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TRABALHOS ACEITOS PARA PUBLICAÇÃO

A 007 - 06

On fallacies concerning nonextensive thermodynamics and q-entropy.

A 008 - 06

The Theory of irreversible processes : Foundations of a non-equilibrium statistical ensemble formalism.

TRABALHOS PUBLICADOS

Agosto à Setembro 2006

P 193 à P241 / 2006

TRABALHOS ACEITOS PARA PUBLICAÇÃO

A 007 - 06 "On fallacies concerning nonextensive thermodynamics and q-entropy"

Luzzi, R., Vasconcellos, A. R., and Ramos, J. G.

On the question in the special issue 36/6 (2005) of Europhysics News it should be noticed that claims about the formulation of a grand-generalization of non-extensive thermodynamics, based on a so-called q-entropy, have given rise to a flood of papers which are receiving critical scrutiny: Several distinguished researchers in the area have pointed out the misconceptions involved in such an approach.

Europhysics News, 37[2], 11. 2006.

A 008 - 06 "The theory of irreversible processes: Foundations of a non-equilibrium statistical ensemble formalism"

Luzzi, R., Vasconcellos, A. R., and Ramos, J. G.

A general overview on the construction of a Non-equilibrium Statistical Mechanics Ensemble Formalism is presented. Such construction has been approached along the recently past twentieth century by a pleiad of distinguished scientists. Their work is here subsumed in a large systematization in the form of a physically sound, general and useful, theoretical framework. It includes their contributions and also incorporates some extensions and generalizations. The present contribution has been organized in sixteen items and five appendices where the main questions associated to such construction are considered and discussed. Among them are the relevant ones of choice of the basic variables, the questions of historicity and irreversibility and the approach to equilibrium. The derivation of a non-equilibrium grand-canonical statistical operator is presented. In terms of it a Statistical Irreversible Thermodynamics can be built, which provides microscopic (mechano-statistical) foundations to phenomenological Extended Irreversible Thermodynamics. It also provides a statistical Non-Linear Higher-Order-Hydrodynamics, including fluctuations, thus providing a unification of the kinetic and hydrodynamic approaches. Moreover, a brief description of an all-important accompanying Non-Linear Quantum Kinetic Theory of relaxation processes is presented, as well as a Response Function Theory and a Fluctuation-Dissipation Theorem for far-from-equilibrium systems. The aspect of validation of the theory (comparison of theory and experiment) is reviewed in compact form. Furthermore, it is briefly discussed the derivation of the formalism within the scope of a variational principle in an approach associated to Information Theory. Considerations on the question of the use of the formalism for dealing with systems with complex structure, small systems, and other particular situations, are presented.

Rivista del Nuovo Cimento, accepted on October 2006.

TRABALHOS PUBLICADOS

P 193- 06 "A general theory for the Frozen Waves and their realization through finite apertures"

Dartora, C. A., Nobrega, K. Z., Dartora, A., Viana, G. A., and Filho, H. S.

In this paper, we present a generalization of the so-called Frozen Waves, which are new solutions to Maxwell's equations having the important characteristic of remaining static in space and keeping any previously chosen arbitrary longitudinal field pattern. In the pioneering work, these waves were introduced as a discrete superposition of zero-order Bessel beams. As a fact, here we will represent these waves as a continuous superposition of Bessel beams

leading to a simpler and more compact mathematical formalism, which allows us to derive certain inequalities that restrict the physical properties of the Frozen Waves, such as their attainable longitudinal resolution. Besides this, we will discuss losses compensation in a lossy medium and, finally, their practical realization through finite apertures.

Optics Communications 265[2], 481-487. 2006.

P 194 - 06 "A new member of the aldo-keto reductase family from the plant pathogen *Xylella fastidiosa*"

Rosselli, L. K., Oliveira, C. L. P., Azzoni, A. R., Tada, S. F. S., Catani, C. F., Saraiva, A. M., Soares, J. S. M., Medrano, F. J., Torriani, I. L., and Souza, A. P

The *Xylella fastidiosa* genome program generated a large number of gene sequences that belong to pathogenicity, virulence and adaptation categories from this important plant pathogen. One of these genes (XF1729) encodes a protein similar to a superfamily of aldo-keto reductase together with a number of structurally and functionally related NADPH-dependent oxidoreductases. In this work, the similar sequence XF1729 from *X. fastidiosa* was cloned onto the pET32Xa/LIC vector in order to overexpress a recombinant His-tag fusion protein in *Escherichia coli* BL21(DE3). The expressed protein in the soluble fraction was purified by immobilized metal affinity chromatography (agarose-IDA-Ni resin). Secondary structure contents were verified by circular dichroism spectroscopy. Small angle X-ray scattering (SAXS) measurements furnish general structural parameters and provide a strong indication that the protein has a monomeric form in solution. Also, ab initio calculations show that the protein has some similarities with a previously crystallized aldo-keto reductase protein. The recombinant XF1729 purified to homogeneity catalyzed the reduction of DL-glyceraldehyde (K-cat 2.26 s⁻¹), K-m 8.20 +/- 0.98 mM) and 2-nitrobenzaldehyde (K-cat 11.74 s⁻¹), K-m 0.14 +/- 0.04 mM) in the presence of NADPH. The amino acid sequence deduced from XF1729 showed the highest identity (40% or higher) with several functional unknown proteins. Among the identified AKRs, we found approximately 29% of identity with YakC (AKR13), 30 and 28% with AKR11A and AKR11B, respectively. The results establish XF1729 as the new member of AKR family, AK R13B1. Finally, the first characterization by gel filtration chromatography assays indicates that the protein has an elongated shape, which generates an apparent higher molecular weight. The study of this protein is an effort to fight *X. fastidiosa*, which causes tremendous losses in many economically important plants.

Archives of Biochemistry and Biophysics 453[2], 143-150. 2006.

P 195-06 "A simple two-phase route to silver nanoparticles/polyaniline structures"

Oliveira, M. M., Castro, E. G., Canestraro, C. D., Zanchet, D., Ugarte, D., Roman, L. S., and Zarbin, A. J. G.

Novel silver nanoparticles/polyaniline composites were obtained through a two-phase water/toluene interfacial reaction. We show that by rigorously controlling the reaction time, different structures of the nanocomposites can be obtained, such as a thin sheet of polyaniline around the silver nanoparticles or a polymer mass with nanoparticles homogeneously embedded within it. Samples were characterized by FT-IR, UV-vis-NIR and Raman spectroscopy, X-ray diffraction, cyclic voltammetry, TEM, and HRTEM. Conductivity and current-voltage characteristics of the nanocomposites were measured, and the results indicate that different properties result from the different structures in which the nanocomposites were formed.

Journal of Physical Chemistry B 110[34], 17063-17069. 2006.

