Abstracta

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Trabalhos Publicados

P146-08 "Broadband 2.12 GHz Ti : sapphire laser compressed to 5.9 femtoseconds using MIIPS"

Nogueira, G. T., Xu, B. W., Coello, Y., Dantus, M., and Cruz, F. C.

We report a self-starting prismless femtosecond Ti:sapphire ring laser whose repetition rate has been gradually increased from 1 to 2.12 GHz. A broadband spectrum extending from 650 to 1040 nm, in which 17% of the intracavity power is generated in a single-pass through the crystal, is preserved in spite of the reduction in peak power. An average power of 0.95 W was obtained for 7.5 W of pump power, with very stable operation verified over 22 hours. Pulses from this laser have been fully characterized in spectral phase, and then compressed to 5.9 femtoseconds using multiphoton intrapulse interference phase scan (MIIPS). (C) 2008 Optical Society of America

P147-08 "Centrality dependence of charged hadron and strange hadron elliptic flow from root s(NN)=200 GeVAu+Au collisions"

Abelev, B. I., Aggarwal, M. M., Ahammed, Z., Anderson, B. D., Arkhipkin, D., Averichev, G. S., et all

We present STAR results on the elliptic flow upsilon(2) Of charged hadrons, strange and multistrange particles from,root s(NN) = 200 GeV Au+Au collisions at the BNL Relativistic Heavy Ion Collider (RHIC). The detailed study of the centrality dependence of upsilon(2) over a broad transverse momentum range is presented. Comparisons of different analysis methods are made in order to estimate systematic uncertainties. To discuss the nonflow effect, we have performed the first analysis Of upsilon(2) with the Lee-Yang zero method for K-S(0) and A. In the relatively low PT region, P-T <= 2 GeV/c, a scaling with m(T) - m is observed for identified hadrons in each centrality bin studied. However, we do not observe nu 2(p(T))) scaled by the participant eccentricity to be independent of centrality. At higher PT, 2 1 <= PT <= 6 GeV/c, V2 scales with quark number for all hadrons studied. For the multistrange hadron Omega, which does not suffer appreciable hadronic interactions, the values of upsilon(2) are consistent with both m(T) - m scaling at low p(T) and number-of-quark scaling at intermediate p(T). As a function ofcollision centrality, an increase of p(T)-integrated upsilon(2) scaled by the participant eccentricity has been observed, indicating a stronger collective flow in more central Au+Au collisions

P148-08 "Chemical synthesis and structural characterization of highly disordered ni colloidal nanoplarticles"

Winnischofer, H., Rocha, T. C. R., Nunes, W. C., Socolovsky, L. M., Knobel, M., and Zanchet, D.

This work focuses on synthetic methods to produce monodisperse Ni colloidal nanoparticles (NPs), in the 4-16 nm size range, and their structural characterization. Narrow size distribution nanoparticles were obtained by high-temperature reduction of a nickel salt and the production of tunable sizes of the Ni NPs was improved compared to other methods previously described. The assynthesized nanciparticles exhibited spherical shape and highly disordered structure, as it could be assigned by X-ray diffraction (XRD) and high resolution transmission electron microscopy (HRTEM). Annealing at high temperature in organic solvent resulted in an increase of nanoparticle atomic ordering; in this case, the XRD pattern showed an fcc-like structure. Complementary data obtained by X-ray absorption spectroscopy confirmed the complex structure of these nanoparticles. Temperature dependence of the magnetic susceptibility of these highly disordered Ni NPs showed the magnetic behavior cannot be described by the conventional superparamagnetic theory, claiming the importance of the internal structure in the magnetic behavior of such nanomaterials

P149-08 "Cluster-type entangled coherent states"

Munhoz, P. P., Semiao, F. L., Vidiella-Barranco, A., and Roversi, J. A.

We present the cluster-type entangled coherent states (CTECS) and discuss their properties. A cavity QED generation scheme using suitable choices of atom-cavity interactions, obtained via detunings adjustments and the application of classical external fields, is also presented. After the realization of simple atomic measurements, CTECS representing nonlocal electromagnetic fields in separate cavities can be generated. (c) 2008 Elsevier B.V. All rights reserved

P150-08 "Coherent control of ultrahigh-frequency acoustic resonances in photonic crystal fibers"

Wiederhecker, G. S., Brenn, A., Fragnito, H. L., and Russell, P. S. J.

Ultrahigh frequency acoustic resonances (2 GHz) trapped within the glass core (1 mu m diameter) of a photonic crystal fiber are selectively excited through electrostriction using laser pulses of duration 100 ps and energy 500 pJ. Using precisely timed sequences of such driving pulses, we achieve coherent control of the acoustic resonances by constructive or destructive interference, demonstrating both enhancement and suppression of the vibrations. A sequence of 27 resonantly-timed pulses provides a 100-fold increase in the amplitude of the vibrational mode. The results are explained and interpreted using a semianalytical theory, and supported by precise numerical simulations of the complex light-matter interaction

P151-08 "DCOOD optically pumped by a (CO2)-C-13 laser: new terahertz laser lines"

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

In this work we report on new optically pumped THz laser lines from deuterated formic acid (DCOOD). An isotopic (CO2)-C-13 laser was used for the first time as a pump source for this molecule, and a Fabry-Perot cavity was used as a THz laser resonator. Optoacoustic absorption spectra were used as a guide to search for new THz laser lines. We could observe six new laser lines in the range from 303.8 mu m (0.987 THz) to 725.1 mu m (0.413 THz). The lines were characterized according to wavelength, relative polarization, relative intensity, and optimum working pressure. The transferred lamb-dip technique was used to measure the frequency absorption transition for both of these laser lines. Furthermore, we also present a catalogue of all THz laser lines generated from DCOOD Applied Physics B-Lasers and Optics 91[3-4], 517-520. 2008. (c) 2008

P152-08 "Delay times for symmetrized and antisymmetrized quantum tunneling configurations"

Bernardini, A. E.

The transit times are obtained for a symmetrized (two identical bosons) and an antisymmetrized (two identical fermions) quantum colliding configuration. Considering two identical particles symmetrically impinging on a one-dimensional barrier, we demonstrate that the phase time and the dwell time give connected results where, however, the exact position of the scattered particles is explicitly determined by the phase time (group delay). For the antisymmetrized wave function configuration, an unusual effect of accelerated transmission is clearly identified in a simultaneous tunneling of two identical fermions

P153-08 "Dielectric and magnetic coupling in lead-free FeAlO3 magnetoelectric compound"

Cotica, L. F., Santos, I. A., Venet, M., Garcia, D., Eiras, J. A., and Coelho, A. A.

