Abstracta

Ano IX- N. 02

TRABALHOS ACEITOS PARA PUBLICAÇÃO

A 007- 07 **Entanglement in the dispersive interaction of trapped ions with a quantized field.**
A 008- 07 **Unconditional Bell-type state generation for spatially separate trapped ions.**

TRABALHOS PUBLICADOS

Fevereiro 2007 à Março 2007

P 039-07 à P 081-07

TRABALHOS ACEITOS PARA PUBLICAÇÃO

A 007- 07 Entanglement in the dispersive interaction of trapped ions with a quantized field.

F. L. Semião and K. Furuya

The mode-mode entanglement between trapped ions and cavity fields is investigated in the dispersive regime. We show how a simple initial preparation of Gaussian coherent states and {\bf a} postselection may be used to generate motional non-local mesoscopic states (NLMS) involving ions in different traps. We also present a study of the entanglement induced by dynamical Stark-shifts considering a cluster of N-trapped ions. In this case, all entanglement is due to the dependence of the Stark-shifts on the ions' state of motion manifested as a cross-Kerr interaction between each ion and the field.

Phys. Rev. A 75, accepted on March 2007.

A 008- 07 Unconditional Bell-type state generation for spatially separate trapped ions.

F. L. Semião, R. J. Missori, K. Furuya

We propose a scheme for generation of maximally entangled states involving internal electronic degrees of freedom of two distant trapped ions, each of them located in a cavity. This is achieved by using a single flying atom to distribute entanglement. For certain specific interaction times, the proposed scheme leads to the non-probabilistic generation of a perfect Bell-type state. At the end of the protocol, the flying atom completely disentangles from the rest of the system, leaving both ions in a Bell-type state. Moreover, the scheme is insensitive to the cavity field state and cavity losses. The issue of the practical implementation of our scheme is addressed by considering the realistic situation in which dephasing and dissipation are taken into account for the flying atom in its way from one cavity to the other. We then discuss the applicability of the resulting noisy channel for performing quantum teleportation.

J. Phys. B: At. Mol. Opt. Phys, accepted on March 2007.

TRABALHOS PUBLICADOS

P 039-07 "3D XY versus 3D LLL revisited in YBa2Cu3O7-delta"

Ujevic, S., da Silva, E. Z., and Salem-Sugui, S.

We analyzed magnetization data from a YBa2Cu3O7-delta sample with a sharp transition at T-c = 92.3 K. Two models are discussed and compared. The XY model in three dimensions and the Ginzburg-Landau description based in the lowest Landau level approximation. We confirm the validity of the XY model scaling on low applied magnetic fields. For high applied magnetic fields the scaling behavior of both models provides similar results.

Physica C-Superconductivity and Its Applications 452[1-2], 1-5. 2007.

P 040-07 "A time-of-flight spectrometer for synchrotron radiation-based recoil ion momentum spectroscopy in laser cooled atoms"

Coutinho, L. H., Tosin, G., Fonseca, P. T., Cavasso Filho, R. L., Cruz, F. C., and de Brito, A. N.

We describe a new time-of-flight (TOF) spectrometer for recoil ion momentum determination. The ionization is produced by synchrotron radiation and the sample is laser cooled. The main purpose is to measure the recoil suffered by an ion after the ejection of the electron, and to obtain the respective photoelectrons angular distribution. Flight trajectories and expected detection efficiencies are discussed. Results of TOF spectra for cesium ions from a laser cooled sample are presented. (c) 2006 Elsevier B.V. All rights reserved

Nuclear Instruments & Methods in Physics Research Section A-Accelerators Spectrometers Detectors and Associated Equipment 571[3], 748-754. 2007.

P 041-07 "Aluminium-induced nanocrystalline Ge formation at low temperatures"

Muniz, L. R., Ribeiro, C. T. M., Zanatta, A. R., and Chambouleyron, I.

The present work contributes to establishing the role of hydrogenation and of the substrates in the aluminium-induced crystallization process of amorphous germanium layers. For such a purpose, four series of a-Ge(Al) samples, deposited under identical nominal conditions, were studied: hydrogenated samples, H-free samples, and samples deposited on crystalline silicon and on glass substrates, respectively. On purpose, the impurity concentration was kept at a doping level (10(-5) < [Al/Ge] < 2 x 10(-3)). Furthermore, the films were submitted to isochronal cumulative thermal annealing in the 200-550 degrees C range. Raman scattering spectroscopy was used to characterize the crystallization process. The role of Al impurity as a precursor seed for the crystallization of a-Ge:H has been clearly established, confirming that the metal-induced crystallization (MIC) phenomenon occurs at an atomic level. Moreover, it has been found that hydrogenation and the periodic nature of the substrate play a fundamental role in the appearance of crystal seeds at low temperatures. The evolution of crystallization with annealing temperature and the analysis of the distribution of crystallite sizes indicate that the formation of crystal seeds occurs at the amorphous film-substrate interface. The importance of fourfold-coordinated aluminium as the embryo of nanocrystal formation is discussed

Journal of Physics-Condensed Matter 19[7]. 2007.

Trabalhos Publicados

P 042-07"An upper limit to the photon fraction in cosmic=rays above 10(19) eV from the Pierre Auger Observatory"

Abraham, J., et al

An upper limit of 16% (at 95% c.l.) is derived for the photon fraction in cosmic rays with energies greater than 10(19) eV, based on observations of the depth of shower maximum performed with the hybrid detector of the Pierre Auger Observatory. This is the first such limit on photons obtained by observing the fluorescence light profile of air showers. This upper limit confirms and improves on previous results from the Haverah Park and AGASA surface arrays. Additional data recorded with the Auger surface detectors for a subset of the event sample support the conclusion that a photon origin of the observed events is not favored. (c) 2006 Elsevier B.V. All rights reserved

Astroparticle Physics 27[2-3], 155-168. 2007.