P 196-06 "Analyses of residual stresses on stamped valves by X-ray diffraction and finite elements method"

Martins, J. A., Cardoso, L. P., Fraymann, J. A., and Button, S. T.

The evolution of the engineering materials, manufacturing processes, as well as of many mechanical parts have required more and more the development of new techniques and methods to their analyses. The metalworking of the metallic materials by plastic deformation generates internal stresses called residual stresses, which can result changes in the materials' expected mechanical behavior. This paper presents the analyses of these residual stresses in stamped valves by X-ray diffraction and also by the finite element method. Therefore, in this context, it was developed an alternative method to the usual σ_{psi} to determine the residual stresses by X-ray diffraction on small areas, the same method utilized to the residual stresses determination in thin film layers. The results obtained by X-ray diffraction were compared to experimental results as well as to the results from the numerical simulation with the finite elements method (FEM). Fatigue tests were carried out in a endurance bench applying alternate reverse bending on dynamical valves under the following manufacturing conditions: (a) just blanked; (b) blanked and plastically deformed on specific regions of the higher stresses and (c) blanked, plastically deformed and plus an additional abrasive process applied in order to minimize or eliminate regions of the potential crack initiation, previously identified in the numerical simulation. The results obtained in the fatigue tests have proven the validity of the methods used to analyze the residual stresses.

Journal of Materials Processing Technology 179[1-3], 30-35. 2006.

P 197-06 "Analysis of the interatomic potential of the helium systems"

Ujevic, S. and Vitiello, S. A.

The effects of interatomic potentials in the equation of state of He-4 and other properties of the system are investigated. A multi-weight diffusion Monte Carlo method is applied in order to compute very small energies differences with great accuracy. From our analysis we identify the best current description for the helium systems.

International Journal of Modern Physics B 20[19], 2682-2686. 2006.

P 198-06 "Cathodic behavior of co-sputtered Cu/V oxides thin films"

Souza, E. A., Landers, R., Tabacniks, M. H., Cardoso, L. P., and Gorenstein, A.

In this paper, Cu/V oxide thin films were prepared by reactive d.c./r.f. co-sputtering. Nanostructured films were obtained and their composition and crystallinity were investigated. The electrochemical behavior of the thin film electrodes was studied, in order to evaluate their performance as cathodes in miniaturized systems. The behavior of the mixed oxide films and the pure vanadium pentoxide in thin film form are compared. All films presented a high insertion capacity in the first cycle. The film with composition CU4.0VO5.5 presented the highest capacity and stability in comparison with all the other films.

Electrochimica Acta 51[26], 5885-5891. 2006.

P 199-06 "Characterization of the reversible photoinduced optical changes in Sb-based glasses"

Nalin, M., Poirier, G., Ribeiro, S. J. L., Messaddeq, Y., Carvalho, E. J., and Cescato, L.

Changes occurring in absorption coefficients when glasses in the SbPO₄-WO₃ binary system were irradiated by light, at the edge of the absorption band, were measured in real time. These glasses present good thermal and optical properties and photoinduced changes in the absorption coefficients are reversible by heat treatment around 150 degrees C. Subsequent recording/erasing cycles could be made without sample degradation. The sensitivity of the induced optical changes was studied for different wavelengths, light powers and energy of light dose exposures, and for different compositions of the glasses. The changes in the absorption coefficients of the glass samples were accompanied by a color change from yellow to blue, and were also characterized by visible spectroscopy. The color changes occurred through the entire volume of the glass (similar to 2 mm thickness) for the Ar-ion laser lines at the edge of the absorption band.

Journal of Non-Crystalline Solids 352[32-35], 3535-3539. 2006.

P 200-06 "Decoherence rates in complex Josephson qubit circuits"

DiVincenzo, D. P., Brito, F., and Koch, R. H.

A complete analysis of the decoherence properties of a Josephson junction qubit is presented. The qubit is of the flux type and consists of two large loops forming a gradiometer, one small loop, and three Josephson junctions. We develop a complete, quantitative description of the inductances and capacitances of the circuit. Including two stray capacitances makes the quantum mechanical modeling of the system five dimensional. To make the required calculation tractable, we devise a general Born-Oppenheimer approximation which reduces the effective dimensionality in the calculation to one. Contributions to relaxation (T-1) and dephasing (T-phi) arising from two different control circuits, one coupled to the small loop and one coupled to a large loop, is computed. We explore T-1 and T-phi along an optimal line in the space of applied fluxes; along this "S line" we see significant and rapidly varying contributions to the decoherence parameters, primarily from the circuit coupling to the large loop.

Physical Review B 74[1]. 2006.

P 201-06 "Effects of HeNe laser irradiation on experimental paracoccidioidomycotic lesions"

Ferreira, M. C., Brito, V. N., Gameiro, J., Costa, M. R. S. N., Vasconcellos, E. C.C., Cruz-Hofling, M. A., and Verinaud, L.

Paracoccidioidomycosis (PCM) is the most prevalent human mycosis in Latin America. The infection is thought to take place firstly in the lungs and then may disseminate to other organs and tissues. Treatment by currently available antifungals is lengthy, the drugs may have undesirable side effects, and some are costly. Occasional resistant strains of *Paracoccidioides brasiliensis*, the causative agent of PCM, have been reported. So, the search for more efficient treatments or adjuvant therapies has to be continued. In this work, we evaluated the effects of HeNe laser irradiation on cutaneous inflammatory lesions caused by the inoculation of $5 \times 10^6/0.1$ ml yeasts cells into the back footpad of Balb/c mice. HeNe irradiation ($\lambda = 632.8$ nm, 3 mW, incident energy of 3 J/cm²) was applied at days 7, 8 and 9 postinfection and histological and immunohistochemical analysis were done. Unirradiated animals were used as controls. The results showed that laser-treated mice presented reduction of footpad edema, faster cutaneous wound healing, confluent granuloma, diffuse- and more loosely distributed immunolabeling for TNF-alpha, enhanced labeling of IFN-gamma and any *P. brasiliensis* form detected, whereas multiple viable fungi were seen in diffuse widespread granulomas obtained from non-treated mice foot-pad. Fungi that were harvested from laser-treated animals presented no capability of growth in vitro as compared to those obtained from non-treated mice. We conclude that HeNe laser irradiation was able to inhibit the progress of inflammatory

local reaction produced by *P. brasiliensis* infection and influence local cytokines production. We suggest that this treatment modality can be a useful adjuvant tool to be combined with antifungal agents in the treatment of PCM ulcerations. The mechanisms involved in laser therapy of PCM lesions need further investigation.

Journal of Photochemistry and Photobiology B-Biology 84[2], 141-149. 2006.

