

# **(Re)interpretation of the LHC results for new physics**

## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

# A Novel Experimental Search Channel for Very Light Higgses in the 2HDM Type I

Thursday, December 15, 2022 10:00 AM (15 minutes)

We present a reinterpretation study of existing results from the CMS Collaboration, specifically, searches for light Beyond the Standard Model (BSM) Higgs pairs produced in the chain decay  $pp \rightarrow H_{\text{SM}} \rightarrow hh(aa)$  into a variety of final states, in the context of the CP-conserving 2-Higgs Doublet Model (2HDM) Type-I. Through this, we test the LHC sensitivity to a possible new signature,  $pp \rightarrow H_{\text{SM}} \rightarrow ZA \rightarrow ZZh$ , with  $ZZ \rightarrow jj\mu^+\mu^-$  and  $h \rightarrow b\bar{b}$ . We investigate the significance of a potentially visible signal through a full Monte Carlo simulation down to the {parametrised} detector level and show that it is an alternative promising channel to standard four-body searches for light BSM Higgses at the LHC already with an integrated luminosity of  $\text{cal}L = 300 \text{ fb}^{-1}$ . For a tenfold increase of the latter, discovery should be possible over most of the allowed parameter space.

**Primary authors:** Prof. SHEPHERD-THEMISTOCLEOUS, Claire (Particle Physics Department, Rutherford Appleton Laboratory); SEMLALI, Souad (School of Physics and Astronomy, University of Southampton); Prof. MORETTI, Stefano (School of Physics and Astronomy, University of Southampton)

**Presenter:** SEMLALI, Souad (School of Physics and Astronomy, University of Southampton)

**Session Classification:** Reinterpretation studies

Contribution ID: 2

Type: **not specified**

## New developments in MadAnalysis 5

*Monday, December 12, 2022 2:55 PM (15 minutes)*

MadAnalysis 5 is a framework for phenomenological investigations at particle colliders. Based on a C++ kernel, this program allows to efficiently perform, in a straightforward and user-friendly fashion, sophisticated physics analyses of event files such as those generated by a large class of Monte Carlo (MC) event generators. This talk will focus on recent developments in MadAnalysis' reinterpretation capabilities, such as the usage of simplified and full statistical models, LLP searches and jet substructure analyses.

**Primary author:** ARAZ, Jack Y. (IPPP - Durham University)

**Presenter:** ARAZ, Jack Y. (IPPP - Durham University)

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 3

Type: **not specified**

## Model independent measurements of standard model cross sections with domain adaptation

*Thursday, December 15, 2022 12:00 PM (15 minutes)*

With the ever growing amount of data collected by the ATLAS and CMS experiments at the CERN LHC, fiducial and differential measurements of the Higgs boson production cross section have become important tools to test the Standard Model predictions with an unprecedented level of precision, as well as seeking deviations that can manifest the presence of physics beyond the standard model. These measurements are in general designed for being easily comparable to any present or future theoretical prediction, and to achieve this goal it is important to keep the model dependence to a minimum. Nevertheless, the reduction of the model dependence usually comes at the expense of the measurement precision, preventing to exploit the full potential of the signal extraction procedure. In this talk a novel methodology based on the machine learning concept of domain adaptation is proposed, which allows using a complex deep neural network in the signal extraction procedure while ensuring a minimal dependence of the measurements on the theoretical modelling of the signal.

