6th ComHEP: Colombian Meeting on High Energy Physics

Report of Contributions

https://indico.global/e/8701

Contribution ID: **1** Type: **Regular Talk (15'+5')**

Search for new physics in the final state $B - \tau - \nu$

Friday 3 December 2021 11:05 (20 minutes)

The $R_{D^{(*)}}$ Anomaly is a taint in the Lepton Flavor Universality. With recent data the anomaly has a statistical significance more than 3σ between BaBar, LHCb and Belle. Many theoretical models had been proposed to solve this problem, extending the Standard model in different sectors. In this talk we will discuss about the road to look for a charged mediator in two different mass spectra with the final state $B - \tau - \nu$ in proton-to-proton colissions using computational tools as MadGraph5, Pythia8 and Delphes to develop montecarlo samples, calculating the cross-section between the partons, simulating the hadronization cascade and showering and emulating the CMS response for these particles and finally how touse python for the analysis. This work in order to explain the $R_{D^{(*)}}$ Anomaly taking into account the crossing symmetry in the LHC experimental context.

Authors: RUIZ, Jose (Universidad de Antioquia (CO)); ATEHORTUA GARCES, Tomas (Universidad de Antioquia (CO))

Presenter: ATEHORTUA GARCES, Tomas (Universidad de Antioquia (CO))

Session Classification: Theory - Phenomenology

Track Classification: Beyond the standard model

Contribution ID: **3** Type: **Regular Talk (15'+5')**

Effective potential and dynamical symmetry breaking up to five loops in a massless abelian Higgs model

Friday 3 December 2021 10:45 (20 minutes)

we investigate the consequences of the Renormalization Group Equation (RGE) in the determination of the effective potential and the study of Dynamical Symmetry Breaking (DSB) in a massless Abelian Higgs (AH) model with N-component complex scalar field in (3+1) dimensional spacetime. The classical Lagrangian presents scale invariance, which is broken by radiative corrections to the effective potential. We studied the behavior of effective potential and observed that the configuration of the minimum of potential, where is possible to study the DSB in the leading logs aproximation. This approach was reached by the use of RGE with the help of renormalization group functions, $\widetilde{\beta}$ and $\widetilde{\gamma}$, calculated up to four loops in the MS scheme. Using these renormalization group functions, we find the version of these in the CW scheme, β and γ, using the requirement of multi-scales. So, we apply them together with the RGE for computing the effective potential up to five loops and with this, we studied the DSB in or model where we have found for $N \geq 104$ that the gauge dependence of ξ is approximately removed.

Authors: Dr GÓMEZ QUINTO, Andres (Universidad del Atlantico); Dr VEGA MONROY, Ricardo (Universidad del Atlantico); Dr FERRARI, Alysson (Universidade Federal do ABC); Dr LEHUM, André (Universidade Federal do Pará,)

Presenter: Dr GÓMEZ QUINTO, Andres (Universidad del Atlantico)

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **4** Type: **Regular Talk (15'+5')**

A low energy effective quark-gluon vertex to calculate the pseudoscalar meson spectrum

Monday 29 November 2021 16:25 (20 minutes)

Based on the generalized quantum electrodynamics expression for the Podolsky propagator, which preserves gauge invariance for massive photons, we propose a model for the massive gluon propagator that reproduces well-known features of established strong-interaction models in the framework of the Dyson-Schwinger equation. By adjusting the Podolsky mass and the coupling strength we thus construct a model with simple analytical properties known from perturbative theory, yet well suited to describe a confining interaction. We obtain solutions of the Dyson-Schwinger equation for the quark at spacelike momenta on the real axis as well as on the complex plane and solving the bound-state problem with the Bethe-Salpeter equation yields masses and weak decay constants of the π, K and ηc in excellent agreement with experimental values, while the D and Ds are reasonably well described. The analytical simplicity of this effective interaction has the potential to be useful for phenomenological applications and may facilitate calculations in Minkowski space.

Authors: EL-BENNICH, Bruno (Universidade Cruzeiro do Sul); ROJAS, Eduardo (Universidad de Nariño); Dr RAMOS-ZAMBRANO, German (Universidad de Nariño.)

Presenter: ROJAS, Eduardo (Universidad de Nariño)

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **5** Type: **Regular Talk (15'+5')**

Measurement of prompt production cross section ratio of χc states in pPb collisions at sqrt(s) = 8.16 TeV

Monday 29 November 2021 17:25 (20 minutes)

Preliminary results about the prompt production of some heavy quarkonium states are presented, which are based on an event sample of pPb collisions at a center-of-mass energy of 8.16 TeV, collected by CMS detector during 2016 and corresponding to an integrated luminosity of 180 nb^{-1}. $\chi_{c1} \rightarrow J/\psi\gamma$ and $\chi_{c1} \rightarrow J/\psi\gamma$ decays are used for these studies. The ratio of the prompt production cross sections for the χ_{c1} and χ_{c2} states ($\sigma(\chi_{c2})/\sigma(\chi_{c1})$) has been measured in the bins of the J/ψ transverse momentum and track multiplicity.

Authors: MUNOZ ACEVEDO, Andres (Universidad de Antioquia (CO)); Dr MEJIA GUISAO, Jhovanny Andrés (Universidad de Antioquia)

Presenter: MUNOZ ACEVEDO, Andres (Universidad de Antioquia (CO))

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **6** Type: **Regular Talk (15'+5')**

Kinetic Misalignment Made Easy

Kinetic Misalignment Made Easy

Author: BERNAL, Nicolás (Universidad Antonio Nariño)

Presenter: BERNAL, Nicolás (Universidad Antonio Nariño)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **7** Type: **Short Talk (5')**

Oscilaciones de neutrinos: un análisis cualitativo

Thursday 2 December 2021 17:45 (5 minutes)

Para explicar los resultados experimentales de las oscilaciones de los neutrinos es necesario considerar que estas partículas sean masivas; no obstante, el modelo estándar de la física de partículas elementales, el esquema teórico más exitoso que explica con buena precisión tres de las cuatro interacciones fundamentales de la naturaleza ,asume que los neutrinos son partículas sin masa.
La dificultad en la solución de este problema conlleva a física más allá del modelo estándar, extensiones del modelo estándar, que permitan mecanismos que generen masa para los neutrinos.
En esta contribución se elabora una revisión conceptual e histórica de la Física de los neutrinos, desde su postulación por parte de Wolfang Pauli, hasta los más recientes avances investigativos a nivel teórico y experimental. Consideramos de primordial importancia analizar las perspectivas experimentales que pueden proporcionar respuestas parciales sobre las masas y oscilaciones de los neutrinos.
Palabras clave: neutrino,oscilacion,sabor, modelo estandar,Majorana, Dirac

Authors: Dr GONZALEZ SIERRA, Hernando (Universidad Surcolombiana); CORREA ANGEL, Silvia Lucia (USCO)

Presenter: CORREA ANGEL, Silvia Lucia (USCO)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **8** Type: **Regular Talk (15'+5')**

The Scattering and Neutrino Detector at the LHC

Tuesday 30 November 2021 17:55 (20 minutes)

SND@LHC is a compact and stand-alone experiment to perform measurements with neutrinos produced at the LHC in a hitherto unexplored pseudo-rapidity region of 7.2 < 𝜂 < 8.6, complementary to all the other experiments at the LHC. The experiment is to be located 480 m downstream of IP1 in the unused TI18 tunnel. The detector is composed of a hybrid system based on an 800 kg target mass of tungsten plates, interleaved with emulsion and electronic trackers, followed downstream by a calorimeter and a muon system. The configuration allows efficiently distinguishing between all three neutrino flavours, opening a unique opportunity to probe physics of heavy flavour production at the LHC in the region that is not accessible to ATLAS, CMS and LHCb. This region is of particular interest also for future circular colliders and for predictions of very high-energy atmospheric neutrinos. The detector concept is also well suited to searching for Feebly Interacting Particles via signatures of scattering in the detector target. The first phase aims at operating the detector throughout LHC Run 3 to collect a total of 150 fb−1. The experiment was recently approved by the Research Board at CERN. A new era of collider neutrino physics is just starting.

Author: ILIEVA, Simona Ilieva (University of Sofia - St. Kliment Ohridski (BG))

Co-author: DI CRESCENZO, Antonia (CERN)

Presenter: ILIEVA, Simona Ilieva (University of Sofia - St. Kliment Ohridski (BG))

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **11** Type: **Regular Talk (15'+5')**

Scale Invariant FIMP Miracle

Thursday 2 December 2021 10:45 (20 minutes)

We study the freeze-in production of vector dark matter (DM) in a classically scale invariant theory, where the Standard Model (SM) is augmented with an abelian $U(1)_X$ gauge symmetry that is spontaneously broken due to the non-zero vacuum expectation value (VEV) of a scalar charged under the $U(1)_X$. Generating the SM Higgs mass at 1-loop level, it leaves only two parameters in the dark sector, namely, the DM mass m_X and the gauge coupling g_X as independent, and supplement with a naturally light dark scalar particle. We show, for $g_X \sim \mathcal{O}\left(10^{-5}\right)$, it is possible to produce the DM X out-of-equilibrium in the early Universe, satisfying the observed relic abundance for $m_X \sim \mathcal{O}\,(\text{TeV})$, which in turn also determines the scalar mixing angle $\sin\theta \sim \mathcal{O}\left(10^{-5}\right)$. The presence of such naturally light scalar mediator with tiny mixing with the SM, opens up the possibility for the model to be explored in direct search experiment, which otherwise is insensitive to standard freeze-in scenarios. Moreover we show that even with such feeble couplings, necessary for the DM freeze-in, the scenario is testable in several light dark sector searches (e.g., in DUNE and in FASER-II), satisfying constraints from the observed relic abundance as well as big bang nucleosynthesis (BBN). Particularly, we find, regions in the parameter space with $m_X > 1.8$ TeV becomes insensitive to direct detection probe but still can be accessible in lifetime frontier searches, again courtesy to the underlying scale invariance of the theory.

Authors: BARMAN, Basabendu; GHOSHAL, Anish

Presenter: BARMAN, Basabendu

Session Classification: Astroparticles - Cosmology

Track Classification: Dark Matter

Contribution ID: **13** Type: **Short Talk (5')**

Selection of the D+⟶ K−K+K+ candidates at the LHCb experiment

Monday 29 November 2021 18:10 (5 minutes)

The selection of $D^+ \longrightarrow K^-K^+K^+$ candidates is performed using a multivariate analysis. The study is based on a sample of pp-collision data, collected at a centre-of-mass energy of 13 TeV with the LHCb detector in 2016. Different multivariate classifiers are considered and their signal-background discrimination performance is evaluated. The signal significance is investigated and its optimization is examined for each classifier. The result is a final selection of $D^+ \longrightarrow K^-K^+K^+$ candidates useful for a further analysis, e.g, CP violation and amplitude analysis studies.

Authors: ORDONEZ SOTO, Juan Sebastian (CERN); ORDONEZ, Sebastian

Co-authors: Prof. MILANÉS, Diego (Universidad Nacional de Colombia); Prof. CORREA DOS REIS, Alberto (Centro Brasileiro de Pesquisas Físicas - CBPF)

Presenter: ORDONEZ, Sebastian

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **14** Type: **Short Talk (5')**

Testbeam results of 3D silicon sensors for the Inner Tracker system of the Phase-2 CMS detector.

Wednesday 1 December 2021 10:30 (5 minutes)

This presentation describes the test beam studies of 3D silicon sensors (pitch 50x50 μm2) exposed to a 120 GeV proton beam at the Fermilab Test Beam Facility. We show the pixel efficiency, cluster size and hit resolution before and after irradiation. The 3D silicon sensors are considered for the innermost layers of the Inner Tracker (IT) of the Phase-2 upgrade of CMS Detector. This detector is expected to operate at a peak instantaneous luminosity of 7.5×10^{34} cm^{-2} s^{-1}, resulting in a total fluence of 2.3×10^{16} neq/cm^2 at the innermost layer of the IT, in center of the CMS detector. The IT must separate particle tracks in extremely dense collision debris: 140-200 collisions per bunch crossing. These conditions require thin, highly granular sensor components and readout chips that are radiation-tolerant, fast, and efficient.

