Planck 2013
<h2>From the Planck Scale to the Electroweak Scale</h2>

Report of Contributions

Contribution ID: **2**   Type: **not specified**

The LHC: Latest news from the energy frontier

Monday 20 May 2013 09:00 (55 minutes)

Presenter: Mr JONATHAN, Butterworth

Session Classification: Review Talk

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Contribution ID: **3**   Type: **not specified**

Implications of the Higgs discovery

Monday 20 May 2013 10:00 (25 minutes)

Presenter: Mr DJOUADI, Abdelhak

Session Classification: Plenary Session

Contribution ID: **4** Type: **not specified**

SUSY after the Higgs

Monday 20 May 2013 11:00 (25 minutes)

Presenter: KRAML, Sabine (LPSC Grenoble)

Session Classification: Plenary Session

Contribution ID: **5**   Type: **not specified**

Scales of supersymmetry breaking and flavor models

Monday 20 May 2013 11:30 (25 minutes)

Presenter: Mr POKORSKI, Stefan

Session Classification: Plenary Session

Contribution ID: **6** Type: **not specified**

Are we done with the LHC?

Monday 20 May 2013 12:00 (25 minutes)

Presenter: Mr MURAYAMA, Hitoshi

Session Classification: Plenary Session

Contribution ID: **7**   Type: **not specified**

Do we need an LC to see SUSY?

Monday 20 May 2013 14:30 (25 minutes)

Presenter: Prof. MOORTGAT-PICK, Gudrid (University of Hamburg / DESY)

Session Classification: Plenary Session

Contribution ID: **8**   Type: **not specified**

Higgs thermal inflation and low energy supersymmetry

Monday 20 May 2013 15:00 (25 minutes)

Presenter: Mr JONES, Tim

Session Classification: Plenary Session

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Contribution ID: **9**   Type: **not specified**

The Status of Constrained SUSY, and implications from the Higgs

Monday 20 May 2013 15:30 (25 minutes)

Presenter: Mr BECHTLE, Philip

Session Classification: Plenary Session

Contribution ID: **10**   Type: **not specified**

The MSSM Higgs Mass Revisited

Monday 20 May 2013 16:30 (25 minutes)

Presenter: HABER, Howie

Session Classification: Plenary Session

Contribution ID: **11**   Type: **not specified**

Fermi 130 GeV gamma ray line as an indirect signal of DM

Monday 20 May 2013 17:00 (25 minutes)

Presenter: Mr RAIDAL, Martti

Session Classification: Plenary Session

Contribution ID: **12**   Type: **not specified**

Visible sector models of inflation and curvaton

Monday 20 May 2013 17:30 (25 minutes)

Presenter: Mr MAZUMDAR, Anupam

Session Classification: Plenary Session

Contribution ID: **13**   Type: **not specified**

Cosmology and astroparticle physics after Planck

Tuesday 21 May 2013 09:00 (55 minutes)

Presenter: Mrs COVI, Laura

Session Classification: Review Talk

Contribution ID: **14**   Type: **not specified**

Acceleration, then and now

Tuesday 21 May 2013 10:00 (25 minutes)

Presenter: Mr BURGESS, Cliff

Session Classification: Plenary Session

Contribution ID: **15**   Type: **not specified**

Probing High-Scale Physics with Planck

Tuesday 21 May 2013 11:00 (25 minutes)

Presenter: Mr BAUMANN, Daniel

Session Classification: Plenary Session

Contribution ID: **16**   Type: **not specified**

Dark Matter in the Discovery Age

Tuesday 21 May 2013 11:30 (25 minutes)

Presenter: Mr HOOPER, Dan

Session Classification: Plenary Session

Contribution ID: **17**   Type: **not specified**

Exponential mass hierarchies and cosmology

Tuesday 21 May 2013 12:00 (25 minutes)

Presenter: Mr LALAK, Zygmunt

Session Classification: Plenary Session

Contribution ID: **18**   Type: **not specified**

Critical issues in flavor physics

Wednesday 22 May 2013 09:00 (55 minutes)

Presenter: Mr MASIERO, Antonio

Session Classification: Review Talk

Contribution ID: **19**   Type: **not specified**

Flavour physics in the Higgs Era

Wednesday 22 May 2013 10:00 (25 minutes)

Presenter: Mr BRANCO, Gustavo C.

Session Classification: Plenary Session

Contribution ID: **20**   Type: **not specified**

Adding flavor to Higgs studies

Wednesday 22 May 2013 11:00 (25 minutes)

Presenter: Mr ISIDORI, Gino

Session Classification: Plenary Session

Contribution ID: **21**   Type: **not specified**

Flavour physics, supersymmetry, and GUTs

Wednesday 22 May 2013 11:30 (25 minutes)

Presenter: Prof. NIERSTE, Ulrich (Karlsruhe Institute of Technology)

Session Classification: Plenary Session

Contribution ID: **22**   Type: **not specified**

Neutrino Mass: status and implications

Wednesday 22 May 2013 12:00 (25 minutes)

Presenter: Mr VALLE, Jose

Session Classification: Plenary Session

Contribution ID: **23** Type: **not specified**

String Phenomenology in the Higgs Era

Thursday 23 May 2013 09:00 (55 minutes)

Presenter: Mr IBANEZ, Luis

Session Classification: Review Talk

Contribution ID: **24**   Type: **not specified**

New Aspects of Heterotic/F-theory duality

Thursday 23 May 2013 10:00 (25 minutes)

Presenter: Mrs ANDERSON, Lara

Session Classification: Plenary Session

Contribution ID: **25**   Type: **not specified**

Non-geometric string compactification

Thursday 23 May 2013 11:00 (25 minutes)

Presenter: Mr BLUMENHAGEN, Ralph

Session Classification: Plenary Session

Contribution ID: **26** Type: **not specified**

Hypercharge flux and U(1)s in F-theory GUTs

Thursday 23 May 2013 11:30 (25 minutes)

Presenter: Mr PALTI, Eran

Session Classification: Plenary Session

Contribution ID: **27**　　　　　　　　　　　　　　　　　　Type: **not specified**

Precision gauge unification in strings

Thursday 23 May 2013 12:00 (25 minutes)

Presenter: Prof. RATZ, Michael (TU Munich)

Session Classification: Plenary Session

Contribution ID: **28**   Type: **not specified**

Review BSM Phenomenology

Friday 24 May 2013 09:00 (55 minutes)

Presenter: Mr CHOI, Kiwoon

Session Classification: Review Talk

Contribution ID: **29** Type: **not specified**

Aspects of string phenomenology in the LHC era

Friday 24 May 2013 10:00 (25 minutes)

Presenter: Mr ANTONIADIS, Ignatios

Session Classification: Plenary Session

Contribution ID: **30**   Type: **not specified**

Origin and Phenomenology of Dark Radiation

Friday 24 May 2013 11:00 (25 minutes)

Presenter: Mr CONLON, Joseph

Session Classification: Plenary Session

Contribution ID: **31**   Type: **not specified**

Probing BSM physics with inflationary gravitational waves

Friday 24 May 2013 11:30 (25 minutes)

Presenter: Mr MOROI, Takeo

Session Classification: Plenary Session

Contribution ID: **32**   Type: **not specified**

New regions in the NMSSM with a 125 GeV Higgs

Friday 24 May 2013 12:00 (25 minutes)

Presenter: Mr OLECHOWSKI, Marek

Session Classification: Plenary Session

Contribution ID: **33**   Type: **not specified**

Axion Physics

Friday 24 May 2013 14:00 (25 minutes)

Presenter: Mr KIM, Jihn E.

Session Classification: Plenary Session

Contribution ID: **34** Type: **not specified**

Composite Higgs vs LHC data

Friday 24 May 2013 14:30 (25 minutes)

Presenter: WULZER, Andrea

Session Classification: Plenary Session

Contribution ID: **35**   Type: **not specified**

Status of constrained SUSY in light of LHC data

Friday 24 May 2013 15:00 (25 minutes)

Presenter: ROSZKOWSKI, Leszek

Session Classification: Plenary Session

Contribution ID: **36**   Type: **not specified**

Charginos and neutralinos, Higgs physics and LHC

Friday 24 May 2013 15:30 (25 minutes)

Presenter: Mr CASAS, Alberto

Session Classification: Plenary Session

Contribution ID: **37**
Type: **not specified**

Physics Post LHC 8: Quo Vadis?

Friday 24 May 2013 16:30 (55 minutes)

Presenter: Mr ROSS, Graham

Session Classification: Final Talk

Contribution ID: **38** Type: **not specified**

MFV in 2HDM

Tuesday 21 May 2013 14:00 (25 minutes)

We discuss extensions of the Standard Model with two Higgs doublets, where there are flavour changing neutral currents both in the quark and leptonic sectors, with their strength controlled by the fermion mixing matrices V_{CKM} and V_{PMNS}. These models are an extension to the leptonic sector of the class of models previously considered by Branco, Grimus and Lavoura, for the quark sector. They are based on a symmetry and as a result they are very constrained from the experimental point of view.

Presenter: REBELO, Margarida Nesbitt

Session Classification: Parallel Session on Flavor Physics

Contribution ID: **39**   Type: **not specified**

Complementarity of Bs->mu+mu- and B-> K l+l- decays in New Physics searches

Tuesday 21 May 2013 14:30 (25 minutes)

We discuss the advantages of combining the experimental bound on Br(B_s -> mu+ mu-) and the measured Br(B -> K l+l-) to get the model independent constraints on physics beyond the Standard Model. Since the two decays give complementary information, one can study not only the absolute values of the Wilson coefficients that are zero in the Standard Model, but also their phases. We study benchmark phenomenological models, where only one type of Wilson coefficient is present at a time as well as motivated supersymmetric models and models with leptoquarks. To identify the sector in which the new physics might appear, information about the shapes of the transverse asymmetries in B -> K* l+l- at low q^2's can be particularly useful. We also emphasize the importance of measuring the forward-backward asymmetry in B -> K l+l- decay at large q^2's.