**Primary author:** CAMAIANI, Benedetta (Universita e INFN, Firenze (IT))

**Presenter:** CAMAIANI, Benedetta (Universita e INFN, Firenze (IT))

**Session Classification:** Reinterpretation studies

Contribution ID: 4

Type: **not specified**

## LHC constraints on monojet signatures from electroweakino DM and coloured-superpartner decays

*Thursday, December 15, 2022 10:40 AM (15 minutes)*

We revisit LHC searches for heavy invisible particles. First recasting a dijet signal region in a general multijet plus missing transverse momentum analysis by ATLAS. We find that non-trivial mass limits can be obtained for the Wino and Higgsino LSP scenarios with the present data. We then study monojet/dijet channels as a tool for searching for squarks and gluinos with distinct mass hierarchies. In the case of large mass hierarchy between the squarks and the lightest electroweakino ( $\tilde{\chi}$ ), the associated squark-wino production,  $pp \rightarrow \tilde{q}\tilde{\chi}$  can lead to a mono-jet like signature, where the high  $p_T$  jet is originated from the squark decay,  $\tilde{q} \rightarrow q + \tilde{\chi}$ . This associated production, together with  $pp \rightarrow \tilde{W}\tilde{W} + \text{jets}$  production, has a significant impact on the exclusion limit in the squark-neutralino mass plane. In the case that either either squarks or gluinos are only a few GeV heavier than the LSP, associated squark-gluino production,  $pp \rightarrow \tilde{q}\tilde{g}$  can lead to a distinctive mono-jet signature, where the high  $p_T$  jet is produced from the decay of the heavier coloured particle into the lighter one and the lighter coloured particle is invisible due to the approximate mass degeneracy. We show that non-trivial exclusion limits in the squark-gluino mass plane can be obtained from existing monojet and dijet analyses.

**Primary author:** LARA PEREZ, Iñaki**Presenter:** LARA PEREZ, Iñaki**Session Classification:** Reinterpretation studies

Contribution ID: 5

Type: **not specified**

## Reinterpretation of CMS search for LLPs using endcap muon detectors

*Thursday, December 15, 2022 12:40 PM (15 minutes)*

We present the recast and sensitivity projection in a large number of benchmark models, significantly extending the physics scope of the recent search for LLPs using the CMS endcap muons detector (<https://arxiv.org/abs/2107.04838>). The search uses the endcap muon detectors as sampling calorimeter to identify displaced showers produced by decays of long-lived particles (LLPs). The exceptional shielding provided by the steel return-yoke interleaved between the CMS muon detector stations drastically reduces the SM background that limits other existing searches. We present a new dedicated Delphes module for fast detector response simulation of the muon detector showers. The Delphes module can be used to recast this analysis to any BSM model that predicts the existence of LLPs. I will show the recast and projected sensitivity of this search, using the Delphes module, in a few benchmark models. We show that this new search approach is sensitive to LLPs as light as a few GeV, and can be complementary to proposed and existing dedicated LLP experiments.

**Primary author:** WANG, Christina Wenlu (California Institute of Technology (US))

**Presenter:** WANG, Christina Wenlu (California Institute of Technology (US))

**Session Classification:** Reinterpretation studies

Contribution ID: 6

Type: **not specified**

## Global fits of simplified models for dark matter with GAMBIT

*Thursday, December 15, 2022 10:20 AM (15 minutes)*

Dark matter candidates can arise from a wide range of extensions to the Standard Model. Simplified models with a small number of new particles allow for the optimisation and interpretation of dark matter and collider experiments, without the need for a UV-complete theory. In this talk, I will discuss the results from a recent GAMBIT study of global constraints on vector-mediated simplified dark matter models. I will cover several models with differing spins of the dark matter candidate.

**Primary authors:** KVELLESTAD, Anders (University of Oslo); CHANG, Christopher; KAHLHOEFER, Felix (Karlsruhe Institute of Technology); WHITE, Martin John (University of Adelaide (AU)); SCOTT, Pat (The University of Queensland); Dr GONZALO, Tomas (Karlsruhe Institute for Technology (KIT))

