

Selected Abstracts from Other Physical Review Journals

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New connection between central engine weak physics and the dynamics of gamma-ray burst fireballs. Jason Pruet, Kevork Abazajian, and George M. Fuller, *Department of Physics, University of California, San Diego, La Jolla, California 92093-0319*. (Received 8 February 2001; published 24 August 2001)

We demonstrate a qualitatively new aspect of the dynamics of gamma-ray burst (GRB) fireballs: the development of a substantial dispersion in the proton component in fireballs in which neutron decoupling occurs and is sufficiently pronounced. This effect depends sensitively on the neutron to proton ratio in the fireball, becoming more dramatic with increasing neutron excess. Simple physical arguments and transport calculations indicate that the dispersion in the Lorentz factor of the protons can be of the order of the final mean Lorentz factor of the fireball. We show how plasma instabilities could play an important role in the evolution of the fireball and how they might ultimately govern the development of such a velocity dispersion in the proton component. The role of these instabilities in setting or diminishing a proton Lorentz factor dispersion represents a new and potentially important venue for the study of plasma instabilities. Significant dispersion in the proton velocities translates into fewer protons attaining the highest Lorentz factors. This is tantamount to a reduction in the total energy required to attain a given Lorentz factor for the highest energy protons. As well, a velocity dispersion in the proton component can have consequences for the electromagnetic and neutrino signature of GRB's. [Phys. Rev. D **64**, 063002 (2001)]

Nonstandard neutrino properties and the high-energy cosmic neutrino flux. R. Horvat, *"Rudjer Bošković" Institute, P. O. Box 1016, 10001 Zagreb, Croatia*. (Received 20 March 2001; published 27 August 2001)

Recently, it has been shown that cosmic neutrino flux at the gamma ray burster/active galactic nuclei source, $F_{\nu_e}^0:F_{\nu_\mu}^0:F_{\nu_\tau}^0 \approx 1:2:0$, inevitably oscillates (in the three neutrino framework) to 1:1:1, irrespective of the mixing angle relevant to the solar data. It has also been pointed out that the intrinsic flux of the cosmic high-energy neutrinos may not have the standard ratio, in which case the cosmic neutrino flux in the far distance should be dependent on the mixing angle. For neutrinos with nonzero electromagnetic properties, we show in the latter case that matter effects on oscillations of high-energy cosmic neutrinos can substantially modify the vacuum oscillation probability, if the mass-squared difference is $\lesssim 10^{-10} \text{ eV}^2$. [Phys. Rev. D **64**, 067302 (2001)]

New fit to solar neutrino data in models with large extra dimensions. D. O. Caldwell,¹ R. N. Mohapatra,² and S. J. Yellin¹
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String inspired models with millimeter scale extra dimensions provide a natural way to understand an ultralight sterile neutrino needed for a simultaneous explanation of the solar, atmospheric and Liquid Scintillation Neutrino Detector neutrino oscillation results. The sterile neutrino is the bulk neutrino (ν_B) postulated to exist in these models, and it becomes ultralight in theories that prevent the appearance of its direct mass terms. Its Kaluza-Klein (KK) states then add new oscillation channels for the electron neutrino emitted from the solar core. We show that successive Mikheyev-Smirnov-Wolfenstein transitions of solar ν_e to the lower lying KK modes of ν_B in conjunction with vacuum oscillations between the ν_e and the zero mode of ν_B provide a new way to fit the solar neutrino data. The characteristic predictions can be tested by solar neutrino observations and forthcoming solar neutrino experiments. We discuss both intermediate and low string scale models where the desired spectrum can emerge naturally. [Phys. Rev. D **64**, 073001 (2001)]

Nonadiabatic level crossing in resonant and nonresonant neutrino oscillations. M. Kachelrieß, *TH Division, CERN, 1211 Geneva 23, Switzerland*; R. Tomás, *Instituto de Física Corporal - C.S.I.C. - Universitat de València, 46071 València, Spain*. (Received 9 April 2001; published 27 August 2001)