P 202-06 "Electric-field inversion asymmetry: Rashba and Stark effects for holes in resonant tunneling devices"

de Carvalho, H. B., Brasil, M. J. S. P., Lopez-Richard, V., Gobato, Y. G., Marques, G. E., Camps, I., Dacal, L. C. O., Henini, M., Eaves, L., and Hill, G.

We report electric-field-induced modulation of the spin splitting during the charging and discharging processes of a p-type GaAs/AlAs double-barrier resonant-tunneling diode under an applied bias and magnetic field. In addition to the conventional Zeeman effect, we find experimental evidence of excitonic spin splitting produced by a combination of the Rashba spin-orbit interaction, the Stark effect, and the charge accumulation. The abrupt changes in the photoluminescence with the applied bias provide information about charge accumulation effects in the device.

Physical Review B 74[4]. 2006.

P 203-06 "Electron collisions with cyclobutane"

Bettega, M. H. F., Lopes, A. R., Lima, M. A. P., and Ferreira, L. G.

We report integral, differential, and momentum transfer cross sections for elastic scattering of low-energy electrons by cyclobutane ($c\text{-C}_4\text{H}_8$), which is an isomer of the C_4H_8 molecule and has a closed chain. Our calculations were performed with the Schwinger multichannel method with pseudopotentials at the static-exchange level of approximation, for energies up to 50 eV. We compare the cross sections of cyclobutane with the cross sections of other three isomers of C_4H_8 , namely, isobutene, cis-2-butene, and skew-1-butene. These isomers have open chain and were the subject of a previous study by our group [Lopes et al. *J. Phys. B* 37, 997 (2004)]. We also show previous calculated integral and momentum transfer cross sections for isomers of C_3H_4 , C_3H_6 and C_4H_6 , which have open and closed chains. For each isomeric group we discuss the isomer effect focusing on the closed chain isomer. The isomer effect is related to differences in the isomers cross sections due to differences in their geometries.

Brazilian Journal of Physics 36[2B], 570-575. 2006.

P 204-06 "Evolution of wave-function statistics from closed quantum billiards up to the open quantum dot limit: Application to the measurement of dynamical properties through imaging experiments"

Mendoza, M. and Schulz, P. A.

We discuss the evolution of the electronic and scattering properties of a square billiard connected to the outside either by tunneling barriers or by progressively higher-conductance leads. The slightest connection already induces features of chaotic dynamics in the otherwise regular system. In the absence of large ensembles for energy level statistics or power spectrum analysis, we propose the distribution of the local densities to inspect the character of the underlying dynamics of a scattering state. We show that the wave-function statistics in wide open chaotic billiards strongly

deviates from available predictions. The precursors of scarred wave functions are found in wave-function vortices that are tuned by the lead width.

Physical Review B 74[3]. 2006.

P 205-06 "Exact partial wave expansion of optical beams with respect to an arbitrary origin"

Neves, A. A. R., Fontes, A., Padilha, L. A., Rodriguez, E., Cruz, C. H. D., Barbosa, L. C., and Cesar, C. L.

Using an analytical expression for an integral involving Bessel and Legendre functions, we succeed in obtaining the partial wave decomposition of a general optical beam at an arbitrary location relative to the origin. We also showed that solid angle integration will eliminate the radial dependence of the expansion coefficients. The beam shape coefficients obtained are given by an exact expression in terms of single or double integrals. These integrals can be evaluated numerically on a short time scale. We present the results for the case of a linear-polarized Gaussian beam.

Optics Letters 31[16], 2477-2479. 2006.

P 206-06 "Excitation of the $a(1)\text{Pi}(g)$ and B-3 $\text{Pi}(g)$ electronic states of the nitrogen molecule by electron impact"

Da Costa, R. F. and Lima, M. A. P.

Ab initio calculations were performed for the excitations of the $a(1)\text{Pi}(g)$ and B-3 $\text{Pi}(g)$ electronic states of the N_2 molecule by impact of low-energy electrons. The scattering amplitudes were obtained by means of the Schwinger multichannel method within the scope of the minimal orbital basis for the single configuration interactions (MOB-SCI) approach. Through the use of the MOB-SCI strategy, we have investigated the coupling effects among ground state, first singlet, and first triplet excited states of the $\text{Pi}(g)$ symmetry. Integral and differential cross sections are shown for impact energies from near threshold up to 30 eV. Present results are compared with SMC two-state calculations and also with available theoretical and experimental data.

International Journal of Quantum Chemistry 106[13], 2664-2676. 2006.

P 207-06 "First direct observation of Dirac fermions in graphite"

Zhou, S. Y., Gweon, G. H., Graf, J., Fedorov, A. V., Spataru, C. D., Diehl, R. D., Kopelevich, Y., Lee, D. H., Louie, S. G., and Lanzara, A.

Originating from relativistic quantum field theory, Dirac fermions have been invoked recently to explain various peculiar phenomena in condensed-matter physics, including the novel quantum Hall effect in graphene(1,2), the magnetic-field-driven metal-insulator-like transition in graphite(3,4), superconductivity in He-3 (ref. 5) and the exotic pseudogap phase of high-temperature superconductors(6,7). Despite their proposed key role in those systems, direct experimental evidence of Dirac fermions has been limited. Here, we report the first direct observation of relativistic Dirac fermions with linear dispersion near the Brillouin zone (BZ) corner H, which coexist with quasiparticles that have a parabolic dispersion near another BZ corner K. In addition, we also report a large electron pocket that we attribute to defect-induced localized states. Thus, graphite presents a system in which massless Dirac fermions, quasiparticles with finite effective mass and defect states all contribute to the low-energy electronic dynamics.

Nature Physics 2[9], 595-599. 2006.

P 208-06 "Ga_{1-x}Al_xN system, Madelung, and strain energies: A study on the quality of cluster expansions"

Ferreira, L. G., Marques, M., and Teles, L. K.

First-principles calculations within the local-density formalism were used to study the accuracy of cluster expansion techniques to predict the energy band gaps and enthalpy of the pseudobinary system Ga_{1-x}Al_xN, a technologically important alloy. The chosen pseudobinary system has the advantage of having small lattice mismatches, which minimizes the enthalpies of formation, and of being a semiconducting system with a direct band gap for any concentration *x*. Many different cluster expansion techniques were tested, some presenting clear advantages. The many cluster expansions were also compared against models of Madelung and strain energy, both long-range interactions. Though cluster expansions fail completely for the long-range Madelung interaction model, they behave remarkably well in the not so long-range strain model. The qualitative results for the strain model are similar to the results for the enthalpy and gap of the alloy system, thus giving us an assurance of our conclusions. Using only short-range interactions, all cluster expansions are clearly inadequate for the long-period orderings.

Physical Review B 74[7]. 2006.

P 209-06 "Hafnium silicide formation on Si(100) upon annealing"

de Siervo, A., Fluchter, C. R., Weier, D., Schurmann, M., Dreiner, S., Westphal, C., Carazzolle, M. F., Pancotti, A., Landers, R., and Kleiman, G. G.

