PASCOS 2017

Report of Contributions

Contribution ID: **11**   Type: **Parallel talk**

The muon g-2 and dark matter in the MSSM at 100 TeV

Thursday 22 June 2017 17:00 (15 minutes)

We study the muon g-2 and neutralino dark matter as explained by the MSSM where the squarks and 3rd generation sleptons are decoupled. Particularly, we focus on constraints from current and future dark matter experiments such as PandaX-II and LUX-2016 as well as current bounds from collider searches. Using the constraints on the MSSM from the muon g-2 and DM searches, we study constraints from multilepton + MET searches at 8 TeV LHC, and the prospects for searches at 100 TeV proton-proton collision energies.

Presentation type

Parallel talk

Authors: TALIA, Matthew (University of Sydney); KOBAKHIDZE, Archil (The University of Sydney); WU, Lei

Presenter: TALIA, Matthew (University of Sydney)

Session Classification: Parallel III

Contribution ID: **12**   Type: **Parallel talk**

Electroweak monopoles and the electroweak phase transition

Tuesday 20 June 2017 15:30 (15 minutes)

We consider an isolated electroweak monopole solution within the Standard Model with a non-linear Born-Infeld extension of the hypercharge gauge field. Monopole (and dyon) solutions in such an extension are regular and their masses are predicted to be proportional to the Born-Infeld mass parameter. We argue that cosmological production of electroweak monopoles in a narrow mass range may delay the electroweak phase transition and make it more strongly first order while satisfying nucleosynthesis constraints.

Presentation type

Parallel talk

Authors: ARUNASALAM, Suntharan (University of Sydney); KOBAKHIDZE, Archil (The University of Sydney)

Presenter: ARUNASALAM, Suntharan (University of Sydney)

Session Classification: Parallel III

Contribution ID: **14** Type: **Parallel talk**

Holography for spin-2 fields in rotating black holes

Thursday 22 June 2017 14:45 (15 minutes)

We find the explicit form of two-point function for the conformal spin-2 energy momentum operators on the near horizon of a near extremal Kerr black hole by variation of a proper boundary action. In this regard, we consider an appropriate boundary action for the gravitational perturbation of the Kerr black hole. We show that the variation of the boundary action with respect to the boundary fields yields the two-point function for the energy momentum tensor of a conformal field theory. We find agreement between the two-point function and the correlators of the dual conformal field theory to the Kerr black hole.

Presentation type

Parallel talk

Author: GHEZELBASH, Masoud (University of Saskatchewan)

Presenter: GHEZELBASH, Masoud (University of Saskatchewan)

Session Classification: Parallel II

Contribution ID: **16**   Type: **Parallel talk**

SMASH, a simple extension of the SM to address dark matter, inflation, baryogenesis, the strong CP-problem and neutrino masses

Tuesday 20 June 2017 15:00 (15 minutes)

I will present a simple extension of the Standard Model which adds a new scale at 10ˆ11 GeV, solving the strong CP problem with an axion and the smallness of neutrino masses via a variant of the see-saw mechanism. This leads to a dark matter candidate (the axion), and explanation of the matter/anti-matter asymmetry of the Universe (through leptogenesis) and the identity of the inflaton. The axion mass is predicted to be between 50 and 200 micro eV and may be detected in the near future with axion-photon conversion experiments. The model gives specific predictions for the spectrum of primordial perturbations and the number of extra relativistic species, both of which may be tested at the required precision with future cosmological probes.

Presentation type

Parallel talk

Author: Dr BALLESTEROS , Guillermo (University Paris-Saclay)

Presenter: Dr BALLESTEROS , Guillermo (University Paris-Saclay)

Session Classification: Parallel V

Contribution ID: **17**   Type: **Parallel talk**

Angular Momentum of Dark Matter Black Holes

Thursday 22 June 2017 15:45 (15 minutes)

The putative black holes which may constitute all the dark matter are described by a Kerr metric with only two parameters, mass M and angular momentum J. There has been little discussion of J since it plays no role in the upcoming attempt at detection by microlensing. Nevertheless J does play a central role in understanding the previous lack of detection, especially of CMB distortion. We explain why bounds previously derived from lack of CMB distortion are too strong for primordial black holes with J non-vanishing. Almost none of the dark matter black holes can be from stellar collapse, and nearly all are primordial, to avoid excessive CMB distortion.

Presentation type

Parallel talk

Author: Prof. FRAMPTON, Paul H (University of Salento)

Presenter: Prof. FRAMPTON, Paul H (University of Salento)

Session Classification: Parallel III

Contribution ID: **18**   Type: **Parallel talk**

Baryogenesis from Primordial Magnetic Helicity

Thursday 22 June 2017 17:45 (15 minutes)

The origin of the matter / antimatter asymmetry is one of the most persistent and challenging problems in the study of the early universe. In this talk I will describe how the baryon asymmetry may have arisen from the decaying helicity of a primordial (hyper-)magnetic field without further need for beyond-the-SM particles or interactions. The relic baryon asymmetry is shown to depend sensitively on the dynamics of the Standard Model electroweak crossover, where the hypermagnetic field is converted into an electromagnetic field. Since the primordial magnetic field will persist in the universe today, observations of this relic intergalactic magnetic field today may inform our understanding of the cosmological excess of matter over anti-matter.

Presentation type

Parallel talk

Author: LONG, Andrew (University of Chicago)

Co-author: KAMADA, Kohei (Ecole Polytechnique Federale de Lausanne (CH))

Presenter: LONG, Andrew (University of Chicago)

Session Classification: Parallel I

Contribution ID: **19** Type: **Parallel talk**

The Zee model: connecting neutrino masses to Higgs lepton flavor violation

Tuesday 20 June 2017 14:45 (15 minutes)

I will discuss the Zee model, a radiative neutrino mass model with possible large lepton flavor violating Higgs (HLFV) decays, in particular $h \to \tau\mu$. In the first part I will analyse the effective operators responsible for HLFV and their tree level UV completions, based on arXiv:1605.06091. By imposing constraints from charged lepton flavour violating observables, like $\tau \to \mu\gamma$, upper limits on BR($h \to \tau\mu$) can be set for the different realizations. In the second part of the talk, I will discuss the connection of HLFV to popular neutrino mass models. We will argue why most neutrino models generate very suppressed HLFV at one loop level. On the other hand, the general Zee model generates HLFV at tree level. We will present results of a full parameter scan, based on arXiv:1701.05345, which show how the model is fully testable by LHC and LFV searches.

Presentation type

Parallel talk

Author: Dr HERRERO GARCIA, Juan (CoEPP, University of Adelaide)

Presenter: Dr HERRERO GARCIA, Juan (CoEPP, University of Adelaide)

Session Classification: Parallel V

Contribution ID: **21**   Type: **Parallel talk**

Constraining Z' widths from pT measurements in Drell-Yan processes

Tuesday 20 June 2017 17:15 (15 minutes)

We define a Focus Point (FP) Asymmetry, A_{FP}, obtained by integrating the normalised transverse momentum distribution of either lepton produced in the Drell-Yan (DY) process below and above a point where a variety of popular Z' models all have the same magnitude.

For a given Z' mass the position of this FP is predictable, depending only on the collider energy and on the low transverse momentum cut chosen in the normalisation procedure.

The resulting A_{FP} is very sensitive to the Z' width, and can be used to constrain this parameter in experimental fits.

Presentation type

Parallel talk

Authors: FIASCHI, Juri (University of Southampton); ACCOMANDO, Elena (Southampton University); MORETTI, Stefano (STFC - Rutherford Appleton Lab. (GB)); SHEPHERD-THEMISTOCLEOUS, Claire (STFC - Rutherford Appleton Lab. (GB))

Presenter: FIASCHI, Juri (University of Southampton)

Session Classification: Parallel IV

Contribution ID: **23**   Type: **Parallel talk**

Study of dark matter physics in the non-universal gaugino mass scenario

Tuesday 20 June 2017 16:30 (15 minutes)

We study dark matter physics in the Minimal Supersymmetric Standard Model
with non-universal gaugino masses at the unification scale.
In this scenario, the specific ratio of wino and gluino masses
realizes the electro-weak scale naturally and achieve the 125 GeV Higgs mass.
Then, relatively light higgsinos are predicted
and the neutral component is a good dark matter candidate.
The direct detection of the dark matter
are sensitive to not only a higgsino mass
but also gaugino masses significantly.
The upcoming XENON1T experiment excludes parameter region where
the bino or the gluino is lighter than about 2.5 TeV
if the higgsino and the gaugino mass parameters have a same sign
and the observed dark matter abundance is explained
by the thermal freeze-out mechanism. The limit for the gluino mass is tightened
for the lighter bino and higgsino,
while it becomes much weaker
if the higgsino and the gaugino mass parameters have opposite signs.
We have studied the Higgs mass and the LHC phenomenology
of this scenario in arXiv:1208.5328, 1505.03729, 1601.03484.
The dark matter physics is discussed in my Ph.D thesis,
but the paper with more complete results is in preparation and coming soon.

Presentation type

Parallel talk

Author: KAWAMURA, Junichiro (Waseda University)

Co-author: OMURA, Yuji (KMI, Nagoya University)

Presenter: KAWAMURA, Junichiro (Waseda University)

Session Classification: Parallel III

Contribution ID: **25**   Type: **Parallel talk**

Gravitational wave, collider and dark matter signals of a singlet scalar electroweak baryogenesis

Tuesday 20 June 2017 15:15 (15 minutes)

I will discuss a simple extension of the SM with just an additional scalar singlet coupling to the Higgs. My main focus will be the possible probes of electroweak baryogenesis in this model including collider searches gravitational wave detection and direct dark matter detection experiments. I will show there are regions in the parameter space where observation of gravitational waves is the most promising way of finding evidence for this model.

Presentation type

Parallel talk

Author: LEWICKI, Marek (University of Warsaw (PL))

Presenter: LEWICKI, Marek (University of Warsaw (PL))

Session Classification: Parallel III

Contribution ID: **27** Type: **Parallel talk**

Large Galaxy Surveys for cosmology

Tuesday 20 June 2017 14:30 (15 minutes)

In this talk, a review of the information that large galaxy surveys can bring about cosmological parameters will be presented. I will describe the present and near future constraints coming from current galaxy surveys. I will review also the future projects that are proposed or in construction, and their expected sensitivities, mainly to the dark side of the universe, dark matter and dark energy.

Presentation type

Parallel talk

Author: SANCHEZ, Eusebio (CIEMAT)

Presenter: SANCHEZ, Eusebio (CIEMAT)

Session Classification: Parallel I

Contribution ID: **29**   Type: **Parallel talk**

GAMBIT: The Global and Modular BSM Inference Tool

Tuesday 20 June 2017 17:45 (15 minutes)

The Global and Modular Beyond-the-Standard Model Inference Tool (GAMBIT)
is an open-source tool for performing global fits in generic Beyond the Standard Model theories.
GAMBIT is the amalgamation of frontline scanner algorithms, advanced calculations of physical
observables and likelihoods, and a flexible and powerful interface with the user and external codes.
Due to the deep modularity of the code, GAMBIT allows the addition of user-made models, observables and scanners in a highly simplistic manner, as well as the usage of any extenal backend tool,
easily embedded and run in unison. In this talk I will introduce the main features of GAMBIT,
briefly describing the core and internal structure of the code. I will also present the first preliminary results obtained with GAMBIT regarding global fits on a CMSSM and a Singlet Dark Matter
model. Lastly I will discuss the plans for future extensions and improvements of the code, along
with the steps made towards expanding the set of models covered and the inclusion of new physics
sectors.

Presentation type

Parallel talk

Authors: KVELLESTAD, Anders (Nordita); BUCKLEY, Andy (University of Glasgow (GB)); RAKLEV, Are (University of Oslo (NO)); Dr FARMER, Benjamin (Oskar Klein Centre); WENIGER, Christoph (University of Amsterdam); ROGAN, Christopher (Harvard University (US)); BALAZS, Csaba (Monash University); KAHLHOEFER, Felix (University of Oxford); BERNLOCHNER, Florian Urs (University of Bonn (DE)); MARTINEZ, Gregory; MCKAY, James (Imperial College London); Prof. CONRAD, Jan (Stokcholm University); EDSJO, Joakim (Stockholm University); CORNELL, Jonathan (McGill University); Dr HARZ, Julia (ILP / LPTHE Paris); CHRZASZCZ, Marcin (Universitaet Zuerich (CH), Institute of Nuclear Physics (PL)); WHITE, Martin John (University of Adelaide (AU)); MAHMOUDI, Nazila (Universite Claude Bernard-Lyon I (FR)); SERRA, Nicola (Universitaet Zuerich (CH)); SCOTT, Pat; JACKSON, Paul Douglas (University of Adelaide); ATHRON, Peter; RUIZ DE AUSTRI, Roberto (Instituto de Fisica Corpuscular (ES)); TROTTA, Roberto (Imperial College London); Mr HOOF, Sebastian; WILD, Sebastian (TU Munich); GONZALO, Tomas (University of Oslo); BRINGMANN, Torsten (University of Oslo)

Presenter: GONZALO, Tomas (University of Oslo)

Session Classification: Parallel IV

Contribution ID: **30** Type: **Parallel talk**

Phases of axion inflation

Tuesday 20 June 2017 14:30 (15 minutes)

A central theme in string cosmology in recent years has been the construction of realistic large field inflationary models through axions. In this talk we will discuss a set-up with both closed and open string axions in Type IIA string theory in which strong dynamical effects determine the inflaton candidate. The interplay of Nambu-Jona-Lasinio type interactions, gauge instantons and chiral condensates leads to distinct types of inflationary models, which correspond to different phases of axion inflation in analogy to the different phases of a non-Abelian gauge theory.

Presentation type

Parallel talk

Author: STAESSENS, Wieland (Instituto de Fisica Teorica IFT UAM-CSIC)

Presenter: STAESSENS, Wieland (Instituto de Fisica Teorica IFT UAM-CSIC)

Session Classification: Parallel II

Contribution ID: **31** Type: **Parallel talk**

Probing Non-holomorphic MSSM via precision constraints, dark matter and LHC data

Tuesday 20 June 2017 15:30 (15 minutes)

We explore the phenomenological constraints of models with non-holomorphic soft SUSY breaking terms in a beyond the MSSM scenario having identical particle content. The model referred as NHSSM shows various promising features like the possibility of a strong reduction in electroweak fine-tuning even for a scenario of a heavy higgsino type of LSP, a fact that is unavailable in pMSSM models. The other important aspect is satisfying the muon g−2 data even for a small tanβ via a small value of coupling A′μ associated with the tri-linear non-holomorphic soft term. Thus, a large SUSY contribution to muon g−2 is possible even for a significantly large smuon mass $m_{\tilde{\mu}1}$. The Higgs mass radiative corrections are contributed by both the holomorphic and non-holomorphic trilinear soft parameters At and A′t, thus diluting the requirement to have a larger At to satisfy the Higgs mass data. The model also provides with valid parameter space satisfying the constraint of B→Xs+γ for large values of tanβ, a scenario unfavourable in pMSSM. We will further discuss the effect of considering appropriate SUSY breaking mechanisms.

