Portoroz 2011: The Role of Heavy Fermions in Fundamental Physics

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Hotel Slovenija, Portoroz

Book of Abstracts

Contents

Grand Unification / **0**

Flavor Symmetry and Grand Unification

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The combination of flavor symmetry with grand unification is considered. The flavor group SO(3) is used. For the flavon fields (singlets with respect of the GUT group) and the Higgs fields (singlets with respect to the generation group) a simple form for the effective potentials is postulated. It is applied to describe the spontaneous symmetry breaking of flavon fields which are responsible for fermion mass hierarchy and fermion mixings. Similarly, the invariant potential for the Higgs field of an E6 GUT has minima which can be tuned to give simultaneously low and very high Higgs mass values.

1

Precision calculations for top-quark pair production at hadron colliders

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to be completed later

Beauty 2 / **2**

B-Physics Probes for New Physics in the LHC Era

Author: Robert Fleischer[1]

[1] *Nikhef*

We have just entered a new round in the testing of the flavour sector of the Standard Model through high-precision measurements of B-meson decays. While the last decade has revealed many new insights thanks to the interplay between theory and the B-decay data, there is still a largely unexplored territory of the B-physics landscape left for the LHC and improved analyses at the Tevatron. I will discuss recent theoretical developments related to these measurements, with a focus on those decays that are particularly promising for revealing footprints of New Physics.

BSM 2 / **3**

4th Family is Natural in Technicolor

Author: francesco Sannino[1]

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Imagine to discover a new fourth family of leptons at the Large Hadron Collider (LHC) but no signs of an associated fourth family of quarks. What would that imply? An intriguing possibility is that the new fermions needed to compensate for the new leptons gauge anomalies simultaneously address the big hierarchy problem of the Standard Model. A natural way to accomplish such a scenario is to have the Higgs itself be composite of these new fermions. This is the setup we are going to investigate in this paper using as a template Minimal Walking Technicolor. We analyze a general heavy neutrino mass structure with and without mixing with the Standard Model families. We also analyze the LHC potential to observe the fourth lepton family in tandem with the new composite Higgs dynamics. We finally introduce a model uniting the fourth lepton family and the technifermion sector at higher energies.

SUSY 2 / **4**

CP violation in three body decays

Author: Monika Blanke[1]

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I discuss the potential of measuring CP violation in three body decays, paying particular attention to the different possible origins of the “strong” CP-even phase. This phase can be obtained from the propagation of intermediate state particles - either when diagrams with different intermediate particles interfer, or when the intermediate state is off-shell by a different amount. I will elaborate mainly on the second case here which has not yet received much attention in the literature. After analysing a simple toy model I apply our findings to a specific example, namely neutralino decay in the MSSM.

Top 2 / **5**

Studying anomalous top-gluon couplings at Tevatron/LHC

Author: Zenro Hioki[1]

[1] *University of Tokushima*

Corresponding Author: hioki@ias.tokushima-u.ac.jp

Through top-quark pair productions at Tevatron/LHC, we study possible effects of anomalous top-gluon couplings yielded by SU(3)xSU(2)xU(1) invariant dimension-6 effective operators. We calculate the total cross section and also some distributions for pp/ppbar -> ttbar X as functions of two anomalous-coupling parameters, i.e., the chromoelectric and chromomagnetic moments of the top. We show that we get a much stronger constraint on these couplings by combining the Tevatron and LHC data than the one from Tevatron data alone.

Grand Unification / **6**

Aspects of SO(10) unifications with extended matter sector

Author: Michal Malinsky[1]

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In SO(10) unifications with extended matter sector some of the drawbacks of the traditional models can be resolved. On one hand, it is easy to smear the down-quark - charged-lepton Yukawa degeneracy, yet without large Higgs representations. In the flipped variant, supersymmetric SO(10) can be broken down to the SM at the renormalizable level even with multiplets not bigger than the adjoint.