High dielectric constant materials, such as HfO₂, have been extensively studied as alternatives to SiO₂ in new generations of Si based devices. Hf silicate/silicide formation has been reported in almost all literature studies of Hf based oxides on Si, using different methods of preparation. A silicate interface resembles close to the traditional Si/SiO₂. The silicate very likely forms a very sharp interface between the Si substrate and the metal oxide, and would be suitable for device applications. However, the thermal instability of the interfacial silicate/oxide film leads to silicidation, causing a dramatic loss of the gate oxide integrity. Despite the importance of the Hf silicide surface and interface with Si, only a few studies of this surface are present in the literature, and a structural determination of the surface has not been reported. This paper reports a study of the Hf silicide formation upon annealing by using a combination of XPS, LEED, and x-ray photoelectron diffraction (XPD) analyses. Our results clearly indicate the formation of a unique ordered Hf silicide phase (HfSi₂), which starts to crystallize when the annealing temperature is higher than 550 degrees C.

Physical Review B 74[7]. 2006.

P 210-06 "High resolution atomic coherent control via spectral phase manipulation of an optical frequency comb"

Stowe, M. C., Cruz, F. C., Marian, A., and Ye, J.

We demonstrate high resolution coherent control of cold atomic rubidium utilizing spectral phase manipulation of a femtosecond optical frequency comb. Transient coherent accumulation is directly manifested by the enhancement of signal amplitude and spectral resolution via the pulse number. The combination of frequency comb technology and spectral phase manipulation enables coherent control techniques to enter a new regime with natural linewidth resolution.

Physical Review Letters 96[15]. 2006.

P 211-06 "Influence of spin reorientation on magnetocaloric effect in NdAl₂: A microscopic model"

von Ranke, P. J., de Oliveira, N. A., Mello, C., Garcia, D. C., de Souza, V. A., and Carvalho, A. M. G.

We report a theoretical investigation about the influence of the spin reorientation from easy magnetic direction $\langle 001 \rangle$ to the applied magnetic field direction $\langle 111 \rangle$ on the magnetocaloric properties of NdAl₂. This compound was fully investigated using a model Hamiltonian which includes the Zeeman-exchange interactions and the crystalline electrical field, which are responsible for the magnetic anisotropy. All theoretical results were obtained using the proper model parameters for NdAl₂, found in the literature. The existence of a minimum in magnetic entropy change below the phase transition was predicted and ascribed to the strong jump on the spin reorientation.

Physical Review B 74[5]. 2006.

P 212-06 "Influence of the process temperature on the steel microstructure and hardening in pulsed plasma nitriding"

Zagonel, L. F., Figueroa, C. A., Droppa, R., and Alvarez, F.

In this paper we report the influence of temperature (260 to 510 degrees C) on the AISI H13 steel microstructure and hardness in pulsed plasma nitriding processes. The experimental results show that bulk nitrogen penetration is well represented by a temperature-activated law. Even at the lowest studied temperatures, grain boundary diffusion causes nitrogen to move relatively deep in the bulk sample. The microstructure was studied by X-ray diffraction analysis at grazing angle and in the Bragg-Brentano configuration. Scanning Electron Microscopy with spatially resolved X-ray energy dispersive spectroscopy was also employed to map nitrogen influence on the morphology of the material. Also, surface (frontal) and profiling nano-indentation was utilized to elucidate the effect of the temperature on the nitrided material hardness.

Surface & Coatings Technology 201[1-2], 452-457. 2006.

P 213- 06 "Infrared spectroscopy investigation of various plasma deposited polymer films irradiated with 170 keVHe⁺ ions"

Gelamo, R. V., Trasferetti, B. C., Durrant, S. F., Davanzo, C. U., Rouxinol, F. P., Gadioli, G. Z., and de Moraes, M. A. B.

This work illustrates the advantages of using p-polarized radiation at an incidence angle of 70 degrees in contrast to the conventional unpolarized beam at normal (or near-normal) incidence for the infrared spectroscopic study of polycarbosilane, polysilazane and polysiloxane thin films synthesized by plasma enhanced chemical vapor deposition (PECVD) and subsequently irradiated with 170 keV He⁺ ions at fluences from 1 x 10¹⁴ to 1 x 10¹⁶ cm⁻². Several bands not seen using the conventional mode could be observed in the polarized mode.

Nuclear Instruments & Methods in Physics Research Section B-Beam Interactions with Materials and Atoms 249, 162-166.2006.

P 214-06 "Ion irradiation effects on a-C : H, a-C : N : H and a-C : F : H films"

Galvao, J. R., Luce, F. P., Baptista, D. L., da Costa, M. E. M., Lepienski, C. M., and Zawislak, F. C.

Hydrogenated amorphous carbon (a-C:H) films as well as films with incorporated nitrogen (a-C:N:H) and fluorine (a-C:F:H) have been irradiated with 400 keV N⁺ at fluences ranging

from $10(14)$ to $3 \times 10(16)$ ions cm^{-2}). The films were 200 nm thick deposited on Si and irradiated at RT. The loss of H, N and F as function of the irradiated fluences was monitored via nuclear reactions. The results show that: (i) the loss of H in all cases is well explained by the molecular recombination model; (ii) there is no loss of N and F as function of fluence for the a-C:N:H and a-C:F:H films. The evolution of the hardness and Young modulus for the three films reach the same values of approximate to 12 and 130 GPa, respectively, at maximum fluence. The intrinsic stress data show a change from a compressive stress to a relaxed structure after irradiations. The Raman data confirm the microstructural evolution of the samples into a structure containing a large number of disordered sp⁽²⁾-C clusters.

Nuclear Instruments & Methods in Physics Research Section B-Beam Interactions with Materials and Atoms 249, 409-413. 2006.

P 215-06 "Lateral access to the holes of photonic crystal fibers - selective filling and sensing applications"

Cordeiro, C. M. B., dos Santos, E. M., Cruz, C. H. B., de Matos, C. J. S., and Ferreira, D. S.

A new, simple, technique is demonstrated to laterally access the cladding holes of solid-core photonic crystal fibers (PCFs) or the central hole of hollow-core PCFs by blowing a hole through the fiber wall (using a fusion splicer and the application of pressure). For both fiber types material was subsequently and successfully inserted into the holes. The proposed method compares favorably with other reported selective filling techniques in terms of simplicity and reproducibility. Also, since the holes are laterally filled, simultaneous optical access to the PCFs is possible, which can prove useful for practical sensing applications. As a proof-of-concept experiment, Rhodamine fluorescence measurements are shown.

Optics Express 14[18], 8403-8412. 2006.

