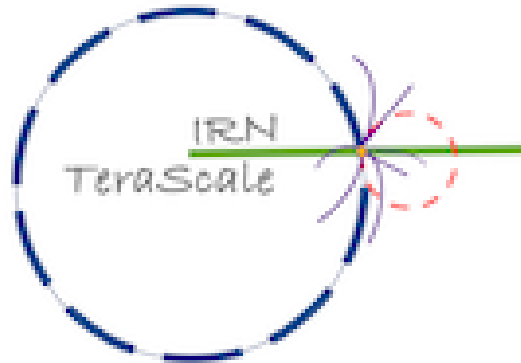


# IRN Terascale @ LPSC Grenoble



## Rapport sur les contributions

ID de Contribution: 27

Type: **Non spécifié**

## Physics at the High Energy Muon Collider

*mardi 25 avril 2023 17:10 (20 minutes)*

In this talk I will review the physics case of a high energy muon collider for the exploration of new physics with particular focus on Higgs boson physics, top quark physics and dark matter. I will discuss the role of a high energy muon collider in the landscape of future experiment to probe new physics in the next decades.

**Auteur principal:** FRANCESCHINI, Roberto (CERN)

**Orateur:** FRANCESCHINI, Roberto (CERN)

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM

ID de Contribution: 28

Type: Non spécifié

## Higgs Couplings to Weak Gauge Bosons: Probing 2 New Physics Scales at Once!

*mardi 25 avril 2023 15:00 (20 minutes)*

Measuring the Higgs boson couplings with an increasing precision is an indirect probe of new physics scenarios. In this talk, I will discuss how observing loop-induced deviations to  $hWW$  and  $hZZ$  couplings via new vectorlike leptons close to the weak scale can be used to deduce an upper bound on the mass scale of new bosons. This is an interesting example where observing a deviation to the Standard Model predictions allows probing new physics at a scale higher than the new mass scale that is responsible for the anomaly.

**Auteur principal:** NORTIER, Florian (IPhT (CEA Paris-Saclay))

**Co-auteurs:** Dr RIGO, Gabriele (CEA Paris-Saclay, IPhT); M. SESMA, Pablo (CEA Paris-Saclay, IPhT); Dr D'AGNOLO, Raffaele Tito (CEA Paris-Saclay, IPhT)

**Orateur:** NORTIER, Florian (IPhT (CEA Paris-Saclay))

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM

ID de Contribution: 30

Type: **Non spécifié**

# The Universal One-Loop Effective Action with Gravity

*mardi 25 avril 2023 16:30 (20 minutes)*

**Auteur principal:** LARUE, Rémy (LPSC)

**Orateur:** LARUE, Rémy (LPSC)

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM

ID de Contribution: 31

Type: **Non spécifié**

## SUSPECT3

*mercredi 26 avril 2023 09:30 (20 minutes)*

Presentation of the new version of SUSPECT3 (v3.1.1) described in “SuSpect3: A C++ Code for the Supersymmetric and Higgs Particle Spectrum of the MSSM”

**Auteurs principaux:** M. DJOUADI, Abdelhak (LPT Orsay); ZERWAS, Dirk (IJCLab and DM-Lab); MOULTAKA, Gilbert (L2C Montpellier, UMR5221-UM2/INP/CNRS); KNEUR, Jean-Loic (LCC Montpellier); UGHETTO, Michaël (L2C and CPPM)

**Orateur:** ZERWAS, Dirk (IJCLab and DMLab)

**Classification de Session:** Methods and Tools

**Classification de thématique:** Methods and Tools

ID de Contribution: 32

Type: **Non spécifié**

## Simplified likelihoods using linearized systematic uncertainties

*mercredi 26 avril 2023 10:20 (20 minutes)*

The ability to reuse published experimental results – for instance reinterpretations in the context of alternative models, or combinations of multiple results – is crucial to searches for new phenomena in high energy physics. The information that is made public, typically best-fit values, uncertainties and covariance matrices, is often insufficient to fully carry out this program, in particular in the presence of non-Gaussian effects from low event counts or correlated systematic uncertainties.

