(Re)interpretation of the LHC results for new physics

Report of Contributions

Contribution ID: **1** Type: **Talk**

Determining The Sign Of \kappa_{Z} Using New Resonance Searches.

Tuesday 29 August 2023 12:10 (15 minutes)

In this talk I will describe a method to determine the relative sign between the hZZ and hWW couplings using the data which are collected by the ATLAS and CMS collaborations. Using the concept of perturbative unitarity we have developed a prescription and reconstruct a phenomenological Lagrangian using FeynRule package. After that we have constructed the UFO file for this simplified model and generate relevant signals using Madgraph event simulators. We have recasted existing direct search bounds from ATLAS and CMS to improve existing constraints on 125 GeV Higgs boson couplings with SM gauge bosons.

Author: Prof. DAS, Dipankar (IIT Indore)

Co-authors: SARKAR, Agnivo (HRI); Prof. KUNDU, Anirban (Calcutta University); Mr PRASAD, Anugrah (IIT Indore); Dr SAHA, Ipshita (Allahabad University); Dr LEVY, Miguel (CFTP)

Presenter: SARKAR, Agnivo (HRI)

Session Classification: Reinterpretation studies / pheno

Contribution ID: **2**
Type: **Talk**

Active Learning for analysis reinterpretation and constraining additional physics parameters

Wednesday 30 August 2023 15:30 (20 minutes)

Most Beyond Standard Model (BSM) physics theories are characterized by multiple BSM parameters. These encompass properties like new particle masses, coupling constants, decay widths, and effective field theory parameters.

When testing such theories against data, analysts might choose to consider only a subset of relevant BSM physics parameter in order to work within limits of computational resources and person power. Nonetheless, it is generally desirable to constrain all relevant physics parameters in a given BSM theory and produce exclusion contours in the n-dimensional space spanned by the BSM parameters.

To make the calculation of such n-dimensional exclusion contours more tenable, we present an advanced automated analysis workflow that allows the computationally efficient reinterpretation of preserved analyses.
The workflow comprises an integrated analysis pipeline and active learning. The former automatically executes all steps of an analysis from event generation through to limit setting, reducing thus the required labor.

On the other hand, active learning is employed to guide the sampling of the multi-dimensional BSM parameter phase space to find the exclusion contours in an iterative process. The sampling process focuses on prioritizing points in the vicinity of the exclusion region, while reducing the sampling density in less relevant areas. This allows exclusions over high-dimensional theory phase spaces that are otherwise impractical.

We showcase the implementation of the workflow in the Production and Distributed Analysis (PanDA) system and intelligent Data Delivery Service (iDDS) in ATLAS. To demonstrate its utility, we present its application in an extended search for a dark Z-boson using events with four-lepton final states. Additionally, we highlight the progress made towards a second demonstration in a heavy Higgs analysis.

Author: WEBER, Christian (Brookhaven National Laboratory)

Presenter: WEBER, Christian (Brookhaven National Laboratory)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: **3**   Type: **Talk**

Testing the scalar triplet solution to CDF's heavy W problem at the LHC

Tuesday 29 August 2023 10:10 (15 minutes)

The type II seesaw model remains a popular and viable explanation of neutrino masses and mixing angles. By hypothesizing the existence of a scalar that is a triplet under the weak gauge interaction, the model predicts strong correlations among neutrino oscillation parameters, signals at lepton flavour experiments, and collider observables at high energies. We investigate reports that the type II seesaw can naturally accommodate recent measurements by the CDF collaboration, which finds the mass of the W boson to be significantly larger than allowed by electroweak precision data, while simultaneously evading constraints from direct searches. Experimental scrutiny of this parameter space in the type II seesaw has long been evaded since it is not characterized by "golden channels" at colliders but instead by cascade decays, moderate mass splittings, and many soft final states. In this work, we test this parameter space against publicly released measurements made at the Large Hadron Collider. By employing a newly developed tool chain combining madgraph5_amc@nlo and contur, we find that most of the favoured space for this discrepancy is already excluded by measurements of Standard Model final states. We give suggestions for further exploration at run III of the LHC, which is now under way.