A lead-free FeAlO3 multiferroic magnetoelectric compound was obtained through the sol-gel technique with subsequent annealing in an oxidative atmosphere. Dielectric investigations revealed a frequency-and temperature-dependent dielectric anomaly, which can be probably coupled to the sample magnetic ordering at around 220 K. These results indicate that the lead-free FeAlO3 magnetoelectric compound, which has a lower environmental impact in comparison to other multiferroics, is a potential candidate to be employed in areas where the magnetoelectric effect can be exploited. (C) 2008 Elsevier Ltd. All rights reserved

P154-08 "Effect of Ni(II) doping on the structure of L-histidine hydrochloride monohydrate crystals"

Remedios, C. M. R., Paraguassu, W., Lima, J. A., Freire, P. T. C., Mendes, J., Melo, F. E. A., de Menezes, A. S., dos Santos, A. O., Cardoso, L. P., and Miranda, M. A. R.

In this paper, we study the effect of Ni(II) doping on the structure of L-histidine hydrochloride monohydrate crystals using x-ray diffraction and Raman spectroscopy. X-ray powder diffraction shows no significant change in the unit cell parameters of the doped single crystal, whereas x-ray multiple diffraction using synchrotron radiation indicates that the Ni ions are located in interstitial positions in the crystal lattice. The temperature-dependent Raman spectra reveal a structural phase transition in the 10-300 K temperature range. The proposed mechanism of this phase transition supports the suggestion that the Ni ions occupy interstitial positions

P155-08 "Electrocatalytic applications of a sol-gel derived cobalt phthalocyanine-dispersed carbon-ceramic electrode"

Arguello, J., Magosso, H. A., Landers, R., and Gushikem, Y.

The preparation and characterization of a surface renewable carbon-ceramic electrode, $SiO2/SnO2/C$-graphite/(SiPy+)(4)CoPcTs-4, is reported. Cobalt(II) tetrasulfonated plithalocyanine(CoPcTs-4) absorbed on a 3-n-propylpyridinium chloride silsesquioxane polymer was dispersed in a stannic-silica C-graphite sol-gel matrix. The performance of $SiO2/SnO2/C$-graphite/(SiPy+)(4)CoPcTs-4 as electrode material was investigated by cyclic voltammetry in the electrocatalytic oxidation of oxalic acid and nitrite. The modified carbon-ceramic material was characterized by X-ray fluorescence spectroscopy, BET specific surface area, thermogravimetric analysis, X-ray photoelectron spectroscopy, and scanning electron microscopy.

P156-08 "Electrochemical, morphological and microstructural characterization of carbon film resistor electrodes for application in electrochemical sensors"

Gouveia-Caridade, C., Soares, D. M., Liess, H. D., and Brett, C. M. A.

The electrochemical and microstructural properties of carbon film electrodes made from carbon film electrical resistors of 1.5, 15, 140 Omega and 2.0 k Omega nominal resistance have been investigated before and after electrochemical pre- treatment at +0.9 V vs SCE, in order to assess the potential use of these carbon film electrodes as electrochemical sensors and as substrates for sensors and biosensors. The results obtained are compared with those at electrodes made from previously investigated 2 Omega carbon film resistors. Cyclic voltammetry was performed in acetate buffer and phosphate buffer saline electrolytes and the kinetic parameters of the model redox system Fe(CN)(6) (3) (/4) obtained. The 1.5 Omega resistor electrodes show the best properties for sensor development with wide potential windows, similar electrochemical behaviour to those of 2 Omega and close-to-reversible kinetic parameters after electrochemical pre- treatment. The 15 and 140 Omega resistor electrodes show wide potential windows although with slower kinetics, whereas the 2.0 k Omega resistor electrodes show poor cyclic voltammetric profiles even after pre- treatment. Electrochemical impedance spectroscopy related these findings to the interfacial properties of the electrodes. Microstructural and morphological studies were carried out using contact mode Atomic Force Microscopy (AFM), Confocal Raman spectroscopy and X-ray diffraction. AFM showed more homogeneity of the films with lower nominal resistances, related to better electrochemical characteristics. X-ray diffraction and Confocal Raman spectroscopy indicate the existence of a graphitic structure in the carbon films.

P157-08 "ESR investigation of graphite-like amorphous carbon films revealing itinerant states as the ones responsible for the signal"

Viana, G. A., Lacerda, R. G., Freire, F. L., and Marques, F. C.

The origin of paramagnetic centers in graphite-like amorphous carbon is investigated. The films were deposited by the ion beam assisted deposition (IBAD) and have a concentration of sp(2) sites of about 90% and zero energy band gap. The density of the film and the electrical resistivity are close to these of crystalline graphite. However, the hardness and stress of the films are similar to those of diamond-like carbon. Electron spin resonance (ESR) performed at the X-band (9.4 GHz) revealed an unexpected low density of paramagnetic centers, ascribed to conduction electrons with a g-value of about 2.003.

P158-08 "Evolution of thermodynamic potentials in closed and open nanocrystalline systems: Ge-Si : Si(001) islands"

Leite, M. S., Malachias, A., Kycia, S. W., Kamins, T. I., Williams, R. S., and Medeiros-Ribeiro, G.

An open (closed) system, in which matter is (not) exchanged through surface diffusion, was realized via growth kinetics. Epitaxially grown Si-Ge:Si (001) islands were annealed in different environments affecting the diffusivity of Si adatoms selectively. The evolution of the driving forces for intermixing while approaching the equilibrium was inferred from Synchrotron x-ray measurements of composition and strain. For the open system, intermixing due to the Si inflow from the wetting layer (reservoir) caused a decrease in the Ge content, leading to a lowering of the elastic energy and an increase in the mixing entropy. In contrast, for the closed system, while keeping the average Ge composition constant, atom rearrangement within the islands led to an increase in both elastic and entropic contributions. The Gibbs free energy decreased in both cases, despite the different evolution paths for the composition profiles

P159-08 "Febrifugine derivative antimalarial activity: Quantum mechanical predictors"

Autreto, P. A. D. and Lavarda, F. C.

Plasmodium falciparum resistant strain development has encouraged the search for new antimalarial drugs. Febrifugine is a natural substance with high activity against P. falciparum presenting strong emetic property and liver toxicity, which prevent it from being used as a clinical drug. The search for analogues that could have a better clinical performance is a current topic. We aim to investigate the theoretical electronic structure by means of febrifugine derivative family semi-empirical molecular orbital calculations, seeking the electronic indexes that could help the design of new efficient derivatives. The theoreticalresults show there is a clustering in well-defined ranges of several electronic indexes of the most selective molecules. The model proposed for achieving high Selectivity was tested with success

P160-08 "GaAs-(Ga, Al) As double quantum rings: confinement and magnetic field effects"

Culchac, F. J., Porras-Montenegro, N., and Latge, A.