Beauty 2 / **7**

New Physics in B mixing

Author: Alexander Lenz[1]

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We present a strategy to search model independently for new physics. In that respect we also review the theoretical status of the standard model predictions for mixing observables. Finally we discuss the effects of a heavy fourth family to B mixing.

Beauty 1 / **8**

Isgur-Wise functions and the Lorentz group

Author: Luis Oliver[1]

[1] *Laboratoire de Physique Théorique Université de Paris-Sud*

The Isgur-Wise functions are expressed in terms of scalar products of states of the light cloud in a Hilbert space, related by Lorentz transformations. This fact leads to strong constraints on their possible shape.

Dark Matter / **9**

Cosmic Antiproton Constraints on Effective Interactions of the Dark Matter

Author: Tzu-Chiang Yuan[1]

Co-authors: Kingman Cheung [2]; Po-Yan Tseng [2]

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[2] *National Tsinghua University*

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Using an effective interaction approach to describe the interactions between the dark matter particle and the light degrees of freedom of the standard model, we calculate the antiproton flux due to the annihilation of the dark matter in the Galactic Halo and compare to the most recent antiproton spectrum of the PAMELA experiment. We obtain useful constraints on the size of the effective interactions that are comparable to those deduced from collider and gamma-ray experiments.

SUSY 1 / **10**

B mixing, supersymmetry and GUTs

Author: Ulrich Nierste[1]

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The 2010 data on quark flavour physics reveal a considerable tension
with the Standard Model. However, an excellent fit is found if one
permits new physics in the amplitudes describing meson-antimeson mixing in the B_d and B_s systems. The corresponding global analysis disfavours the Standard Model at the level of 3.6 standard deviations and calls for new sources of CP violation in the B-Bbar mixing amplitudes. The Minimal Supersymmetric Standard Model (MSSM) with the popular MFV hypothesis cannot explain this discrepancy. I discuss several viable explanations, ranging from the MSSM with radiative flavour violation to an SO(10) GUT model with novel b->s transitions driven by the atmospheric neutrino mixing angle.

Neutrinos / **11**

Leptogenesis in type-III seesaw models and the implications of flavor effects

Author: Diego Aristizabal[1]

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In type-III seesaw the generation of a lepton asymmetry proceeds via the dynamics of Majorana electroweak triplets. In this talk I will discuss the importance of flavor effects in this type of models, in particular the impact that such effects can have for TeV-scale triplets. I will show that as long as the asymmetry is produced by the
dynamics of the lightest triplet flavor effects are negligible, but open the possibility for scenarios in which the asymmetry is produced
above the TeV scale by heavier states, readily surviving the TeV
related washouts. Possible experimental tests of these scenarios are
also discussed.

Top 2 / **12**

Interplay of t -> bW and B-meson mixing in MFV models

Author: Jure Drobnak[1]

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I will present our recent study on anomalous tWb couplings in minimal flavor violating models. On one hand we examine the effects such couplings might have on the helicity fractions of the W-boson produced in the main decay channel of the top quark and on the other hand, how such couplings can affect B-meson mixing.

Top 3 / **13**

Non-resonant new physics in top pair production at hadron colliders

Author: Degrande Celine[1]

[1] *UCL*

An effective theory is very useful to study the phenomenology of non-resonant new physics at colliders, in a model-independent way. After introducing all the new operators relevant for top pair production, I will then present the constraints on their coefficients derived from Tevatron results. Finally, I will show how the associated new interactions could manifest them-selves at the LHC.

Beauty 1 / **14**

A model for the color suppressed decay mode B\^0 –> 2 \pi\^0

Author: Jan Olav Eeg[1]

[1] *University of Oslo*

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I present a model for the color suppressed decay mode B\^0 –> 2 \pi\^0. The model is an extension of (heavy-light) chiral quark models.
The color suppressed (nonfactorizable) decay mode is obtained in terms of a model dependent gluon condensate. The model can account for the experimental result. Unfortunately, the theoretical result obtained within the model is very sensitive to the two model dependent parameters: The gluon condensate and the constituent light quark mass.

