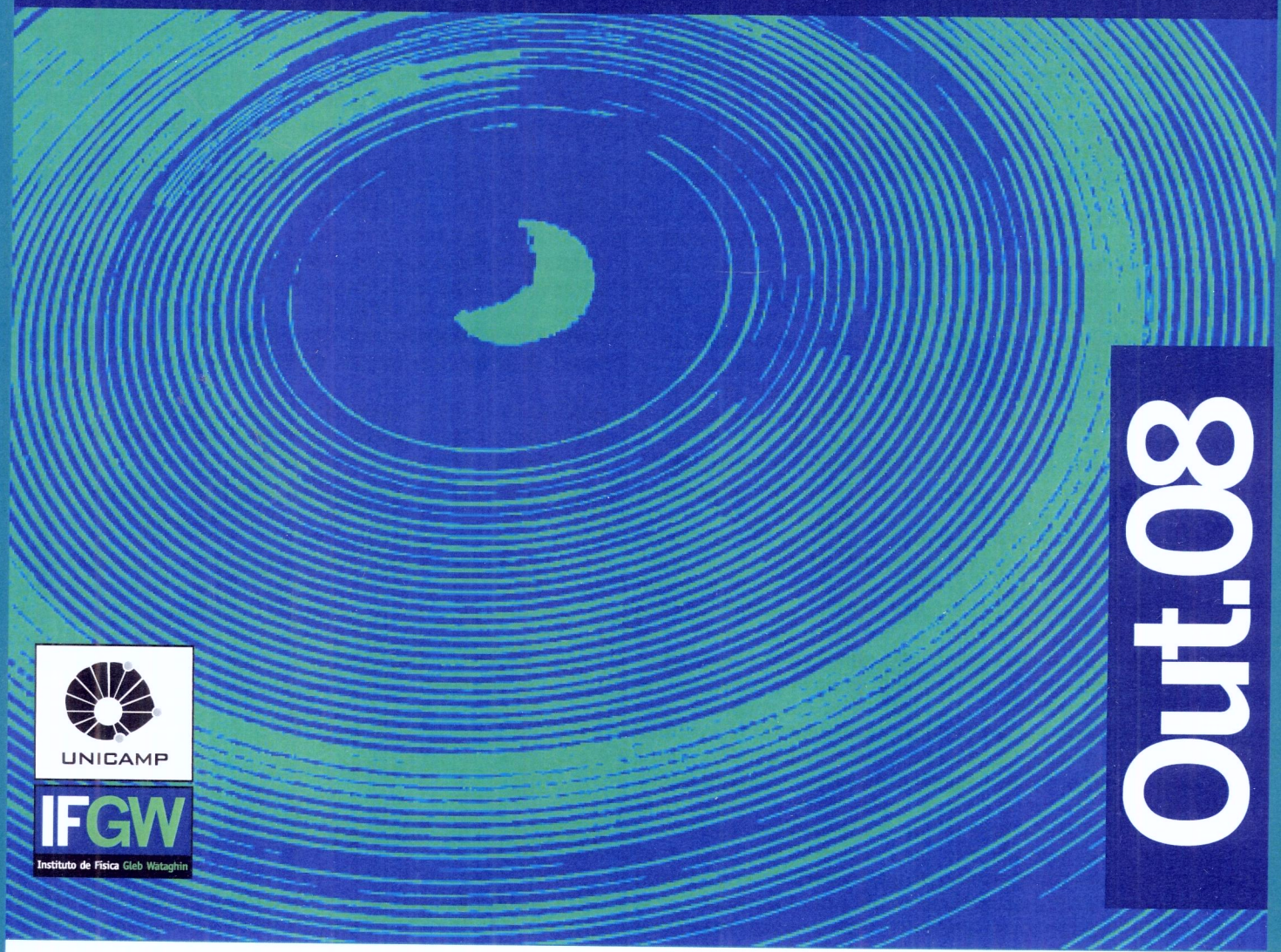
Abstracta

Ano X - N. 05



Trabalhos Aceitos para Publicação

A002-08 "Theoretical calculations of nonlinear electronic transport behavior in 111- nitrides: GaN and AIN "

Clóves G. Rodrigues', 1, Áurea R. Vasconcellos2, Roberto Luzzi

Trabalhos Publicados

Setembro 2008 à Outubro 2008

P 198-08 à P 233-08

Trabalhos Aceitos para Publicação

A002-08 "Theoretical calculations of nonlinear electronic transport behavior in 111- nitrides: GaN and AIN "

Clóves G. Rodrigues', 1, Áurea R. Vasconcellos2, Roberto Luzzi

The dependence of the mobility in n-doped lll-nitrides on the electric field strength and the concentration of electrons and impurities is derived. Such dependence is determined by the nonequilibrium thermodynamic state of the system, which is led to far-from equilibrium conditions by lhe action of intermediate to strong electric fields. It is shown that the mobility decreases with the increase of lhe electric field strength and the concentration of carriers, in a way evidencing the influente of the nonlinear transport involved. Dependence of the mobility with the concentration following two types of regimes characterized by exponential laws are evidenced. They can also be approximately described by fractional power laws. The influence of the thermal bath temperature is also analyze

Physica Status Solidi B , pssb.200844157

Trabalhos Publicados

P198-08 "A consistent metric for nestedness analysis in ecological systems: reconciling concept and measurement"

Almeida-Neto, M., Guimaraes, P., Guimaraes, P. R., Loyola, R. D., and Ulrich, W.