We study neutrino oscillations and the level-crossing probability $P_{\text{LSZ}} = \exp(-\gamma_n \mathcal{F}_n \pi/2)$ (LSZ stands for Landau-Stückelberg-Zener) in power-law-like potential profiles $A(r) \propto r^n$. After showing that the resonance point coincides only for a linear profile with the point of maximal violation of adiabaticity, we point out that the "adiabaticity" parameter γ_n can be calculated at an arbitrary point if the correction function $\mathcal{F}_n$ is rescaled appropriately. We present a new representation for the level-crossing probability, $P_{\text{LSZ}} = \exp(-\kappa_n \mathcal{G}_n)$, which allows a simple numerical evaluation of P_{LSZ} in both the resonant and nonresonant cases, and where $\mathcal{G}_n$ contains the full dependence of P_{LSZ} on the mixing angle ϑ . As an application we consider the case $n = -3$ important for oscillations of supernova neutrinos. [Phys. Rev. D **64**, 073002 (2001)]

Probing flavor changing neutrino interactions using neutrino beams from a muon storage ring. A. M. Gago,^{1,2} M. M. Guzzo,³ H. Nunokawa,³ W. J. C. Teves,¹ and R. Zukanovich Funchal¹
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We discuss the capabilities of a future neutrino factory based on intense neutrino beams from a muon storage ring to explore the nonstandard neutrino matter interactions, which are assumed to be subleading effects in the standard mass induced neutrino oscillations. The conjunction of these two mechanisms will magnify the fake CP violating effect in the presence of matter which is not coming from the CP phase in the neutrino mixing matrix. We show that such a fake CP violation can be observed in neutrino factory experiments by measuring the difference between the neutrino and antineutrino probabilities. In order to perform such a test, we consider three neutrino flavors, admitting the mixing parameters in the range consistent with the oscillation solution to the atmospheric and the solar neutrino problems, as well as with the constraints imposed by the reactor neutrino data. We show that with a 10 kt detector with 5 years of operation, a stored muon energy $E_\mu \geq 20$ GeV, 2×10^{20} muon decays per year, and a base line $L \sim 732$ km, such a neutrino facility can probe the nonstandard flavor changing neutrino interactions down to the level of $(10^{-3}-10^{-2})G_F$ in both $\nu_\mu \rightarrow \nu_\tau/\bar{\nu}_\mu \rightarrow \bar{\nu}_\tau$ and $\nu_e \rightarrow \nu_\tau/\bar{\nu}_e \rightarrow \bar{\nu}_\tau$ modes. [Phys. Rev. D **64**, 073003 (2001)]

Neutrino masses and lepton flavor violation in thick brane scenarios. Gabriela Barenboim, G. C. Branco, André de Gouvêa, and M. N. Rebelo, *Theory Division, CERN, CH-1211 Geneva 23, Switzerland*. (Received 7 May 2001; published 4 September 2001)

We address the issue of lepton flavor violation and neutrino masses in the “fat-brane” paradigm, where flavor changing processes are suppressed by localizing different fermion field wave functions at different positions (in the extra dimensions) in a thick brane. We study the consequences of suppressing lepton number violating charged lepton decays within this scenario for lepton masses and mixing angles. In particular, we find that charged lepton mass matrices are constrained to be quasideagonal. We further consider whether the same paradigm can be used to naturally explain small Dirac neutrino masses by considering the existence of three right-handed neutrinos *in the brane*, and discuss the requirements to obtain phenomenologically viable neutrino masses and mixing angles. Finally, we examine models where neutrinos obtain a small Majorana mass by breaking lepton number in a far away brane and show that, if the fat-brane paradigm is the solution to the absence of lepton number violating charged lepton decays, such models predict, in the absence of flavor symmetries, that charged lepton flavor violation will be observed in the next round of rare muon or tau decay experiments. [Phys. Rev. D **64**, 073005 (2001)]