BSM 1 / **15**

Minimal Flavour Violation and Two-Higgs doublet Models.

Author: Margarida Nesbitt Rebelo[1]

Co-authors: Francisco Botella [2]; Gustavo Branco [3]; Miguel Nebot [2]

[1] *UTL/CFTP/IST*

[2] *U. Valencia*

[3] *CFTP/IST*

We construct 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 fixed 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. We consider both the cases of Dirac and Majorana neutrinos and identify the minimal discrete symmetry required in order to implement the models in a natural way.

BSM 2 / **16**

Combined analysis of meson mixings and EW precision observables in 4th generation SM

Authors: Emi Kou[1]; Nejc Košnik[1]

[1] *LAL*

Corresponding Author: nejc.kosnik@ijs.si

Combined analysis of meson mixings and EW precision observables in 4th generation SM.

Dark Matter / **17**

Dark matter models with uniquely spin-dependent detection

Author: Zoltan Ligeti[1]

[1] *Lawrence Berkeley National Laboratory*

It is often assumed that the first evidence for direct dark matter detection will come from experiments probing spin-independent interactions, because of higher sensitivities due to coherence effects. We explore the possibility of models that would be invisible in such experiments, but detectable via spin-dependent interactions. The existence of much larger (or only) spin-dependent tree-level interactions is not sufficient, due to potential spin-independent subdominant or loop-induced interactions. We find that most models with detectable spin-dependent interactions would also generate detectable spin-independent interactions. Models in which a light pseudoscalar acts as the mediator seem to uniquely evade this conclusion. We present a viable dark matter model generating such an interaction.

Top 1 / **18**

Massive Colour-Octet Bosons in Top-Quark Pair Production

Authors: Susanne Westhoff[1]; Ulrich Haisch[1]

[1] *Mainz University*

Corresponding Author: westhoff@uni-mainz.de

Strongly-coupling heavy gauge bosons are predicted in various extensions of the Standard Model. Examples are Kaluza-Klein gluons from extra dimensions or axigluons in models with an enlarged gauge symmetry. I report generic constraints from precision observables and direct production at the LHC. Given these constraints, I discuss the effects of massive colour-octet bosons in top-antitop-quark production. I show that the anomalously large forward-backward asymmetry can be consistently explained within a specific axigluon model.

Beauty 2 / **19**

In pursuit of determining the Bs mixing phase betas

Author: Fulvia De Fazio[1]

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I discuss the possibility of determining the Bs-Bsbar mixing phase from nonleptonic Bs decays to a charmonium state and a light meson, induced by the b \to c cbar s transition.
In particular, I consider the mode Bs \to J/psi f0(980).

SUSY 2 / **20**

Charged LFV in a low-scale seesaw mSUGRA model

Author: Amon Ilakovac[1]

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We investigate the influence of the boundary conditions of minimal supergravity (mSUGRA) on the supersymmetric mechanism for lepton flavour violation (LFV) proposed recently [1], within the framework of the MSSM extended by TeV-scale singlet heavy neutrinos. We find that the consideration of the mSUGRA boundary condition may increase the branching ratios of the muon and tauon decaying into three charged leptons by up to a factor of 5, whereas the corresponding branching ratio for their photonic decays remains almost unchanged.

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Heavy fermions in models for SM fermion masses

Author: Stefan Pokorski[1]

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In many models, the flavour hierarchies among SM fermions are generated directly or indirectly through their dynamical mixing with new heavy (vector-like) fermions. Various predictions of such

models for the FCNC and CP violation effects, generated by the presence of the heavy fermions, will be discussed.