Nestedness has been widely reported for both metacommunities and networks of interacting species. Even though the concept of this ecological pattern has been well-defined, there are several metrics by which it can be quantified. We noted that current metrics do not correctly quantify two major properties of nestedness: (1) whether marginal totals (i.e. fills) differ among columns and/or among rows, and (2) whether the presences (1's) in less-filled columns and rows coincide, respectively, with those found in the more-filled columns and rows. We propose a new metric directly based on these properties and compare its behavior with that of the most used metrics, using a set of model matrices ranging from highly-nested to alternative structures in which no nestedness should be detected. We also used an empirical dataset to explore possible biases generated by the metrics as well as to evaluate correlations between metrics. We found that nestedness has been quantified by metrics that inappropriately detect this pattern, even for matrices in which there is no nestedness. In addition, the most used metrics are prone to type I statistical errors while our new metric has better statistical properties and consistently rejects a nested pattern for different types of random matrices. The analysis of the empirical data showed that two nestedness metrics, matrix temperature and the discrepancy measure, tend to overestimate the degrees of nestedness in metacommunities. We emphasize and discuss some implications of these biases for the theoretical understanding of the processes shaping species interaction networks and metacommunity structure

Oikos **117[8], 1227-1239. 2008.**

P199-08 "Absorption effects in intermediate-energy electron scattering by hydrogen sulphide"

Brescansin, L. M., Machado, L. E., Lee, M. T., Cho, H., and Park, Y. S.

In this work, we present a joint theoretical-experimental study on elastic electron-H2S collisions in the low- and intermediate-energy range. Absolute differential cross sections have been measured for energies in the 30-100 eV range over scattering angles between 10 degrees and 180 degrees, using a crossed-beam electron spectrometer combined with a magnetic angle-changing device to extend the measurements to backward angles. In addition, differential, integral and momentum-transfer cross sections as well as total and absorption cross sections are calculated and reported for energies ranging from 1 to 500 eV. A complex optical potential was used to represent the electron-molecule interaction dynamics. The iterative Schwinger variational method combined with the distorted-wave approximation was used to solve the scattering equations. The comparison between our calculated and measured results, as well as with other experimental and theoretical data available in the literature, is encouraging

Journal of Physics B-Atomic Molecular and Optical Physics **41[18]. 2008.**

P200-08 "All-optical switching device for infrared based on PbTe quantum dots"

Rodriguez, E., Kellermann, G., Craievich, A. F., Jimenez, E., Cesar, C. L., and Barbosa, L. C.

Multilayers of PbTe quantum dots embedded in SiO2 were fabricated by alternate use of Pulsed Laser Deposition (PLD) and Plasma Enhanced Chemical Vapor Deposition (PECVD) techniques. The morphological properties of the nanostructured material were studied by means of High Resolution Transmission Electron Microscopy (HRTEM), Grazing-Incidence Small-Angle X-ray scattering (GISAXS) and X-ray Reflectometry (XRR) techniques. A preliminary analysis of the GISAXS spectra provided information about the multilayer periodicity and its relationship to the size of the deposited PbTe nanoparticles. Finally multilayers were fabricated inside a Fabry-Perot cavity. The device was characterized by means of Scanning Electron Microscopy (SEM). Transmittance measurements show the device functionality in the infrared region. (C) 2007 Elsevier Ltd. All rights reserved

Superlattices and Microstructures **43[5-6], 626-634. 2008.**

P201-08 "Asynchronous encrypted information transmission with sub-6 fs laser system at 2.12 GHz repetition rate" Xu, B. W., Coello, Y., Nogueira, G. T., Cruz, F. C., and Dantus, M.

The asynchronous transmission (encoding and decoding) of 64-bit information using binary spectral phase shaping is demonstrated. The accurate introduction and retrieval of the binary information is possible by using multiphoton intrapulse interference phase scan (MIIPS) to measure and correct the spectral phase distortions of the laser and the transmission media. Experimental demonstration is achieved using a sub-6 fs Ti:Sapphire laser with 2.12-GHz repetition rate and an adaptive phase control system. (C) 2008 Optical Society of America

Optics Express **16[19], 15109-15114. 2008.**

P202-08 "Borosilicate glass for photonics applications"

Carvalho, I. C. S., Fokine, M., Cordeiro, C. M. B., Carvalho, H., and Kashyap, R.