Presenter: KOSNIK, Nejc

Session Classification: Parallel Session on Flavor Physics

Contribution ID: **40**   Type: **not specified**

Heavy neutrino search in accelerator-based experiments

Tuesday 21 May 2013 15:00 (25 minutes)

It is known that heavy sterile neutrinos (HSN) of order 100 MeV can serve as an agent of the baryon asymmetry and successful supernova explosions. We explore the feasibility of detecting such HSN by the existing facilities of neutrino experiments. Taking the T2K experiment as a typical example, we find that the HSN are copiously produced at the secondary beam line and their decays taking place inside the near detector can be observed. The sensitivity of T2K at 10^{21} POT is better than that of the previous experiment PS191, which has placed the most stringent bounds on the HSN couplings.

Presenter: WATANABE, Atsushi

Session Classification: Parallel Session on Flavor Physics

Contribution ID: **41**   Type: **not specified**

Neutrino mixing in an extended Babu-Ma-Valle model

Tuesday 21 May 2013 16:00 (15 minutes)

Recently the last of the neutrino mixing angle θ_{13} has been measured giving a non zero value. Using discrete symmetries to successfully explain lepton mixing is still possible. As an example, we have modified the so called Babu-Ma-Valle model in such a way that we account for the current neutrino mixing values at $3\,\sigma$.

Presenter: VANEGAS FORERO, David

Session Classification: Parallel Session on Flavor Physics

Contribution ID: **42** Type: **not specified**

UV completions of A4 models with viable theta13

Tuesday 21 May 2013 16:20 (15 minutes)

The ultraviolet completion of flavour models can strongly improve the predictivity of the respective effective models. We consider A4 models, existing minimal UV completions and construct several next-to-minimal UV complete models. We compare the results of these possibilities to the experimental data including theta13. Through the predictive power of the UV completions, we are able to either rule out or constrain several minimal and next-to-minimal alternatives.

Presenter: DE MEDEIROS VARZIELAS, Ivo

Session Classification: Parallel Session on Flavor Physics

Contribution ID: **43** Type: **not specified**

Lepton Mixing Patterns from a Scan of Finite Discrete Groups

Tuesday 21 May 2013 16:40 (15 minutes)

The recent discovery of a non-zero value of the mixing angle theta_13 has ruled out tri-bimaximal mixing as the correct lepton mixing pattern generated by some discrete flavor symmetry (barring large next-to-leading order corrections in concrete models). In this work we assume that neutrinos are Majorana particles and perform a general scan of all finite discrete groups with order less than 1536 to obtain their predictions for lepton mixing angles. To our surprise, the scan of over one million groups only yields 3 interesting groups that give lepton mixing patterns which lie within 3-sigma of the current best global fit values. A systematic way to categorize such groups and the implications for flavor symmetry are discussed.

Presenter: LIM, Kher Sham

Session Classification: Parallel Session on Flavor Physics

Contribution ID: 44   Type: **not specified**

Muon conversion to electron in nuclei in type-I seesaw models

Tuesday 21 May 2013 17:00 (15 minutes)

The talk will be based on the paper arXiv:1209.2679, in which is computed the $\mu \to e$ conversion in the type-I seesaw model, as a function of the right-handed neutrino mixings and masses. The definite predictions will be presented and discussed. In particular, the ratios between the $\mu \to e$ conversion rate for a given nucleus and the rate of two other processes which also involve a $\mu - e$ flavor transition: $\mu \to e\gamma$ and $\mu \to eee$. Indeed, for a quasi-degenerate mass spectrum of right-handed neutrino masses -which is the most natural scenario leading to observable rates- those ratios depend only on the seesaw mass scale, offering a quite interesting testing ground. Furthermore, it turns out that planned $\mu \to e$ conversion experiments would be sensitive to masses as low as 2 MeV. Finally, taking into account other experimental constraints, future $\mu \to e$ conversion experiments will be fully relevant to detect or constrain sterile neutrino scenarios in the 2 GeV–1000 TeV mass range.

Presenter: DHEN, Mikael

Session Classification: Parallel Session on Flavor Physics

Contribution ID: **45**   Type: **not specified**

Revisiting the Γ(K→eγ)/Γ(K→μγ) ratio in supersymmetric unified models

Tuesday 21 May 2013 17:20 (15 minutes)

It has been pointed out that supersymmetric extensions of the Standard Model can induce significant changes to the theoretical prediction of the ratio $\Gamma(K\to e\nu)/\Gamma(K\to\mu\nu)=R_K$, through lepton flavor violating couplings. We shall discuss these new contributions to R_K arising in the context of different constrained supersymmetric models which succeed in accounting for neutrino data, further considering the possibility of accommodating a near future observation of a $\mu\to e\gamma$ transition. The prospects for R_K in the framework of unconstrained supersymmetric models will also be accessed, taking into account limits on BR($B_s\to\mu\mu$) and, more importantly, BR($\tau\to e\gamma$) and BR($B_u\to\tau\upsilon$).

Presenter: FONSECA, Renato

Session Classification: Parallel Session on Flavor Physics

Contribution ID: 46   Type: **not specified**

SU(5)-type unification of Yukawa couplings of fermions in MSSM

Tuesday 21 May 2013 17:40 (15 minutes)

What are the conditions, a minimal phenomenologically viable supersymmetric grand unified theory should fulfill? Here, we address the possibility of unification of eigenvalues of down-quark and lepton Yukawa matrices in the framework of renormalizable MSSM. Results will be presented together with a discussion of current values of relevant low-energy observables. This will present an update to previous accounts of supersymmetric SU(5)-type unification of Yukawa couplings for all families of fermions.

Presenter: ISKRZYŃSKI, Mateusz

Session Classification: Parallel Session on Flavor Physics

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

Compressed SUSY and Gauge Coupling Unification

Tuesday 21 May 2013 14:00 (25 minutes)

I study precision gauge coupling unification (PGU) in the MSSM with pure gravity and mixed gravity/anomaly mediation. Implications of PGU for SUSY searches at the LHC are discussed.

Presenter: WINKLER, Martin

Session Classification: Parallel Session on Formal BSM

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

A model for light sterile neutrinos

Tuesday 21 May 2013 14:30 (25 minutes)

Some experimental anomalies suggest the possible existence of light sterile neutrino(s) mixing with the active ones. In this talk, we present a (supersymmetric) scenario in which the sterile neutrino is the fermionic partner of the pseudo-Goldstone boson associated with the spontaneous breaking of an approximate global symmetry. This property protects the sterile neutrino mass against large contributions that would otherwise be allowed by all symmetries. We discuss the phenomenological implications of such a light sterile neutrino.

Presenter: LAVIGNAC, Stéphane

Session Classification: Parallel Session on Formal BSM

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

The naturally light dilaton

Tuesday 21 May 2013 15:00 (25 minutes)

The Goldstone theorem does not apply straightforwardly to the case of spontaneously broken spacetime symmetries such as dilatation invariance. We elucidate under which conditions a light scalar degree of freedom, identifiable with the dilaton, can naturally arise in a field theory. Our construction can be considered as an example of an explicit dynamical solution to the Cosmological Constant problem in the scalar version of gravity. Note added: it is NOT about interpreting the Higgs boson as a dilaton/impostor.

Presenter: LODONE, Paolo

Session Classification: Parallel Session on Formal BSM

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

Low scale SUSY breaking and its LHC signatures

Tuesday 21 May 2013 16:00 (15 minutes)

Scenarios in which the supersymmetry breaking scale is not far above the soft parameters of the Minimal Supersymmetric Standard Model (MSSM) have two main consequences for model building. First, the particle spectrum is extended by an almost massless gravitino and possibly a sgoldstino scalar. Second, the MSSM interactions receive significant corrections from higher dimensional effective operators involving the goldstino supermultiplet and MSSM superfields. We present the deformation of MSSM in the case of low supersymmetry breaking scale and its consequences on LHC phenomenology. We focus on deviations of the Standard Model Higgs couplings to gauge bosons and fermions as well as on LHC constraints on the supersymmetry breaking scale.

Presenter: TZIVELOGLOU, Pantelis

Session Classification: Parallel Session on Formal BSM

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

Flavour-messenger unification

Tuesday 21 May 2013 16:20 (15 minutes)

The motivation behind flavour-messenger unification originates from some F-theory constructions of GUT theories where flavour and messengers come from the same D7-brane intersection. This means that messengers and visible matter should be treated on equal footing. This scenerio has very strong consequences on model building and low energy phenomenology.

Presenter: PAWEŁCZYK, Jacek

Session Classification: Parallel Session on Formal BSM

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

A portal extension of the standard model with an unbroken local dark U(1)

Tuesday 21 May 2013 16:40 (15 minutes)

We propose an extension of the standard model in which dark sector respects an unbroken local U(1) symmetry and communicates with standard model sector via portal interactions of Higgs, right-handed neutrinos and kinetic mixing. Various constraints and physics involved in the model are discussed.

Presenter: PARK, Wan-Il

Session Classification: Parallel Session on Formal BSM

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

Phenomenology of Bulk Higgs-Radion Mixing

Tuesday 21 May 2013 17:00 (15 minutes)

The discovery of the Higgs candidate boson last year offers a new tool to investigate BSM physics. Models with warped extra dimensions involve an additional scalar, the radion, which can mix with the Higgs. This mixing has been previously considered for Higgses localised on the infrared brane. We extend these studies to two further classes of models: those with a bulk Higgs, and gauge-Higgs unification scenarios where the Higgs is part of a five-dimensional vector field. We demonstrate how the relevant mixing terms can be generated by loop effects, and in particular how this is related to the breaking of gauge symmetry for gauge-Higgs unification models. We further constrain the radion mass and mixing using the observed Higgs production and branching ratios. Finally we consider additional LHC signals that might shed light on these models.

Presenter: SPRAY, Andrew

Session Classification: Parallel Session on Formal BSM

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

Low-energy predictions of yukawa-deflected gauge mediation models"

Tuesday 21 May 2013 17:20 (15 minutes)

Recent discovery of Higgs-like particle at the LHC points to modifications of standard gauge mediation models. Those which have attracted the most attention contain additional interactions between messengers and matter. During the talk I will discuss the role of such messenger-matter couplings and give examples of low-energy spectra in that class of models.