Author: AGUIRRE NARVAEZ, Alexis Javier (University of Puerto Rico (PR))

Presenter: AGUIRRE NARVAEZ, Alexis Javier (University of Puerto Rico (PR))

Session Classification: LHC

Track Classification: Beyond the standard model

Contribution ID: **15** Type: **Regular Talk (15'+5')**

Future probes of light bosons

Tuesday 30 November 2021 09:00 (30 minutes)

The status of the current and future searches of light bosons is reviewed. I will focus on light bosons acting as the dark matter or the dark energy in the Universe

Author: Dr VISINELLI, Luca (Shanghai Jiao Tong University)

Presenter: Dr VISINELLI, Luca (Shanghai Jiao Tong University)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **16** Type: **Short Talk (5')**

The lepton flavor universality violation in ϒ and B meson decays and the W'-triplet boson model

Monday 29 November 2021 18:15 (5 minutes)

In recent years, evidence of Lepton Flavour Universality Violation has been observed in semi-leptonic decays associated with the charged-current transition □→□□□ by BABAR, Belle and LHCb experiments, up to 3 standard deviations (3σ). While for the neutral-current transition □□ →□ˆ+ □ˆ–, the BABAR collaboration in 2020 reported a discrepancy of 1.8σ in the leptonic decay of the ϒ(3s) meson. Since the new physics operator that modifies the charged transition also contributes to the neutral process, in this work we study the impact of these measurements on a new physics model consisting of an extra triplet of left-handed vector-bosons (W', Z') that coupled preferably to fermions of the third family. We observe that this model cannot simultaneously explain the recent measurement obtained by BABAR for ϒ(3s) and the observables given by the transition □→□□□.

Authors: GARCIA DUQUE, Cristian Harold (Universidad del Quindío); ROJAS, Eduardo (Universidad de Nariño); MUÑOZ , José Herman (Universidad del Tolima); QUINTERO POVEDA, Nestor (Universidad Santiago de Cali)

Presenter: GARCIA DUQUE, Cristian Harold (Universidad del Quindío)

Session Classification: Heavy Flavour

Track Classification: Beyond the standard model

Contribution ID: **17** Type: **Short Talk (5')**

Optimizing GEANT for Monte Carlo simulation challenge at the HL-LHC

Wednesday 1 December 2021 09:45 (5 minutes)

The High Luminosity Large Hadron Collider (HL-LHC) will produce at least 250 inverse femtobarns of data per year. In order to analyze this data, we need to produce a substantial number of events. This possesses a considerable challenge to the already-optimized full CMS detector simulation that uses Geant4. One avenue being explored is modifying the simulation parameters to process events even more quickly, but with reduced accuracy. Machine learning algorithms would then be applied to the reduced-accuracy output to get a high-quality final result. This contribution talks about first steps in this direction where we vary parameters such as RusRoNeutronEnergyLimit and RusRoProtonEnergyLimit, and their combinations in the detector simulation and impacts on the running time and physical output.

Author: GUERRERO DE LA CRUZ, Harold (University of Puerto Rico (PR))

Presenter: GUERRERO DE LA CRUZ, Harold (University of Puerto Rico (PR))

Session Classification: LHC

Track Classification: Beyond the standard model

Contribution ID: **18** Type: **Regular Talk (15'+5')**

Spin 3/2 dark matter in the radiative seesaw

Tuesday 30 November 2021 10:55 (20 minutes)

We propose a model with spin 3/2 fermions and vector doublets. We compute neutrino masses via radiative seesaw mechanism. We investigate the consequences of the model in the dark matter relic abundance. Furthermore, we implement the Casas-Ibarra parametrization to constraint the parameter space considering theoretical constraints. We also analyze the parameter space for direct detection of dark matter.

Author: SUÁREZ, David (Universidad de Antioquia)

Co-author: RESTREPO, Diego (Universidad de Antioquia)

Presenter: SUÁREZ, David (Universidad de Antioquia)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **19** Type: **Regular Talk (15'+5')**

Production studies of B^+ meson in pPb collisions at $\sqrt{s_{NN}} = 8.16$ TeV

Monday 29 November 2021 17:05 (20 minutes)

The description of some B^+ meson production studies is presented, which are based on an event sample of pPb collisions at a center-of-mass energy of $\sqrt{s_{NN}} = 8.16$ TeV, collected by CMS detector at the CERN LHC during 2016 and corresponding to an integrated luminosity of 189.7 nb^{-1}. The $B^+ \to J/\psi\, K^+$ and $J/\psi \to \mu^+\mu^-$ decays are used for these studies.

Author: TORRES CASTANO, Camilo Jose (Universidad de Antioquia (CO))

Co-author: MEJIA GUISAO, Jhovanny Andrés (Universidad de Antioquia)

Presenter: TORRES CASTANO, Camilo Jose (Universidad de Antioquia (CO))

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **20** Type: **Short Talk (5')**

Boosted Higgs boson tagger calibration using Z+ jets events

Wednesday 1 December 2021 09:05 (5 minutes)

This work pretends to study the boosted Higgs boson calibration using Z + jets events by optimizing the signal significance after tagging this topology data with the objective that allows others to investigate this type of decay for different processes. Besides, this project also focuses on the automation of the event selection in this tagger to allow the code to be safe and robust to errors, building a CI/CD workflow, allowing it to be reproducible by others.

Authors: MORENO PEREZ, Juan Manuel (Universidad Nacional de Colombia (CO)); CAVIEDES BETANCOURT, Laura Juliana (Universidad Nacional de Colombia (CO))

Co-authors: SANDOVAL USME, Carlos (Universidad Nacional de Colombia); CAMACHO TORO, Reina Coromoto (Centre National de la Recherche Scientifique (FR)); HE, Yajun (LPNHE, Paris)

Presenter: CAVIEDES BETANCOURT, Laura Juliana (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **21** Type: **Regular Talk (15'+5')**

Searching for light long-lived neutralinos at Super-Kamiokande

Thursday 2 December 2021 16:50 (20 minutes)

Cherenkov neutrino detectors offer a powerful tool to study long-lived particles that are produced in the decay of mesons from atmospheric showers. In this talk, we explain this approach by considering the lightest neutralino in the context of R parity violating (RPV) supersymmetry, and show how to use Super-Kamiokande atmospheric neutrino data to place constraints on the parameter space of the RPV sector. We demonstrate that for the parameters involved in the production of neutralinos from the decays of kaons and D-mesons, these searches can probe regions of the parameter space that have not been excluded by searches in collider or beam dump experiments.

Authors: Mr CANDIA, Pablo (The University of Manchester); COTTIN, Giovanna (Universidad Adolfo Ibañez); Mr MÉNDEZ, Andrés (Pontificia Universidad Católica de Chile); MUÑOZ, Víctor (IFIC, UV)

Presenter: Mr CANDIA, Pablo (The University of Manchester)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **23** Type: **Regular Talk (15'+5')**

Vector Boson Fusion Topology and Simplified Models for Dark Matter searches at colliders

Tuesday 30 November 2021 11:15 (20 minutes)

We study the possible searches of dark matter at colliders using Vector Boson Fusion topology in the context of Simplified Models signatures. We examine the possible physics reach of these searches with regard to monojet-type searches, and determine how these two signatures might be complementary.

Author: OCAMPO HENAO, Daniel (Universidad de Antioquia (CO))

Co-authors: Mr DUQUE-ESCOBAR, Santiago (Universidad de Antioquia); Dr RUIZ-ÁLVAREZ, José David (Universidad de Antioquia)

Presenter: OCAMPO HENAO, Daniel (Universidad de Antioquia (CO))

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **24** Type: **Short Talk (5')**

Tools for physics analysis using ATLAS Open Data. A BDT in H->ZZ

Wednesday 1 December 2021 09:25 (5 minutes)

En el mundo digital actual, los numerosos cambios transforman constantemente la forma de manejar, almacenar y distribuir datos, y el surgimiento de nuevas infraestructuras computacionales y servicios remotos posibilita realizar distintas tareas de manera virtual, sin contar con recursos computacionales sofisticados. Esto resulta especialmente útil en análisis con datos abiertos de los experimentos del LHC, los cuales están fuertemente ligados al equipamiento computacional personal e institucional de los usuarios.
Este proyecto busca estudiar la forma de adaptar el modelo "multi-cloud"a ambientes donde los recursos están distribuidos, a través del uso de máquinas virtuales, contenedores de herramientas y protocolos de acceso abierto, que faciliten las colaboraciones internacionales en el desarrollo de análisis y monitoreo, posibilitando que usuarios con menos recursos disponibles puedan replicar la infraestructura y las herramientas necesarias, permitiéndoles aprender y contribuir. Adicionalmente se busca replicar algunos análisis en física, usando los esquemas disponibles y los datos abiertos del experimento ATLAS, que permiten replicar de manera educativa experimentos del modelo estándar.

Author: VILLAMIL SANTIAGO, Juan David (Universidad Nacional de Colombia (CO))

Presenter: VILLAMIL SANTIAGO, Juan David (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **25** Type: **Short Talk (5')**

An implementation of python and C++ on physics analysis using ATLAS Experiment Run 2 data.

Wednesday 1 December 2021 09:30 (5 minutes)

El procesamiento y análisis de datos está tomando cada vez mayor relevancia en el campo de la investigación científica, por lo que actualmente se busca facilitar el desarrollo de herramientas que realicen estos análisis sin la limitación de la infraestructura computacional personal que pueda llegar a tener un usuario. Así, el desarrollo y uso de herramientas de software que provean un servicio remoto podría ser una muy buena solución para sobreponerse a tales limitaciones. Particularmente, el LHC permite hacer uso de datos abiertos y, por lo tanto, es posible desarrollar herramientas de software remoto que puedan facilitar el análisis de tales datos y que sean orientadas específicamente al procesamiento y análisis de experimentos en física de altas energías (HEP).
El proyecto que se busca implementar consiste en extender algunos programas de software remoto, que son usados para el análisis de datos abiertos del ATLAS Open Data con 13 TeV, en un lenguaje de programación diferente a C++ (como Python) con el objetivo de actualizar y mejorar el procesamiento y análisis de estos datos y a su vez, permitir que personas principiantes y un poco más avanzados en el manejo de técnicas computacionales en HEP puedan hacer uso de éstos programas para complementar su proceso de formación de una manera mucho más sencilla, diversa y accesible.

Author: GARCIA RUIZ, Miguel Angel (Universidad Nacional de Colombia (CO))

Presenter: GARCIA RUIZ, Miguel Angel (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **27** Type: **Short Talk (5')**

Desarrollo de un análisis TMVA para separación de eventos en los datos del LHCO 2020.

Wednesday 1 December 2021 09:35 (5 minutes)

En física de partículas los algoritmos computacionales son fundamentales para seleccionar eventos interesantes para estudiar, esto se hace reduciendo la cantidad de eventos de fondo en cualquier muestra. Este proyecto intenta utilizar las muestras proporcionadas por el desafío LHC Olympics del 2020 para optimizar un análisis multivariado de tipo BDT capaz de separar los eventos de señal y fondo. Para este caso los eventos son dijets y vamos a utilizar jets de radio R grande, se utilizarán como entradas a este algoritmo variables conocidas de cada uno de los eventos y se minimizará la cantidad de ruido en nuestra muestra resultante.

Authors: SANDOVAL USME, Carlos (Universidad Nacional de Colombia); Dr MILANÉS CARREÑO, Diego Alejandro (Universidad Nacional de Colombia); MORENO PEREZ, Juan Manuel (Universidad Nacional de Colombia (CO)); CAVIEDES BETANCOURT, Laura Juliana (Universidad Nacional de Colombia (CO))

Presenter: MORENO PEREZ, Juan Manuel (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **28** Type: **Short Talk (5')**

Lepton masses in a non universal U(1) model with three families

Friday 3 December 2021 11:55 (5 minutes)

In a model with additional U(1) symmetry, anomaly free, the mass of the active neutrinos is generated by the inverse see saw mechanism. The muon and tau get masses at the tree level and the mass of the electron is generated by effective operators of dimension 7 by introducing a Lambda scale. Using a Monte Carlo simulation, the model parameters are adjusted according to the mass of the charged leptons, the squared mass differences of the neutrinos, and the PMNS mixing matrix.