P 043-07"Atomic scale patterns formed during surface scanning by atomic force microscopy tips"

Teschke, O., Soares, D. M., Valente, J. F., and de Souza, E. F.

In this work, tip sliding at the water/substrate interfacial region was used to investigate the pattern observed during image acquisition with atomic resolution in atomic force microscopy. The process responsible for the pattern formation is the oscillatory movement of the tip in the direction that is normal to scanning induced by a change in the water interfacial dielectric permittivity from epsilon approximate to 4 at the interface to epsilon approximate to 80 (bulk value) that results in a variation of the measured force acting on the tip of approximate to 30 pN. (c) 2006 American Institute of Physics

Applied Physics Letters 89[25]. 2006.

P 044-07"CH3OH optically pumped by a (CO2)-C-13 laser: new laser lines and assignments"

Costa, L. F. L., Moraes, J. C. S., Cruz, F. C., Viscovini, R. C., and Pereira, D.

We report 12 new THz (far-infrared) laser lines from methanol (CH3OH), ranging from 58.1 mu m (5.2 THz) to 624.6 mu m (0.5 THz). A(13) CO2 laser of wide tunability (110 MHz) has been used for optical pumping, allowing access to previously unexplored spectral regions. Optoacoustic absorption spectra were used as a guide to search for new THz laser lines, which have been characterized in wavelength, polarization, offset, relative intensity, and optimum operation pressure. For 20 laser lines previously observed, we have measured the absorption offset with respect to the (CO2)-C-13 laser line center

Applied Physics B-Lasers and Optics 86[4], 703-706. 2007.

P 045-07"Circular polarization from a nonmagnetic p-i-n resonant tunneling diode"

de Carvalho, H. B., Brasil, M. J. S. P., Gobato, Y. G., Marques, G. E., Galeti, H. V. A., Henini, M.,and Hill, G.

The authors investigate the circular polarization of the electro- and photoluminescence emissions from the quantum well and contact layers of a nonmagnetic GaAs-AlAs p-i-n resonant tunneling diode under an external magnetic field. The contact emission evidences the formation of a spin polarized two-dimensional electron gas at the n-accumulation layer. The quantum well electroluminescence presents a strong sigma(-) degree of polarization, even for null Zeeman splitting energies, and a slight bias dependence. The observed circular polarization is mainly attributed to the spin polarization of the electrons injected into the quantum well from the two-dimensional electron gas. (c) 2007 American Institute of Physics

Applied Physics Letters 90[6]. 2007.

P 046-07"Clinicopathologic features of small-volume prostate cancer in patients submitted to radical prostatectomy in Brazil"

Billis, A., Watanabe, I. C., Telles, G. H., Magna, L. A., and Ferreira, U.

Modern Pathology 20, 137A-138A. 2007.

P 047-07"Conformal Klein-Gordon equations and quasinormal modes"

da Rocha, R. and de Oliveira, E. C

Using conformal coordinates associated with conformal relativity-associated with de Sitter spacetime homeomorphic projection into Minkowski spacetime-we obtain a conformal Klein-Gordon partial differential equation, which is intimately related to the production of quasi-normal modes (QNMs) oscillations, in the context of electromagnetic and/or gravitational perturbations around, e.g., black holes. While QNMs arise as the solution of a wave-like equation with a Poschl-Teller potential, here we deduce and analytically solve a conformal 'radial' d'Alembert-like equation, from which we derive QNMs formal solutions, in a proposed alternative to more completely describe QNMs. As a by-product we show that this 'radial' equation can be identified with a Schrodinger-like equation in which the potential is exactly the second Poschl-Teller potential, and it can shed some new light on the investigations concerning QNMs

International Journal of Theoretical Physics 46[2], 301-317. 2007.

P 048-07"Domain structure and miscibility studies of blends of styrene-butadiene styrene block copolymers (SBS) and styrene-glycidyl methacrylate statistical copolymers(PS-GAAA) using SAXS and DMTA"

Canto, L. B., Torriani, I. L., Plivelic, T. S., Hage, E., and Pessan, L. A.

The domain structure and miscibility in the solid state of a series of blends of styrene-butadiene-styrene (SBS) block copolymers and styrene-glycidyl methacrylate (PS-GMA) statistical copolymers with varying molecular weights and compositions were studied using small angle X-ray scattering and dynamic mechanical thermal analysis. Depending on the molecular characteristics of each component, different types and degrees of solubilization of PS-GMA in SBS were found which, in addition to the initially SBS phase morphology, lead to materials with multiphase domain morphologies with differences in size and structure. The degree of solubilization of PS-GMA into the PS domains of SBS was found to be higher for blends containing PS-GMA with lower molecular weight (M-w = IS 100 g mol(-1)) and lower GMA content (I wt%) and/or for SBS with higher PS content (39 wt%) and longer PS blocks (Mw = 19 600 g mol(-1)). Localized solubilization of PS-GMA in the middle of PS domains of SBS was found to be the most probable to occur for the systems under study, causing swelling of PS domains. However, uniform solubilization was also observed for SBS/PS-GMA blends containing SBS with composition in the range of a morphological transition (PS block M-w = 19 600 g mol(-1) and 39 wt% of PS) causing a morphological transition in the SBS copolymer (cylinder to lamella). Copyright (c) 2006 Crown in the right of Canada. Published by John Wiley & Sons, Ltd

Polymer International 56[3], 308-316. 2007.

