results towards the High Luminosity LHC upgrade are also discussed. Search results on new resonances decaying into pairs of Higgs bosons are also reported.

You are

non-PhD student

Primary author: KHOO, Teng Jian

Presenter: KHOO, Teng Jian

Session Classification: Parallel: Di-Higgs

Contribution ID: **82** Type: **Parallel session**

Multi-Higgs production in vector boson scattering

Friday, 1 December 2023 10:10 (15 minutes)

We present an effective field theory study of WW scattering into two, three and four Higgs bosons in the final state. We consider the general HEFT approach and then particularize it for SMEFT scenarios. We make use of the equivalence theorem and improve previous results on $WW \to nh$ cross sections, showing several important cancellations and simplifications which allows us to display these amplitudes in a much more compact form. We show that for a growing number of Higgs bosons in the final state, SMEFT leads to an important suppression of cross sections with a large number of Higgses, while this does not happen for general HEFT low-energy theories (which do not accept a SMEFT description). We provide some numerical estimates of these multi-Higgs cross sections based on current experimental bounds.

You are

non-PhD student

Primary authors: SALAS-BERNARDEZ, Alexandre (Universidad Complutense de Madrid & IPARCOS); SANZ-CILLERO, Juan José (U. Complutense de Madrid & IPARCOS); MARTINEZ-MARTIN, Javier (Universidad Complutense de Madrid & IPARCOS); DELGADO, Rafael L. (Universidad Politecnica de Madrid); GOMEZ-AMBROSIO, Raquel (Torino University)

Presenter: SANZ-CILLERO, Juan José (U. Complutense de Madrid & IPARCOS)

Session Classification: Parallel: EFT

Contribution ID: **83** Type: **Parallel session**

Measurements of the Higgs boson production cross sections in bosonic decay channels with the CMS experiment

Wednesday, 29 November 2023 16:00 (15 minutes)

In this talk we present measurements of Higgs boson production cross sections with the CMS experiment, using the decay channels H->ZZ, H->WW, and H->gammagamma. Both inclusive and differential cross section measurements will be discussed

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: FERNANDEZ, Sergio Blanco

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **84** Type: **Parallel session**

Searches for exotic Higgs boson decays at CMS

Thursday, 30 November 2023 09:20 (15 minutes)

We present CMS searches for exotic decays of the Higgs boson with the CMS experiment. Searches where the 125 GeV Higgs boson decays into two low-mass scalars are discussed. We also present searches for the 125 GeV Higgs boson decaying to a Z boson and a light scalar.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: LU, Meng (Northeastern University)

Session Classification: Parallel: BSM

Contribution ID: **85** Type: **Parallel session**

Search for dark matter in mono-Higgs signatures at CMS

Thursday, 30 November 2023 09:55 (15 minutes)

Searches for dark matter in final states with invisible particles recoiling against a Higgs boson are presented. Various final states, topologies and kinematic variables are explored. In this talk, we focus on the recent CMS results obtained using the full Run-II dataset collected at the LHC.

You are

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Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: SAHU, Bisnupriya (Indian Inst. of Science Educat. and Research)

Session Classification: Parallel: BSM

Contribution ID: **86** Type: **Parallel session**

Searches for additional heavy Higgs bosons at CMS

Tuesday, 28 November 2023 12:10 (15 minutes)

Searches for additional Higgs bosons with mass above 125 GeV are presented, using the Run-2 data set collected by the CMS experiment. A variety of processes and final states (A->tautau/bb, Z* -> h/H A, A->Zh, …) are discussed.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: JAFFEL, Khawla

Session Classification: Parallel: BSM

Contribution ID: **87** Type: **Parallel session**

Rare Higgs boson decays with the CMS experiment

Tuesday, 28 November 2023 11:35 (15 minutes)

Exclusive rare decays of the Higgs boson into a gauge boson (Z or gamma) + meson (such as J/Psi, eta_c, rho, phi etc.) provide an excellent probe of the Higgs Yukawa coupling to quarks of the first and second generations. While the contribution to the rate of these decays from the diagrams involving Yukawa couplings is negligible in the Standard Model (SM), in theories beyond the SM this contribution could be significantly enhanced and deviations from the SM branching ratios could be observed because of the interference with the dominant diagrams, where meson is formed via Higgs boson decays to Z bosons or photons. This presentation gives an overview of the CMS analyses searching for the H->gamma/Z+meson decays and discusses interpretation of the search results within various BSM scenarios predicting enhanced couplings of the Higgs boson to charm and light-flavor quarks. We will also cover other rare Higgs boson decay channels, such as H->Zgamma and H->invisible.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: UMORET, Giulio

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **88** Type: **Parallel session**

Searches for rare Higgs boson production modes at CMS

Tuesday, 28 November 2023 12:10 (15 minutes)

