LIO international conference on Future colliders and the origin of mass

Rapport sur les contributions

ID de Contribution: **25** Type: **Non spécifié**

TBA

Orateur: LELLOUCH, Laurent (CPT Marseille)

Classification de Session: g-2

ID de Contribution: **26** Type: **Non spécifié**

TBA

Orateur: CRIVELLIN, Andreas (CERN)

Classification de Session: g-2

ID de Contribution: **27**   Type: **Non spécifié**

Some thoughts on muon g-2 and B-meson anomalies

mercredi 23 juin 2021 10:00 (40 minutes)

Orateur: LEE, Hyun Min

Classification de Session: g-2

ID de Contribution: **28**

Type: **Non spécifié**

Naturalness, the deus-ex-machina of the muon g-2 anomaly and lepton non-universality.

mercredi 23 juin 2021 11:00 (40 minutes)

I will critically present the state-of-the-art of the observed standard model anomalies in flavor physics and in muon g-2 experiment. I will discuss whether the standard model could still be rescued both theoretically and experimentally and whether the anomalies can be considered as serious hints of new physics and what type. In particular I will make the case that the anomalies, especially the g-2 one hint to revived natural models of beyond standard model physics. Looking ahead, I will present possible scenarios of discovery of new physics at colliders and beyond.

Orateur: SANNINO, Francesco (CP3)

Classification de Session: g-2

ID de Contribution: **29** Type: **Non spécifié**

New Physics Models

mercredi 23 juin 2021 14:00 (40 minutes)

Orateur: CRIVELLIN, Andreas (CERN)

Classification de Session: g-2

ID de Contribution: **30**   Type: **Non spécifié**

Prospects for the ILC project

lundi 21 juin 2021 10:00 (40 minutes)

The International Linear Collider (ILC) is the highest-energy electron-positron collider proposed by the international high-energy physics community. It is planned to start as a Higgs Factory with center-of–mass energy of 250 GeV, keeping energy extendibility at a later stage. Preparation for the ILC has entered a new stage recently with publication of "Proposal for the ILC Preparation Laboratory (Pre-lab)"by the ILC International Development Team. I will introduce the outline of the ILC and physics at the ILC, and explain current efforts and future prospects to realize the ILC as an international project.

Orateur: OKADA, Yasuhiro (KEK)

ID de Contribution: **31**   Type: **Non spécifié**

Physics prospects of the Future Circular Collider

lundi 21 juin 2021 11:00 (40 minutes)

Orateur: MANGANO, michelangelo (CERN)

ID de Contribution: **32**   Type: **Non spécifié**

A new resolution of flavor problem in 2HDM with U(1) Higgs gauge symmetry

jeudi 24 juin 2021 11:00 (40 minutes)

Generic 2HDM's suffer from neutral Higgs mediated FCNC problem. Traditionally this problem is avoided by softly broken Z2 symmetry that distinguishes H1 and H2. In this talk I implement the softly broken Z2 symmetry to spontanesouly broken U(1) Higgs gauge symmetry. In this setup one often has to add new chiral fermions in order to maintain gauge anomaly cancellation. I discuss extensions of Type I, II, X, Y, and discuss some phenomenology.

Orateur: KO, Pyungwon (KIAS)

ID de Contribution: **33**   Type: **Non spécifié**

physics and challenges at FCC-ee

jeudi 24 juin 2021 10:00 (40 minutes)

Orateur: BERNARDI, Gregorio (APC & LPNHE Paris)

ID de Contribution: **34**   Type: **Non spécifié**

Towards the Consistent Dark Matter exploration

jeudi 24 juin 2021 14:00 (40 minutes)

The nature of Dark Matter (DM) is one of the greatest puzzles of modern particle physics and cosmology. Although overwhelming observational evidences from galactic to cosmological scales point to the existence of DM, after decades of experimental effort only its gravitational interaction has been experimentally confirmed. Currently, we do not have any clue on DM properties, such as its spin, mass, interactions other than gravitational, symmetry responsible for its stability, number of states associated to it, and possible particles that would mediate the interactions between DM and the standard model (SM) particles.

If DM is light enough and interacts with SM particles directly or via some mediators with a strength beyond the gravitational one, its elusive nature can be decoded or constrained though combined searches: a) from direct production at colliders b) via the relic density precisely measured through the observations of cosmic microwave background (CMB) anisotropies by WMAP and PLANCK collaborations; c) from DM direct detection (DD) experiments, which are sensitive to elastic spin independent (SI) or spin dependent (SD) DM scattering off nuclei; d) from DM indirect detection searches, that look for SM particles produced in the decay or annihilation of DM present in the cosmos, both with high energies observables (gamma-rays, neutrinos, charge cosmic rays) produced in the local Universe, and by studying the effects of energy produced by DM annihilation in the early universe on the properties of the CMB spectrum.