In this paper, we present the use of three different processing techniques which call be used to manufacture low cost optical waveguides and fibers using commercially available borosilicate glass. The techniques used are rod and tube stacking for photonic crystal fiber fabrication, dual laser ablation processing for planar waveguides, and thermal poling, which could potentially be used for refractive index engineering of planar optical waveguides. (c) 2007 Elsevier B.V. All rights reserved

Optical Materials 30[12], 1816-1821. 2008.

P203-08 "Comment on "Generalized Stoner-Wohlfarth Model and the Non-Langevin Magnetism of Single-Domain Particles" by M.A. Chuev"

De Biasi, E., Zysler, R. D., Ramos, C. A., and Knobel, M.

The model recently proposed by M.A. Chuev [JETP Lett.85, 611 (2007)] has been analyzed. It has been shown that the anisotropy corrections near the blocking temperature always lead to a magnetization lower than the equilibrium value, contrary to the findings in Chuev's work. In addition, the asymptotic high-temperature limit of Chuev's model is inconsistent with the expected thermodynamic limit. Moreover, even at a low temperature, only a careful implementation of this theory can guarantee arriving at the correct result, avoiding some wrong conclusions in Chuev's work

Jetp Letters 87[12], 703-706. 2008.

P204-08 "Comparison between thorium and uranium fission track diameters in glass"

Moreira, P. A. F. P., Iunes, P. J., Guedes, S., and Hadler, J. C.

Comparisons between diameters of uranium and thorium neutron induced fission tracks in glass made possible to test indirectly the hypothesis that observation efficiency of spontaneous U-238 and induced U-235 fission tracks may be considered the same. The sources of fission fragments were uranium and thorium thin films irradiated with neutrons with and without Cd-cover. After irradiation, the glasses were etched for 50 s by HF 24% at 15 degrees C followed by another etching for 30 s in same conditions. Diameters were measured after each chemical etching. Only tracks presenting a ratio between the longer and shorter diameters lesser than 1. 1 have been analyzed. The results indicates the hypothesis is valid. (C) 2008 Elsevier Ltd. All rights reserved

Radiation Measurements 43, S329-S333. 2008.

P205-08 "Constraints from solar and reactor neutrinos on unparticle long-range forces"

Gonzalez-Garcia, M. C., de Holanda, P. C., and Funchal, R. Z.

We have investigated the impact of long-range forces induced by unparticle operators of scalar, vector and tensor nature coupled to fermions in the interpretation of solar neutrinos and KamLAND data. If the unparticle couplings to the neutrinos are mildly non-universal, such long-range forces will not factorize out in the neutrino flavour evolution. As a consequence large deviations from the observed standard matter-induced oscillation pattern for solar neutrinos would be generated. In this case, severe limits can be set on the infrared fixed point scale, Lambda(u), and the new physics scale, M, as a function of the ultraviolet (d(UV)) and anomalous (d) dimension of the unparticle operator.

For a scalar unparticle, for instance, assuming the non-universality of the lepton couplings to unparticles to be of the order of a few per mil we find that, for d(UV) = 3 and d = 1.1, M is constrained to be M > O(10(9)) TeV (M > O(10(10)) TeV) if Lambda(u) = 1 TeV (10 TeV). For given values of Lambda(u) and d, the corresponding bounds on M for vector (tensor) unparticles are similar to 100 (similar to 3/ root Lambda(u)/ TeV) times those for the scalar case. Conversely, these results can be translated into severe constraints on universality violation of the fermion couplings to unparticle operators with scales which can be accessible at future colliders

Journal of Cosmology and Astroparticle Physics [6]. 2008.

P206-08 "Electron Lande g factor in GaAs-(Ga,Al)As quantum wells under applied magnetic fields: Effects of Dresselhaus spin splitting"

Reyes-Gomez, E., Porras-Montenegro, N., Perdomo-Leiva, C. A., Brandi, H. S., and Oliveira, L. E.

The effects of the Dresselhaus spin splitting on the Lande g factor associated with conduction electrons in GaAs-(Ga,Al)As quantum wells are studied by using the nonparabolic Ogg-McCombe effective Hamiltonian. The g factor and cyclotron effective mass are calculated as functions of applied magnetic fields (along both the growth and in-plane directions) and GaAs well widths of the heterostructure. Present calculations indicate that in GaAs-(Ga,Al)As heterostructures, the inclusion of the Dresselhaus term leads to very small corrections in the effective Lande factor. Taking into account the effects of nonparabolic and anisotropic terms in the Hamiltonian is fundamental in obtaining quantitative agreement with experimental measurements. Moreover, the present results suggest that previous theoretical work on the Dresselhaus spin-splitting effects on the effective Lande factor should be viewed with caution if nonparabolic and anisotropic effects are not taken into account. (c) 2008 American Institute of Physics

Journal of Applied Physics 104[2]. 2008.