We discuss rare Higgs boson production modes studied with the CMS experiment. Rare production modes where the Higgs boson is produced in association with a quark provide a channel to test Higgs Yukawa couplings independently from the Higgs boson decay. Such searches have been carried out by the CMS Collaboration using the dataset collected by the CMS experiment, exploiting a variety of Higgs boson decay channels. Results of these experimental studies are presented and confronted against predictions of the SM and BSM theories.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: GUAN, Zhe (Peking University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **89** Type: **Parallel session**

Study of the boosted Higgs boson production

Thursday, 30 November 2023 11:00 (15 minutes)

The study of Higgs boson production at large transverse momentum is one of the new frontiers for the LHC Higgs physics programme. Measuring the properties of highly Lorentz-boosted Higgs bosons can test the existence of physics beyond the SM (BSM) in the scalar sector, as well as test higher order EW radiative corrections in Higgs production. In this presentation we discuss CMS analyses targeting the boosted Higgs boson production followed by the Higgs boson decay into bottom quarks, charm quarks, and tau lepton pairs. Experimental studies are performed using full Run 2 dataset and make use of dedicated algorithms, which resolve overlapping decay products of the Higgs boson, thereby facilitating its detection in the boosted regime. Results of these analyses are presented in terms of measured fiducial cross sections and differential distributions and compared to the state-of-the-art theoretical predictions.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: XIAO, Jie (IPN)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **90** Type: **Parallel session**

Higgs boson cross-section measurements in fermionic final states with the CMS detector

Tuesday, 28 November 2023 09:40 (15 minutes)

With the huge amount of data collected at the LHC, very detailed measurements of the properties of the Higgs boson can be performed, exploiting a variety of final states and production modes and probing different regions of the phase space with increasing precision. In this talk we present an overview of the most recent differential and fiducial Higgs boson cross section measurements from CMS, studying the fermionic decay channels of the Higgs boson.

You are

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Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: Dr JAVAID, Tahir (Beihang University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **91** Type: **Parallel session**

Measurement of Higgs boson mass using bosonic decay channels with the CMS detector

Wednesday, 29 November 2023 16:40 (15 minutes)

The mass of the Higgs boson can be measured in the Higgs to four leptons and Higgs to two photons decay channels, thanks to their excellent mass resolution. The same decays can be used to measure the Higgs boson natural width, either by exploiting the offshell Higgs contribution to the four leptons and two leptons plus two neutrinos production at high mass, or by fitting the on-shell distribution in the diphoton decay. This talk presents the most recent measurements of Higgs boson mass and width performed by the CMS experiment, using Run 2 data of pp collisions collected at 13 TeV at the LHC.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: IEMMI, Fabio (IHEP)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **92** Type: **Parallel session**

Combined measurements of Higgs boson cross sections and couplings at CMS

Wednesday, 29 November 2023 14:20 (15 minutes)

The best possible understanding of the Higgs boson and its interactions is achieved via combining measurements of the different Higgs boson production modes and decay channels. This talk focuses on the results of the latest Higgs boson combinations performed by the CMS experiment. The results are extracted using the full CMS Run 2 dataset. After detailing the procedure for the combinations, measurements of Higgs boson signal strengths, cross sections and couplings to SM particles will be presented.

You are

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Primary authors: LIAO, Hongbo (Institute of High Energy Physics); YANG, Chuxue (Sun Yat-Sen University)

Presenter: YANG, Chuxue (Sun Yat-Sen University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **93** Type: **Parallel session**

Search for anomalous couplings affecting Higgs boson production and decay with the CMS experiment

Friday, 1 December 2023 09:55 (12 minutes)

A search for Higgs boson anomalous couplings is carried out using the CMS Run 2 dataset. Anomalous couplings of the Higgs boson to vector bosons (HVV) and gluons (Hgg) are considered, including CP violating effects. The ggH, VBF, and VH production modes of the Higgs boson are targeted. Kinematic information from associated jets is combined using matrix element techniques to increase sensitivity to anomalous effects at the production vertex. A simultaneous measurement of multiple Higgs boson couplings to electroweak vector bosons is performed in the framework of a standard model effective field theory. Constraints are set on the fractional contribution of the anomalous couplings to the Higgs boson cross section.

You are

non-PhD student

Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: SANTOCCHIA, Attilio (Univ. di Perugia e Sez. dell'INFN)

Session Classification: Parallel: EFT

Contribution ID: **94** Type: **Parallel session**

Non-resonant Di-Higgs searches at CMS

Tuesday, 28 November 2023 09:55 (15 minutes)

Recent results on studies of Higgs boson pair (HH) production are presented, exploiting data collected in Run 2 of the LHC by the CMS experiment. A variety of Higgs boson decay channels will be studied, ranging from those with large branching fractions (combinations of H->bb and H->VV) to thos with smaller branching fractions. Limits are presented on nonresonant HH production via gluon-gluon fusion and vector boson fusion, assuming SM properties, as well as a range of anomalous Higgs boson couplings.