Simplified likelihoods provide an intermediate solution between this situation and the use of full likelihoods, which is often complex and computing-intensive. This talk presents a new such format, Simplified Likelihoods with Linearized Systematics (SLLS), which is complementary to other formats in current use. It preserves the Poisson nature of event-counting measurements and all the sources of systematic uncertainties of the full likelihood, which permit an accurate treatment of low event counts and correlated systematic effects. Systematic uncertainties are treated in the linear approximation, which leads to large gains in likelihood minimization performance, compared to full likelihoods.

Related publication: <https://arxiv.org/abs/2301.05676>

**Auteur principal:** BERGER, Nicolas (LAPP)

**Orateur:** BERGER, Nicolas (LAPP)

**Classification de Session:** Methods and Tools

**Classification de thématique:** Methods and Tools

ID de Contribution: 33

Type: **Non spécifié**

## **Can we trust machine learning? Parton distributions as a case study**

*mercredi 26 avril 2023 11:40 (20 minutes)*

I discussed some issues that arise when using Machine Learning as an inference tool in the particular context of the determination of parton distributions. Problems I address include: how do we know that the ML model generalizes correctly? Can we detect overlearning? Can we assign an uncertainty to the ML model predictions, and can we validate this assignment?

**Auteur principal:** FORTE, Stefano (Dipartimento di Fisica, Università di Milano)

**Orateur:** FORTE, Stefano (Dipartimento di Fisica, Università di Milano)

**Classification de Session:** Methods and Tools

**Classification de thématique:** Methods and Tools

ID de Contribution: 34

Type: **Non spécifié**

# Precision predictions for exotic lepton production at the Large Hadron Collider

*mardi 25 avril 2023 14:00 (20 minutes)*

We calculate total and differential cross sections for the pair production, at the Large Hadron Collider, of exotic leptons that could emerge from models with vector-like leptons and in Type-III seesaw scenarios. Our predictions include next-to-leading-order QCD corrections, and we subsequently match them with either parton showers, or threshold resummation at the next-to-next-to-leading logarithmic accuracy. Our results show an important increase of the cross sections relative to the leading-order predictions, exhibit a distortion of the shapes for various differential distributions, and feature a significant reduction of the scale uncertainties. Our predictions have been obtained from new FeynRules model implementations and associated UFO model libraries. This completes the set of next-to-leading-order implementations of new physics models featuring extra leptons that are publicly available on the FeynRules model database.

**Auteurs principaux:** Dr ABDUL HAMEED, Ajjath (LPTHE - CNRS); FUKS, Benjamin (LPTHE Paris); SHAO, Huasheng (CNRS)UMR7589); SIMON, Yehudi (LPTHE - Sorbonne Université)

**Orateur:** SIMON, Yehudi (LPTHE - Sorbonne Université)

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM



ID de Contribution: 35

Type: **Non spécifié**

## The general THDM in gauge-invariant form

*mardi 25 avril 2023 09:40 (20 minutes)*

In the general Two-Higgs Doublet Model it has been shown that the Higgs potential can be expressed in terms of gauge-independent quantities. In particular, stability, electroweak symmetry breaking, and CP symmetry can be understood in a concise way, avoiding unphysical gauge degrees of freedom. In a recent work, arXiv:2208.13179, we have completed this program showing how all the masses, the trilinear and quartic scalar interactions, the gauge-boson-Higgs interactions, as well as the Yukawa couplings in the general THDM can be expressed in a gauge-invariant form.

**Auteurs principaux:** SCHIENBEIN, Ingo (LPSC); M. SARTORE, Lohan (LPSC); HERRMANN, Björn (LAPTh / Université Savoie Mont Blanc); Prof. MANIATIS, Markos (Universidad del Bio-Bio)

**Orateur:** SCHIENBEIN, Ingo (LPSC)

**Classification de Session:** Higgs

**Classification de thématique:** Higgs

ID de Contribution: 36

Type: Non spécifié

## Directional detection of WIMPs with MIMAC

*lundi 24 avril 2023 15:15 (25 minutes)*

Directional detection is the only admitted strategy for the unambiguous identification of galactic Dark Matter (DM) even in the presence of an irreducible background. The directional detection strategy relies on the simultaneous measurements of the energy and the direction of a DM-induced nuclear recoil, and on the correlation of the recoil direction with the expected incoming WIMPs direction. Recoil energies must be searched in the keV-range: a WIMP typically transfers at maximum an energy lower than 10 keV/nucleon. The measurement of the directions of such low-energy nuclear recoils is challenging and, until the presented work, no directional detectors had achieved it.