**Presenter:** CHANG, Christopher

**Session Classification:** Reinterpretation studies

Contribution ID: 7

Type: **not specified**

## **Preservation and reuse of BSM searches: ATLAS review**

*Monday, December 12, 2022 10:10 AM (20 minutes)*

**Presenter:** NG, Yvonne (Deutsches Elektronen-Synchrotron (DE))

**Session Classification:** Experiments' reviews



Contribution ID: 8

Type: **not specified**

## **Preservation and reuse of BSM searches: CMS review**

*Monday, December 12, 2022 10:35 AM (20 minutes)*

**Presenter:** QIAN, Sitian (Peking University (CN))

**Session Classification:** Experiments' reviews

Contribution ID: 9

Type: **not specified**

## **Preservation and reuse of SM (incl. top, Higgs, etc) measurements: ATLAS review**

*Monday, December 12, 2022 11:35 AM (20 minutes)*

**Presenter:** VOZAK, Matous (Nikhef National institute for subatomic physics (NL))

**Session Classification:** Experiments' reviews

Contribution ID: **10**

Type: **not specified**

## **Preservation and reuse of SM (incl. top, Higgs, etc) measurements: CMS review**

*Monday, December 12, 2022 12:00 PM (20 minutes)*

**Presenter:** SEIDEL, Markus (Riga Technical University (LV))

**Session Classification:** Experiments' reviews

Contribution ID: 11

Type: **not specified**

## **Preservation and reuse of BSM searches: discussion**

*Monday, December 12, 2022 11:00 AM (15 minutes)*

**Session Classification:** Experiments' reviews

Contribution ID: 12

Type: **not specified**

## **Preservation and reuse of SM (incl. top, Higgs, etc) measurements: discussion**

*Monday, December 12, 2022 12:25 PM (15 minutes)*

**Session Classification:** Experiments' reviews

Contribution ID: 13

Type: **not specified**

## Machine Learning LHC likelihoods

*Wednesday, December 14, 2022 4:00 PM (15 minutes)*

Full statistical models encapsulate the complete information of an experimental result, including the likelihood function given observed data. Their proper publication is of vital importance for a long lasting legacy of the LHC. Major steps have been taken towards this goal; a notable example being ATLAS release of statistical models with the pyhf framework. However, even the likelihoods are often high-dimensional complex functions that are not straightforward to parametrize. Thus, we propose to describe them with Normalizing Flows, a modern type of generative networks that explicitly learn the probability density distribution. As a proof of concept we focused on two likelihoods from global fits to SM observables and a likelihood of a NP-like search, obtaining great results for all of them. Complementarily, for New Physics search reinterpretation we are often only interested in the profiled likelihood given a signal strength, reducing the problem to a much less dimensional one. In this talk, we also discuss ongoing efforts on parametrising profiled likelihoods with neural networks.

**Primary author:** REYES-GONZÁLEZ, Humberto (University of Genoa)

**Presenter:** REYES-GONZÁLEZ, Humberto (University of Genoa)

**Session Classification:** Hands on tools

Contribution ID: 14

Type: **not specified**

## **LHCb**

*Tuesday, December 13, 2022 10:00 AM (20 minutes)*

**Presenter:** REDI, Federico Leo (CERN)

**Session Classification:** Experiments' reviews

Contribution ID: 15

Type: **not specified**

## **Belle-II**

*Tuesday, December 13, 2022 10:30 AM (20 minutes)*

**Presenter:** STEFKOVA, Slavomira

**Session Classification:** Experiments' reviews



Contribution ID: 17

Type: **not specified**

## News from HEPData

*Monday, December 12, 2022 12:40 PM (15 minutes)*

**Presenter:** WATT, Graeme

**Session Classification:** Experiments' reviews

Contribution ID: 18

Type: **not specified**

## Unbinned multivariate observables for global SMEFT analyses from machine learning

*Wednesday, December 14, 2022 10:25 AM (15 minutes)*

Theoretical interpretations of particle physics data, such as the determination of the Wilson coefficients of the Standard Model Effective Field Theory (SMEFT), often involve the inference of multiple parameters from a global dataset. Optimizing such interpretations requires the identification of observables that exhibit the highest possible sensitivity to the underlying theory parameters. In this talk, I will present results based on our recently developed open source framework, ML4EFT, that enables the integration of unbinned multivariate observables into global SMEFT fits. In particular, I will focus on optimal observables in top-quark pair and Higgs+ $Z$  production at the LHC, demonstrate their impact on the SMEFT parameter space as compared to binned measurements, and present the improved constraints associated to multivariate inputs. Since the number of neural networks to be trained scales quadratically with the number of parameters and can be fully parallelized, the ML4EFT framework is well-suited to construct unbinned multivariate observables which depend on up to tens of EFT coefficients, as required in global fits.