P 216-06 "Low-cost nanomanipulator for in situ experiments in a SEM"

Nakabayashi, D., Silva, P. C., Gonzalez, J. C., Rodrigues, V., and Ugarte, D.

Here, we describe the development of an inexpensive and versatile manipulation system for in situ experiments in a field emission scanning electron microscope based on a parallel-guiding plate-spring mechanism and low cost materials. The system has been tested for a wide range of applications, such as collecting, moving, and positioning particles, fabricating atomic force microscopy tips based on carbon nanotubes, and characterizing individual nanobjects. The nanomanipulation results demonstrate that there are many opportunities for the use of physical manipulation in the bottom-up approach to fabrication of nanodevices.

Microscopy and Microanalysis 12[4], 311-316. 2006.

P 217-06 "Low temperature specific heat of doped and undoped glasses"

Astrath, N. G. C., Steimacher, A., Medina, A. N., Rohling, J. H., Pereira, J. R. D., Bento, A. C., Baesso, M. L., da Silva, L. M., and Gandra, F. G

In this work we have measured the specific heat, $c(p)$ of several glasses between 2 and 160 K. The experiments were performed in low silica calcium aluminosilicate (prepared under vacuum and room atmosphere conditions), in silicate and in fluoride glasses. The influence of neodymium, iron and cobalt in $c(p)$ values at low temperature was also investigated. The scaling proposed by Liu and Lohneysen was used to analyze the experimental data.

The temperatures in which the maxima in $c(p)/T^3$, the so called boson peak, occur are discussed in terms of the Hruby coefficient, which provides information about the glass forming ability.

Journal of Non-Crystalline Solids 352[32-35], 3572-3576. 2006.

P 218-06 "Numerical routines for the optimization of pump power and wavelength in distributed Raman amplifiers"

Lopez-Barbero, A. P., Pontes, M. J., Giraldo, M. T. M. R., Cani, S. P. N., Calmon, L. C., Segatto, M. E. V., Martinez, M. A. G., and Rieznik, A. A.

We present optimization routines developed to define rapidly and precisely the best pump wavelengths and powers for distributed Raman amplifier design. We confirm the validity of our method through simulations by solving the full propagation equations, which govern the amplifier behavior. The sensitivity of the results obtained on the target bandwidth and on the correct selection of the pump wavelengths is studied. Finally, we compare the efficiency of the presented method in relation to previously presented algorithms.

Fiber and Integrated Optics 25[5], 347-361. 2006.

P 219-06 "On the XIIIth international workshop on low-energy e(+) and Ps physics"

Bromley, M. W. J., Lima, M. A. P., and Laricchia, G.

A comment is presented on the XIIIth International Workshop on Low-Energy Positron and Positronium Physics (held at UNICAMP, Campinas, Brazil, 27-30 July 2005). Exciting progress was reported on a range of antimatter research areas. The focus of the conference is on understanding fundamental positron and positronium scattering and annihilation from gas-phase atoms and molecules. Other hot topics included antihydrogen production and antimatter- and matter-bound states. We discuss some of the achievements and outstanding questions that have arisen during the past two years and discuss some directions for the future.

Physica Scripta 74[3], C37-C45. 2006.

P 220-06 "Operational classification and quantification of multipartite entangled states"

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

We formalize and extend an operational multipartite entanglement measure introduced by T. R. Oliveira, G. Rigolin, and M. C. de Oliveira, Phys. Rev. A 73, 010305(R) (2006), through the generalization of global entanglement (GE) [D. A. Meyer and N. R. Wallach, J. Math. Phys. 43, 4273 (2002)]. Contrarily to GE the main feature of this measure lies in the fact that we study the mean linear entropy of all possible partitions of a multipartite system. This allows the construction of an operational multipartite entanglement measure which is able to distinguish among different multipartite entangled states that GE failed to discriminate. Furthermore, it is also maximum at the critical point of the Ising chain in a transverse magnetic field, being thus able to detect a quantum phase transition.

Physical Review A 74[2]. 2006.

P 221-06 "Phase stability, chemical bonds, and gap bowing of $\text{In}_x\text{Ga}_{1-x}\text{N}$ alloys: Comparison between cubic and wurtzite structures"

Caetano, C., Teles, L. K., Marques, M., Dal Pino, A., and Ferreira, L. G

Thermodynamic, structural, and electronic properties of wurtzite $\text{In}_x\text{Ga}_{1-x}\text{N}$ alloys are studied by combining first-principles total energy calculations with the generalized quasichemical approach, and compared to previous results for the zinc-blende structure. Results for bond-lengths, second-nearest-neighbors distances, and bowing parameter are presented. We observed that the wurtzite results are not significantly different from the ones obtained previously for the zinc-blende structure. The calculated phase diagram of the alloy shows a broad and asymmetric miscibility gap as in the zinc-blende case, with a similar range for the growth temperatures, although with a higher critical temperature. We found a value of 1.44 eV for the gap bowing parameter giving support to the recent smaller band gap bowing findings. We emphasize that other theoretical results may suffer from incomplete sets of atomic configurations to properly describe the alloy properties, and experimental findings. Moreover one must take into account a broad composition range in order to obtain reliable results.

Physical Review B 74[4]. 2006.

P 222-06 "Photoionization of C_2F_4 in the VUV region"

Dos Santos, A. S., Brescansin, L. M., Lee, M. T., and Machado, L. E.

We report calculated cross sections and asymmetry parameters for photoionization out of the outermost valence orbital $2b(2u)$ of C_2F_4 for photon energies ranging from near-threshold to 19 eV. We also report asymmetry parameters for photoionization out of the eight outermost orbitals of C_2F_4 at the He I radiation energy (21.23 eV). The iterative Schwinger variational method at the exact static-exchange level is used to obtain the continuum photoelectron orbitals. Our calculated results are compared with experimental results available in the literature.

International Journal of Quantum Chemistry 106[13], 2552-2557. 2006.

P 223-06 "Possible anisotropy gap in $\text{La}_{1.35}\text{Sr}_{1.65}\text{Mn}_2\text{O}_7$ and $\text{La}_{1.5}\text{Sr}_{0.5}\text{NiO}_4$ detected through specific heat and Magnetization measurements"

Lopez, J. and de Lima, O. F.

