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Trabalhos Publicados

[P188-11] "An experimental and theoretical investigation into positron and electron scattering from formaldehyde"

Zecca, A., Trainotti, E., Chiari, L., Garcia, G., Blanco, F., Bettega, M. H. F., Varella, M. T. D., Lima, M. A. P., Brunger, M. J.

We report on measurements of total cross sections (TCSs) for positron scattering from the fundamental organic molecule formaldehyde (CH_2O). The energy range of these measurements was 0.26-50.3 eV, whereas the energy resolution was similar to 260 meV. To assist us in interpreting these data, Schwinger multichannel level calculations for positron elastic scattering from CH_2O were also undertaken (0.5-50 eV). These calculations, incorporating an accurate model for the target polarization, are found to be in good qualitative agreement with our measured data. In addition, in order to compare the behaviour of positron and electron scattering from this species, independent atom model-screened additivity rule theoretical electron TCSs, now for energies in the range 1-10 000 eV, are also reported.

[P189-11] "Anderson localization and Brewster anomalies in photonic disordered quasiperiodic lattices"

Reyes-Gomez, E., Bruno-Alfonso, A., Cavalcanti, S. B., Oliveira, L. E.

A comprehensive study of the properties of light propagation through one-dimensional photonic disordered quasiperiodic superlattices, composed of alternating layers with random thicknesses of air and a dispersive metamaterial, is theoretically performed. The superlattices consist of the successive stacking of N quasiperiodic Fibonacci or Thue-Morse heterostructures. The width of the slabs in the photonic superlattice may randomly fluctuate around its mean value, which introduces a structural disorder into the system. It is assumed that the left-handed layers have a Drude-type dispersive response for both the dielectric permittivity and magnetic permeability, and Maxwell's equations are solved for oblique incidence by using the transfer-matrix formalism. The influence of both quasiperiodicity and structural disorder on the localization length and Brewster anomalies are thoroughly discussed.

[P190-11] "Application of manganese (II) phthalocyanine synthesized in situ in the SiO(2)/SnO(2) mixed oxide matrix for determination of dissolved oxygen by electrochemical techniques"

Santos, L. S. S., Landers, R., Gushikem, Y.

This work describes the in situ immobilization of Mn(II) phthalocyanine (MnPc) in a porous SiO_2/SnO_2 mixed oxide matrix obtained by the sol gel processing method. The chemically modified matrix SiO_2/SnO_2/MnPc, possessing an estimated amount of 8×10^{-10} mol cm^{-2} of MnPc on the surface, was used to prepare an electrode to analyze dissolved oxygen in water by an electrochemical technique. The electrode was prepared by mixing the material with ultrapure graphite and evaluated using differential pulse voltammetry. Dissolved O_2 was reduced at -0.31 V with a limit of detection (LOD) equal to 7.0×10^{-4} mmol L^{-1}. A mechanism involving four electrons in O_2 reduction was determined by the rotating disk electrode technique. (C) 2011 Published by Elsevier B.V.

[P191-11] "Characterization of the time-dependent L-asparagine monohydrate crystal phase transition"

De Menezes, A. S., Ardito, F. M., dos Santos, A. O., Moreno, A. J. D., Lima, R. J. C., Hayashi, M. A., Cardoso, L. P.

The high-temperature phase transition of single crystals of l-asparagine monohydrate was investigated by X-ray diffraction in association with Rietveld refinement and dilatometer measurements as a function of annealing time. The X-ray results showed that, for samples annealed at 343 K (or even 333 K) for 5 h, the expected anhydrous l-asparagine phase has been formed, monoclinic system (space group P2(1)), with lattice parameters a = 5.0677 (2), b = 6.7657 (2), c = 8.0742 (3) angstrom and beta = 91.276 (4)degrees. The results obtained from measurements as a function of annealing time confirmed that the phase transition associated with loss of the water molecule is time dependent.

[P192-11] "Cold Welding of Gold and Silver Nanowires: A Molecular Dynamics Study"

Pereira, Z. S., da Silva, E. Z.

Recently a new possibility of welding was experimentally shown in the case of gold nanowires (NWs) at ambient temperatures, without need of additional heat and with low pressures, called cold welding (Nat, Nanotechnol. 2010, 5, 218). Using molecular dynamics with effective potentials, we present the simulated cold welding of gold, silver, and silver-gold NWs with diameters of 4.3 nm at 300 K. We show the cold welding is a possible process in metal NWs and that these welded NWs, even after losing their crystalline structure after breaking, can reconstruct their face-centered cubic structure during the welding process with the result of very few defects for the final cold welded NWs. The stress tensor shows a low average value during welding with oscillations indicating tension and relaxation stages. Small pressures are required for the process to occur, resulting in a fairly perfect crystal structure for the final NW after being broken and welded. Cold welding is the result of nanoscale sample dimensions and mechanically assisted fast surface-atom diffusion. We also showed that the process occurs using different metals welded together and that the quality of the welding (resistance to rupture) of Ag-Au NW is good. Our results are in good agreement with the experiments.