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

**Presenter:** TER HOEVE, Jaco

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 19

Type: **not specified**

## Probing the flavor of new physics in semileptonic transitions at high- $p_T$

*Thursday, December 15, 2022 11:00 AM (15 minutes)*

High- $p_T$  tail observables at the LHC offer a complementary probe to low-energy experiments for studying the flavor structure of the Standard Model and beyond. We discuss the high- $p_T$  tails of neutral- and charged-current Drell-Yan processes to probe New Physics (NP) effects in semileptonic transitions. For this purpose, we describe the relevant cross-sections in terms of general form-factors, which are matched to the Standard Model Effective Field Theory (SMEFT), or to new resolved bosonic mediators arising in ultraviolet models. Using the latest run-2 datasets from LHC on the relevant mono-lepton and di-lepton production channels, we derive constraints on the SMEFT Wilson coefficients and the NP coupling constants. We also present the Mathematica package HighPT, which provides a simple way to compute the relevant high- $p_T$  tail observables and to extract the complete LHC likelihood for Drell-Yan with general flavor structure. To illustrate the relevance of these results, we revisit the leptoquark explanations of the charged-current  $B$ -meson anomalies, by exploring the complementarity of our high- $p_T$  constraints with the relevant low-energy observables.

**Primary author:** WILSCH, Felix (University of Zurich)

**Presenter:** WILSCH, Felix (University of Zurich)

**Session Classification:** Reinterpretation studies

Contribution ID: 20

Type: **not specified**

## Reusing Neural Networks: Lessons learned and Suggestions for the future

*Monday, December 12, 2022 5:00 PM (15 minutes)*

I present the lessons learned as re-interpreters trying to reuse analyses centred on neural networks in the RIVET framework, using two recent ATLAS analyses – SUSY and Exotics searches – as examples. I survey the possible ways that an analysis team can preserve and publicise their neural network for future use, and provide a detailed examination of the ONNX and lwttn preservation tools, describing their advantages and disadvantages for both the original analysis team and re-interpreters.

I also comment on how thinking about re-use from the beginning could change how analyses design and use neural networks; and what supplementary data becomes even more important for validation.

**Primary author:** PROCTER, Tomasz (University of Glasgow (GB))

**Presenter:** PROCTER, Tomasz (University of Glasgow (GB))

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 21

Type: **not specified**

## Collider constraints on electroweakinos in the presence of a light gravitino with GAMBIT

*Wednesday, December 14, 2022 11:05 AM (15 minutes)*

Using GAMBIT, we show that present collider data is not only consistent with low-scale supersymmetry, but permits scenarios where the masses of all six neutralinos and charginos of the MSSM are well below a TeV. We constrain the  $\tilde{G}$ -EWMSSM – the MSSM with an eV-scale gravitino as the lightest supersymmetric particle and the six electroweakinos as the only other light new states – using 15 ATLAS and 12 CMS searches at 13 TeV, and a large collection of ATLAS and CMS measurements of Standard Model signatures using Rivet and Contur. We will discuss this new interface and the features it has added to GAMBIT, RIVET and CONTUR.

While much of the  $\tilde{G}$ -EWMSSM parameter space is excluded, several viable parameter regions predict phenomenologically rich scenarios where multiple neutralinos and charginos are within kinematic reach of the LHC Run 3 or the High Luminosity LHC.