P 049-07 "Effects of crossed electric and magnetic fields on the electronic and excitonic states in bulk GaAs and GaAs/Ga1-xAlx-As quantum wells"

Dios-Leyva, M., Duque, C. A., and Oliveira, L. E.

The variational procedure in the effective-mass and parabolic-band approximations is used in order to investigate the effects of crossed electric and in-plane magnetic fields on the electronic and exciton properties in semiconductor heterostructures. Calculations are performed for bulk GaAs and GaAs/Ga1-xAlxAs quantum wells, for applied magnetic fields parallel to the layers and electric fields in the growth direction, and it is shown that the combined effects on the heterostructure properties of the applied crossed electric and magnetic fields and the direct coupling between the center-of-mass and internal exciton motions may be dealt with via a simple parameter representing the spatial distance between the centers of the electron and hole magnetic parabolas. Exciton properties are analyzed by using a simple hydrogenlike envelope excitonic wave function and present theoretical results are found in fair agreement with available experimental measurements on the diamagnetic shift of the photoluminescence peak position of GaAs/Ga1-xAlxAs quantum wells under in-plane magnetic fields

Physical Review B 75[3]. 2007.

P 050-07 "Effects of gamma radiation on beta-lactoglobulin: Oligomerization and aggregation"

Oliveira, C. L. P., de la Hoz, L., Silva, J. C., Torriani, I. L., and Netto, F. M.

The conformational changes and aggregation process of beta-lactoglobulin (beta-LG) subjected to gamma irradiation are presented. beta-LG in solutions of different protein concentrations (3 and 10 mg/ml) and in solid state with different water activities (a(w)) (0.22; 0.53; 0.74) was irradiated using a Colbalt-60 radiation source at dose level of 1-50 kGy. Small-angle X-ray scattering (SAXS) was used to study the conformational changes of beta-LG due to irradiation treatment. The irradiated protein was also examined by high performance size exclusion chromatography (HP-SEC) and sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) under nonreducing and reducing conditions and fluorescence. SAXS analysis showed that the structural conformation of irradiated beta-LG in solid state at different a(w) and dose level was essentially the same as the nonirradiated beta-LG. The scattering data also showed that the irradiation of beta-LG in solution promoted the formation of oligomers. Interestingly, from the data analysis and model building, it could be shown that the formed oligomers are linear molecules, built by linear combinations of beta-LG dimers (tetramers, hexamers, etc). The formation of oligomers was also evidenced by SDS-PAGE analysis HPSEC chromatograms, in which products with higher molecular mass than that of the dimer beta-LG were detected. Formation of intermolecular cross-linking between tyrosyl radicals are proposed to be at least partially responsible for this occurrence. From the results it could be shown that the samples irradiated in solution presented some conformational changes under gamma irradiation, resulting in well ordered oligomers and aggregates formed by cross-linking of beta-LG dimers subunits, while the samples irradiated in the solid state were not modified. (c) Wiley Periodicals, Inc

Biopolymers 85[3], 284-294. 2007.

P 051-07 "Electron-impact electronic excitation of molecular nitrogen using the Schwinger multichannel variational method"

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

The Schwinger multichannel method is applied to study the low-energy electron-impact excitation of molecular nitrogen. The scattering amplitudes are obtained within the minimal orbital basis for single configuration interactions (MOBSCI) level of approximation, for impact energies from near threshold up to 30 eV. Through the use of the MOBSCI strategy we have performed a close-coupling calculation for up to nine states, including the ground state and all singlet and triplet states resulting from the pi(u)->pi(g) transitions. Integral and differential cross sections for the X (1)Sigma(+)(g)-> A (3)Sigma(+)(u), W (3)Delta(u), B-' (3)Sigma(-)(u), a(') (1)Sigma(-)(u), and w (1)Delta(u) electronic transitions are presented and compared with available experimental data and also with other theoretical results

Physical Review A 75[2]. 2007.

P 052-07 "Electrospray ionization mass spectrometry fingerprinting of perfumes: rapid classification and counterfeit detection"

Marques, L. D., Catharino, R. R., Bruns, R. E., and Eberlin, M. N.

A fast procedure to classify perfumes and identify counterfeit samples is described. Dilution of a few mu L of the sample in a 1:1 methanol/water solution is followed by detection of its major polar components via direct infusion electrospray ionization mass spectrometry (ESI-MS) in the positive ion mode. As proof-of-principle cases, three famous brands of perfumes were used. The ESI(+)-MS fingerprints of authentic samples were very characteristic, showing distinctive sets of polar markers for each sample. Principal component analysis (PCA) placed samples of the three perfume brands in well-defined groups. Counterfeit samples were also clearly detected owing to contrasting ESI-MS fingerprints, with PCA placing these samples far away from the authentic samples. Copyright (c) 2006 John Wiley & Sons, Ltd

Rapid Communications in Mass Spectrometry 20[24], 3654-3658. 2006

P 053-07 "Ferromagnetism and superconductivity in carbon-based systems"

Kopelevich, Y. and Esquinazi, P.

In this article, we shortly review previous and recently published experimental results that provide evidence for intrinsic, magnetic-impurity-free ferromagnetism and for high-temperature superconductivity in carbon-based materials. The available data suggest that the origin of those phenomena is related to structural disorder and the presence of light elements like hydrogen, oxygen and/or sulfur

Journal of Low Temperature Physics 146[5-6], 629-639. 2007.