You are

non-PhD student

Primary authors: LIAO, Hongbo (Institute of High Energy Physics); D'ANZI, Brunella

Presenter: D'ANZI, Brunella

Session Classification: Parallel: Di-Higgs

Contribution ID: **95** Type: **Parallel session**

Resonant HH/HY searches at the CMS experiment

Wednesday, 29 November 2023 16:30 (15 minutes)

We present the latest results on resonant searches for di-Higgs production from the CMS experiment. The results are presented as upper limits on the production of a heavy resonance that decays to two 125 GeV Higgs bosons. We will also cover searches for a heavy resonance decaying to a 125 GeV Higgs boson and another heavy resonance.

You are

non-PhD student

Primary author: KRAMER, Tobias (University of Hamburg)

Presenter: KRAMER, Tobias (University of Hamburg)

Session Classification: Parallel: Di-Higgs

Contribution ID: **96** Type: **Parallel session**

Prospects for Higgs measurements and HH/HY searches at the HL-LHC with CMS

Friday, 1 December 2023 11:00 (20 minutes)

We present prospects for Higgs boson measurements at the HL-LHC with the CMS experiment. In particular we focus on resonant and non-resonant di-Higgs searches. For the case of a heavy resonance, we also cover the HL-LHC prospects for decays to a 125 GeV Higgs boson and another heavy resonance.

You are

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Primary author: LIAO, Hongbo (Institute of High Energy Physics)

Presenter: GUO, Zhengliang (University for Science and Technology of China)

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **97** Type: **Parallel session**

Search the charged and neutral scalars at the LHC

Thursday, 30 November 2023 09:00 (15 minutes)

we would like to introduce our recent work about BSM Higgs searches at LHC, in the framework of 2HDM. The study will include both the neutral and charged Higgs studies. including various BSM Higgs production and decay channels, as well as the exotic Higgs decays.

You are

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Primary author: Dr 苏, 伟 (Sun Yat-Sen University)

Presenter: Dr 苏, 伟 (Sun Yat-Sen University)

Session Classification: Parallel: BSM

Contribution ID: **98** Type: **Parallel session**

Low-mass doubly charged Higgs bosons at the LHC

Wednesday, 29 November 2023 14:00 (15 minutes)

Search for light (within the mass range 84–200 GeV) doubly-charged Higgs bosons decaying into a pair of W-bosons has been deemed challenging using the conventional LHC searches with leptons, jets and missing transverse momentum in the final state. Such Higgses together with slightly heavier singly-charged and neutral Higgses, when arranged in an $SU(2)_L$ triplet as in the type-II see-saw model, are lately shown to accommodate the recent measurement of the W-boson mass by the CDF collaboration. These, when produced in a highly Lorentz-boosted regime, tend to manifest themselves as a single fat-jet or a pair of adjacent same-sign leptons plus missing transverse momentum. First, we perform a multivariate analysis to discern such exotic jets from the SM jets. Then, we present a novel search in the final state with an exotic jet and two same-sign leptons plus missing transverse momentum. We find that such low-mass doubly-charged Higgsses could be directly probed with the already collected Run 2 LHC data.

You are

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Primary authors: Dr GHOSH, Kirtiman; ASHANUJJAMAN, Saiyad (University of Delhi); Mr SAHU, Rameswar

Presenters: ASHANUJJAMAN, Saiyad (University of Delhi); Mr SAHU, Rameswar

Session Classification: Parallel: BSM

Contribution ID: **99** Type: **Parallel session**

High precision results for Higgs and Top decay in QCD

Thursday, 30 November 2023 09:40 (15 minutes)

The detailed investigation of the production and decay the Standard Model Higgs boson and Top quark, as well as the search for new Higgs resonances, remain among the major research topics at the Large Hadron Collider and the future high-energy lepton colliders. The talk will be devoted to the presentation of the perturbative results for the decay of Higgs and Top (in QCD) at the level of sub-percent precision.

You are

non-PhD student

Primary authors: CHEN, Long (Shandong University); Prof. BERNRUETHER, Werner (RWTH Aachen University); Dr CHEN, Xiang (Peking University); Dr GUAN, Xin (Peking University); Prof. MA, Yan-Qing (Peking University); Prof. SI, Zongguo (Peking University)

Presenter: CHEN, Long (Shandong University)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **100** Type: **Parallel or Poster session**

Exploring dark photon production via maverick top partner decays at the LHC

Friday, 1 December 2023 11:40 (15 minutes)

In this talk, we present a novel model that extends the standard model (SM) by introducing a $SU(2)_L$ singlet vectorlike quark (VLQ) charged under an additional local $U(1)_d$ symmetry group, along with the associated gauge boson, known as the dark photon. Owing to the additional $U(1)_d$ charge, the model predicts a suppressed branching ratio for the VLQ in the standard modes, leading to an intriguing possibility: its decay into a top quark and a dark photon/dark Higgs. This unique decay mode helps us to evade existing LHC bounds and at the same time offers an unexplored territory in the context of collider experiments. We conduct a comprehensive study of the collider signatures associated with the proposed model at the 13 and 14 TeV LHC center-of-mass energies. Specifically, we focus on the $t\bar{t}+missing\,transverse\,energy$ and $t+missing\,transverse\,energy$ signatures, which allow us to constrain the VLQ mass and its mixing angle with the top quark.