In this talk, we present the low-energy performance of MIMAC, a directional detector based on Micromegas, demonstrating directionality down to a few keV. At low energy, the detector must operate at high gain (above  $10^4$ ). In these conditions, the interplay in signal formation between the electronic and the ionic signals distorts the 3D track reconstruction while it improves the detector sensitivity. We develop an improved procedure to reconstruct the direction of a nuclear recoil with MIMAC by handling the track distortions at high gain. We then determine the directional performance of the detector by means of mono-energetic neutron fields at 27 keV and 8 keV in order to measure the scattering angle of neutron-proton interactions. The reconstruction of the neutron energy spectra, which depends on the scattering angle, with a better than  $15^\circ$  angular resolution in the keV-range, achieves the target requirements for the directional strategy of detection.

A bi-chamber module of MIMAC is currently running at the Underground Laboratory of Modane (LSM) using a  $10 \times 10$  cm<sup>2</sup> Micromegas made of low-radioactivity materials. In the meantime, the collaboration is testing a  $35 \times 35$  cm<sup>2</sup> Micromegas, aiming for an installation of such a larger detector at the LSM in 2023. This will be the elementary brick for the m3 MIMAC detector.

More details can be found at: <https://arxiv.org/abs/2112.12469>

**Auteur principal:** BEAUFORT, Cyprien (CNRS/LPSC)

**Orateur:** BEAUFORT, Cyprien (CNRS/LPSC)

**Classification de Session:** Dark Universe

**Classification de thématique:** Dark Universe

ID de Contribution: 37

Type: **Non spécifié**

# Quantum information in Higgs to tau tau at future lepton colliders

*mardi 25 avril 2023 11:00 (20 minutes)*

We introduce a methodology and investigate the feasibility of measuring quantum properties of tau lepton pairs in the  $H \rightarrow \tau^+ \tau^-$  decay at future lepton colliders.

In particular, observation of entanglement, steerability and violation of Bell inequalities are examined for the ILC and FCC-ee.

**Auteurs principaux:** ALTAKACH, Mohammad Mahdi; LAMBA, Priyanka; MALTONI, Fabio; MAWATARI, Kentarou; SAKURAI, Kazuki

**Orateur:** ALTAKACH, Mohammad Mahdi

**Classification de Session:** Higgs

**Classification de thématique:** Higgs

ID de Contribution: **38**Type: **Non spécifié**

## New developments in SModelS

*mercredi 26 avril 2023 09:55 (20 minutes)*

I will present recent developments in SModelS, in particular the update of the database with the latest available experimental results for full Run-2 luminosity, the interface to the new statistical package Spey, and the statistical combination of analyses. The latter allows one to increase the robustness of the statistically inferred constraints. To demonstrate the physics impact, I will use the electroweakino sector of the MSSM as an illustrative example.

**Auteur principal:** PASCAL, Timothee**Orateur:** PASCAL, Timothee**Classification de Session:** Methods and Tools**Classification de thématique:** Methods and Tools

ID de Contribution: 39

Type: **Non spécifié**

## Functional one-loop matching of effective field theories

*mardi 25 avril 2023 14:20 (20 minutes)*

The separation of scales in effective field theories is essential for studying the low-energy phenomenology of BSM models. An effective theory, containing only light degrees of freedom, can be obtained from an underlying UV theory by integrating out heavy states using path integral techniques, ensuring that both theories describe the same low-energy dynamics. It is important to perform this matching beyond the leading order, as a great number of observables, like FCNC, only appear at the loop level. In this talk we discuss the functional matching procedure and highlight some of the technical challenges arising from operator reduction and evanescent operators in the EFT Lagrangian. We also present Matchete: a Mathematica code for the automatic one-loop matching of effective theories based on functional methods.