**Primary author:** PROCTER, Tomasz (University of Glasgow (GB))

**Presenter:** PROCTER, Tomasz (University of Glasgow (GB))

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 22

Type: **not specified**

## Implementation of multi-bin searches in CheckMATE

*Monday, December 12, 2022 3:15 PM (15 minutes)*

The use of the combination of information from independent signal regions in statistical tests in high energy physics gives stronger and more robust limits than single-binned analysis. We present the implementation of multi-binned analysis in CheckMATE based on a PYHF implementation of simplified likelihoods. This method turns out to be superior to the usual limits calculated by CheckMATE using only the expected most sensitive signal region. The validation of this method is discussed using the reinterpretation of various ATLAS searches for supersymmetry.

**Primary author:** LARA PEREZ, Iñaki

**Presenter:** LARA PEREZ, Iñaki

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 23

Type: **not specified**

## Implementation of ML searches in CheckMATE

*Monday, December 12, 2022 5:20 PM (15 minutes)*

I will discuss a recent CheckMATE implementation of ATLAS searches using MVA/BDT and NN methods.

**Primary author:** ROLBIECKI, Krzysztof (Warsaw University)

**Presenter:** ROLBIECKI, Krzysztof (Warsaw University)

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 24

Type: **not specified**

## Recasting DM direct detection results

*Tuesday, December 13, 2022 11:20 AM (20 minutes)*

Searches for dark matter scattering in direct detection experiments are commonly reported for only a limited set of interactions and theory parameters. As experiments construct more complex analysis techniques with several analysis dimensions, approximating results for alternate signal models can become more difficult. In this presentation, I will review some typical direct detection analyses, and discuss cases where experiments have released data that allows easy reinterpretation, and, recently, an approximate likelihood for XENON1T nuclear recoil searches.

**Presenter:** MORÅ, Knut (Columbia University)

**Session Classification:** Experiments' reviews



Contribution ID: 25

Type: **not specified**

## Efficient search for new physics using Active Learning in the ATLAS Experiment with RECAST

*Thursday, December 15, 2022 12:20 PM (15 minutes)*

Searches for new physics and their reinterpretations constrain the parameter space of models with exclusion limits in typically only few dimensions. However, the relevant theory parameter space often extends into higher dimensions. Limited computing resources for signal process simulations impede the coverage of the full parameter space. We present an Active Learning approach based on the RECAST reinterpretation framework to address this limitation. Compared to the usual grid sampling, it reduces the number of parameter space points for which exclusion limits need to be determined. Consequentially, it allows to extend interpretations of searches to higher dimensional parameter spaces and therefore to raise their value, e.g. via the identification of barely excluded subspaces which motivate dedicated new searches. The procedure is demonstrated by reinterpreting a Dark Matter search performed by the ATLAS experiment, extending its interpretation from a 2 to a 4-dimensional parameter space while keeping the computational effort at a low level.

**Primary authors:** SKORDA, Eleni (Lund University (SE)); ESPEJO MORALES, Irina (New York University); VON AHNEN, Janik (Deutsches Elektronen-Synchrotron (DE)); CRANMER, Kyle Stuart (New York University (US)); HEINRICH, Lukas Alexander (Max Planck Society (DE)); RIECK, Patrick (New York University (US)); GADOW, Philipp (Deutsches Elektronen-Synchrotron (DE)); POTTGEN, Ruth (Lund University (SE)); BHATTI, Zubair (New York University (US))

**Presenter:** ESPEJO MORALES, Irina (New York University)

**Session Classification:** Reinterpretation studies

Contribution ID: 26

Type: **not specified**

## Constraining Dimension7/9 SMEFT from reinterpreting same sign dilepton analysis at CMS

*Thursday, December 15, 2022 11:40 AM (15 minutes)*

The Standard Model Effective Field Theory (SMEFT) provides a model-independent description to the collider events, from which the measured Wilson coefficients can be interpreted with some specific BSM model and vice versa. In the context of SMEFT, operators constructed with odd dimensions may lead to Lepton Number Violation (LNV). In this work, we will present the results of reinterpreting SSWW induced signal searches in same-sign dimuon final state from CMS for constraining dimension 7/9 operators.