You are

PhD student

Primary author: Mr VERMA, Shivam (Ramakrishna Mission Vivekananda Educational and Research Institute)

Co-authors: Dr CHATTERJEE, Anirban (Indian Institute of Technology Kanpur); Dr BISWAS, Sanjoy (Ramakrishna Mission Vivekananda Educational and Research Institute); Mr GANGULY, Joy (Indian Institute of Technology Hyderabad)

Presenter: Mr VERMA, Shivam (Ramakrishna Mission Vivekananda Educational and Research Institute)

Session Classification: Parallel: BSM

Contribution ID: **101** Type: **Parallel session**

Discovering a light charged Higgs boson at the LHC

Wednesday, 29 November 2023 14:20 (15 minutes)

Most of the current experimental searches for charged Higgs bosons at the Large Hadron Collider (LHC) concentrate upon the tb and τν decay channels. In the present study, we analyze instead the feasibility of the bosonic decay channel W±∗h, with the charged gauge boson being off-shell and h being a neutral light Higgs boson, which decays predominantly into b¯b. We perform a Monte Carlo (MC) analysis for the associate production of a charged Higgs with such a light neutral one, pp ⟶ H±h, at the LHC followed by the aforementioned charged Higgs boson decay, which leads to a W±∗ + 4gamma/W±∗ + 4b/W±∗ + 2b2τ final state. The analysis is performed within the 2-Higgs Doublet Model (2HDM) with Yukawa texture of Type-I. We take into account all available experimental constraints from LEP, Tevatron and the LHC as well as the theoretical requirements of selfconsistency of this scenario. In order to study the full process, we provide several Benchmark Points (BPs) amenable to further analysis, with MH± + Mb < Mt, for which we prove that there is a strong possibility that this spectacular signal could be found at the LHC with center of mass energy of 14 TeV and luminosity of 300 fbˆ{−1}.

You are

non-PhD student

Primary authors: YAN, Qi-Shu (UCAS); WANG, yan (内蒙古师范大学); MORETTI, Stefano (School of Physics and Astronomy, University of Southampton, United Kingdom)

Presenter: WANG, yan (内蒙古师范大学)

Session Classification: Parallel: BSM

Contribution ID: **102** Type: **Parallel session**

Pseudo-Nambu-Goldstone Dark Matter from Non-Abelian Gauge Symmetry

Thursday, 30 November 2023 11:00 (15 minutes)

Weakly-Interacting Massive Particle (WIMP), a strong candidate for dark matter (DM), faces the dilemma of being severely constrained by DM direct detection experiments when trying to explain DM relic abundance.
One WIMP model that avoids this dilemma is the pseudo-Nambu-Goldstone dark matter model (pNGB DM model). The pNGB DM requires explicit global symmetry breaking, but all realistic and UV-completed models so far have allowed DM to decay.
In our study, we have succeeded in introducing a stable pNGB DM. We impose a new dark SU(2) gauge symmetry on the theory and introduce new scalar fields. This model in fact has an accidental global symmetry larger than the dark SU(2) (in the same way as the custodial symmetry of the Standard Model). This subgroup of global symmetries guarantees the stability of the pNGB DM. We also present benchmarks that allow us to avoid the current experimental constraints coming from direct detection experiments and Higgs invisible decay. This presentation is based on Phys. Rev. D 106, 115033 (2022).

You are

non-PhD student

Primary authors: Dr OTSUKA, Hajime (Kyushu University); Dr UCHIDA, Yoshiki (South China Normal University); Prof. TSUMURA, Koji (Kyushu University); Dr YAMATSU, Naoki (National Taiwan University); Prof. SHIMOMURA, Takashi (University of Miyazaki)

Presenter: Dr UCHIDA, Yoshiki (South China Normal University)

Session Classification: Parallel: BSM

Contribution ID: **104** Type: **Parallel session**

Semi-leptonic ttbar & ttH reconstruction using Symmetry Preserving Attention Networks at the LHC

Thursday, 30 November 2023 11:40 (15 minutes)

The reconstruction of hadronically decaying particles such as top quarks and Higgs bosons from their decay components is a complex problem which limits the sensitivity of many analyses including Higgs boson measurements and BSM searches. A novel approach to this problem, utilizing Symmetry Preserving Attention Networks (SPANet), has been previously studied for all-hadronic $t\bar{t}$ decays. In this talk, we present new features implemented in the algorithm as well as its extended application to semi-leptonic final states. Its potential impact on $ttH(\rightarrow b\bar{b})$ and $t\bar{t}$-related analyses will be shown.