Author: Mr CORTÉS PARRA, Camilo Andrés (Universidad Nacional de Colombia)

Co-authors: Dr MARTÍNEZ MARTÍNEZ, Roberto (Universidad Nacional de Colombia); Mr JAIMES CAMPOS, Ricardo Andrés (Universidad Nacional de Colombia)

Presenter: Mr CORTÉS PARRA, Camilo Andrés (Universidad Nacional de Colombia)

Session Classification: Theory - Phenomenology

Track Classification: Beyond the standard model

Contribution ID: **29** Type: **Short Talk (5')**

Lepton masses for a non Universal U(1) model with 2 right-handed massive neutrinos

Friday 3 December 2021 11:50 (5 minutes)

In a model with additional U(1) gauge symmetry, free of anomalies, the mass of the active neutrinos are generated by type I see saw mechanism by introducing two right handed neutrinos. The muon and tau get mass at the tree level and the masses of the electron is generated by effective operators of dimension 7 by introducing a Lambda scale. Using a Monte Carlo, the model parameters are adjusted according to the mass of the charged leptons, the squared mass differences of the neutrinos and the PMNS mixing matrix.

Author: ANDRES JAIMES CAMPOS, Ricardo

Co-authors: Mr CORTES PARRA, Camilo andres (Universidad Nacional de Colombia); Prof. MARTINEZ MARTINEZ, Roberto (Universidad Nacional de Colombia)

Presenter: ANDRES JAIMES CAMPOS, Ricardo

Session Classification: Theory - Phenomenology

Track Classification: Beyond the standard model

Contribution ID: **30** Type: **Regular Talk (15'+5')**

Dark Matter decay to neutrinos

Thursday 2 December 2021 17:10 (20 minutes)

Dark matter (DM) particles are predicted to decay into Standard Model particles which would produce signals of neutrinos, gamma-rays, and other secondary particles. Neutrinos provide an avenue to probe astrophysical sources of DM particles. We review the decay of dark matter into neutrinos over a range of dark matter masses from MeV/c2 to ZeV/c2. We examine the expected contributions to the neutrino flux at current and upcoming neutrino and gamma-ray experiments, such as Hyper-Kamiokande, DUNE, CTA, TAMBO, and IceCube Gen-2. We consider galactic and extragalactic signals of decay processes into neutrino pairs, yielding constraints on the dark matter decay lifetime that ranges from tau ~ 1.2×10ˆ21 s at 10 MeV/c2 to 1.5x10ˆ29 s at 1 PeV/c2.

Author: ARGÜELLES-DELGADO, Carlos A. (Harvard University)

Co-author: DELGADO LOPEZ, Diyaselis (Harvard University (US))

Presenter: DELGADO LOPEZ, Diyaselis (Harvard University (US))

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **31** Type: **Short Talk (5')**

Command line tools for Podio

Wednesday 1 December 2021 10:15 (5 minutes)

Podio is an EDM tool that generates all code from YAML descriptions. As part of the Key4Hep project it is necessary that it has some tools that are already available in the iLC software, we present advances made during the summer student project implementing tools similar to anajob and dumpevent.

Authors: GAEDE, Frank-Dieter (Deutsches Elektronen-Synchrotron (DE)); MORENO PEREZ, Juan Manuel (Universidad Nacional de Colombia (CO)); MADLENER, Thomas (Deutsches Elektronen-Synchrotron (DESY))

Presenter: MORENO PEREZ, Juan Manuel (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **32** Type: **Regular Talk (15'+5')**

Estudio de la desintegración Bc->etac mu nu

Monday 29 November 2021 15:30 (20 minutes)

La universalidad leptónica implica que los bosones gauge están acoplados por igual a las tres familias de leptones. Esta característica está implícita en el modelo estándar el cual es nuestro modelo actual en física de partículas. Los test de universalidad leptónica consisten en encontrar alguna anomalía con respecto a lo predicho por el modelo estándar, por esta razón estamos interesados en estudiar la desintegración $B_c \to \eta_c \ell \nu_\ell$, la cual puede ser utilizada para realizar el test. Comenzamos estudiando la desintegración $B_c \to \eta_c \mu \nu_\mu$ para medir posteriormente su branching fraction. Los datos utilizados provienen del experimento LHCb de colisiones *pp* de los años 2015, 2016 y 2017.

Authors: GOMEZ ARIAS, Santiago; BARSUK, Sergey (Université Paris-Saclay (FR)); MILANÉS, Diego (Universidad Nacional de Colombia); USACHOV, Andrii (Nikhef National institute for subatomic physics (NL))

Presenter: GOMEZ ARIAS, Santiago

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **33** Type: **Short Talk (5')**

Scalar potential analysis of the Z5 multi-component dark matter model

Tuesday 30 November 2021 11:55 (5 minutes)

In recent years the multicomponent scalar dark matter models with discrete symmetries $\mathbb{Z}_N$ has been widely studied in the literature. Among them, the $\mathbb{Z}_5$ model proposes two complex fields that transform as singlets under the gauge group of Standard Model. The model has eleven free parameters that must be restricted. In that sense, the main purpose of this research is to develop an detailed analysis of the scalar potential with the objective to establish the perturbative unitarity, vacuum estability and positivity conditions, and finally to determine the viable parameter space of the model.

Author: Mr RÍOS PÉREZ, Diego Alejandro (Universidad de Antioquia)

Presenter: Mr RÍOS PÉREZ, Diego Alejandro (Universidad de Antioquia)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **34** Type: **Short Talk (5')**

Charmonium Spectrum from Non-Relativistic Quantum Mechanics

Monday 29 November 2021 18:20 (5 minutes)

Heavy mesons (quarkonia) behavior is a challenge because of the limitations of the QCD theory at low energies; that is why We propose as a simple approximation to use a nonrelativistic Hamiltonian, which has two divisions: for the close interaction, the Hulthen potential and the distant interaction a root confining potential, theses contributions are neccesary to determine the mass spectra of S. This system is solved using Numerov method and Tri-dimensional harmonic oscillator wavefunction in the Variational method. The results are compared with the available experimental data.

Author: LEAL MESA, Pedro Jose (Universidad Nacional de Colombia (CO))

Co-authors: SANDOVAL USME, Carlos (Universidad Nacional de Colombia); MILANÉS, Diego (Universidad Nacional de Colombia); Mr FIGUEROA FALLA, Pablo Jose (Universidad Nacional de Colombia (CO))

Presenters: LEAL MESA, Pedro Jose (Universidad Nacional de Colombia (CO)); Mr FIGUEROA FALLA, Pablo Jose (Universidad Nacional de Colombia (CO))

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **35** Type: **Short Talk (5')**

Weak factorization for Ds->KKK decay mode

Monday 29 November 2021 18:25 (5 minutes)

The modeling of heavy hadrons into light ones'decay modes presents a problem, the weak dynamics factorization. There are some proposals for it, for instance, the MMM (Multi Meson Model) applied to D-> KKK, models the weak part of the amplitude using D's decay constant and its momentum. This is possible as long as the main contribution to the amplitude comes from the annihilation topology, D-> W-> KKK. For the Ds-> KKK decay mode there are other topologies that could be dominant over the annihilation topology, as the radiation topology, Ds-> W phi-> KKK. The current work is focused on presenting an alternative for the weak factorization based on chiral lagrangians and its application on the Ds-> KKK's radiation topology.

Author: ALEJANDRO BARON OSPINA, David

Co-authors: CORREA DOS REIS, Alberto (CBPF - Centro Brasileiro de Pesquisas Físicas (BR)); MAGALHAES, Patricia (University of Bristol (GB)); MILANÉS, Diego (Universidad Nacional de Colombia)

Presenter: ALEJANDRO BARON OSPINA, David

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **36** Type: **Short Talk (5')**

Long-distance matrix elements in charmonium production fitted with LHCb data

Monday 29 November 2021 18:05 (5 minutes)

The charmonium decay and production can be modeled using nonrelativistic QCD factorization. This factorization consists of some long-distance matrix elements and a set of constants that must be fixed by the short-distance dynamics. The current work is focused on reviewing the short distance constants' computation for the B decays into charmonium at NLO using covariant projectors, and their application on the factorization formulae to perform a fitting with the LHCb data.

Author: ALEJANDRO BARON OSPINA, David

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Presenter: ALEJANDRO BARON OSPINA, David

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **37** Type: **Short Talk (5')**

Uso de la técnica del plano de Lund para la identificación de bosones W en el experimento ATLAS

Wednesday 1 December 2021 09:10 (5 minutes)

Los métodos de identificación de partículas son una herramienta poderosa para filtrar datos no deseados y con ello mejorar los resultados finales del experimento. En este caso en conciso, se estudiara el rendimiento de distintos métodos de identificación de bosones W en eventos de colisiones del experimento ATLAS, tomando especial atención a los métodos basados en el llamado Plano de Lund, el cual según resultados preliminares presenta un rendimiento superior a los métodos actualmente usados.

Author: VINASCO SOLER, Rafael Andrei (Universidad Nacional de Colombia (CO))

Co-authors: SANDOVAL USME, Carlos (Universidad Nacional de Colombia); CAMACHO TORO, Reina Coromoto (Centre National de la Recherche Scientifique (FR))

Presenter: VINASCO SOLER, Rafael Andrei (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **38** Type: **Short Talk (5')**

Development of a Pyhf - Combine interface

Wednesday 1 December 2021 10:20 (5 minutes)

In the field of High energy physics, there are many tools used to perform the statistical analysis needed to do experimental and phenomenological research in that field. Inside of the CMS collaboration, Combine tool is heavily used to produce binned statistical models. Although Combine is open source and is based in other open source tools as RootFit, RooStats and is build over HistFactory, its proper configuration to work outside of the CMS collaboration is, to say the least, difficult. To avoid these complications, tools based on pure-python have appeared in recent years, an example of this tools is pyhf. The main objective of this work is developing an intermediary software that enable the use of Combine datacards to perform statistical analysis using pyhf. This will allow any scientist outside of the CMS collaboration to run the Combine-based statistical models used to produce the results of experimental analyses.

Authors: OCAMPO-HENAO, Daniel (Universidad de Antioquia (CO)); DUQUE ESCOBAR, Santiago (Universidad de Antioquia (CO)); RUIZ-ÁLVAREZ, José David (Universidad de Antioquia)

Presenter: DUQUE ESCOBAR, Santiago (Universidad de Antioquia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **39** Type: **Short Talk (5')**

Left-Right Mirror Model with Dark Matter

Tuesday 30 November 2021 12:00 (5 minutes)

We consider a model with Left-Right symmetry with $SU(3)C \times SU(2)_R \times SU(2)_L \times U(1)_{Y'}$ gauge group that includes an additional fermions which are charged under the $SU(2)_R$. The model and their fields charged under $SU(2)_R$ are known as Left–Right Mirror Model (LRMM) and mirror fermions, respectively. Although the motivation for introducing LRMM was to analyze the CP problem, in addition we have redirected the model to be able to introduce a candidate for dark matter. This candidate arises from a physical state of mixture of mirror fermions. To ensure the dark matter as viable proposal, a Z_2 discrete symmetry has been introduced, which not only guarantees the stability of the dark matter but also controls the free parameters of the model such that they are significantly reduced. In this work we also obtain the relic density for the dark matter candidate in LRMM and the spin independent scattering cross section between dark matter and proton (neutron).

Authors: MONTES DE OCA YEMHA, Jose Halim (Universidad Nacional Autónoma de México); ARROYO UREÑA, Marco Antonio; LAMPREA, Mario; GAITÁN, Ricardo (Universidad Nacional Autónoma de México); Dr VALENCIA PEREZ, Tomas

Presenter: MONTES DE OCA YEMHA, Jose Halim (Universidad Nacional Autónoma de México)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **40** Type: **Regular Talk (15'+5')**

Search for vector-like fermions in final states with muons and missing transverse momentum at the HL LHC.

Tuesday 30 November 2021 11:35 (20 minutes)

A proposal is presented for a dark matter (DM) signal search with the Phase-2 CMS Detector at the high luminosity LHC. The model under study includes a scalar field and new particles heavy fermions. Deep neural networks are constructed for the study of the experimental signature consisting of one or two muons in the presence of lost transverse moment. The results of these models are compared with those obtained by making linear cuts .