Earth regeneration of solar neutrinos at SNO and Super-Kamiokande. V. Barger,¹ D. Marfatia,¹ K. Whisnant,² and B. P. Wood¹ ¹*Department of Physics, University of Wisconsin–Madison, Wisconsin 53706* ²*Department of Physics and Astronomy, Iowa State University, Ames, Iowa 50011*. (Received 13 April 2001; published 5 September 2001)

We analyze the 1258-day Super-Kamiokande day and night solar neutrino energy spectra with various χ^2 definitions. The best-fit lies in the large mixing angle (LMA) region at $(\Delta m^2, \tan^2 \theta) = (5.01 \times 10^{-5} \text{ eV}^2, 0.60)$, independently of whether systematic errors are included in the χ^2 definition. We compare the exclusion and allowed regions from the different definitions and choose the most suitable definition to predict the regions from SNO at the end of

three years of data accumulation. We first work under the assumption that Super-Kamiokande “sees” a flux-suppressed flat energy spectrum. Then, we consider the possibility of each one of the three Mikheyev-Smirnov-Wolfenstein regions being the solution to the solar neutrino problem. We find that the exclusion and allowed regions for the flat spectrum hypothesis and the LMA and low probability, low mass solutions are alike. In three years, we expect SNO to find very similar regions to that obtained by Super-Kamiokande. We evaluate whether the zenith angle distribution at SNO with optimum binning will add anything to the analysis of the day and night spectra; for comparison, we show the results of our analysis of the 1258-day zenith angle distribution from Super-Kamiokande, for which the best-fit parameters are $(\Delta m^2, \tan^2 \theta) = (5.01 \times 10^{-5} \text{ eV}^2, 0.56)$. [Phys. Rev. D **64**, 073009 (2001)]

Realization of the large mixing angle solar neutrino solution in an $SO(10)$ supersymmetric grand unified model. Carl H. Albright, *Department of Physics, Northern Illinois University, DeKalb, Illinois 60115 and Fermi National Accelerator Laboratory, P.O. Box 500, Batavia, Illinois 60510*; S. M. Barr, *Bartol Research Institute, University of Delaware, Newark, Delaware 19716*. (Received 30 April 2001; published 5 September 2001)

An $SO(10)$ supersymmetric grand unified model proposed earlier leading to the solar solution involving “just-so” vacuum oscillations is reexamined to study its ability to obtain the other possible solar solutions. It is found that all four viable solar neutrino oscillation solutions can be achieved in the model simply by modification of the right-handed Majorana neutrino mass matrix M_R . Whereas the small mixing and vacuum solutions are easily obtained with several texture zeros in M_R , the currently favored large mixing angle solution requires a nearly geometric hierarchical form for M_R that leads by the seesaw formula to a light neutrino mass matrix which has two or three texture zeros. The form of the matrix which provides the “fine-tuning” necessary to achieve the large mixing angle solution can be understood in terms of Froggatt-Nielsen diagrams for the Dirac and right-handed Majorana neutrino mass matrices. The solution satisfies several leptogenesis requirements which in turn can be responsible for the baryon asymmetry in the universe. [Phys. Rev. D **64**, 073010 (2001)]

Neutrinos from stellar collapse: Comparison of signatures in water and heavy water detectors. G. Dutta, *Harish-Chandra Research Institute, Allahabad 211 019, India*; D. Indumathi, M. V. N. Murthy, and G. Rajasekaran, *The Institute of Mathematical Sciences, Chennai 600 113, India*. (Received 26 February 2001; revised manuscript received 7 June 2001; published 5 September 2001)

Signatures of neutrino and antineutrino signals from stellar collapse in heavy water detectors are contrasted with those in water detectors. The effects of mixing, especially due to the highly dense matter in the supernova core, are studied. The mixing parameters used are those sets allowed by the current understanding of available neutrino data: from solar, atmospheric and laboratory neutrino experiments. Signals at a heavy water detector, especially the dominant charged current reactions on deuteron, are very sensitive to some of these sets of allowed mixing parameters. Theoretical uncertainties on supernova neutrino spectra notwithstanding, a combination of supernova measurements with water and heavy water de-

tectors may be able to distinguish many of these mixing possibilities and thus help in ruling out many of them. [Phys. Rev. D **64**, 073011 (2001)]