**Auteur principal:** WILSCH, Felix (University of Zurich)

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

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM

ID de Contribution: 40

Type: **Non spécifié**

## On axion couplings and anomalies

*mardi 25 avril 2023 16:10 (20 minutes)*

The axion couplings and their relation to quantum anomalies are discussed.  
I comment on a puzzling non-decoupling effect and its consequences.

**Auteur principal:** DUDAS, Emilian (CPHT, Ecole Polytechnique)

**Orateur:** DUDAS, Emilian (CPHT, Ecole Polytechnique)

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM

ID de Contribution: 41

Type: **Non spécifié**

## **NFLikelihood: Unsupervised Machine Learning LHC likelihoods with Normalizing Flows.**

*mercredi 26 avril 2023 11:15 (20 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.

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

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

**Classification de Session:** Methods and Tools

**Classification de thématique:** Methods and Tools

ID de Contribution: 42

Type: **Non spécifié**

## **New perspectives in Gravity Mediated SUSY Breaking: New contributions to the Higgs sector**

*mardi 25 avril 2023 16:50 (20 minutes)*

I will present a model related to a new class of solutions in gravity-mediated supersymmetry breaking. This class of solutions involves a new sector which may help to reduce the fine tuning of the Higgs boson mass. New supersymmetry breaking terms are generated corresponding to soft breaking terms and new hard breaking terms that are Planck-suppressed but may be sizable and contribute to the Higgs boson mass. Since these models involve singlets, they are naturally related to singlet-extensions of the MSSM, such as the NMSSM. We construct a two-singlet extension of the MSSM, called S2MSSM, assuming this new class of solutions. The order of magnitude of the one-loop contribution to the Higgs boson mass is studied. The new tree-level structure is also investigated.

**Auteur principal:** DUCROCQ, Robin (IPHC)

**Orateur:** DUCROCQ, Robin (IPHC)

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM



ID de Contribution: 43

Type: **Non spécifié**

## Towards a combined global SMEFT fit: Using likelihood analyses in the Top and Higgs sector

*mardi 25 avril 2023 14:40 (20 minutes)*

We present an updated global SMEFT analysis in the Top sector using the SFitter framework which focuses on a comprehensive treatment of uncertainties. We make use of a newly implemented marginalization procedure which allows for comparisons between profiling and marginalization methods. In addition, two top measurements included in the fit are updated using likelihoods made publicly available by the Top working group at ATLAS. This enables us to extract uncertainties more easily and to use a much more flexible treatment of the different nuisance parameters. Finally, we present some preliminary results for a combined global fit of this Top analysis with a previous analysis in the Higgs and Electroweak sector.

**Auteur principal:** SCHMAL, Nikita (ITP, Heidelberg University)

**Orateur:** SCHMAL, Nikita (ITP, Heidelberg University)

**Classification de Session:** Beyond the Standard Model

**Classification de thématique:** BSM

ID de Contribution: 44

Type: **Non spécifié**

## The interactions and the possible probes of a light scalar dark matter

We study a minimal model for a light scalar dark matter (DM) with a mass of a few GeV, requiring a light dark photon mediator to interact with the Standard Model (SM) particles. We analyse the model by focusing on the Breit-Wigner resonance for DM annihilation channels, considering the thermal relic abundance condition that includes the early kinetic decoupling effect. The interactions of the mediator can be constrained by various low-energy terrestrial probes such as proton beam-dumps measuring rare meson decays or electron beam-dump experiments measuring mediator decay into leptons. On the other hand, the interactions of the DM are tested by indirect searches, which include the cosmic ray and gamma-ray observations, and also by the low-mass direct detection experiments. We do a systematic analysis involving the latest and future limits in each category of the experiments/observations.

**Auteur principal:** CHAKRABORTI, Sreemanti

**Orateur:** CHAKRABORTI, Sreemanti

**Classification de Session:** Dark Universe

**Classification de thématique:** Dark Universe

ID de Contribution: 45

Type: **Non spécifié**

## **First results from the LUX-ZEPLIN (LZ) dark matter experiment.**

*lundi 24 avril 2023 14:15 (25 minutes)*

LUX-ZEPLIN (LZ) is a direct dark matter detection experiment currently operating at the Sanford Underground Research Facility (SURF) in Lead, South Dakota. It uses the world's largest dual-phase xenon time projection chamber, with 7 tonnes of active xenon, primarily to look for dark matter in the form of Weakly Interacting Massive Particles (WIMPs). LZ has released its first WIMP search results last year with an exposure of 60 live days using a fiducial mass of 5.5 tonnes. These results set new limits on spin-independent and spin-dependent WIMP-nucleon cross-sections for WIMP masses above  $9 \text{ GeV}/c^2$ . This talk will provide an overview of the LZ project and the efforts that enabled LZ to achieve this world-leading WIMP search result.