Presentation type

Parallel talk

Author: Prof. CHATTOPADHYAY, Utpal (IACS, Kolkata)

Co-author: Mr DEY, Abhishek (Maulana Azad College, Kolkata)

Presenter: Prof. CHATTOPADHYAY, Utpal (IACS, Kolkata)

Session Classification: Parallel V

Contribution ID: **32** Type: **Parallel talk**

The Belle II experiment: status and Physics prospects.

Thursday 22 June 2017 14:30 (15 minutes)

The Belle II experiment is a substantial upgrade of Belle detector and will operate at the SuperKEKB energy-asymmetric e^+e^- collider, which has started commissioning and is working towards its design luminosity of 8×10^{35} cm^{-2}s^{-1}. The Belle II experiment aims to record 50 ab^{-1} of data, a factor of 50 more than the Belle experiment. This large data set will be accumulated with low backgrounds and high trigger efficiencies in a clean e^+e environment and will provide unprecedented sensitivity to new physics signatures in B and D meson decays as well as τ lepton decays. This talk will review the present status of the detector upgrade, and the physics capabilities of this experiment.

Presentation type

Parallel talk

Author: Dr MEROLA, Mario (University of Naples and INFN)

Presenter: Dr MEROLA, Mario (University of Naples and INFN)

Session Classification: Parallel IV

Contribution ID: **34**   Type: **Parallel talk**

The Power of Series

Thursday 22 June 2017 17:15 (15 minutes)

In quantum mechanics and quantum field theory the perturbative series usually have factorially growing coefficients, hence being non-convergent asymptotic expansions. In order to go beyond the approximation given by the optimal truncation one can Borel-resum the series but generically extra contributions (non-perturbative in the coupling) such as instantons, must be included to reproduce the exact results.

I will show that in a class of quantum mechanical problems one can define suitably modified perturbative expansions which are Borel-resummable to the exact results, avoiding the need to include

instantons. The non-perturbative contributions are therefore encoded in the coefficients of the new

expansions.

I will illustrate this explicitly in examples which are known to contain non-perturbative effects, such as the (supersymmetric) double-well potential and the perturbative expansion around a false vacuum. I will comment on possible extensions to quantum field theory.

Presentation type

Parallel talk

Author: SPADA, Gabriele (SISSA)

Presenter: SPADA, Gabriele (SISSA)

Session Classification: Parallel II

Contribution ID: **35** Type: **Parallel talk**

Where to look for Supersymmetry

Tuesday 20 June 2017 14:30 (15 minutes)

Combining experimental data from the LHC, low-energy precision observables, flavor measurements and astrophysical data, we analyze various incarnations of Supersymmetry (SUSY). This work is done within the MasterCode framework. We find that simple SUSY models are in agreement with all experimental data. We obtain predictions where the LHC has the best chances to find SUSY and where the direct detection experiments are sensitive to the discovery of Dark Matter.

Presentation type

Parallel talk

Author: HEINEMEYER, Sven (CSIC (Madrid, ES))

Presenter: HEINEMEYER, Sven (CSIC (Madrid, ES))

Session Classification: Parallel IV

Contribution ID: **36**   Type: **Parallel talk**

Asymmetric thermal-relic dark matter

Thursday 22 June 2017 17:45 (15 minutes)

I will discuss symmetric and asymmetric dark matter with long-range interactions, in particular dark matter coupled to a light vector or scalar force mediator. Accurate determination of the relic abundance requires inclusion of Sommerfeld enhancement and consideration of bound state formation. Due to the Sommerfeld enhancement, highly asymmetric dark matter with long-range interactions can have a significant annihilation rate in halos today, potentially larger than symmetric dark matter of the same mass with contact interactions. Finally, I will discuss the unitarity bound on the inelastic cross-section and why it can be realised only by long-range interactions. I will showcase upper bounds on the mass of symmetric and asymmetric thermal-relic dark matter for s-wave and p-wave annihilation, and exhibit how these bounds strengthen as the dark asymmetry increases.

Presentation type

Parallel talk

Author: Dr BALDES, Iason (DESY)

Presenter: Dr BALDES, Iason (DESY)

Session Classification: Parallel III

Contribution ID: **37** Type: **Parallel talk**

Higgs mass prediction from the cosmological constant running

Thursday 22 June 2017 17:45 (15 minutes)

We revisit the decoupling effects associated with heavy particles in the renormalization group running of the vacuum energy in a mass-dependent renormalization scheme. We find the running of the vacuum energy stemming from the Higgs condensate in the entire energy range and show that it behaves as expected from the simple dimensional arguments meaning that it exhibits the quadratic sensitivity to the mass of the heavy particles in the infrared regime. The consequence of such a running to the fine-tuning problem with the measured value of the Cosmological Constant is analyzed and the constraint on the mass spectrum of a given model is derived. We show that in the Standard Model (SM) this fine-tuning constraint is not satisfied while in the massless theories this constraint formally coincides with the well known Veltman condition. We also provide a remarkably simple extension of the SM where saturation of this constraint enables us to predict the radiative Higgs mass correctly. Generalization to constant curvature spaces is also given.

Presentation type

Parallel talk

Authors: MELIC, Blazenka (Rudjer Boskovic Institute, Zagreb); ANTIPIN, Oleg (Institut Rudjer Boskovic)

Presenter: MELIC, Blazenka (Rudjer Boskovic Institute, Zagreb)

Session Classification: Parallel IV

Contribution ID: **39**   Type: **Parallel talk**

Supersymmetry in dynamical M-brane systems

Thursday 22 June 2017 15:00 (15 minutes)

The supersymmetry arises in certain theories of fermions coupled to gauge fields and gravity in a spacetime of eleven dimensions. The dynamical M-brane backgrounds have mainly been studied for the class of purely bosonic solutions only, but developments involving time-dependent supersymmetric solution have made it clear that one can get more information by asking what happens on dynamical brane systems. In this presentation, we show an exact supersymmetric solution of dynamical M-brane background in the eleven-dimensional supergravity and consider applications to supersymmetric breaking, dynamics of geodesic motion and black hole physics.

Presentation type

Parallel talk

Authors: Prof. MAEDA, Kengo (Shibaura Institute of Technology); Dr UZAWA, Kunihito (Kwansei Gakuin University)

Presenter: Dr UZAWA, Kunihito (Kwansei Gakuin University)

Session Classification: Parallel II

Contribution ID: **40**   Type: **Parallel talk**

Cosmological implications of unification with D-parity

Tuesday 20 June 2017 15:45 (15 minutes)

Exclusion of several classes of models due to LHC and astroparticle data has revived interest in grand unification. We consider SO(10) unified models with D-parity due to their success in incorporating light neutrino masses. We study various patterns of symmetry and supersymmetry breaking therein. Formation of topological defects in these models can alter the nature of phase transitions, including inflation. Combining the constraints on inflation from CMB data and the constraints from big bang nucleosynthesis we identify constraints to be satisfied by the energy scales of symmetry breaking and of supersymmetry breaking in this class of models.

Presentation type

Parallel talk

Author: YAJNIK, Urjit (IIT Bombay Mumbai India)

Co-authors: BANERJEE, Piyali; Dr GARG, Ila (IIT Bombay)

Presenter: YAJNIK, Urjit (IIT Bombay Mumbai India)

Session Classification: Parallel V

Contribution ID: **41** Type: **Parallel talk**

Primordial Black Holes and Dark Matter from Axion Inflation

Tuesday 20 June 2017 16:45 (15 minutes)

According to the Standard Model of Cosmology, about 25% of the content of the universe is composed of dark matter. From a theoretical point of view, there are many possible alternatives to explain its origin and composition, ranging from ultralight axions to supermassive black holes. However, despite many experimental efforts, the nature of dark matter is still obscure. One interesting possibility is that dark matter is composed of Primordial Black Holes (PBHs), arising from high peaks in the matter power spectrum of some inflationary models. In this talk, I will show that models of axion-inflation in which the inflaton is coupled to massless gauge fields and non-minimally coupled to gravity can give rise to the production of PBHs. I will discuss the possibility that such PBHs compose a fraction of the dark matter observed in the universe, and I will present some ideas about a possible UV completion of such inflationary model.

Presentation type

Parallel talk

Author: Dr MUIA, Francesco (University of Oxford)

Co-authors: Dr DOMCKE, Valerie (APC Paris); Dr PIERONI, Mauro (APC Paris); Dr WITKOWSKI, Lukas T. (APC Paris)

Presenter: Dr MUIA, Francesco (University of Oxford)

Session Classification: Parallel I

Contribution ID: **45**   Type: **Parallel talk**

Phenomenology of Composite 2-Higgs Doublet Models

Thursday 22 June 2017 17:15 (15 minutes)

We investigate the phenomenology of Composite 2-Higgs Doublet Models (C2HDMs) of various Yukawa types based on the global symmetry breaking SO(6)→SO(4)×SO(2). The kinetic part and the Yukawa Lagrangian are constructed in terms of the pseudo Nambu-Goldstone Boson (pNGB) matrix and a 6-plet of fermions under SO(6). The scalar potential is assumed to be the same as that of the Elementary 2-Higgs Doublet Model (E2HDM) with a softly-broken discrete Z2 symmetry. We first survey their parameter spaces allowed by theoretical bounds from perturbative unitarity and vacuum stability. We also investigate their parameter spaces allowed by experiments. We then discuss the phenomenological differences between the E2HDM and C2HDM by focusing on the deviations from Standard Model (SM) couplings of the discovered Higgs state (h) as well as on the production cross sections and Branching Ratios(BRs) at the Large Hadron Collider (LHC) of extra Higgs bosons. We also investigate single- and double-h, the discovered Standard Model (SM)-like Higgs boson, production at future e+e− colliders in Composite 2-Higgs Doublet Models (C2HDMs) and Elementary 2-Higgs Doublet Models (E2HDMs) with a softly-broken Z2 symmetry.

Presentation type

Parallel talk

Authors: Prof. DE CURTIS, Stefania (INFN, Sezione di Firenze, and Department of Physics and Astronomy, University of Florence); Prof. MORETTI, Stefano (University of Southampton); Dr YAGYU, Kei (INFN, Sezione di Firenze, and Department of Physics and Astronomy, University of Florence); Ms YILDIRIM, Emine (University of Southampton)

Presenter: Ms YILDIRIM, Emine (University of Southampton)

Session Classification: Parallel IV

Contribution ID: **46**   Type: **Parallel talk**

Higgsino Dark Matter at Collider

Tuesday 20 June 2017 16:30 (15 minutes)

The Higgsino is the most promising candidate for the dark matter.
The almost pure Higgsino, however, is known to be a very challenging target at the LHC.
I will show that improvement of tracking technique of disappearing tracks can significantly increase the sensitivity for the Higgsino.
I will also discuss a future 33 TeV collider can probe the 1 TeV Higgsino, which is the most interesting for the thermal relic density.

Presentation type

Parallel talk

Author: SHIRAI, Satoshi (Kavli IPMU)

Co-authors: FUKUDA, Hajime (The University of Tokyo); OTONO, Hidetoshi (Kyushu University (JP)); NAGATA, Natsumi

Presenter: SHIRAI, Satoshi (Kavli IPMU)

Session Classification: Parallel IV

Contribution ID: **49** Type: **Parallel talk**

Dark Matter at High Nuclear Recoil

Tuesday 20 June 2017 17:30 (15 minutes)

There exist well motivated models of particle dark matter which predominantly scatter inelastically off nuclei in direct detection experiments. This inelastic transition causes the dark matter to up-scatter in terrestrial experiments into an excited state up to 550 keV heavier than the dark matter itself. An inelastic transition of this size is highly suppressed by both kinematics and nuclear form factors. In this paper, we extend previous studies of inelastic dark matter to deter- mine the present bounds on the scattering cross section, and the prospects for improvements in sensitivity. Three scenarios provide illustrative examples: nearly pure Higgsino supersymmetric dark matter; magnetic inelastic dark matter; and inelastic models with dark photon exchange.

Presentation type

Parallel talk

Authors: Prof. MARTIN, Adam (University of Notre Dame); BRAMANTE, Joseph Andrew; FOX, Patrick; KRIBS, Graham

Presenter: Prof. MARTIN, Adam (University of Notre Dame)

Session Classification: Parallel III

Contribution ID: **50**   Type: **Parallel talk**

Gravitational waves at aLIGO with a scalar singlet

Thursday 22 June 2017 17:00 (15 minutes)

Contrary to popular belief stochastic gravitational waves might exist in reach of aLIGO (in operation by about 2020). I present a scenario, based on a scalar singlet extension of the Standard Model, that generates such gravitational waves.

Presentation type

Parallel talk

Authors: BALAZS, Csaba (Monash University); Dr FOWLIE, Andrew (Monash University); MAZUMDAR, Anupam (Lancaster University); WHITE, Graham (Monash University)

Presenter: BALAZS, Csaba (Monash University)

Session Classification: Parallel I

Contribution ID: **51**   Type: **Parallel talk**

Special Relativity from Soft Gravitons

Thursday 22 June 2017 15:30 (15 minutes)

We study all translationally and rotationally invariant local theories involving massless spin 2 and spin 1 particles that mediate long range forces, allowing for general energy relations and violation of boost invariance. Although gauge invariance is not a priori required to describe non Lorentz invariant theories, we first establish that locality requires 'soft gauge invariance'. Then by taking the soft graviton limit in scattering amplitudes, we prove that in addition to the usual requirement of universal graviton couplings, the special relativistic energy-momentum relation is also required and must be exact. We contrast this to the case of theories with only spin ≤1 particles, where, although we can still derive charge conservation from locality, special relativity can be easily violated. We provide indications that the entire structure of relativity can be built up from spin 2 in this fashion.

Presentation type

Parallel talk

Author: Prof. HERTZBERG, Mark (Tufts University)

Co-author: Dr SANDORA, McCullen (Tufts University)

Presenter: Prof. HERTZBERG, Mark (Tufts University)

Session Classification: Parallel II

Contribution ID: **52**   Type: **Parallel talk**

Inflation and dS vacua in type IIA strings on rigid Calabi–Yau manifold

Tuesday 20 June 2017 15:00 (15 minutes)

My talk is devoted to superstring cosmology and moduli stabilization, and is based on arXiv:1607.05293 (published in JHEP), and 1703.08993 (submitted to PTEP). We search for dS vacua and slow roll inflation in a class of flux compactifications of type IIA strings on rigid Calabi-Yau manifolds with local N=2 supersymmetry in four spacetime dimensions. These theories represent a nice theoretical laboratory for explicit calculation of quantum gravity corrections to the superstring low-energy effective action. We derive a non-perturbative potential of the scalar fields from the exact D-instanton corrected metric on the hypermultiplet moduli space. This potential stabilizes all axions. Next, we study the remaining scalars, i.e. dilaton and Kaehler moduli. We find that the perturbative scalar potential does not have local minima for any number of Kaehler moduli. And, in the one-modulus case, the instanton corrections do not help. Finally, we study the inflationary properties in the one modulus case, in the absence of instanton contributions. We find that the scalar potential can satisfy the positivity and slow-roll conditions, but also causes decomactification. We conclude that it is not phenomenologically viable in the given class of rigid Calabi-Yau flux compactifications of type IIA strings, unless N=2 local supersymmetry is broken.