Presenter: JELINSKI, Tomasz

Session Classification: Parallel Session on Formal BSM

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

Effective action in quantum gravity

Tuesday 21 May 2013 17:40 (15 minutes)

We present the formalism of computing one-loop effective action for quantum gravitation using non-local heat kernel methods. We find agreement with previous old results. In main part of my talk I consider the system of E-H gravitation and scalar fields. We are able to derive nonlocal quantum effective action up to the second order in heat kernel generalized curvatures. By going to flat spacetime expressions for gravitational formfactors are constructed and compared with the results from effective field theory for gravity.

Presenter: RACHWAL, Leslaw

Session Classification: Parallel Session on Formal BSM

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

An enhanced CMB power spectrum from quantum gravity

Tuesday 21 May 2013 14:00 (25 minutes)

We evaluate the modifications to the CMB anisotropy spectrum that result from a semiclassical expansion of the Wheeler–DeWitt equation for a real scalar field coupled to gravity in a spatially flat FLRW universe. Recently, such an investigation has led to the prediction that the power at large scales is suppressed. We make here a more general analysis and show that there is an ambiguity in the choice of solution to the equations describing the quantum gravitational effects. Whereas one of the two solutions describes a suppression of power, the other one decribes an enhancement. We investigate possible criteria for an appropriate choice of solution. We also derive general formulae for arbitrary values of the complex parameter in the general solution of the nonlinear differential equations for the JWKB wave function.

Presenter: ESPOSITO, Giampiero

Session Classification: Parallel Session on Cosmology

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

Results for Leptogenesis from Non-Equilibrium Field Theory

Tuesday 21 May 2013 14:30 (25 minutes)

We explain how non-equilibrium methods give rise to NLO corrections to the theory of unflavoured Leptogenesis in the strong washout regime. New LO predictions are made available in the weak washout case (including Leptogenesis from mixing light sterile neutrinos) and for the transition between the flavoured and unflavoured regimes. As a new source of CP-violation, we identify the mixing of active species, i.e. of lepton doublets or several Higgs doublets.

Presenter: GARBRECHT, Björn

Session Classification: Parallel Session on Cosmology

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

Top and bottom partner production in composite Higgs models at the LHC

Tuesday 21 May 2013 15:00 (25 minutes)

Natural composite Higgs models predict light top and bottom partners, vector-like quarks that mix strongly with the top and bottom quarks. We describe the strategy to discover them and the Large Hadron Collider and their use to explore further aspects of models of strong electroweak symmetry breaking.

Presenter:　SANTIAGO, Jose

Session Classification:　Parallel Session on LHC

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

Gravitational waves from the sound of a first-order phase transition

Tuesday 21 May 2013 15:00 (25 minutes)

I will report on the first numerical 3+1D simulation of a thermal first-order phase transition. The simulation includes a scalar field plus a relativistic fluid. We follow
the evolution and collisions of the bubbles related to the phase transition. We compute the generated gravitational wave spectrum, and find that their prime source are sound
produced by the colliding bubbles.

Presenter: HUBER, Stephan

Session Classification: Parallel Session on Cosmology

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

Strong phase transitions in 2HDM

Tuesday 21 May 2013 16:00 (15 minutes)

We do a random scan over the parameter space of the two-Higgs-doublet model searching for points with a strong phase transition. The results show that the model is a robust candidate for explaining baryogenesis, especially in the light of the recent results by ATLAS and CMS regarding the properties of the recently discovered scalar.

Presenter: CARVALHO DORSCH, Glauber

Session Classification: Parallel Session on Cosmology

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

A predictive scheme for triplet leptogenesis

Tuesday 21 May 2013 16:20 (15 minutes)

I present a model of baryogenesis through leptogenesis, inspired from arXiv:0804.0801, in which a lepton asymmetry is generated by the CP-violating decay of an electroweak scalar triplet. This triplet also gives rise to neutrino Majorana masses through the type II seesaw mechanism. Therefore, there is a very direct link between the CP asymmetry and neutrino parameters, which are already known or could be measured by future experiments. I study the impact of flavor effects and compute the final baryon asymmetry predicted by the model. In particular, the final baryon asymmetry strongly depends on the mixing angle theta_13. The value measured by the Daya Bay experiment is in the right ballpark to account for the observed baryon-to-photon ratio.

Presenter: SCHMAUCH, Benoit

Session Classification: Parallel Session on Cosmology

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

Tribrid inflation: a framework for connecting inflation with particle physics

Tuesday 21 May 2013 16:40 (15 minutes)

We discuss recent progress on supersymmetric tribrid inflation, a variant of hybrid inflation which is particularly suited for connecting inflation with particle physics. Inflation ends with a phase transition near the GUT scale, and the inflaton can be a D-flat combination of charged fields in the matter sector of the particle theory. This relates the inflaton couplings – which can be constrained by measurements of the CMB – to the properties of matter particles, which may be observable in the low-energy theory. In this talk, we identify three different regimes of tribrid inflation and summarize their respective predictions for the CMB spectrum. Afterwards, we explain how the framework of tribrid inflation may be applied in model-building to realise tribrid inflation in explicit SUSY particle physics models near the GUT scale.

Presenter: NOLDE, David

Session Classification: Parallel Session on Cosmology

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

Higgs-Dilaton Cosmology: an effective field theory approach

Tuesday 21 May 2013 17:00 (15 minutes)

The Higgs-Dilaton cosmological model describes simultaneously an inflationary period in the early Universe and a dark energy dominated stage responsible for the present day acceleration. The common origin of both processes gives rise to a non-trivial relation between the spectral tilt of scalar perturbations and the dark energy equation of state. We study the self-consistency of this model from an effective field theory point of view. Taking into account the influence of the dynamical background fields, we determine the effective cut-off of the theory, which turns out to be parametrically larger than all the relevant energy scales from inflation to the present epoch. We finally formulate the set of assumptions needed to estimate the amplitude of the quantum corrections in a systematic way and show that the connection between the early and late universe observables remains unchanged if these conditions are satisfied.

Presenter: RUBIO, Javier

Session Classification: Parallel Session on Cosmology

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

On the electroweak vacuum stability in the inflationary Universe

Tuesday 21 May 2013 17:20 (15 minutes)

Recent LHC results suggest the electroweak vacuum metastability. Although its lifetime is longer than the cosmic age in almost all the parameter space, quantum tunneling to the unwanted true vacuum in the quasi-de Sitter background may occur during inflation. This, in turn, constrains severely high-scale inflation models. In this talk, we discuss how to avoid such tunneling during high-scale inflation and give new constraints on parameters of inflation models, such as reheating temperature.

Presenter: KAMADA, Kohei

Session Classification: Parallel Session on Cosmology

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

On the requirements for a successful WIMPy baryogenesis

Tuesday 21 May 2013 17:40 (15 minutes)

I give a brief overview of a recently proposed mechanism dubbed WIMPy baryogenesis. A stable Weakly Interacting Massive Particle (WIMP) is the Dark Matter (DM) candidate. Via CP-violating annihilations of the WIMP into a quark and an exotic heavy antiquark, one gets not only the right DM thermal relic abundance but also generates the observed baryon asymmetry. I discuss the key ingredients of the models explored so far and suggest possible variants that we are currently investigating.

Presenter: UBALDI, Lorenzo

Session Classification: Parallel Session on Cosmology

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

Light RPV stops hiding in the LHC data

Tuesday 21 May 2013 14:00 (25 minutes)

I will discuss the 8 TeV LHC reach on pair produced heavy flavored di-jet resonances. Motivated by theories of R-parity violation in supersymmetry I will concentrate on a final state with two b-jets and two light jets. I will exploit b-tagging to reject the background and discuss its importance at the trigger level to probe light stops. I will also present kinematical selections that can be used to isolate the signal as a bump in the mass distribution of the candidate resonances. As a result I will show that stops with R-parity violating couplings giving rise to fully hadronic final states can be found in the present LHC dataset. Remarkably, the LHC can probe stop masses well within the range predicted by naturalness.

Presenter: TORRE, Riccardo

Session Classification: Parallel Session on LHC

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

Light stops emerging in WW cross section measurements?

Tuesday 21 May 2013 14:30 (25 minutes)

Recent ATLAS and CMS measurements show a slight excess in the WW cross section measurement. While still consistent with the Standard Model within 1-2 sigma, the excess could be also a first hint of physics beyond the Standard Model. We argue that this effect could be attributed to the production of scalar top quarks within supersymmetric models. The stops of mass ~200 GeV has the right cross section and under some assumptions can significantly contribute to the final state of two leptons and missing energy. We scan this region of parameter space to find particle masses preferred by the WW cross section measurements. Taking one sample benchmark point we show that it can be consistent with low energy observables and Higgs sector measurements and propose a method to distinguish supersymmetric signal from the Standard Model contribution.

Presenter: ROLBIECKI, Krzysztof

Session Classification: Parallel Session on LHC

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

Spin-1 resonances as a signature of composite Higgs at the LHC

Tuesday 21 May 2013 16:00 (15 minutes)

This talk will focus on the consequences of electroweak symmetry breaking by strong dynamics, assuming the existence of a light composite scalar appearing as a pseudo- Goldstone boson of some global symmetry of the new strongly interacting sector. In such a scenario, the composite scalar has properties very similar to the Standard Model Higgs, but the existence of additional resonances with different spins is also expected. Properties and phenomenology of lightest spin-1 resonances will be considered in a simple general effective Lagrangian description. The question whether the effects of spin- 1 resonances can be observed at the LHC, shedding light on the nature of the Higgs boson, will be addressed.