Decoding of unknown underlying theory of DM requires systematic approach. Therefore we suggest the classification of Dark Matter models with mediator multiplets of different spins charged under the weak group. This classification allows to identify models which are already excluded and those models and signatures which can be tested and possibly discovered at the LHC, future colliders and non-colldier experiments. Systematic exploration of DM models and their signatures at present creates the ground for the discovery of DM and its identification in the near future.
Several classes of those models are discussed.

Orateur: BELYAEV, Alexander (Southampton University)

ID de Contribution: **35**   Type: **Non spécifié**

New Physics prospects from D to pi l+l-

mardi 22 juin 2021 10:00 (40 minutes)

I will discuss the decay D to pi l+l-, providing motivation from the B physics anomalies. After having reviewed the previous status of the calculation for this decay, I will motivate our calculation where we take a new approach to the the resonance contributions and include for the first time the relatively large contributions from the weak annihilation diagrams. I will then discuss the consequences of this calculation of the search for new physics via D to pi l+l-, mentioning both the model independent case and the case of specific models.

Orateur: BHARUCHA, Aoife (CPT, Marseille)

ID de Contribution: **36**   Type: **Non spécifié**

Searching for New Physics with semileptonic B decays

mardi 22 juin 2021 11:00 (40 minutes)

Orateur: MAHMOUDI, Nazila (Lyon University)

ID de Contribution: **37**   Type: **Non spécifié**

On the dispersive evaluation of the HVP contribution to a_mu and alphaQED, and implications for the EW fit

vendredi 25 juin 2021 10:00 (40 minutes)

Orateur: MALAESCU, Bogdan (LPNHE, Paris, FRANCE)

Classification de Session: g-2

ID de Contribution: **38**

Type: **Non spécifié**

Leading hadronic contribution to the muon magnetic moment from lattice quantum chromodynamics

vendredi 25 juin 2021 11:00 (40 minutes)

Orateur: LELLOUCH, Laurent (CPT Marseille)

Classification de Session: g-2

ID de Contribution: **39**
Type: **Non spécifié**

The neutrinoless beta beta process at the LHC and beyond

mardi 22 juin 2021 14:00 (40 minutes)

The Majorana nature of neutrinos and whether lepton number symmetry is conserved are among the most pressing mysteries in physics today. This follows from their widespread implications for cosmology, nuclear physics, and particle physics. Along these lines, searches for the neutrinoless beta beta (0vBB) decay mode of heavy nuclei are highly sensitive probes of these questions, albeit with important limitations. In this talk we present a new look into the high-energy realization of the 0vBB process at the Large Hadron Collider (LHC). As a case study, we focus on the same-sign WW scattering process to same-sign muons, which violates lepton number and is outside the reach of nuclear decay experiments. Whether mediated by heavy Majorana neutrinos or more generally by the Weinberg operator, we find that the LHC offers incredible complementarity to lower energy experiments and further extends the sensitivity to the nature of neutrinos.

Orateur: RUIZ, Richard (Institute of Nuclear Physics (IFJ) PAN)

ID de Contribution: **40**   Type: **Non spécifié**

Terazooming into compositeness/ALP's

lundi 21 juin 2021 14:00 (40 minutes)

The Tera-Z phase of future e+e– colliders, FCC-ee and CepC, is a goldmine for exploring Z portal physics. We focus on axion-like particles (ALPs) that can be produced via Z decays with a monochromatic photon. As a template model, we consider composite Higgs models with a light pseudo-scalar that couples through the Wess-Zumino-Witten term to the electroweak gauge bosons. For both photophilic and photophobic cases, we show that the Tera-Z can probe composite scales up to 100s of TeV, well beyond the capability of the LHC and current precision physics. Our results also apply to generic ALPs and, in particular, severely constrain models that explain the muon g−2 anomaly

Orateur: Dr IYER, ABHISHEK (IP2I Lyon)

ID de Contribution: **41**   Type: **Non spécifié**

On the EFT description of ALPs coupled to heavy chiral matter

mardi 22 juin 2021 12:00 (20 minutes)

The impact of heavy new physics on low-energy observables is generically and conveniently described using effective field theories (EFTs). The latter framework, when applied to the degrees of freedom of the standard model (SM), raises several questions, for instance: which is the most general EFT? which UV models require that the most general EFT be used? which observables allow to test whether the most general EFT is necessary? In this talk, I will approach these questions using the SM extended with an axion-like particle (ALP) and heavy chiral fermions. In particular, I will explain why non-decoupling effects forbid the description within the SMEFT of the interaction between the ALP and two SM gauge bosons. I will also compare the latter interaction with an adequate UV anomaly coefficient, which is also non-decoupling.

Orateur: BONNEFOY, Quentin