P 054-07 "Frequency degenerate and nondegenerate two-photon absorption spectra of semiconductor quantum dots"

Padilha, L. A., Fu, J., Hagan, D. J., Van Stryland, E. W., Cesar, C. L., Barbosa, L. C., Cruz, C. H. B., Buso, D., and Martucci, A.

The frequency degenerate and nondegenerate two-photon absorption (2PA) spectra of direct band gap semiconductor quantum dots are studied. Measuring the spectra for both cases in samples of CdSe and CdTe with different quantum dot sizes and size distributions, we observe that the 2PA spectra and the 2PA coefficient are size dependent, so that smaller dots have smaller 2PA even after taking into account the volume fraction. Theory considering the mixing of the hole bands, in a k center dot p model, explains the data quite well except for the smallest dots. A comparison with the parabolic band approximation is also shown

Physical Review B 75[7]. 2007.

P 055-07 "Grain growth of CuO nanocrystal activated by high energy ball milling"

Bianchi, A. E., Stewart, S. J., Punte, G., Vina, R., Plivelic, T. S., and Torriani, I. L.

X-ray Diffraction (XRD), small-angle X-ray scattering, scanning electron microscopy and energy dispersive X-ray Analysis were used to investigate the effect of controlled high energy ball milling (HEBM) on the average volume weighted crystallite size, < D >(V) and weighted average microstrain, < epsilon >, of nanostructures of CuO prepared by solid state reaction. The starting material, S-0, consists of almost strain free nanocrystals of monoclinic CuO with < D >(V) & 20nm, as determined by XRD data Rietveld analysis. It was found that after an initial decrease of < D >(V) and increase of < epsilon >, the values of these parameters go through a steady-state stage followed by an increase of an order of magnitude in < D > after a period of only 120 m of HEBM. According to the results here presented, the presence of small amounts of contaminants

in the starting material can have an influence on the kinetics of crystal growth in HEBM CuO. (c) 2006 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 389[1], 135-139. 2007.

P 056-07 "Influence of miscibility on the energy-gap dispersion in AlxGa1-xN alloys: First-principles calculations"

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

We present first-principles calculations of the electronic properties of AlxGa1-xN alloys. Resulting from a low spinodal decomposition temperature, the miscibility of AlN and GaN at the growth temperatures is very high. Due to a likely low diffusion rate it is possible to prepare the alloy at different configurations with different properties and energy band gaps. The calculated band gaps are found to be mostly dependent on the local order and composition rather than dependent on the global composition. The different gaps investigated here provide an explanation for the discrepancies of the experimental values of the AlxGa1-xN bowing parameter found in the literature

Physical Review B 75[3]. 2007.

P 057-07 "Infrared and far-infrared spectroscopy of (CH3OH)-C-13: TeraHertz laser lines and assignments"

Costa, L. F. L., Moraes, J. C. S., Cruz, F. C., Viscovini, R. C., and Pereira, D.

We use a (CO2)-C-13 laser as optical pumping source to search for new THz laser lines generated from (CH3OH)-C-13. Nineteen new THz laser lines (also identified as far-infrared, FIR) ranging from 42.3 mu m (7.1 THz) to 717.7 mu m (0.42 THz) are reported. They are characterized in wavelength, offset, relative polarization, relative intensity, and optimum working pressure. We have assigned eight laser lines to specific rotational energy levels in the excited state associated with the C-O stretching mode. (c) 2006 Elsevier Inc. All rights reserved

Journal of Molecular Spectroscopy 241[2], 151-154. 2007.

P 058-07 "Infrared reflectivity of Co-x(SiO2)(1-x)(x similar to 0.85, 0.55, 0.38) granular films on SiO2 glass substrates"

Massa, N. E., Denardin, J. C., Socolovsky, L. A., Knobel, M., de la Cruz, F. P., and Zhang, X. X.

We report the infrared specular reflectivity of Co-x(SiO2)(1-x) (x similar to 0.85, 0.55, 0.38) films on SiO2 glass spanning from a metal-like to insulating behavior. While films for x similar to 0.85 show carrier metallic shielding and hopping conductivity, for x similar to 0.65 and lower concentrations, the nanoparticles' number and size promote a localization edge near the highest longitudinal optical frequency. Such an edge is associated with a reflectivity minimum and a higher frequency band connoting strong electron-phonon interactions, carrier phonon assisted hopping, and polaron formation. Optical conductivity fits with current polaron models provide grounds toward a microscopic understanding of transport properties in these as-prepared granular films. (C) 2007 Elsevier Ltd. All rights reserved

Solid State Communications 141[10], 551-554. 2007.

P 059-07 "Interactions of chlorpromazine with phospholipid monolayers: Effects of the ionization state of the drug"

Pickholz, M., Oliveira, O. N., and Skaf, M. S.

Molecular dynamics simulations have been performed to investigate the interactions between chlorpromazine (CPZ) and Langmuir monolayers of the zwitterionic dipalmitoylphosphatidylcholine (DPPC) and the anionic dipalmitoylphosphatidylglycerol (DPPG). Simulations for a fixed surface density and different charge states - neutral and protonated CPZ - were able to capture important features of the CPZ-phospholipid monolayer interaction. Neutral CPZ is predominantly found in the hydrophobic tail region, whereas protonated CPZ is located at the lipid-water interface. Specific interactions (hydrogen bonds) between protonated CPZ and the lipid head groups were found for both zwitterionic and anionic monolayers. We computed lipid tail order parameters and investigated the effects of the drug upon tail ordering. We also computed electrostatic surface potentials and found qualitative good agreement with experimental results. (c) 2006 Elsevier B.V. All rights reserved

Biophysical Chemistry 125[2-3], 425-434. 2007.