Authors: HEECK, Julian; MATTELAER, Olivier (IPPP); RUIZ, Richard (IPPP / University of Durham); JEON, Sihyun

Co-author: BUTTERWORTH, Jonathan (UCL)

Presenter: BUTTERWORTH, Jonathan (UCL)

Session Classification: Reinterpretation studies / pheno

Contribution ID: **5**   Type: **Talk**

Global constraints of the electroweak-ino sector of the MSSM with SModelS 2.3

Tuesday 29 August 2023 11:30 (15 minutes)

Reinterpretations of LHC searches are typically done in a channel-by-channel approach, considering the constraints from each experimental search separately. In this presentation, we go a step further and discuss how combining LHC search results into a global likelihood can give better and statistically more robust constraints on the tested models. Concretely, our analysis focuses on the electroweakino sector of the MSSM, for which we derive global constraints based on the ~10 publicly available and reusable ATLAS and CMS searches for signals in this sector through the SModelS package.

Authors: LESSA, Andre; ALTAKACH, Mohammad; KRAML, Sabine (LPSC Grenoble); NARASIMHA, Sahana; PASCAL, Timothee; WALTENBERGER, Wolfgang

Presenter: PASCAL, Timothee

Session Classification: Reinterpretation studies / pheno

Contribution ID: **7**   Type: **Talk**

Off-the-shelf flavour constraints for your SMEFT fit

Thursday 31 August 2023 10:00 (20 minutes)

I will discuss how SMEFT fits incorporate constraints from quark flavour physics
at the hand of two recent examples. I will also highlight the technical
complexity of this endeavour, due to the large number of low-energy hadronic parameters involved.
I propose an approach that "preserves" the flavourful results of such low-energy EFT fits
and provides them to subsequent SMEFT fits as "off the shelf goods".

Authors: Dr VAN DYK, Danny (IPPP Durham);   REBOUD, Méril (IPPP Durham);   WESTHOFF, Susanne (Radboud University Nijmegen)

Presenter: Dr VAN DYK, Danny (IPPP Durham)

Session Classification: EFT fits

Contribution ID: **8** Type: **Talk**

Interpreting HEP data in SMEFiT

Thursday 31 August 2023 10:30 (20 minutes)

Global fits to particle physics data outside experimental collaborations requires the combination and (re)interpretation of a vast range of LHC datasets. This is a non trivial exercise and requires state of the art Monte Carlo simulations at NLO QCD in the Standard Model Effective Field Theory (SMEFT). In this talk, I will present the latest ongoing efforts from the SMEFiT collaboration, focusing especially on the combined top, Higgs, diboson and EW sectors. I will also show results related to explicit UV complete models via matching. Throughout the talk, I will highlight several aspects that are relevant to the interplay between theory and experiment in the context of global EFT fits.

Author: TER HOEVE, Jaco (Nikhef / VU Amsterdam)

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

Session Classification: EFT fits

Contribution ID: **9**   Type: **Talk**

A model-independent likelihood function for the Belle II $B^+ \to K^+ \nu\bar{\nu}$ analysis

Wednesday 30 August 2023 15:00 (20 minutes)

Rare decays like $B^+ \to K^+ \nu\bar{\nu}$, searched for by the Belle II collaboration, are important in particle physics research as they offer a window into physics beyond the Standard Model. However, the experimental challenges induced by the two final state neutrinos require assumptions on the kinematic distribution of this decay. Consequently, the results feature a model dependency arising from both Standard Model assumptions and from the description of the pertinent hadronic matrix element, making reinterpretation complicated without reanalysing the underlying data.

In this work, we address this issue by deriving a model-independent likelihood function, parameterizing the theory space in terms of Wilson coefficients of the weak effective theory, and reweighting the signal template according to the predicted kinematic signal distribution.