You are

non-PhD student

Primary authors: SHMAKOV, Alexander (University of California, Irvine); Prof. OKAWA, Hideki (高能所); WHITESON, Daniel (University of California, Irvine); HSIAO, Ko-Yang (National Tsing Hua University); FENTON, Michael James (University of California, Irvine); BALDI, Pierre (University of California, Irvine); HSU, Shih-Chieh (University of Washington); LI, Yuji (Fudan University)

Presenter: Prof. OKAWA, Hideki (高能所)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **105** Type: **Parallel session**

Higgs Physics with ILC

Friday, 1 December 2023 09:00 (15 minutes)

Energy staged data collection, polarization of both beams and capability of a linear machine to reach TeV center-of-mass energies makes ILC ideal option for a future Higgs factory. It offers unique sensitivity to probe New Physic's deviations from the Standard Model predictions in the Higgs sector. Coupling precisions of the order of 1% and better are necessary to pin down a concrete New Physic's model, while the Higgs self-coupling can be determined with the relative precision of about 10%, also in cases when it deviates strongly from the Standard Model. CP properties of the Higgs boson can be probed with targeted precision, in numerous production and decay vertices, when the Higgs boson is coupled either to vector bosons or fermions. These and other ILC measurements will be highlighted in this talk.

You are

non-PhD student

Primary authors: BOZOVIC, Ivanka (Vinca Institute of Nuclear Sciences); Dr TIAN, Junping (University of Tokyo)

Presenter: BOZOVIC, Ivanka (Vinca Institute of Nuclear Sciences)

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **106** Type: **Parallel session**

Determination of CPV Higgs mixing angle in ZZ-fusion at 1 TeV ILC

Friday, 1 December 2023 10:00 (15 minutes)

With the current precision of LHC experiments, it is still possible that the 125 GeV mass eigenstate of the Higgs boson is a CP violating mixture of CP eigenstates of opposite parity. We investigate the possibility to measure CPV mixing angle in such scenario, assuming CP-odd admixture of up to 10%. Polarized ILC data are simulated employing the ILD detector, at 1 TeV center of mass energy. Result is discussed in the light of the theoretical precision target of 10-5 for CP violating factor fCP.

You are

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Primary author: BOZOVIC, Ivanka (Vinca Institute of Nuclear Sciences)

Co-authors: Mr KACAREVIC, Goran (VINCA Institute of Nuclear Sciences, University of Belgrade); Ms VUKASINOVIC, Natasa (VINCA Institute of Nuclear Sciences, University of Belgrade)

Presenter: BOZOVIC, Ivanka (Vinca Institute of Nuclear Sciences)

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **107** Type: **Parallel session**

Prospects for light exotic scalar measurements at the e+e- Higgs factory.

Friday, 1 December 2023 11:25 (15 minutes)

The physics program of the Higgs factory will focus on measurements of the 125 GeV Higgs boson, with the Higgs-strahlung process being the dominant production channel at 250 GeV. However, production of extra light scalars is still not excluded by the existing experimental data, provided their coupling to the gauge bosons is sufficiently suppressed. Fermion couplings of such a scalar could also be very different from the SM predictions leading to non-standard decay paterns. Considered in the presented study is the feasibility of direct light scalar observation at future Higgs factory experiments assuming dominant decays to tau lepton pairs.

You are

non-PhD student

Primary authors: ZARNECKI, Aleksander Filip (Faculty of Physics, University of Warsaw); FILIP ZARNECKI, Aleksander

Presenters: ZARNECKI, Aleksander Filip (Faculty of Physics, University of Warsaw); FILIP ZARNECKI, Aleksander

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **108** Type: **Parallel session**

Implication of the 95GeV di-tau and di-photon excesses

Tuesday, 28 November 2023 11:55 (12 minutes)

The CMS collaboration has reported the di-tau and also di-photon excesses with the local significance of $\approx 3\sigma$ levels where the invariant mass is m = 95–100 GeV. These excesses can be interpreted as a light scalar boson that couples to the third-generation fermions, particularly top and tau. Based on the simplest model that can account for the CMS di-tau excess, we evaluate experimental sensitivities to the additional light resonance using the results reported by the ATLAS collaboration. We see that a search for the top-quark associated production of the SM Higgs boson that decays into di-tau sets a strong model-independent limit. We also find that the CP-even scalar interpretation of the light resonance is excluded by the ATLAS results, while the CP-odd interpretation is not. Furthermore, we discuss the asymmetric di-Higgs production in this simplified model.