P 060-07 "Investigation of the surface properties and the hydrogen evolution reaction, HER, at thermal rhodium oxide electrodes"

Gouveia, H., Landers, R., and Boodts, J. F. C.

A systematic investigation was conducted of the surface properties and the HER at electrodes of nominal composition Ti/RhxTi((1-x))O-y prepared by thermal decomposition (T-cal: 500 degrees C; t(cal): 2h; O-2 flux: 5 dm(-1) min(-1)) from salt precursor solutions dissolved in 6.0 mol dm(-3) HNO3. Films were characterized ex situ by SEM, EDX, XPS and XRD and in situ by open circuit potential measurements and CV. The electrochemical behaviour was investigated by CV as function of the anodic, E-lambda,E-a, and cathodic, E-lambda,E-c, switching potentials showing the Rh surface oxidation states strongly depend on these experimental variables. Surface Rh-sites are reduced to metallic rhodium in the cathodic potential region while higher oxidation states (I-III) are formed at more positive potentials (E >= 0.5 V/RHE). Hydrogen adsorption and desorption peaks as well as a short double layer charging region are observed at intermediate potential values. The HER was investigated by Tafel coefficients and reaction order with respect to H+ as function of nominal Rh-content. (c) 2006 Elsevier Ltd. All rights reserved

Electrochimica Acta 52[7], 2359-2369. 2007.

P 061-07 "Longitudinal dynamics with rf phase modulation in the Brazilian electron storage ring"

Abreu, N. P., Farias, R. H. A., and Tavares, P. F.

In the Brazilian synchrotron light source (LNLS - Laboratorio Nacional de Luz Sincrotron), we observed that modulating the phase of the accelerating fields at approximately twice the synchrotron frequency suppressed remarkably well a longitudinal coupled-bunch mode of the beam driven by a higher order mode in one of the radiofrequency (rf) cavities. In this work, we present the results of a set of systematic measurements, in single and multibunch mode, aimed at characterizing the effects of rf phase modulation on the beam. We compare those experiments with the results of tracking simulations and of a theoretical model in which Landau damping is the stabilizing mechanism that explains the suppression of the longitudinal coupled-bunch instability. We also measure the frequency of the stable islands created in longitudinal phase space by phase modulation and the longitudinal beam transfer function as a function of the modulation frequency and amplitude. The experimental results are in good agreement with theoretical expectations

Physical Review Special Topics-Accelerators and Beams 9[12]. 2006.

P 062-07 "Mixed valence states in cobalt iron cyanide"

Martinez-Garcia, R., Knobel, M., Balmaseda, J., Yee-Madeira, H., and Reguera, E.

Cobalt iron cyanide with both Co and Fe in mixed valence states were prepared and characterized. In this mixed valence system the cobalt atom is found both as high spin Co(2+) and low spin Co(III) while iron always appears in low spin state to form two solid solutions: Co(2 +)Co(III) hexacyanoferrates (II,III), and Co(2 +)Co(III) hexacyanoferrate (II). Such solid solutions have the following formula units: (Co2+)(x)(Co-III)(1-x)K[(Fe-II)(1-x)(Fe-III)(x)(CN)(6)] center dot 1/2H(2)O and (CO2+)(1.5x)(Co-III)(1-x)K[Fe-II(CN)(6)]center dot yH(2)O (0 <= x <= 1, 1 <= y <= 14). Compounds within these two series were characterized from Infrared, Mossbauer, X-ray diffraction and thermo-gravimetric data, and magnetic measurements at low temperature. A model for their crystal structure is proposed and the structure for a representative composition refined from XRD powder patterns using the Rietveld method. A simple and reproducible procedure to prepare these solid solutions is provided. Within hexacyanoferrates, such mixed valence states system in both metal centres shows unique features, which are discussed from the obtained data. (c) 2006 Elsevier Ltd. All rights reserved

Journal of Physics and Chemistry of Solids 68[2], 290-298. 2007.

P 063-07 "Monoprosthesis for simultaneous correction of stress urinary incontinence and cystocele: A multicentric prospective study"

Palma, P., Riccetto, C., Muller, V., Paladini, M., Adile, B., Cianci, A., Contreras, O., and Barthos, P.

European Urology Supplements 6[2], 240-240. 2007.

P 064-07 "Multiband effects in the electron spin resonance of Gd3+ in the intermediate-valence compound YbAl3 and its reference compound LuAl3"

Urbano, R. R., Bittar, E. M., Pires, M. A., Ferreira, L. M., Bufaical, L., Rettori, C., Pagliuso, P. G., Magill, B., Oseroff, S. B., Thompson, J. D., and Sarrao, J. L.

Electron spin resonance (ESR) results of Gd3+ in YbAl3 and LuAl3 are analyzed using a multiband (f-, d-, and p-type) model of correlated conduction electrons. The need for a multiband analysis of our results is based on the following observations: (i) the Korringa rates b similar or equal to 14 Oe/K and b similar or equal to 9 Oe/K for Gd3+ for YbAl3 and LuAl3, respectively, are larger than those expected from the respective measured g shifts (Knight shift), and (ii) negative and positive g shifts Delta g similar or equal to-0.004 and Delta g similar or equal to+0.003 were observed for Gd3+ in YbAl3 and LuAl3, respectively. Specific heat and magnetic susceptibility measurements, in the samples studied by ESR, show that electron-electron correlations are present in both compounds

Physical Review B 75[4]. 2007.