**Auteur principal:** Dr COTTLE, Amy (University of Oxford - Department of Physics)

**Orateur:** Dr COTTLE, Amy (University of Oxford - Department of Physics)

**Classification de Session:** Dark Universe

**Classification de thématique:** Dark Universe

ID de Contribution: 47

Type: **Non spécifié**

## **MadGraph and NLO Access**

*mercredi 26 avril 2023 13:45 (20 minutes)*

**Orateur:** Dr FLORE, Carlo (IJCLab Orsay)

**Classification de Session:** Joint session with GDR QCD (WG3)

**Classification de thématique:** Joint session with GDR QCD WG3

ID de Contribution: 48

Type: **Non spécifié**

## **QCD corrections for precision measurements of W/Z at the LHC using POWHEG**

*mercredi 26 avril 2023 14:10 (20 minutes)*

**Orateur:** RE, Emanuele

**Classification de Session:** Joint session with GDR QCD (WG3)

**Classification de thématique:** Joint session with GDR QCD WG3

ID de Contribution: 49

Type: **Non spécifié**

## Combined EW+PDF fits

*mercredi 26 avril 2023 14:35 (20 minutes)*

**Orateur:** TAFOYA VARGAS, Juan Salvador (ATLAS - IJCLab / Université Paris-Saclay)

**Classification de Session:** Joint session with GDR QCD (WG3)

**Classification de thématique:** Joint session with GDR QCD WG3

ID de Contribution: 50

Type: **Non spécifié**

## **TMD/PDF extraction for precision W/Z measurements at the LHC**

*mercredi 26 avril 2023 15:00 (20 minutes)*

**Orateur:** BERTONE, Valerio (IRFU, CEA, Université Paris-Saclay)

**Classification de Session:** Joint session with GDR QCD (WG3)

**Classification de thématique:** Joint session with GDR QCD WG3

ID de Contribution: 51

Type: **Non spécifié**

## **Cosmic antiparticles : is there room for dark matter?**

*lundi 24 avril 2023 16:15 (25 minutes)*

TBA

**Auteur principal:** GÉNOLINI, Yoann (LAPTh, Annecy)

**Orateur:** GÉNOLINI, Yoann (LAPTh, Annecy)

**Classification de Session:** Dark Universe

**Classification de thématique:** Dark Universe



ID de Contribution: 53

Type: **Non spécifié**

## First WIMP Search Results from the XENONnT Experiment

*lundi 24 avril 2023 14:45 (25 minutes)*

A rich number of astrophysical and cosmological observations indicate the existence of a massive, non-luminous and non-baryonic matter component which is commonly referred to as dark matter (DM). One well motivated class of DM are weakly interacting massive particles (WIMPs) which arise naturally from several beyond-Standard-model theories.

The XENON dark matter project aims for the direct detection of WIMPs utilizing the concept of a dual-phase time projection chamber (TPC), currently operating the 4th generation of XENON experiment, XENONnT, at the INFN Laboratori Nazionali del Gran Sasso underground laboratory. XENONnT was designed as a fast upgrade of its predecessor XENON1T, augmented by many new subsystems – among them the world’s first water Cherenkov neutron veto. The XENONnT TPC features a sensitive liquid xenon mass of 5.9 t and an unprecedented low background of intrinsic  $^{85}\text{Kr}$  and  $^{222}\text{Rn}$ , leading to an electronic recoil background rate of  $(15.8 \pm 1.3)$ , events/(t·y·keV) in the region of interest.

In this seminar we will report on the first WIMP search results with the XENONnT experiment, conducted in a blind analysis in an energy range between 3.1 keV and 60.0 keV, and an exposure of approximately 1.1 tonne-year.