Presentation type

Parallel talk

Author: WAKIMOTO, Yuki (Tokyo Metropolitan University)

Co-authors: ALEXANDROV, Sergey (Montpellier University); KETOV, Sergey (Tokyo Metropolitan University)

Presenter: WAKIMOTO, Yuki (Tokyo Metropolitan University)

Session Classification: Parallel II

Contribution ID: **53** Type: **Parallel talk**

Well-tempered n-plet dark matter

Thursday 22 June 2017 14:45 (15 minutes)

The WIMP-paradigm tells us that a neutral particle with an EW cross-section and an electroweak-scale mass roughly explains the observed relic abundance. However, a closer look reveals that this correspondance is quantitatively not very precise since multi-TeV dark matter masses are reached for the simplest models, which is 1-2 orders of magnitude larger than the electroweak scale. But with an extended dark sector, it is possible to maintain the DM particle mass close to the electroweak scale and to keep the observed relic density. I will talk about simple effective models of fermionic WIMP dark matter, where the dark matter candidate is a mixture of a Standard Model singlet and an n-plet of $SU(2) \times U(1)$. The dark matter is assumed to be around the electroweak scale, and the mixing is generated by higher-dimensional operators. I will focus on the observed relic density and direct detection constraints for n = 3, 4 and 5.

Presentation type

Parallel talk

Authors: Dr BHARUCHA, Aoife (CPT); Dr BRÜMMER, Felix (LUPM); Mr RUFFAULT, Ronan (LUPM)

Presenter: Mr RUFFAULT, Ronan (LUPM)

Session Classification: Parallel III

Contribution ID: **54**   Type: **Parallel talk**

The UV structure of Horava gravity

Thursday 22 June 2017 15:15 (15 minutes)

We complete the renormalization program of (projectable) Horava gravity. We show that the theory is renormalizable in any space-time dimension, preserving scaling and gauge invariance of the counter-terms at any order in the loop expansion. Later, we focus on 2+1 dimensions, where we show that the renormalization group flow of the marginal couplings contains a UV fixed point leading to asymptotic freedom.

These two results together imply that 2+1 Horava gravity is a complete theory of Quantum Gravity with dynamical degrees of freedom. This theory can thus be used as a toy-model to study fundamental aspects of quantum gravity.

Presentation type

Parallel talk

Author: HERRERO VALEA, Mario (Ecole Polytechnique Federale de Lausanne (CH))

Co-authors: SIBIRYAKOV, Sergey (CERN & EPFL & INR RAS); BLAS TEMINO, Diego (CERN); Prof. BARVINSKY, Andrei; Dr STEINWACHS, Christian

Presenter: HERRERO VALEA, Mario (Ecole Polytechnique Federale de Lausanne (CH))

Session Classification: Parallel II

Contribution ID: **56**   Type: **Parallel talk**

Special Grand Unification

Thursday 22 June 2017 15:30 (15 minutes)

I will propose new-type grand unified theories (GUTs) based on GUT gauge groups broken to their special subgroups as well as their regular subgroups. In the framework, to obtain the Standard Model (SM), 4D gauge anomaly cancellation restricts the minimal number of generations of the 4D SM Weyl fermions. In this talk, I will show that in an SU(16) GUT on 6D orbifold space whose GUT group is broken to its special subgroup SO(10) and further SM gauge groups, three generations of the SM fermions are allowed by the 6D and 4D gauge anomaly cancellation on the bulk and fixed points without exotic 4D chiral fermions. This talk is based on arXiv:1704.08827.

Presentation type

Parallel talk

Author: YAMATSU, Naoki (Kyoto Sangyo University)

Presenter: YAMATSU, Naoki (Kyoto Sangyo University)

Session Classification: Parallel IV

Contribution ID: **57** Type: **Parallel talk**

Kahler moduli stabilization in magnetized orbifold models

Tuesday 20 June 2017 15:30 (15 minutes)

We study Kahler moduli stabilizations in semi-realistic magnetized D-brane models based on Z2 × Z'2 toroidal orbifolds. In type IIB compactifications, 3-form fluxes can stabilize the dilaton and complex structure moduli fields, but there remain some massless closed string moduli fields, K¨ahler moduli. The magnetic fluxes generate Fayet-Iliopoulos terms, which can fix ratios of K¨ahler moduli. On top of that, we consider D-brane instanton effects to stabilize them in concrete D-brane models and investigate the brane configurations to confirm that the moduli fields can be stabilized successfully. We find suitable configurations where the D-brane instantons can stabilize the moduli fields within both types of D-brane models, explaining an origin of a small constant term of the superpotential which is a key ingredient for successful moduli stabilizations.

Presentation type

Parallel talk

Author: SUMITA, Keigo

Co-authors: ABE, Hiroyuki (Waseda University); Dr UEMURA, Shohei; Prof. KOBAYASHI, Tatsuo (Hokkaido University)

Presenter: SUMITA, Keigo

Session Classification: Parallel II

Contribution ID: **58** Type: **Parallel talk**

Novel Method for Detecting Ultralight Dark Matter

Tuesday 20 June 2017 17:45 (15 minutes)

Ultralight bosonic particle is one of the dark matter and called fuzzy dark matter.
Its astrophysical properties are interesting and have been recently studied.
On the other hand, the detection method is less discussed. We propose a new method to detect
them using the motions of heavenly bodies.

(This is a work in progress)

Presentation type

Parallel talk

Author: FUKUDA, Hajime (The University of Tokyo)

Co-authors: Dr MATSUMOTO, Shigeki (Kavli IPMU); Prof. YANAGIDA, Tsutomu (Kavli IPMU)

Presenter: FUKUDA, Hajime (The University of Tokyo)

Session Classification: Parallel III

Contribution ID: **60**   Type: **Parallel talk**

Microscopic constraints for de Sitter uplifts in String Theory

Tuesday 20 June 2017 15:15 (15 minutes)

In this talk I will start by studying some general aspects of String Theory compactifications to four dimensions, focusing on the the constraints to obtain 4 dimensional de Sitter vacua. These microscopic constraints will then be applied to some existing mechanisms to uplift the cosmological constant, that will allow us to understand the mechanisms and their limitations better.

Presentation type

Parallel talk

Author: RETOLAZA, Ander (DESY)

Presenter: RETOLAZA, Ander (DESY)

Session Classification: Parallel II

Contribution ID: **61**   Type: **Parallel talk**

Hidden sector behind the CKM matrix

Thursday 22 June 2017 15:15 (15 minutes)

The small quark mixing, described by the Cabibbo-Kobayashi-Maskawa (CKM) matrix in the Standard Model,
may be a clue to reveal new physics around the TeV scale.
We consider a simple scenario that extra particles in a hidden sector radiatively
mediate the flavor violation to the quark sector around the TeV scale and effectively realize the observed CKM matrix.
The lightest particle in the hidden sector, whose contribution to
the CKM matrix is expected to be dominant, is a good dark matter (DM) candidate.
There are many possible setups to describe this scenario, so that we investigate
some universal predictions of this kind of model, focusing on the contribution of DM to the quark mixing and flavor physics. In this scenario, there is an explicit relation between the CKM matrix and flavor violating couplings, such as four-quark couplings, because both are radiatively induced by the particles in the hidden sector. Then, we can explicitly find the DM mass region and the size of Yukawa couplings between the DM and quarks, based on the study of flavor physics and DM physics. In conclusion, we show that DM mass in our scenario is around the TeV scale, and the Yukawa couplings are between $calO(0.01)$ and $calO(1)$.
The spin-independent DM scattering cross section is estimated as $calO(10^{-9})$ [pb]. An extra colored particle is also predicted at the $calO(10)$ TeV scale.

Presentation type

Parallel talk

Author: OMURA, Yuji (KMI, Nagoya University)

Co-author: Mr OKAWA, Shohei (Nagoya University)

Presenter: OMURA, Yuji (KMI, Nagoya University)

Session Classification: Parallel IV

Contribution ID: **62** Type: **Parallel talk**

Dynamically Determining the Weak Scale from Inflation

Tuesday 20 June 2017 17:30 (15 minutes)

Dynamical scanning of the Higgs mass by an axion-like particle during inflation may provide a cosmological component to explaining part of the hierarchy problem. We propose a novel interplay of this cosmological relaxation mechanism with inflation, whereby the backreaction of the Higgs vacuum expectation value near the weak scale causes inflation to end. As Hubble drops, the relaxion's dissipative friction increases relative to Hubble and slows it down enough to be trapped by the barriers of its periodic potential. Such a scenario raises the natural cut-off of the theory up to ~10^10 GeV, while maintaining a minimal relaxion sector without having to introduce additional scanning scalars or new physics coincidentally close to the weak scale.

Presentation type

Parallel talk

Author: Dr YOU, Tevong (University of Cambridge)

Presenter: Dr YOU, Tevong (University of Cambridge)

Session Classification: Parallel I

Contribution ID: **63** Type: **Parallel talk**

A Systematic Effective Operator Analysis of Semi-Annihilating Dark Matter

Thursday 22 June 2017 14:30 (15 minutes)

Semi-annihilation is a generic feature of dark matter theories stabilized by symmetries larger than a Z_2. It contributes to thermal freeze out, but is irrelevant for direct and collider searches. This allows semi-annihilating dark matter to avoid those limits in a natural way. We use an effective operator approach to make the first model-independent study of the associated phenomenology. We enumerate all possible operators that contribute to $2 \to 2$ semi-annihilation up to dimension 6, plus leading terms at dimension 7. We find that when the only light states charged under the dark symmetry are dark matter, the model space is highly constrained. Only fifteen operators exist, and just two for single-component dark sectors. If there can be additional light, unstable "dark partner" states the possible phenomenology greatly increases, at the cost of additional model dependence in the dark partner decay modes. We also derive the irreducible constraints on models with single-component dark matter from cosmic ray searches and astrophysical observations. We find that for semi-annihilation to electrons and light quarks, the thermal relic cross sections can be excluded for dark matter masses up to 100 GeV. However, significant model space for semi-annihilating dark matter remains.

Presentation type

Parallel talk

Author: SPRAY, Andrew (CoEPP, University of Melbourne)

Co-author: CAI, Yi

Presenter: SPRAY, Andrew (CoEPP, University of Melbourne)

Session Classification: Parallel III

Contribution ID: **64**   Type: **Parallel talk**

Cross-tests of CMB features in the primordial spectra

Tuesday 20 June 2017 15:15 (15 minutes)

The Planck data on the CMB power spectrum marginally support pronounced deviations from scale invariance at several multipole ranges. We examine the implications of such features for the scalar bispectrum and the tensor power spectrum providing several concistency relations and templates while highlighting the power of joint analysis of spectra in search for features.

Presentation type

Parallel talk

Authors: SYPSAS, Spyros (FCFM, Universidad de Chile); Prof. PALMA, Gonzalo (DFI, FCFM, UChile); GONG, Jinn-Ouk (Asia Pacific Centerfor Theoretical Physics); Mr PRADENAS, Bastian; Mr RIQUELME, Walter

Presenter: SYPSAS, Spyros (FCFM, Universidad de Chile)

Session Classification: Parallel I

Contribution ID: **65** Type: **Parallel talk**

The production of Axion-like particles via primordial magnetic fields

Tuesday 20 June 2017 15:45 (15 minutes)

Primordial magnetic fields (PMFs) can be an important ingredient in the early and even the present Universe, which might explain the present magnetic fields in the galaxies and intergalactic magnetic fields suggested by blazar observations. We discuss the production of axion-like particles (ALPs) through the photon-axion conversion through the PMFs. We identify the conditions in which the ALPs produced by this mechanism are responsible for the dark matter of the Universe. ALP dark matter by this mechanism does not suffer from large isocurvature perturbations unlike the misalignment mechanism. Since it has relatively long free streaming length, it might solve the core-cusp problem or the missing satellite problem. We also identify the parameter spaces that are ruled out by the warm/hot dark matter constraint.

Presentation type

Parallel talk

Author: KAMADA, Kohei (Arizona State University)

Presenter: KAMADA, Kohei (Arizona State University)

Session Classification: Parallel III

Contribution ID: **66** Type: **Parallel talk**

What is the Magnetic Weak Gravity Conjecture for Axions?

Tuesday 20 June 2017 16:45 (15 minutes)

The electric Weak Gravity Conjecture demands that axions with large decay constant f couple to light instantons. The resulting large instantonic corrections pose problems for natural inflation. We explore an alternative argument based on the magnetic Weak Gravity Conjecture for axions, which we try to make more precise. Roughly speaking, it demands that the minimally charged string coupled to the dual 2-form-field exists in the effective theory. Most naively, such large-f strings curve space too much to exist as static solutions, thus ruling out large-f axions. More conservatively, one might allow non-static string solutions to play the role of the required charged objects. In this case, topological inflation would save the superplanckian axion. Furthermore, a large-f axion may appear in the low-energy effective theory based on two subplanckian axions in the UV. The resulting effective string is a composite object built from several elementary strings and domain walls.

Presentation type

Parallel talk

Authors: HEBECKER, Arthur (Heidelberg University); HENKENJOHANN, Philipp (University of Heidelberg); Dr WITKOWSKI, Lukas T. (APC Paris)

Presenter: HENKENJOHANN, Philipp (University of Heidelberg)

Session Classification: Parallel II

Contribution ID: **68** Type: **Parallel talk**

Non-Gaussianity as a Particle Detector

Tuesday 20 June 2017 15:30 (15 minutes)

Cosmological correlation functions encode the spectrum of particles during inflation, in analogy to scattering amplitudes in colliders. In this talk, I will discuss the imprints of massive particles with arbitrary spin on cosmological correlators. The spinning case is particularly interesting because the detection of massive higher-spin particles would be strongly indicative of a stringy origin of inflation. I will describe their key spectroscopic features in the scalar and tensor bispectra, and discuss scenarios in which they lead to observable non-Gaussianity.

Presentation type

Parallel talk

Author: LEE, Hayden (University of Cambridge)

Co-authors: Prof. BAUMANN, Daniel; Dr PIMENTEL, Guilherme

Presenter: LEE, Hayden (University of Cambridge)

Session Classification: Parallel I

Contribution ID: **69** Type: **Parallel talk**

SIMPs with Vector Mediators

Thursday 22 June 2017 16:45 (15 minutes)

A general mechanism for thermal production of dark matter (DM) via 3-to-2 scatterings, or other higher-order interactions, allows for sub-GeV dark matter and strong self-interactions that meet existing constraints but have the potential to explain mysteries with cold DM and structure formation. In such models, so-called Strongly Interacting Massive Particles (SIMPs), a correct thermal average is important. These SIMP mechanism can exist in models with multiple scalars or in a strongly coupled gauge theory where the Weiss-Zumino-Witten term generates the 3-to-2 interaction. Particularly, a two-scalar model with a residual Z_5 discrete symmetry and a model with a dark QCD sector can produce parameter spaces where the SIMP paradigm is realized. In both models, the importance of vector mediators in the SIMP mechanism, and how these vector mediators affect the thermal average, is discussed.