Authors: RUALES BARBOSA, Anderson Alexis (Universidad de Antioquia (CO)); RUIZ, Jose (Universidad de Antioquia (CO)); RODRIGUEZ GIRALDO, Manuel Alejandro (Universidad de Antioquia (CO))

Presenter: RUALES BARBOSA, Anderson Alexis (Universidad de Antioquia (CO))

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **41** Type: **Short Talk (5')**

Iterative jet finding in the ATLAS trigger for the HL-LHC (1)

Wednesday 1 December 2021 09:15 (5 minutes)

Las actualizaciones que se están desarrollando en el LHC, permitirán un incremento de las colisiones de protones en el acelerador de partículas. El incremento de la luminosidad instantánea, permitirá investigar fenómenos físicos poco frecuentes, obtener medidas más precisas de los fenómenos ya conocidos e incluso investigar eventos más allá del modelo estándar. Satisfacer los requerimientos que suponen estos enfoques de investigación, traen consigo grandes retos para el LHC, tanto en hardware, como en software. El experimento ATLAS, por ejemplo, podrá observar eventos de hasta 200 colisiones de protones, por lo que, el algoritmo de adquisición de datos necesita ser tanto eficiente como ligero y preciso, ya que, producto de las colisiones, se observarán jets casi colineales que podrían no ser seleccionados por el sistema de adquisición de datos estándar. A partir de la propuesta de un algoritmo AntikT modificado que establece regiones de interés en el detector para reconstruir jets online y medir los observables de estos, se realiza un estudio de su desempeño en la selección de eventos con jets casi colineales tomando en cuenta los recursos y el tiempo de ejecución.

Author: BUCURU RODRIGUEZ, Neidy Lorena (Universidad Nacional de Colombia (CO))

Co-authors: MORENO SARRIA, Andres Felipe (Universidad Nacional de Colombia (CO)); Mr BUITRAGO CARDENAS, Carlos Fernando (Student); Mr PRADA SIERRA, Juan Camilo (Student); PALACINO, Gabriel (Indiana University (US)); SANDOVAL USME, Carlos (Universidad Nacional de Colombia)

Presenter: BUCURU RODRIGUEZ, Neidy Lorena (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **42** Type: **Regular Talk (15'+5')**

Separation of photons and electrons in a LHCb-like EM calorimeter

Wednesday 1 December 2021 10:35 (20 minutes)

Forward photons and electrons in the LHCb experiment are detected with the inner modules of the EM calorimeter. However, the granularity of the cells makes difficult to detect precisely the shape of the showers produced by those particles. Then, photons and electrons candidates are hard to differentiate especially when nearly collinear particles hit the calorimeter. Simulations in Geant4 of the inner section of the EM calorimeter were run to create a data set of events which were used as inputs of a machine learning model of classification. This model takes the number of electrons and photons created in each cell of the modules, as well as the energy deposition to classify events of one electron, one photon and two nearly collinear photons due to a π^0 decay.

Author: MORENO SARRIA, Catalina (Universidad Nacional de Colombia (CO))

Co-authors: BUCURU RODRIGUEZ, Neidy Lorena (Universidad Nacional de Colombia (CO)); MILANÉS, Diego (Universidad Nacional de Colombia)

Presenter: MORENO SARRIA, Catalina (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **43** Type: **Short Talk (5')**

Iterative jet finding in the ATLAS trigger for the HL-LHC (2)

Wednesday 1 December 2021 09:20 (5 minutes)

El upgrade ATLAS HL-LHC permitirá que algoritmos de reconstrucción de jets similares a aquellos utilizados de forma offline sean implementados a nivel del Trigger más bajo. Estos algoritmos tienen como objetivo reconstruir parámetros de los jets de forma precisa de tal forma que sea posible maximizar la coherencia entre los datos del trigger y aquellos seleccionados en el análisis. El algoritmo de identificación de jets anti-kT es ampliamente utilizado en los análisis del ATLAS. Sin embargo, debido a su naturaleza iterativa no satisface los requerimientos de latencia y recursos necesarios para poder ser utilizado de forma online. Hemos estudiado el desempeño de un algoritmo para la identificación de jets, el cual corresponde a una modificación del algoritmo anti-kT, que ha sido desarrollado con la intención de ser corrido de forma online (siendo implementado en un chip tipo FPGA) a nivel de trigger en el experimento ATLAS haciendo uso de la información de los calorímetros. El número total de topoclusters del calorímetro en cualquier evento de interés es demasiado grande para que el algoritmo anti-kT pueda ser ejecutado en su totalidad satisfaciendo las restricciones de latencia. Por lo anterior, el primer paso de este nuevo algoritmo modificado, que será tratado en la charla corta, consiste en definir ciertas regiones de interés (ROIs) cuyo tamaño es tal que el número de topoclusters sea manejable por el algoritmo y donde los jets son propensos a aparecer.

Author: BUITRAGO CARDENAS, Carlos Fernando (Universidad Nacional de Colombia (CO))

Co-authors: MORENO SARRIA, Andres Felipe (Universidad Nacional de Colombia (CO)); SANDOVAL USME, Carlos (Universidad Nacional de Colombia); PALACINO, Gabriel (Indiana University (US)); PRADA SIERRA, Juan Camilo (Student); BUCURU RODRIGUEZ, Neidy Lorena (Universidad Nacional de Colombia (CO))

Presenter: BUITRAGO CARDENAS, Carlos Fernando (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **44** Type: **Short Talk (5')**

Study of nearby effects at the interaction point of the PLUME detector at the LHCb.

Wednesday 1 December 2021 09:40 (5 minutes)

In the process of measuring the beam status and the luminosity during the Run 3 of the Large Hadron Collider, at the interaction point of the LHCb experiment is projected the Probe for Luminosity Measurement (PLUME) detector. Through the use of Geant4 simulations, the adjacent effects to the operation point are studied by means of the Cherenkov light emitted by particles coming from the collision point that pass through quartz radiators present in the detector. The result of this study derives as expected measurements at the Run 3 of the LHC for the PLUME detector.

Author: DUQUE BRAN, Andres Felipe (Universidad Nacional de Colombia (CO))

Co-authors: MORENO SARRIA, Andres Felipe (Universidad Nacional de Colombia (CO)); BARSUK, Sergey (Université Paris-Saclay (FR)); MILANÉS, Diego (Universidad Nacional de Colombia)

Presenter: DUQUE BRAN, Andres Felipe (Universidad Nacional de Colombia (CO))

Session Classification: LHC

Track Classification: Higgs / Standard model

Contribution ID: **45** Type: **Short Talk (5')**

PRUEBAS AL MODELO ESTÁNDAR POR MEDIO DE LA DISPERSIÓN ELÁSTICA COHERENTE NEUTRINO-NÚCLEO

Thursday 2 December 2021 17:40 (5 minutes)

Durante esta charla presentaré los avances realizados de mi trabajo de investigación de grado. Iniciaré con una descripción de la dispersión elástica coherente neutrino-núcleo (CevNS), en particular, mostraré el desarrollo del cálculo de la sección eficaz de este proceso. Posteriormente se abordará el análisis estadístico 2 que nos permitirá restringir parámetros fundamentales del Modelo Estándar, tales como el ángulo de mezcla débil a bajas energías.

Author: Mr OLIVO MARCELO, Neider Yesith (universidad de pamplona)

Co-author: Dr CAÑAS ORDUZ , Blanca Cecilia (universidad de pamplona)

Presenter: Mr OLIVO MARCELO, Neider Yesith (universidad de pamplona)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **46** Type: **Short Talk (5')**

g–2 anomaly and minimal models for the Z'

Friday 3 December 2021 11:45 (5 minutes)

In this work, we present a solution of the experimental anomaly in $g-2$ for the Z' charges allowed by the anomaly equations and the constraints coming from the Yukawa Lagrangian terms.
The Z' considered here has a minimum fermion content, i.e., our models contain only the standard model fermions, 3 right-handed neutrinos, and one exotic charged lepton. The allowed parameter space for $g-2$ was obtained with a 68% confidence level. The region allowed by neutrino trident production $m_{Z'}/g_{Z'} > 0.75$˜TeV was also found. A mass of 80˜GeV was assumed for the exotic particle.

Author: Ms MUÑOZ, Laura (Universidad de Nariño)

Co-author: Dr ROJAS, Eduardo (Universidad de Nariño)

Presenter: Ms MUÑOZ, Laura (Universidad de Nariño)

Session Classification: Theory - Phenomenology

Track Classification: Beyond the standard model

Contribution ID: **47** Type: **not specified**

Beyond the Standard Model Physics

Friday 3 December 2021 08:00 (30 minutes)

Presenter: VALLE, Jose

Session Classification: Theory - Phenomenology

Contribution ID: **48** Type: **not specified**

Muon and tau decays in the Standard Model and beyond

Friday 3 December 2021 08:30 (30 minutes)

Presenter: ROIG, Pablo

Session Classification: Theory - Phenomenology

Contribution ID: **49** Type: **not specified**

The Nambu Goldstone Theorem and Integrability

Friday 3 December 2021 09:00 (30 minutes)

Presenter: ARRAUT, Ivan

Session Classification: Theory - Phenomenology

Contribution ID: **50** Type: **not specified**

Machine Learning applied to HEP

Friday 3 December 2021 15:00 (45 minutes)

Author: TERAO, KAZUHIRO (C)

Co-author: HIMMEL, Alexander (Fermilab)

Presenter: TERAO, KAZUHIRO (C)

Session Classification: Closing session

Contribution ID: **51** Type: **not specified**

Tests of lepton universality

Friday 3 December 2021 16:00 (45 minutes)

Presenter: BARSUK, Sergey (Université Paris-Saclay (FR))

Session Classification: Closing session

Contribution ID: **52** Type: **not specified**

Neutrino Physics

Thursday 2 December 2021 14:00 (30 minutes)

Presenter: DE GOUVEA, Andre (Northwestern University)

Session Classification: Neutrinos - Theory

Contribution ID: **53** Type: **not specified**

Overview of Supernovae Neutrinos

Thursday 2 December 2021 14:30 (30 minutes)

Presenter: LUNARDINI, Cecilia (Arizona State University)

Session Classification: Neutrinos - Theory

Contribution ID: **54** Type: **not specified**

Neutrino magnetic moments

Thursday 2 December 2021 15:00 (30 minutes)

Presenter: MIRANDA, Omar (Cinvestav)

Session Classification: Neutrinos - Theory

Contribution ID: **55** Type: **not specified**

Top quark couplings

Wednesday 1 December 2021 11:15 (30 minutes)

Presenter: MORENO LLACER, Maria (Univ. of Valencia and CSIC (ES))

Session Classification: LHC

Contribution ID: **56** Type: **not specified**

SUSY searches in ATLAS

Wednesday 1 December 2021 08:00 (30 minutes)

Presenter: WAHLBERG, Hernan Pablo (National University of La Plata (AR))

Session Classification: LHC

Contribution ID: **57** Type: **not specified**

SUSY searches in CMS

Wednesday 1 December 2021 08:30 (30 minutes)

Presenter: SHARMA, Seema (Indian Institute of Science Education and Research (IN))

Session Classification: LHC

Contribution ID: **58** Type: **not specified**

Latest T2K Results

Tuesday 30 November 2021 14:00 (30 minutes)

Presenter: MAHN, Kendall (Michigan State University)

Session Classification: Neutrinos - Experimental

Contribution ID: **59** Type: **not specified**

Latest NOvA oscillation results

Tuesday 30 November 2021 14:30 (30 minutes)

Presenter: VAHLE, Patricia

Session Classification: Neutrinos - Experimental

Contribution ID: **60** Type: **not specified**

Neutrino Cross Sections

Tuesday 30 November 2021 15:30 (30 minutes)

Presenter: PALEY, Jonathan (Fermi National Accelerator Lab. (US))

Session Classification: Neutrinos - Experimental

Contribution ID: **61** Type: **not specified**

SB neutrino program

Tuesday 30 November 2021 15:00 (30 minutes)

Presenters: BETANCOURT, Minerba (Fermilab); BETANCOURT, Minerba

Session Classification: Neutrinos - Experimental

Contribution ID: **62** Type: **not specified**

New hadrons spectroscopy

Monday 29 November 2021 15:00 (30 minutes)