Here we address a theoretical study of concentric GaAs-(Ga, Al) As double quantum rings, under a magnetic field applied perpendicularly to the ring plane. Electron-hole transition energies are calculated as a function of the system geometry confinement, following a single-particle picture, neglecting interaction effects. We adopted an effective-mass approximation, within a hard potential model calculation, exactly solved by using confluent hypergeometric functions. A huge dependence on the barrier width value and on the external ring width of the Ga1-xAlxAs coupled rings is found for the transition energy values. The results show a high competition between geometric and magnetic-field confinement, leading to an increase of the electron-hole energies with the magnetic field, and a reducing behavior as the outer ring width is assumed to be larger. Our results are in quite good agreement with the experimental data by Mano et al (2005 Nano Lett. 5 425)

P161-08 "Gamma-X mixing in GaAs-Ga1-xAlxAs quantum wells under hydrostatic pressure"

Mora-Ramos, M. E., Lopez, S. Y., and Duque, C. A.

The mixing between the Gamma and X conduction-band valleys in GaAs-Ga1-xAlxAs quantum wells is investigated by using a phenomenological model which takes into account the effects of applied hydrostatic pressure. The dependencies of the variationally calculated photoluminescence peak-energy transitions on the applied hydrostatic pressure and quantum-well width are presented. A systematic study of the Gamma-X mixing parameter is also reported. In particular, it is shown that the inclusion of the Gamma-X mixing explains the non-linear behavior in the photoluminescence peak of confined exciton states that has been experimentally observed for pressures above 15 kbar in GaAs-Ga1-xAlxAs quantum wells

P162-08 "Giant effective g-factor in PbxEu1-xTe epitaxial films"

Heredia, E., Rappl, P. H. D., Motisuke, P., Gazoto, A. L., Iikawa, F., and Brasil, M. J. S. P.

We investigated PbxEu1-xTe films with x <= 0.2 by magneto-optical measurements. For x similar to 0.01, the optical emission is similar to high quality EuTe films with two narrow lines attributed to excitonic recombinations associated with magnetic polarons. For increasing x, the emission becomes dominated by a broader lower energy band, which is very efficient as compared to the binary emission. The magneto-optical properties of the ternary films show various similarities with EuTe results, such as quenchings at similar temperatures and magnetic fields. Most remarkably, they also present a giant effective g-factor that makes this material a strong candidate for spintronic applications.

P163-08 "Imaging with two spiral diffracting elements intermediated by a pinhole"

Lunazzi, J. J., Rivera, N. I. R., and Magalhaes, D. S. F.

A pseudoscopic (inverted depth) image made with spiral diffracting elements intermediated by a pinhole is explained by its symmetry properties. The whole process is made under common white light illumination and allows the projection of images. The analysis of this projection demonstrates that the

images of two objects pointing away longitudinally have the main features of standardpseudoscopic image points. An orthoscopic (normal depth) image has also been obtained with the breaking of the symmetry conditions. (C) 2008 Optical Society of America

Journal of the Optical Society of America A-Optics Image Science and Vision 25[5], 1091-1097. 2008

P164-08 "Influence of the microstructure on steel hardening in pulsed plasma nitriding"

Ochoa, E. A. and Figueroa, C. A.

The plasma technologies are widely used in metal surface engineering processes. Basically, these treatments improve the mechanical, tribological, and chemical properties of the material such aswear resistance, hardness, fatigue resistance, friction, and corrosion resistance. In this work, a comprehensive study of the influence of the microstructure on hardness of AISI P20 steel treated at different temperatures and times by pulsed plasma nitriding is reported. The processes were done by using a pulsed plasma industrial system. The samples were characterized by nano-indentation (hardness), x-ray diffraction (XRD), scanning electron microscopy (SEM), and x-ray dispersion spectroscopy (EDS). At lower treatment temperatures (360 degrees C), a high density of small lamellar precipitates, constituted by more epsilon-Fe2-3N phase than gamma(')-Fe4N phase, is formed. At intermediate treatment temperatures (480 degrees C), big lamellar precipitates, constituted by more gamma(')-Fe4N phase than epsilon-Fe2-3N phase, are formed at grain boundary. At higher treatment temperatures (520 degrees C), the nitrided layer does not contain lamellar precipitates and it is only constituted by alpha-Fe phase saturated in nitrogen. Hardness depends on size, shape, and distribution of precipitates and crystalline phases (microstructure). The higher hardness values are obtained when more and smaller lamellar precipitates are presented and constituted by more epsilon-Fe2-3N phase

Journal of Vacuum Science & Technology A 26[3], 328-332. 2008.

P165-08 "Li diffusion and electrochromism in amorphous and crystalline vanadium oxide thin film electrodes"

Scarminio, J., Catarini, P. R., Urbano, A., Gelamo, R. V., Rouxinol, F. P., and de Moraes, M. A. B.

Amorphous vanadium oxide films were synthesized onto ITO-coated glass substrates by the hot filament metal oxide deposition technique. The as-deposited samples were heat-treated in an argon atmosphere. X-ray diffraction analysis revealed that the films treated at 200 and 300 degrees C were still amorphous, while those treated at 400 and 500 degrees C were crystalline, with a V2O5 structure. All electrodes were electrochemically reversible for Li+ intercalation, exhibiting the electrochromic effect, observed from optical transmittance measurements at 632.8 nm. The Li-diffusion coefficient, DC, was measured by the galvanostatic intermittent titration technique (GITT) as function of the inserted charge. For the crystalline films it was observed that the optical absorbance and the DC increase with increasing Li insertion in the single-phase regions of crystalline LixV2O5 and decrease in the two-phase regions. For the latter, an effective DC was considered. The presence of other vanadium oxides mixed to the V2O5 matrix was inferred for the crystalline films from the chronopotentiometric and DC measurements

Journal of the Brazilian Chemical Society 19[4], 788-794. 2008.

P166-08 "Li+ distribution into V2O5 films resulting from electrochemical intercalation reactions"

Decker, F., Donsanti, F., Salvi, A. M., Ibris, N., Castle, J. E., Martin, F., Alamarguy, D., Vuk, A. S., Orel, B., and Lourenco, A.

We studied interface effects of thin film V2O5 electrodes on top of indium tin oxide (ITO) glass for Li intercalation by means of a combination of methods: depth-profiling by secondary ion mass spectroscopy (SIMS), electrochemical insertion-extraction of lithium ions by slow-scan cyclic voltammetry (SSCV) and by potentiostatic intermittent titration technique (PITT). We show that the Li+ distribution inside the oxide film is always far from homogeneous, and that different diffusion paths (parallel to interfaces as well as perpendicular to them) have to be considered in experiments with electrodes having areas of few cm(2). The exposed edge formed when cutting out coupons from the coated glass plate supporting the V2O5 electrode plays a significant role in the process, because it exposes the V2O5-ITO interface to the electrolyte

Journal of the Brazilian Chemical Society 19[4], 667-671. 2008.