P 065-07 "Nernst effect in semimetals: The effective mass and the figure of merit"

Behnia, K., Measson, M. A., and Kopelevich, Y.

We present a study of electric, thermal, and thermoelectric transport in elemental bismuth, which presents a Nernst coefficient much larger than what was found in correlated metals. We argue that this is due to the combination of an exceptionally low carrier density with a very long electronic mean-free path. The low thermomagnetic figure of merit is traced to the lightness of electrons. Heavy-electron semimetals, which keep a metallic behavior in the presence of a magnetic field, emerge as promising candidates for thermomagnetic cooling at low temperatures

Physical Review Letters 98[7]. 2007.

P 066-07 "On the impact of multipath interference noise in all-Raman dispersion compensated links"

Tenenbaum, S. and Poggiolini, P.

The impact of multipath interference (MPI) in all-Raman multispan dispersion-compensated links operating at 42.67 Gb/s was studied. D+/D- and D+/D-/D+ compensation schemes were considered using different fiber sets. Optical signal-to-noise ratio (OSNR) penalties due to MPI were calculated for several backward-pumped system configurations, imposing system target OSNR levels suitable for intensity modulation with direct detection (IMDD) and differential phase-shift keying (DPSK). The analysis in this paper confirmed that the D+/D-/D+ OSNR penalty is typically much less than that of the D+/D- scheme. The authors then estimated the increase due to MPI in the number of spans required to satisfy a target OSNR for a given total link length, taking into account Kerr nonlinearities. It turned out that such an increase can be very significant (up to 15%-20%) with the D+/D- scheme and lower but nonnegligible (5%-10%) with the D+/D-/D+ schemes. The analysis confirms that, to substantially curtail the span increase, both forward and backward pumping should be adopted, as recent experimental results have shown. Finally, at the lower OSNR levels required by DPSK with respect to IMDD, the impact of MPI was shown to be smaller across all configurations

Journal of Lightwave Technology 24[12], 4850-4860. 2006.

P 067-07 "On the nature of the disordered microstructure in Sm(Co,Cu)(5) alloys with increasing Cu content"

Penton, A., Estevez, E., Lora, R., Espina-Hernandez, J. H., Grossinger, R., Turtelli, R. S., and Valor-Reed, A.

X-ray diffraction and transmission electron microscopy (TEM) experiments were performed in heat-treated Sm(Co,Cu)(5) samples with different Co/Cu content. The major phase observed in the diffraction patterns exhibits a hexagonal CaCu5 type structure in all the studied compositions. The behavior of the diffraction profiles, as function of the Cu content, is believed to be due to an inhomogeneous distribution of Co and Cu through out the samples. Heavily planar faulted regions have been observed by means of TEM and are also associated with Sm and Co rich phases within the matrix. A CaCu5 type structure with local Sm rich regions seems to be responsible for the observed magnetic behavior.

Journal of Alloys and Compounds 429[1-2], 343-347. 2007.

P 068-07 "Phenomenological characterization of photoactive centers in Bi12TiO20 crystals"

Frejlich, J., Montenegro, R., Inocente-Junior, N. R., dos Santos, P. V., Launay, J. C., Longeaud, C., and Carvalho, J. F.

We report optical and electrical measurements contributing for a better characterization of the relevant photoactive center levels in undoped photorefractive Bi12TiO20 (BTO) crystals grown in Brazil. Comparative results for Pb-doped BTO and Bi12GaO20 are also reported. A center responsible for photochromism was identified at 0.42-0.44 eV, probably below the conduction band (CB). The main electron and hole donor center is detected at 2.2 eV from the CB and the equilibrium Fermi level is pinned at this level. Other localized centers were identified at different positions in the band gap and their relation with the behavior of BTO under different wavelengths and operating conditions is discussed with particular attention to holographic recording

Journal of Applied Physics 101[4]. 2007.

P 069-07 "Photoelectron spectroscopy (XPS) and photoelectron diffraction (XPD) studies on the system hafnium silicide and hafnium oxide on Si(100)"

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

Continuous down-scaling of silicon based transistors results in device lengths of less than 100 nm. This requires a reduction of the gate dielectric thickness to less than 15 angstrom which is not possible for SiO2 due to an increasing leakage current. One of the most promising candidates for a replacement material for the gate dielectric is HfO2 [Wilk GD, Wallace RM, Anthony JM. J Appl Phys 2001; 89:5243]. In this work we applied X-ray photoelectron spectroscopy (XPS) and photoelectron diffraction measurements in order to study the interface of hafnium oxide to Si(100). The high resolution measurements were performed with synchrotron radiation at beamlines 5 and 11 at DELTA (Dortmund). For the first time, photoelectron diffraction patterns for this system were recorded. The spectral resolution allowed to separate different spectral components. The preparation of hafnium oxide films on Si(100) was performed by evaporation of hafnium at a partial oxygen background pressure of 1 x 10(-8) mbar. Three different spectral components were observed in the hafnium 4f photoemission signal by high resolution XPS. The photoelectron signals with binding energies shift of 3.1 and 1.2 eV with respect to signal of hafnium silicide were assigned to hafnium dioxide and hafnium silicate, respectively. The corresponding high-resolution diffraction patterns result from different local environments for each component. The experimental patterns re compared with simulations for a model structure of hafnium silicide.