Neutrino anomalies and large extra dimensions. Amol S. Dighe¹ and Anjan S. Joshipura² ¹*Max-Planck-Institut für Physik, Föhringer Ring 6, D-80805 München, Germany* ²*Theoretical Physics Group, Physical Research Laboratory, Navarangpura, Ahmedabad, 380 009, India.* (Received 5 June 2001; published 10 September 2001)

Theories with large extra dimensions can generate small neutrino masses when the standard model neutrinos are coupled to singlet fermions propagating in higher dimensions. The couplings can also generate mass splittings and mixings among the flavor neutrinos in the brane. We systematically study a minimal scenario involving only one singlet bulk fermion coupling weakly to the flavor neutrinos. We explore the neutrino mass structures in the brane that can potentially account for the atmospheric, solar and Liquid Scintillation Neutrino Detector anomalies simultaneously in a natural way. We demonstrate that in the absence of *a priori* mixings among the standard model (SM) neutrinos, it is not possible to reconcile all these anomalies. The presence of some structure in the mass matrix of the SM neutrinos can solve this problem. This is exemplified by the Zee model, which when embedded in extra dimensions in a minimal way can account for all the neutrino anomalies.

14.60.Pq, 11.10.Kk, 12.60.-i, 14.60.St

Matter fluctuation effect to T violation at a neutrino factory. Takahiro Miura, Tetsuo Shindou, Eiichi Takasugi, and Masaki Yoshimura, *Department of Physics, Osaka University, Toyonaka, Osaka 560-0043, Japan.* (Received 11 June 2001; published 11 September 2001)

We derive an analytic formula for T violation by using the perturbation theory for small quantities, $\Delta m_{21}^2 L/2E$ and $\delta a(x)L/2E$, where $\delta a(x)$ represents symmetric and asymmetric matter fluctuations, i.e., deviations from the average density. We analyze the effect of matter fluctuations to T violation, by assuming a PREM profile of Earth matter density. We find that matter fluctuations do not give any viable contribution for $L < 6000$ km, while the fluctuation effect becomes large due to resonances for $L > 7000$ km. For $7000 \text{ km} < L < 8000$ km, matter fluctuations contribute destructively to the average density term and the net result is small, while for $L > 8000$ km, the contribution from matter fluctuations becomes large but contributes constructively. [Phys. Rev. D **64**, 073017 (2001)]

Phase space description of the leading order quark and gluon production from a space-time dependent chromofield. Dennis D. Dietrich, Gouranga C. Nayak, and Walter Greiner, *Institut für Theoretische Physik, J. W. Goethe-Universität, D-60054 Frankfurt am Main, Germany.* (Received 8 June 2000; published 4 September 2001)

We derive source terms for the production of quarks and gluons from the QCD vacuum in the presence of a space-time dependent external chromofield A_{cl} to the order of $S^{(1)}$. We find that the source terms for the parton production processes $A_{cl} \rightarrow q\bar{q}$ and

$A_{cl}, A_{cl}A_{cl} \rightarrow gg$ also include the annihilation processes $q\bar{q} \rightarrow A_{cl}$ and $g\bar{g} \rightarrow A_{cl}, A_{cl}A_{cl}$. The source terms we derive are applicable for the description of the production of partons with momentum p larger than gA which itself must be larger than Λ_{QCD} . We observe that these source terms for the production of partons from a space-time dependent chromofield can be used to study the production and equilibration of the quark-gluon plasma during the very early stages of an ultrarelativistic heavy-ion collision. [Phys. Rev. D **64**, 074006 (2001)]