**Primary authors:** XIAO, Jie (Peking University (CN)); LI, Qiang (Peking University (CN)); JEON, Si Hyun (Seoul National University (KR)); QIAN, Sitian (Peking University (CN))

**Presenter:** QIAN, Sitian (Peking University (CN))

**Session Classification:** Reinterpretation studies

Contribution ID: 27

Type: **not specified**

## Combining orthogonal LHC new physics searches.

*Wednesday, December 14, 2022 11:25 AM (15 minutes)*

The combination of LHC results is of great relevance if we want to obtain a deeper more comprehensive understanding of the data collected by the experiments. In practice, it would allow us to derive stronger limits on Beyond Standard Model (BSM) theories, and to perform searches for dispersed signals, as well searching for deviations from the Standard Model in the observed data. However, the combination of LHC analyses requires an exact knowledge of their correlation, which is certainly not straightforward to determine. Nonetheless, we can determine if signal regions (SRs) from different analyses are approximately independent from each other by estimating the corresponding degrees of overlapping events; hence, can be trivially combined. In this talk, we present a novel stochastic method to determine such overlaps between SRs of different LHC new-physics searches. Also, we introduce a graph theory based method to efficiently find the optimal combination of approximately orthogonal SRs to constrain a given BSM theory. The benefits of the approach are demonstrated by deriving stronger limits on several new physics models of increasing complexity.

**Primary authors:** BUCKLEY, Andy (University of Glasgow (GB)); FUKS, Benjamin; REYES-GONZÁLEZ, Humberto (University of Genoa); ARAZ, Jack Y. (IPPP - Durham University); YELLEN, James David (University of Glasgow (GB)); WILLIAMSON, Sophie (LPTHE, Sorbonne Université); WALTENBERGER, Wolfgang (Austrian Academy of Sciences (AT))

**Presenter:** YELLEN, James David (University of Glasgow (GB))

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 28

Type: **not specified**

## Automated Collider Event Analysis, Plotting, and Machine Learning with AEACuS, RHADAManTHUS, and MInOS

*Wednesday, December 14, 2022 4:20 PM (15 minutes)*

A trio of automated collider event analysis tools are described and demonstrated. **AEACuS** interfaces with the standard MadGraph/MadEvent, Pythia, and Delphes simulation chain, via the Root file output. An extensive algorithm library facilitates the computation of standard collider event variables and the transformation of object groups (including jet clustering and substructure analysis). Arbitrary user-defined variables and external function calls are also supported. An efficient mechanism is provided for sorting events into channels with distinct features. **RHADAManTHUS** generates publication-quality one- and two-dimensional histograms from event statistics computed by AEACuS, calling Matplotlib on the back end. Large batches of simulation (representing either distinct final states and/or oversampling of a common phase space) are merged internally, and per-event weights are handled consistently throughout. Arbitrary bin-wise functional transformations are readily specified, e.g. for visualizing signal-to-background significance as a function of cut threshold. **MInOS** implements machine learning on computed event statistics with XGBoost. Ensemble training against distinct background components may be combined to generate composite classifications with enhanced discrimination. ROC curves, as well as score distribution, feature importance, and significance plots are generated on the fly. Each of these tools is controlled via instructions supplied in a reusable card file, employing a simple, compact, and powerful meta-language syntax.

**Primary author:** WALKER, Joel (Sam Houston State University)

**Presenter:** WALKER, Joel (Sam Houston State University)

**Session Classification:** Hands on tools

Contribution ID: **30**

Type: **not specified**

## CheckMATE

**Presenter:** LARA PEREZ, Iñaki (Warsaw University)

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: **31**

Type: **not specified**

## **Analyses combination in SModelS**

*Monday, December 12, 2022 3:35 PM (15 minutes)*

We report on new developments in SModelS, in particular the functionality of analyses combination introduced in v2.2.