Presentation type

Parallel talk

Authors: NATALE, Alexander (Korea Institute for Advanced Study); KO, pyungwon (Korea Inst. for Advanced Study (KIAS)); LEE, Hyun Min (CAU - Chung-Ang University (KR)); Mr CHOI, Soo-Min (Chung Ang University); KANG, Yoo-Jin (Chung Ang University)

Presenter: NATALE, Alexander (Korea Institute for Advanced Study)

Session Classification: Parallel III

Contribution ID: **70**   Type: **Parallel talk**

Gravitational waves from cosmological domain walls in the Standard Model with nonrenormalizable operators

Thursday 22 June 2017 17:30 (15 minutes)

The study of the renormalization group improved effective potential of the Standard Model has revealed the existence of a local maximum at field strengths of the order of 10^10 GeV. If the Standard Model is valid for very high energy scales, then the possibility of the production of cosmological domain walls in the early Universe occurs.

We investigated the dynamics of networks of domain walls using lattice simulations. In our previous research we assumed that the Standard Model is valid up to the Planck scale. Recently we studied scenario in which the Standard Model breaks down at much lower scales using the formalism of Effective Field Theory. A nonrenormalizable operator was included in the Lagrangian density and its impact on evolution of networks of domain walls was investigated. Our recent results will be presented.

Presentation type

Parallel talk

Author: KRAJEWSKI, Tomasz (University of Warsaw)

Co-authors: LALAK, Zygmunt (Faculty of Physics);   LEWICKI, Marek (University of Warsaw (PL));   Mr OLSZEWSKI, Paweł (University of Warsaw)

Presenter: KRAJEWSKI, Tomasz (University of Warsaw)

Session Classification: Parallel I

Contribution ID: **72**   Type: **Parallel talk**

Rethinking Time at the Big Bang

Thursday 22 June 2017 14:30 (15 minutes)

I will discuss two ways in which revising the notion of time at the Big Bang will lead to testable predictions. I will then contrast these predictions against standard ΛCDM scenario, and cosmological observations. The first model, Holographic Cosmology, is based on a 3d quantum field theory without time, suggesting the possibility of nonperturbative effects on large angles (l<30) in the CMB sky. The second model, Periodic Time Cosmology, relates (past and future) cosmic expansion history to the spectrum of cosmic perturbations by demanding consistency with an exactly periodic notion of time. Comparing this model to observations leads to surprising implications for dark energy and/or neutrino masses in cosmology.

Presentation type

Parallel talk

Author: Ms GOULD, Elizabeth (Perimeter Institute for Theoretical Physics and the University of Waterloo)

Co-author: Dr AFSHORDI, Niayesh (Perimeter Institute for Theoretical Physics and the University of Waterloo)

Presenter: Ms GOULD, Elizabeth (Perimeter Institute for Theoretical Physics and the University of Waterloo)

Session Classification: Parallel II

Contribution ID: **73**   Type: **Parallel talk**

Can cosmological relaxation be reconciled with high reheating temperature?

Tuesday 20 June 2017 17:45 (15 minutes)

We propose a new scenario of cosmological relaxation compatible with reheating temperature higher than the electroweak scale. Cosmological relaxation is a novel solution to the hierarchy problem, which is proposed recently. However, the barrier potential, that settles the relaxion down to realize the correct electroweak scale, vanishes at high temperature where the electroweak symmetry restores. Therefore, the conventional cosmological relaxation scenario is not compatible with high reheating temperature, which is often requested in other cosmological context, e.g. baryogenesis. We tackle this issue by introducing an anomalous coupling of the relaxion with a hidden U(1) gauge field. In this case, the moving relaxion induces an explosive production of the coupled gauge field via tachyonic instability and undergoes significant friction as a backreaction. We show that this efficiently suppresses the excursion of relaxion after reheating. In addition, the introduction of the coupling to a hidden gauge field can mitigate many experimental and observational constraints present in the conventional scenario. Instead, the amount of produced gauge bosons is subject to cosmological constraints. We show the viable parameter region for our scenario and the testability.

Presentation type

Parallel talk

Author: Dr SEKIGUCHI, Toyokazu (IBS-CTPU)

Co-authors: Dr KIM, Hyungjin (KAIST, IBS-CTPU);   CHOI, Kiwoon (KAIST)

Presenter: Dr SEKIGUCHI, Toyokazu (IBS-CTPU)

Session Classification: Parallel I

Contribution ID: **74**　　　　　　　　　　　　　　　　Type: **Parallel talk**

Probing inflationary primordial black holes for the LIGO gravitational wave events

Thursday 22 June 2017 17:15 (15 minutes)

Primordial black holes (PBHs) are one of the candidates to explain the gravitational wave (GW) signals observed by the LIGO detectors. Among several phenomena in the early Universe, cosmic inflation is a major example to generate PBHs from large primordial density perturbations. In this talk, we discuss the possibility to interpret the observed GW events as mergers of PBHs which are produced by cosmic inflation. In this case, the primordial curvature perturbation should be large enough to generate a sizable amount of PBHs, and thus we have several other probes to test this scenario. We point out that the current pulsar timing array (PTA) experiments already put severe constraints on GWs generated via the second-order effects, and that the observation of the cosmic microwave background (CMB) puts severe restriction on its small-scale distortions, such as ¥mu-distortion. In particular, for simple inflation models, it is found that the scalar power spectrum should have a sharp peak at k ˜ 10ˆ6 Mpcˆ-1 to fulfill the required abundance of PBHs while evading constraints from the PTA experiments and the mu-distortion.

Presentation type

Parallel talk

Author:　Dr MUKAIDA, Kyohei (Kavli IPMU)

Presenter:　Dr MUKAIDA, Kyohei (Kavli IPMU)

Session Classification:　Parallel I

Contribution ID: **75**   Type: **Parallel talk**

Breit-Wigner resonance in cosmology

Thursday 22 June 2017 17:30 (15 minutes)

Motivated by the possibility of enhancing dark-matter self-interaction cross-section σ_{self}, we have revisited the issue of dark matter annihilation through a Breit-Wigner resonance.

For instance the resonance-enhanced early-universe annihilation cross section implies so small cross section for elastic scattering between dark matter and the Standard Model, that effects of early kinetic decoupling of dark matter are crucial for correct prediction of relic dark matter abundance. Also the standard Breit-Wigner parametrization of a resonance propagator must be corrected by including momentum dependence of the resonance width. It has been shown that when coupling between the resonance and the dark matter is not negligible then consequences of momentum dependent width are important and can not be neglected.

Model independent discussion is illustrated within a theory of Abelian vector dark matter. The model assumes extra $U(1)$ symmetry group factor and an additional complex Higgs field needed to generate a mass for the dark vector boson, which provides an extra neutral Higgs boson h_2.

If $2M_{DM} \approx M_{h_2}$ then σ_{self} could be amplified by s-channel resonance and also the observed dark matter abundance could be properly reproduced.

The momentum dependence of the scalar resonance introduces a gauge dependance of annihilation amplitudes. Also unitarity constraints might be jeopardized. \bg{Both effects have been discussed. It turns out that for the s-channel resonance enhancement, the Fermi-LAT data favor heavy dark matter with no substantial enhancement of

σ_{self}.

Presentation type

Parallel talk

Author: GRZADKOWSKI, Bohdan (University of Warsaw)

Co-author: DUCH, Mateusz (University of Warsaw)

Presenter: GRZADKOWSKI, Bohdan (University of Warsaw)

Session Classification: Parallel III

Contribution ID: **77**   Type: **Parallel talk**

Testing the WIMP paradigm at future experiments

Thursday 22 June 2017 15:00 (15 minutes)

We discuss the capability of next generation of Direct Detection experiments, for example XENON1T and LZ, as well as of future runs of LHC and possible future accelerators, of fully probing the WIMP paradigm. We will indeed show, in some simple relevant cases of study, that the projected sensitivities of these experiments can fully cover the parameter space corresponding to the correct DM relic density, according the Standard WIMP mechanism.

Presentation type

Parallel talk

Author: ARCADI, Giorgio (MPIK Heidelberg)

Presenter: ARCADI, Giorgio (MPIK Heidelberg)

Session Classification: Parallel III

Contribution ID: **81**   Type: **Parallel talk**

Quenching preheating by light fields

Thursday 22 June 2017 14:30 (15 minutes)

Talk shall describe the role of light fields indirectly coupled to background during preheating. In our previous study, when we considered massless background field, we proved that non-perturbative production of states associated with such fields can be sizeable due to quantum corrections. Talk will extend this study considering massive inflaton within the interacting field formalism. It helps us with the secular growth problem observed before. Possible ways of quenching the process of preheating and analogies with instant preheating shall be presented.

Presentation type

Parallel talk

Author: CZERWIŃSKA, Olga (University od Warsaw)

Co-authors: LALAK, Zygmunt Adam (University of Warsaw (PL)); ENOMOTO, Seishi

Presenter: CZERWIŃSKA, Olga (University od Warsaw)

Session Classification: Parallel I

Contribution ID: **82** Type: **Parallel talk**

On the robustness of renormalized Higgs inflation

Thursday 22 June 2017 15:30 (15 minutes)

I will discuss the cosmological consequences of higher-dimensional operators respecting the asymptotic symmetries of the tree-level Higgs inflation action. The main contribution of these operators to the renormalization group enhanced potential is localized in a compact field range, whose upper limit is close to the end of inflation. The spectrum of primordial fluctuations in the so-called universal regime turns out to be almost insensitive to radiative corrections and in excellent agreement with the latest Planck/BICEP2 results. However, higher-dimensional operators can play an important role in critical Higgs inflation scenarios containing a quasi-inflection point along the inflationary trajectory. The interplay of radiative corrections with this quasi-inflection point may translate into a sizable modification of the inflationary observables.

Presentation type

Parallel talk

Author: Dr RUBIO, Javier (ITP Heidelberg)

Presenter: Dr RUBIO, Javier (ITP Heidelberg)

Session Classification: Parallel I

Contribution ID: **83**   Type: **Parallel talk**

Lepton Number Violation and the Baryon Asymmetry of the Universe

Tuesday 20 June 2017 14:30 (15 minutes)

Neutrinoless double beta decay, lepton number violating collider processes and the Baryon Asymmetry of the Universe (BAU) are intimately related. In particular lepton number violating processes at low energies in combination with sphaleron transitions will typically erase any pre-existing baryon asymmetry of the Universe. In this contribution we briefly review the tight connection between neutrinoless double beta decay, lepton number violating processes at the LHC and constraints from successful baryogenesis. We argue that far-reaching conclusions can be drawn unless the baryon asymmetry is stabilized via some newly introduced mechanism.

Presentation type

Parallel talk

Authors: PÄS, Heinrich (TU Dortmund);   HARZ, Julia (DESY Hamburg);   Dr DEPPISCH, Frank (University College London);   HIRSCH, Martin (IFIC/CSIC, University of Valencia);   HUANG, Wei-Chih (Technische Universität Dortmund)

Presenter: PÄS, Heinrich (TU Dortmund)

Session Classification: Parallel III

Contribution ID: **85** Type: **Parallel talk**

Measuring Non-Gaussianity in Galaxy Surveys: A New Window on the Universe

Tuesday 20 June 2017 14:45 (15 minutes)

Most information about cosmological parameters and the inflationary universe comes from the CMB, however with the advent of galaxy surveys such as the DES and Euclid further constraints can be obtained from LSS. The gravitational collapse of matter is a complex non-linear process, and is typically modelled numerically with N-body codes. Since N-body codes are expensive to run many have proposed fast dark matter codes which are benchmarked by their ability to reproduce the matter power spectrum. The accuracy of these codes can be further tested by looking at higher-order statistics, and in my talk I will present a fast methodology (MODAL-LSS) to calculate the full bispectrum. As a test case we compared a number of fast dark matter and halo-finder codes with GADGET-2 over a wide redshift range. This will serve as an important diagnostic tool for dark matter/halo mock catalogs. We will also apply it to galaxy survey data to break parameter degeneracies and search for primordial non-Gaussianity.

Presentation type

Parallel talk

Author: Mr HUNG, Johnathan (DAMTP, Cambridge)

Co-authors: Dr FERGUSSON, James (DAMTP, Cambridge); Prof. SHELLARD, Paul (DAMTP, Cambridge)

Presenter: Mr HUNG, Johnathan (DAMTP, Cambridge)

Session Classification: Parallel I

Contribution ID: **89** Type: **Parallel talk**

GUT inspired SUSY scenarios: Dark Matter versus LHC searches.

Thursday 22 June 2017 16:30 (15 minutes)

We expand the GUT scenarios studied in in arXiv:1511.06205 with an analysis of the Pati-Salam (PS) group. The new SUSY scenarios that can be directly compared with our previous SO(10) analysis. Regarding neutralino relic density, the PS group can fit WMAP bounds in areas where gluinos and stops can coannihilate with the neutralino. We also investigate whether the models can predict a significant SUSY contribution to the muon g-2. We find that future LHC searches are able to constrain the different SUSY GUT scenarios in a complementary way with dark matter searches. This work is mainly based in work in preparation following a similar scheme as arXiv:1511.06205, including the new CMS updates on the searches of SUSY particles.

Presentation type

Parallel talk

Authors: GOMEZ, Mario E. (Universidad de Huelva); LOLA, Magda (University of Patras (GR)); RUIZ DE AUSTRI, Roberto (Instituto de Fisica Corpuscular (ES)); SHAFI, qaisar (university of delaware)

Presenter: GOMEZ, Mario E. (Universidad de Huelva)

Session Classification: Parallel III

Contribution ID: **91**   Type: **Parallel talk**

On the vacuum structure of F-theory compactifications

Thursday 22 June 2017 15:45 (15 minutes)

We study moduli stabilization of F-theory compactified on an elliptically fibered Calabi-Yau four-fold arising from open mirror symmetry prescription including the brane deformation.
We focus on a particular background and utilize associated fourfold periods to determine the properties of resulting 4D $calN = 1$ effective theory for moduli fields. We find that the F-theory vacua has a remarkable structure even before taking into account the Kähler moduli stabilization.

Presentation type

Parallel talk

Authors: OTSUKA, Hajime; Dr HONMA, Yoshinori

Presenter: OTSUKA, Hajime

Session Classification: Parallel II

Contribution ID: **92**   Type: **Parallel talk**

Baryon Asymmetry and Gravitational Waves from Pseudoscalar Inflation

Thursday 22 June 2017 16:30 (15 minutes)

In models of inflation driven by an axion-like pseudoscalar field, the inflaton, a, may be coupled to the standard model hypercharge via a Chern-Simons-type interaction, $L \supset a\,F\tilde{F}$. This coupling results in explosive gauge field production during inflation, which has two interesting phenomenological consequences: (1) The primordial hypermagnetic field is maximally helical and, thus, capable of sourcing the generation of nonzero baryon number (via the standard model chiral anomaly) around the electroweak phase transition. (2) The gauge field production during inflation feeds back into the spectra of primordial perturbations, which, among other things, leaves an imprint in the stochastic background of gravitational waves (GWs). In this talk, I am going to discuss the correlation between these two phenomena. I will (a) present an updated investigation of baryogenesis via hypermagnetic fields and (b) describe the corresponding implications for GWs. As it turns out, successful baryogenesis is indeed feasible – provided the axion couples to the gauge fields with a certain strength. Moreover, in the case of successful baryogenesis, one expects a characteristic peak in the GW spectrum at high frequencies.