Neutrinos / **22**

Phenomenology of Seesaw-Motivated Heavy Leptons at the LHC

Authors: Branimir Radovcic[1]; Ivica Picek[1]; Kresimir Kumericki[1]

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We study the phenomenology of
Dirac fermion 5-plets leading to the tree-level seesaw different from
standard type I and III. They give rise to the seesaw formula m_{nu} ˜ vˆ6/Mˆ5
which reproduces masses for light neutrinos m_{nu} ˜ 10ˆ{-1} eV by M > TeV new states, testable at the LHC.
Their Drell-Yan production rates are enhanced due to the
enlarged effective gauge couplings, and their tree-level cascade decays are opened by enlarged mass splittings within a multiplet.
Specific decays, including
a distinguished triply charged Σ^{+++} into $W^+W^+l^+$
channel with specific decay signature, may be accessible already at present
$\sqrt{s} = 7$ TeV and 1fb^{-1} of data.

Beauty 3 / **23**

Theory of B -> K(*) l+l- decays at high qˆ2

Author: Gerhard Buchalla[1]

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We discuss a systematic framework for exclusive rare B decays
of the type B -> K(*) *l+l- at large dilepton invariant mass qˆ2.*
It is based on an operator product expansion (OPE) for the required matrix elements of the nonleptonic weak Hamiltonian in this kinematic regime. Matrix elements of subleading terms in the OPE are computed explicitly and a quantitative estimate of duality violation is presented. The main conclusion is that the high-qˆ2 region of
*B -> K(*) l+l- is theoretically under excellent control.
Interesting opportunities exist for precision flavour physics
and new physics tests at the LHC and Super Flavour Factories.

Grand Unification / **24**

Light colored scalar as a messenger of up-, down-quark and charged lepton flavor dynamics in Grand Unified Theories

Author: Ilja Dorsner[1]

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The measured forward-backward asymmetry in the top pair production at Tevatron might be explained by exchange of an additional colored weak singlet. This state emerges naturally in a theoretically well-motivated class of grand unified models and it has some unique properties.
Namely, it interacts with the up-quarks only when they are from different generations. It is also a leptoquark as it couples to the down quarks and charged leptons. We systematically investigate a role of that state in the up-, down-quark and charged lepton physics. The constraints on the relevant Yukawa coupling constants come from the plethora of experimentally measured observables. We present implications of these bounds on the Yukawa couplings and associated predictions for the charged fermion sector.

Beauty 3 / **25**

Radiative b decays as probes of New Physics

Author: Sébastien Descotes-Genon[1]

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Corresponding Author: descotes@th.u-psud.fr

I discuss how current and (some) future observables on inclusive and exclusive radiative b decays can be combined to constrain on the Wilson coefficients of the effective Hamiltonian and discriminate between the Standard Model and some scenarii of New Physics.

Charm / **26**

Charmonium production at LHCb: search strategy with ppbar final state

Author: Emi Kou[1]

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We propose to investigate the charmonium production and spectroscopy using their decays to p pbar final state at LHCb. The yield of J/ψ $\longrightarrow$ p pbar is estimated to be about 60 events/pb−1 at $\sqrt{s}$ = 7 TeV, which should be achieved soon. We will also discuss a potential re-discovery of the hc state at LHCb using the p pbar final state.

Kaons / **27**

The s —> d gamma decay in and beyond the Standard Model

Author: Christopher Smith[1]

[1] *IPN Lyon*

FCNC are suppressed in the Standard Model, and thus constitute our best tools to search for New Physics in low-energy flavor experiment. In this talk, the phenomenology of the s —> d gamma transition is analyzed. In a first part, the anatomy of the Standard Model contributions is reviewed, emphasizing the similarities and differencies with that of b —> s gamma. Besides, it is shown that the radiative transitions could hold the key to the theoretical control of epsilon'/epsilon. Then, a systematic study of the possible New Physics impacts is performed by combining all the FCNC transitions in the s —> d sector, i.e. epsilon', rare K decays, and radiative decays, first in a model-independent setting and then in the MSSM.