**Auteur principal:** Dr MASBOU, Julien (SUBATECH)

**Orateur:** Dr MASBOU, Julien (SUBATECH)

**Classification de Session:** Dark Universe

**Classification de thématique:** Dark Universe

ID de Contribution: 54

Type: **Non spécifié**

## Gravitational portals during reheating

*lundi 24 avril 2023 16:45 (25 minutes)*

Inflation is now very well motivated because it can solve many issues of the Big Bang scenario. Specific models of inflation can be tested by observations, most notably by the CMB anisotropy power spectrum. I will present results on (dark) matter production in the late time evolution of this inflationary field usually called “reheating”, and the challenges to probe these mechanisms. Especially I will present what we call gravitational portals, as a minimal scenario to produce perturbatively particles during this phase of the early Universe.

**Auteur principal:** CLÉRY, Simon (IJCLab - Pôle théorie)

**Orateur:** CLÉRY, Simon (IJCLab - Pôle théorie)

**Classification de Session:** Dark Universe

**Classification de thématique:** Dark Universe

ID de Contribution: 55

Type: **Non spécifié**

## **Test of CP-invariance of the Higgs boson in VBF production and 4 lepton decays in ATLAS**

*mardi 25 avril 2023 09:00 (20 minutes)*

**Orateurs:** SCHAFFER, Arthur (IJCLab); SCHAFFER, R.D. (lal)

**Classification de Session:** Higgs

**Classification de thématique:** Higgs

ID de Contribution: 56

Type: **Non spécifié**

## **Study of top-Higgs CP properties with $t\bar{t}H$ and $tH$ events with $H \rightarrow b\bar{b}$ decays in ATLAS**

*mardi 25 avril 2023 09:20 (20 minutes)*

**Orateur:** Dr THEVENEAUX-PELZER, Timothée (CPPM)

**Classification de Session:** Higgs

**Classification de thématique:** Higgs

ID de Contribution: 57

Type: **Non spécifié**

## **Search for low mass resonance in diphotons with CMS**

*mardi 25 avril 2023 10:00 (20 minutes)*

**Orateurs:** GASCON-SHOTKIN, Suzanne (IPN Lyon); GASCON-SHOTKIN, Suzanne (IPN Lyon/Universite Claude Bernard Lyon 1)

**Classification de Session:** Higgs

**Classification de thématique:** Higgs

ID de Contribution: 58

Type: **Non spécifié**

## **Exploring extended Higgs sectors via pair production at the LHC**

*mardi 25 avril 2023 11:20 (20 minutes)*

**Orateur:** CACCIAPAGLIA, Giacomo (IP2I Lyon)

**Classification de Session:** Higgs

ID de Contribution: 59

Type: **Non spécifié**

## **Differential cross-section measurement in H->ZZ with CMS**

*mardi 25 avril 2023 11:40 (20 minutes)*

**Orateur:** TARABINI, Alessandro

**Classification de Session:** Higgs

**Classification de thématique:** Higgs

ID de Contribution: 60

Type: **Non spécifié**

## **Study of h(125) off-shell couplings in 4l and ll $\nu\nu$ channels with ATLAS**

*mardi 25 avril 2023 12:00 (20 minutes)*

**Orateur:** MAURY, Arnaud ({UNIV PARIS-SACLAY}UMR9012)

**Classification de Session:** Higgs

**Classification de thématique:** Higgs



ID de Contribution: **61**

Type: **Non spécifié**

## **Muon(ium) g-2**

*mardi 25 avril 2023 15:20 (20 minutes)*

**Orateur:** DELAUNAY, Cedric (LAPTH)

**Classification de Session:** Beyond the Standard Model

ID de Contribution: **62**

Type: **Non spécifié**

## **Round table**

*mercredi 26 avril 2023 12:05 (25 minutes)*

**Classification de Session:** Methods and Tools

ID de Contribution: **63**

Type: **Non spécifié**

## **Round table -cont-**

*mercredi 26 avril 2023 15:25 (25 minutes)*

**Classification de Session:** Joint session with GDR QCD (WG3)

ID de Contribution: **64**

Type: **Non spécifié**

## Workshop Dinner

*mardi 25 avril 2023 19:30 (2h 30m)*