By extending the pyhf fitting software and interfacing it with the EOS software for flavor physics phenomenology, we can perform a runtime update of the theoretical model, enabling us to derive exclusion limits in the space of Wilson coefficients.

Once public, the model-independent likelihood function will be a useful tool for the particle physics community to perform tests on existing theoretical models.

Author: GAERTNER, Lorenz (Belle II / Ludwig-Maximilians-University Munich)

Presenter: GAERTNER, Lorenz (Belle II / Ludwig-Maximilians-University Munich)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: **10**

Type: **Talk**

Reduce, Reuse, Recycle: an end-to-end pipeline for recycling particle physics results

Tuesday 29 August 2023 16:35 (20 minutes)

Searches for new physics at the Large Hadron Collider have constrained many models of physics beyond the Standard Model. Many searches also provide resources that allow them to be reinterpreted in the context of other models. We describe a reinterpretation pipeline that examines previously untested models of new physics using supplementary information from ATLAS Supersymmetry (SUSY) searches in a way that provides accurate constraints even for models that differ meaningfully from the benchmark models of the original analysis. The public analysis information, such as public analysis routines and serialized probability models, is combined with common event generation and simulation toolkits MadGraph, Pythia8, and Delphes into workflows steered by TOML configuration files, and bundled into the mapyde python package. The use of mapyde is demonstrated by constraining previously untested SUSY models with compressed sleptons and electroweakinos using ATLAS results.

Author: STARK, Giordon (SCIPP, UC Santa Cruz)

Co-author: Prof. HANCE, Mike (SCIPP, UC Santa Cruz)

Presenter: STARK, Giordon (SCIPP, UC Santa Cruz)

Session Classification: Update on reinterpretation software

Contribution ID: **11**   Type: **Talk**

Global EFT fits within the ATLAS experiment

Thursday 31 August 2023 11:50 (20 minutes)

With detailed precision measurements of physics at the scale of electroweak symmetry breaking (EWSB), the experimental study of the Standard Model at the Large Hadron Collider is rapidly shifting towards an effective field theory (EFT) approach. An effective field theory prescription allows to consistently account for all possible deformation to the Standard Model arising from decoupled New Physics scenarios. This calls for a global approach consisting of measurements from different physics sectors and experiments to uncover deviations in data.

In this talk, I will discuss a global EFT fit within ATLAS, which combines kinematic measurements of the Higgs boson and the electroweak sector and includes constraints of electroweak precision observables from LEP and SLD. I will emphasise further how such fits can be allowed to go towards more global fits both within the collaboration and also serves as an input to global fits performed outside the collaboration.

Author: BALASUBRAMANIAN, Rahul (Nikhef)

Presenter: BALASUBRAMANIAN, Rahul (Nikhef)

Session Classification: EFT fits

Contribution ID: **12**   Type: **Talk**

Testing the Standard Model and beyond with $B \to PP$ decays

Tuesday 29 August 2023 11:50 (15 minutes)

The starting point to our discussion is the "$B \to K\pi$ puzzle".
We show, that although the "puzzle" can be resolved by a more detailed analysis, there is a more fundamental question that needs to be addressed:
Is New Physics necessary to describe the experimentally observed asymmetries and branching fractions of the $B \to PP$ decays?
We perform a phenomenological analysis based on fits of an model-independent New Physics parameterisation and obtain exclusion χ^2 plots of the two ad-hoc parameters (magnitude and a weak phase) sensitive to New Physics.
The results show that the Standard Model expectation value lies within 1σ with respect to the global minimum but the overall picture is not well constrained by the existing data. Our results are mostly sensitive to the time-dependent asymmetry and branching fraction of the $B^0 \to K^0\pi^0$ decay. New experimental outcomes are highly expected and results of this analysis provide strong hints for improvement of precision in current experiments LHCb and Belle II.
Although the Standard Model expectations seem fully consistent with the experimental data, our approach can be used to constrain New Physics models, \emph{e.g.} leading to limits on Wilson coefficients of four-quark SMEFT operators or specific Z' models.