P207-08 "Entanglement, quantum phase transition and fixed-point bifurcation in the N-atom Jaynes-Cummings model with an additional symmetry breaking term"

Chagas, E. A. and Furuya, K.

In the present work we analyze the quantum phase transition (QPT) in the N-atom Jaynes-Cummings model (NJCM) with an additional symmetry breaking interaction term in the Hamiltonian. We show that depending on the type of symmetry breaking term added the transition order can change or not and also the fixed point associated to the classical analogue of the Hamiltonian can bifurcate or not. We present two examples of symmetry broken Hamiltonians and discuss based on them. the interconnection between the transition order, appearance of bifurcation and the behavior of the entanglement. (C) 2008 Elsevier B.V. All rights reserved

Physics Letters A 372[34], 5564-5568. 2008.

P208-08 "Flavor mixing in a Lee-type model"

Nishi, C. C. and Guzzo, M. M.

An exactly solvable quantum field theory (QFT) model of Lee type is constructed to study how neutrino flavor eigenstates are created through interactions and how the localization properties of neutrinos follows from the parent particle that decays.

The two-particle states formed by the neutrino and the accompanying charged lepton can be calculated exactly as well as their creation probabilities. We can show that the coherent creation of neutrino flavor eigenstates follows from the common negligible contribution of neutrino masses to their creation probabilities. On the other hand, it is shown that it is not possible to associate a well-defined "flavor" to coherent superpositions of charged leptons

***Physical Review D* 78[3]. 2008.**

P209-08 "Group analysis method for fission track thermochronology"

Hadler, J. C., Lunes, P. J., Tello, C. A., and Guedes, S.

A methodology to obtain ages and thermal histories of sets of apatite samples from localities with geologically compatible characteristics is described. A methodology exploring the fact that samples with similar geological characteristics should present the same thermal history is proposed. This approach can contribute for the obtainment of more conclusive results by analysing fewer samples than it is necessary when the samples are individually analysed. In order to determine the ages, we use the absolute neutron dosimetry through thin films of natural uranium along with lambda(f) = 8.46 x 10(-17) a(-1). As an example of application of the proposed methodology, we analyse samples collected in a Brazilian region, Sao Francisco Craton, which experienced low tectonic activity. (C) 2008 Elsevier Ltd. All rights reserved

***Radiation Measurements* 43, S163-S168. 2008.**

P210-08 "Highlights from the Latin American conference on applications of powder diffraction"

Granado, E.

***Powder Diffraction* 23[2], S2-S4. 2008.**

P211-08 "Indoor radon and radon progeny survey at Campinas-Brazil using CR-39: Final results"

Hadler, J. C., Neman, R. S., Iunes, P. J., Pereira, O. L. S., and Paulo, S. R.

In a survey performed at Campinas-SP, Brazil, the CR-39 detector was used as an alpha-spectrometer taking into account the size and the gray level of round tracks measured under an automatic optical microscopy system. The exposures were carried out in the same room of 70 dwellings during two successive periods of six months: the first one from November 1996 to May 1997 (summer exposure) and the second one from May 1997 to December 1997 (winter exposure). The results of the assessment of radon and radon progeny (RP) joint activity in the air neighboring the detector and the plated-out RP activity on the material surfaces are given. (C) 2008 Elsevier Ltd. All rights reserved

Radiation Measurements 43, S440-S444. 2008.

P212-08 "Influence of second-order corrections to the energy-dependence of neutrino flavor conversion formulas"

Bernardini, A. E. and Guzzo, M. M.

We discuss the intermediate wave-packet formalism for analytically quantifying the energy dependence of the two-flavor conversion formula that is usually considered for anlyzing neutrino oscillations and adjusting the focusing horn, target position and/or detector location of some flavor conversion experiments. Following a sequence of analytical approximations where we consider the second-order corrections in a power series expansion of the energy, we point out a residual time-dependent phase which, in addtion to some well-known wave-packet effects, can subtly modify the oscillation parameters and limits. In the present precision era of neutrino oscillation experiments where higher precision measurements are required, we quantify some small corrections in neutrino flavor conversion formulas which lead to a modified energy-dependence for nu(mu) <-> nu(e) oscillations

***Modern Physics Letters A* 23[23], 1949-1960. 2008.**

P213-08 "Interaction of BSA protein with copper evaluated by electrochemical impedance spectroscopy and quartz crystal microbalance"

Pinto, E. M., Soares, D. M., and Brett, C. M. A

The interaction of bovine Serum albumin (BSA) protein with copper in phosphate buffer solution has been studied by a combination of electrochemical impedance spectroscopy (EIS) close to the open circuit potential, with simultaneous monitoring by the electrochemical quartz crystal microbalance (EQCM). in order to throw light on BSA adsorption. Copper films were electroplated onto gold quartz crystals and mounted in the EQCM. Experiments were conducted in the presence and absence of dissolved oxygen and of BSA and the results show the influence of O-2 on the protein/metal interaction and also show specific interactions between BSA and copper. The good reproducibility obtained in these experiments suggests future application to other systems and which should lead to a better understanding of the use of such types of protein as corrosion inhibitors. (c) 2008 Elsevier Ltd. All rights reserved

***Electrochimica Acta* 53[25], 7460-7466. 2008.**

P214-08 "Low-temperature specific heat spectra considering nonextensive long-range correlated quasiperiodic DNA molecules"

Moreira, D. A., Albuquerque, E. L., da Silva, L. R., and Galvao, D. S.