P167-08 "Local structure, optical and magnetic studies of Ni nanostructures embedded in a SiO2 matrix by ion implantation"

Sharma, S. K., Kumar, P., Kumar, R., Knobel, M., Thakur, P., Chae, K. H., Choi, W. K., Kumar, R., and Kanjilal, D.

This work reports the formation of Ni nanostructures, their growth and saturation to form oxides by using ion implantation and thermal treatment in air at 600 degrees C. A quartz (SiO2) matrix was implanted with 100 keV Ni+ ions to doses in the range 5 x 10(15) -2 x 10(17) ions cm(-2). The formation of Ni nanoclusters was observed by high resolution x-ray diffraction (HRXRD), UV-visible optical spectroscopy, dc magnetization, AFM/ MFM and x-ray absorption spectroscopy (XAS). The cluster size distribution is narrow, with an average size of similar to 25 +/- 0.5 nm for the sample implanted at a dose of 1 x 10(16) ions cm(-2), but increases with implantation dose. Optical absorption spectra also show a clear signature of a surface plasmon resonance (SPR) peak at around 388 nm in accordance with the theoretical Mie's spectra. Temperature dependent zero-field-cooled and field-cooled magnetization measurements clearly indicate a superparamagnetic behavior, which is properly analyzed considering the size distribution of the magnetic nanostructures. The results show that the magnetic properties of the nanoparticles can be controlled by the implantation dose. A detailed investigation of the local structure using Ni K-edge NEXAFS/EXAFS suggests that the size of the Ni nanostructures is altered by implantation dose, reaching saturation in the form of oxides/silicates of Ni at a dose of 2 x 10(17) ions cm(-2)

Journal of Physics-Condensed Matter 20[28]. 2008.

P168-08 "Low-energy positron scattering by CO2"

Sanchez, S. D., Arretche, F., and Lima, M. A. P.

In this work we present results of integral (ICS) and differential (DCS) cross sections for positronCO2 scattering at low incident energies. Our *ICS* shows a significant improvement toward the experimental data, especially below 2 eV, and all the way up to the positronium formation threshold (7.8 eV), in comparison to our previous calculations [S. d'A. Sanchez, F. Arretche, M. T. do N. Varella, and M. A. P. Lima, Phys. Scr. T110, 276 (2004)]. Our calculated DCSs show a better resemblance in shape with the quasielastic experimental points of the Detroit group [D. A. Przybyla, W. Addo-Asah, W. E. Kaupilla, C. K. Kwan, and T. S. Stein, Phys. Rev. A 60, 359 (1999)], but the agreement is still not fully satisfactory, indicating a need for further theoretical and experimental investigation

Physical Review A 77[5]. 2008.

P169-08 "Magnetic behavior of Ni nanoparticies with high disordered atomic structure"

Nunes, W. C., de Biasi, E., Meneses, C. T., Knobel, M., Winnischofer, H., Rocha, T. C. R., and Zanchet, D.

This report concerns the magnetic properties of colloidal Ni nanoparticles (NPs) obtained by chemical reduction of Ni(II) salt in an organic solvent. The NPs present a complex and disordered atomic structure, where small clusters of a few Ni atoms appear to coexist within each NP. These NPs exhibit interesting magnetic properties, with a low temperature ferromagnetic order followed by a transition from ferromagnetic to a "spin-glass-like" state as the temperature decreases. The results are discussed considering the role of the atomic ordering of the NPs on the corresponding magnetic behavior. (C) 2008 American Institute of Physics

Applied Physics Letters 92[18]. 2008.

P170-08 "Magnetic field dependent magnetization of a conducting plasticized poly(aniline) film"

Djurado, D., Pron, A., Travers, J. P., Duque, J. G. S., Pagliuso, P. G., Rettori, C., Chinaglia, D. L., and Walmsley, L.

We report magnetic data of free standing films of poly(aniline) (PANI) protonated with a plasticizing di-ester of succinic acid. The data have been obtained using the electron spin resonance (ESR) technique at two different frequencies, X-band (9.4 GHz) and Q-band (34 GHz), on one hand, and by magnetization measurements in broad ranges of temperatures and magnetic fields on the other hand. All the data can be explained assuming a transition as a function of temperature from delocalized magnetic moments in the valence band to localized positive polarons in several antiferromagnetically correlated bands. By increasing the magnetic field, the magnetic properties are affected in several ways. An intra-band admixture of states occurs; it contributes to increase the spins' localization and finally promotes an antiferromagnetic-metamagnetic transition

Journal of Physics-Condensed Matter 20[28]. 2008.

P171-08 "Magnetic ordering of EuTe/PbTe multilayers determined by x-ray resonant diffraction"

Diaz, B., Granado, E., Abramof, E., Rappl, P. H. O., Chitta, V. A., and Henriques, A. B.

In this work we use resonant x-ray diffraction combined with polarization analysis of the diffracted beam to study the magnetic ordering in EuTe/PbTe

multilayers. The presence of satellites at the (1/2 1/2 1/2) magnetic reflection of a 50 /repetition EuTe/PbTe superlattice demonstrated the existence of magnetic correlations among the alternated EuTe layers. The behavior of the satellites intensity as T increases toward the Neel temperature T-N indicates that these correlations persist nearly up to T-N and suggests the preferential decrease of the magnetic order parameter of external monolayers of each EuTe layer within the superlattice. (C) 2008 American Institute of Physics

Applied Physics Letters 92[24]. 2008.

P172-08 "Magnetic vortices in tridimensional nanomagnetic caps observed using transmission electron microscopy and magnetic force microscopy"

Soares, M. M., de Biasi, E., Coelho, L. N., dos Santos, M. C., de Menezes, F. S., Knobel, M., Sampaio, L. C., and Garcia, F.

Magnetic domain formation on three-dimensional nanostructures was investigated. Co/Pd multilayers were deposited on polystyrene nanospheres (50-1000 nm) to form a magnetic cap with variable thickness. High resolution transmission electron microscopy and magnetic force microscopy images, allied with micromagnetic simulations, were used to correlate the three-dimensional shape of the caps with their domain structures. For smaller spheres (50-100 nm), the caps are segmented into nanopillars (similar or equal to 10 nm) oriented toward the radial direction. For larger spheres (500-1000 nm), the cap is a continuous film with the magnetization forming a vortex at the top of the cap, with a core well larger than the ones observed in planar disks

Physical Review B 77[22]. 2008.

P173-08 "Microstructural and electrical properties of PbTIO3 screen-printed thick films"

Fechine, P. B. A., da Rocha, M. J. S., Santos, M. R. P., Pereira, F. M. M., de Menezes, A. S., Almeida, J. M. A., Goes, J. C., Ayala, A. P., and Sombra, A. S. B.