Presenter: CORREA DOS REIS, Alberto (CBPF - Centro Brasileiro de Pesquisas Físicas (BR))

Session Classification: Heavy Flavour

Contribution ID: **63** Type: **not specified**

Heavy Flavour Anomalies

Monday 29 November 2021 14:00 (30 minutes)

Presenter: POMPILI, Alexis (Universita e INFN, Bari (IT))

Session Classification: Heavy Flavour

Contribution ID: **64** Type: **not specified**

Belle-II results

Monday 29 November 2021 14:30 (30 minutes)

Presenter: PODESTA LERMA, Pedro (Universidad Autonoma de Sinaloa (MX))

Session Classification: Heavy Flavour

Contribution ID: **65** Type: **not specified**

Latest results from Muon g-2

Monday 29 November 2021 09:00 (1 hour)

Presenter: TARAZONA, David

Session Classification: Opening session

Contribution ID: **66** Type: **not specified**

Contenido de materia de la Vía Láctea

Monday 29 November 2021 10:20 (1 hour)

Presenter: SOLER, Juan Diego

Session Classification: Opening session

Contribution ID: **67** Type: **not specified**

Probing the scale of grand unification with gravitational waves

Monday 29 November 2021 11:20 (1 hour)

Cosmic strings arise as remnants of phase transitions in the early Universe, often related to theories of grand unification (GUTs). If such a phase transitions occurs at high energies, the resulting cosmic string network generates a sizable amount of gravitational waves. Most work so far has focused on the gravitational wave signal from topologically stable cosmic strings. In this talk I will introduce metastable cosmic strings, which are a generic consequence of many GUTs. I will discuss how this idea can be probed in various ongoing and upcoming gravitational wave experiments, from pulsar timing arrays to space- and ground-based interferometers. In the final part of my talk I will discuss a recent proposal on using the radio telescopes to probe this and other sources of ultra high frequency gravitational waves.

Presenter: DOMCKE, Valerie (CERN)

Session Classification: Opening session

Contribution ID: **68** Type: **not specified**

Dark matter at the LHC

Tuesday 30 November 2021 08:00 (30 minutes)

Presenter: LOWETTE, Steven (Vrije Universiteit Brussel (BE))

Session Classification: Dark Matter

Contribution ID: **69** Type: **not specified**

Multicomponent dark matter

Tuesday 30 November 2021 08:30 (30 minutes)

Presenter: BELANGER, Genevieve

Session Classification: Dark Matter

Contribution ID: **70** Type: **not specified**

Axion dark matter

Presenter: VISINELLI, Luca (Shanghai Jiao Tong University)

Session Classification: Dark Matter

Contribution ID: **71** Type: **not specified**

Astrophysics and beyond the Standard Model with the NOvA neutrino experiment

Thursday 2 December 2021 08:30 (30 minutes)

Presenter: STRAIT, Matthew (University of Minnesota)

Session Classification: Astroparticles - Cosmology

Contribution ID: **72** Type: **not specified**

Cosmology with Supernovae

Thursday 2 December 2021 08:00 (30 minutes)

Presenter: GONZALEZ-GAITAN, Santiago (CENTRA, Instituto Superior Tecnico)

Session Classification: Astroparticles - Cosmology

Contribution ID: **73** Type: **not specified**

Astroparticles, some efforts in Chiapas, Mexico

Thursday 2 December 2021 09:00 (30 minutes)

Presenter: CABALLERO MORA, Karen Salome (UNACH)

Session Classification: Astroparticles - Cosmology

Contribution ID: **75** Type: **Regular Talk (15'+5')**

Universal inverse seesaw and radiative neutrino masses.

Thursday 2 December 2021 15:30 (20 minutes)

In this talk I will describe a theory where the Inverse seesaw mechanism is implemented not only in the neutrino sector but also in the SM charged fermion sector in order to explain the pattern of SM fermion masses. To the best of my knowledge, that model corresponds to the first implementation of the inverse seesaw mechanism for the charged fermion sector. I will discuss its implications in the muon and electon anomalous magnetic moments, meson oscillations, dark matter and leptogenesis. Then, I will explain a scotogenic neutrino mass model where the fermionic particles mediating the one-loop level radiative seesaw mechanism are crucial for achieving successful gauge coupling unification. Finally, I will discuss a theory capable of reproducing the g-2 muon anomaly, where the Universal seesaw mechanism generates the SM fermion mass hierarchy and a radiative linear seesaw mechanism produces the tiny masses of the light active neutrinos.

Author: CÁRCAMO HERNÁNDEZ, Antonio Enrique

Presenter: CÁRCAMO HERNÁNDEZ, Antonio Enrique

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **76** Type: **Short Talk (5')**

Cálculo del Potencial cuántico de Broglie Bohm para un oscilador armónico dependiente del tiempo

Friday 3 December 2021 11:25 (5 minutes)

El oscilador armónico es uno de los temas fundamentales que es punto de partida para el estudio de diversas ramas de la física, desde el estudio en la mecánica clásica hasta el estudio en mecánica cuántica, por tanto, ha sido estudiado exhaustivamente. En este trabajo se resuelve la ecuación de Schoringuer unidimensional en el enfoque de Madelung-Bohm para la mecánica cuántica, el ansatz que consideramos es una fase dependiente del tiempo y que depende de la posición esto conduce a un potencial de Bohm, que corresponde al de un oscilador armónico dependiente del tiempo, siempre que el término dependiente del tiempo en la fase obedezca una ecuación diferencial de Ermakov.

Author: Dr MENDOZA SUÁREZ, Jairo Alonso (Universidad de Pamplona)

Co-authors: Dr LOPEZ CARREÑO, Juan Carlos (Universidad de Pamplona); Prof. MENDOZA SUÁREZ, Rosalba (Universidad de Pamplona)

Presenter: Dr MENDOZA SUÁREZ, Jairo Alonso (Universidad de Pamplona)

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **77** Type: **Regular Talk (15'+5')**

Recent Results of Dark Sector Searches with the BaBar Experiment

Tuesday 30 November 2021 09:30 (20 minutes)

Many scenarios of physics beyond the Standard Model predict new particles with masses well below the electroweak scale. Low-energy, high luminosity colliders such as BaBar are ideally suited to discover these particles. We present several recent searches for low-mass dark sector particles at BaBar, including leptophilic scalars, self-interacting dark matter bound states, and axion like particles produced in B decays. These examples demonstrate the importance of B-factories in fully exploring low-mass new physics.

Author: SHUVE, Brian (Harvey Mudd College)

Presenter: SHUVE, Brian (Harvey Mudd College)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **78** Type: **Regular Talk (15'+5')**

SpaceMath: A Mathematica package for beyond the standard model parameter space searches.

Friday 3 December 2021 10:25 (20 minutes)

We present a pedagogical Mathematica package, so-called SpaceMath, for Beyond the Standard Model (BSM) parameter space searches. In this first version, SpaceMath v1.0 works with the Higgs boson data (HBD). These results are the most up-to-date experimental measurements made at the Large Hadron Collider (LHC) and the expected results at future colliders, namely, High Luminosity LHC, High Energy LHC and the Future Circular hadron-hadron Collider.

Authors: Dr ARROYO UREÑA, Marco Antonio (FESC-UNAM); VALENCIA PÉREZ, Tomás Antonio (FESC-UNAM)

Co-authors: Dr MONDRAGÓN CEBALLOS, Myriam (IFUNAM); Dr GAITÁN, Ricardo (FESC-UNAM)

Presenter: VALENCIA PÉREZ, Tomás Antonio (FESC-UNAM)

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **79** Type: **Short Talk (5')**

Systematic study of 3-3-1 models without exotic electric charges

Friday 3 December 2021 11:30 (5 minutes)

We review in a systematic way how anomaly free $SU(3)_c \otimes SU(3)_L \otimes U(1)_x$ models without exotic electric charges can be constructed, using as basis closed sets of fermions which includes each one the particles and antiparticles of all the electrically charged fields. Our analysis reproduce not only the known models in the literature, but also shows the existence of several more independent models for one and three families not considered so far. An analysis of one of the new models is done, where the mass scales, the gauge boson masses and the masses for the spin 1/2 particles is presented.

Authors: ROJAS, Eduardo (Universidad de Nariño); BEANVIDES, Richard; ANTONIO PONCE GUTIERREZ, WILLIAM; GIRALDO ÚSUGA, Yithsbey (Universidad de Nariño)

Presenter: GIRALDO ÚSUGA, Yithsbey (Universidad de Nariño)

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **80** Type: **Regular Talk (15'+5')**

The Standard Model of Particle Physics as an effective theory from two non-universal U(1)'s

Friday 3 December 2021 10:05 (20 minutes)

We study the possibility of obtaining the standard model of particle physics as an effective theory of a more fundamental one, whose electroweak sector includes two non-universal local U(1)'s gauge groups.

Author: Prof. BENAVIDES, Richard (ITM)

Co-authors: Prof. MUÑOZ, Luis (ITM); Prof. ROJAS, Eduardo (UdeNar); Prof. PONCE, William (UdeA); RODRÍGUEZ, Oscar (UdeA)

Presenter: Prof. BENAVIDES, Richard (ITM)

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **81** Type: **Short Talk (5')**

A minimal axion model for mass matrices with five texture-zeros

Friday 3 December 2021 11:35 (5 minutes)

A model is proposed where the fermionic and scalar fields are charged under a Peccei-Queen (PQ) symmetry. The PQ charges are chosen in such a way that they can reproduce mass matrices with five texture zeros that can reproduce the masses of the Standard Model (SM) fermions, the CKM matrix and the PMNS matrix. To obtain this result, at least 4 Higgs doublets are needed. As we will see in the manuscript this is a highly non-trivial result since the texture zeros of the mass matrices impose a large number of restrictions. This model shows a route to understand the different scales of the SM by extending it with a Higgs sector and a PQ symmetry. Since the PQ charges are not universal, the model presents flavor changing neutral currents (FCNC) at the tree level, a feature that constitutes the main source of restrictions on the parameter space. By including a heavy quark it is possible to fit the anomaly reported by xenon as a consequence of light axions. We report the regions of the parameter space allowed by lepton decays and compare the strength of these constraints with those coming from the semileptonic decays $K^{\pm} \longrightarrow \pi\bar{\nu}\nu$. We also show the excluded regions for the axion-photon coupling as a function of the axion mass and compare it with the parameter space of our model.

Authors: ROJAS, Eduardo (Universidad de Nariño); Dr MONTENEGRO, Juan Carlos; MARTINEZ, Roberto (Universidad Nacional de Colombia); GIRALDO ÚSUGA, Yithsbey (Universidad de Nariño)

Presenter: Dr MONTENEGRO, Juan Carlos

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **82** Type: **Regular Talk (15'+5')**

Quenching factor for low energy nuclear recoils in Si and Ge

Tuesday 30 November 2021 17:15 (20 minutes)

The nuclear recoil ionization efficiency or "quenching factor" (QF) plays a crucial role in low-threshold ionization type detectors used in dark matter searches, CEνNS detection, and in searches for new physics through this channel. We study the ionization efficiency of nuclear recoil in pure materials using a model based on Lindhard´s theory. We include the effect of atomic binding energy, as well as improved modeling of electronic stopping and other improvements. Our model describes available QF data in silicon and can also accommodate the effects observed in recent germanium data, predicting QF behavior up to the Frenkel pair production energy scale (40 eV)

Authors: SARKIS MOBARAK, Youssef (Instituto de Ciencias Nucleares UNAM); AGUILAR-AREVALO, Alexis (Instituto de Ciencias Nucleares, UNAM); D'OLIVO, JUAN CARLOS (INSTITUTO DE CIENCIAS NUCLEARES, UNAM)

Presenter: SARKIS MOBARAK, Youssef (Instituto de Ciencias Nucleares UNAM)

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **84** Type: **Short Talk (5')**

La dispersión (anti)neutrino-electrón como estudio de interacciones no estándares del neutrino

Thursday 2 December 2021 17:35 (5 minutes)

Dentro de los bloques constitutivos de la materia se encuentran los neutrinos, su estudio ha jugado un papel principal no sólo a la hora de confirmar las predicciones teóricas del modelo estándar (ME), sino también en la búsqueda de nueva física (NF). Una de las evidencias más claras de NF que tenemos hasta la fecha, se conoce como oscilaciones de neutrinos.
Actualmente la física de neutrinos se encuentra en una era de precisión; los parámetros que describen el fenómeno de oscilaciones de neutrinos están siendo medidos con una exactitud que va en aumento. Futuros experimentos tendrán como objetivo determinar efectos subdominantes que revelen interacciones adicionales de los neutrinos con la materia, también conocidas como Interacciones No Estándar (INE).
En esta charla presentaremos el trabajo de investigación que me encuentro actualmente desarrollando para obtener el título de grado en Físico por la Universidad de Pamplona. Se abordará el estudio fenomenológico de las INE asociadas a NF en el sector de neutrinos. Para llevar a cabo esta investigación, en primer lugar, se estudiará la dispersión (anti)neutrino-electrón bajo el ME de la física de partículas elementales y posteriormente se analizará el impacto que tienen dichas interacciones adicionales, de los neutrinos con la materia, en la dispersión (anti)neutrino-electrón. Esta última parte de la investigación, abarcará un estudio estadístico sobre el análisis de datos experimentales y su implementación en los códigos numéricos que nos permitirán obtener cotas a los parámetros de INE.