We consider the low-temperature specific heat spectra of long-range correlated quasiperiodic DNA molecules using a q-gaussian distribution, and compare them with those considering the Boltzmann-Gibbs distribution. The energy spectra are calculated using the one-dimensional Schrodinger equation in a tight-binding approximation with the on-site energy exhibiting long-range disorder and non-random hopping amplitudes. We focus our attention at the low temperature region, where the specific heat spectra presents a logarithmic-periodic oscillations as a function of the temperature T around a mean value given by a characteristic dimension of the energy spectrum. (C) 2008 Elsevier B.V. All rights reserved

***Physica A-Statistical Mechanics and Its Applications* 387[22], 5477-5482. 2008.**

P215-08 "Magnetization, spin current, and spin-transfer torque from SU(2) local gauge invariance of the nonrelativistic Pauli-Schrodinger theory"

Dartora, C. A. and Cabrera, G. G.

In this Brief Report, we consider local gauge symmetries of the nonrelativistic Pauli-Schrodinger theory. From the simplest free Lagrangian density for Pauli two-component spinors, we obtain the spin interaction with a magnetic field and define the spin-current vector without invoking relativistic theory. Applying U(1)xSU(2) local gauge symmetry, and proceeding via the Noether's theorem, we are able to construct a covariant conserved spin-current density in a natural way. Our approach allow us to understand the main features of spin transport properties and suggests that SU(2) is a fundamental symmetry of nonrelativistic quantum mechanics

Physical Review B **78[1]. 2008.**

P216-08 "New in situ blends of polyaniline and cardanol bio-resins"

Souza, F. G., Richa, P., de Siervo, A., Oliveira, G. E., Rodrigues, C. H. M., Nele, M., and Pinto, J. C.

Cardanol, a well known natural resource, was used to produce a polymer resin in the presence of formaldehyde, catalyzed by H2SO4. Before reticulation, PAni center dot H2SO4 was blended with the resin. The blended material was cast into poly(propylene) cups and kept inside a desiccator under vacuum until complete water evaporation. The final in situ polymer blend was solid and could not be dissolved in ordinary solvents, indicating that a reticulated material had been obtained. Samples prepared similarly were then characterized, showing that the produced blends can be used as pressure sensing materials

Macromolecular Materials and Engineering **293[8], 675-683. 2008.**

P217-08 "Observation of the suppression of the flux of cosmic rays above 4x10(19) eV"

Abraham, J., Abreu, P., Aglietta, M., Aguirre, C., Allard, D., Allekotte, I., Allen, J., et all

The energy spectrum of cosmic rays above 2.5 x 10(18) eV, derived from 20 000 events recorded at the Pierre Auger Observatory, is described. The spectral index gamma of the particle flux, J proportional to E-gamma, at energies between 4 x 10(18) eV and 4 x 10(19) eV is 2.69 +/- 0.02(stat) +/- 0.06(syst), steepening to 4.2 +/- 0.4(stat) +/- 0: 06 (syst) at higher energies. The hypothesis of a single power law is rejected with a significance greater than 6 standard deviations. The data are consistent with the prediction by Greisen and by Zatsepin and Kuz'min

Physical Review Letters **101[6]. 2008.**

P218-08"On energy absorption effects in uranium and thorium thin films"

Hadler, J. C., Lunes, P. J., Bigazzi, G., and Paulo, S. R.

The use of U and Th thin films, attached to detectors of fission tracks, allows determining the neutron fluence in nuclear reactors. In principle, the parameters involved in neutron fluence determinations through U and Th thin films that might be influenced by effects related with fission fragments and a particle energy absorption are: (i) the detection efficiency of nuclear emulsions for x particles, (ii) the detection efficiency of muscovite mica for fission fragments from thin films, F-epsilon and (iii) the detection efficiency of nuclear emulsions for fission fragment energy absorption effects are negligible in case of U and Th thin films employed in neutron fluence determinations for fission-track (FT) dating. (C) 2008 Published by Elsevier Ltd

Radiation Measurements 43, S334-S336. 2008.

P219-08 "On the fluorescence of pyrrole derivative oligomer" Guimaraes, J. R., Amazonas, J. G., Silva, C. A. B., de Melo, C. P., Laks, B., and Del Nero, J.