[P193-11] "Connection among spacecrafts and ground level observations of small solar transient events An overview of small solar transient events observed at ground"

Augusto, C. R. A., Fauth, A. C., Navia, C. E., Shigeouka, H., Tsui, K. H.

An overview of the results of the search for small solar transient events, in association with muon enhancements (deficits) registered at ground-level by the Tupi muon telescopes, is presented. Among the events, there are three interplanetary shocks and two solar flares of small scale whose X-ray emission flux is much smaller than 10^{-5} W m^{-2} at 1 AU (GOES-Tupi connection). Two of the interplanetary shocks are cataloged as corotating interaction region and the third shock is due to the passage of a CME (coronal mass ejection) ejecta (ACE and SOHO-Tupi connection) in the Earth's proximities. In most cases, the particles excess (deficit) coming from these events have only been observed with spacecraft instruments. However, the Tupi telescopes are located at sea level and within the South Atlantic Anomaly (SAA), a region where the shielding effect of the magnetosphere is not perfectly spherical and shows a 'dip'.

This fact enables the muon telescopes to achieve a low rigidity of response to primary and secondary charged particles (>= 0.1 GV). Muon excesses (deficits) with significances above 4 sigma have been found. These events observed at ground admit a temporal correlation with solar transient events observed by spacecrafts, which suggests strongly a real connection between them. Details of these observations are reported.

[P194-11] "Direct measurement of tissue blood flow and metabolism with diffuse optics"

Mesquita, R. C., Durduran, T., Yu, G. Q., Buckley, E. M., Kim, M. N., Zhou, C., Choe, R., Sunar, U., Yodh, A. G.

Diffuse optics has proven useful for quantitative assessment of tissue oxy- and deoxyhaemoglobin concentrations and, more recently, for measurement of microvascular blood flow. In this paper, we focus on the flow monitoring technique: diffuse correlation spectroscopy (DCS). Representative clinical and pre-clinical studies from our laboratory illustrate the potential of DCS. Validation of DCS blood flow indices in human brain and muscle is presented. Comparison of DCS with arterial spin-labelled MRI, xenon-CT and Doppler ultrasound shows good agreement ($0.50 < r < 0.95$) over a wide range of tissue types and source detector distances, corroborating the potential of the method to measure perfusion non-invasively and in vivo at the microvasculature level. Alloptical measurements of cerebral oxygen metabolism in both rat brain, following middle cerebral artery occlusion, and human brain, during functional activation, are also described. In both situations, the use of combined DCS and diffuse optical spectroscopy/near-infrared spectroscopy to monitor changes in oxygen consumption by the tissue is demonstrated. Finally, recent results spanning from gene expression-induced angiogenic response to stroke care and cancer treatment monitoring are discussed. Collectively, the research illustrates the capability of DCS to quantitatively monitor perfusion from bench to bedside, providing results that match up both with literature findings and with similar experiments performed with other techniques.

[P195-11] "Elastic constants of hcp (4)He: Path-integral Monte Carlo results versus experiment"

Ardila, L. A. P., Vitiello, S. A., de Koning, M.

The elastic constants of hcp (4)He are computed using the path-integral Monte Carlo (PIMC) method. The stiffness coefficients are obtained by imposing different distortions to a periodic cell containing 180 atoms, followed by measurement of the elements of the corresponding stress tensor. For this purpose an appropriate path-integral expression for the stress tensor observable is derived and implemented into the PIMC++ package. In addition to allowing the determination of the elastic stiffness constants, this development also opens the way to an explicit atomistic determination of the Peierls stress for dislocation motion using the PIMC technique. A comparison of the results to available experimental data shows an overall good agreement of the density dependence of the elastic constants, with the single exception of C(13). Additional calculations for the bcc phase, on the other hand, show good agreement for all elastic constants.

[P196-11] "Electromagnetically induced grating with maximal atomic coherence"

Carvalho, S. A., de Araujo, L. E. E.

We describe theoretically an atomic diffraction grating that combines an electromagnetically induced grating with a coherence grating in a double-Lambda atomic system. With the atom in a condition of maximal coherence between its lower levels, the combined gratings simultaneously diffract both the incident probe beam as well as the signal beam generated through four-wave mixing. A special feature of the atomic grating is that it will diffract any beam resonantly tuned to any excited state of the atom accessible by a dipole transition from its ground state.

[P197-11] "Electron spin resonance study of the LaIn(3-x)Sn(x) superconducting system"

Bittar, E. M., Adriano, C., Giles, C., Rettori, C., Fisk, Z., Pagliuso, P. G.