Presentation type

Parallel talk

Author: Dr SCHMITZ, Kai (Max Planck Institute for Nuclear Physics (MPIK))

Co-authors: Mr JIMENEZ, Daniel (MPIK Heidelberg);   KAMADA, Kohei (Arizona State University); Dr XU, Xun-Jie (MPIK Heidelberg)

Presenter: Dr SCHMITZ, Kai (Max Planck Institute for Nuclear Physics (MPIK))

Session Classification: Parallel I

Contribution ID: **94**   Type: **Parallel talk**

The minimal fermionic model of electroweak baryogenesis

Tuesday 20 June 2017 15:00 (15 minutes)

We present the minimal purely fermionic model of EWBG. A strong first order phase transition is obtained from fermion-induced radiative corrections on the Higgs potential, while the baryon asymmetry is obtained from asymmetric scattering of the same set of fermions on the bubble wall. The model introduces no additional tuning below the TeV scale: all new fields are stabilized at the electroweak scale by chiral symmetries. Most of the model's parameter space is going to be decisively tested at LHC by multilepton searches.

Presentation type

Parallel talk

Author: EGANA-UGRINOVIC, Daniel (Stony Brook University)

Presenter: EGANA-UGRINOVIC, Daniel (Stony Brook University)

Session Classification: Parallel III

Contribution ID: **95**   Type: **Parallel talk**

Multi-field alpha attractor in fundamental theory

Tuesday 20 June 2017 15:45 (15 minutes)

We discuss the possible realizations of α-attractor in Maximal supersymmetric theory/string theory/M-theory. The α-attractor is realized with the Kahler potential $K = -3\alpha \log(T + \bar{T})$, which describes hyperbolic geometry. The tensor-to-scalar ratio r in this model is proportional to α. It is known that the 4-dimesional supersymmetric truncation of maximal supergravity/ string/ M-theory can have multiple moduli fields with $\alpha \leq 1$. Then, we naively expect $r \leq 0.04 \left(\frac{55}{N}\right)^2$.

In this talk, we discuss the possibility to realize r larger than the naive expectation with using multi-α-attractor, which is testable by near-future B-mode experiments. We consider the dynamically realized constraints on moduli space, which effectively realize the large α direction. We also show that the fibre inflation in string theory can be understood as the multi field α-attractor with a dynamical constraint.

Presentation type

Parallel talk

Author: YAMADA, Yusuke (Stanford University)

Presenter: YAMADA, Yusuke (Stanford University)

Session Classification: Parallel II

Contribution ID: **96** Type: **Parallel talk**

Inflation with dissipation and metastability

Thursday 22 June 2017 15:00 (15 minutes)

We analyze two models in which primordial inflation has non-standard features. In the first model we study the evolution of a system in which the inflaton is slowed down by dissipation of energy into gauge bosons instead of the usual Hubble friction: in particular we study the conditions of the onset of such a scenario from a static field configuration, its evolution and we mention some features of the treatment of perturbations. In the second model we consider the case of a metastable vacuum which sources exponential inflation and we show that the presence of scalar-tensor gravity can induce a power-law expansion which allows successful tunneling. We also analyze the case in which such a metastable vacuum might be in the Standard Model Higgs potential.

Presentation type

Parallel talk

Author: Prof. NOTARI, Alessio (Universitat de Barcelona)

Presenter: Prof. NOTARI, Alessio (Universitat de Barcelona)

Session Classification: Parallel I

Contribution ID: **97**   Type: **Parallel talk**

Update on R-Parity violation at the LHC

Tuesday 20 June 2017 15:45 (15 minutes)

We examine in detail the current LHC coverage of signatures arising from the R-Parity-violating Minimal Supersymmetric Standard Model. We take into account all experimental analyses for prompt signatures within this context, both explicit searches for RPV signals as well as other analyses containing applicable experimental signatures. These are contrasted with well-motivated phenomenological scenarios whereby we take the R-Parity-violating CMSSM as a guideline, imposing both Higgs and flavour constraints. We find that the analyses performed by the experimental collaborations provide very good coverage of relevant signatures. Finally, we address the question of whether R-Parity violation can ease the stringent collider constraints on models with CMSSM boundary conditions. We find that virtually all R-Parity-violating CMSSM models are either more strongly constrained or similarly constrained in comparison to the R-Parity-conserving CMSSM.

Presentation type

Parallel talk

Authors: DERCKS, NÉ SCHMEIER, Daniel; DREINER, Herbi (Bonn University); Dr KRAUSS, Manuel E. (Bonn University); OPFERKUCH, Toby (Universität Bonn); REINERT, Annika (BCTP)

Presenter: Dr KRAUSS, Manuel E. (Bonn University)

Session Classification: Parallel IV

Contribution ID: **98**   Type: **Parallel talk**

Effective field theory of inflation in Lifshitz regime of gravity

Thursday 22 June 2017 15:15 (15 minutes)

A violation of the diffeomorphism (Diff) invariance generically induces an additional degree of freedom. In Horava-Lifshitz (HL) gravity, where the 4D Diff invariance is broken into the foliation preserving Diff, there appears a scalar degree of freedom in the gravity sector, Khronon, which describes the degree of freedom for the time foliation. One may naively expect that during inflation, we need to solve a mixed system with the inflaton and Khronon. By contrast, we find that in the non-projectable version of HL gravity, Khronon acquires a mass which is much larger than the Hubble scale and is decoupled from the adiabatic perturbation, which is sourced by the inflaton. As a result, we obtain a robust prediction for the spectrum of the adiabatic perturbation generated in the Lifshitz regime of gravity. We also discuss a possible imprint of the Lorentz violation in the early universe.

Presentation type

Parallel talk

Author: Dr URAKAWA, Yuko (Nagoya university)

Co-authors: Dr SIBIRYAKOV, Sergey (CERN);   Mr ARAI, Shun (Nagoya university)

Presenter: Dr URAKAWA, Yuko (Nagoya university)

Session Classification: Parallel I

Contribution ID: **100**   Type: **Parallel talk**

Primordial Black Holes from Critical Higgs Inflation

Tuesday 20 June 2017 16:30 (15 minutes)

Primordial Black Holes (PBH) arise naturally from high peaks in the curvature power spectrum of near-inflection-point single-field inflation, and could constitute today the dominant component of the dark matter in the universe. In this talk we explore the possibility that a broad spectrum of PBH is formed in models of Critical Higgs Inflation (CHI), where the quasi-inflection point is related to the near-critical value of the RGE running of both the Higgs self-coupling $\lambda(\mu)$ and its non-minimal coupling to gravity $\xi(\mu)$. The peak in the matter spectrum arises at sufficiently small scales that it passes all the observational constraints from the cosmic microwave background (CMB) and large scale structure (LSS) observations. The model predicts a lognormal PBH broad-mass distribution peaked at $\mu_{\mathrm{PBH}} = 4 \times 10^{-11} \, M_{\odot}$, with dispersion $\sigma_{\mathrm{PBH}} = 1.4$, which is consistent with the present constraints on PBH and may eventually be discovered with microlensing experiments. The stochastic background of gravitational waves coming from the unresolved black-hole-binary (BHB) mergings could also be detected by LISA or PTA. Furthermore, the parameters of the CHI model correspond to a Standard Model Higgs couplings that are consistent, within 2σ, with those measured at the LHC. Future measurements of the PBH mass spectrum will allow us to determine the SM couplings of the Higgs and their running from the electroweak scale to almost the Planck scale.

Presentation type

Parallel talk

Authors: Prof. GARCIA-BELLIDO, Juan (Universidad Autonoma de Madrid); Prof. RUIZ MORALES, Ester (Universidad Politecnica de Madrid); EZQUIAGA, Jose Maria (Universidad Autonoma de Madrid)

Presenter: Prof. GARCIA-BELLIDO, Juan (Universidad Autonoma de Madrid)

Session Classification: Parallel I

Contribution ID: **101**   Type: **Parallel talk**

Exploring Extended Scalar Sectors with Di–Higgs Signals: A Higgs EFT Perspective

Tuesday 20 June 2017 17:00 (15 minutes)

We consider extended scalar sectors of the Standard Model as ultraviolet–complete motivations for studying the effective Higgs self–interaction operators of the Standard Model effective field theory. We investigate all motivated heavy scalar models which generate the dimension–6 effective operator, $|H|^6$, at tree level and proceed to identify the full set of tree–level dimension–six operators by integrating out the heavy scalars. Next we perform global fits to constrain relevant Wilson coefficients from the LHC single Higgs measurements as well as the electroweak oblique parameters S and T. In order to determine the extent to which the Wilson coefficient of the $|H|^6$ operator may be constrained at a future 100 TeV collider we study the di–Higgs process and simulate its signatures at the proposed collider. We explore future sensitivity of the Higgs self–interaction operators at the future collider and project it onto the Higgs potential parameters of the extended scalar sectors to identify the discovery potentials in future.

Presentation type

Parallel talk

Authors: CORBETT, Tyler (University of Melbourne); YU, Jiang-Hao (UMass Amherst); JOGLEKAR, Aniket (University of Chicago); LI, Hao-Lin (UMass Amherst)

Presenter: CORBETT, Tyler (University of Melbourne)

Session Classification: Parallel IV

Contribution ID: **104** Type: **Parallel talk**

A model of loop induced Z' coupling explaining $B \to K^{(*)}\ell^+\ell^-$ anomalies and dark matter

Thursday 22 June 2017 15:00 (15 minutes)

In this talk, we discuss a scenario to generate flavor violating Z' interactions at one loop level, by introducing $U(1)_{\mu-\tau}$(-like) gauge symmetry, extra vectorlike quark doublets Q'_a and singlet scalar χ. Both Q'_a and χ are charged under $U(1)_{\mu-\tau}$ and carry odd dark Z_2 parity. Assuming that χ is the dark matter (DM) of the universe and imposing various constraints from dark matter search, flavor physics and collider search for Q'_a, one can show that radiative corrections to $b \to s Z'^* \to s\ell^+\ell^-$ involving Q'_a and χ can induce $\Delta C_9 \sim -1$ which can resolve the LHCb anomalies related with $B \to K^{(*)}\ell^+\ell^-$. Therefore both DM and B physics anomalies could be accommodated in the model.

Presentation type

Parallel talk

Authors: Dr NOMURA, Takaaki (KIAS); Prof. KO, P. (KIAS); Dr OKADA, Hiroshi (NCTS, Taiwan)

Presenter: Dr NOMURA, Takaaki (KIAS)

Session Classification: Parallel IV

Contribution ID: **106**   Type: **Parallel talk**

Predictive 2HDM as a low energy effective theory

Thursday 22 June 2017 16:45 (15 minutes)

Two-Higgs-doublet models (2HDM), {\em per se}, cannot predict the
values of the nonstandard scalar masses (m_H, m_A and m_+).
However, assuming that a type-II 2HDM arises as an effective theory at
the electroweak scale from a supersymmetric ultraviolet (UV)
completion, where the quartic couplings of the 2HDM potential are
related to the gauge couplings of the Standard Model (SM), the ever
growing LHC Higgs boson data allow the {\em hitherto} unknown
nonstandard scalar masses to be almost uniquely determined from just
two input parameters: the supersymmetry breaking scale and $\tan\beta$
(the ratio of the two vacuum expectation values). We highlight some of
the salient features of this framework not emphasized previously in
the context of the Minimal Supersymmetric Standard Model (MSSM), and
make specific predictions on the masses and branching ratios of the
nonstandard scalars which can be probed by targeted experimental
searches. Our framework is valid even if the UV theory is not
supersymmetric but something else but unambiguously predicts the
scalar quartic couplings at the high scale.

Presentation type

Parallel talk

Authors: Dr SAHA, Ipsita (INFN, Roma 1); BHATTACHARYYA, Gautam (Saha Institute of Nuclear
Physics); DAS, Dipankar (Saha Institute of Nuclear Physics (IN)); PEREZ, Michael (University of Flor-
dia); SANTAMARIA, Arcadi; VIVES GARCIA, Oscar Manuel (Univ. of Valencia and CSIC (ES))

Presenter: Dr SAHA, Ipsita (INFN, Roma 1)

Session Classification: Parallel IV

Contribution ID: **107**   Type: **Parallel talk**

Point Particle Effective Actions

Thursday 22 June 2017 16:45 (15 minutes)

Nature is full of examples pairings of small but massive compact objects (of linear size R) interacting with and controlling the motions of their neighbours over within a much larger surrounding domain (of size a $\gg$ R). For such systems familiar arguments (such as the multipole expansion) show that only a few features of the compact object are relevant to understanding motions in their larger environment.

Effective field theories are the natural language for exploiting this kind of simplicity, though these are often only formulated in a second-quantized language in which all species of particles are represented by their respective quantum field. We explore how to formulate such effective theories using instead a first-quantized language for the heavy compact object, reserving the second-quantized language for the lighter particles with which it interacts. In this situation all information about the source enters observables through the boundary conditions that it implies for fields at the origin; boundary conditions that are completely determined by the source's effective action. Relating these boundary conditions to the source action takes the guesswork out of small-R boundary conditions, and shows in particular why linear boundary conditions are so generic at low energies. Besides this they show how to handle singular potentials (like V (r) $\propto$ rˆp with p $\leq$ −2) unambiguously, despite the generic absence in these cases [7] of smooth solutions at the origin. Our formalism has various applications, for instance corrections to Coulomb bound energy levels.

Presentation type

Parallel talk

Authors: RUMMEL, Markus; BURGESS, Clifford (High Energy Physics Group - McGill University); Mr ZALAVARI, Laszlo (McMaster University/Perimeter Institute); Mr HAYMAN, Peter (McMaster University/Perimeter Institute)

Presenter: RUMMEL, Markus

Session Classification: Parallel II

Contribution ID: **108**   Type: **Parallel talk**

Non-thermal gravitino production after large-field inflation

Thursday 22 June 2017 15:45 (15 minutes)

We revisit the non-thermal gravitino production at the (p)reheating stage after inflation. Particular attention is paid to large-field inflation models with a $\mathbb{Z}_2$ symmetry, for which the previous perturbative analysis is inapplicable; and inflation models with a stabilizer superfield, which have not been studied non-perturbatively. It is found that in single-superfield inflation models (without the stabilizer field), non-thermal production of the transverse gravitino can be cosmologically problematic while the abundance of the longitudinal gravitino is small enough. In multi-superfield inflation models (with the stabilizer field), production of the transverse and longitudinal gravitinos is significantly suppressed, and they are cosmologically harmless. If time remains, gravitino production in the case with (orthogonal) nilpotent fields is also discussed.

Presentation type

Parallel talk

Authors: Mr EMA, Yohei (The University of Tokyo); Dr MUKAIDA, Kyohei (Kavli IPMU); Prof. NAKAYAMA, Kazunori (The University of Tokyo); Dr TERADA, Takahiro (KEK)

Presenter: Dr TERADA, Takahiro (KEK)

Session Classification: Parallel IV

Contribution ID: **111**   Type: **Parallel talk**

Cosmological Imprints of the Ultra-Large Scale Universe

Tuesday 20 June 2017 15:00 (15 minutes)

Inflation provides a dynamical mechanism to seed density fluctuations that eventually collapse to form all of the structure in the observable universe. However, microphysical theories of inflation often predict that on scales much larger than our present horizon, the universe may be extremely inhomogeneous.