Gluon-photon mixing in dense QCD. Nguyen Van Hieu, *Institute of Physics, NCST of Vietnam, Nghia Do, Hoang Quoc Viet Str., Cau Giay, Hanoi, Vietnam and Faculty of Technology, Hanoi National University, 144 Xuan Thuy Str., Cau Giay, Hanoi, Vietnam; Pham Xuan-Yem, Laboratoire de Physique Théorique et Hautes Energies, Universités Paris 6 et Paris 7, Unité associée au CNRS, UMR 7589, Tour 16/1er étage, 4 place Jussieu, F-75252 Paris Cedex 05, France.* (Received 12 February 2001; published 5 September 2001)

At high baryonic density with the formation of a diquark condensate $\Delta \neq 0$, the QCD color symmetry is spontaneously broken. Being massive by the Anderson-Higgs mechanism, a gluon and photon should mix together within two linear combinations due to the color nonconservation. Consequently a gluon $\tilde{G}$ could decay into an e^-e^+ pair via its photon component. With a low invariant mass (about a few ten MeV) and an extremely narrow width peaking above the continuum background, the purely leptonic decay of a strongly interacting gluon $\tilde{G} \rightarrow e^- + e^+$ constitutes a very distinctive signature of the color superconductivity phase. By a similar scenario of gluon-Z mixing, another “missing-energy” decay into invisible neutrinos $\tilde{G} \rightarrow \nu + \bar{\nu}$ could arise; its amplitude is, however, $(\Delta/M_Z)^2$ power suppressed. [Phys. Rev. D **64**, 074009 (2001)]

Quark fragmentation functions in a diquark model for Λ production. Jian-Jun Yang, *Department of Physics, Nanjing Normal University, Nanjing 210097, China and Departamento de Física, Universidad Técnica Federico Santa María, Casilla 110-V, Valparaíso, Chile.* (Received 21 March 2001; revised manuscript received 10 May 2001; published 5 September 2001)

Using a simple quark-diquark model, we extract a set of unpolarized and polarized fragmentation functions for the Λ based on the available unpolarized Λ production data in e^+e^- annihilation. It was found that there is a strong $SU(3)$ flavor symmetry breaking in the unpolarized Λ fragmentation functions and that the polarized u and d quark contributions to the polarized Λ fragmentation are positive in the medium and large z regions. The predictions of Λ polarization with the obtained quark fragmentation functions are compatible with the available data on the longitudinally polarized Λ produced in e^+e^- annihilation, polarized charged lepton deep inelastic scattering (DIS), and neutrino DIS. The spin asymmetry for the Λ production in $p\bar{p}$ collisions is also predicted for a future test in experiments at BNL RHIC. [Phys. Rev. D **64**, 074010 (2001)]

Parton interactions in the Bjorken limit of QCD. S. E. Derkachov, *Naturwissenschaftlich-Theoretisches Zentrum und Institut für Theoretische Physik, Universität Leipzig, Augustusplatz 10, D-04109 Leipzig, Germany and Department of Mathematics, St.*

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We consider the Bjorken limit in the framework of the effective action approach and discuss its similarities to the Regge limit. The proposed effective action allows for a rather simple calculation of the known evolution kernels. We represent the result in terms of two-parton interaction operators involving gluon and quark operators depending on light-ray position and helicity and analyze their symmetry properties. [Phys. Rev. D **64**, 074013 (2001)]

Minimal color-flavor-locked–nuclear interface. Mark Alford,¹ Krishna Rajagopal,² Sanjay Reddy,³ and Frank Wilczek² ¹*Physics and Astronomy Department, Glasgow University, Glasgow G12 8QQ, United Kingdom* ²*Center for Theoretical Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139* ³*Institute for Nuclear Theory, University of Washington, Box 351550, Seattle, Washington 98195-1550.* (Received 22 May 2001; published 11 September 2001)