**Presenter:** WALTENBERGER, Wolfgang (Austrian Academy of Sciences (AT))

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 32

Type: **not specified**

## Rivet/Contur

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 33

Type: **not specified**

## Machine learning model serialization experiences

*Monday, December 12, 2022 4:40 PM (15 minutes)*

**Presenter:** GUEST, Dan (Humboldt University of Berlin (DE))

**Session Classification:** Experience and feedback using reinterpretation material



Contribution ID: 34

Type: **not specified**

## LHC Measurements in Global SFitter Analyses

*Wednesday, December 14, 2022 10:45 AM (15 minutes)*

**Presenter:** PLEHN, Tilman

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 36

Type: **not specified**

## Welcome & introduction

*Monday, December 12, 2022 10:00 AM (10 minutes)*

**Presenter:** KRAML, Sabine (LPSC Grenoble)

Contribution ID: 37

Type: **not specified**

## ADL/CutLang developments towards large scale (re)interpretation

*Wednesday, December 14, 2022 2:00 PM (15 minutes)*

We report recent developments in Analysis Description Language (ADL) and the runtime interpreter CutLang in view of (re)interpretation studies. We present an infrastructure setup dedicated to a large scale LHC analysis validation functionality and the ongoing collective efforts to implement and validate a number of LHC BSM searches. We also highlight several ongoing innovative core developments towards achieving a more robust, automated and extensible language-interpreter system.

**Primary authors:** HUH, Changgi (Kyungpook National University (KR)); RILEY, Daniel (Florida State University); UNEL, Gokhan (University of California Irvine (US)); FEDYUKOVICH, Grigory (Florida State University); PROSPER, Harry (Florida State University (US)); LEE, Junghyun (Kyungpook National University (KR)); SEKMEN, Sezen (Kyungpook National University (KR)); ŞEN, burak

**Presenter:** UNEL, Gokhan (University of California Irvine (US))

**Session Classification:** Hands on tools

Contribution ID: **38**

Type: **not specified**

## **Report from the LHC EFT WG**

*Wednesday, December 14, 2022 10:00 AM (20 minutes)*

**Presenter:** BRIVIO, Ilaria (University of Zurich)

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 39

Type: **not specified**

## **CERNs Open Science Policy: background and practical implementations**

*Monday, December 12, 2022 2:30 PM (15 minutes)*

On October 1st 2022 the CERN Open Science Policy came in force. The policy has been developed by an organisation wide working group and contains nine chapters focusing on the different elements of Open Science. It is available here: <https://cds.cern.ch/record/2835057>

This presentation will briefly outline the background of the policy development, provide more details on the policy's content and will open the floor to a discussion on what this policy now means for our daily practice in the organization. This is very timely as the working group on Open Science continues its work and currently focuses on an implementation plan for the Open Science Policy.

**Primary authors:** LANGE, Clemens (Paul Scherrer Institute (CH)); DALLMEIER-TIESEN, Sunje (CERN)

**Presenter:** DALLMEIER-TIESEN, Sunje (CERN)

**Session Classification:** Keynote

Contribution ID: 40

Type: **not specified**

## **Analysis preservation in heavy-ion collisions experiments**

*Tuesday, December 13, 2022 11:50 AM (20 minutes)*

**Presenter:** OLIVEIRA DA SILVA, Antonio Carlos (University of Tennessee - Knoxville)

**Session Classification:** Experiments' reviews

Contribution ID: 42

Type: **not specified**

## **Publishing Statistical Models Overview**

*Tuesday, December 13, 2022 2:00 PM (10 minutes)*

Brief overview of the state of the field for publishing statistical models and setting the goals for the discussion.