One possible source of such ultra-large scale structure (ULSS) is from the initial conditions preceding the inflationary phase. Using numerical relativity, I will discuss the ultra-large scale structure arising from initial fluctuations in the inflaton, in particular the contribution to the CMB quadrupole (known as the Grishuk-Zel'dovich effect). For large fluctuations, the resulting distribution is strongly distorted from the Gaussian form usually assumed in the literature. Surprisingly, we find that this leads to significantly weaker constraints on large amplitude initial fluctuations than would be obtained for a Gaussian contribution from the ULSS.

Presentation type

Parallel talk

Author: Dr BRADEN, Jonathan (University College London)

Co-authors: Prof. PEIRIS, Hiranya (University College London and Oskar Klein Center); Prof. JOHNSON, Matt (York University and Perimeter Institute); Prof. AGUIRRE, Anthony (UC Santa Cruz)

Presenter: Dr BRADEN, Jonathan (University College London)

Session Classification: Parallel I

Contribution ID: **112**   Type: **Parallel talk**

Tests of Gravity Using Supermassive Black Holes

Tuesday 20 June 2017 17:15 (15 minutes)

Modified gravity models with screening mechanisms, such as galileons, are prime dark energy candidates but they are notoriously difficult to test. In this talk, I will discuss a new scenario for testing galileons. Black holes do not feel the galileon force and, as a consequence, the supermassive black holes in galaxies falling into clusters should be offset from the galactic centre by a significant amount. I will show how this can already be used to place new constraints using nearby clusters, and how future surveys could constrain these theories to new levels.

Presentation type

Parallel talk

Author: SAKSTEIN, Jeremy (University of Pennsylvania)

Presenter: SAKSTEIN, Jeremy (University of Pennsylvania)

Session Classification: Parallel I

Contribution ID: **113** Type: **Parallel talk**

Primordial black holes in multi-field inflation models

Tuesday 20 June 2017 17:00 (15 minutes)

We consider formation of primordial black holes (PBHs) in multi-field inflation models (double inflation or axion curvaton model) and discuss the possibility that produced PBHs account for the observed gravitational events by LIGO or all dark matter of the universe. We point out that the current pulsar timing array (PTA) experiments already put severe constraints on gravitational waves generated via the second-order effects. It is shown that the multi-field inflation models can produce PBHs with sharp mass spectrum and evade the PTA constraint. Furthermore, PBHs produced in double inflation can account for all dark matter.

Presentation type

Parallel talk

Author: KAWASAKI, Masahiro (The University of Tokyo)

Presenter: KAWASAKI, Masahiro (The University of Tokyo)

Session Classification: Parallel I

Contribution ID: **114**   Type: **Parallel talk**

Effect of CP violation in the singlet-doublet dark matter model

Thursday 22 June 2017 17:15 (15 minutes)

We revisit the singlet-doublet dark matter model with a special emphasis on the CP violation effect on the dark matter phenomenology. The CP violation in the dark sector induces a pseudoscalar interaction of a fermionic dark matter candidate with the SM Higgs boson. The pseudoscalar interaction helps the dark matter candidate evade the strong constraints from the dark matter direct detection experiments. We show that the model can explain the measured value of the dark matter density even if dark matter direct detection experiments do not observe any signal. We also show that the electron electric dipole moment is an important complement to the direct detection for testing this model. Its value is smaller than the current upper bound but within the reach of future experiments.

Presentation type

Parallel talk

Author: Dr ABE, Tomohiro (Nagoya University)

Presenter: Dr ABE, Tomohiro (Nagoya University)

Session Classification: Parallel III

Contribution ID: **115**   Type: **Parallel talk**

Does the detection of primordial gravitational waves exclude low energy inflation?

Thursday 22 June 2017 16:45 (15 minutes)

We show that a detectable tensor-to-scalar ratio (r≥0.001) on the CMB scale can be generated even during extremely low energy inflation which saturates the BBN bound $\rho=(30MeV)^4$. The source of the gravitational waves is not quantum fluctuations of graviton but those of SU(2) gauge fields, energetically supported by coupled axion fields. The curvature perturbation, the backreaction effect and the validity of perturbative treatment are carefully checked. Our result indicates that measuring r alone does not immediately fix the inflationary energy scale.

Presentation type

Parallel talk

Author: Dr FUJITA, Tomohiro (Kyoto Univ.)

Presenter: Dr FUJITA, Tomohiro (Kyoto Univ.)

Session Classification: Parallel I

Contribution ID: **116**   Type: **Parallel talk**

Constant-roll inflation

Thursday 22 June 2017 14:45 (15 minutes)

We propose a phenomenological class of inflationary models in which the assumption of inflaton slow-roll is replaced by more general, constant-roll condition. We derive general exact solution for the inflaton potential and dynamics, and show that there exists parameter region that satisfies the latest observational constraint on the scalar spectral index and the tensor-to-scalar ratio. We also consider its generalization to the case of $f(R)$ gravity. We provide a simple constant-roll condition defined in the original, Jordan frame, obtain exact expressions for the scalaron potential in the Einstein frame, for the function $f(R)$ in the parametric form and for inflationary dynamics, and show the model has observationally viable parameter region.

Presentation type

Parallel talk

Author: Dr MOTOHASHI, Hayato (IFIC/ CSIC-University of Valencia)

Co-authors: Prof. STAROBINSKY, Alexei (Landau Institute for Theoretical Physics); Prof. YOKOYAMA, Jun'ichi (The University of Tokyo)

Presenter: Dr MOTOHASHI, Hayato (IFIC/ CSIC-University of Valencia)

Session Classification: Parallel I

Contribution ID: **117** Type: **Parallel talk**

Diagnosing new physics in $b \to s$ transitions

Thursday 22 June 2017 14:45 (15 minutes)

Several anomalies in $b \to s$ transitions have been recently reported
by the LHCb collaboration. These include discrepancies with the Standard Model predictions in some angular observables and branching ratios and three intriguing hints for lepton universality violation in the R_K and R_{K^*} ratios. We study the implications of these results using a model-independent approach based on the Standard Model Effective Field Theory (SMEFT), in which the new physics effects are encoded in the coefficients of gauge-invariant dimension-six operators. In particular, we determine the required SMEFT coefficients at low and high energies and identify valid new physics scenarios. With the help of the computer code DsixTools, we also study indirect constraints due to renormalization group effects.

Presentation type

Parallel talk

Author: VICENTE, Avelino (IFIC - CSIC / U. Valencia)

Presenter: VICENTE, Avelino (IFIC - CSIC / U. Valencia)

Session Classification: Parallel IV

Contribution ID: **118**   Type: **Parallel talk**

The LUX-ZEPLIN (LZ) Experiment

Tuesday 20 June 2017 17:15 (15 minutes)

The identification of dark matter is presently one of the greatest challenges in science, fundamental to our understanding of the Universe. Weakly Interacting Massive Particles (WIMPs) that arise naturally in several models of physics beyond the Standard Model are compelling candidates for dark matter.

The LUX-ZEPLIN (LZ) collaboration is constructing a massive dark matter detector, to be installed at the 4850 level of the Sanford Underground Research Facility in Lead, South Dakota. The LZ detector will be instrumented as a dual-phase liquid xenon time projection chamber, featuring 5.6 tons of target material in the fiducial region (from a total of 10 tons of xenon). The experiment aims at a baseline sensitivity of 2.3E-48 cm2 for a 40 GeV/c2 WIMP mass after 1000 live-days of operation. This represents an improvement of a factor of 50 relative to to the current best result set by LUX.

In this talk, we will present an overview of the LZ detector design, planned experimental program (including physics beyond WIMP searches), current project status and timeline.

Presentation type

Parallel talk

Author: Dr NEVES, Francisco (LIP - Coimbra)

Co-author: THE LZ COLLABORATION

Presenter: Dr NEVES, Francisco (LIP - Coimbra)

Session Classification: Parallel III

Contribution ID: **123**   Type: **Parallel talk**

How light a higgsino or a wino dark matter can become in a compressed scenario of MSSM

Thursday 22 June 2017 15:15 (15 minutes)

Higgsinos and Wino have strong motivations for being
Dark Matter (DM) candidates in supersymmetry, but their annihilation cross sections are quite large.
For thermal generation and a single component DM setup
the higgsinos or wino may have masses of around 1 or 2-3 TeV respectively. For such DM candidates,
a small amount of slepton coannihilation may decrease the effective DM annihilation cross section.
This, in turn reduces the lower limit of the relic density satisfied
DM mass by more than 50\%.
Almost a similar degree of reduction of the same limit is also seen for
squark coannihilations. However, on the contrary, for
nearly mass-degenerate squarks and higgsino
DM, the associated coannihilations may decrease
the relic density, thus extending the region of right abundance
towards higher DM masses.
We also compute the direct and indirect detection signals.
Here, because of the quasi-mass degeneracy of the squarks and the
LSP, we
come across a situation where squark exchange diagrams
may contribute significantly or more strongly than the
Higgs exchange contributions in the spin-independent
direct detection cross section of DM.
For the higgsino-DM scenario,
we observe that a DM mass of 600 GeV to be consistent with
WMAP/PLANCK and LUX data for sfermion coannihilations.
The LUX data itself excludes the region of 400 to 600 GeV,
by a half order of magnitude of the cross-section, well within
the associated uncertainty.
The similar combined lower limit for
a wino DM is about 1 TeV.
There is hardly any collider bound from the LHC for squarks and
sleptons in such a compressed scenario where sfermion masses are close
to the mass of a higgsino/wino LSP.

Presentation type

Parallel talk

Authors: Dr CHAKRABORTI, Manimala (University of Bonn); Dr PODDAR, Sujoy (Diamond Har-

bour Women's University); Prof. CHATTOPADHYAY, Utpal (Indian Association for the Cultivation of Science)

Presenter: Dr CHAKRABORTI, Manimala (University of Bonn)

Session Classification: Parallel III

Contribution ID: **125**   Type: **Parallel talk**

Quantum scale-invariant effective potentials

Thursday 22 June 2017 17:30 (15 minutes)

I will describe a modified version of the dimensional regularization of a classically scale invariant theory, motivated by the requirement to preserve scale invariance at the quantum level. The role of the subtraction scale μ is played be a dynamic scalar field. This field is assumed to have non-zero VEV thus triggering spontaneous breakdown of scale symmetry which in turn triggers EWSB. This approach is conjectured to be free of the anomaly associated with the broken scale invariance. On the other hand, the method requires non-polynomial operators in the original Lagrangian. It also results in a modification of the renormalization group functions, relative to their form in a similar model regularized in the usual way with μ=constant (field-independent). Application of this formalism to the unstable scalar potential of Standard Model is discussed.

Presentation type

Parallel talk

Author: Mr OLSZEWSKI, Paweł (University of Warsaw)

Presenter: Mr OLSZEWSKI, Paweł (University of Warsaw)

Session Classification: Parallel II

Contribution ID: **127** Type: **Parallel talk**

Towards a non-perturbative approach to the Hierarchy problem

Thursday 22 June 2017 17:00 (15 minutes)

Combining the ideas of quantum scale invariance with the absence of new particle thresholds between the Planck and the Electroweak (EW) scales leads to stability of the latter against quantum corrections. However, the large discrepancy between the scales remains unexplained. We suggest a non-perturbative mechanism of generation of the EW scale that is able to reproduce naturally this hierarchy.

Presentation type

Parallel talk

Authors: SHAPOSHNIKOV, Mikhail (EPFL); SHKERIN, Andrey (EPFL)

Presenter: SHKERIN, Andrey (EPFL)

Session Classification: Parallel II

Contribution ID: **128**   Type: **Parallel talk**

Weak gravity conjecture and black hole puzzles

Tuesday 20 June 2017 17:00 (15 minutes)

The Weak Gravity Conjecture (WGC) has recently received much attention for its potential applications to models of large field inflation. Unfortunately, generic motivations behind the WGC remain somewhat weak. In this talk, I will discuss suggestive arguments hinting at the WGC in two different contexts: extremal black holes in Einstein-Maxwell theories, and 'axionic black holes' in theories with a massless two-form field.

Presentation type

Parallel talk

Author: SOLER, Pablo (ITP Heidelberg)

Presenter: SOLER, Pablo (ITP Heidelberg)

Session Classification: Parallel II

Contribution ID: **129**   Type: **Parallel talk**

The cosmological constant problem and gravity in the extreme infrared

Tuesday 20 June 2017 15:45 (15 minutes)

This talk is based on the vacuum energy sequestering scenario which is an approach to tackling cosmological constant problem via global modifications of gravity. We will discuss the core issue with the cosmological constant, namely, radiative instability and show how in the vacuum energy sequestering proposal the loop corrections decouple from the gravitational field equations order by order in perturbation theory.

Presentation type

Parallel talk

Author: STEFANYSZYN, David

Presenter: STEFANYSZYN, David

Session Classification: Parallel I

Contribution ID: **130**   Type: **Parallel talk**

Solving anomalies with Dark Matter

Thursday 22 June 2017 15:30 (15 minutes)

We investigate the constraints on exotic charges of standard model and dark sector fermions coming from the cancellation of gauge anomalies in simplified models of dark matter. Assuming generation-independent charges, we show that the standard coupling structures assumed in such models necessitate the existence of additional exotic fermions. These fermions cannot be arbitrarily heavy, and some have to be charged under the standard model gauge group, introducing interesting experimental signatures.

Recent flavour anomalies reported by LHCb and other experiments can be explained by a Z' with non-universal charges. Relaxing the assumption of generation-independent charges, we explore the constraints that anomaly cancellation imposes on models that can explain the flavour excess without coming into conflict with other flavour observables. We show examples where DM or other exotic fermions are needed to provide a gauge anomaly-free model of the flavour anomaly.

Presentation type

Parallel talk

Authors: TUNNEY, Patrick (King's College London); Prof. ELLIS, John (CERN); Prof. FAIRBAIRN, Malcolm (King's College London)

Presenter: TUNNEY, Patrick (King's College London)

Session Classification: Parallel III

Contribution ID: **131**   Type: **Parallel talk**

Fermion number violating effects in low scale leptogenesis

Tuesday 20 June 2017 14:45 (15 minutes)

The baryon asymmetry and dark matter in the Universe can be explained just by introducing right-handed neutrinos with masses well below the Fermi scale. For the masses of the order of GeV scale baryogenesis via neutrino oscillations works as a mechanism to generate the baryon asymmetry. We derived kinetic equations of the baryogenesis accounting for fermion number violating effects missed so far, and discussed the impact. Further we identified one of the domains of right-handed neutrino masses that can potentially lead to large lepton asymmetry generation required from the resonant production of sterile neutrino dark matter.