At nuclear matter density, electrically neutral strongly interacting matter in weak equilibrium is made of neutrons, protons, and electrons. At sufficiently high density, such matter is made of up, down, and strange quarks in the color-flavor-locked (CFL) phase, with no electrons. As a function of increasing density (or, perhaps, increasing depth in a compact star) other phases may intervene between these two phases, which are guaranteed to be present. The simplest possibility, however, is a single first order phase transition between CFL and nuclear matter. Such a transition, in space, could take place either through a mixed phase region or at a single sharp interface with electron-free CFL and electron-rich nuclear matter in stable contact. Here we construct a model for such an interface. It is characterized by a region of separated charge, similar to an inversion layer at a metal-insulator boundary. On the CFL side, the charged boundary layer is dominated by a condensate of negative kaons. We then consider the energetics of the mixed phase alternative. We find that the mixed phase will occur only if the nuclear-CFL surface tension is significantly smaller than dimensional analysis would indicate. [Phys. Rev. D **64**, 074017 (2001)]

Higgs bosons and the indirect search for weakly interacting massive particles. V. A. Bednyakov, *Laboratory of Nuclear Problems, Joint Institute for Nuclear Research, 141980 Dubna, Russia;* H. V. Klapdor-Kleingrothaus and H. Tu, *Max-Planck-Institut für Kernphysik, Postfach 103980, D-69029, Heidelberg, Germany.* (Received 23 February 2001; revised manuscript received 2 May 2001; published 5 September 2001)

We investigate the contribution of the minimal supersymmetric extension of the standard model Higgs bosons produced in the neutralino annihilation in the Earth and Sun to the total weakly interacting massive particles detection signal. We find that this contribution is important and results in a lower bound for the muon flux from the Sun of 10^{-7} – 10^{-8} m⁻² yr⁻¹ for neutralinos heavier than about 200 GeV. We notice that due to the SUSY charged Higgs bosons one can expect an energetic τ neutrino flux from the Sun at a level of 10^2 m⁻² yr⁻¹. [Phys. Rev. D **64**, 075004 (2001)]

Can the Zee model explain the observed neutrino data? Yoshio Koide, *Department of Physics, University of Shizuoka, 52-1 Yada, Shizuoka 422-8526, Japan.* (Received 24 April 2001; published 14 August 2001)

The eigenvalues and mixing angles in the Zee model are investigated parameter independently. When we require $|\Delta m_{12}^2/\Delta m_{23}^2| \ll 1$ in order to understand the solar and atmospheric data simultaneously, the only solution is one that gives bimaximal mixing. It is pointed out that the present best-fit value of $\sin^2 2\theta_{\text{solar}}$ in the Mikheyev-Smirnov-Wolfenstein large mixing angle solution cannot be explained within the framework of the Zee model, because we derive a severe constraint on the value of $\sin^2 2\theta_{\text{solar}}$, $\sin^2 2\theta_{\text{solar}} \geq 1 - (1/16)(\Delta m_{\text{solar}}^2/\Delta m_{\text{atm}}^2)^2$. [Phys. Rev. D **64**, 077301 (2001)]

Neutrino oscillations and neutrinoless double beta decay. D. Falcone and F. Tramontano, *Dipartimento di Scienze Fisiche, Università di Napoli, Complesso di Monte Sant'Angelo, Via Cintia, Napoli, Italy.* (Received 16 March 2001; published 10 September 2001)

The relation between neutrino oscillation parameters and neutrinoless double beta decay is studied, assuming normal and inverse hierarchies for Majorana neutrino masses. For a normal hierarchy the crucial dependence on U_{e3} is explored. The link with tritium beta decay is also briefly discussed. [Phys. Rev. D **64**, 077302 (2001)]

Bulk viscosity of neutron-star matter. P. B. Jones, *Department of Physics, University of Oxford, Nuclear and Astrophysics Laboratory, Keble Road, Oxford OX1 3RH, United Kingdom.* (Received 14 March 2001; published 4 September 2001)

Hyperon bulk viscosity is the most significant transport coefficient affecting the growth or decay of any neutron-star mode of oscillation which has, even to second order in its amplitude, a periodic density fluctuation. This paper evaluates both the direct Urca and strangeness-changing four-baryon weak-interaction terms in the coefficient. [Phys. Rev. D **64**, 084003 (2001)]