You are

non-PhD student

Primary author: KITAHARA, Teppei (ITP, CAS)

Co-authors: ZHANG, Hantian; IGURO, Syuhei; OMURA, Yuji

Presenters: KITAHARA, Teppei; KITAHARA, Teppei (ITP, CAS)

Session Classification: Parallel: BSM

Contribution ID: **109** Type: **Parallel session**

Higgs-strahlung at the LHC in the inert doublet model: Full next-to-leading electroweak and QCD corrections

Thursday, 30 November 2023 09:40 (12 minutes)

Full one-loop QCD and electroweak corrections to the Higgs-starhlung process at the LHC, $pp \to W^{\pm}H, ZH$ in the inert doublet model (IDM) are studied. Taking all available constraints on the parameter space of the IDM, we consider the case where the IDM qualifies as a good dark matter (DM) candidate within the freeze-out mechanism and the case where DM constraints are not imposed, hence the model is not assumed to provide a DM candidate. Within the respective constraints we quantify the deviation from the standard model predictions at the one-loop order. For a better quantification of the deviation from the SM prediction, for the one-loop QCD corrections we adapt the renormalisation and factorisation scales such that the N3LO are recovered. We stress the importance of the photon induced real corrections. We find that while the one-loop corrections are large, the deviations from the SM are small. This is particularly true if the present DM constraints are imposed, the deviations from the SM in this case are a few per-mil and may not be measured. In case the model does not provide a good DM candidate, the corrections can reach a few percent. Another motivation for the present work is to show that one-loop electroweak and QCD corrections for a new physics model can be performed with an automated tool both for the virtual and the real corrections where for the latter both a dipole subtraction and a phase space slicing can be implemented.

You are

PhD student

Primary authors: 何, 大壮 (大连理工大学); Prof. 张, 宇; Prof. FAWZI, Boudjema; Prof. 孙, 昊

Presenter: 何, 大壮 (大连理工大学)

Session Classification: Parallel: BSM

Contribution ID: **111** Type: **Parallel or Poster session**

Searching for dark neutrinos through exotic Higgs decays at the ILC

Friday, 1 December 2023 11:45 (15 minutes)

In this study we investigate the feasibility of detecting heavy dark neutrinos (N_d) through exotic Higgs decays at the proposed International Linear Collider (ILC), specifically in the channel of $e^+e^- \to qq\ H$ with $H \to \nu N_d \to \nu\ lW \to \nu l\ qq$. Analyses based on full detector simulations of the ILD are performed at the center-of-mass energy of 250 GeV for two different beam polarization schemes with a total integrated luminosity of 2 ab^{-1}. A range of dark neutrino masses between the Z boson and Higgs boson masses are studied. The 2σ significance reach for the joint branching ratio of $BR(H \to \nu N_d) \cdot BR(N_d \to lW)$ is about 0.1%, nearly independent of the dark neutrino masses, while the 5σ discovery is possible at a branching ratio of 0.3%. Interpreting these results in terms of constraints on the mixing parameters $|\varepsilon_{id}|^2$ between SM neutrinos and the dark neutrino, it is expected to have at least a factor of 10 improvement from current constraints.

You are

non-PhD student

Primary authors: TIAN, Junping (The University of Tokyo); THOR, Simon (KTH Royal Institute of Technology); Prof. ISHINO, Masaya (The University of Tokyo)

Presenter: THOR, Simon (KTH Royal Institute of Technology)

Session Classification: Parallel: Future

Track Classification: Future colliders and experiments (including projections)

Contribution ID: **112** Type: **Parallel session**

Anomalous triple gauge couplings in electroweak dilepton tails at the LHC and interference resurrection

Friday, 1 December 2023 09:20 (15 minutes)

We study the electroweak dilepton production with two forward jets at the LHC, aiming to measure the anomalous triple gauge couplings in the Effective Field Theory (EFT) approach. This process exhibits a distinctive feature, namely, the interference between Standard Model (SM) and beyond the SM is resurrected in the inclusive cross section of the full amplitude, including two forward jets. As a concrete illustration, we perform the detailed analytic and numerical study of the interference using a simpler toy process, and discuss the subtlety of the effective W approximation. We propose a new kinematic variable, VBFhardness, that controls the amount of energy flowing into the dilepton subprocess. We show that an appropriate cut on VBFhardness makes the interference resurrection manifest.
Finally, we use the invariant mass of the dilepton system as well as the transverse momentum, as done in the literature, to derive the sensitivity to anomalous triple gauge couplings at the LHC and the high luminosity LHC. Our result is compared with the existing limits from the experiments.