In this work we have investigated the ground state and others eletronic properties of the biosensor 3-methyl pyrrole-4-carboxilic acid (MPC) oligomers and related compounds. We considered the systems described by a DFT/B3LYP/6-31G* type Hamiltonian and explored the effects due to the presence of conformational defects. Furthermore the excited states have been determined by a post Hartree-Fock CI methodology. The results revealed the existence of different electronic patterns for the MPC if compared to the ones existing for the oligopyrrole derivative systems. The response of one of investigated polymers (MPC) was found to be critically dependent on the radicals linked to the studied oligomer chain structure so that the electronic structure analyses should be easily improved by choosing a proper set of preparation parameters to design conducting polymers with desirable properties. (c) 2007 Elsevier B.V. All rights reserved

Materials Science & Engineering C-Biomimetic and Supramolecular Systems **28[7], 1076-1081. 2008.**

P220-08 "Optical and magnetic properties of Zn0.9-xCo0.1O : Al-x thin films"

Samanta, K., Bhattacharya, P., Duque, J. G. S., Iwamoto, W., Rettori, C., Pagliuso, P. G., and Katiyar, R. S.

The high-T-c ferromagnetic property in Co-doped ZnO (ZCO), mediated by donor impurity band was tested by controlled introduction of shallow donors (Al) in the Zn0.9-xCo0.1O : Al-x (x = 0.005 and 0.01) thin films. The saturation magnetization for the 10% Co-doped ZnO (4 emu/cc) at 300 K reduces (similar to 0.8 emu/cc) due to Al doping. The resistivity drops abruptly, from similar to 10(3) Omega-cm for the ZCO film to 0.033 and 0.02 Omega cm for the 0.5% and 1.0% Al doped ZCO samples, respectively. The XPS measurements did not show any signature of metallic CO Clusters formation in these samples. (C) 2008 Elsevier Ltd. All rights reserved

Solid State Communications **147[7-8], 305-308. 2008.**

P221-08 "Optical frequency combs generated by four-wave mixing in optical fibers for astrophysical spectrometer calibration and metrology" Cruz, F. C.

Optical frequency combs generated by multiple four-wave mixing in short and highly nonlinear optical fibers are proposed for use as high precision frequency markers, calibration of astrophysical spectrometers, broadband spectroscopy and metrology. Implementations can involve two optical frequency standards as input lasers, or one standard and a second laser phase-locked to it using a stable microwave reference oscillator. Energy and momentum conservation required by the parametric generation assures phase coherence among comb frequencies, while fibers with short lengths can avoid linewidth broadening and stimulated Brillouin scattering. In contrast to combs from mode-locked lasers or microcavities, the absence of a resonator allows large tuning of the frequency spacing from tens of gigahertz to beyond teraHertz. (C) 2008 Optical Society of America

Optics Express **16[17], 13267-13275. 2008.**

P222-08 "Principle of stationary phase for propagating wave packets in the unidimensional scattering problem"

Bernardini, A. E.

We point out some incompatibilities which appear when one applies the stationary phase method for deriving phase times to obtain the spatial localization of wave packets scattered by a unidimensional potential barrier. We concentrate on the above barrier diffusion problem where the wave packet collision implies the possibility of multiple reflected and transmitted wave packets, which, depending on the boundary conditions, can overlap or stand in relative separation in space. We demonstrate that the indiscriminate use of the method for such a particular configuration leads to paradoxical results for which the correct interpretation, confirmed by analytical/numerical calculations, imposes the necessity of the appearance of multiple peaks as a consequence of multiple reflections by the barrier steps

European Physical Journal C **56[4], 545-556. 2008.**

P223-08 "Quantification of continuous variable entanglement with only two types of simple measurements"

Rigolin, G. and de Oliveira, M. C.

Here we propose an experimental set-up in which it is possible to obtain the entanglement of a two-mode Gaussian state, be it pure or mixed, using only simple linear optical measurement devices. After a proper unitary manipulation of the two-mode Gaussian state only number and purity measurements of just one of the modes suffice to give us a complete and exact knowledge of the state's entanglement. (C) 2008 Elsevier Inc. All rights reserved

Annals of Physics **323[9], 2172-2182. 2008.**

P224-08 "Relation between phase and dwell times for quantum tunneling of a relativistically propagating particle"

Bernardini, A. E.

The general and explicit relation between the phase time and the dwell time for quantum tunneling of a relativistically propagating particle is investigated and quantified. In analogy with previously obtained non-relativistic results, it is shown that the group delay can be described in terms of the dwell time and a self-interference delay. Lessons concerning the phenomenology of the relativistic tunneling are drawn. Copyright (C) EPLA, 2008

Epl **82[6]. 2008.**

P225-08 "Rotational dynamics and polymerization of C-60 in C-60-cubane crystals: A molecular dynamics study"

Coluci, V. R., Sato, F., Braga, S. F., Skaf, M. S., and Galvao, D. S.