Author: Mrs GONZALEZ VILLAMIZAR, Ninibed Yelitza (Universidad de Pamplona)

Co-author: Dr CAÑAS ORDUZ, Blanca Cecilia (Universidad de Pamplona)

Presenter: Mrs GONZALEZ VILLAMIZAR, Ninibed Yelitza (Universidad de Pamplona)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **85** Type: **Short Talk (5')**

Two-body nonleptonic weak decays of vector heavy mesons in vector mesons

Monday 29 November 2021 16:45 (20 minutes)

We study the nonleptonic weak decays V_1⟶ V_2 M, where V_1 is a vector heavy meson as D_((s))ˆ,J/Ψ,B_((s))ˆ,B_cˆ*,Y(1S); V_2 is a vector meson and M is a pseudoscalar or vector meson. We calculate the tree-level contribution to these decays given by the transition vector-to-vector, V_1 ⟶ V_2, using the covariant light-front quark model to evaluate the form factors. We find that some of these decays have branching ratios that can be measured at future experiments at BESIII and LHC.

Authors: Mr VERA, Carlos Eduardo (Universidad del Tolima); MUÑOZ, José Herman (Universidad del Tolima); Mr PULIDO CAVIEDES, Deiby Alexander (Universidad del Tolima)

Presenter: MUÑOZ, José Herman (Universidad del Tolima)

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **86** Type: **Regular Talk (15'+5')**

Signatures of primordial black hole dark matter at DUNE and THEIA

Tuesday 30 November 2021 09:50 (20 minutes)

Primordial black holes (PBHs) are a potential dark matter candidate whose masses can span over many orders of magnitude. If their masses lie in the $10^{15} - 10^{17}$ g range, they can emit sizeable fluxes of MeV neutrinos through evaporation via Hawking radiation. We investigate the possibility of detecting light (non-)rotating PBHs with future neutrino experiments DUNE and THEIA. We show that these next-generation facilities will be able to set competitive constraints on PBH dark matter, providing complementary probes in a part of the PBH parameter space currently constrained mainly by photon data.

Author: DE ROMERI, Valentina (IFIC CSIC/UV Valencia)

Presenter: DE ROMERI, Valentina (IFIC CSIC/UV Valencia)

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **87** Type: **Regular Talk (15'+5')**

Modified gravity, generalized SU(2) Proca theory, and inflation

Thursday 2 December 2021 09:45 (20 minutes)

This talk will be split into three pieces. In the first part of the talk, I will introduce the common ideas surrounding the modified gravity proposals starting from their main motivation: Einstein gravity, despite all its success on the observational side, is an effective theory. In the second part of the talk, I will present the recent reconstruction of the generalized SU(2) Proca theory (GSU2P for short). As a modified gravity theory that introduces new gravitational degrees of freedom, the GSU2P is the non-Abelian version of the well known generalized Proca theory where the action is invariant under global transformations of the SU(2) group. In the third part of the talk, I will show what the impact of the GSU2P is on the cosmic primordial inflation epoch and what its main challenges are. We study the two-dimensional phase space of the system that results when the cosmic triad configuration is employed in the Friedmann-Lemaitre-Robertson-Walker background and find an attractor curve whose attraction basin both covers almost all the allowed region and does not include a Big-Bang singularity. Such an attractor curve corresponds to a primordial inflationary solution that has the following characteristic properties: 1). it is a de Sitter solution whose Hubble parameter is regulated by a generalized version of the SU(2) group coupling constant, 2). it is constant-roll including, as opposite limiting cases, the slow-roll and ultra slow-roll varieties, 3). a number of e-folds N > 60 is easily reached, 4). it has a graceful exit into a radiation dominated period powered by the canonical kinetic term of the vector field and the Einstein-Hilbert term.

Authors: Dr GALLEGO CADAVID, Alexánder (Universidad de Valparaiso); RODRIGUEZ GARCIA, Yeinzon; Dr NAVARRO LEON, Andres Americo (Universidad Santo Tomas); Mr GARNICA AGUIRRE, Juan Camilo (Universidad Industrial de Santander); Dr GOMEZ DIAZ, Luis Gabriel (Universidad de Santiago de Chile)

Presenter: RODRIGUEZ GARCIA, Yeinzon

Session Classification: Astroparticles - Cosmology

Track Classification: Cosmology / Astroparticles

Contribution ID: **88** Type: **not specified**

Míster X en el LHC

Thursday 2 December 2021 18:30 (45 minutes)

Presenter: RUIZ, Jose (Universidad de Antioquia (CO))

Session Classification: Charla de divulgación

Contribution ID: **89** Type: **not specified**

Opening

Wednesday 1 December 2021 14:00 (15 minutes)

Presenter: ACHARYA, Bobby Samir (Abdus Salam Int. Cent. Theor. Phys. (IT))

Session Classification: CONHEP network assessment meeting

Contribution ID: **90** Type: **not specified**

Network status, overview, plans

Wednesday 1 December 2021 14:15 (20 minutes)

Presenter: SANDOVAL USME, Carlos (Universidad Nacional de Colombia)

Session Classification: CONHEP network assessment meeting

Contribution ID: **91** Type: **not specified**

Red Suratómica

Wednesday 1 December 2021 15:20 (20 minutes)

Presenter: Ms RIVERA, Natalia

Session Classification: Reunión Red CONHEP

Contribution ID: **92** Type: **not specified**

Discussion

Wednesday 1 December 2021 14:35 (25 minutes)

Presenter: SANDOVAL USME, Carlos (Universidad Nacional de Colombia)

Session Classification: CONHEP network assessment meeting

Contribution ID: **93** Type: **Short Talk (5')**

TAMBO: Hunting Astrophysical tau neutrinos in the Andes

Tuesday 30 November 2021 18:35 (5 minutes)

IceCube's discovery of astrophysical neutrinos, and subsequent characterization of their energy spectrum up to a few PeV, has provided a new window to the high-energy Universe. A series of next-generation experiments aim to discover neutrinos with ultra-high energies, optimizing their sensitivity in the EeV range. However, many opportunities for discovery still remain in the study of the observed astrophysical flux. In particular, only a handful of astrophysical neutrinos have been detected above 1PeV in energy, and flavor measurements remain challenging due to the difficulty of differentiating tau events from other flavors. TAMBO (Tau Air-Shower Mountain-Based Observatory) is a proposed water-Cherenkov detector set on a cliff-edge in the high Peruvian Andes. Utilizing the unique geometry of the Colca valley, TAMBO is situated to produce a high-purity sample of 1–100 PeV astrophysical tau neutrino events, providing a novel aperture into the under-explored component of the existing high-energy neutrino spectrum.

Author: ZHELNIN, Pavel

Co-author: ARGÜELLES-DELGADO, Carlos A. (Harvard University)

Presenter: ZHELNIN, Pavel

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **95** Type: **Short Talk (5')**

Faddeev-Jackiw quantization of Proca's Electrodynamics on the null-plane

Friday 3 December 2021 11:40 (5 minutes)

The generalized symplectic formalism quantization method, which is equivalent to that Dirac, is employed to study the gauge invariance Proca's electrodynamics theory on the null-plane. We show that the zero modes of the symplectic matrix are the generators of the gauge transformation. After fixing the gauge, the generalized brackets are calculated.

Authors: ROJAS, Eduardo (Universidad de Nariño); ZAMBRANO, German

Presenter: ZAMBRANO, German

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **96** Type: **Short Talk (5')**

Neutrinos pesados de Majorana y el origen de la materia oscura en el paradigma de Freeze-in.

Tuesday 30 November 2021 12:10 (5 minutes)

Actualmente se considera que la materia oscura (DM) es uno de los principales componentes del universo, sin embargo, su origen y naturaleza sigue siendo una pregunta abierta, ya que la DM no forma parte del modelo estándar de las partículas elementales (SM). En este trabajo se propone que la DM se genera, no en un escalar, sino por co-aniquilación de neutrinos pesados de Majorana, a través del mecanismo de *freeze-in*; estos neutrinos forman parte de las extensiones mínimas del SM e interactúan con la materia del SM, con el objetivo es estudiar la viabilidad del modelo para la producción de DM.

Author: PORTILLA ROJAS, Belcy Rocío

Co-authors: Dr SALAZAR ARIAS, José Germán (Centro de Investigaciones y Estudios Avanzados del Instituto Politécnico Nacional); Dr CAÑAS ORDUZ, Blanca Cecilia (Universidad de Pamplona)

Presenter: PORTILLA ROJAS, Belcy Rocío

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **97** Type: **Regular Talk (15'+5')**

Extended SU(2) Proca theory

Thursday 2 December 2021 10:05 (20 minutes)

In this work, we explore the construction of a vector-tensor theory with a SU(2) global symmetry in the vector sector as a proposal for a modified theory of gravity. We start with a general Lagrangian containing terms involving symmetric and antisymmetric combinations of the covariant derivatives of the field. Then, we study the degeneracy of the full theory to determine whether it can be healthy or not. Thus, we find relations among some of the free functions in the theory to guarantee the degeneracy. We find that there are several ways in which the kinetic matrix can be turned degenerate. Finally, we take the scalar limit to check whether the resulting theory is also degenerate and present the set of linear combinations that are degenerate both at the vector and scalar levels.

Author: NIETO, Carlos

Co-authors: Mr RODRÍGUEZ, Yeinzon (Universidad Industrial de Santander); Mr GALLEGO, Alexander (Universidad de Valparaíso)

Presenter: NIETO, Carlos

Session Classification: Astroparticles - Cosmology

Track Classification: Cosmology / Astroparticles

Contribution ID: **98** Type: **Regular Talk (15'+5')**

Long-lived charged particles and multi-lepton signatures from neutrino mass models

Thursday 2 December 2021 16:10 (20 minutes)

Lepton number violation (LNV) is usually searched for by the LHC collaborations using the same-sign di-lepton plus jet signature. We discuss multi-lepton signals of LNV that can arise with experimentally interesting rates in certain models of neutrino mass generation. Interestingly, in such models the observed smallness of the active neutrino masses, together with the high-multiplicity of the final states, leads in large parts of the viable parameter space of such models to the prediction of long-lived charged particles.

Authors: Dr CAROLINA, Arbelaez (Universidad Tecnica Federico Santa Maria); Dr GIOVANNA, Cottin (Universidad Adolfo Ibañez); Dr JUAN CARLOS, Helo (Universidad de La Serena); Dr MARTIN , Hirsch (Instituto de Fisica Corpuscular de Valencia)

Presenter: Dr CAROLINA, Arbelaez (Universidad Tecnica Federico Santa Maria)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **99** Type: **Regular Talk (15'+5')**

Earth Tomography with Atmospheric Neutrinos in DUNE

Tuesday 30 November 2021 16:55 (20 minutes)

The expected capabilities of Liquid Argon Time projection Chambers (LArTPCs) will allow for an impressive reconstruction of sub-GeV atmospheric neutrinos interactions in the future DUNE experiment. Since standard oscillations of atmospheric neutrinos are crucially dependent on the matter profile of the Earth, it will be possible to study the interior of our planet. Considering a realistic simulation that accounts for particle reconstruction, nuclear physics effects, and several uncertainties on the atmospheric neutrino flux, we show that the DUNE experiment can measure the total mass of the Earth at the 10% level. Meanwhile, if one imposes constraints from the total mass and moment of inertia, the density of the core can be constrained at the 9% level.