Presenter: KAMINSKA, Anna

Session Classification: Parallel Session on LHC

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

Implications of effective axial-vector coupling of gluon for $t\bar{t}$ spin polarizations at the LHC

Tuesday 21 May 2013 16:20 (15 minutes)

We analyze the impact of effective axial-vector coupling of the gluon on spin polarization observables in $t\bar{t}$ pair production at the LHC (arXiv:1212.3272, to appear on PRD). Working at leading order in QCD, we compute the $t\bar{t}$ spin-correlation and left-right spin asymmetry coefficients in the helicity basis in the laboratory frame as functions of the new physics scale Λ associated with this coupling. We found that the $t\bar{t}$ invariant mass dependent asymmetries are more sensitive to the scale Λ than the corresponding inclusive ones, in particular when suitable cuts selecting high $t\bar{t}$ invariant mass regions are imposed. In the context of this scenario, we show that the LHC has potential either to confirm or to rule out the Tevatron FB top asymmetry anomaly by analyzing the $t\bar{t}$ spin-correlation and left-right polarization asymmetries. On the other hand, stringent lower bound on the new physics scale Λ can be set in this scenario if no significant deviations from the SM predictions for those observables will be measured.

Presenter: RACIOPPI, Antonio

Session Classification: Parallel Session on LHC

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

The MSSM at the end of LHC Phase 1 - status report

Tuesday 21 May 2013 16:40 (15 minutes)

The discovery of the Higgs boson at 126 GeV seems to imply masses in the multi-TeV regime for the simplest constrained SUSY models. Such a heavy supersymmetric spectrum is somewhat at odds with the naturalness criterion. Moreover, in such a framework it is impossible to obtain the correct value of $(g-2)_\mu$. By construction, SUSY models with light sleptons and light third generation squarks do not present the same problem. In this context we analyze the status of a version of the MSSM with 9 free parameters at the end of LHC Phase 1 runs. We investigate the impact on the parameter space of different direct SUSY searches using a statistical approach. We also include various other constraints from b-physics, the anomalous magnetic moment of the muon, the relic density and direct and indirect detection of dark matter. All experimental results are implemented through the likelihood functions, including the limits from XENON100 and from two 8 TeV CMS searches (inclusive search of SUSY particles with α_T and electroweak production), for which the likelihood is constructed through simulation of the signal yields to be compared with observed events and backgrounds given by the experimental collaborations.

Presenter: SESSOLO, Enrico Maria

Session Classification: Parallel Session on LHC

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

Using top polarization for improving third generation squark searches

Tuesday 21 May 2013 17:00 (15 minutes)

If supersymmetry is the solution to the Higgs mass hierarchy problem, this requires the existence of light stops and sbottoms. The current reach of the experimental searches for stops and sbottoms at the LHC is however still limited. In this work, we exploit the information about top polarization in sbottom (and stop) decays into tops, in order to gain better control over the signals arising from these sparticles. We discuss various scenarios leading to distinct top polarization. Further, we investigate different observables related to top polarization and comment upon their helpfulness to improve searches for third generation super-particles.

Presenter: KULKARNI, Suchita

Session Classification: Parallel Session on LHC

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

Supersymmetric Parameter Determination at the LHC using a Neural Network

Tuesday 21 May 2013 17:20 (15 minutes)

Finding signs of new physics and even knowing the underlying theory does not automatically come along with the knowledge of the model parameters. In most new physics theories the relation mapping the measured observables onto the model parameters is unknown. In this talk the ability of a neural network is demonstrated to find this unknown relation in parameter space. As example different reference regions of the mSUGRA parameter space are examined in the context of the LHC with a center of mass energy of 14 TeV. But in general a neural network can also be used for any other model. For a given measurement the artificial neural network directly computes the values of the model parameters and their errors.

Presenter: BORNHAUSER, Nicki

Session Classification: Parallel Session on LHC

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

Probing dynamical electroweak symmetry breaking with cosmic rays

Tuesday 21 May 2013 17:40 (15 minutes)

The energies attained by cosmic rays offer an opportunity for probing the mechanism for dynamical electroweak symmetry breaking directly. In this talk we will discuss which signals are expected to be observed in air showers in the presence of such mechanisms.

Presenter: DIETRICH, Dennis D.

Session Classification: Parallel Session on LHC

Contribution ID: **74**   Type: **not specified**

Discrete Symmetries in Global MSSM-like D-Brane Models

Wednesday 22 May 2013 14:00 (25 minutes)

Discrete symmetries are usually invoked to explain the absence of baryon- and lepton-number violating operators in the MSSM. In global D-brane models, discrete Z_n symmetries arise as remnants of massive Abelian gauge symmetries. I will discuss the conditions for the existence of Z_n symmetries in intersecting D-brane worlds on orbifold backgrounds. An examplary global model with particle physics spectrum will be presented together with its set of family-independent and family-dependent discrete Z_n symmetries.

Presenter: HONECKER, Gabriele

Session Classification: Parallel Session on String Theory

Contribution ID: 75   Type: **not specified**

Neutrino mass textures from String symmetries

Wednesday 22 May 2013 14:30 (25 minutes)

tba

Presenter: LEONTARIS, George

Session Classification: Parallel Session on String Theory

Contribution ID: **76** Type: **not specified**

The heterotic string on magnetized orbifolds

Wednesday 22 May 2013 15:00 (25 minutes)

We give an alternative description of the Schoen manifold as the blow-up of a Z_2 × Z_2 orbifold in which one Z_2 factor acts as a roto-translation. Since for this orbifold the fixed tori are only identified in pairs but not orbifolded, four-dimensional chirality can never be obtained using standard techniques alone. This situation is typical for orbifolds that have vanishing Euler number. However, chirality is recovered when its tori become magnetized. To exemplify this, we construct an SU(5) GUT on the Schoen manifold with Abelian gauge fluxes, which becomes an MSSM with three generations after an appropriate Wilson line is associated to its freely acting involution.

Presenter: GROOT NIBBELINK, Stefan

Session Classification: Parallel Session on String Theory

Contribution ID: **77**   Type: **not specified**

Inflation in the random SUGRA landscape

Wednesday 22 May 2013 16:00 (15 minutes)

tba

Presenter: PEDRO, Francisco

Session Classification: Parallel Session on String Theory

Contribution ID: **78**   Type: **not specified**

Moduli Stabilization and Cosmology With Poly-Instanton Corrections

Wednesday 22 May 2013 16:20 (15 minutes)

In the context of type IIB orientifold compactifications, we present a new class of Kaehler moduli inflation realized in the LARGE volume scenarios. The inflaton is a Kaehler modulus corresponding to the volume of a so-called "Wilson" divisor which is relevant for supporting the poly-instanton corrections. Further, this standard single-field model is generalized into a two-field model by the inclusion of respective axion modulus, and large non-Gaussianity signatures are observed in beyond slow-roll regime. Note: The talk would be based on the papers arXiv:1205.2485 (JHEP 1206 (2012) 162), arXiv:1208.1160 (JHEP 1211 (2012) 101) and arXiv:1301.6076 (JHEP 1303 (2013) 061).

Presenter: SHUKLA, Pramod

Session Classification: Parallel Session on String Theory

Contribution ID: **79**   Type: **not specified**

A Zip-Code for Quarks Leptons and Higgs Bosons

Wednesday 22 May 2013 16:40 (15 minutes)

The location of matter fields and the pattern of gauge symmetry in extra dimensions are crucial ingredients for string model building. We analyze realistic MSSM models from the heterotic Z6 Mini-Landscape and extract those properties that are vital for their success. We find that Higgs bosons and the top quark are not localized in extra dimensions and live in the full D=10 dimensional space-time. The first two families of quarks and leptons, however, live at specific fixed points in extra dimensional space and exhibit a (discrete) family symmetry. Within a newly constructed Z2XZ4 orbifold framework we further elaborate on these location properties and the appearance of discrete symmetries. A similar geometrical picture emerges. This particular Zip-code for quarks, leptons and Higgs bosons seems to be of more general validity and thus a useful guideline for realistic model building in string theory.

Presenter: OEHLMANN, Paul

Session Classification: Parallel Session on String Theory

Contribution ID: **80**　　　　　　　　　　　　　　　　　Type: **not specified**

Where is the PdV term in the first law of black hole thermodynamics?

Wednesday 22 May 2013 17:00 (15 minutes)

A PdV term is introduced into the first law of black hole thermodynamics, with the volume being defined to be the variable thermodynamically conjugate to the pressure that arises from the cosmological constant. The black hole equation of state then bears a remarkable similarity to the van der Waals equation. The effect of this new term in the equation of state will be explored.

Presenter: DOLAN, Brian

Session Classification: Parallel Session on String Theory

Contribution ID: **81**   Type: **not specified**

R Symmetries from Heterotic Orbifold Compactifications

Wednesday 22 May 2013 17:20 (15 minutes)

We consider the string theory origin of R-charge conservation laws in heterotic orbifold compactifications, deriving the corresponding string coupling selection rule for factorizable and non-factorizable orbifolds, with prime ordered and non-prime ordered point groups. R-charge conservation arises due to symmetries among the worldsheet instantons that can mediate the couplings. Among our results is a previously missed non-trivial contribution to the conserved R-charges from the Gamma-phases in non-prime orbifolds, which weakens the R-charge selection rule. Symmetries among the worldsheet instantons can also lead to additional selection rules for some couplings. We make a similar analysis for Rule 4 or the 'torus lattice selection rule'.

Presenter: MAYORGA PENA, Damian Kaloni

Session Classification: Parallel Session on String Theory

Contribution ID: **82** Type: **not specified**

The Scale-Invariant NMSSM and the 126 GeV Higgs Boson

Wednesday 22 May 2013 14:00 (25 minutes)

The recent LHC discovery of a Higgs-like resonance at 126 GeV suggests that the minimal supersymmetric standard model must be modified in order to preserve naturalness. A simple extension is to include a singlet superfield and consider the scale-invariant NMSSM, whose renormalizable superpotential contains no dimensionful parameters. This extension not only solves the \mu-problem, but can easily accommodate a 126 GeV Higgs. I will present our recent study of naturalness in the scale-invariant NMSSM taking into account the constraints from LHC searches, flavor physics and electroweak precision tests. We show that TeV-scale stop masses are still allowed in much of the parameter space with 5% tuning for a low messenger scale of 20 TeV, split families (with third-generation sleptons decoupled) and Higgs-singlet coupling \lambda of order one. For larger values of the Higgs-singlet coupling, which can relieve the tuning in the Higgs VEV, an additional tuning in the Higgs mass limits increasing the (lightest) stop mass beyond 1.2 TeV, the gluino mass above 3 TeV, and electroweak charginos and neutralinos beyond 400 GeV for a combined tuning better than 5%. This implies that the natural region of parameter space for the scale-invariant NMSSM will be fully explored at the 14 TeV LHC.