Magnetization and specific heat measurements, as a function of temperature, were performed on single crystals of $\text{La}_{1.35}\text{Sr}_{1.65}\text{Mn}_2\text{O}_7$ and $\text{La}_{1.5}\text{Sr}_{0.5}\text{NiO}_4$, under different applied magnetic fields (H). The specific heat in $\text{La}_{1.35}\text{Sr}_{1.65}\text{Mn}_2\text{O}_7$ was decreased for $H = 9$ T parallel to the crystal c axis, compared with $H = 0$, possibly due to a suppression of spin-wave excitations (magnons) in that ferromagnetic bilayer structure. On the other hand, the applied magnetic field had no effect in the specific heat of the antiferromagnetic $\text{La}_{1.5}\text{Sr}_{0.5}\text{NiO}_4$. For $H = 9$ T and below the temperature of 4 K the specific heat data, for each crystal, was well fitted by an exponential decay law. This allowed the calculation of energy gaps around 1 meV for both compounds, in close agreement with $\Delta = 2 \mu\text{H-B}$ for an expected energy gap in the magnon spectrum. Detailed magnetization measurements showed monotonic variations below 4 K and a steep increase close to 2 K. Both magnetization and specific heat measurements suggest the existence of an anisotropy gap in the energy spectrum of $\text{La}_{1.35}\text{Sr}_{1.65}\text{Mn}_2\text{O}_7$ and $\text{La}_{1.5}\text{Sr}_{0.5}\text{NiO}_4$.

Solid State Communications 139[6], 273-277. 2006.

P 224-06 "Prediction of giant electroactuation for papyruslike carbon nanoscroll structures: First-principles calculations"

Rurali, R., Coluci, V. R., and Galvao, D. S.

We study by first-principles calculations the electromechanical response of carbon nanoscroll structures. We show that although they present a very similar behavior to carbon nanotubes in their axial deformation sensitivity, they exhibit a radial response upon charge injection which is up to one order of magnitude larger. In association with their high stability, this behavior makes them a natural choice for a new class of very efficient nanoactuators.

Physical Review B 74[8]. 2006.

P 225-06 "Quantum dissipation and decoherence via interaction with low dimensional chaos: A Feynman-Vernon approach"

Bonanca, M. V. S. and de Aguiar, M. A. M.

We study the effects of dissipation and decoherence induced on a harmonic oscillator by the coupling to a chaotic system with two degrees of freedom. Using the Feynman-Vernon approach and treating the chaotic system semiclassically, we show that the effects of the low-dimensional chaotic environment are in many ways similar to those produced by thermal baths. The classical correlation and response functions play important roles in both classical and quantum formulations. Our results are qualitatively similar to the high-temperature regime of the Caldeira-Leggett model.

Physical Review A 74[1]. 2006.

P 226-06 "Rayleigh instability of charged aggregates: Role of the dimensionality, ionic strength, and dielectric contrast"

Tamashiro, M. N. and Schiessel, H.

We extended a previous analysis of the classical Rayleigh instability of spherical charged droplets in the presence of neutralizing monovalent counterions [M. Deserno, Eur. Phys. J. E 6, 163 (2001)], by generalizing the problem for suspensions of aggregates with D-dimensional symmetry, corresponding for $D=2$ to infinite (rodlike) cylindrical charged bundles and for $D=3$ to spherical charged droplets. In addition, we include the effects of added monovalent salt and of dielectric contrast between the charged aggregate and the surrounding solvent. The electrostatic energy taking the microion screening into account is estimated using uniform profiles within the framework of the cell model. We verify the robustness of these results by also considering Debye-Huckel-type microion profiles that are obtained by the minimization of a linearized Poisson-Boltzmann free-energy functional. In the case when the microions can enter inside the charged aggregates, we confirm the occurrence of a discontinuous phase change between aggregates of finite size and an infinite aggregate, which takes place at a collapse temperature that depends on their volume fraction ϕ and on the salt content. Decrease of ϕ shifts the phase-change temperature toward higher values, while salt addition has an opposite effect. We obtain analytical expressions for the phase-separation line in the asymptotic limit of infinite dilution ($\phi \rightarrow 0$), showing that the collapse temperature depends logarithmically on ϕ . As an application for $D=3$ we discuss the stability of the pearl-necklace structures of flexible polyelectrolytes in poor solvents. The case $D=2$ is applied to the problem of finite bundle sizes of stiff polyelectrolytes that attract each other-via, e.g., multivalent counterions-leading to an effective surface tension.

Physical Review e 74[2]. 2006.

P 227-06 "Recording different geometries of 2D hexagonal photonic crystals by choosing the phase between two beam interference exposures"

Menezes, J. W. and Cescato, L.

2D hexagonal patterns can be generated by the superimposition of two or three fringe patterns that have been formed by two-wave interference and that have rotations of 60 degrees between them. Superimposing three exposures solves the problem of asymmetry in the cross section of structures, which is caused by double exposure. The resulting structure, however, depends on the phase shift of the third fringe pattern in relation to the previous two. We propose a method for controlling the phase shift, and we demonstrate that three different lattice geometries of hexagonal photonic crystals can be recorded when the phase is chosen.

Optics Express 14[19], 8578-8583. 2006.

P 228-06 "Reply to "Comment on 'Photoionization of helium atoms irradiated with intense vacuum ultraviolet free-electron laser light. Part II. Theoretical modeling of multiphoton and single-photon processes' ""

de Castro, A. R. B., Laarmann, T., Schulz, J., Wabnitz, H., and Moller, T.

We cannot agree with the Comment by Maquet [*Phys. Rev. A*, 74, 027401 (2006)]. It seems that Maquet are thinking in terms of classical fields. In our recent paper we have presented a study of the two-photon rate of He making use of quantized fields. This approach becomes a natural choice if we have in mind processes at high photon energy. In this description of the problem the squared vector potential $A \cdot \dot{A}$ term is essential.

Physical Review A 74[2]. 2006.

P 229-06 "Reversible holographic glasses using visible lasers"

Nalin, M., Carvalho, E. J., Cescato, L., Poirier, G., Ribeiro, S. J. L., and Messaddeq, Y.

Antimony based glasses have been investigated for the first time regarding the possibility of holographic data storage using visible lasers sources. Changes in both refractive index and the absorption coefficient were measured using a holographic setup. The modulation of the optical constants is reversible by heat treatment. Bragg gratings were written under visible light of an Ar laser and erased thermally.

Physics and Chemistry of Glasses-European Journal of Glass Science and Technology Part B 47[2], 186-188. 2006.

P 230-06 "Self-similarity and anti-self-similarity of the effective Lande g (perpendicular to) factor in GaAs (Ga,Al)As Fibonacci superlattices under in-plane magnetic fields"

Reyes-Gomez, E., Perdomo-Leiva, C. A., Dios-Leyva, M., and Oliveira, L. E.

A theoretical study of the effects of in-plane magnetic fields on the Lande g (perpendicular to) factor associated to conduction electrons in GaAs-(Ga,Al)As Fibonacci superlattices is presented. We have used the Ogg-McCombe effective Hamiltonian, which includes nonparabolic and anisotropy effects, in order to describe the electron states in the Fibonacci heterostructure. We have expanded the corresponding electron envelope wave functions in terms of harmonic-oscillator wave functions, and obtained the Lande g (perpendicular to) factor for magnetic fields

related by even powers of the golden mean $\tau=(1+\sqrt{5})/2$. Theoretical results for GaAs-(Ga,Al)As Fibonacci superlattices, under magnetic-field values scaled by $\tau(2n)$, clearly exhibit a self-similar (for even n) or anti-self-similar (for odd n) behavior for the Lande g (perpendicular to) factors, as appropriate.