Author: SZABELSKI, Adam (National Centre for Nuclear Research)

Presenter: SZABELSKI, Adam (National Centre for Nuclear Research)

Session Classification: Reinterpretation studies / pheno

Contribution ID: **13**   Type: **Talk**

Signal region combination in CheckMATE

Tuesday 29 August 2023 14:50 (20 minutes)

I will present new features of CheckMATE, in particular implementation of multibin fits in a number of ATLAS and CMS searches. I will show an application of the method to electroweakino scenarios and discuss notable improvements in exclusion range due to CMS multijet search.

Author: ROLBIECKI, Krzysztof (University of Warsaw)

Presenter: ROLBIECKI, Krzysztof (University of Warsaw)

Session Classification: Update on reinterpretation software

Contribution ID: **14**   Type: **Talk**

Deconstructing signals of new physics at collider

Wednesday 30 August 2023 10:30 (20 minutes)

One of the critical points in performing phenomenological analyses of new physics at collider is that, very often, large parameter scans are necessary: intensive and often redundant MC simulations have to be performed to cover relevant regions of signal parameter space and achieve enough accuracy in the determination of signal features.

On the other hand, disk space and computing time are often limited, and the environmental impact of performing such computations is almost never taken into consideration.

There is a growing need to devise strategies to optimise data production and share resources in the HEP community, both theory and experiment.

I will describe a framework which allows such approach, where simulated signal samples are deconstructed into complete sets of basic elements to be combined a posteriori to perform different analysis.

The framework is modular, collaborative, flexible and resource-friendly.

I will describe it through a concrete example: the analysis of BSM contributions in Higgs pair production at the LHC, and indicate possible short- and long-term developments and applications.

Author: PANIZZI, Luca (Universita' della Calabria)

Presenter: PANIZZI, Luca (Universita' della Calabria)

Session Classification: Storage and (re)usage of theoretical predictions, including event samples

Contribution ID: **15**   Type: **Talk**

Spey: smooth inference for reinterpretation studies

Wednesday 30 August 2023 14:00 (20 minutes)

Analysing statistical models is at the heart of any empirical study for hypothesis testing. We present a new cross-platform Python-based package which employs different likelihood prescriptions through a plug-in system, enabling the statistical inference of hypotheses. This framework empowers users to propose, examine, and publish new likelihood prescriptions without the need for developing a new inference system. Within this package, we propose a new simplified likelihood prescription that surpasses its predecessors' approximation accuracy by incorporating asymmetric uncertainties. Furthermore, this package facilitates the integration of various likelihood combination routines, thereby broadening the scope of independent studies through a meta-analysis. By remaining agnostic to the source of the likelihood prescription and the signal hypothesis generator, our platform allows for the seamless implementation of packages with different likelihood prescriptions, fostering compatibility and interoperability.

Author: ARAZ, Jack (IPPP - Durham University)

Presenter: ARAZ, Jack (IPPP - Durham University)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: **17** 　　　　　　　　　　　　　　　　　　　　　　　　　Type: **Talk**

Pineline: Industrialization of High-Energy Theory Predictions

Wednesday 30 August 2023 10:00 (20 minutes)

We present a collection of tools automating the efficient computation of large sets of theory predictions for high-energy physics. Calculating predictions for different processes often require dedicated programs. These programs, however, accept inputs and produce outputs that are usually very different from each other. The industrialization of theory predictions is achieved by a framework which harmonizes inputs (runcard, parameter settings), standardizes outputs (in the form of grids), produces reusable intermediate objects, and carefully tracks all meta data required to reproduce the computation. Parameter searches and fitting of non-perturbative objects are exemplary use cases that require a full or partial re-computation of theory predictions and will thus benefit of such a toolset.