**Presenter:** FEICKERT, Matthew (University of Wisconsin Madison (US))

**Session Classification:** Discussion session

Contribution ID: 43

Type: **not specified**

## Open Statistical Models : CMS Viewpoint

*Tuesday, December 13, 2022 2:15 PM (15 minutes)*

**Presenter:** MARINI, Andrea Carlo (CERN)

**Session Classification:** Discussion session



Contribution ID: 44

Type: **not specified**

## High Energy Physics Statistics Serialization (HS3)

*Tuesday, December 13, 2022 3:55 PM (15 minutes)*

**Primary authors:** Dr BURGARD, Carsten (Technische Universitaet Dortmund (DE)); REMBSER, Jonas (CERN)

**Presenters:** Dr BURGARD, Carsten (Technische Universitaet Dortmund (DE)); REMBSER, Jonas (CERN)

**Session Classification:** Discussion session

Contribution ID: 45

Type: **not specified**

## Statistical Model Conversion between HistFactory and CMS Combine

*Tuesday, December 13, 2022 2:55 PM (15 minutes)*

**Primary authors:** HELD, Alexander (University of Wisconsin Madison (US)); SKOVPEN, Kirill (Ghent University (BE))

**Presenters:** HELD, Alexander (University of Wisconsin Madison (US)); SKOVPEN, Kirill (Ghent University (BE))

**Session Classification:** Discussion session

Contribution ID: 46

Type: **not specified**

## **CMS Combine public release**

**Presenter:** WARDLE, Nicholas (Imperial College (GB))

**Session Classification:** Discussion session

Contribution ID: 47

Type: **not specified**

## **Tutorial: MaPyDe + ATLAS SimpleAnalysis**

*Wednesday, December 14, 2022 4:40 PM (1 hour)*

A tutorial of a full reinterpretation pipeline using MaPyDe, with a reproduction pipeline by incorporating ATLAS SimpleAnalysis

**Presenter:** Dr STARK, Giordon Holtsberg (University of California,Santa Cruz (US))

**Session Classification:** Hands on tools

Contribution ID: 48

Type: **not specified**

## Reproducing a CMS higgsino search from public data

*Tuesday, December 13, 2022 2:35 PM (15 minutes)*

**Presenter:** FORD, William (University of Colorado Boulder (US))

**Session Classification:** Discussion session

Contribution ID: 49

Type: **not specified**

## **CMS inputs on ML models re-usability**

*Monday, December 12, 2022 5:40 PM (10 minutes)*

**Presenter:** NGADIUBA, Jennifer (FNAL)

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 50

Type: **not specified**

## **Publication and reuse of ML models for recasting - discussion**

*Monday, December 12, 2022 5:55 PM (30 minutes)*

Discussion of technical and conceptual questions around the publication and reuse of ML models for recasting. Time is indicative.

**Presenter:** ALL

**Session Classification:** Experience and feedback using reinterpretation material

(Re)interpretatio ... / Report of Contributions

discussion

Contribution ID: 51

Type: **not specified**

## **discussion**

**Presenter:** ALL

**Session Classification:** Discussion session



Contribution ID: 52

Type: **not specified**

## **Intro**

*Monday, December 12, 2022 4:30 PM (5 minutes)*

**Session Classification:** Experience and feedback using reinterpretation material

Contribution ID: 53

Type: **not specified**

## ATLAS SimpleAnalysis

*Tuesday, December 13, 2022 4:30 PM (20 minutes)*

**Presenters:** Dr STARK, Giordon Holtsberg (University of California, Santa Cruz (US)); HANCE, Mike (UC Santa Cruz)

**Session Classification:** Discussion session

Contribution ID: 54

Type: **not specified**

## General analysis-code discussion

*Tuesday, December 13, 2022 5:00 PM (30 minutes)*

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

**Session Classification:** Discussion session

Contribution ID: 55

Type: **not specified**

## General discussion

*Thursday, December 15, 2022 2:30 PM (1 hour)*

Renewal of the RIF Steering Group, how to move forward, next workshop, ....

Contribution ID: 56

Type: **not specified**

## The big picture

*Wednesday, December 14, 2022 2:20 PM (20 minutes)*

**Presenter:** HEINRICH, Lukas Alexander (Max Planck Society (DE))

**Session Classification:** Discussion session

Contribution ID: 57

Type: **not specified**

## Overlap handling

*Wednesday, December 14, 2022 2:40 PM (15 minutes)*

**Presenter:** DADO, Tomas (Technische Universitaet Dortmund (DE))

**Session Classification:** Discussion session