Presenter: SCHMIDT, Michael

Session Classification: Parallel Session on BSM Physics

Contribution ID: **83** Type: **not specified**

SO(10) meets LHC

Wednesday 22 May 2013 14:30 (25 minutes)

In terms of physics results, 2012 has been an exciting year. In July 2012, the ATLAS and CMS collaborations have discovered a new particle that is consistent with the Standard Model Higgs boson. At the same time, the LHC has pushed the lower limits for supersymmetric particles to new heights, and this has contributed to the anxiety in the physics community that SUSY, if realized in nature, may not be "natural" after all. Complementary to these "direct" searches for new physics, the LHCb experiment has presented in November 2012 the first evidence for the rare decay B_s -> mu+ mu- which strongly constrains supersymmetric models with large tanbeta. However, the new results have not been limited to collider searches. In early 2012, the Daya Bay and Reno collaborations have measured a "large" neutrino mixing angle theta13 of about 9 degrees, thereby strongly disfavoring the tribimaximal mixing scenario which has been a paradigm in neutrino physics for the last decade. Also, the Xenon100 experiment has started to probe regions of the SUSY parameter space which are "preferred" by many models. In my talk, I will explore the consequences of these experimental results on generic SO(10) models with Yukawa unification in general, and on the so-called Dermisek-Raby (DR) model in particular. After motivating why we might expect a grand unified gauge group at some larger energy scale, I will introduce the DR-model and discuss how well it fits current data in light of the recent experimental results. I will conclude with predictions of the DR model that are testable at the LHC.

Presenter: WINGERTER, Akin

Session Classification: Parallel Session on BSM Physics

Contribution ID: **84**   Type: **not specified**

Light Staus and Enhanced Higgs Diphoton Rate in SUSY SO(10) Yukawa Unification

Wednesday 22 May 2013 15:00 (25 minutes)

In SUSY SO(10) GUT the top, bottom and tau Yukawa couplings unify at the GUT scale. It is shown that in a MSSM scenario restricted by top-bottom-tau Yukawa unification and the SO(10) gauge symmetry the low-energy SUSY spectrum may consist of the 125 GeV Higgs and light, strongly-mixed staus leading to enhanced Higgs diphoton rate.

Presenter: BADZIAK, Marcin

Session Classification: Parallel Session on BSM Physics

Contribution ID: **85**   Type: **not specified**

Gauge Mediation beyond Minimal Flavor Violation

Wednesday 22 May 2013 16:00 (15 minutes)

We discuss a minimal modification of Gauge Mediation in which the messenger sector couples directly to the MSSM matter fields. These couplings are controlled by the same dynamics that explain the flavor hierarchies, and therefore are parametrically as small as the Yukawas. This setup gives rise to an interesting SUSY spectrum that is calculable in terms of a single new parameter. Due to large A-terms, the model can easily accommodate a 125 GeV Higgs with a relatively light SUSY spectrum. The flavor structure depends on the particular underlying flavor model, but flavor-violating effects arise dominantly in the up-sector and are strongly suppressed in Delta C =2 observables. This structure allows to account for the recent observation of direct CP violation in D-meson decays.

Presenter: CALIBBI, Lorenzo

Session Classification: Parallel Session on BSM Physics

Contribution ID: **86**   Type: **not specified**

Minimal SUSY SU(5) GUT in the high-scale SUSY scenario

Wednesday 22 May 2013 16:20 (15 minutes)

We revisit the minimal supersymmetric SU(5) grand unified theory (SUSY SU(5) GUT) in the high-scale SUSY scenario. Although the model has been believed to be excluded due to the too short lifetime of proton, we have found that it is possible to evade the experimental constraints on the proton decay rate if the supersymmetric particles have masses much heavier than the electroweak scale. Since the resultant proton lifetime lies in the regions which may be reached in the future experiments, proton decay searches may give us a chance to verify the scenario as well as the supersymmetric grand unified models.

Presenter: NAGATA, Natsumi

Session Classification: Parallel Session on BSM Physics

Contribution ID: **87**   Type: **not specified**

Supersymmetric quiver gauge theories: a phenomenological perspective

Wednesday 22 May 2013 16:40 (15 minutes)

The recent LHC discovery of a Higgs-like particle that could be involved in electroweak symmetry breaking places strong bounds on the parameter space of supersymmetric models. In particular, it has been argued that minimal gauge mediated supersymmetry breaking scenarios seem to be at odds with a Higgs boson of ~126 GeV. Supersymmetric quiver gauge theories are an already well-established attractive class of models, communicating SUSY breaking to the visible sector via linking fields. These models arise naturally in high-energy models, and interpolate between general gauge and gaugino mediated supersymmetry breaking. Recently, it has been shown that they can fairly easily accommodate a Higgs boson of ~126 GeV. In this talk, we will explore phenomenological aspects of SUSY quiver models relevant both for colliders and dark matter searches.

Presenter: GOUDELIS, Andreas

Session Classification: Parallel Session on BSM Physics

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

Little hierarchy problem for new physics just beyond the LHC

Wednesday 22 May 2013 17:00 (15 minutes)

I discuss two possible extensions to the standard model in which an inert singlet scalar state that only interacts with the Higgs boson is added together with some fermions. In one model the fermions provide for a see-saw mechanism for the neutrino masses, in the other model for grand unification of the gauge couplings. Masses and interaction strengths are fixed by the requirement of controlling the finite one-loop corrections to the Higgs boson mass thus addressing the little hierarchy problem. The inert scalar could provide a viable dark matter candidate.

Presenter: FABBRICHESI, Marco

Session Classification: Parallel Session on BSM Physics

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

Automatized generation of non-SUSY RGEs for a general gauge field theory

Wednesday 22 May 2013 17:20 (15 minutes)

In light of the conspicuous absence of SUSY in the energy range explored by the LHC in 2012, non-supersymmetric BSM scenarios are becoming more and more attractive. One key ingredient in exploring such BSM physics are the renormalization group equations (RGEs) that are essential for extrapolating the theory to higher energy scales. Although the 2-loop RGEs for a general quantum field theory are known since a long time, there is no easy-to-use tool that automatically generates them (for supersymmetric models, see the Mathematica package SARAH by F. Staub). In this talk, I will present a set of Python programs that generate the RGEs for an arbitrary model that is specified in terms of its gauge group and particle content. Then I will discuss its application to some simple BSM scenarios like the extension of the SM by vectorlike quarks and leptons. This is work in progress in collaboration with Ingo Schienbein, Florian Staub and Akin Wingerter.

Presenter: LYONNET, Florian

Session Classification: Parallel Session on BSM Physics

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

keV Neutrino Dark Matter

Wednesday 22 May 2013 14:00 (25 minutes)

In this talk, an introduction to keV sterile neutrinos as Dark Matter particles is given. After reviewing the cosmological aspects of (Warm) Dark Matter, I will explain why the topic is interesting for particle physics model building and also point out the differences to ordinary neutrino model building. We will go through a couple of generic models, all of which yield interesting and fundamental connections between the neutrino and the Dark Matter sectors. We finally present some alternative ideas and generalizations.

Presenter: MERLE, Alexander

Session Classification: Parallel Session on Dark Matter

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

Correlations between Indirect Detection and Collider Signals in Decaying Dark Matter Scenarios

Wednesday 22 May 2013 14:30 (25 minutes)

Decaying dark matter is an interesting and viable alternative to the common paradigm of stable dark matter. Our purpose is to investigate whether the LHC can probe scenarios of decaying DM. Although the limits on the DM lifetime forbid the direct collider observation of its decays, the couplings responsible for these processes can determine, thanks to crossing symmetries, DM production cross section. In this case a collider analysis outcome can be combined with an eventual dark matter indirect detection in order to get better insight of DM properties. We thus propose a model independent study of operators connecting the dark matter particle with SM model quarks or, possibly, with gauge bosons. Relevant indirect detection limits, namely antiprotons and gamma-rays, already disfavor the simplest configurations of direct coupling of the DM with Standard model states. More promising turn to be instead scenarios in which the interactions of the dark matter are mediated by a scalar state carrying color charge or at least electromagnetic. Its production is not affected by ID limits while at the same time it induces three-body decays of the dark matter. The same couplings also determine decays of the scalar into DM and SM states which can be observed at the collider. In this framework several scenarios can be distinguished, featuring WIMP DM as well as FIMP and superWIMP configurations. For each scenario the relevant constraints from dark matter observables have been investigated. In addition have been identified the current and next future collider searches of new Physics which are relevant for the particle physics framework under consideration.

Presenter: ARCADI, Giorgio

Session Classification: Parallel Session on Dark Matter

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

The 130 GeV gamma-ray line and generic dark matter model building constraints from continuum gamma rays, radio and antiproton data

Wednesday 22 May 2013 15:00 (25 minutes)

An analysis of the Fermi gamma ray space telescope data has recently revealed a resolved gamma-ray feature close to the galactic center which is consistent with monochromatic photons at an energy of about 130 GeV. If interpreted in terms of dark matter (DM) annihilating into \gamma \gamma, this would correspond to a DM particle mass of roughly 130 GeV. The rate for these loop-suppressed processes, however, is larger than typically expected for thermally produced DM. Correspondingly, one would generically expect even larger tree level production rates of standard model fermions or gauge bosons. Here, we quantify this expectation in a rather model-independent way by relating the tree level and loop amplitudes with the help of the optical theorem. As an application, we consider bounds from continuum gamma rays, radio and antiproton data on the tree level amplitudes and translate them into constraints on the loop amplitudes. We find that, independently of the DM production mechanism, any DM model aiming at explaining the line signal in terms of charged standard model particles running in the loop is in rather strong tension with at least one of these constraints, with the exception of loops dominated by top quarks. We stress that attempts to explain the 130 GeV feature with internal bremsstrahlung do not suffer from such difficulties. (based on arXiv:1211.6739)

Presenter: ASANO, Masaki

Session Classification: Parallel Session on Dark Matter

Contribution ID: **93**   Type: **not specified**

Effective Theory of Dark Matter Decay into Monochromatic Photons and its Implications: Constraints from Associated Cosmic-Ray Emission

Wednesday 22 May 2013 16:00 (15 minutes)

We show that there exists only a quite limited number of higher dimensional operators which can naturally lead to a slow decay of dark matter particles into monochromatic photons. As each of these operators inevitably induces decays into particles other than photons, we show that the g-lines it induces are always accompanied by a continuum flux of cosmic rays. Hence constraints on cosmic-ray fluxes imply constraints on the intensity of g-lines and vice versa. A comparison with up to date observational bounds shows the possibilities to observe or exclude cosmic rays associated to g-line emission, so that one could better determine the properties of the DM particle, possibly discriminating between some of the operators.