Authors: Dr CANDIDO, Alessandro (INFN Milan); BARONTINI, Andrea (University of Milan); Dr SCHWAN, Christopher (Universitat Wurzburg); Dr HEKHORN, Felix (INFN Milan); Dr CRUZ-MARTINEZ, Juan (CERN)

Presenter: BARONTINI, Andrea (University of Milan)

Session Classification: Storage and (re)usage of theoretical predictions, including event samples

Contribution ID: **18**   Type: **Talk**

Parametrising profiled likelihoods with neural networks

Thursday 31 August 2023 09:30 (20 minutes)

Full statistical models encapsulate the complete information of an experimental result, including the likelihood function given observed data. Since a few years ago ATLAS started publishing statistical models that can be reused via the pyhf framework; a major step towards fully publishing LHC results. In the case of fast Simplified Model Spectra based reinterpretation we are often only interested in the profiled likelihood given a signal strength. However, their computation using pyhf take the order of seconds per parameter point, slowing down SMS reinterpretation by orders of magnitude. Thus, to fully leverage from the precision obtained from full statistical models without compromising speed, we propose to learn the profiled likelihood functions with Neural Networks (NNs). We show that such functions can be well described with simple NNs, that can be easily published in the ONNX format.

Author: REYES-GONZALEZ, Humberto

Presenter: REYES-GONZALEZ, Humberto

Session Classification: Extra session

Contribution ID: **19**   Type: **Talk**

Save the EFT: a primer for the ATLAS+CMS combination in the top sector

Thursday 31 August 2023 11:20 (20 minutes)

The talk includes an overview of the latest EFT studies in the top sector from the CMS experiment. Various physics processes and experimental approaches are reviewed, with an additional discussion of prospects for a potential ATLAS-CMS EFT combination for top-related processes.

Author: SKOVPEN, Kirill (Ghent University)

Presenter: SKOVPEN, Kirill (Ghent University)

Session Classification: EFT fits

Contribution ID: **20**   Type: **Talk**

Using a Neural Network to Approximate the Negative Log Likelihood Function

Wednesday 30 August 2023 14:30 (20 minutes)

An increasingly frequent challenge faced in HEP data analysis is to characterize the agreement between a prediction that depends on a dozen or more model parameters-such as predictions coming from an effective field theory (EFT) framework-and the observed data. Traditionally, such characterizations take the form of a negative log likelihood (NLL) distribution, which can only be evaluated numerically. The lack of a closed-form description of the NLL function makes it difficult to convey results of the statistical analysis. Typical results are limited to extracting "best fit" values of the model parameters and 1-D intervals or 2-D contours extracted from scanning the higher dimensional parameter space. It is desirable to explore these high-dimensional model parameter spaces in more sophisticated ways. One option for overcoming this challenge is to use a neural network to approximate the NLL function. This approach has the advantage of being continuous and differentiable by construction, which are essential properties for an NLL function and may also provide useful handles in exploring the NLL as a function of the model parameters. In this talk, we demonstrate the application of this technique to an analysis involving a search for new physics in the top quark sector within the framework of effective field theory. We also touch on options for distributing this likelihood function in a portable fashion.

Author: JAMIESON, Nathan (University of Notre Dame)

Presenter: JAMIESON, Nathan (University of Notre Dame)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: **22**   Type: **Talk**

Progress and plans for Contur

Tuesday 29 August 2023 14:25 (20 minutes)

An update on recent developments and results, current activities and future plans, for the Contur (Constraints of new theories using Rivet) toolkit.

Authors: BUTTERWORTH, Jonathan (UCL); WANG, Peng; YEH, Yoran (UCL)

Presenter: YEH, Yoran (UCL)

Session Classification: Update on reinterpretation software

Contribution ID: **23**

Type: **Talk**

Using unbinned measurements for new physics

Wednesday 30 August 2023 16:30 (20 minutes)

Machine learning tools have enabled a new type of differential cross section measurements that are unbinned and high-dimensional (see e.g. 2109.13243). This talk will discuss the challenges and prospects of (re)using such measurements with respect to new physics.