Physical Review B 74[3]. 2006

P 231- 06 "Spectroscopic characterization of polyaniline formed in the presence of montmorillonite clay"

do Nascimento, G. M., Constantino, V. R. L., Landers, R., and Temperini, M. L. A.

This work shows the spectroscopic characterization of polyaniline-montmorillonite clay (PANI-MMT) composites prepared by polymerization of aniline in aqueous suspensions of montmorillonite clay and camphorsulfonic acid containing persulfate ions as oxidizing agent. X-ray diffraction, scanning electron microscopy, and X-ray absorption near Silicon K-edge data show that morphologies and structures of PANI-MMT nanocomposites depend on their relative amount. The electrical conductivity values of composites increase from 10^{-4} to 10^{-1} S/cm when PANI-MMT ratio increases, and percolation threshold is observed when polymer/clay mass ratio is changed. Resonance Raman, UV-VIS-NIR spectroscopy, electron spin resonance (EPR) and X-ray absorption near Nitrogen K-edge data confirm that PANI has emeraldine salt form for all PANI-MMT materials prepared.

Polymer 47[17], 6131-6139. 2006.

P 232- 06 "Structural and optical characterization of strained free-standing InP nanowires"

Gonzalez, J. C., da Silva, M. I. N., Lozano, X. S., Zanchet, D., Ugarte, D., Ribeiro, E., Gutierrez, H. R., and Cotta, M. A.

The structural and optical properties of high-quality crystalline strained InP nanowires are reported in this article. The nanowires were produced by the vapor-liquid-solid growth method in a chemical-beam epitaxy reactor, using 20 nm gold nanoparticles as catalysts. Polarization-resolved photoluminescence experiments were carried out to study the optical properties of the InP nanowires. These experiments revealed a large blue shift of 74 meV of the first electron-to-heavy hole optical transition in the nanowires, which cannot be solely explained by quantum size effects. The blue shift is mainly attributed to the presence of biaxial compressive strain in the inward radial direction of the InP nanowires. High-resolution transmission electron microscopy Electron and selected area electron diffraction experiments show that the nanowires have high crystal quality and grow along a [001] axes. These experiments also confirmed the presence of 1.8% compressive radial strain and 2% tensile longitudinal strain in the nanowires. A simple theoretical model including both quantum confinement and strain effects consistently describes the actual energy position of the InP nanowires optical emission.

Journal of Nanoscience and Nanotechnology 6[7], 2182-2186. 2006.

P 233- 06 "Structural insights into the interaction between prion protein and nucleic acid"

Mauricio, L., Lima, T. R., Cordeiro, Y., Tinoco, L. W., Marques, A. F., Oliveira, C. L. P., Sampath, S., Kodali, R., Choi, G., Foguel, D., Torriani, I., Caughey, B., and Silva, J. L.

The infectious agent of transmissible spongiform encephalopathies (TSE) is believed to comprise, at least in part, the prion protein (PrP). Other molecules can modulate the conversion of the normal PrP^C into the pathological conformer (PrP^{Sc}), but the identity and mechanisms of action of the key physiological factors remain unclear. PrP can bind to nucleic acids with relatively high affinity. Here, we report small-angle X-ray scattering (SAXS) and nuclear magnetic resonance spectroscopy measurements of the tight complex of PrP with an 18 bp DNA sequence. This double-stranded

DNA sequence (E2DBS) binds with nanomolar affinity to the full-length recombinant mouse PrP. The SAXS data show that formation of the rPrP-DNA complex leads to larger values of the maximum dimension and radius of gyration. In addition, the SAXS studies reveal that the globular domain of PrP participates importantly in the formation of the complex. The changes in NMR HSQC spectra were clustered in two major regions: one in the disordered portion of the PrP and the other in the globular domain. Although interaction is mediated mainly through the PrP globular domain, the unstructured region is also recruited to the complex. This visualization of the complex provides insight into how oligonucleotides bind to PrP and opens new avenues to the design of compounds against prion diseases

Biochemistry 45[30], 9180-9187. 2006.

P 234-06 "Synthesis and X-ray structural characterization of NiO nanoparticles obtained through gelatin"

Maia, A. O. G., Meneses, C. T., Menezes, A. S., Flores, W. H., Melo, D. M. A., and Sasaki, J. M.

Nanoparticles of fcc-NiO phase were obtained by heating the dried resin resultant of a mixture of gelatin and NiCl₂ center dot 6H₂O in aqueous solution. The average particle size and microstrain were calculated from the line broadening of X-ray powder diffraction peaks, and these values were between 15 nm and 78 nm, and 0.056% and 0.172%, respectively. The Rietveld refinement method was applied to all diffraction patterns. The particle size, obtained from this procedure, changes as a function of temperature, heating time and the remarkable reduction due to the addition of NaOH to the solution, which can be attributed to the presence of NaCl crystals and carbon

Journal of Non-Crystalline Solids 352[32-35], 3729-3733. 2006.

P 235-06 "Tapered semiconductor amplifiers for optical frequency combs in the near infrared"

Cruz, F. C., Stowe, M. C., and Ye, J

A tapered semiconductor amplifier is injection seeded by a femtosecond optical frequency comb at 780 nm from a mode-locked Ti:sapphire laser. Energy gains of more than 17 dB (12 dB) are obtained for 1 mW (20 mW) of average input power when the input pulses are stretched into the picosecond range. A spectral window of supercontinuum light generated in a photonic fiber has also been amplified. Interferometric measurements show sub-Hertz linewidths for a heterodyne beat between the input and amplified comb components, yielding no detectable phase-noise degradation under amplification. These amplifiers can be used to boost the infrared power in f-to-2f interferometers used to determine the carrier-to-envelope offset frequency, with clear advantages for stabilization of octave-spanning femtosecond lasers and other supercontinuum light sources.

Optics Letters 31[9], 1337-1339. 2006

P 236-06 "Tellurite photonic crystal fiber made by a stack-and-draw technique"

Chillcce, E. F., Cordeiro, C. M. B., Barbosa, L. C., and Cruz, C.H. B.

We report a method for producing, from the raw materials, high optical and geometrical quality glass tubes and photonic crystal fiber (PCF) preforms, without using extrusion or drilling at any stage. A thermal glass study was carried out in order to choose the appropriate glass composition to avoid crystallization problems during the tube, preform and fiber fabrication. A two period PCF was fabricated in addition to a co-doped Erbium and Thulium photonic crystal fiber. In the latter, a 187 nm wide amplified spontaneous emission (ASE)

spectrum was obtained when pumping a 15 cm long fiber at a wavelength of 790 nm.