Presenter: SCARNA, Tiziana

Session Classification: Parallel Session on Dark Matter

Contribution ID: **94**   Type: **not specified**

Internal Bremsstrahlung Signatures from Dark Matter Annihilations in Light of Direct Detection and Collider Searches

Wednesday 22 May 2013 16:20 (15 minutes)

Over the last years direct dark matter detection, collider searches and gamma ray observations have made tremendous progress towards probing dark matter. In particular searches for gamma ray lines have attracted a lot of attention during the last year. A well known alternative to gamma lines is provided by the hard spectrum of Internal Bremsstrahlung. We investigate the importance of direct detection and collider constraints for IB scenarios and consider prospect for upcoming experiments. With instruments like CTA and Xenon1T it seems even possible to observe dark matter independently both by direct and indirect detection.

Presenter: VOGL, Stefan

Session Classification: Parallel Session on Dark Matter

Contribution ID: **95**   Type: **not specified**

Study of internal bremsstrahlung in the inert doublet model

Wednesday 22 May 2013 16:40 (15 minutes)

We show evidence for the existence of internal bremsstrahlung signatures in the Inert Doublet Model (IDM). In particular, we show they naturally arise in the high dark matter mass regime due to the near-degeneracy of the extra scalar masses. We calculate the corresponding annihilation cross-sections and compare them against constraints coming from direct and indirect dark matter searches. Finally we comment on the possibility of observing this feature in the H.E.S.S experiment.

Presenter: GARCIA CELY, Camilo A

Session Classification: Parallel Session on Dark Matter

Contribution ID: **96** Type: **not specified**

Dark Matter and Co-annihilation

Wednesday 22 May 2013 17:00 (15 minutes)

Co-annihilation can be dominant in many scenarios. We adopt an effective operator approach to the dark matter physics where co-annihilation is dominant in giving the right amount of relic abundance. The related collider constraints on these effective operators are also studied.

Presenter: CAI, Yi

Session Classification: Parallel Session on Dark Matter

Contribution ID: **97**   Type: **not specified**

Anisotropies in the gamma-ray sky from galactic dark matter annihilation

Wednesday 22 May 2013 17:20 (15 minutes)

High-energy photons from dark matter annihilation in dark matter halos and subhalos may contribute to the diffuse gamma-ray background. We study here the features of the angular power spectrum of the signal expected from dark matter annihilation in galactic halos and subhalos. We evaluate the anisotropy signal obtained from various galactic-sized cosmological simulations and discuss the relevant phenomenological consequences.

Presenter: DE ROMERI, Valentina

Session Classification: Parallel Session on Dark Matter

Contribution ID: **98**   Type: **not specified**

Froggatt-Nielsen models with derived Z4 R-symmetry

Wednesday 22 May 2013 14:00 (25 minutes)

The observed hierarchies of fermion masses and mixing angles can be explained in the framework of Froggatt and Nielsen by imposing a family dependent U(1) symmetry. Based on a supersymmetric setting, we consider the possibility of a flavor U(1) R-symmetry which breaks down to a remnant Z4 R-symmetry. While containing R-parity as a subgroup, this discrete R-symmetry provides a solution to the mu-problem by forbidding the bilinear Hu Hd term.

Presenter: LUHN, Christoph

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: 99   Type: **not specified**

Natural SUSY from a SU(2)xU(1) Flavor Model

Wednesday 22 May 2013 14:30 (25 minutes)

I am going to present a SUSY flavor model based on a global SU(2) and a gauged U(1) horizontal symmetry. In the fermion sector it closely resembles the successful predictions of the U(2) models for various relations between fermion masses and mixing angles. In the sfermion sector the U(1) acquires a large D-term vev which together with the usual F-term contribution leads to split spectrum in which only gauginos, higgsinos and 3rd generation sfermions are light.

Presenter: ZIEGLER, Robert

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **100**   Type: **not specified**

Spontaneous CP violation in A4xSU(5) with Constrained Sequential Dominance 2

Wednesday 22 May 2013 15:00 (25 minutes)

We revisit a two right-handed neutrino model with two texture zeros, namely an indirect model based on A4 with the recently proposed new type of constrained sequential dominance (CSD2), involving vacuum alignments along the (0,1,-1)^T and (1,0,2)^T directions in flavour space, which are proportional to the neutrino Dirac mass matrix columns. In this paper we construct a renormalizable and unified indirect A4xSU(5) model along these lines and show that, with spontaneous CP violation and a suitable vacuum alignment of the phases, the charged lepton corrections lead to a reactor angle in good agreement with results from Daya Bay and RENO. The model predicts a right-angled unitarity triangle in the quark sector and a Dirac CP violating oscillation phase in the lepton sector of delta approximately 130 degrees, while providing a good fit to all quark and lepton masses and mixing angles.

Presenter: SPINRATH, Martin

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **101**   Type: **not specified**

Neutrino Mass from a d=7 Effective Operator in a SUSY-GUT Framework

Wednesday 22 May 2013 16:00 (15 minutes)

If the d=5 Weinberg operator is forbidden by a discrete symmetry, neutrino mass can be generated by new physics at the TeV scale, which can be tested at the LHC. We want to discuss models where neutrino mass originates from a d=7 operator in the framework of SUSY-GUTs containing an SU(5) subgroup. The embedding in GUT multiplets has phenomenological consequences, which we want to discuss on the basis of a specific example. We will present the cosmological consequences of additional heavy d-quarks that are predicted in this scenario and are constrained by big bang nucleosynthesis and direct searches for heavy nuclei.

Presenter: KRAUSS, Martin

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **102**   Type: **not specified**

CP and Discrete Flavour Symmetries

Wednesday 22 May 2013 16:20 (15 minutes)

We discuss issues surrounding the definition of CP transformations in theories with discrete flavour symmetries. We will show that the consistency of the theory implies that every generalised CP transformation can be interpreted as a representation of an automorphism of the discrete group. Using this formalism, we will discuss various approaches that try to derive CP phases from geometrical properties of groups. In particular, we will clear up issues concerning recent claims about geometrical CP violation in models based on T', clarify the origin of 'calculable phases' in Delta(27) and explain why apparently CP violating scalar potentials of A4 result in a CP conserving ground state. based on http://arxiv.org/abs/1211.6953 , to appear in JHEP

Presenter: HOLTHAUSEN, Martin

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **103**   Type: **not specified**

Electroweak Precision Tests of Composite Higgs Models

Wednesday 22 May 2013 16:40 (15 minutes)

We examine the compatibility of the composite Higgs models with the constraints coming from Electroweak Precision Tests from the low-energy effective theory (EFT) prospective. The EFT approach allows us to capture the common features of the composite Higgs models and incorporate a broad class of explicit models. In our analysis we concentrate on the effects related to a presence of relatively light composite fermionic resonances. We show that some of the typically used observables are non-predictable within the low energy theory and derive the bounds on the parameters of the known explicit models. (Based on a work in collaboration with Christophe Grojean and Giuliano Panico, to appear soon)

Presenter: MATSEDONSKYI, Oleksii

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **104** Type: **not specified**

General Composite Higgs Models

Wednesday 22 May 2013 17:00 (15 minutes)

We construct a general class of pseudo-Goldstone composite Higgs models, within the minimal SO(5)/SO(4) coset structure. We characterize the main properties these models should have in order to give rise to a Higgs mass around 125 GeV. We assume the existence of relatively light and weakly coupled spin 1 and 1/2 resonances. In absence of a symmetry principle, we introduce the Minimal Higgs Potential (MHP) hypothesis: the Higgs potential is assumed to be one-loop dominated by the SM fields and the above resonances, with a contribution that is made calculable by imposing suitable generalizations of the first and second Weinberg sum rules. We show that a 125 GeV Higgs requires light, often sub-TeV, fermion resonances.

Presenter: MARZOCCA, David

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **105**   Type: **not specified**

A minimally tuned composite Higgs model from an extra dimension

Wednesday 22 May 2013 17:20 (15 minutes)

I present the 5D realization of a composite Higgs model with minimal tuning. The Higgs is a (pseudo-)Goldstone boson from the spontaneous breaking of a global SO(5) symmetry to an SO(4) subgroup. The peculiarity of our construction lies in the specific choice of the SO(5) representations of the 5D fermions which reduces the tuning to the minimal model-independent value allowed by electroweak precision tests. I analyse the main differences between our 5D construction and other descriptions in terms of purely 4D field theories. 5D models show a generic difficulty in accommodating a light Higgs without reintroducing large corrections to the S parameter. I propose a specific construction in which this tension can be relaxed. I discuss the spectrum of the top partners in the viable regions of parameter space and predict the existence of light exotic quarks, Y, of charge 8/3 whose striking decay channel $Y \to W^+ W^+ W^+ b$ can lead to either exclusion or confirmation of the model in the near future.

Presenter: THAMM, Andrea

Session Classification: Parallel Session on Flavor Physics + Composite Models

Contribution ID: **106**   Type: **not specified**

Non-Equilibrium Thermal Dark Matter

Thursday 23 May 2013 18:00 (25 minutes)

Dark Matter (DM) may have been produced out of thermal equilibrium in the early universe. This possibility has been investigated before through the so-called "Freeze-in" scenario of Feebly-Interacting-Massive-Particles. In this talk I show that this is just a particular case of a general out-of-equilibrium-generated DM, by describing new alternatives which are totally different at a fundamental level. As an example, Grand Unification Theories can naturally lead to such mechanisms, where a DM with unsuppressed couplings can populate the universe to the relic density values we observe today, while never reaching equilibrium with the thermal bath.