In this article we will study the structural and electrical properties of PbTiO3 (PTO) screen-printed thick films. These properties can change with synthetic routes employed for synthesis of PTO. The ceramic powder has been synthesized by mechanical alloying and solid state route. This material crystallizes in the tetragonal system, with space group P4mm and unit cell dimensions a = b = 3.904, c = 4.152 angstrom, and Z = 1. From our results, it was observed that PTO obtained by mechanical alloying provides smaller crystallite size. The Rietveld refinement showed that the samples synthesized by mechanical alloying and solid state route crystallize in the tetragonal system but with different cell parameters. The Raman shifts of these films agree with modes from literature. However, some displacements happen, because the morphology and structural characteristics of the thick films are are different, compared to single crystal and thin film. The photomicrographs of the PTO thick films showed that the choice of synthetic routes obtained samples with different microstructures

Journal of Materials Science-Materials in Electronics 19[10], 973-980. 2008.

P174-08 "Network analysis reveals contrasting effects of intraspecific competition on individual vs. population diets"

Araujo, M. S., Guimaraes, P. R., Svanback, R., Pinheiro, A., Guimaraes, P., Dos Reis, S. F., and Bolnick, D. I.

Optimal foraging theory predicts that individuals should become more opportunistic when intraspecific competition is high and preferred resources are scarce. This density-dependent diet shift should result in increased diet breadth for individuals as they add previously unused prey to their repertoire. As a result, the niche breadth of the population as a whole should increase. In a recent study, R. Svanback and D. I. Bolnick confirmed that intraspecific competition led to increased population diet breadth in threespine stickleback (Gasterosteus aculeatus). However, individual diet breadth did not expand as resource levels declined. Here, we present a new method based on complex network theory that moves beyond a simple measure of diet breadth, and we use the method to reexamine the stickleback experiment. This method reveals that the population as a whole added new types of prey as stickleback density was increased. However, whereas foraging theory predicts that niche expansion is achieved by individuals accepting new prey in addition to previously preferred prey, we found that a subset of individuals ceased to use their previously preferred prey, even though other members of their population continued to specialize on the original prey types. As a result, populations were subdivided into groups of ecologically similar individuals, with diet variation among groups reflecting phenotype-dependent changes in foraging behavior as prey density declined. These results are consistent with foraging theory if we assume that quantitative trait variation among consumers affects prey preferences, and if cognitive constraints prevent individuals from continuing to use their formerly preferred prey while adding new rey

Ecology 89[7], 1981-1993. 2008.

P175-08 "New analyses of Double-Bang events in the atmosphere"

Moura, C. A. and Guzzo, M. M.

We use CORSIKA+Herwig simulation code to produce ultra-high energy neutrino interactions in the atmosphere. Our aim is to reproduce extensive air showers originated by extragalactic tau-neutrinos. For charged current tau-neutrino interactions in the atmosphere, beside the air shower originated from the neutrino interaction, it is expected that a tau is created and may decay before reaching the ground. That phenomenon makes possible the generation of two related extensive air showers, the so called Double-Bang event. We make an analysis of the main characteristics of Double-Bang events in the atmosphere for mean values of the parameters involved in such phenomenon, like the inelasticity and tau decay length. We discuss what may happen for the "out of the average" cases and conclude that it may be possible to observe this kind of event in ultra-high energy cosmic ray observatories such as Pierre Auger or Telescope Array

Brazilian Journal of Physics 38[2], 219-226. 2008.

P176-08 Óptica Pré-colombina Del Perú

José J. Lunazzi

Archaeological American mirrors are common findings and lhe images obtained with them are often described by archaeologists as possessing high quality. However, photographs attesting this fact are rare, if any. To lhe best ofmy knowledge, only two papers show that quality concerning lhe Olmeca culture, and only one ofthem mentions lhe pre-lnca cultures case. Certainly more images are needed to increase awareness ofthe importance ofthe existence ofsophisticated imaging elements, particularly when evaluating the cultural degree ofthe pre-Columbian civilizations In this paper we show images made in furte museums in Lima, Peru, by means of mirrors and the lens action on a necklace elemento

Vol 24, No. ~ (2007) p. 170-174 Rev. Cub. de Física

P177-08 "Oxygen etching mechanism in carbon-nitrogen (CNx) domelike nanostructures"

Acuna, J. J. S., Figueroa, C. A., Biggemann, D., Kleinke, M. U., and Alvarez, F.

We report a comprehensive study involving the ion beam oxygen etching purification mechanism of domelike carbon nanostructures containing nitrogen. The CNx nanodomes were prepared on Si substrate containing nanometric nickel islands catalyzed by ion beam sputtering of a carbon target and assisting the deposition by a second nitrogen ion gun. After preparation, the samples were irradiated in situ by a low energy ion beam oxygen source and its effects on the nanostructures were studied by x-ray photoelectron spectroscopy in an attached ultrahigh vacuum chamber, i.e., without atmospheric contamination. The influence of the etching process on the morphology of the samples and structures was studied by atomic force microscopy and field emission gun-secondary electron microscopy, respectively. Also, the nanodomes were observed by high resolution transmission electron microscopy. The oxygen atoms preferentially bond to carbon atoms by forming terminal carbonyl groups in the most reactive parts of the nanostructures. After the irradiation, the remaining nanostructures are grouped around two well-defined size distributions. Subsequent annealing eliminates volatile oxygen compounds retained at the surface. The oxygen ions mainly react with nitrogen atoms located in pyridinelike structures. (C) 2008 American Institute of Physics

Journal of Applied Physics 103[12]. 2008.

P178-08 "Photo-electromotive-force from volume speckle pattern vibration with large amplitude"

dos Santos, T. O., Launay, J. C., and Frejlich, J.

We report an accurate mathematical model describing the photo-electromotive-force signal produced by a speckle pattern of light vibrating in the volume of a photorefractive crystal with a large transverse amplitude. Our model shows that, for vibrations much faster than the material response time, the first harmonic term of the photo-electromotive-force signal exhibits a maximum at a characteristic value of the vibration-amplitude-to-speckle-size ratio that depends on the dark-to-photoconductivity ratio in the material. The theoretical results are in good agreement with experimental data from a vanadium-doped photorefractive CdTe (CdTe:V) crystal under 1064 nm wavelength illumination. (C) 2008 American Institute of Physics

Journal of Applied Physics 103[11]. 2008.

P179-08 "Planar and non-planar ion acoustic shock waves in electron-positron-ion plasmas"

Masood, W., Jehan, N., Mirza, A. M., and Sakanaka, P. H.

Ion acoustic shock waves (IASW's) are studied in an unmagnetized plasma consisting of electrons, positrons and adiabatically hot positive ions. This is done by deriving the Kortweg-deVries-Burger (KdVB) equation under the small amplitude perturbation expansion method. The dissipation is introduced by taking into account the kinematic viscosity among the plasma constituents. It is found that the strength of ion acoustic shock wave is maximum for spherical, intermediate for cylindrical, and minimum for planar geometry. It is observed that the positron concentration, ratio of ion to electron temperature, and the plasma kinematic viscosity significantly modifies the shock structure. Finally, it is found that the temporal evolution of the non-planar IASW's is quite different by comparison with the planar geometry. The relevance of the present study with regard to the dense astrophysical environments is also pointed out. (C) 2008 Elsevier B.V. All rights reserved

Physics Letters A 372[23], 4279-4282. 2008.