Journal of Non-Crystalline Solids 352[32-35], 3423-3428. 2006.

P 237- 06 "The Dirac-Hestenes equation for spherical symmetric potentials in the spherical and Cartesian gauges"

Da Rocha, R. and Rodrigues, W. A.

In this paper, using the apparatus of the Clifford bundle formalism, we show how straightforwardly solve in Minkowski space-time the Dirac-Hestenes equation - which is an appropriate representative in the Clifford bundle of differential forms of the usual Dirac equation - by separation of variables for the case of a potential having spherical symmetry in the Cartesian and spherical gauges. We show that, contrary to what is expected at a first sight, the solution of the Dirac-Hestenes equation in both gauges has exactly the same mathematical difficulty.

International Journal of Modern Physics A 21[19-20], 4071-4082. 2006.

P 238- 06 "The Einstein-Hilbert Lagrangian density in a two-dimensional spacetime is an exact differential"

Da Rocha, R. and Rodrigues, W. A.

Recently Kiriushcheva and Kuzmin(1) claimed to have shown that the Einstein-Hilbert Lagrangian density cannot be written in any coordinate gauge as an exact differential in a two-dimensional spacetime. Since this is contrary to other statements on the subject found in the literature, as e.g., by Deser,(2) Deser and Jackiw,(3) Jackiw(4) and Grumiller, Kummer and Vassilevich(5) it is necessary to decide who has reason. This is done in this paper in a very simply way using the Clifford bundle formalism.

Modern Physics Letters A 21[19], 1519-1527. 2005.

P 239- 06 "Theoretical conformational study of poly(trans-1, 2-di(2-thienyl) ethylene): Effects on the electronic structure and optical properties"

Marcal, N., Laks, B., and Dos Santos, R. P. B.

In the present study, we investigate the monomer ethylene-bridged-bithiophene (TET) and the dimer ethylene-bridged-bithiophene (TET), to find the more probable conformations of the oligomer and their electronic properties. Geometrical optimizations were carried out at semiempirical level using the Austin method one (AM1) and parametric method 3 (PM3). The electronic transition energies and their associated oscillator strength values are calculated for neutral oligomers. The calculations are conducted using the intermediate neglect of differential overlap Hamiltonian (INDO) in combination with a single configuration-interaction technique in order to include correlation effects. We also employ the negative factor counting (NFC) technique to obtain the electronic density of states (DOS).

International Journal of Quantum Chemistry 106[13], 2723-2730. 2006.

P 240-06 "Thermo-optical properties and nonradiative quantum efficiency of Er³⁺-doped and Er³⁺/Tm³⁺-co doped tellurite glasses"

Pilla, V., Chillcce, E. F., Rodriguez, E., Catunda, T., Munin, E., Cesar, C. L., and Barbosa, L. C.

Thermal lens (TL) measurements were performed in tellurite glasses, 70TeO₂-19WO₃-7Na₂O-4Nb₂O₅ (mol%), undoped, doped with Er³⁺ (1.19 x 10²⁰ ions/cm³) and co-doped with Er³⁺ (1.19 x 10²⁰ ions/cm³)/Tm³⁺ (1.56 x 10²⁰ ions/cm³). The absolute nonradiative quantum efficiency (ϕ)

was determined by the TL method. The ϕ values for $\text{Er}^{3+}/\text{Tm}^{3+}$ -co-doped and Er^{3+} -doped tellurite glasses were 0.98 and 0.74, respectively. Fluorescence spectra were performed at $\lambda(e) = 488 \text{ nm}$ and used to estimate the fluorescence quantum efficiency (η) using the TL results. These values were compared with results obtained by Judd-Ofelt calculations.

Journal of Non-Crystalline Solids 352[32-35], 3598-3602. 2006.

P 241-06 "Three-dimensional and two-dimensional high field vortex fluctuations in deoxygenated $\text{YBa}_2\text{Cu}_3\text{O}_7-x$ depending on the vicinity of $T_c(H)$ "

Salem-Sugui, S., da Silva, E. Z., and Alvarenga, A. D.

We analyzed reversible magnetization data, M versus T curves, of three single crystals of $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ (Y123), with superconducting transition temperatures $T_c = 62.5$ ($x = 0.35$), 52 ($x = 0.5$), and 41 K ($x = 0.6$). M versus T curves of each sample exhibited a field independent crossing point, $M(T^*)$, occurring close to the superconductor critical temperature. These crossing points were shown to be due to fluctuations of vortices. Besides the reversible data of each sample were shown to obey a two-dimensional diamagnetic lowest-Landau-level (LLL) fluctuation theory, it is shown here that the data, within a temperature region where the crossing points occur for two samples (62.5 K and 52 K), are also explained by a three-dimensional version of this fluctuation theory. Since the crossing points for these two samples occur close to T , these are interpreted as been due to three-dimensional vortex fluctuations instead two-dimensional ones. An expression for the field independent magnetization, $M(T^*)$, which is expected to occur at the crossing point of the various M versus T curves, is obtained for the case of three-dimensional vortex fluctuations, and compared to the experimental values of $M(T^*)$. This comparison produced consistent values for the coherence length along the c -axis of the samples with $T_c = 62.5$ and 52 K , solving an inconsistent result previously published, when experimental values of $M(T^*)$ were compared with an expression obtained from two-dimensional vortex-fluctuations. The results of the present work show that, despite the fact that two-dimensional LLL fluctuations scaling is obeyed in a much wider temperature range for two studied samples ($T_c = 52$ ($x = 0.5$), and 62.5 K ($x = 0.35$)) when compared to the 3D-LLL scaling form, these systems behave as three-dimensional for temperatures close to $T_c(H)$.

Physica C-Superconductivity and Its Applications 443[1-2], 1-4. 2006.

ERRATA

A 006 - 06 Survival probability of large rapidity gaps in a QCD model with a dynamical infrared mass scale

E.G.S. Luna

We compute the survival probability $\langle |S|^2 \rangle$ of large rapidity gaps (LRG) in a QCD based eikonal model with a dynamical gluon mass, where this dynamical infrared mass scale represents the onset of nonperturbative contributions to the diffractive hadron-hadron scattering. Since rapidity gaps can occur in the case of Higgs boson production via fusion of electroweak bosons, we focus on $WW \rightarrow H$ fusion processes and show that the resulting $\langle |S|^2 \rangle$ decreases with the increase of the energy of the incoming hadrons, in line with the available experimental data for LRG. We obtain $\langle |S|^2 \rangle = 27.6 \pm 7.8\%$ ($18.2 \pm 7.0\%$) at Tevatron (CERN-LHC) energy for a dynamical gluon mass $m_g = 400 \text{ MeV}$.

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Abstracta

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