Gluon self-energy in a two-flavor color superconductor. Dirk H. Rischke, *Institut für Theoretische Physik, Johann Wolfgang Goethe Universität, Robert-Mayer-Strasse 8-10, D-60054 Frankfurt/Main, Germany.* (Received 21 March 2001; published 18 September 2001)

The energy and momentum dependence of the gluon self-energy is investigated in a color superconductor with two flavors of massless quarks. The presence of a color-superconducting quark-quark condensate modifies the gluon self-energy for energies that are of the order of the gap parameter. For gluon energies much larger than the gap, the self-energy assumes the form given by the standard hard-dense-loop approximation. It is shown that this modification of the gluon self-energy does not affect the magnitude of the gap to leading and subleading order in the weak-coupling limit. [Phys. Rev. D **64**, 094003 (2001)]

Muon anomalous magnetic moment, lepton flavor violation, and flavor changing neutral current processes in supersymmetric grand unified theory with right-handed neutrinos. Seungwon Baek,¹ Toru Goto,² Yasuhiro Okada,^{2,3} and Ken-ichi Okumura⁴
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Motivated by the large mixing angle solutions for the atmospheric and solar neutrino anomalies, flavor changing neutral current processes and lepton flavor violating processes as well as the muon anomalous magnetic moment are analyzed in the framework of SU(5) supersymmetric grand unified theory (SUSY GUT) with right-handed neutrinos. In order to explain realistic mass relations for quarks and leptons, we take into account the effects of higher dimensional operators above the GUT scale. It is shown that the supersymmetric contributions to the CP violation parameter in $K^0\text{--}\bar{K}^0$ mixing, ε_K , the $\mu \rightarrow e \gamma$ branching ratio, and the muon anomalous magnetic moment become large in a wide range of parameter space. We also investigate the correlations among these quantities. Within the current experimental bound of $B(\mu \rightarrow e \gamma)$, large SUSY contributions are possible either in the muon anomalous magnetic moment or in ε_K . In the former case, the favorable value of the recent muon anomalous magnetic moment measurement at the BNL E821 experiment can be accommodated. In the latter case, the allowed region of the Kobayashi-Maskawa phase can be different from the prediction within the standard model (SM)

and therefore measurements of the CP asymmetry of the $B \rightarrow J/\psi K_S$ mode and Δm_{B_s} could discriminate this case from the SM. We also show that the $\tau \rightarrow \mu \gamma$ branching ratio can be close to the current experimental upper bound and the mixing induced CP asymmetry of the radiative B decay can be enhanced in the case where the neutrino parameters correspond to the Mikheyev-Smirnov-Wolfenstein small mixing angle solution. [Phys. Rev. D **64**, 095001 (2001)]

Neutrinoless double beta decay with and without Majoron-like boson emission in a 3-3-1 model. J. C. Montero, *Instituto de Física Teórica, Universidade Estadual Paulista, Rua Pamplona 145, 01405-900 São Paulo, SP, Brazil*; C. A. de S. Pires, *Department of Physics, University of Maryland, College Park, Maryland 20742-4111*; V. Pleitez, *Instituto de Física Teórica, Universidade Estadual Paulista, Rua Pamplona 145, 01405-900 São Paulo, SP, Brazil.* (Received 28 March 2000; revised manuscript received 17 April 2001; published 17 September 2001)

We consider the contributions to the neutrinoless double beta decays in a $SU(3)_L \otimes U(1)_N$ electroweak model. We show that for a range of parameters in the model there are diagrams involving vector-vector-scalar and trilinear scalar couplings which can be potentially as contributing as the light massive Majorana neutrino exchange one. We use these contributions to obtain constraints upon some mass scales of the model, such as the masses of the new charged vector and scalar bosons. We also consider briefly the decay in which, in addition to the two electrons, a Majoron-like boson is emitted. [Phys. Rev. D **64**, 096001 (2001)]