The LaIn(3-x)Sn(x) alloy system is composed of superconducting Pauli paramagnets. For LaIn(3) the superconducting critical temperature T(c) is approximately 0.7 K and it shows an oscillatory dependence as a function of Sn substitution, presenting its highest value T(c) approximate to 6 : 4 K for the LaSn(3) end member. The superconducting state of these materials was characterized as being of the conventional type. We report our results for Gd(3+) electron spin resonance measurements in the LaIn(3-x)Sn(x) compounds as a function of x. We show that the effective exchange interaction parameter J(fs) between the Gd(3+) 4f local moment and the s-like conduction electrons is almost unchanged by Sn substitution and observe microscopically that LaSn(3) is a conventional superconductor.

[P198-11] "Electronic properties of Fibonacci and random Si-Ge chains"

Vasconcelos, M. S., Azevedo, D. L., Hadad, A., Galvao, D. S.

In this paper we address a theoretical calculation of the electronic spectra of an Si-Ge atomic chain that is arranged in a Fibonacci quasi-periodic sequence, by using a semi-empirical quantum method based on the Huckel extended model. We apply the Fibonacci substitutional sequences in the atomic building blocks A(Si) and B(Ge) through the inflation rule or a recursion relation. In our ab initio calculations we use only a single point, which is sufficient for considering all the orbitals and charge distribution across the entire system. Although the calculations presented here are more complete than the models adopted in the literature which take into account the electronic interaction only up to the second and third neighbors, an interesting property remains in their electronic spectra: the fractality (which is the main signature of this kind of system). We discuss this fractality of the spectra and we compare them with the random arrangement of the Si-Ge atomic chain, and with previous results based on the tight-binding approximation of the Schrodinger equation considering up to the nearest neighbor.

[P199-11] "Electro-optic coefficient and wavelength dispersion in sillenite crystals"

De Oliveira, I., dos Santos, T. O., Carvalho, J. F., Frejlich, J.

We report on the measurement of the electro-optic or Pockels coefficient of titanosillenite crystals and show that there is no sensible wavelength dispersion, at least in the explored 510-650 nm wavelength range. This result is in close agreement with a previous paper by Papazoglou et al.: Appl. Phys. B 65, 499-503 (1997) for titanosillenites but in contradiction with a recent paper by Efremidis et al.: Appl. Phys. B 95, 467-473 (2009) reporting on a large dispersion for sillenite crystals. We stress on the fact that photoinduced space-charge electrical polarization may be at the origin of a misleading apparent wavelength dependence of the electro-optic coefficient.

[P200-11] "Enhanced Eshelby Twist on Thin Wurtzite InP Nanowires and Measurement of Local Crystal Rotation"

Tizei, L. H. G., Craven, A. J., Zagonel, L. F., Tence, M., Stephan, O., Chiaramonte, T., Cotta, M. A., Ugarte, D.

We have performed a detailed study of the lattice distortions of InP wurtzite nanowires containing an axial screw dislocation. Eshelby predicted that this kind of system should show a crystal rotation due to the dislocation induced torque. We have measured the twisting rate and the dislocation Burgers vector on individual wires, revealing that nanowires with a 10-nm radius have a twist up to 100% larger than estimated from elasticity theory. The strain induced by the deformation has a Mexican-hat-like geometry, which may create a tube-like potential well for carriers.

[P201-11] "Ferroelectricity in a quasiamorphous ultrathin BaTiO(3) film"

Wang, J. L., Pancotti, A., Jegou, P., Niu, G., Gautier, B., Mi, Y. Y., Tortech, L., Yin, S., Vilquin, B., Barrett, N.

Until now, the quasiamorphous (QA) phase in BaTiO(3) (BTO), SrTiO(3) (STO), and BaZrO(3) was achieved by pulling a thick film through a steep temperature gradient. Here, we show that a room-temperature deposited ultrathin film, subsequently annealed in O(2) can also produce a QA phase. The atomic, electronic, and ferroelectric (FE) structure of a QA, ultrathin BTO grown on STO were studied by x-ray diffraction (XRD), x-ray photoelectron diffraction (XPD), x-ray photoelectron spectroscopy (XPS), and piezoforce microscopy (PFM). The absence of long-range order is confirmed by in-and out-of-plane XRD as well as Ti 2p XPD. FE polarized domains with good retention have been successfully written into the QA film and exhibit a clear P-E hysteresis loop. Substrate clamping frustrates volume expansion during annealing leading to a QA film. Photoelectron spectroscopy confirms a similar overall electronic structure as for thicker films but with some significant differences. Simple charge-transfer arguments are not sufficient to explain the high-resolution core-level spectra. Ba, Ti, and O all show components associated with a surface region. We suggest that the observation of such a component in the Ti 2p spectrum is linked with the high dynamic charge tensor induced by the large off-center displacement of the Ti ion.