Presenter: ZALDIVAR, Bryan

Session Classification: Parallel Session on LHC and DM

Contribution ID: **107**

Type: **not specified**

Interplay between Fermi gamma-ray lines and collider searches

Thursday 23 May 2013 18:30 (25 minutes)

We explore the interplay between lines in the gamma-ray spectrum and LHC searches involving missing energy and photons. As an example, we consider a singlet Dirac fermion dark matter with the mediator for Fermi gamma-ray line at 130 GeV. A new chiral or local U(1) symmetry makes weak-scale dark matter natural and provides the axion or Z' gauge boson as the mediator connecting between dark matter and electroweak gauge bosons. In these models, the mediator particle can be produced in association with a monophoton at colliders and it produces large missing energy through the decays into a DM pair or ZZ Z gamma with at least one Z decaying into a neutrino pair. We adopt the monophoton searches with large missing energy at the LHC and impose the bounds on the coupling and mass of the mediator field in the models. We show that the parameter space of the Z' mediation model is already strongly constrained by the LHC 8 TeV data, whereas a certain region of the parameter space away from the resonance in axion-like mediator models are bounded. We foresee the monophoton bounds on the Z' and axion mediation models at the LHC 14 TeV.

Presenter: LEE, Hyun Min

Session Classification: Parallel Session on LHC and DM

Contribution ID: **108**   Type: **not specified**

Two ultimate tests of constrained supersymmetry

Thursday 23 May 2013 19:00 (25 minutes)

The discovery of the Higgs boson at 126 GeV seems to imply masses in the multi-TeV regime for the simplest constrained SUSY models. Thus, with the exception of limited regions of the parameter space where stop mixing is large, in these scenarios the new physics might be out of reach even for the 14 TeV run. We discuss the prospects of using two alternative and complementary ways to explore the high-mass regions of the parameter space of the CMSSM and the NUHM: 1) We quantify the impact of reducing the experimental error in the measurement of $BR(B_s \to \mu^+\mu^-)$ to about 5% around the Standard Model value. We show that, in the CMSSM, $BR(B_s \to \mu^+\mu^-)$ has power to disfavor the A-funnel region that, otherwise, could neither be probed by direct SUSY searches at the LHC nor by direct dark matter searches. We also discuss the case of the NUHM, where the constraining power of $BR(B_s \to \mu^+\mu^-)$ is not as significant. 2) We show that the multi-TeV region of the parameter space of both models will be, for the most part, sensitive to direct dark matter searches in future one-tonne detectors. A nearly complete experimental testing of the CMSSM over multi-TeV ranges of superpartner masses, far beyond the reach of direct SUSY searches at the LHC, can therefore be achievable. For the NUHM, it will be more difficult to derive detailed information, but light can be shed on the model in a few cases.

Presenter: KOWALSKA, Kamila

Session Classification: Parallel Session on LHC and DM

Contribution ID: **109**   Type: **not specified**

Naturalness of Light Neutralino Dark Matter

Thursday 23 May 2013 16:00 (15 minutes)

We (P. Grothaus, M. Lindner, Y. T.) investigate neutralino dark matter in the low-energy phenomenological minimal supersymmetric standard model taking account of the newest results from the Large Hadron Collider as well as all other experimental bounds from collider physics and the cosmological abundance. We find that near updates of direct searches signicantly rule out a large area of the parameter space, but will not rise the minimal value of fine-tuning. There is a band at small neutralino masses, where the fine-tuning stays low even for cross-sections of about 10^{-16} pb.

Presenter: TAKANISHI, Yasutaka

Session Classification: Parallel Session on LHC and DM

Contribution ID: **110**   Type: **not specified**

Dark matter, singlet extensions of the nuMSM, and symmetries

Thursday 23 May 2013 16:20 (15 minutes)

The Lyman-alpha forest bound severely constrains the non-resonant production of warm dark matter in the nuMSM. It has been shown that an extension of the nuMSM by a Higgs singlet phi can provide a dark matter production mechanism through the decays of phi that readily satisfies or escapes the Lyman-alpha bound. I will discuss the astrophysical and cosmological constraints on such models and demonstrate how the required pattern of masses and couplings can be realized with underlying symmetries.

Presenter: ALLISON, Kyle

Session Classification: Parallel Session on LHC and DM

Contribution ID: **111**   Type: **not specified**

SUSY-QCD corrections to neutralino-stop co-annihilation

Thursday 23 May 2013 16:40 (15 minutes)

We have computed the one-loop SUSY-QCD corrections for neutralino-stop coannihilation into electroweak gauge and Higgs bosons in the MSSM. I will show that these annihilation channels are phenomenologically relevant within the pMSSM, in particular in the light of the observation of the Higgs boson with a mass of about 126 GeV at the LHC. I will show numerical results for the cross sections and their impact on the neutralino relic density and demonstrate that the corrections have to be considered in order to match with experimental precision from Planck results.

Presenter: LE BOULC'H, Quentin

Session Classification: Parallel Session on LHC and DM

Contribution ID: **112**   Type: **not specified**

Higgs couplings after Moriond 2013

Thursday 23 May 2013 17:00 (15 minutes)

Performing a fit to all publicly available data, we analyze the extent to which the latest results from the LHC and Tevatron constrain the couplings of the Higgs boson-like state at ~ 125 GeV, as well as invisible (or undetected) decays. This is based on arXiv:1212.5244 (to appear in JHEP) and G. Belanger, BD, U. Ellwanger, J. F. Gunion, S. Kraml, in preparation.

Presenter: DUMONT, Beranger

Session Classification: Parallel Session on LHC and DM

Contribution ID: **113**   Type: **not specified**

Higgs signal at the LHC for the 4D Composite Higgs Model

Thursday 23 May 2013 17:20 (15 minutes)

General Composite Higgs models provide an elegant solution to the hierarchy problem present in the Standard Model (SM) and give an alternative pattern leading to the mechanism of electroweak symmetry breaking (EWSB). We present a recently proposed realistic realization of this general idea analyzing in detail the Higgs production and decay modes. Comparing them with the latest Large Hadron Collider (LHC) data We show that the 4D Composite Higgs Model (4DCHM) could provide a better explanation than the SM to the LHC results pointing to the discovery of a Higgs like particle at 125 GeV.

Presenter: BARDUCCI, Daniele

Session Classification: Parallel Session on LHC and DM

Contribution ID: **114**   Type: **not specified**

Constraints on models with universal extra dimensions from dilepton searches at the LHC

Thursday 23 May 2013 17:40 (15 minutes)

Models with universal extra dimensions predict that each Standard Model particle is accompanied by a tower of Kaluza-Klein resonances. Canonical searches for the production and cascade decays of first Kaluza-Klein modes through missing transverse momentum signatures suffer in general from low detection efficiencies because of the rather compressed Kaluza-Klein particle mass spectrum. We analyze signatures from the production of second Kaluza-Klein states which can decay into Standard Model particles and thus do not result in any missing transverse momentum. Such signatures provide a strong sensitivity, and are of particular interest as they would allow for a clear distinction between extra dimension models and other models of new physics like supersymmetry.

Presenter: EDELHÄUSER, Lisa

Session Classification: Parallel Session on LHC and DM

Contribution ID: **115** Type: **not specified**

Double Higgs production in a singlet-extended Higgs model

Thursday 23 May 2013 14:00 (25 minutes)

In this talk we revisit the simplest Higgs sector extension containing an additional scalar singlet. We perform a detailed analysis of double Higgs production at the LHC, exploring in particular the bbWW channel. We also comment the relevance of the results for Higgs portal DM models.

Presenter: MORENO, Jesus M.

Session Classification: Parallel Session on Higgs Physics

Contribution ID: **116**   Type: **not specified**

BSM models face Higgs coupling data

Thursday 23 May 2013 14:30 (25 minutes)

We discuss how to probe Beyond Standard Model theories with Higgs coupling data. I will discuss, first, how much Higgs couplings deviate from their Standard Model values in different theories if no other states are accessible at the LHC. We will argue that this is the experimental precision required in the measurement of Higgs couplings. Finally, I will discuss how present and future Higgs coupling data can probe natural SUSY models. Refs: 1) Gupta, Rzehak and Wells (arXiv:1206.3560) 2) Gupta, Montull and Riva (arXiv:1212.5240)

Presenter: GUPTA, Rick Sandeepan

Session Classification: Parallel Session on Higgs Physics

Contribution ID: **117**　　　　　　　　　　　　　　　　　　Type: **not specified**

Engineering a 125 GeV Higgs in the MSSM

Thursday 23 May 2013 15:00 (25 minutes)

The a 125 GeV Higgs boson can be most naturally realized within the MSSM if there is significant stop squark mixing. This talk deals with the difficulties in obtaining large stop mixing from high-scale SUSY breaking models. We detail the necessary conditions on the high-scale soft terms, and review several scenarios of SUSY breaking mediation with regards to their compatibility with maximal stop mixing. We also present a new model in which maximal stop mixing can be naturally realized within gauge-mediated SUSY breaking.

Presenter: BRUEMMER, Felix

Session Classification: Parallel Session on Higgs Physics

Contribution ID: **118**   Type: **not specified**

Modified Higgs Physics from Composite Light Flavors

Thursday 23 May 2013 16:30 (15 minutes)

Nature seems to have chosen a light scalar to unitarize WW scattering. Yet, the Higgs discovery at the LHC does not fully resolve the electroweak symmetry breaking puzzle and one is left to find out what renders the light scalar naturally insensitive to (unknown) very short distance dynamics. New Physics models where the Higgs emerges as a Goldstone boson of some new strong dynamics at the TeV scale provide an appealing solution to this problem, alternate to supersymmetry. In this framework, the large top mass requires that the top quak (and left-handed bottom) is a composite object. There are however no low-energy hint regarding whether the first and second quark generations (and right-handed bottom) are also composite objects or remain elementary states up to very high energies. We argue in this talk that radiative Higgs couplings are relatively sensitive probes to the degree of compositeness of the light quark flavors. We further elaborate on how and to what extend Higgs rate measurements at the LHC can be used to infer the flavor structure of the strong dynamics.