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Effective four-fermion operators in top production and decay

Author: Juan Antonio Aguilar Saavedra[1]

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Corresponding Author: juan.antonio.aguilar.saavedra@cern.ch

I will discuss several processes of single and top pair production mediated by four-fermion operators and the future prospects for LHC.

Beauty 1 / 29

Threshold Resummed Mass Corrected Spectra in Heavy Quark Decays

Author: Giulia Ricciardi[1]

[1] *Dip. di Scienze Fisiche Univ. Napoli Federico II*

We discuss resummed formulae in semileptonic decays of a heavy quark h
into a quark q plus a non-hadronic final state, including mass effetcs
of the final quark.

BSM 2 / 30

CP violation with the fourth generation quarks

Author: Blazenka Melic[1]

[1] *Rudjer Boskovic Institute*

By constructing and employing global, unique fit for the fourth generation mass mixing matrix within the Standard model with the 4th generation quarks b' and t', we examine CP-violating phenomena in flavor changing neutral current processes t -> cX; b'-> sX, b'-> bX,t'-> cX, and t'-> tX, with X=Z,H,gamma,g
and discuss their effects on the global CPV picture.

BSM 3 / 31

Combined analysis of flavour physics effects in New Physics models

Author: Stefan Recksiegel[1]

[1] *TUM*

Corresponding Author: stefan@tum.de

Using the 4th Generation and Littlest Higgs with T Parity as examples, We discuss how it is necessary to do a simultaneous analysis of all relevant flavour physics observables to determine the possible effects of such models on yet unmeasured observables. We argue that very often in the literature spectacular effects are claimed which originate in peculiar combinations of New Physics parameters which are in fact excluded by experiment.

SUSY 1 / **32**

SUSY_FLAVOR: a computational tool for FCNC and CP-violating processes in the MSSM

Author: Janusz Rosiek[1]

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I present SUSY_FLAVOR – a library of programs that calculate important leptonic and semi-leptonic low-energy observables in the general R-parity conserving MSSM. Currently the code gives predictions for the K0-bar K0, D-bar D, B_d-bar B_d and B_s-bar B_s mixing parameters; B to X_s gamma, B_{s,d} to l+ l-, K0_L to pi nu-bar nu and K+ to pi+ nu-bar nu decay branching ratios; and the electric dipole moments of the leptons and the neutron. All these quantities are calculated at one-loop level (with some higher-order QCD corrections included) in the exact sfermion mass eigenbasis. I discuss also how to include resummation of higher order chirally enhanced corrections in the planned next version of the library.

Top 3 / **33**

Implications of the top pair forward-backward asymmetry

Author: Gilad Perez[1]

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We study the various theoretical and experimental implications for the recent $t\bar{t}$ forward backward asymmetry measurements done by the CDF collaboration.

Top 3 / **34**

The Top Quark Forward Backward Asymmetry and Flavor

Author: alexander kagan[1]

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We show that the forward-backward asymmetry in top quark pair production can be enhanced by fields that transform nontrivially under the flavour group and satisfy Minimal Flavour Violation, while at the same time the constraints from associated effects on the dσ(t¯t)/dMt¯t distribution, dijet resonance searches, same sign top pair production and other phenomenology are satisfied. We focus on the examples of a
scalar color sextet field and a vector colour octet field that are also sextets and octets of flavor $SU(3)_U$, respectively.

BSM 1 / **35**

Left Right symmetry, neutrinoless double beta decay and the LHC

Author: Miha Nemevsek[1]

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The question of parity restoration has lead to a theory with a left-right symmetric gauge sector, which predicts a non-zero neutrino mass. The existence of (heavy) right-handed neutrinos leads to lepton number violating phenomena at low and high energy scales in the form of neutrinoless double beta decay and two leptons with two jet signatures at colliders. We argue that the neutrinoless double beta transition may need to be dominated by new physics due to an interplay of cosmology and direct searches. We carefully analyze the possible contributions in the minimal model and show how this tension may be relieved by a new contribution which comes from an O(TeV) scale.