Author: PEREZ, Yuber

Presenter: PEREZ, Yuber

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **100** Type: **Regular Talk (15'+5')**

Application of Machine Learning in the search for the magnetic monopole in 13TeV p-p collisions at ATLAS

Wednesday 1 December 2021 10:55 (20 minutes)

Among the outstanding questions of particle physics, proof of the existence of a magnetic monopole is still one of great interest. Not only would the observation of a magnetically charged particle bring symmetry between electric and magnetic fields in Maxwell's equations, but it would also explain the quantization of the electric charge. TeV-mass Dirac Magnetic Monopoles, which behave as a high-electric-charge objects, could potentially be produced by the 13 TeV proton-proton collisions at the LHC. Detection is based on the particles'characteristic high ionization, penetration distance and lack of calorimeter shower. The increase in the average number of collisions per bunch crossing during the last 2 years of Run 2 brought the challenge of isolating the monopole high energy depositions in the inner detector. In order to overcome this challenge, we introduce a random forest classifier trained on region of interest wedges of the transition radiation tracker (TRT) against a random wedge of the TRT in the same event - same pileup conditions. We achieve discrimination power equivalent to that of the traditional cut-and-count method applied in previous searches, and some improvement in charges and masses at which ATLAS has low sensitivity.

Author: RODRIGUEZ VERA, Ana Maria (York University (CA))

Co-author: TAYLOR, Wendy (York University (CA))

Presenter: RODRIGUEZ VERA, Ana Maria (York University (CA))

Session Classification: LHC

Track Classification: LHC

Contribution ID: **101** Type: **Regular Talk (15'+5')**

Radiative corrections to $\tau \to \pi(K)\nu_\tau[\gamma]$: a reliable new physics test.

The ratios $R_{\tau/P} \equiv \Gamma(\tau \to P\nu_\tau[\gamma])/\Gamma(P \to \mu\nu_\mu[\gamma])$ $(P = \pi, K)$ provide sensitive tests of lepton universality $|g_\tau/g_\mu| = 1$ and are a useful tool for new physics searches. The radiative corrections to $R_{\tau/P}$ are computed following a large-N_C expansion to deal with hadronic effects: Chiral Perturbation Theory is enlarged by including the lightest multiplets of spin-one heavy states such that the relevant Green functions are well-behaved at high energies. We find $\delta R_{\tau/\pi} = (0.18 \pm 0.57)\%$ and $\delta R_{\tau/K} = (0.97 \pm 0.58)\%$, which imply $|g_\tau/g_\mu|_\pi = 0.9964 \pm 0.0038$ and $|g_\tau/g_\mu|_K = 0.9857 \pm 0.0078$, compatible with and at 1.8σ of lepton universality, respectively. We test unitarity and bind non-standard effective interactions with the $\tau \to P\nu_\tau[\gamma]$ decays.

Authors: Dr LÓPEZ-CASTRO, Gabriel (CINVESTAV); Dr HERNÁNDEZ-TOMÉ, Gerardo (CINVESTAV, UNAM); Dr ROIG, Pablo (CINVESTAV); Dr ROSSELL, Ignasi (CEU); ARROYO, Marco

Presenter: ARROYO, Marco

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **102** Type: **Short Talk (5')**

Abstraction of user storage mechanisms for heterogeneous REANA scientific pipelines.

Wednesday 1 December 2021 10:25 (5 minutes)

In recent years there has been a reproducibility crisis in most science fields, where researchers fail to reproduce other researchers and their own experiments. In HEP, the computational analysis of the data obtained from experiments, such as the LHC, is the new concept of a experiment. The computational experiments are bounded to the environment and equipment used to perform the analysis. REANA is an open-source reusable research data analysis platform, that allows researchers to run their analyses in remote compute clouds by structuring the input data, the analysis' code, the containerized environment and using declarative workflow systems. This project aims to make a full abstraction of the storage where the workflows inside the REANA platform run, known as the workspace. The centralization and abstraction of the workspace from REANA code base, allows the support for POSIX compliant file systems to be used as storage backend inside REANA-clusters.

Author: DIAZ SANCHEZ, Maria Camila (Universidad Nacional de Colombia)

Co-authors: MECIONIS, Audrius (CERN); SIMKO, Tibor (CERN)

Presenter: DIAZ SANCHEZ, Maria Camila (Universidad Nacional de Colombia)

Session Classification: LHC

Track Classification: LHC

Contribution ID: **103** Type: **Regular Talk (15'+5')**

Status and Physics Prospects of the JUNO Experiment

Tuesday 30 November 2021 16:15 (20 minutes)

The Jiangmen Underground Neutrino Observatory (JUNO) is a multi-purpose neutrino experiment under construction at a baseline of roughly 52.5 km from 8 nuclear reactors in China. JUNO will use an acrylic sphere containing 20 kton of liquid scintillator surrounded by about 18,000+25,000 (20-inch + 3-inch) photomultiplier tubes immersed in ultrapure water as the primary neutrino target. In addition to determining the neutrino mass ordering and measuring three neutrino oscillation parameters to sub-percent precision using reactor antineutrinos, JUNO will also have a rich physics program with neutrinos from the Sun, the Earth, the atmosphere, and supernovae. The collaboration will also deploy a satellite detector very near to one of its 4.6 GWth reactor cores to make precision measurements of reactor antineutrino emission. The design, status, and physics prospects of the experiment will be covered in this talk.

Authors: Dr HU, Bei-Zhen (National Taiwan University); Dr SISTI, Monica (Universita & INFN, Milano-Bicocca (IT))

Co-author: COLLABORATION, JUNO

Presenters: Dr HU, Bei-Zhen (National Taiwan University); COLLABORATION, JUNO

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **104** Type: **Short Talk (5')**

Supersymmetric low-scale seesaw scenario at the ILC

Friday 3 December 2021 12:00 (5 minutes)

We investigate a scenario inspired by natural supersymmetry, where neutrino data is explained within a low-scale seesaw scenario. For this the Minimal Supersymmetric Standard Model is extended by adding light right-handed neutrinos and their superpartners, the R-sneutrinos. Moreover, we consider the lightest neutralinos to be higgsino-like. We first update a previous analysis and assess to which extent does existing LHC data constrain the allowed slepton masses. Here we find scenarios where sleptons with masses as low as 175 GeV are consistent with existing data. However, we also show that the up-coming run will either discover or rule out sleptons with masses of 300 GeV, even for these challenging scenarios.

We then take a scenario which is on the borderline of observability of the upcoming LHC run assuming a luminosity of 300 fb^{-1}. We demonstrate that a prospective international e^+e^- linear collider with a center of mass energy of 1 TeV will be able to discover sleptons in scenarios which are difficult for the LHC. Moreover, we also show that a measurement of the spectrum will be possible within 1-3 per-cent accuracy.

Authors: MASIAS TEVES, JOAQUIN (PUCP); JONES-PEREZ, Joel (PUCP); CERNA VELAZCO, Nhell Heder (Pontificia Universidad Católica del Perú); POROD, Werner (Uni. Würzburg)

Presenter: MASIAS TEVES, JOAQUIN (PUCP)

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **105** Type: **Regular Talk (15'+5')**

Lepton number constraints from loop corrections to light neutrino masses in the low-scale SUSY Seesaw

Thursday 2 December 2021 16:30 (20 minutes)

We show the analisis to one-loop light neutrino mass considering the Type-I Seesaw Model. In our work we have two parts: with and without SUSY. The mass insertion approximation method is applied to calculate the one loop corrections in SUSY considering diagrams that contain lepton number violation terms in order to observe its effects on the light neutrinos masses. In Non-SUSY case ($3 + 2$ and $3 + 3$ scenario), we can see the eigenvalues behaviour in the limit case when $M_5 >> M_6$ y $M_5 << M_6$. We focus on the problem of having too large corrections when the mixing between active and heavy neutrinos is enhanced. Different ways of solving this are outlined for each model, commenting on the type of fine-tuning involved.

Authors: Dr JONES-PEREZ, Joel (PUCP); Dr POROD, Werner Rudolf (Julius Maximilians Universitaet Wuerzburg (DE)); SUAREZ-NAVARRO, Omar (PUCP)

Presenter: SUAREZ-NAVARRO, Omar (PUCP)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **106** Type: **Short Talk (5')**

Neutrino-nucleus coherent elastic scattering as a test of the standard model and the search for new physics.

Thursday 2 December 2021 17:30 (5 minutes)

The recent COHERENT collaboration results on the neutrino-nucleus coherent elastic scattering boosted the interest in this line of research. We will address some aspects of the neutrino-nucleus coherent elastic scattering, the impact of the actual measurements, the proposals for future investigations to observe this process within the standard model and beyond.

Author: CAÑAS ORDUZ, Blanca Cecilia (Universidad de Pamplona)

Co-authors: ROJAS, Eduardo (Universidad de Nariño); MIRANDA ROMAGNOLI, Omar Gustavo (Cinvestav)

Presenter: CAÑAS ORDUZ, Blanca Cecilia (Universidad de Pamplona)

Session Classification: Neutrinos - Theory

Track Classification: Neutrinos - Theory

Contribution ID: **107** Type: **Regular Talk (15'+5')**

Anisotropic Scalar Field Dark Energy with a Disformally Coupled Yang-Mills Field

Thursday 2 December 2021 10:25 (20 minutes)

In the context of quintessence, the inclusion of new degrees of freedoms to the matter sector might produce additional imprints on cosmological observables while keeping the scalar field responsible for the quintessence and the standard matter minimally coupled to gravity. We investigate this premise by including a canonical SU(2) Yang-Mills field to the total content of the universe coupled to the standard quintessence field by a disformal transformation. The background dynamics study is addressed by a dynamical system analysis from which novel anisotropic scaling solutions with a non-vanishing gauge field are obtained. An interesting result to be confronted with observations is a transient matter-radiation phase for the gauge field dynamics. We have also quantified the redshift-dependent contribution of the gauge field in the form of dark radiation during the radiation era to the effective number of relativistic species. This depends essentially on the initial conditions and, more importantly, on the disformal coupling function. Phenomenological couplings and the Abelian version of the model are discussed as well to check the generality of our results.

Authors: GÓMEZ, Gabriel; BELTRAN, Juan Pablo (Universidad Nacional de Colombia); RODRIGUEZ GARCIA, Yeinzon

Presenter: GÓMEZ, Gabriel

Session Classification: Astroparticles - Cosmology

Track Classification: Cosmology / Astroparticles

Contribution ID: **108** Type: **Short Talk (5')**

Phenomenology of spin-orbit potential for charmonium.

Monday 29 November 2021 18:30 (5 minutes)

I will present a simple exploration to the physics of charmonium, i.e., mesonic states which are not simply charm - anticharm configurations. I will describe the most popular configurations proposed for these states. I will then show how these states can be produced in hadronic collisions and in heavy ion collisions, both in central and peripheral reactions.\\

A review of the states for the potential Spin-Orbit, $V_{L,S}$ is presented. It is described phenomenologically for charmonium. The description extended to spin-dependent interactions to be added to the nonrelativistic interaction.

Author: Ms AMAZO-GÓMEZ, Fabiola (Universidad Nacional de Colombia)

Presenter: Ms AMAZO-GÓMEZ, Fabiola (Universidad Nacional de Colombia)

Session Classification: Heavy Flavour

Track Classification: Theory - Phenomenology

Contribution ID: **109** Type: **Short Talk (5')**

Validation Regions for non-prompt background estimation in same charged $W^{\pm}W^{\pm}$ scattering at the ATLAS experiment

Wednesday 1 December 2021 09:00 (5 minutes)

The second largest background of this $W^{\pm}jj - EW$ signal originates from misidentified leptons, also known as non-prompt leptons. One approach employed to properly estimate this background is the data-driven fake factor method, which requires fake factors extracted from a defined control region. In this work, two trilepton validation regions were defined in order to test the fake factors calculated from a dilepton control region, which is intented to be a cross-check for the nominal fake studies. The data studied were measured with the ATLAS experiment at a collision energy of 13 TeV with an integrated luminosity of 138.7 fb^{-1}.