Materials Science in Semiconductor Processing 9[6], 1055-1060. 2006.

P 070-07 "Photonic band structure and symmetry properties of electromagnetic modes in photonic crystals"

Cavalcanti, S. B., Dios-Leyva, M., Reyes-Gomez, E., and Oliveira, L. E.

Within the Maxwell framework and using a transfer-matrix technique we have determined a general equation which governs the photonic band structure and the density of states of one-dimensional superlattices composed of two alternate layers characterized by different refractive indexes, which may take on positive as well as negative values. Besides the usual well-known results, we have found null-gap points for commensurate values of the optical path lengths of each layer. Furthermore, we have been able to characterize non-Bragg gaps that show up in frequency regions in which the average refractive index is null

Physical Review e 75[2]. 2007.

P 071-07 "Piezoelectric coefficients of L-histidine hydrochloride monohydrate obtained by synchrotron x-ray Renninger scanning"

de Menezes, A. S., dos Santos, A. O., Almeida, J. M. A., Sasaki, J. M., and Cardoso, L. P.

The method for determining piezoelectric coefficients based on synchrotron radiation x- ray multiple diffraction (Avanci et al 1998 Phys. Rev. Lett. 81 5426) has been used in the case of a single crystal of the amino acid L- histidine center dot HCl center dot H2O. The method relates the E- induced strain with the angular shift in the multiple diffraction peak position. Thus, it allowed us to determine all three (d(14) = 2.25(9) x 10(-10) C N-1, d(25) = 4.1(5) x 10(-11) C N-1 and d(36) = 2.3(2) x 10(-10) C N-1) piezoelectric coefficients of L- histidine center dot HCl center dot H2O, using the (10 0 0) and (0 0 4) primary reflections

Journal of Physics-Condensed Matter 19[10]. 2007.

P 072-07 "Probing a resonant circuit with a PC sound card"

Magno, W. C., de Araujo, A. E. P., Lucena, M. A., Montarroyos, E., and Chesman, C.

We discuss an inexpensive experimental system that enables us to generate and acquire electronic signals using only a personal computer and its sound card to study the resonance of an RLC oscillator circuit. (C) 2007 American Association of Physics Teachers

American Journal of Physics 75[2], 161-162. 2007.

P 073-07 "Probing long-range leptonic forces with solar and reactor neutrinos"

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

In this work we study the phenomenological consequences of the existence of long-range forces coupled to lepton flavour numbers in solar neutrino oscillations. We study electronic forces mediated by scalar, vector or tensor neutral bosons and analyse their effect on the propagation of solar neutrinos as a function of the force strength and range. Under the assumption of one mass scale dominance, we perform a global analysis of solar and KamLAND neutrino data which depends on the two standard oscillation parameters, Delta m(21)(2) and tan(2)theta(12), the force coupling constant, its range and, for the case of scalar-mediated interactions, on the neutrino mass scale as well. We find that, generically, the inclusion of the new interaction does not lead to a very statistically significant improvement on the description of the data in the most favored MSW LMA (or LMA-I) region. It does, however, substantially improve the fit in the high-Delta m(2) LMA (or LMA-II) region which can be allowed for vector and scalar lepto-forces (in this last case if neutrinos are very hierarchical) at 2.5 sigma. Conversely, the analysis allows us to place stringent constraints on the strength versus range of the leptonic interaction

Journal of Cosmology and Astroparticle Physics [1]. 2007.

P 074-07 "Size dependence on the ordering process in colloidal FePt nanoparticles"

Vargas, J. M., Zysler, R. D., Socolovsky, L. M., Knobel, M., and Zanchet, D.

An alternative method to study the effects of annealing process on colloidal FePt nanoparticles (2-4 nm) has been achieved. Annealing experiments at temperatures between 773 and 1073 K under inert atmosphere flux were performed in powder samples with excess of surfactant molecules on nanoparticle surface. Transmission electron microscopy, x-ray diffraction and magnetic measurements were performed to evidence the evolution of the chemically disordered fcc to chemically ordered face-centered tetragonal phase transformation. Magnetization measurements under zero-field-cooling and field-cooling (M-ZFC-M-FC) conditions, and hysteresis loops are extremely sensitive to the particle size distribution and were strongly affected by the annealing treatment. (c) 2007 American Institute of Physics

Journal of Applied Physics 101[2]. 2007.

P 075-07 "Small corrections to the tunneling phase-time formulation"

Bernardini, A. E.

After reexamining the above- barrier diffusion problem where we notice that the wave packet collision implies the existence of multiple reflected and transmitted wave packets, we analyze the way of obtaining phase times for tunneling/reflecting particles in a particular colliding configuration where the idea of multiple peak decomposition is recovered. To partially overcome the analytical incongruities which frequently arise when the stationary phase method is adopted for computing the (tunneling) phase-time expressions, we present a theoretical exercise involving a symmetrical collision between two identical wave packets and a unidimensional squared potential barrier where the scattered wave packets can be recomposed by summing the amplitudes of simultaneously reflected and transmitted wave components so that the conditions for applying the stationary phase principle are totally recovered. Lessons concerning the use of the stationary phase method are drawn

European Physical Journal C 49[3], 891-896. 2007.