Author: NACHMAN, Benjamin (Lawrence Berkeley National Laboratory)

Presenter: NACHMAN, Benjamin (Lawrence Berkeley National Laboratory)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: **24**   Type: **Talk**

GAMBIT update and results

Tuesday 29 August 2023 14:00 (20 minutes)

Placeholder for results and updates from GAMBIT

Author: GONZALO, Tomas (KIT)

Presenter: GONZALO, Tomas (KIT)

Session Classification: Update on reinterpretation software

Contribution ID: **25**   Type: **Talk**

Summary of LHC EFT WG activities

Thursday 31 August 2023 14:30 (30 minutes)

I will give an overview of the LHC EFT working group and summarise ongoing activities.

Authors: MIMASU, Ken; WARDLE, Nicholas (Imperial College London)

Presenter: MIMASU, Ken

Session Classification: LHC EFT WG

Contribution ID: **26**   Type: **Talk**

CANCELLED Simultaneous determination of SMEFT coefficients and PDFs

Thursday 31 August 2023 14:00 (20 minutes)

I present a tool for the simultaneous determination of Parton Distribution Functions and EFT coefficients. I discuss the importance of this simultaneous fit, as well as challenges in obtaining proper constraints. I present the most comprehensive analysis of both PDF and EFT effects in the top sector, which will be reproducible with our tool.

Presenter: KASSABOV ZAHARIEVA, Zahari Dimitrov (University of Turin)

Session Classification: LHC EFT WG

Contribution ID: 27   Type: **not specified**

Discussion session on EFT (re)interpretations

Thursday 31 August 2023 16:40 (40 minutes)

Presenters: MIMASU, Ken;   WARDLE, Nicholas (Imperial College London)

Session Classification: LHC EFT WG

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

New developments in SModelS

Tuesday 29 August 2023 15:15 (20 minutes)

Presenter: KRAML, Sabine (LPSC Grenoble)

Session Classification: Update on reinterpretation software

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

Discussion

Wednesday 30 August 2023 12:10 (20 minutes)

Presenters: BUCKLEY, Andy (University of Glasgow (GB)); GUTSCHOW, Christian (UCL); BUTTERWORTH, Jonathan (UCL)

Session Classification: Storage and (re)usage of theoretical predictions, including event samples

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

tba (NNPDF)

Presenter: NOCERA, Emanuele Roberto (Università degli Studi di Torino and INFN Torino)

Session Classification: Storage and (re)usage of theoretical predictions, including event samples

Contribution ID: **31**   Type: **Talk**

LHC data for PDF determination: challenges and prospects

Wednesday 30 August 2023 11:30 (20 minutes)

I discuss how current LHC measurements are employed in the determination of the Parton Distribution Functions (PDFs) of the proton. I focus on the current praxis and I outline a few challenges in the release and usage of the experimental data. I finally discuss prospects to improve best practice measures, in light of LHC Run III and beyond.

Author: NOCERA, Emanuele Roberto (Università degli Studi di Torino and INFN Torino)

Presenter: NOCERA, Emanuele Roberto (Università degli Studi di Torino and INFN Torino)

Session Classification: Storage and (re)usage of theoretical predictions, including event samples

Contribution ID: **32** Type: **Talk**

EFTs, models and matching: the necessity and caveats

Thursday 31 August 2023 15:10 (20 minutes)

In this talk, I will address the distinction between two different kinds of Effective Field Theories. I will specifically discuss the differences between the Standard Model Effective Field Theory (SMEFT) and the Higgs Effective Field Theory and motivate the importance of both while interpreting data, providing an example for the scalar sector. I will then focus on the importance of global fits in matching a class of single-scalar extended models to SMEFT operators, giving emphasis to various measurements. Furthermore, I will review the importance of EFT-model matching in obtaining the cut-off scale during event generation. Finally, I will discuss some bounds relating Wilson Coefficients of four-fermion operators giving rise to flavour violating and flavour conserving processes.