[P202-11] "Improved Search for Muon-Neutrino to Electron-Neutrino Oscillations in MINOS"

Adamson, P., Auty, D. J., Ayres, D. S., Backhouse, C., Barr, G., Betancourt, M., Bishai, M., Blake, A., Bock, G. J., Boehnlein, D. J., Bogert, D.

We report the results of a search for nu(e) appearance in a nu(mu) beam in the MINOS long-baseline neutrino experiment. With an improved analysis and an increased exposure of 8.2 x 10(20) protons on the NuMI target at Fermilab, we find that 2sin(2)(theta(23))sin(2)(2 theta(13)) < 0.12(0.20) at 90% confidence level for delta = 0 and the normal (inverted) neutrino mass hierarchy, with a best-fit of 2sin(2)(theta(23))sin(2)(2 theta(13)) = 0.041(-0.031)(+0.047)(0.079(-0.053)(+0.071)). The theta(13) 0 hypothesis is disfavored by the MINOS data at the 89% confidence level.

[P203-11] "Intrinsic Stability of the Smallest Possible Silver Nanotube"

Autreto, P. A. S., Lagos, M. J., Sato, F., Bettini, J., Rocha, A. R.,Rodrigues, V., Ugarte, D., Galvao, D. S.

Recently, Lagos et al. [Nature Nanotech. 4, 149 (2009)] reported the discovery of the smallest possible Ag nanotube with a square cross section. Ab initio density functional theory calculations strongly support that the stability of these hollow structures is structurally intrinsic and not the result of contamination by light atoms. We also report the first experimental observation of the theoretically predicted corrugation of the hollow structure. Quantum conductance calculations predict a unique signature of 3: 6G(0) for this new family of nanotubes.

[P204-11] "Light propagation and Anderson localization in disordered superlattices containing dispersive metamaterials: Effects of correlated disorder"

Mogilevtsev, D., Pinheiro, F. A., dos Santos, R. R., Cavalcanti, S. B., Oliveira, L. E.

We have investigated the effects of disorder correlations on light propagation and Anderson localization in one-dimensional dispersive metamaterials. We consider and compare the cases where disorder is uncorrelated to situations where it is totally correlated and anticorrelated. The photonic gaps of the corresponding periodic structure are not completely destroyed by the presence of disorder, which leads to minima in the localization length. In the vicinities of a gap, the behavior of the localization length depends crucially on the physical origin of the gap (Bragg or non-Bragg gaps). Within a Bragg gap, the localization length increases as the degree of disorder increases, an anomalous behavior that only occurs for the uncorrelated and completely correlated cases. In these cases, minima of the localization length at the positions of Bragg gaps are shifted by increasing disorder, which does not occur for the anticorrelated case, where the positions of the minima remain unaltered. Minima in the localization length corresponding to non-Bragg gaps are not shifted by increasing disorder, albeit the widths of these minima are changed. We have found that the asymptotic behavior for the localization length xi proportional to lambda(6) for disordered metamaterials is not affected by correlations. Finally, we have investigated the role of absorption on the delocalized Brewster modes and argue that it could be mitigated in light of the state-of-the-art of metamaterials research.

[P205-11] "Magnetic antidot arrays on alumina nanoporous membranes: Rutherford backscattering andmagnetic characterization"

Prieto, P., Pirota, K. R., Climent-Font, A., Vazquez, M., Sanz, J. M.

Highly ordered antidot arrays of permalloy have been prepared by sputtering onto different nanoporous alumina membranes (NAMs) and characterized by Rutherford backscattering spectrometry (RBS), SEM and Vibrating sample magnetometry (VSM). RBS spectrometry combined with SEM image analysis provides information on the in-depth composition and porosity of the different magnetic antidot nanostructures. The coercivity increases in the antidot nanostructures as compared with that of its parent continuous film. The saturation magnetization values of the antidot nanostructures are observed to increase with increasing pore size. Our results suggest an enhanced magnetization at the $Fe(20)Ni(80)/Al(2)O(3)$ interface. Copyright (C) 2011 John Wiley & Sons, Ltd.

[P206-11] **"Magnetoelectric Contribution to Magnetoelastic Coupling in Pb(Fe(1/2)Nb(1/2))O(3) Multiferroics Ceramics"**

Fraygola, B., Frizon, N., Lente, M. H., Coelho, A. A., Garcia, D., Eiras, J. A.

In this work, electrical permittivity, magnetic and anelastic measurements in lead iron niobate ceramics (PFN) were performed in the frequency and temperature range from 1 kHz to 10 MHz and from 15 K to 400 K, respectively. Anelastic results characterized unambiguously the magnetoelectric effect in the PFN, demonstrating that ME coupling arises indirectly via strain contribution rather than a direct coupling between electrical and magnetic order parameters.