You are

PhD student

Primary authors: Mr HWANG, Haeyun (Korea University); Mr MIN, Ui (TDLI/SJTU); Mr PARK, Junghyeon (KAIST); Prof. SON, Minho (KAIST); Prof. YOO, Jae Hyeok (Korea University)

Presenter: Mr MIN, Ui (TDLI/SJTU)

Session Classification: Parallel: EFT

Contribution ID: **113** Type: **Parallel session**

Two-loop EW Corrections to Higgs Boson Pair Production: Yukawa and Self-coupling corrections

Wednesday, 29 November 2023 16:00 (12 minutes)

QCD corrections to Higgs Boson pair production are known at N3LO in the Heavy Top Limit and NLO including the top quark mass. However, the complete NLO electroweak corrections are currently missing. Given the current focus of the LHC experiments and knowing that the electroweak corrections to single Higgs production amount to around 5% and vary strongly depending on the mass of the Higgs boson, it is now interesting to examine the size of their impact on Higgs pair production. In this talk, we present exact numerical results for the Yukawa enhanced and Higgs self-coupling pieces of the electroweak corrections. This challenging 2->2 calculation is carried out retaining the exact symbolic dependence on all masses and scales during reduction, the resulting master integrals are then evaluated at high precision using both the series expansion of the differential equations and sector decomposition.

You are

PhD student

Primary authors: VESTNER, Augustin; HEINRICH, Gudrun; KERNER, Matthias; JONES, Stephen; STONE, Thomas

Presenter: STONE, Thomas

Session Classification: Parallel: Di-Higgs

Track Classification: Precision & Yukawas

Contribution ID: **114** Type: **Parallel session**

Measurement of the H to ZZ to 4l cross-section in pp collisions at sqrt{s} == 13.6 TeV with the ATLAS detector

Wednesday, 29 November 2023 15:20 (12 minutes)

The inclusive Higgs boson production cross-section is measured at an unprecedented energy frontier for the first time in the H to ZZ*to 4l decay channel, using 29.0 fb-1 of pp collision data collected with the ATLAS detector at a center-of-mass-energy of sqrt{s} = 13.6 TeV. To reduce the model dependence, the measurement is restricted to a particle-level phase space that closely matches the channel's detector-level kinematic selection, and corrected for detector effects. This talk presents the measured fiducial cross-section for the H to ZZ* to 4l process, which is found to be in good agreement with the corresponding Standard Model predictions. The fiducial measurement is also extrapolated to the full phase space, assuming Standard Model acceptance and branching fraction.

You are

PhD student

Primary authors: PETERS, Krisztian (DESY); YE, Xinmeng

Presenter: YE, Xinmeng

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **117** Type: **Parallel session**

Probing the CP Violating top Yukawa coupling at the LHC

Friday, 1 December 2023 09:40 (12 minutes)

We study Higgs boson production associated with single top or anti-top via t-channel weak boson exchange at the LHC. The process is an ideal probe of the top quark Yukawa coupling, because we can measure the relative phase of htt and hWW couplings, thanks to the significant interference between the two amplitudes. Both the azimuthal asymmetry and the polarization perpendicular to the scattering plane are found to have the opposite sign between the top and anti-top events. We identify the origin of the sign of asymmetries, and propose the possibility of direct CP violation test in pp collisions by comparing the top and anti-top polarization at the LHC.

You are

non-PhD student

Primary authors: Prof. HAGIWARA, Kaoru; Prof. BARGER, Vernon; ZHENG, Ya-Juan

Presenter: ZHENG, Ya-Juan

Session Classification: Parallel: EFT

Contribution ID: **119** Type: **Parallel session**

Non-factorizable corrections to Higgs production in Vector Boson Fusion: Beyond Eikonal

Thursday, 30 November 2023 10:00 (15 minutes)

Higgs production in Vector Boson Fusion (VBF) has the second largest cross section at the LHC. Its signature on collider is characterized by two energetic jets in the forward region. The previous high-order corrections to VBF Higgs production usually neglect the non-factorizable contribution which is color suppressed compared to its factorizable counterpart. It was however found in the leading eikonal approximation that the non-factorizable contribution had an enhancement by a factor Pi squared. To have a better understanding of non-factorizable corrections to VBF Higgs production, it is desirable to go beyond leading eikonal approximation. In this talk, I will show how to expand the two-loop five-point VBF amplitude in the eikonal limit and obtain the first power correction. A compact integral representation will be presented. With suitable arguments, only logarithmic and dilogarithmic functions are enough to express the amplitude. The new sub-leading contribution will change the current estimate of the non-factorizable corrections to VBF cross section by about 20 percent.