P180-08 "Plasma enhanced chemical vapor deposition of titanium(IV) ethoxide-oxygen-helium mixtures"

Durrant, S. F., da Cruz, N. C., Rangel, E. C., and de Moraes, M. A. B.

Thin films were deposited by plasma enhanced chemical vapor deposition from titanium (IV) ethoxide (TEOT)-oxygen-helium mixtures. Actinometric optical emission spectroscopy was used to obtain the relative plasma concentrations of the species H, CH, O and CO as a function of the percentage of oxygen in the feed, R-ox. The concentrations of these species rise with increasing R-ox and tend to fall for R-ox greater than about 45%. As revealed by a strong decline in the emission intensity of the actinometer Ar as R-ox was increased, the electron mean energy or density (or both) decreased as greater proportions of oxygen were fed to the chamber. This must tend to reduce gas-phase fragmentation of the monomer by plasma electrons. As the TEOT flow rate was fixed, however, and since the species H and CH do not contain oxygen, the rise in their plasma concentrations with increasing R-ox is explained only by intermediate reactions involving oxygen or oxygen-containing species. Transmission infrared (IRS) and X-ray photoelectron (XPS)spectroscopies were employed to investigate film structure and composition. The presence of CH2, CH3, C=C, C-O and C=O groups was revealed by IRS. In addition, the presence of C-O and C=O groups was confirmed by XPS, which also revealed titanium in the +4 valence state. The Ti content of the films, however, was found to be much less than that of the monomer material itself. (C) 2007 Elsevier B.V. All rights reserved

Thin Solid Films 516[15], 4940-4945. 2008.

P181-08 "Polarization effects on low-energy electron collisions with propane"

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

We employed the Schwinger multichannel method to compute elastic cross sections for low-energy electron collisions with propane (C_3H_8). The calculations are carried out within the static-exchange and static-exchange plus polarization approximations and covered the energy range from 0 to 15 eV. The computed differential cross sections show good agreement with the experiment, and the computed integral cross sections present the same shape as the measured total cross sections. We found a broad structure in the integral cross section around 8.5 eV and also a Ramsauer-Townsend minimum around 0.1 eV. These results are in agreement with the experimental observations

Physical Review A 77[5]. 2008.

P182-08 "Pressure-induced changes in the magnetic and magnetocaloric properties of RMn2Ge2 (R=Sm,Gd)"

Kumar, P., Suresh, K. G., Nigam, A. K., Magnus, A., Coelho, A. A., and Gama, S.

We have studied the variation of magnetic and magnetocaloric properties of polycrystalline compounds SmMn2Ge2 and GdMn2Ge2 as a function of applied hydrostatic pressure. Themagnetic transition temperatures are found to change considerably with pressure. The temperature regime of existence of antiferromagnetic (AFM) ordering is found to increase with pressure, in both the compounds. In SmMn2Ge2, the sign of the magnetocaloric effect at the low-temperature ferromagnetic (FM)-AFM transition changes with pressure. The isothermal magnetic entropy change in this compound is found to increase by about 20 times as the pressure is increased from the ambient value to 6.8 kbar. Effect of pressure in GdMn2Ge2 is less compared to that in SmMn2Ge2. The variations in the magnetic and magnetocaloric properties are attributed to the changes in the magnetic state of the Mn sublattice under pressure.

The difference in R-Mn coupling in Sm and Gd compounds is also found to play a role in determining the magnetic and magnetocaloric properties, both at ambient as well as under applied pressures

Physical Review B 77[22]. 2008.

P183-08 "Probing the electronic structure of pure and doped CeMIn5 (M=Co,Rh,Ir) crystals with nuclear quadrupolar resonance"

Rusz, J., Oppeneer, P. M., Curro, N. J., Urbano, R. R., Young, B. L., Lebegue, S., Pagliuso, P. G., Pham, L. D., Bauer, E. D., Sarrao, J. L., and Fisk, Z.

We report calculations of the electric-field gradients (EFGs) in pure and doped CeMIn5 (M=Co, Rh, and Ir) compounds and compare with experiment. The degree to which the Ce 4f electron is localized is treated within various models: the local-density approximation, generalized gradient approximation (GGA), GGA+U, and 4f-core approaches. We find that there is a correlation between the observed EFG and whether the 4f electron participates in the band formation or not. We also find that the EFG evolves linearly with Sn doping in CeRhIn5, suggesting the electronic structure is modified by doping. In contrast, the observed EFG in CeCoIn5 doped with Cd changes little with doping. These results indicate that nuclear quadrupolar resonance is a sensitive probe of electronic structure

Physical Review B 77[24]. 2008.

P184-08 "Relativistic tunneling and accelerated transmission"

Bernardini, A. E.

We obtain the solutions for the tunneling zone of a one-dimensional electrostatic potential in the relativistic (Dirac to Klein-Gordon) wave equation regime when the incoming wave packet exhibits the possibility of being almost totally transmitted through the potential barrier. The conditions for the occurrence of accelerated and, eventually, superluminal tunneling transmission probabilities are all quantified and the problematic superluminal interpretation originated from the study based on non-relativistic dynamics of tunneling is reevaluated. The treatment of the problem suggests revealing insights into condensed-matter experiments using electrostatic barriers in single- and bi-layer graphenes, for which the accelerated tunneling effect deserves a more careful investigation

Journal of Physics A-Mathematical and Theoretical 41[21]. 2008.

P185-08 "Role of interparticle interactions on the magnetic behavior of Mg0.95Mn0.05Fe2O4 ferrite nanoparticles"

Sharma, S. K., Kumar, R., Kumar, S., Knobel, M., Meneses, C. T., Kumar, V. V. S., Reddy, V. R., Singh, M., and Lee, C. G.

We present here a detailed investigation of the static and dynamic magnetic behavior of a Mg0.95Mn0.05Fe2O4 spinel ferrite nanoparticle system synthesized by high-energy ball milling of almost identical particle size distributions (< D > = 4.7, 5.1 and 6.0 +/- 0.6 nm). The samples were characterized by using x-ray diffraction, Mossbauer spectroscopy, dc magnetization and frequency dependent real. chi'(T) and imaginary chi ''(T) parts of ac susceptibility measurements. The zero-field-cooled (ZFC) and field-cooled (FC) magnetization have been recorded in a low field and show a behavior typical of superparamagnetic particles above a temperature of 185 +/- 5 K, which is further supported from the temperature dependent Mossbauer measurements. The fact that the blocking temperature calculated from the ZFC magnetization and Mossbauer data are almost similar gives a clear indication of the interparticle interactions among these nanoparticle systems. This is further supported from the FC magnetization curves, which are almost flat below a certain temperature (less than the blocking temperature), as compared with the monotonically increasing behavior characteristics of non-interacting superparamagnetic particles. A shift of the blocking temperature with increasing frequency was observed in the real. chi'(T) and imaginary. chi ''(T) parts of the ac susceptibility measurements. The analysis of the results shows that the data fit well with the Vogel-Fulcher law, whereas trials using the Neel -Brown and power law are unproductive. The role of magnetic interparticle interactions on the magnetic behavior, namely superparamagnetic relaxation time and magnetic anisotropy, are discussed

Journal of Physics-Condensed Matter 20[23]. 2008.