P 076-07 "Structure analysis of the system hafnium/silicon(100) by means of X-rayphotoelectron spectroscopy and X-ray photoelectron diffraction (XPD)"

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

Due to the ongoing miniaturization of semiconductor devices new gate dielectrics are required for future applications. In this work we investigated hafnium silicide as a pre-system for hafnium oxide, one of the most promising candidates. One of the major problems of HfO2-films on silicon is the formation of hafnium silicide at the HfO2/Si interface. Therefore, ultrathin films of the system HfSi on Si(100) with a systematic varied thickness from 3 to 30 angstrom were prepared. Measurements were conducted by means of X-ray photoelectron spectroscopy and low energy electron diffraction (LEED). Also full 2 pi X-ray photoelectron diffraction (XPD) patterns with high spectral resolution were recorded. Against other reports related to thicker films, several heating cycles showed no phase transitions of the ultrathin films. However, above temperatures of

630 degrees C an island formation is strongly indicated. The experimental XPD patterns are compared to simulated patterns of model structures. For the first time we present a modification of the C49 structure a possible structure for ultrathin HfSi2-films on bulk Si. As an outlook possibilities for preparing the system HfO2/Si(100) are introduced. (c) 2006 Elsevier Ltd. All rights reserved

Materials Science in Semiconductor Processing 9[6], 1049-1054. 2006.

P 077-07 "The effect of surface electrode temperature on cold electrode erosion behaviour"

Essiptchouk, A. M., Sharakhovsky, L. I., and Marotta, A.

This work presents an experimental study of copper cathode erosion in magnetically driven arcs as a function of electrode temperature. The experiments were carried out in air at atmospheric pressure. A critical temperature of about 500 - 600K for the transition from micro- to macro- erosion was found for magnetic fields in the range 0.01 - 0.35 T. We show that the electrode temperature is the main parameter that determines erosion, especially in the macro- erosion regime when it strongly increases with temperature. The obtained experimental data can be represented as an exponential function of the time for the electrode surface to reach the fusion temperature underneath the arc root

Plasma Sources Science & Technology 16[1], 1-6. 2007.

P 078-07 "Theoretical investigation of a Mn-doped Si/Ge heterostructure"

Arantes, J. T., da Silva, A. J. R., Fazzio, A., and Antonelli, A.

We investigate, through ab initio density-functional theory calculations, the electronic and structural properties of neutral Mn impurities at tetrahedral interstitial and substitutional sites in both Si and Ge layers of a Si/Ge heterostructure. We conclude that substitutional Mn at the Ge layers is more stable than interstitial Mn at the Si layers by approximately 0.45 eV, and we estimate an energy barrier of at least 1.12 eV to diffuse away from these most stable substitutional sites. Mn has a magnetic moment in the heterostructure that is similar to that in the bulk, and for the compressed Ge layer the Mn-Mn exchange interaction is always weakly antiferromagnetic. Varying the lattice constant of the substrate, the Mn-Mn ground state becomes ferromagnetic. This result opens up the possibility of manipulating the interaction between Mn impurities at Ge layers grown over a Si1-xGex substrate by changing x

Physical Review B 75[7]. 2007.

P 079-07 "Two-photon interaction between trapped ions and cavity fields"

Semiao, F. L. and Vidiella-Barranco, A.

In this paper, we generalize the ordinary two-photon Jaynes-Cummings model (TPJCM) by considering the atom (or ion) to be trapped in a simple harmonic well. A typical setup would be an optical cavity containing a single ion in a Paul trap. Due to the inclusion of atomic vibrational motion, the atom. field coupling becomes highly nonlinear what brings out quite different behaviours for the system dynamics when compared to the ordinary TPJCM. In particular, we derive an effective two-photon Hamiltonian with dependence on the number operator of the ion's center-of-mass motion. This dependence occurs both in the cavity induced Stark-shifts and in the ion-field coupling, and its role in the dynamics is illustrated by showing the time evolution of the probability of occupation of the electronic levels for simple initial preparations of the state of the system

European Physical Journal D 41[2], 417-423. 2007.

P 080-07 "Vibrational and electronic excitations in the (Ce,La)MIn5 (M = Co,Rh)heavy-fermion family"

Martinho, H., Pagliuso, P. G., Fritsch, V., Moreno, N. O., Sarrao, J. L., and Rettori, C.

We present a systematic study at ambient pressure of the phononic and electronic Raman-active excitations in the ab plane of the (Ce,La)MIn5 (M=Co,Rh) heavy-fermion family. We found that the characteristic Raman spectra of this family of compounds display two phonon modes at similar to 38 and similar to 165 cm(-1) and a broad electronic background centered at similar to 40 cm(-1). For CeCoIn5, the temperature dependence of these excitations shows anomalous behavior near T-*=45 K that may indicate a nontrivial renormalization of the electronic structure driven by strong correlations between hybridized 4f electrons

Physical Review B 75[4]. 2007.

P 081-07 "Waveguide produced by fiber on glass method using r3+-doped tellurite glass"

Rivera, V. A. G., Rodriguez, E., Chillcce, E. F., Cesar, C. L., and Barbosa, L. C.

We report the fabrication of waveguides using the fiber on glass (FOG) method. Taking advantage of a Thermal Mechanical Analyzer (Shimadzu TMA-50), we were able to produce a new type of waveguide by coupling an erbium doped fiber core onto a planar glass substrate. Both optical fiber core and substrate were fabricated from tellurite glass. Important thermal characteristics of the substrate and fiber like the transition temperature T-g, the temperature for the crystallization onset T-x and the maximum crystallization temperature T-c were determined by Differential Thermal Analysis (DTA). The thermal expansion coefficient of the tellurite glass was determined by Thermal Mechanical Analysis (TMA). (c) 2006 Published by Elsevier B.V

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Abstracta

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