Presentation type

Parallel talk

Authors: EIJIMA, Shintaro (EPFL); Prof. SHAPOSHNIKOV, Mikhail (EPFL)

Presenter: EIJIMA, Shintaro (EPFL)

Session Classification: Parallel III

Contribution ID: **132**   Type: **Parallel talk**

Solitons, bounces, and tunneling with non-canonical kinetic terms

Thursday 22 June 2017 15:45 (15 minutes)

Scalar fields with non-canonical kinetic terms are ubiquitous in theories of dark energy and modified gravity. This naturally raises the question of how non-perturbative effects, like domain walls and quantum tunneling, are modified in the presence of these kinetic terms. Focusing on galileons, which appear in the decoupling limit of massive gravity and DGP, I will discuss the construction and stability of solitonic solutions, as well as the effect of these terms on tunneling decay rates. We confirm for the first time that the WKB approximation and Coleman tunneling approach are valid in the presence of galileon-type and $P(X)$ kinetic terms. This can shed light on tunneling rates and non-perturbative solutions in modified gravity theories with screening mechanisms and non-trivial non-linear effects.

Presentation type

Parallel talk

Author: Dr SOLOMON, Adam (University of Pennsylvania)

Co-authors: Ms CARRILLO GONZÁLEZ, Mariana (University of Pennsylvania); Dr MASOUMI, Ali (Tufts University); TRODDEN, Mark (University of Pennsylvania)

Presenter: Dr SOLOMON, Adam (University of Pennsylvania)

Session Classification: Parallel I

Contribution ID: **133** Type: **Parallel talk**

E_6-extended SUSY trinification

Tuesday 20 June 2017 15:15 (15 minutes)

I will review recent work on a supersymmetric trinification model, where the standard trinification gauge group $[SU(3)_L \times SU(3)_R \times SU(3)_C] \times \mathbb{Z}_3 \subset E_6$ is supplemented by a global $SU(3)_F$ family symmetry. The chiral super field content of the model is taken from the **248** branching under $E_8 \supset E_6 \times SU(3)_F$, and includes novel gauge adjoint fields in addition to the conventional gauge bi-fundamental fields. Even though this leads to a highly constrained theory with an extraordinarily low number of free parameters (including both a single unified gauge coupling and one Yukawa coupling in the fundamental sector), the scalar potential allows for SUSY conserving vacuum expectation values (VEVs) in the gauge adjoint chiral superfields that can consistently break the trinification gauge symmetry. In addition, these VEVs break the Colour-Left and Colour-Right parity symmetries of the high-scale theory while preserving $\mathbb{Z}_2$ symmetry that can be identified with conventional Left-Right parity. Upon integrating out all fields that receive masses on the order of the GUT scale, we obtain a SUSY Left-Right symmetric theory that in principle allows for Fayet-Iliopoulos SUSY breaking. When allowing for a softly broken SUSY in the high-scale theory, we observe that all subsequent symmetry breaking scales (including both the scale of spontaneous parity breaking and the electro-weak scale) are controlled by the soft SUSY breaking terms such that these scales are protected from large radiative corrections and are thus naturally small compared to the GUT scale.

Presentation type

Parallel talk

Author: WESSÉN, Jonas (Lund University)

Presenter: WESSÉN, Jonas (Lund University)

Session Classification: Parallel V

Contribution ID: **134**   Type: **Parallel talk**

Bubbles of Nothing and Supersymmetric Compactifications

Tuesday 20 June 2017 17:30 (15 minutes)

We investigate the non-perturbative stability of supersymmetric compactifications with respect to decay via a bubble of nothing. We show examples where this kind of instability is not prohibited by the spin structure, i.e., periodicity of fermions about the extra dimension. However, such "topologically unobstructed" cases do exhibit an extra-dimensional analog of the well-known Coleman-De Luccia suppression mechanism, which prohibits the decay of supersymmetric vacua. We demonstrate this explicitly in a four dimensional Abelian-Higgs toy model coupled to supergravity. The compactification of this model to $M_3 \times S_1$ presents the possibility of vacua with different windings for the scalar field. Away from the supersymmetric limit, these states decay by the formation of a bubble of nothing, dressed with an Abelian-Higgs vortex. We show how, as one approaches the supersymmetric limit, the circumference of the topologically unobstructed bubble becomes infinite, thereby preventing the realization of this decay. This demonstrates the dynamical origin of the decay suppression, as opposed to the more familiar argument based on the spin structure. We conjecture that this is a generic mechanism that enforces stability of any topologically unobstructed supersymmetric compactification.

Presentation type

Parallel talk

Authors: Prof. BLANCO-PILLADO, Jose Juan (IKERBASQUE & UPV/EHU); Dr SHLAER, Ben (University of Auckland); Dr URRESTILLA, Jon (UPV/EHU); SOUSA, Kepa

Presenter: SOUSA, Kepa

Session Classification: Parallel II

Contribution ID: **135**   Type: **Parallel talk**

Status of Two-Higgs-doublet model with LHC 13 TeV data

Thursday 22 June 2017 16:30 (15 minutes)

The Two-Higgs-doublet model (2HDM) is one of the most studied extensions of the Standard Model. But just as the other popular "New Physics" models, it gets more and more constrained by recent experimental progress, especially by the LHC data. For all four 2HDM types with a softly broken Z2 symmetry, we present updated results of global analyses obtained with the open-source HEPfit code. We emphasize the impact of the LHC run II data.

Presentation type

Parallel talk

Author: CHOWDHURY, Debtosh (INFN, Roma)

Co-authors: EBERHARDT, Otto (Istituto Nazionale di Fisica Nucleare); SILVESTRINI, Luca (INFN Rome); PAUL, Ayan (INFN, Sezione di Roma)

Presenter: CHOWDHURY, Debtosh (INFN, Roma)

Session Classification: Parallel IV

Contribution ID: **137** Type: **Parallel talk**

Inflation and Attractors from Nilpotent Kaehler corrections

Tuesday 20 June 2017 14:45 (15 minutes)

We develop a new class of supergravity cosmological models where inflation is induced by terms in the K\"ahler potential which mix a nilpotent superfield S with a chiral sector Φ. As the new terms are non-(anti)holomorphic, and hence cannot be removed by a K\"ahler transformation, these models are intrinsically K\"ahler potential driven. Such terms could arise for example due to a back-reaction of an anti-D3 brane on the string theory bulk geometry. We show that this mechanism is very general and allows for a unified description of inflation and dark energy, with controllable SUSY breaking at the vacuum. When the internal geometry of the bulk field is hyperbolic, we prove that small perturbative K\"ahler corrections naturally lead to α-attractor behaviour, with inflationary predictions in excellent agreement with the latest Planck data.

Presentation type

Parallel talk

Authors: Mr MCDONOUGH, Evan (McGill University); Dr SCALISI, Marco (KU Leuven)

Presenter: Dr SCALISI, Marco (KU Leuven)

Session Classification: Parallel II

Contribution ID: **138** Type: **Parallel talk**

Confronting SUSY models with LHC data via electroweakino production

Tuesday 20 June 2017 14:45 (15 minutes)

We investigate multi-lepton signals produced by ElectroWeakino (EWino)
decays in the MSSM and the TMSSM scenarios with sfermions, gluinos and non Standard
Model Higgses at the TeV scale, being the Bino electroweak-scale dark matter. We recast
the present LHC constraints on EWinos for these models and we find that wide MSSM and
TMSSM parameter regions prove to be allowed. We forecast the number of events expected
in the signal regions of the experimental multi-lepton analyses in the next LHC runs. The
correlations among these numbers will help to determine whether future deviations in
multi-lepton data are ascribable to the EWinos, as well as the supersymmetric model they
originate from.

Presentation type

Parallel talk

Author: MARTIN-LOZANO, Victor (BCTP / Uni Bonn)

Co-authors: Dr ARINA, Chiara; Dr CHALA, Mikael; Dr NARDINI, Germano

Presenter: MARTIN-LOZANO, Victor (BCTP / Uni Bonn)

Session Classification: Parallel IV

Contribution ID: **141** Type: **Parallel talk**

Backreaction in Axion Monodromy, 4-forms and the Swampland

Tuesday 20 June 2017 16:30 (15 minutes)

Axion monodromy models can always be described in terms of an axion coupled to 3-form gauge fields with non-canonical kinetic terms. The presence of the saxions parametrising the kinetic metrics of the 3-form fields leads to backreaction effects in the inflationary dynamics. We analyse the case in which saxions backreact on the Kähler metric of the inflaton leading to a logarithmic scaling of the proper field distance at large field. This behaviour is universal in Type II string flux compactifications and consistent with a refinement of the Swampland Conjecture. The critical point at which this behaviour appears depends on the mass hierarchy between the inflation and the saxions. However, in tractable compactifications, such a hierarchy cannot be realised without leaving the regime of validity of the effective theory, disfavouring transplanckian excursions in string theory.

Presentation type

Parallel talk

Author: VALENZUELA, Irene (MPI Munich)

Presenter: VALENZUELA, Irene (MPI Munich)

Session Classification: Parallel II

Contribution ID: **142**   Type: **Parallel talk**

A Chern-Simons Pandemic

Tuesday 20 June 2017 17:15 (15 minutes)

Triple Chern-Simons terms are a generic feature of stringy compactifications, where they are usually responsible for topological masses, or branes ending in branes. Another piece of common lore says that one should not expect exact global symmetries in quantum gravity, and in fact this is the case in every known stringy compactification. I will argue that these two seemingly disconnected observations are in fact related: Black holes can acquire charge under a seemingly exact global two-form symmetry, which can be broken by appropriate triple Chern-Simons terms. A significant amount of stringy examples leads us to conjecture that consistent theories of quantum gravity must always have these Chern-Simons terms. This in turn means that a number of seemingly consistent four-dimensional effective field theories, such as pure gravity or four-dimensional Maxwell+gravity+WGC particles, cannot be consistent theories of quantum gravity by themselves.

Presentation type

Parallel talk

Author: MONTERO, Miguel (Utrecht U.)

Presenter: MONTERO, Miguel (Utrecht U.)

Session Classification: Parallel II

Contribution ID: **144**   Type: **Parallel talk**

LFV Higgs decays in low-scale seesaw models within the mass insertion approximation

Tuesday 20 June 2017 14:30 (15 minutes)

In this work we present a new computation of the lepton flavor violating (LFV) Higgs boson decays within the context of low-scale seesaw models, concretely the inverse seesaw model with three ν_R and three extra singlets X. The novelty of our computation is that it uses the mass insertion approximation (MIA) which works with the electroweak interaction states. This method also allows us to write the analytical results explicitly in terms of the most relevant model parameters, that are the neutrino Yukawa coupling matrix Y_ν and the right-handed mass matrix M_R, which is very convenient for a phenomenological analysis, and can be easily generalized to other low-scale seesaw models. We perform the calculation of the decay amplitude up to order $calO(Y_\nu^2 + Y_\nu^4)$ and study numerically the goodness of the MIA results. We also present the computation of the relevant one-loop effective vertex $H\ell_i\ell_j$ for the LFV Higgs decay which is derived from a large M_R mass expansion of the form factors, that can be of interest for other researchers who wish to estimate the $H \to \ell_i\bar{\ell}_j$ rates in a fast way in terms of their own preferred input values for the relevant model parameters Y_ν and M_R.

Presentation type

Parallel talk

Author: ARGANDA, Ernesto (IFLP - CONICET/UNLP)

Co-authors: HERRERO, maria (Universidad Autonoma de Madrid); MARCANO, Xabier (IFT-UAM/CSIC); Mr MORALES, Roberto (IFLP-CONICET/UNLP); Dr SZYNKMAN, Alejandro (IFLP-CONICET/UNLP)

Presenter: ARGANDA, Ernesto (IFLP - CONICET/UNLP)

Session Classification: Parallel V

Contribution ID: **145** Type: **Parallel talk**

Halo substructure and implications for dark matter annihilation signals

Tuesday 20 June 2017 16:45 (15 minutes)

A prediction of the standard LCDM cosmological model, also confirmed by N-body cosmological simulations, is that dark matter (DM) halos are teeming with numerous self-bound substructure, or subhalos. The precise properties of these subhalos represent important probes of the underlying cosmological model. Subhalos may also play a key role on the search for DM via its annihilation products, as they are expected to boost the DM signal of their host halos significantly (so-called subhalo boost). Previous work has traditionally assumed that subhalos exhibit similar structural properties than main halos, while subhalos are actually more concentrated. In this talk, I will present a refined substructure boost model that takes into account this effect as well as unavoidable tidal stripping effects on the subhalo population. Our work, which is entirely based on N-body simulation data at very different halo and subhalo mass scales, has important implications for current and future DM search strategies and results.

Presentation type

Parallel talk

Author: SÁNCHEZ-CONDE, Miguel (Oskar Klein Centre, Stockholm University)

Presenter: SÁNCHEZ-CONDE, Miguel (Oskar Klein Centre, Stockholm University)

Session Classification: Parallel III

Contribution ID: **146** Type: **Parallel talk**

Latest results from XENON100 electronic recoil modulation

Tuesday 20 June 2017 17:00 (15 minutes)

The XENON100 experiment is designed to search for dark matter in the form of weakly interacting massive particles (WIMPs) by detecting WIMP-induced nuclear recoils (NRs) with a liquid xenon (LXe) time projection chamber. The modulation of the low energy (low-E), (2–6) keV event rate in the DAMA/LIBRA experiment is currently the only long-standing claim for a positive dark matter detection. One possible reasons of this modulation is due to electronic recoils (ERs) from WIMPs. The stable performance of XENON100 over a period of 4 years offers the opportunity to test this hypothesis with a different detector operated for the first time in the same underground site. In this talk I will report about the latest XENON100 results of the test of the periodic variations of the electronic recoil hypothesis.

Presentation type

Parallel talk

Author: Dr BENABDERRAHMANE , Mohamed Lotfi (New York U., Abu Dhabi)

Presenter: Dr BENABDERRAHMANE , Mohamed Lotfi (New York U., Abu Dhabi)

Session Classification: Parallel III

Contribution ID: **147** Type: **Parallel talk**

Asymmetric CFTs and GSUGRA

Thursday 22 June 2017 17:45 (15 minutes)

There are results that suggest a connection between gauged maximal supergravities and asymmetric toroidal orbifolds. By looking at several examples we argue that a similar relationship exists between 4D N=2 gauged supergravities and asymmetric Gepner models. Going further we conjecture that the asymmetric CFTs we construct are the fully backreacted string uplifts of N=1 Minkowski vacua in a N=2 gauged supergravity. More evidence for the correspondence is provided by a classification of asymmetric Gepner models with extended supersymmetry.

Presentation type

Parallel talk

Author: FUCHS, Michael (MPI Munich)

Presenter: FUCHS, Michael (MPI Munich)

Session Classification: Parallel II

Contribution ID: **148**   Type: **Parallel talk**

Einstein-Yang-Mills- Dirac Systems from the Discretized Kaluza-Klein Theories

Thursday 22 June 2017 16:30 (15 minutes)

A unified theory of the non-Abelian gauge interactions with gravity in the framework of a discretized Kaluza-Klein theory is constructed with a modified Dirac operator and wedge product. All the couplings of chiral spinors to the non-Abelian gauge fields emerge naturally as components of the couplings of the chiral spinors to the generalized gravity together with some new interactions. In particular, the currently prevalent gravity-QCD-quark and gravity-electroweak-quark-lepton models are shown to follow as special cases of the general framework.