Author: BANERJEE, Shankha (CERN)

Presenter: BANERJEE, Shankha (CERN)

Session Classification: LHC EFT WG

Contribution ID: **33** Type: **Talk**

Global view on SMEFT interpretations and UV connection

Thursday 31 August 2023 15:40 (30 minutes)

Presenter: MADIGAN, Maeve (University of Heidelberg)

Session Classification: LHC EFT WG

Contribution ID: **34**   Type: **not specified**

Recastable ML: guidelines, surrogate models and all that

Thursday 31 August 2023 09:00 (20 minutes)

Presenter: PROCTER, Tomasz (University of Glasgow)

Session Classification: Extra session

Contribution ID: **35**   Type: **not specified**

discusion

Presenter: BUCKLEY, Andy (University of Glasgow (GB))

Session Classification: Overcoming challenges II: likelihoods and ML models

Contribution ID: **36** Type: **Talk**

HEP Statistics Serialization Standard

Wednesday 30 August 2023 17:00 (20 minutes)

The HEP Statistics Serialization Standard is an emerging standard to serialize statistical models in High Energy Physics as JSON (or JSON-like) files.

Publishing likelihoods has been on the bucket-list of the HEP community since 20 years. With this new standard, which is already implemented in ROOT and has gathered support by all major HEP statistics frameworks, the community will finally and for the first time have the option to publish full statistical models of LHC measurements in a software-independent format. The HS3 standard will not only allow for long-term archiving of analyses but also facilitate the combination and reinterpretation of LHC measurements.

The project is available on GitHub and overleaf and is actively developed by physicists and software engineers from different collaborations and statistical toolkits. Feedback and suggestions for improvements are highly welcome.

Author: BURGARD, Carsten (TU-Dortmund)

Presenter: BURGARD, Carsten (TU-Dortmund)

Session Classification: Extra session

Contribution ID: **37** Type: **Talk**

ADL/CutLang developments towards transparent (re)interpretation

Tuesday 29 August 2023 16:10 (20 minutes)

We report recent developments in Analysis Description Language (ADL) and the runtime interpreter/framework CutLang targeting (re)interpretation studies, including integration of machine learning models and a Jupyter-based interface for plotting. We present validation efforts and results from various LHC analyses along with studies with CMS open data. We also highlight several core developments towards a more formal, robust and automated interpreter system.

Authors: UNEL, Gokhan; SEKMEN, Sezen (Kyungpook National University)

Presenter: SEKMEN, Sezen (Kyungpook National University)

Session Classification: Update on reinterpretation software

Contribution ID: **38**　　　　　　　　　　　　　　　　　　　　　　　　Type: **Talk**

Bidirectional linking in HEPData

Wednesday 30 August 2023 12:00 (10 minutes)

Updates on HEPData

Author:　BYERS, Jordan (Durham University)

Presenter:　BYERS, Jordan (Durham University)

Session Classification:　Storage and (re)usage of theoretical predictions, including event samples

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

more discussion (for those who are still around)

Friday 1 September 2023 14:00 (2 hours)

Presenter: ARAZ, Jack (IPPP - Durham University)

Session Classification: Open discussion session

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

Discussion

Presenter: WARDLE, Nicholas (Imperial College London)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: **41** Type: **not specified**

Informal discussions and hands-on

Friday 1 September 2023 10:00 (1 hour)

Session Classification: Open discussion session

Contribution ID: 42 Type: **not specified**

Informal discussions and hands-on -cont-

Friday 1 September 2023 11:30 (1 hour)

Session Classification: Open discussion session

Contribution ID: **43** Type: **not specified**

Workshop photo

Wednesday 30 August 2023 16:00 (5 minutes)

Session Classification: Overcoming challenges I: Publishing and using statistical models

Contribution ID: 44 Type: **not specified**

Final words while everyone is here

Thursday 31 August 2023 17:30 (5 minutes)

Presenter: ARAZ, Jack (IPPP - Durham University)