[P207-11] **"Mass varying neutrinos in supernovae"**

Rossi-Torres, F., Guzzo, M. M., de Holanda, P. C., Peres, O. L. G.

We study the consequences on the neutrino oscillation parameter space, mixing angle (tan(2)theta) vacuum mass difference (Delta m(0)(2)) when mass varying neutrino (MaVaN) models are assumed in a supernova environment. We consider electronic to sterile channels) nu(e) -> nu(s) and (nu) over bar (e) -> (nu) over bar (s) in two-flavor scenario. In a given model of MaVaN mechanism, we induce a position-dependent effective mass difference, Delta(m) over tilde (2)(r) where r is the distance from the supernova core, that changes the neutrino and antineutrino flavor conversion probabilities. We study the constraints on the mixing angle and vacuum mass difference coming from r-process and the SN1987A data. Our result is the appearance of a new exclusion region for very small mixing angles, tan(2)theta = 10(-6)-10(-2) and small vacuum mass difference, Delta m(0)(2) = 1-20 eV(2), due the MaVaN mechanism.

[P208-11] **"Muon excess at sea level from solar flares in association with the Fermi GBM spacecraft detector"**

Augusto, C. R. A., Navia, C. E., Shigueoka, H., Tsui, K. H., Fauth, A. C.

This paper presents results of an ongoing survey on the association between muon excesses at ground level, registered by the Tupi telescopes, and transient solar events, whose gamma-ray and x-ray emissions were reported by the Fermi Gamma Burst Monitor and the Geostationary Operational Environmental Satellite 14, respectively. We show that solar flares of small scale, those with prompt x-ray emission classified by the Geostationary Operational Environmental Satellite as C-Class with power 10(-6) to 10(-5) Watts m(-2) at 1 AU, may give rise to muon excess probably associated with solar protons and ions emitted by the flare and arriving at the Earth as a coherent particle pulse. The Tupi telescopes are within the central region of the South Atlantic Anomaly, where the geomagnetic field intensity is the lowest on the Earth. Here we argue for the possibility of a "scale-free'' power-law energy spectrum of particles accelerated by solar flares. For energies around and exceeding the pion production, large and small scale flares have the same power-law energy spectrum. The difference is only in the intensity. The Tupi events give support to this conjecture.

[P209-11] **"Optical and spectroscopic properties of soda lime alumino-silicate glasses doped with erbium and silver"**

Carmo, A. P., Bell, M. J. V., Da Costa, Z. M., Anjos, V., Barbosa, L. C., Chillcce, E. F., Giehl, J. M., Pontuschka, W. M.

Spectroscopic properties of Ag/Er co-doped soda lime silicate glasses have been studied with the aim of assessing the effective role of silver as a sensitizer for erbium. Changes in spectroscopic properties of Er(3+) as a function of silver addition to the base composition have been measured. Transmission electron microscopy (TEM), absorption as well as photoluminescence measurements in the visible and infrared spectral region, particularly (4)I(13/2) -> (4)I(15/2) transition of the Er(3+) ion were performed; excitation wavelengths in the range from 325 to 808 nm were used. Enhancement of the Er(3+) luminescence at 1.54 mu m was observed when Ag was added. (C) 2011 Elsevier B.V. All rights reserved.

[P210-11] **"Optical properties of multi-layer type II InP/GaAs quantum dots studied by surface photovoltage spectroscopy"**

Ivanov, T., Donchev, V., Germanova, K., Gomes, P. F., Iikawa, F., Brasil, M. J. S. P., Cotta, M. A.

We present a low-temperature (73 K) study of the optical properties of multi-layer type II InP/GaAs self-assembled quantum dots by means of surface photovoltage (SPV) spectroscopy, taking advantage of its high sensitivity and contactless nature. The samples contain 10 periods of InP quantum dot planes separated by 5 nm GaAs spacers. The SPV amplitude spectra reveal two major broad peaks, situated at low and high energies, respectively. These features are analyzed taking into account the type II character of the structure, the quantum coupling effects, the spectral behavior of the SPV phase, and the photoluminescence spectra. As a result they have been attributed to optical transitions in the quantum dots and the wetting layers, respectively. The main mechanism for carrier separation in the SPV generation process is clarified via the analysis of the SPV phase spectra. The influence of the substrate absorption on the SPV spectra is discussed in details.

[P211-11] **"Phase transitions and spatially ordered counterion association in ionic-lipid membranes: A statistical model"**

Tamashiro, M. N., Barbetta, C., Germano, R., Henriques, V. B.