Presenter: DELAUNAY, Cedric

Session Classification: Parallel Session on Higgs Physics

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

The Effective Chiral Lagrangian for a Light Dynamical Higgs

Thursday 23 May 2013 16:50 (15 minutes)

The basis of CP-even chiral effective operators describing a dynamical Higgs sector, is generalized to the case in which the Higgs-like particle is light. Gauge a nd gauge-Higgs operators are considered up to mass dimension five. This analysis completes the tool needed to explore at leading order the connection between linear realizations of the electroweak symmetry breaking mechanism - whose extreme case is the Standard Model - and non-linear realizations with a light Higgs-like particle present. It may also provide a model-independent guideline to explore which exotic gauge-Higgs couplings may be expected, and their relative strength to Higgsless observable amplitudes. The analysis is reduced by nature to the consideration of flavour -conserving operators except for the standard Yukawa-type fermionic couplings

Presenter: YEPES, Juan Alberto

Session Classification: Parallel Session on Higgs Physics

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

Multiple Higgs and Vector boson production beyond the Standard Model

Thursday 23 May 2013 17:10 (15 minutes)

If the electroweak symmetry breaking is originated from a strongly coupled sector, as for instance in composite Higgs models, the Higgs boson couplings can deviate from their Standard Model values. In such cases, at suficiently high energies there could occur an onset of multiple Higgs boson and longitudinally polarised electroweak gauge boson (VL) production. We study the sensitivity to anomalous Higgs couplings in inelastic processes with 3 and 4 particles (either Higgs bosons or VL's) in the final state. We show that, due to the more severe cancellations in the corresponding amplitudes as compared to the usual 2 to 2 processes, large enhancements with respect to the Standard Model can arise even for small modications of the Higgs couplings. In particular, we find that triple Higgs production provides the best multiparticle channel to look for these deviations. We briefly explore the consequences of multiparticle production at the LHC.

Presenter: OLIVEIRA, Alexandra

Session Classification: Parallel Session on Higgs Physics

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

Higgs to diphoton and vanilla new Physics

Thursday 23 May 2013 17:30 (15 minutes)

After an introduction on the current experimental status of the Higgs boson, I will study the effect of new vector-like fermions on the h -> gamma gamma channels, in which the effect of new physics may be already showing up. In particular, I will analyze colored and uncolored fermions in their smallest SU(2) representations, and the modifications to the previously mentioned channels in regions allowed by electroweak precision measurements.

Presenter: BERTUZZO, Enrico

Session Classification: Parallel Session on Higgs Physics

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

Probing the two light Higgs scenario in the NMSSM with a low-mass pseudoscalar

Thursday 23 May 2013 17:50 (15 minutes)

We propose a simultaneous collider search strategy for a pair of scalar bosons in the NMSSM through the decays of a very light pseudoscalar. The massive scalar has a mass around 126 GeV while the lighter one can have a mass in the vicinity of 98 GeV, thus explaining an apparent LEP excess, or be much lighter. The successive decay of this scalar pair into two light pseudoscalars, followed by leptonic pseudoscalar decays, produces clean multi-lepton final states with small or no missing energy. We emphasize that a dedicated experimental search for multi-lepton final states can be a useful probe for this scenario and, in general, for the NMSSM Higgs sector.

Presenter: PARK, Chan Beom

Session Classification: Parallel Session on Higgs Physics

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

Higgs phenomenology in the triplet extension of the MSSM

Thursday 23 May 2013 18:10 (15 minutes)

Extending the Higgs sector of the MSSM by triplets alleviates the little hierarchy problem and naturally allows for enhancements in the diphoton decay rate of the lightest CP-even Higgs. In this talk the Higgs phenomenology of this theory with a hyperchargeless triplet is analyzed. In particular, for any value $m\_A > m\_h$ there is a parameter region where the CP-even Higgs sector appears at colliders as the SM one, except for loop-induced corrections. At small m_A, moreover, there exists a second parameter region where the lightest CP-even Higgs phenomenology is as in the Standard Model except for decays into bottoms and taus. Improvements in the CP-odd and charged Higgs searches will be worthwhile to discriminate this scenario from the Standard Model.

Presenter: NARDINI, Germano

Session Classification: Parallel Session on Higgs Physics

Contribution ID: **124**   Type: **not specified**

The NMSSM with F-theory unified boundary conditions

Thursday 23 May 2013 14:00 (25 minutes)

We study the phenomenological viablility of a constrained NMSSM with parameters subject to unified conditions from F-theory GUTs. We find that very simple assumptions about modulus dominance SUSY breaking in F-theory unification lead to a predictive set of boundary conditions , consistent with all phenomenological constraints.

Presenter: APARICIO, Luis

Session Classification: Parallel Session on Formal BSM

Contribution ID: **125**	Type: **not specified**

The Higgs mass from stringy high scale SUSY

Thursday 23 May 2013 14:30 (25 minutes)

The Higgs quartic coupling has now been indirectly measured at the electroweak scale. Assuming no new low-scale physics, its running is known and, together with gauge and Yukawa couplings, it is a crucial new piece of information constraining UV completions of the Standard Model. In particular, supersymmetry broken at an intermediate or high energy scale with low tan(beta) is consistent with present data and has an independent theoretical appeal. We analyze the possible string-theoretic motivations for tan(beta)~1 in Higgs sectors realized on either 6- or 7-branes. We identify specific geometries where a vanishing quartic coupling may arise naturally and specify the geometrical problems which need to be solved to determine its precise value in the generic case. Finally we consider models with negative quartic couplings at the SUSY breaking scale.

Presenter: KNOCHEL, Alexander

Session Classification: Parallel Session on Formal BSM

Contribution ID: **126**   Type: **not specified**

Scattering in general gauge mediation and holography

Thursday 23 May 2013 15:00 (25 minutes)

Supersymmetry breaking and its mediation can be reformulated as a scattering problem. This talk will outline how pion scattering and "bottom up" AdS/QCD models may be extended to describe strongly coupled hidden sectors that break supersymmetry. We look at what can "in-principle" be measured and what it can actually predict about the MSSM.

Presenter: MCGARRIE, Moritz

Session Classification: Parallel Session on Formal BSM

Contribution ID: **127**   Type: **not specified**

Supersymmetric SO(10) GUTs with sliding scales

Thursday 23 May 2013 16:30 (15 minutes)

We construct supersymmetric $SO(10)$ models with different intermediate scales, consistent with gauge coupling unification. We found the complete list of sets of fields that can be added in each regime that allows to preserve unification and a "sliding scale mechanism". Using mSugra boundary conditions we calculate some particular combinations of soft SUSY breaking terms, called "invariants", that depend on the squark, slepton and gaugino mass spectra. We classify these invariants into a small number of sets, and show that their measurements contain indirect information about the class of models and the scale of beyond-MSSM physics. Talk based on the paper Hep-ph/1301.6085

Presenter: ARBELÁEZ, Carolina

Session Classification: Parallel Session on Formal BSM

Contribution ID: **128**   Type: **not specified**

One-loop Corrections to Dark Radiation Production in LARGE Volume Models

Thursday 23 May 2013 16:50 (15 minutes)

Dark radiation is produced in LARGE volume models in which reheating is driven by the volume modulus decaying to the visible sector. Decays of this modulus to its axion partner provide the dark radiation. I will discuss the effects of one-loop radiative corrections to the only competitive MSSM decay channel: the decay into Higgs pairs via the Giudice-Masiero term. This alone will more precisely determine the relative fraction of dark radation produced, since by contrast all loop corrections to the volume axion decay channel are Planck-suppressed. Assuming the Giudice-Masiero coupling is fixed at the string scale by a shift symmetry in the Higgs sector, we get a prediction for the effective number of neutrino species, $N_{\{eff\}}$. The result is too large to be consistent with recent WMAP and Planck data, so the minimal model is ruled out.

Presenter: ANGUS, Stephen

Session Classification: Parallel Session on Formal BSM

Contribution ID: **129**   Type: **not specified**

Heterotic Calabi-Yau Compactifications with Flux

Thursday 23 May 2013 17:10 (15 minutes)

As is well known, a standard heterotic compactification to a maximally symmetric space-time does not allow for fluxes to stabilise moduli. By relaxing the condition of a maximally symmetric spacetime, I show how this no-go theorem may be avoided. I will work with the example of a domain wall for concreteness. After moduli stabilisation, the domain wall vacuum may be lifted by means of e.g non-perturbative effects such as a gaugino-condensate.

Presenter: SVANES, Eirik Eik

Session Classification: Parallel Session on Formal BSM

Contribution ID: **130** Type: **not specified**

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Presenter: TORABIAN, Mahdi

Contribution ID: **131**   Type: **not specified**

Proton Stability and Gauge Coupling Unification constraints on string derived models

Thursday 23 May 2013 17:30 (15 minutes)

An appealing proposition to explain the suppression of proton decay mediating and other operators, in heterotic string derived models, is the existence of a low scale Z' that forbids the undesired operators, and thus may arise only after Z' breaking. We will discuss the constraints on such a Z' arising in string derived models and focus on the constraints arising from gauge coupling unification. In two contrasting cases we will show that the phenomenological constraints at the electroweak scale necessitate that the Z' charges are embeddable in E_6. We will discuss how free fermionic models with the required properties may be constructed.

Presenter: MEHTA, Viraf

Session Classification: Parallel Session on Formal BSM

Contribution ID: **132**   Type: **not specified**

Fermion Mixing & Flavor Symmetries: Ideas & Models

Thursday 23 May 2013 17:50 (15 minutes)

I will present ideas of how to predict fermion mixing with the help of discrete non-abelian flavor symmetries which are broken in a particular way and give examples of models in which such ideas are realized. In the leptonic sector emphasis will be put on the possibility to explain the recently measured value of the reactor mixing angle and the possibilities to predict CP violating phases.

Presenter: HAGEDORN, Claudia

Session Classification: Parallel Session on Formal BSM