We report classical and tight-binding molecular dynamics simulations of the C-60 fullerene and cubane molecular crystal in order to investigate the intermolecular dynamics and polymerization processes. Our results show that, for 200 and 400 K, cubane molecules remain basically fixed, presenting only thermal vibrations, while C-60 fullerenes show rotational motions. Fullerenes perform "free" rotational motions at short times (less than or similar to 1 ps), small amplitude hindered rotational motions (librations) at intermediate times, and rotational diffusive dynamics at long times (greater than or similar to 10 ps). The mechanisms underlying these dynamics are presented. Random copolymerizations among cubanes and fullerenes were observed when temperature is increased, leading to the formation of a disordered structure. Changes in the radial distribution function and electronic density of states indicate the coexistence of amorphous and crystalline phases. The different conformational phases that cubanes and fullerenes undergo during the copolymerization process are discussed

Journal of Chemical Physics **129[6]. 2008.**

P226-08 "Scaling of entanglement support for matrix product states"

Tagliacozzo, L., de Oliveira, T. R., Iblisdir, S., and Latorre, J. I.

The power of matrix product states to describe infinite-size translational-invariant critical spin chains is investigated. At criticality, the accuracy with which they describe ground-state properties of a system is limited by the size chi of the matrices that form the approximation. This limitation is quantified in terms of the scaling of the half-chain entanglement entropy. In the case of the quantum Ising model, we find S similar to 1/6log chi with high precision. This result can be understood as the emergence of an effective finite correlation length xi(chi) ruling all the scaling properties in the system. We produce six extra pieces of evidence for this finite-chi scaling, namely, the scaling of the correlation length, the scaling of magnetization, the shift of the critical point, the scaling of the entanglement entropy for a finite block of spins, the existence of scaling functions, and the agreement with analogous classical results. All our computations are consistent with a scaling relation of the form xi(chi)similar to chi(kappa), with kappa=2 for the Ising model. In the case of the Heisenberg model, we find similar results with the value kappa similar to 1.37. We also show how finite-chi scaling allows us to extract critical exponents. These results are obtained using the infinite time evolved block decimation algorithm which works in the thermodynamical limit and are verified to agree with density-matrix renormalization-group results and their classical analog obtained with the corner transfer-matrix renormalization group

Physical Review B **78[2]. 2008.**

P227-08 "Slow magnetic relaxation in (CoCuII)-Cu-II coordination oligomer built into mesoporous material"

Cangussu, D., Nunes, W. C., Pereira, C. L. M., Pedroso, E. F., Mazali, I. O., Knobel, M., Alves, O. L., and Stumpf, H. O.

The ferrimagnetic system CoCu(opba) [opba = ortho-phenylenebis(oxamato)] was employed to prepare a traditional chain [CoCu(opba)]center dot 4H(2)O (1) and a nanocomposite by incorporation in porous Vycor glass (PVG). This nanocomposite was made by first anchoring [BU4N](2)[Cu(opba)] on PVG [PVG-Cu (2)] and then treating it "in situ" with cobalt(II) acetate to obtain the nanomagnet PVG-CuCo (3). Magnetic measurements show that 1 consists of a one-dimensional ferrimagnet with strong intrachain antiferromagnetic coupling and weak interchain interactions that result in spin-glass behavior below 3.5 K. Nanocomposite 3 presents ferrimagnetic chains limited by the nanopore size, which leads to a slow relaxation of the magnetization following Arrhenius' law, frequency dependence for in-phase and out-of-phase susceptibility, and hysteresis below the blocked regime temperature (< 6 K). These features are characteristics of single-chain magnets (SCM). ((C) Wiley-VCH Verlag GmbH & Co. KGaA, 69451 Weinheim, Germany, 2008)

European Journal of Inorganic Chemistry **[24], 3802-3808. 2008.**

P228-08 "Solutions for first- and second-order four-wave mixing cross talk in one-pump fiber optical parametric amplifiers"

Marhic, M. E. and Boggio, J. M. C.

We show that the set of two coupled differential equations governing a four-wave mixing (FWM) component and its associated idler in a one-pump fiber optical parametric amplifier are the same as for standard parametric amplification, but with additional source terms arising from FWM between already-calculated waves. We show how to solve this new set of equations in general: this involves multiplication by an exponential matrix and its inverse, and integration. Hence it is in principle possible to write the exact expressions for the cross-talk fields, in terms of a large number of exponentials. The results show that the power of the first- and second-order cross-talk terms scales, respectively, like the first and second power of the signal power. In the case of two input signals, the powers of the cross-talk terms are independent of the phases of the signals, hence phase control cannot be used for reducing cross talk. In a particular case, cross talk scales like the inverse of pump power, which confirms a general trend noted in numerical simulations, and experiments. (c) 2008 Optical Society of America

Journal of the Optical Society of America B-Optical Physics **25[5], 841-848. 2008.**

P229-08 "Static charged fluid around a massive magnetic dipole"

Polanco, J. D., Letelier, P. S., and Ujevic, M.