We propose a statistical model to account for the gel-fluid anomalous phase transitions in charged bilayer- or lamellae-forming ionic lipids. The model Hamiltonian comprises effective attractive interactions to describe neutral-lipid membranes as well as the effect of electrostatic repulsions of the discrete ionic charges on the lipid headgroups. The latter can be counterion dissociated (charged) or counterion associated (neutral), while the lipid acyl chains may be in gel (low-temperature or high-lateral-pressure) or fluid (high-temperature or low-lateral-pressure) states. The system is modeled as a lattice gas with two distinct particle types-each one associated, respectively, with the polar-headgroup and the acyl-chain states-which can be mapped onto an Ashkin-Teller model with the inclusion of cubic terms. The model displays a rich thermodynamic behavior in terms of the chemical potential of counterions (related to added salt concentration) and lateral pressure. In particular, we show the existence of semidissociated thermodynamic phases related to the onset of charge order in the system. This type of order stems from spatially ordered counterion association to the lipid headgroups, in which charged and neutral lipids alternate in a checkerboard-like order. Within the mean-field approximation, we predict that the acyl-chain order-disorder transition is discontinuous, with the first-order line ending at a critical point, as in the neutral case. Moreover, the charge order gives rise to continuous transitions, with the associated second-order lines joining the aforementioned first-order line at critical end points. We explore the thermodynamic behavior of some physical quantities, like the specific heat at constant lateral pressure and the degree of ionization, associated with the fraction of charged lipid headgroups.

[P212-11] "Phase Transitions and Spatially Ordered Counterion Association in Ionic-Lipid Membranes: Theory versus Experiment"

Henriques, V. B., Germano, R., Lamy, M. T., Tamashiro, M. N.

Aqueous dispersions of phosphatidylglycerol (PG) lipids may present an anomalous chain-melting transition at low ionic strengths, as seen by different experimental techniques such as calorimetry or light scattering. The anomaly disappears at high ionic strengths or for longer acyl-chain lengths. In this article, we use a statistical model for the bilayer that distinguishes both lipid chain and headgroup states in order to compare model and experimental thermotropic and electrical properties. The effective van der Waals interactions among hydrophobic chains compete with the electrostatic repulsions between polar headgroups, which may be ionized (counterion dissociated) or electrically neutral (associated with counterions). Electric degrees of freedom introduce new thermotropic charge-ordered phases in which headgroup charges may be spatially ordered, depending on the electrolyte ionic strength, introducing a new rationale for experimental data on PGs. The thermal phases presented by the model for different chain lengths, at fixed ionic strength, compare well with an experimental phase diagram constructed on the basis of differential scanning calorimetry profiles. In the case of dispersions of DMPG (dimyristoyl phosphatidylglycerol) with added monovalent salt, the model properties reproduce the main features displayed by data from differential scanning calorimetry as well as the characteristic profile for the degree of ionization of the bilayer surface across the anomalous transition region, obtained from the theoretical interpretation of electrokinetic (conductivity and electrophoretic mobility) measurements.

[P213-11] "Photostability of amino acids to Lyman alpha radiation: Glycine"

Ferreira-Rodrigues, A. M., Homem, M. G. P., de Brito, A. N., Ponciano, C. R., da Silveira, E. F.

The amino acids already detected in Solar System bodies and researched in Interstellar Medium are of particular importance for the chemistry related to the origin of life since they are constituents of all living organisms. Several amino acids have been identified in meteorites carbonaceous with significant concentration, while the existence of glycine in regions of star formation has been claimed. To interpret the viability of amino acids in pre-biotic astrochemistry is important to investigate the stability of these compounds in extraterrestrial surroundings. This study investigates, in the laboratory, the stability of glycine to the action of ultraviolet radiation, in spectral region around the wavelength of the Lyman alpha line (1216 angstrom) produced by a hydrogen lamp. (252)Cf-PDMS of positive and negative desorbed ions was performed for glycine, before and during the irradiation, and the dependence of the ion desorption yields on the irradiation time is determined. As a result, the relative photostability curves of the molecular and dimer ions are observed to be a single exponential decay with a time constant 376 min for positive desorbed ions and 675 min for negative ones. The photodissociation cross section found for glycine molecule at room temperature, when positive secondary ions are considered, is 17 Mb: this value drops to 9 Mb when negative secondary ions are analyzed. This new methodology offers a complementary way of understanding the photonic interaction in amino acids, allowing discussion on polymerization and/or radiation induced phase transition effects.

[P214-11] "Recognition of serous ovarian tumors in human samples by multimodal nonlinear optical microscopy"

Adur, J., Pelegati, V. B., Costa, L. F. L., Pietro, L., de Thomaz, A. A., Almeida, D. B., Bottcher-Luiz, F., Andrade, L. A. L. A., Cesar, C. L.

