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Book of Abstracts

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Effective field theory analysis of LFV involving an additional boson

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We have developed the most general effective field theory describing LFV involving an additional boson (chi) up to dimension four terms. The effective couplings are constrained using current upper limits on the branching fractions of the L to l invisible and L to 3l decays. Within this setting, we examine the consequences on the electron and muon anomalous magnetic moments and on Higgs boson decays. We provide experimental signatures able to distinguish the spin and parity of the chi boson.

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Vector-portal dark matter within an effective field theory

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We have examined the simplest case for vector-portal dark matter within an effective field theory (following González-Macías & Wudka JHEP 1507 (2015) 161) and show that the relic dark matter density can be explained in this minimal setting.

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Isospin-breaking corrections to tau to pi pi nu decays and the muon g-2

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In LEP times, hadronic tau decays were the most precise input for the (leading-order) hadronic vacuum polarization piece (HVP,LO) of the muon anomalous magnetic moment (a_mu). With the advent of Phi- and B-factories, e+e- hadronic cross-section surpassed them, giving the most accurate input for this piece. However, since both data-driven determinations are subject to theoretical uncertainties (isospin-breaking for taus and radiator function for dealing with initial-state radiation at the Monte Carlo level for e+e-) it is nevertheless needed to keep on improving the systematic theory uncertainties for using both data sets, as unprecedented precision is requested by the forthcoming measurement of a_mu at FNAL (that should be released before the end of this year). In this context, we have revisited the computations by Cirigliano et al. [Phys.Lett. B513 (2001) 361-370 and JHEP 0208 (2002) 002] to improve the SM theoretical uncertainty associated to the use of (the dominant) tau to pi pi nu decays for a_muˆ{HVP,LO}.

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A covariant simultaneous action for branes

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A covariant simultaneous action for branes in an arbitrary curved background spacetime is considered. The term 'simultaneous' is imported from variational calculus and refers to the fact that extremization of the action produces at once both the first and second variation of a given geometrical action for the brane. The action depends on a pair of independent field variables, the brane embedding functions, through the canonical momentum of a reparametrization invariant geometric model for the brane, and an auxiliary vector field. The form of the action is analogous to a symplectic potential. Extremization of the simultaneous action produces at once the equations of motion and the Jacobi equations for the brane geometric model, and it also provides a convenient shortcut towards its second variation. In this note, we consider geometric models depending only on the intrinsic geometry of the brane worldvolume, and discuss briefly the generalization to extrinsic geometry dependent models. The approach is illustrated for Dirac-NambuGoto [DNG] branes. For a relativistic particle, a simultaneous action was introduced by Bazanski, that served as an inspiration for the present work.

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Cross section for the lepton number violating process tt ->bbll

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Neutrinoless double beta decay (0\nu\beta\beta) is one of the most exhaustive searches for signs of the possible Majorana nature of the neutrino. Nevertheless this is suppressed by the feeble weak interactions at low energies. But, what if we try an analogous version of this at high energy?. In this work we calculate cross sections for the process tt->bbll, with l=e,\mu,\tau, in the context of light Majorana neutrinos. Also, we mention some possible scenarios for this process.

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Neutrinos, Symmetries and Dark Matter

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Neutrino masses and the existence of non-baryonic Dark Matter (DM) are together with the Baryon asymmetry in the Universe three evidences that the Standard Model is not the final theory to describe our nature. In this talk I intend to give a brief review of pathways to generate neutrino masses. I will in particular discuss scenarios where the generation of neutrino masses is linked to the stability of the DM sector.

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L->3l decays in the simplest little Higgs model

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We present advances in the computation of wrong-sign L->3l decays in the Simplest Little Higgs model.

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W' boson explanation to the $R(D)$ and $R(D^*)$ anomalies

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Motivated by the new HFLAV world average values on the ratios $R(D)$ and $R(D^*)$, we addressed the anomalies $R(D^{(*)})$ related to the charged current transition $b \to c \tau \bar{\nu} \tauwithinageneral W^\primebosons
\to c \tau \bar{\nu}\tauobservables, namelytheratiosR(J/\psi),R(X_c), polarizationsP_\tau(D^\ast),
F_L(D^\ast), aswellastheupperlimitBR(B_c^{-} \to \tau^{-} \bar{\nu} \tau) < 10 \%.Wepresentaphenomenologicalst
\to c \tau \bar{\nu}\taudataandwiththemono−tausignaturepp \to \tau_h X + \rm{MET}attheLHC.Forcomparison, u
boson NP realizations that have already been studied in the literature.

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A Private SUSY 4HDM with FCNC in the Up-sector

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We present a *private SUSY Higgs* model with four Higgs doublets, where each fermion type (up, down, and charged leptons) obtain their masses from a different Higgs doublet H_f $(f = u_1, d, e)$. After imposing the conditions for anomaly cancellation, one finds that the remaining doublet H_{u_2}, must have the same hypercharge as H_{u_1}, and thus can only couple to up-type quarks, which opens the possibility to have FCNC's in this sector. We discuss the Lagrangian and the Higgs potential of the model, in order to identify the Higgs mass eigenstates and their interactions, with Yukawa matrices of the texture type. After imposing LHC constraints on the Higgs properties, we identify viable regions of parameter space, which we use to evaluate the decay $t \to ch$, finding that it can reach typically $BR(t \to ch) \approx \mathcal{O}(10^{-5})$. These rates are compared with current bounds from LHC, finding that some cases are already ruled out, but some cases could only be tested at future LHC stages.

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Recent results of WIMP dark matter quest with the DEAP-3600 experiment

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