P186-08 Simple experiments demonstrating some properties of diffractive tens and spiral gratings

José J. Lunazzi (*), Daniel S. F. Magalhães, Maria C. I. Amon, Noemi I. R. Rivera

We introduce some new experiments where light diffraction is demonstrated with simple elements: white light diffraction with a coin, construction ofa diffractive lens by holography, diffraction properties in digital discs and an

interesting experiment that generates images with them. This experiments lead to the idea of a new optics that is entirely diffractive, which is a trem in development for its construction facilities, weight reduction and other benefits it causes.

P187-08 "Spin alignment measurements of the K*(0)(892) and phi(1020) vector mesons in heavy ion collisions at root S-NN=200 GeV"

Abelev, B. I., Aggarwal, M. M., Ahammed, Z., Anderson, B. D., Arkhipkin, D., Averichev, G. S., Bai, et all

We present the first spin alignment measurements for the K*(0)(892) and phi(1020) vector mesons produced at midrapidity with transverse momenta up to 5 GeV/c at root s(NN) = 200 GeV at RHIC. The diagonal spin-density matrix elements with respect to the reaction plane in Au+Au collisions are rho(00) = 0.32 +/- 0.04 (stat) +/- 0.09 (syst) for the K*(0) (0.8 < p(T) < 5.0 GeV/c) and rho(00) = 0.34 +/- 0.02 (stat) +/- 0.03 (syst) for the phi (0.4 < p(T) < 5.0 GeV/c) and are constant with transverse momentum and collision centrality. The data are consistent with the unpolarized expectation of 1/3 and thus no evidence is found for the transfer of the orbital angular momentum of the colliding system to the vector-meson spins. Spin alignments for K-*0 and phi in Au+Au collisions were also measured with respect to the particle's production plane. The phi result, rho(00) = 0.41 +/- 0.02 (stat) +/- 0.04 (syst), is consistent with that in p+p collisions, rho(00) = 0.39 +/- 0.03 (stat) +/- 0.06 (syst), also measured in this work. The measurements thus constrain the possible size of polarization phenomena in the production dynamics of vector mesons

P188-08 "Structural and morphological investigation of magnetic nanoparticles based on iron oxides for biomedical applications"

Haddad, P. S., Martins, T. M., Souza-Li, L., Li, L. M., Metze, K., Adam, R. L., Knobel, M., and Zanchet, D.

The present work reports the synthesis, characterization and properties of magnetic iron oxidenanoparticles for biomedical applications, correlating the nanoscale tunabilities in terms of size, structure, and magnetism. Magnetic nanoparticles in different conditions were prepared through thermal decomposition of Fe(acac)3 in the presence of 1,2 hexadecanodiol (reducing agent) and oleic acid and oleylamine (ligands) in a hot organic solvent. The 2,3-dimercaptosuccinic acid (DMSA) was exchanged onto the nanocrystal surface making the particles stable in water. Nanoparticles were characterized by X-ray diffraction (XRD) measurements, small angle X-ray scattering (SAXS) and transmission electron microscopy (TEM). Preliminary tests of incorporation of these nanoparticles in cells and their magnetic resonance image (MRI) were also carried out. The magnetization characterizations were made by isothermal magnetic measurements. (c) 2007 Elsevier B.V. All rights reserved

P189-08 "Structural, microstructural and magnetic investigations in high-energy ball milled BiFeO3 and Bi0.95Eu0.05FeO3 powders"

Freitas, V. F., Grande, H. L. C., de Medeiros, S. N., Santos, I. A., Cotica, L. F., and Coelho, A. A.

In this paper, synthesis, structural, microstructural and magnetic properties of high-energy ball milled BiFeO3 and Bi0.95Eu0.05FeO3 powders were thoroughly investigated through X-ray diffraction, scanning electron microscopy, Mossbauer spectroscopy and magnetization measurements. Single-phased compounds were processed by using both mechanosynthesis and post-milling annealing. The set of results did not indicate considerable alterations in the magnetic ordering of the powders, even though their ordering temperature, magnetization and coercivity were highly sensitive to the narrow grain sizes distribution of nanograins and substituting Eu ion. In addition, we have shown that enhanced magnetic properties of BiFeO3 could be achieved by a low degree of Eu substitution, yet preserving the structural and microstructural characteristics of the processed powders. (c) 2007 Elsevier B.V. All rights reserved

P190-08 "Sugarcane energy use: The Cuban case"

Alonso-Pippo, W., Luengo, C. A., Koehlinger, J., Garzone, P., and Cornacchia, G.

This paper examines the history, methods, costs, and future prospects of Cuba's attempts to develop the energy potential of sugarcane. An overview of the main factors affecting the current sugarcane agro-industry in Cuba is provided, along with an analysis of why, despite attempts by the Cuban government to revive the country's sugarcane agro-industry, the industry continues to decline. The prevailing conditions and degree of modernization in Cuban sugar factories are evaluated. The sugar-agro industry's main production bottlenecks are studied. The fall in sugarcane yield from 57.5 ton/ha in 1991 to 22.4 ton/ha in 2005 and its relation to land use is explained. The socio-economic impact of the sugarcane agro-industry's downsizing is assessed. The governmental and quasi-governmental entities in charge of sugarcane energy use development and the country's legal framework are analyzed. The Cuban sugarcane agro-industry's opportunities in the growing international biofuels and bioenergy market are evaluated. To situate Cuba within the global bioenergy market, international best practices relating to the production and commercialization of biofuels are examined to determine the degree to which these experiences can be transferred to Cuba. The analysis of the Cuba sugar industry's biofuel potential is based on a comparative technical-economic assessment of three possible production scenarios: (1) the current situation, where only sugar is produced; (2) simultaneous production of sugar-anhydrous anhydrous ethanol; and (3) production of sugar-ethanol and simultaneous generation of surplus electricity exported to a public grid. Some of the key assumptions underlying these analyses are as follows: Ethanol production and operation costs for a 7000 ton/day-sugar mill are estimated to be 0.25 and 0.23 USD/l, respectively. The influence of gasoline prices on sugar-ethanol production is also assessed. The kWh production and operation costs starting from sugarcane bagasse are estimated at 0.06 and 0.04 USD, respectively. Cuba's potential Sugarcane cogeneration capacity is estimated to be 9006 GWh/year. Investment-profit analyses are offered for two scenarios: annexing a 300,000 l/day distillery to a sugar mill, and enlarging the cogeneration capacity of a 7000 ton/day mill. Added production cost/added-value analysis was carried out. The main environmental issues associated with sugarcane-based fuel production are also analyzed. (C) 2008 Elsevier Ltd. All rights reserved

P191-08 "Supercontinuum generation in a water-core photonic crystal fiber"

Bozolan, A., de Matos, C. J. S., Cordeiro, C. M. B., dos Santos, E. M., and Travers, J.