We used a multimodal nonlinear optics microscopy, specifically two-photon excited fluorescence (TPEF), second and third harmonic generation (SHG/THG) microscopies, to observe pathological conditions of ovarian tissues obtained from human samples. We show that strong TPEF + SHG + THG signals can be obtained in fixed samples stained with hematoxylin and eosin (H&E) stored for a very long time, and that H&E staining enhanced the THG signal. We then used the multimodal TPEF-SHG-THG microscopies in a stored file of H&E stained samples of human ovarian cancer to obtain complementary information about the epithelium/stromal interface, such as the transformation of epithelium surface (THG) and the overall fibrillary tissue architecture (SHG). This multicontrast nonlinear optics microscopy is able to not only differentiate between cancerous and healthy tissue, but can also distinguish between normal, benign, borderline, and malignant specimens according to their collagen disposition and compression levels within the extracellular matrix. The dimensions of the layers of epithelia can also be measured precisely and automatically. Our data demonstrate that optical techniques can detect pathological changes associated with ovarian cancer.

[P215-11] "Search for the disappearance of muon antineutrinos in the NuMI neutrino beam"

Adamson, P., Auty, D. J., Ayres, D. S., Backhouse, C., Barr, G., Bishai, M., Blake, A., Bock, G. J., Boehnlein, D. J., Bogert, D., Cao, S. V., Cavanaugh, S., Cherdack, D., Childress, S., et all.

We report constraints on antineutrino oscillation parameters that were obtained by using the two MINOS detectors to measure the 7% muon antineutrino component of the NuMI neutrino beam. In the Far Detector, we select 130 events in the charged-current muon antineutrino sample, compared to a prediction of 136.4 +/- 11.7(stat)(-8.9)(+10.2)(syst) events under the assumption vertical bar Delta(m) over bar (2)vertical bar = 2.32 x 10(-3) eV(2), sin(2)(2(theta) over bar = 1.0. Assuming no oscillations occur at the Near Detector baseline, a fit to the two-flavor oscillation approximation constrains vertical bar Delta m(2)vertical bar < 3.37 x 10(-3) eV(2) at the 90% confidence level with sin(2)(2<(theta)over bar>) = 1.0.

[P216-11] "Search for the Rare Decays K(L) -> pi(0)pi(0)mu(+)mu(-) and K(L) -> pi(0)pi(0)X(0) -> pi(0)pi(0)mu(+)mu(-)"

Abouzaid, E., Arenton, M., Barker, A. R., Bellantoni, L., Blucher, E., Bock, G. J., Cheu, E., Coleman, R., Corcoran, M. D., Cox, B., Erwin, A. R., Escobar, C. O., et al.

The KTeV E799 experiment has conducted a search for the rare decays, K(L) -> pi(0)pi(0)mu(+)mu(-) and K(L) -> pi(0)pi(0)X(0) -> pi(0)pi(0)mu(+)mu(-), where the X(0) is a possible new neutral boson that was reported by the HyperCP experiment with a mass of (214: 3 +/- 0: 5) MeV/c(2). We find no evidence for either decay. We obtain upper limits of Br(K(L) -> pi(0)pi(0) mu(+)mu(-) -> pi(0)pi(0)X(0) -> pi(0)pi(0)mu(+)mu(-)) < 1.0 x 10(-10) and Br(K(L) -> pi(0)pi(0)mu(+)mu(-)) < 9.2 x 10(-11) at the 90% confidence level. This result rules out the pseudoscalar X(0) as an explanation of the HyperCP K(L) result under the scenario that the (d) over bar sX(0) coupling is completely real.

[P217-11] "Single crystal growth and characterization of MnAs"

De Campos, A., Mota, M. A., Gama, S., Coelho, A. A., White, B. D., da Luz, M. S., Neumeier, J. J.

A simple method to grow MnAs single crystals is described, using careful temperature control. Crystal characterization was determined by powder X-ray diffraction, back-reflection Laue diffraction and vibrating sample magnetometry. The results show good magnetic properties with first-order transition sharper than in polycrystalline samples and with the transition occurring at slightly lower temperatures (T(C)=315.5 K) than in the case of polycrystalline samples. The second-order transition in single crystal decreases with applied field at 391 K. (C) 2011 Elsevier B.V. All rights reserved.

[P218-11] "Spin effects in InAs self-assembled quantum dots"

Dos Santos, E. C., Gobato, Y. G., Brasil, M. J. S. P., Taylor, D. A., Henini, M.

We have studied the polarized resolved photoluminescence in an n-type resonant tunneling diode (RTD) of GaAs/AlGaAs which incorporates a layer of InAs self-assembled quantum dots (QDs) in the center of a GaAs quantum well (QW). We have observed that the QD circular polarization degree depends on applied voltage and light intensity. Our results are explained in terms of the tunneling of minority carriers into the QW, carrier capture by InAs QDs and bias-controlled density of holes in the QW.

[P219-11] "SU(5) x SU(5) unification revisited"

Emmanuel-Costa, D., Franco, E. T., Felipe, R. G.