SUSY 1 / **37**

Complete resummation of chirally enhanced corrections in the general MSSM

Authors: Andreas Crivellin[1]; Janusz Rosiek[2]; Lars Hofer[3]

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In the MSSM self-energies can be enhanced either by tan(beta) or by the trilinear A-terms and therefore lead to order one corrections.
In this talk I show how these large corrections can be resummed to all order in perturbation theory. This resummation results in effective gluino, chargino, neutralino and Higgs boson vertices. Using these vertices all chirally enhanced effects can be consistently included into the calculation of the Wilson coefficients.

SUSY 2 / **38**

(Meta)stability of the supersymmetry breaking vacuum and gaugino masses

Author: Stephane Lavignac[1]

Co-authors: Emilian Dudas [2]; Jeanne Parmentier [3]

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One notoriously difficult problem in perturbative gauge mediation of supersymmetry breaking via messenger fields is the generic presence of a phenomenologically unacceptable vacuum with messenger vevs, with a lower energy than the desired (MSSM) vacuum. We investigate the possibility that quantum corrections promote the latter to the ground state of the theory, and find that this is indeed feasible. For this to happen, the couplings of the messengers to the goldstino superfield must be small, and this implies an additional suppression of the MSSM soft terms with respect to the supersymmetry breaking scale. This in turns sets a lower limit on the masses of the messengers and of the supersymmetry breaking fields, which makes both sectors inaccessible at colliders. Contrary to other scenarios like direct gauge mediation, gaugino masses are unsuppressed with respect to scalar masses.

Top 3 / **39**

Top Flavor Gauge Boson Physics

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to be completed later

SUSY 1 / **40**

Heavy Fermions and Flavor Physics beyond the SM

Author: Paride Paradisi[1]

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After a brief review of the status of the flavor physics phenomenology
in the SM, I will focus on possible non-standard signals predicted by
theories beyond the SM (especially Supersymmetry) in the flavor phenomenology of heavy fermions.

SUSY 2 / **41**

Spontaneous R-parity Breaking at TeV scale and at the LHC

Author: Yue Zhang[1]

[1] *Abdus Salam ICTP*

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The fate of R-parity is one of the central issues in the minimal supersymmetric standard model. Gauged $B-L$ symmetry provides a natural framework for addressing this question. I will study the theory and phenomenology in a class of models where gauged R-parity is spontaneously broken at TeV, including the predictions of neutrino masses and the signature for such theories to be detected at the LHC.

BSM 1 / **42**

Heavy Fermions and some Aspects of Physics Beyond the SM

Author: Gustavo C. Branco[1]

[1] *Instituto Superior Tecnico (IST)*

We emphasize the role of Heavy Fermions in various aspects of fundamental physics such as:

i) Generating all CP violations from a vaccum phase.

ii) Generating Naturally Suppressed Deviations of 3x3 Unitarity
and Flavour-Changing Neutral Currents.

iii) Providing a Possible Solution to the Strong CP problem.

iv) Impact on CP Asymmetries

Neutrinos / **43**

The Colorful Seesaw

Author: Sogee Spinner[1]

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An exciting prospect for LHC physics is the lepton number violating signals associated with Majoarana neutrino mass generation. Such signals crucially depend on the nature of the associated seesaw fields and could be absent (even for fields with LHC-friendly masses) if these fields cannot be easily produced. A startling exception is the recently proposed colorful seesaw where the color charged seesaw fields have large production cross sections. I will discuss this mechanism and its exciting same-sign dilepton signature.