Presentation type

Parallel talk

Author: WALI, Kameshwar C (Syracuse University)

Presenter: WALI, Kameshwar C (Syracuse University)

Session Classification: Parallel II

Contribution ID: **149** Type: **Parallel talk**

Inclusive searches for squarks and gluinos with the ATLAS detector

Tuesday 20 June 2017 15:15 (15 minutes)

.Despite the absence of experimental evidence, weak scale supersymmetry remains one of the best motivated and studied Standard Model extensions. This talk summarises recent ATLAS results on inclusive searches for supersymmetric squarks and gluinos, including third generation squarks produced in the decay of gluinos. The searches involve final states containing jets, missing transverse momentum with and without light leptons, taus or photons, and were performed with pp collisions at a centre-of-mass energy of 13 TeV.

Presentation type

Author: ABELOOS, Baptiste (Universite de Paris-Sud 11 (FR))

Presenter: ABELOOS, Baptiste (Universite de Paris-Sud 11 (FR))

Session Classification: Parallel IV

Contribution ID: **150**　　　　　　　　　　　　　　　　　Type: **Parallel talk**

Search for New Phenomena in Dijet Events with the ATLAS Detector at sqrt s = 13 TeV

Tuesday 20 June 2017 17:30 (15 minutes)

.

Presentation type

Parallel talk

Author: ALLEN, Benjamin William (University of Oregon (US))

Presenter: ALLEN, Benjamin William (University of Oregon (US))

Session Classification: Parallel IV

Contribution ID: **151**   Type: **Parallel talk**

Searches for electroweak production of supersymmetric gauginos and sleptons with the ATLAS detector

Tuesday 20 June 2017 15:00 (15 minutes)

Many supersymmetry models feature gauginos and also leptons with masses less than a few hundred GeV. These can give rise to direct pair production rates at the LHC that can be observed in the data sample recorded by the ATLAS detector. The talk presents results from searches for gaugino and slepton pair production in final states with leptons, and were performed with pp collisions at a centre-of-mass energy of 13 TeV.

Presentation type

Parallel talk

Author: CARDILLO, Fabio (Albert-Ludwigs-Universitaet Freiburg (DE))

Presenter: CARDILLO, Fabio (Albert-Ludwigs-Universitaet Freiburg (DE))

Session Classification: Parallel IV

Contribution ID: **152**   Type: **Parallel talk**

Searches for extended Higgs sectors with the CMS experiment

Thursday 22 June 2017 17:00 (15 minutes)

The observation of a Higgs-like boson with a mass near 125 GeV/c2 at the Large Hadron Collider raises a critical question of whether the new particle is in fact the SM Higgs boson. Searches for non-SM Higgs boson production and its decay modes are therefore complementary. I will report the searches for extended Higgs sectors performed with the CMS detector. I will focus on Dark Susy and NMSSM models. Dark Susy predicts cold dark matter at TeV scale and contain a new U(1)D symmetry group (broken), giving rise to light dark photons. Depending on the kinetic mixing parameter with the SM, the dark photon can travel before decaying. NMSSM is an extension of the minimal supersymmetric standard model (MSSM) by an additional gauge singlet field under new U(1)PQ symmetry in the Higgs sector of the superpotential. Compared to the MSSM, the NMSSM naturally generates the mass parameter mu in the Higgs superpotential at the electroweak scale and significantly reduces the amount of fine tuning required. The latest CMS results will be discussed.

Presentation type

Parallel talk

Author: Dr PERNIE, Luca (Texas A&M University)

Presenter: Dr PERNIE, Luca (Texas A&M University)

Session Classification: Parallel IV

Contribution ID: **153**   Type: **Parallel talk**

Standard Model Higgs results from CMS

Tuesday 20 June 2017 16:45 (15 minutes)

The status of most recent measurements of the Standard Model Higgs boson production and properties are presented in this talk. The studies are based on data recorded by the CMS experiment during the 2016 and include an overview of the results of bosonic and fermionic Higgs boson decays, with a focus on the Higgs boson produced in the association to top quark pair and production with single top quark.

Presentation type

Parallel talk

Author: DORDEVIC, Milos (Vinca Institute, University of Belgrade)

Presenter: DORDEVIC, Milos (Vinca Institute, University of Belgrade)

Session Classification: Parallel IV

Contribution ID: **154**   Type: **Parallel talk**

Resonances and loops: scale interplay in the Higgs effective theory

Thursday 22 June 2017 17:30 (15 minutes)

I will discuss the structure of the loop corrections in the case of the non-linear EW effective theory and compare it with the low-energy contributions from the exchange of heavy resonances. The convenience of using either the non-linear HEFT or the linear SMEFT will depend on the interplay of the scales that control these two types of contributions.

Presentation type

Parallel talk

Author: SANZ-CILLERO, Juan José (Universidad Complutense de Madrid)

Presenter: SANZ-CILLERO, Juan José (Universidad Complutense de Madrid)

Session Classification: Parallel IV

Contribution ID: **155**   Type: **Parallel talk**

Search for electroweak production of supersymmetry in CMS

Tuesday 20 June 2017 15:30 (15 minutes)

The large set of proton-proton collision data recorded in 2016 at a centre-of-mass energy of 13 TeV is the basis for first results on electroweak production of supersymmetric particles in LHC Run 2. CMS results on the production of chargino / neutralino pairs are presented based on the analysis of final states with one or more leptons and interpreted under several assumptions for the decay modes of the electroweak gauginos.

Presentation type

Parallel talk

Author: FOLGUERAS, Santiago (Purdue University (US))

Presenter: FOLGUERAS, Santiago (Purdue University (US))

Session Classification: Parallel IV

Contribution ID: **156** Type: **Invited Speaker**

Anti-D3 brane induced geometric inflation

Monday 19 June 2017 16:30 (30 minutes)

Presentation type

Author: KALLOSH, Renata (Stanford university)

Presenter: KALLOSH, Renata (Stanford university)

Session Classification: Plenary

Contribution ID: **157**   Type: **Invited Speaker**

Large field inflation: Recent progress and observational predictions

Tuesday 20 June 2017 09:30 (30 minutes)

Presentation type

Author: LINDE, Andrei (Stanford University)

Presenter: LINDE, Andrei (Stanford University)

Session Classification: Plenary

Contribution ID: **158**   Type: **Invited Speaker**

The many faces of Conformal Bootstrap

Wednesday 21 June 2017 11:30 (30 minutes)

Presentation type

Author: VICHI, Alessandro (Ecole Polytechnique Federale de Lausanne (CH))

Presenter: VICHI, Alessandro (Ecole Polytechnique Federale de Lausanne (CH))

Session Classification: Plenary

Contribution ID: **159**   Type: **Invited Speaker**

The Weak Gravity Conjecture and Scalar Fields

Thursday 22 June 2017 11:00 (30 minutes)

Presentation type

Presenter: PALTI, Eran

Session Classification: Plenary

Contribution ID: **160** Type: **Invited Speaker**

Topological origin of dynamical chiral symmetry breaking in QCD and in gravity

Monday 19 June 2017 14:30 (30 minutes)

Presentation type

Presenter: DVALI, Georgi

Session Classification: Plenary

Contribution ID: **161**   Type: **Invited Speaker**

New Physics at the LHC from CMS

Tuesday 20 June 2017 11:30 (30 minutes)

Presentation type

Presenter: FOLGUERAS, Santiago (Purdue University (US))

Session Classification: Plenary

Contribution ID: 162 Type: **Invited Speaker**

The quest for the axion

Wednesday 21 June 2017 12:00 (30 minutes)

Presentation type

Presenter: RINGWALD, Andreas (Deutsches Elektronen-Synchrotron DESY)

Session Classification: Plenary

Contribution ID: **163**   Type: **Invited Speaker**

Recent LHCb results on hints for New Physics

Monday 19 June 2017 10:30 (30 minutes)

Presentation type

Presenter: MARTINEZ VIDAL, Fernando (IFIC - University of Valencia and CSIC (ES))

Session Classification: Plenary

Contribution ID: **164**   Type: **Invited Speaker**

Future Collider Physics Under the Higgs Lamppost

Friday 23 June 2017 11:00 (30 minutes)

Presentation type

Presenter: HAN, Tao (University of Pittsburgh)

Session Classification: Plenary

Contribution ID: **165** Type: **Invited Speaker**

Gravitational Wave Observations and Implications

Monday 19 June 2017 10:00 (30 minutes)

Presentation type

Presenter: BARISH, Barry (Caltech)

Session Classification: Plenary

Contribution ID: **166**   Type: **Invited Speaker**

The undead 2 TeV diboson excess

Thursday 22 June 2017 09:30 (30 minutes)

I will discuss the untrendy 2 TeV excess in the ATLAS Run 1 hadronic diboson resonance search, pointing out its faint reappearance in three subsequent analyses. On a more general ground, I will discuss the weakness of the strategies used by ATLAS and CMS in this and other new physics searches, and propose a more robust approach to detect unconventional new physics.

Presentation type

Presenter: AGUILAR SAAVEDRA, Juan Antonio (LIP Laboratorio de Instrumentacao e Fisica Experimental de Part)

Session Classification: Plenary

Contribution ID: **167** Type: **Invited Speaker**

Massive Neutrinos circa 2017

Monday 19 June 2017 12:00 (30 minutes)

Presentation type

Presenter: Prof. GONZALEZ-GARCIA, Concepcion (YITP, Stony Brook and ICREA, U. Barcelona)

Session Classification: Plenary

Contribution ID: **168**   Type: **Invited Speaker**

(Un)Naturalness, Spacetime, Quantum Mechanics and the Vacuum

Friday 23 June 2017 12:00 (30 minutes)

Presentation type

Presenter: ARKANI-HAMED, Nima

Session Classification: Plenary

Contribution ID: **169** Type: **Invited Speaker**

The State of Supersymmetry

Tuesday 20 June 2017 12:00 (30 minutes)

Presentation type

Presenter: CRAIG , Nathaniel

Session Classification: Plenary

Contribution ID: **170**　　　　　　　　　　　　　　　　　Type: **Invited Speaker**

New applications of gauge/gravity duality

Wednesday 21 June 2017 11:00 (30 minutes)

Presentation type

Presenter: ERDMENGER, Johanna

Session Classification: Plenary

Contribution ID: **171**   Type: **Invited Speaker**

Dark Matter: Hints and Prospects

Friday 23 June 2017 10:00 (30 minutes)

Presentation type

Presenter: GELMINI, Graciela

Session Classification: Plenary

Contribution ID: **172** Type: **Invited Speaker**

Ultra-light axion dark matter

Monday 19 June 2017 15:00 (30 minutes)

Presentation type

Presenter: HUI, Lam

Session Classification: Plenary

Contribution ID: **173** Type: **Invited Speaker**

Halo independent limits on dark matter properties

Friday 23 June 2017 11:30 (30 minutes)

Presentation type

Presenter: IBARRA, Alejandro

Session Classification: Plenary

Contribution ID: **174**   Type: **Invited Speaker**

A model of a non-singular, cosmological bounce and the cosmological constant problem

Friday 23 June 2017 09:30 (30 minutes)

Presentation type

Presenter: KAPLAN, David E.

Session Classification: Plenary

Contribution ID: **175** Type: **Invited Speaker**

B-mode observations: BICEP/Keck Results and Future Challenges

Wednesday 21 June 2017 10:00 (30 minutes)

Presentation type

Presenter: KOVAC , John

Session Classification: Plenary

Contribution ID: **176**   Type: **Invited Speaker**

New Physics Results at the LHC from ATLAS

Tuesday 20 June 2017 11:00 (30 minutes)

Presentation type

Presenter: MAJEWSKI, Stephanie (University of Oregon (US))

Session Classification: Plenary

Contribution ID: 177 Type: **Invited Speaker**

The path forward with LIGO

Thursday 22 June 2017 12:00 (30 minutes)

Presentation type

Presenter: MARKA, Zsuzsa

Session Classification: Plenary

Contribution ID: **178** Type: **Invited Speaker**

Singularities in General Relativity

Thursday 22 June 2017 11:30 (30 minutes)

Presentation type

Presenter: MUKHANOV, Slava

Session Classification: Plenary

Contribution ID: **179**   Type: **Invited Speaker**

Symmetry in Quantum Gravity and Other Swampland Constraints

Thursday 22 June 2017 10:00 (30 minutes)

Presentation type

Presenter: OOGURI, Hirosi

Session Classification: Plenary

Contribution ID: **180** Type: **Invited Speaker**

The quest for New Physics at the Intensity Frontier

Monday 19 June 2017 11:30 (30 minutes)

Presentation type

Presenter: PARADISI, Paride

Session Classification: Plenary

Contribution ID: **181** Type: **Invited Speaker**

Finding our way to new physics

Tuesday 20 June 2017 10:00 (30 minutes)

Presentation type

Presenter: SANZ, Veronica

Session Classification: Plenary

Contribution ID: **182**   Type: **Invited Speaker**

The mildly non-linear regime of structure formation

Wednesday 21 June 2017 09:30 (30 minutes)

Presentation type

Presenter: ZALDARRIAGA, Matías

Session Classification: Plenary

Contribution ID: **183**　　　　　　　　　　　　　　　　　Type: **Invited Speaker**

Inflation in String Theory and Quantum Gravity

Monday 19 June 2017 16:00 (30 minutes)

Presentation type

Presenter:　SHIU, Gary

Session Classification:　Plenary

Contribution ID: **184** Type: **Poster**

Holographic non-Gaussianities in general single-field inflation

Presentation type

Presenter: Ms ZHOU, Siyi

Contribution ID: **185** Type: **Poster**

Universal black hole stability in four dimensions

Presentation type

Presenter: CANO MOLINA-NIÑIROLA, Pablo Antonio

Contribution ID: **186**   Type: **Poster**

Direct detection constraints on thermal singlino-Higgsino dark matter in NMSSM

Presentation type

Presenter: SZCZERBIAK, Paweł

Contribution ID: **187**   Type: **Poster**

Dark Matter-Neutrino Interactions

Presentation type

Presenter: Mr OLIVARES-DEL CAMPO, Andres (IPPP, Durham University)

Contribution ID: **189**   Type: **Poster**

Abelian tensor hierarchy and Chern-Simons actions in 4D N=1 conformal supergravity

Presentation type

Presenter: YOKOKURA, Ryo (Keio University)

Contribution ID: **190**   Type: **Poster**

Oscillating Chiral Primordial Tensor Spectrum from Axionic Inflation

Presentation type

Presenter: OBATA, Ippei (Kyoto University)

Contribution ID: **191** Type: **Poster**

MHz Gravitational Waves from an Inflaton-Gauge Interaction

Presentation type

Presenter: ITO, Asuka (Kobe University)

Contribution ID: **192**   Type: **Poster**

Light Dark Matter in the SHiP experiment

Presentation type

Presenter: TIMIRYASOV, Inar (EPFL)

Contribution ID: **194**   Type: **Poster**

Extra doublets and the dynamical relaxation

Presentation type

Presenter: MARKIEWICZ, Adam (University of Warsaw)