An analytical solution of Einstein-Maxwell equations with a static fluid as a source is presented. The spacetime is represented by the axially symmetric Weyl metric and the energy-momentum tensor describes a coupling of a fluid with an electromagnetic field. When appropriate limits are performed we recover the well-known solutions of Gutsunaev-Manko and Schwarzschild. Also, using Eckart's thermodynamics, we calculated the temperature, the mechanical pressure, the charge density, and the energy density of the system. The analysis of thermodynamic quantities suggests that the solution can be used to represent a magnetized compact stellar object surrounded by a charged fluid

Physical Review D **78[2]. 2008.**

P230-08 "Superparamagnetism and other magnetic features in granular materials: A review on ideal and real systems"

Knobel, M., Nunes, W. C., Socolovsky, L. M., De Biasi, E., Vargas, J. M., and Denardin, J. C.

An overview on magnetic of nanostructured magnetic materials is presented, with particular emphasis on the basic features displayed by granular nanomagnetic solids. Besides a review of the basic concepts and experimental techniques, the role of structural disorder (mainly the distribution of grain sizes), interparticle magnetic interactions and surface effects are also discussed with some detail. Recent results, models and trends on the area are also discussed

Journal of Nanoscience and Nanotechnology **8[6], 2836-2857. 2008.**

P231-08 "The internal and external electric fields for a resistive toroidal conductor carrying a steady poloidal current"

Hernandes, J. A., Mania, A. J., Luna, F. R. T., and Assis, A. K. T.

We consider the case of a resistive toroidal conductor carrying a steady current in the poloidal direction. We obtain algebraic expressions for the electric potential, the electric field and the surface charges inside and outside the toroidal shell. We use toroidal coordinates, in which Laplace's equation is R-separable. We analyze the limiting case of a thin toroid, which can be compared with the solution for the ideal straight solenoid

Physica Scripta **78[1]. 2008.**

P232-08 "Thermal treatment effects on the Ru/CeO2 catalysts performance for partial hydrogenation of benzene"

Zonetti, P. D., Landers, R., and Cobo, A. J. G.

The aim of this work is to study the effect of the preparation conditions of Ru/CeO2 catalyst (calcination temperature and/or reduction) over the performance in the partial hydrogenation of benzene reaction in the presence of TiCl3. The catalysts were prepared through chlorinated precursors by incipient wetness impregnation method. The reaction occurred in three-phase reactional medium in presence of water at 373 K and 5.0 MPa. Temperature programmed reduction (TPR) profiles of calcinated catalysts indicate the presence of oxidated ruthenium. X-ray photoelectron spectroscopy (XPS) analysis confirms this supposition, showing that the ruthenium appears in the form of RuO2 for the sample calcinated at 673 K, while for the reduced solid at 773 K, the Ru appears in the metallic state. However, the calcination step followed or not by reduction, strongly hinders the catalytic performance. In its turn, the direct reduction leads to a more active Ru/CeO2 catalysts, as well as higher cyclohexene yields throughout all the reaction. (C) 2008 Elsevier B. V. All rights reserved

Applied Surface Science **254[21], 6849-6853. 2008.**

P233-08 "Upper limits on the diffuse supernova neutrino flux from the SuperKamiokande data"

Lunardini, C. and Peres, O. L. G.

We analyze the 1496 days of SuperKamiokande data to put limits on the nu(e), (nu) over bar (e), nu(mu) + nu(tau) and (nu) over bar (mu) + (nu) over bar (tau) components of the diffuse flux of supernova neutrinos, in different energy intervals and for different neutrino energy spectra. By considering the presence of only one component at a time, we find the following bounds at 90% CL and for neutrino energy E > 19.3 MeV: Phi(nu e) < 73.3-154 cm(-2) s(-1), Phi((nu) over bare) < 1.4-1.9 cm(-2) s(-1), Phi(nu mu +nu tau) < (1.0-1.4) x 10(3) cm(-2) s(-1) and Phi((nu) over bar mu+($) over bar tau) < (1.3-1.8) x 10(3) cm(-2) s(-1), where the intervals account for varying the neutrino spectrum. In the interval E = 22.9-36.9 MeV, we find Phi(nu e) < 39-54 cm(-2) s(-1), which improves on the existing limit from SNO in the same energy window. Our results for nu(mu)+nu(tau) and (nu) over bar (mu) + (nu) over bar (tau) improve by about four orders of magnitude the previous best constraints from LSD

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Abstracta

Instituto de Física
Diretor: Prof. Dr. Julio Cesar Hadler Neto
Universidade Estadual de Campinas - UNICAMP
Cidade Universitária C.P. 6165
CEP: 13081-970 - Campinas - SP - Brasil
e-mail: secdir@ifi.unicamp.br
Fone: 0XX 19 3521-5300

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Biblioteca do Instituto de Física Gleb Wataghin
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Diretora Técnica: Rita Aparecida Sponchiado

Elaboração
Antonela Carvalho Ribeiro
antonela@ifi.unicamp.br

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