Beauty 1 / **44**

Status of semileptonic B decays

Author: Paolo Gambino[1]

[1] *Turin U and INFN*

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I will review the determination of Vcb and Vub from semileptonic B decays, focussing on inclusive decays and discussing the extraction of the c and b quark masses from a theoretical point of view.

BSM 2 / **45**

Extra families seek friendship with heavy Higgs and inert doublet

Authors: Alejandra Melfo[1]; Fabrizio Nesti[2]; Goran Senjanovic[3]

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We study the possibility of the existence of extra fermion families and an extra Higgs doublet. We find that requiring the extra Higgs doublet to be inert leaves ample space for three extra families and marginally accommodates four, allowing for mirror fermion families and a dark matter candidate at the same time. The emerging scenario is very predictive: it consists of a heavy Standard Model Higgs, with mass above 450 GeV, heavy new quarks between 340 and 400 GeV, light extra neutral leptons, and an inert scalar with a mass below MZ.

Neutrinos / **46**

Neutrino masses in a two higgs doublet model

Author: Alejandro Ibarra[1]

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TBA

BSM 1 / **47**

Low scale Left-Right symmetry: phenomenology and first bounds from LHC

Author: Fabrizio Nesti[None]

Low scale restoration of Left-Right symmetry is reviewed, with emphasis of the possibility of its striking detection at LHC up to 4 TeV thanks to low scale Lepton-Number-Violation, which may turn out to be required by the claimed evidence and the future studies of neutrinoless double-beta decay, clashing with tightening constraints from cosmology. I focus on the minimal SU(2)L × SU(2)R × U(1)B−L gauge theory reviewing the two possibilities Left-Right symmetry defined as as parity or charge conjugation. A complete study of the quark mass matrices and the associated left and right mixing matrices shows that the limits from flavour-changing and CP violation are as low as M_WR>2.5TeV, and in addition the low scale WR-mediated processes can resolve the current mild discrepancy of the SM with CP violation in the B sector. Thus, the new gauge bosons are accessible at the Large Hadron Collider with spectacular signatures of LNV. The preferred case is Left-Right symmetry coinciding with generalized charge-conjugation, fitting nicely with the SO(10) GUT embedding. I further describe the interplay with LFV, and finally the first bounds derived from the current (CMS) LHC data.

Top 1 / **48**

Signals of the Tevatron t tbar asymmetry at LHC

Author: Juan Antonio Aguilar Saavedra[1]

[1] *University of Granada and Laboratorio de Instrumentacao e Fisica Experimental (LIP)*

If the forward-backward asymmetry in t tbar production at Tevatron is due to new physics, it also implies an enhancement of the t tbar tail at LHC. This could be used to exclude many of the proposed explanations, already with the data collected in 2010. Some other possibilities which do not give a too large tail are discussed, as well as other possible signals.

Beauty 3 / **49**

Determining the photon polarization of the b->s gamma using the B->K1(1270)gamma->(Kpipi)gamma decay

Author: Andrey Tayduganov[None]

Recently the radiative B decay to the strange axial-vector mesons, B->K1(1270)gamma, has been observed with a rather large branching ratio. This process is particularly interesting as the subsequent K1 decay into its three body final state allows us to determine the polarization of the photon, which is mostly left- (right-)handed for Bbar(B) in the SM while various new physics models predict additional right- (left-)handed components. A new method is proposed to determine the polarization, exploiting the full Dalitz plot distribution, which seems to reduce significantly the statistical errors. This polarization measurement requires however a detailed knowledge of the K1->Kpipi strong interaction decays, namely, the various partial wave amplitudes into the several possible quasi two-body channels, as well as their relative phases. The pattern of partial waves is especially complex for the K1(1270). We attempt to obtain the information through the combination of an experimental input and a theoretical one, provided by the 3P0 quark-pair-creation model.

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Heavy fermions and Kaon decays

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Top physics experiments

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B physcs at e+ e- colliders

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B physics at hadron colliders

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Heavy Fermion Physics at Super Flavor Factories

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