Supercontinuum generation is demonstrated in a 5-cm-long water-core photonic crystal fiber pumped near water's zero-dispersion wavelength. Up to 500-nm spectral width (evaluated at -20 dB from the peak) is achieved, while spectral widths were over 4 times narrower with a bulk setup at the same wavelength and peak power, and over 3 times narrower if the PCF was pumped away from the zero-dispersion wavelength. The supercontinuum generation mechanisms for bulk and waveguide setups are compared and tuning of the zero-dispersion wavelength via waveguide dispersion is theoretically investigated. (c) 2008 Optical Society of America

P192-08 "Symmetry controlled spin polarized conductance in Au nanowires"

Pontes, R. B., da Silva, E. Z., Fazzio, A., and Silva, A. J. R.

The fact that the resistance of propagating electrons in solids depends on their spin orientation has led to a new field called spintronics. With the parallel advances in nanoscience, it is now possible to talk about nanospintronics. Many works have focused on the study of charge transport along nanosystems, such as carbon nanotubes, graphene nanoribbons, or metallic nanowires, and spin dependent transport properties at this scale may lead to new behaviors due to the manipulation of a small number of spins. Metal nanowires have been studied as electric contacts where atomic and molecular insertions can be constructed. Here we describe what might be considered the ultimate spin device, namely, a Au thin nanowire with one Co atom bridging its two sides. We show that this system has strong spin dependent transport properties and that its local symmetry can dramatically change them, leading to a significant spin polarized conductance

P193-08 "Theoretical correlation between possible evidences of neutrino chiral oscillations and polarization measurements"

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

Reporting about the formalism with the Dirac equation we describe the dynamics of chiral oscillations for a fermionic particle non-minimally coupling with an external magnetic field. For massive particles, the chirality and helicity quantum numbers represent different physical quantities of representative importance in the study of chiral interactions, in particular, in the context of neutrino physics. After solving the interacting Hamiltonian (Dirac) equation for the corresponding fermionic Dirac-type particle (neutrino) and helicity quantum numbers represent different physical quantities of representative importance in the study of chiral interactions,

in particular, in the context of neutrino physics. After solving the interacting Hamiltonian (Dirac) equation for the corresponding fermionic Dirac-type particle (neutrino) and quantifying chiral oscillations in the Dirac wave packet framework, we avail the possibility of determining realistic neutrino chirality conversion rates by means of (helicity) polarization measurements. We notice that it can become feasible for some particular magnetic field configurations with large values of B orthogonal to the direction of the propagating particle

P194-08 "Tuning the pressure-induced superconducting phase in doped CeRhIn5"

Ferreira, L. M., Park, T., Sidorov, V., Nicklas, M., Bittar, E. M., Lora-Serrano, R., Hering, E. N., Ramos, S. M., Fontes, M. B., Baggio-Saitovich, E., Lee, H. O., Sarrao, J. L., Thompson, J. D., and Pagliuso, P. G.

Pressure- and temperature-dependent heat capacity and electrical resistivity experiments on Sn- and La-doped CeRhIn5 are reported for two samples with specific concentrations, Ce0.90La0.10RhIn5 and CeRhIn4.84Sn0.16, which present the same T-N=2.8 K. The obtained P-T phase diagrams for doped CeRhIn5 compared to that for the pure compound show that Sn doping shifts the diagram to lower pressures while La doping does exactly the opposite, indicating that the important energy scale to define the pressure range for superconductivity in CeRhIn5 is the strength of the on-site Kondo coupling

P195-08 "Two-dimensional photonic crystals in antimony-based films fabricated by holography"

Nalin, M., Menezes, J. W., Cescato, L., Braga, E. S., Hernandez-Figueroa, H., Ribeiro, S. J. L., Messaddeq, Y., and Li, M. S.

In this work, we demonstrated the fabrication of two-dimensional (2D) photonic crystals layers (2D-PCLs) by combining holographic recording and the evaporation of antimony-based glasses. Such materials present high refractive indices that can be tuned from 1.8 to 2.4, depending on the film composition; thus, they are interesting dielectric materials for fabrication of 2D-PCLs. The good quality of the obtained samples allowed the measurement of their PC properties through the well-defined Fano resonances that appear in the transmittance spectrum measurements at different incidence angles. The experimental results are in good agreement with the calculated band diagram for the hexagonal asymmetric structure. (C) 2008 American Institute of Physics

P196-08 "Upper limit on the cosmic-ray photon flux above 10(19) eV using the surface detector of the Pierre Auger Observatory"

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

A method is developed to search for air showers initiated by photons using data recorded by the surface detector of the Auger Observatory. The approach is based on observables sensitive to the longitudinal shower development, the signal risetime and the curvature of the shower front. Applying this method to the data, tipper limits on the flux of photons of 3.8 x 10(-3), 2.5 x 10(-3), and 2.2 x 10(-3) km(-2) sr(-1) yr(-1) above 10(19) eV, 2 x 10(19) eV, and 4 x 10(19) eV are derived, with corresponding limits on the fraction of photons being 2.0%, 5.1%, and 31% (all limits at 95% c.l.). These photon limits disfavor certain exotic models of sources of cosmic rays. The results also show that the approach adopted by the Auger Observatory to calibrate the shower energy is not strongly biased by a contamination from photons.

P197-08 "Upper limit on the diffuse flux of ultrahigh energy tau neutrinos from the Pierre Auger Observatory"

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

The surface detector array of the Pierre Auger Observatory is sensitive to Earth-skimming tau neutrinos that interact in Earth's crust. Tau leptons from nu(tau) charged-current interactions canemerge and decay in the atmosphere to produce a nearly horizontal shower with a significant electromagnetic component. The data collected between 1 January 2004 and 31 August 2007 are used to place an upper limit on the diffuse flux of nu(tau) at EeV energies. Assuming an E-nu(-2) differential energy spectrum the limit set at 90% C. L. is E(nu)(2)dN(nu tau)/dE(nu) < 1: 3 x 10(-7) GeV cm(-2) s(-1) sr(-1) in the energy range 2 x 10(17) eV< E-nu < 2 x 10(19) eV