You are

non-PhD student

Primary author: LONG, Ming-Ming (KIT)

Presenter: LONG, Ming-Ming (KIT)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **120** Type: **Parallel session**

Measurement of ttH and tH Production in the H to bb Decay Channel at CMS

Thursday, 30 November 2023 12:00 (12 minutes)

Measurement of ttH and tH Production in the H to bb Decay Channel at CMS

You are

PhD student

Presenter: DATTA, Abhisek (University of California, Los Angeles)

Session Classification: Parallel: Precision & Yukawas

Track Classification: Precision & Yukawas

Contribution ID: **121** Type: **Parallel session**

Search for a standard model-like Higgs boson in the mass range between 70 and 110 GeV in the diphoton final state in proton-proton collisions at √s=13 TeV

Tuesday, 28 November 2023 11:20 (15 minutes)

Search for a standard model-like Higgs boson in the mass range between 70 and 110 GeV in the diphoton final state in proton-proton collisions at √s=13 TeV with CMS

You are

Primary authors: LIAO, Hongbo (Institute of High Energy Physics); Dr SHAHZAD, Muhammad Aamir

Presenter: Dr SHAHZAD, Muhammad Aamir

Session Classification: Parallel: BSM

Contribution ID: **122** Type: **not specified**

Searches for additional scalar bosons

Thursday, 30 November 2023 14:00 (25 minutes)

Presenter: LIU, Yanwen (USTC)

Session Classification: BSM

Contribution ID: **123** Type: **not specified**

BSM Higgs and anomalies

Wednesday, 29 November 2023 12:00 (25 minutes)

Presenter: SU, Shufang (University of Arizona)

Session Classification: EFT

Contribution ID: **124** Type: **not specified**

Searches for invisible decays of the Higgs boson

Thursday, 30 November 2023 15:00 (25 minutes)

Presenter: HSU, Shih-Chieh (University of Washington)

Session Classification: BSM

Contribution ID: **125** Type: **not specified**

Higgs as a portal and BSM Exotic Higgs decays

Thursday, 30 November 2023 16:00 (25 minutes)

Presenter: LIU, Wei (Nanjing University of Science and Technology)

Session Classification: BSM

Contribution ID: **126** Type: **not specified**

Searches for BSM decays of the Higgs boson

Thursday, 30 November 2023 16:30 (25 minutes)

Presenter: LI, Hengne (South China Normal University)

Session Classification: BSM

Contribution ID: **127** Type: **not specified**

CP properties and searches

Thursday, 30 November 2023 17:00 (25 minutes)

Presenter: CHENG, Tongguang (Beihang University)

Session Classification: BSM

Contribution ID: **128** Type: **not specified**

Higgs boson couplings and EFT constraints from Higgs boson measurements

Wednesday, 29 November 2023 09:00 (25 minutes)

Presenter: ZHOU, Chen (Peking University)

Session Classification: EFT

Contribution ID: **129** Type: **not specified**

EFT beyond Higgs: EFT constraints from measurements in the Top quark sector

Wednesday, 29 November 2023 09:30 (25 minutes)

Presenter: WANG, Haichen

Session Classification: EFT

Contribution ID: **130** Type: **not specified**

EFT beyond Higgs: Measurements of diboson and multiboson production and associated EFT constraints, including global combination

Wednesday, 29 November 2023 10:00 (25 minutes)

You are

Presenter: LIU, Miaoyuan (S)

Session Classification: EFT

Contribution ID: **131** Type: **not specified**

Global EFT fits

Wednesday, 29 November 2023 11:00 (25 minutes)

Presenter: GU, Jiayin (Fudan University)

Session Classification: EFT

Contribution ID: **132** Type: **not specified**

EFT for Higgs beyond dim-6

Wednesday, 29 November 2023 11:30 (25 minutes)

You are

Presenters: SHU, Jing (Institute for Theoretical Physics, Chinese Academy of Sciences); SHU, Jing (Peking University)

Session Classification: EFT

Contribution ID: **133** Type: **not specified**

Hilbert series, the Higgs mechanism, and HEFT

Thursday, 30 November 2023 14:30 (25 minutes)

You are

Primary authors: HENNING, Brian; HENNING, Brian

Presenters: HENNING, Brian; HENNING, Brian

Session Classification: BSM

Contribution ID: **134** Type: **not specified**

Q&A

Session Classification: Parallel: Precision & Yukawas

Contribution ID: **135** Type: **not specified**

Q&A

Session Classification: Parallel: Di-Higgs

Contribution ID: **136** Type: **not specified**

Logistics and announcements

Monday, 27 November 2023 09:50 (10 minutes)

You are

Presenters: RUAN, Manqi (IHEP); CHEN, Mingshui (IHEP); FANG YAQUAN, Yaquan (高能所)

Session Classification: Welcome and Opening

Contribution ID: **137** Type: **not specified**

Closing

Friday, 1 December 2023 17:30 (10 minutes)

Presenter: PIACQUADIO, Giacinto

Session Classification: Closing Remarks

Contribution ID: **138** Type: **not specified**

Higgs 2024 Conference

Friday, 1 December 2023 17:40 (5 minutes)

Presenter: FERRARI, Arnaud

Session Classification: Closing Remarks