Author: ORDONEZ, Sebastian

Co-authors: STANGE, Vincent (TU Dresden); MILANES, Diego (Universidad Nacional de Colombia); MANJARRES, Joany (TU Dresden)

Presenter: ORDONEZ, Sebastian

Session Classification: LHC

Contribution ID: **110** Type: **Regular Talk (15'+5')**

Dark Matter in a scotogenic model with a $U(1)_{L\mu-L\tau}$

Tuesday 30 November 2021 10:35 (20 minutes)

Dark Matter and neutrinos are one of the most puzzling components of the Universe. We study a realization of the scotogenic model for neutrino masses using a $U(1)$ gauge symmetry between muon and tau fermion. The model contains 3 possible WIMP Dark Matter candidates: A majorana fermion, a CP-even and a CP-odd scalar. We consider a basic set of observables to constrain the model, and we make emphasis on the muon's g-2.

Authors: Mr LAYANA, Andres (Universidad Católica del Norte); Prof. LINEROS, Roberto

Presenter: Prof. LINEROS, Roberto

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **111** Type: **Regular Talk (15'+5')**

Improved Inverse Beta Decay event selection and its impact on the PROSPECT oscillation analysis

Tuesday 30 November 2021 16:35 (20 minutes)

The Precision Reactor Oscillation and Spectrum Experiment (PROSPECT) is an above-ground antineutrino experiment at short baselines located at the High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratory (ORNL). The PROSPECT detector comprises 4-tons of Li-6 doped liquid scintillator (6LiLS) divided into an 11x14 array of optically separated segments. This experiment's physics goals include searching for the existence of sterile neutrinos and precisely measuring the antineutrino energy spectrum. Antineutrinos are detected via the inverse beta decay (IBD) interaction which provides a near-unique space-time correlated signal pair consisting of a positron energy deposition and a delayed neutron capture in the liquid scintillator, both of which are recorded by each double-ended PMT segment. First data-taking campaign concluded in 2018 resulting in the publication of both oscillation and spectrum results. However, during the data collection period, information coming from a small number of PMT's had to be excluded causing an overall statistical impact on previous results. A new analysis will extract significantly more information from the data set by making use of Single Ended Event Reconstruction capabilities of the detector, along with parsing the available data into five independent periods. In this talk, I will describe the impact that this new analysis has on the signal-to-noise ratio, effective IBD statistics, optimized selection process used to identify IBD events, and its impact on the oscillation analysis.

This work is supported by the US DOE Office of High Energy Physics, the Heising-Simons Foundation, CFREF and NSERC of Canada, and internal investments at all institutions.

Author: VENEGAS VARGAS, Diego

Presenter: VENEGAS VARGAS, Diego

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **112** Type: **Short Talk (5')**

Dark matter in universal scotogenic Left Right gauge model

Tuesday 30 November 2021 12:05 (5 minutes)

In canonical Left-Right gauge model with only one $SU(2)_L$ Higgs doublet and one $SU(2)_R$ scalar doublet, there is no tree level fermion masses. The universal scotogenic Left-Right gauge model is able to generate all the SM fermion masses radiatively via a dark sector generated through a $U(1)_D$ global dark symmetry. We study the dark matter phenomenology in this model, performing a numerical scan over the parameters space consistent with the current dark matter constraints.

Authors: Dr LAMPREA, Mario; GAITÁN, Ricardo (Universidad Nacional Autónoma de México)

Presenter: Dr LAMPREA, Mario

Session Classification: Dark Matter

Track Classification: Dark Matter

Contribution ID: **113** Type: **Regular Talk (15'+5')**

Discovering the new physics of (g−2)μ at colliders

Friday 3 December 2021 09:30 (20 minutes)

The Fermilab Muon g−2 collaboration has recently released its first measurement of (g−2)μ. This result is consistent with previous Brookhaven measurements and together they yield a statistically significant 4.2σ discrepancy with the Standard Model prediction. BSM solutions to (g−2)μ feature light weakly coupled neutral particles (Singlet Scenarios) or heavy strongly coupled charged particles (Electroweak Scenarios). In recent investigations, it has been shown how a 3TeV muon collider (MuC) can probe all possible Singlet Scenarios, whereas a 30TeV MuC is guaranteed to produce the heavy states in the Electroweak Scenarios under a set of reasonable assumptions. In this talk I will summarise these findings and present new developments. On one hand, a combination of hadron colliders and precision electroweak measurements can probe an important portion of the parameter space in the Singlet Scenarios. This is for heavy singlets in the range between 10 GeV and 1-3 TeV. On the other hand, Electroweak Scenarios where BSM states are too heavy to be produced at any foreseen collider can still be probed by indirect signatures at a MuC. One example in the literature is Higgs+gamma production at a 30TeV MuC. Here, we probe the heaviest Electroweak Scenarios for (g−2)μ looking at di-Higgs production at a 10TeV MuC.

Author: CAPDEVILLA, Rodolfo

Presenter: CAPDEVILLA, Rodolfo

Session Classification: Theory - Phenomenology

Track Classification: Theory - Phenomenology

Contribution ID: **114** Type: **Regular Talk (15'+5')**

TauRunner: A Monte Carlo for Ultra-High Energy Neutrino Propagation

Tuesday 30 November 2021 17:35 (20 minutes)

Ultra-high energy neutrinos (>10ˆ16 GeV) are expected to be produced through cosmic-ray interactions with the Cosmic Microwave Background (CMB). This so-called cosmogenic flux of UHE neutrinos is a target of the next generation neutrino observatories: IceCube-Gen2, TAMBO, RNOG, GRAND, POEMMA, and CHANT. Many of these detectors rely on measuring the neutrino interaction either directly at the vertex, or through its charged particle counterpart's electromagnetic or decay shower. A new technique has also been put forward which relies on the observation of Earth-throughgoing tau neutrinos at PeV energies. By measuring the tau neutrino flux at this energy, one can indirectly observe the flux at the EeV scale since these two are related by the cascading down of tau neutrinos through the process of tau regeneration. These ideas demand an accurate simulation of UHE neutrino transport. In this contribution we present TauRunner, a Python Monte Carlo (MC) package specialized in UHE neutrino transport. We present new functionalities, including the incorporations of all neutrino flavors in the propagation and significant performance improvements enabling an efficient and accurate simulation of neutrino propagation through any media.

Author: SAFA, Ibahim

Presenter: SAFA, Ibahim

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **115** Type: **Regular Talk (15'+5')**

Singlet vector leptoquark explanation of the B meson anomalies

Monday 29 November 2021 16:05 (20 minutes)

Experimental measurements collected by the BABAR, Belle, and LHCb experiments on different observables associated with semileptonic B meson decays, indicate the existence of disagreement with the Standard Model (SM) predictions. We reexamine the new physics scenario in which the SM is extended by a singlet vector leptoquark (LQ) with a TeV-scale mass to accommodate the above mentioned anomalies. We perform a phenomenological study of the allowed couplings parameter space by including the most recent data, as well as bounds from LFV processes of B meson (and tau lepton) and LHC. We show that the singlet vector LQ is (still) an appealing solution providing a simultaneous explanation to the B meson anomalies.

Author: QUINTERO POVEDA, Nestor (Universidad Santiago de Cali)

Presenter: QUINTERO POVEDA, Nestor (Universidad Santiago de Cali)

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **116** Type: **Short Talk (5')**

Estudio de la sensibilidad de la violación de simetría CP en los decaimientos Dˆ+ -> Kˆ+Kˆ-Kˆ+ y Dˆ- -> Kˆ-Kˆ+Kˆ-

Monday 29 November 2021 18:35 (5 minutes)

Se presenta un estudio preliminar sobre la violación de la simetría CP en los decaimientos de los mesones Dˆ+\rightarrow Kˆ+Kˆ-Kˆ+\ \ y\ \ Dˆ-\rightarrow Kˆ-Kˆ+Kˆ-, donde a partir de un Monte Carlo se hace una simulación de estos decaimientos en un Dalitz Plot, y se realiza mediante el modelo Isobar un análisis de la amplitud para los decaimientos del Dˆ+ y Dˆ-.

Author: Mr APONTE MENDIVELSO, Andres (Universidad Distrital Francisco José de Caldas)

Co-author: MONROY CANON, Ignacio Alberto (Universidad Nacional de Colombia (CO))

Presenter: Mr APONTE MENDIVELSO, Andres (Universidad Distrital Francisco José de Caldas)

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **117** Type: **Regular Talk (15'+5')**

Latest results from the CUORE experiment

Tuesday 30 November 2021 18:15 (20 minutes)

The Cryogenic Underground Observatory for Rare Events (CUORE) is the first bolometric experiment searching for 0νββ decay that has been able to reach the one-tonne mass scale. The detector, located at the LNGS in Italy, consists of an array of 988 TeO2 crystals arranged in a compact cylindrical structure of 19 towers. CUORE began its first physics data run in 2017 at a base temperature of about 10 mK and in April 2021 released its 3rd result of the search for 0νββ, corresponding to a tonne-year of TeO2 exposure. This is the largest amount of data ever acquired with a solid state detector and the most sensitive measurement of 0νββ decay in 130Te ever conducted, with a median exclusion sensitivity of 2.8×10ˆ25 yr. We find no evidence of 0νββ decay and set a lower bound of 2.2 ×10ˆ25 yr at a 90% credibility interval on the 130Te half-life for this process. In this talk, we present the current status of CUORE search for 0νββ with the updated statistics of one tonne-yr. We finally give an update of the CUORE background model and the measurement of the 130Te 2νββ decay half-life, study performed using an exposure of 300.7 kg·yr.

Author: Dr BERETTA, Mattia (University of California Berkeley)

Co-author: COLLABORATION, CUORE

Presenters: Dr BERETTA, Mattia (University of California Berkeley); COLLABORATION, CUORE

Session Classification: Neutrinos - Experimental

Track Classification: Neutrinos - Experiments

Contribution ID: **118** Type: **Regular Talk (15'+5')**

Nuclear Femtography in the era of Jefferson Lab 12 GeV program and EIC

Monday 29 November 2021 17:45 (20 minutes)

A new era for the exploration of hadron structure has begun with the Jefferson Lab 12 GeV program and the planned Electron Ion Collider. The new generation of experiments will allow us to probe the quantum correlation function (QCFs) of quarks and gluons that emerges from the theory of strong interactions. Since these QCFs are not direct physical observables, the experimental data needs to be analyzed within the framework of QCD factorization that stress test in a self consistent manner the predictive power of QCD and the universality of QCFs using Bayesian inference. In this talk we will discuss the QCD global analysis program that aims to map out the QCFs that characterized the internal quark and gluon structures in the nucleon and nuclei.

Author: SATO, nobuo (jlab)

Presenter: SATO, nobuo (jlab)

Session Classification: Heavy Flavour

Track Classification: Heavy Flavour

Contribution ID: **119** Type: **not specified**

LASF4RI

Wednesday 1 December 2021 15:00 (20 minutes)

Presenter: BERNAL, Nicolás (Universidad Antonio Nariño)

Session Classification: Reunión Red CONHEP

Contribution ID: **120** Type: **not specified**

Próximo COMHEP

Wednesday 1 December 2021 15:40 (20 minutes)

Presenter: SANDOVAL USME, Carlos (Universidad Nacional de Colombia)

Session Classification: Reunión Red CONHEP

Contribution ID: **121** Type: **not specified**

Asuntos varios de la red

Wednesday 1 December 2021 16:00 (20 minutes)

Presenter: SANDOVAL USME, Carlos (Universidad Nacional de Colombia)

Session Classification: Reunión Red CONHEP

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

Opening

Monday 29 November 2021 08:30 (30 minutes)

Presenter: ARRIETA DIAZ, Enrique (Universidad del Magdalena)

Session Classification: Opening session

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

Closing

Friday 3 December 2021 17:00 (5 minutes)

Presenter: SANDOVAL USME, Carlos (Universidad Nacional de Colombia)

Session Classification: Closing session