The idea of grand unification in a minimal supersymmetric SU(5) x SU(5) framework is revisited. It is shown that the unification of gauge couplings into a unique coupling constant can be achieved at a high-energy scale compatible with proton decay constraints. This requires the addition of a minimal particle content at intermediate energy scales. In particular, the introduction of the SU(2)(L) triplets belonging to the (15, 1)+((15) over bar, 1) representations, as well as of the scalar triplet Sigma(3) and octet Sigma(8) in the (24, 1) representation, turns out to be crucial for unification. The masses of these intermediate particles can vary over a wide range, and even lie in the TeV region. In contrast, the exotic vector-like fermions must be heavy enough and have masses above 10(10) GeV. We also show that, if the SU(5) x SU(5) theory is embedded into a heterotic string scenario, it is not possible to achieve gauge coupling unification with gravity at the perturbative string scale.

[P220-11] "The use of Supernova neutrinos to monitor the collapse, to search for gravity waves, to probe neutrino masses"

Vissani, F., Pagliaroli, G., Torres, F. R.

Although there is a general understanding of the core collapse supernovae, a definitive microscopic model is still to come. We discuss the usefulness of neutrino observations. We analyze the SN1987A observations of Kamiokande-II, IMB and Baksan and show that they provide a 2.5 sigma support to the standard scenario for the explosion. In this context, we discuss the neutrinos as trigger for the search of the gravity wave impulsive emission. We bound the neutrino mass using the SN1987A data and argue, using simulated data, that a future galactic supernova could probe the sub-eV region.

[P221-11] "Thermal precipitation of silver nanoparticles and thermoluminescence in tellurite glasses"

Giehl, J. M., Pontuschka, W. M., Barbosa, L. C., Chillcce, E. F., Da Costa, Z. M., Alves, S.

Silver metal and/or oxide precipitation of nanoparticles in thermally treated Ag-doped tellurite glasses was studied by optical absorption (OA) and transmission electron microscopy (TEM). The Lorentzian adjusted silver nanoparticles plasma resonance OA band was compared to the Drude model approach. The silver nanoparticles size distribution on the surface rather than in the bulk was determined by TEM. A model for the metallic silver precipitation is proposed. The characterization of the formation of silver nanoparticles was carried out with differential thermal analysis (DTA) to determine the glass transition temperature (Tg) and of crystallization (Tc). Previously gamma-irradiated samples exhibited thermoluminescence (TL) peaks and the defect centers TeOHC. NBOHC and TeEC were identified by electron paramagnetic resonance (EPR), but no Ag(0) signal was detected. The silver nanoparticles are known to introduce desired third-order optical nonlinearities in the composites, at wavelengths close to the characteristic surface-plasmon resonance of the metal precipitates. An increase of the glass density and refractive index with increasing AgNO(3) content was observed. Crown Copyright (C) 2011 Published by Elsevier B.V. All rights reserved.

[P222-11] "Tunable Single-Polarization Single-Mode Microstructured Polymer Optical Fiber"

Espinel, Y. A. V., Franco, M. A. R., Cordeiro, C. M. B.

A new procedure to obtain single-polarization singlemode polymeric optical fibers is reported. The selective polarization confinement loss mechanism is obtained by applying external hydrostatic pressure in a specially designed side-hole microstructured polymer optical fiber. It is shown that, at lambda = 588 nm, pressure around 380 bar allows inducing confinement loss as high as 35 dB/m for one polarization state while the other is guided with low loss (3 x 10(-3) dB/m). The loss mechanism is shown to be related to coupling between the fundamental core modes and the cladding modes of the pressurized fiber. Finally, the possibility of tuning the single-polarization single-mode state with the input wavelength with fixed pressure or by introducing small changes in the inner ring of holes of the fiber cross section is presented.

[P223-11] "Tunable Single-Polarization Single-Mode Microstructured Polymer Optical Fiber"

Espinel, Y. A. V., Franco, M. A. R., Cordeiro, C. M. B.

A new procedure to obtain single-polarization singlemode polymeric optical fibers is reported. The selective polarization confinement loss mechanism is obtained by applying external hydrostatic pressure in a specially designed side-hole microstructured polymer optical fiber. It is shown that, at lambda = 588 nm, pressure around 380 bar allows inducing confinement loss as high as 35 dB/m for one polarization state while the other is guided with low loss (3 x 10(-3) dB/m). The loss mechanism is shown to be related to coupling between the fundamental core modes and the cladding modes of the pressurized fiber. Finally, the possibility of tuning the single-polarization single-mode state with the input wavelength with fixed pressure or by introducing small changes in the inner ring of holes of the fiber cross section is presented.

Proceedings

[P224-11] "Supercontinuum generation by using Photonic Crystal Fibers made from borosilicate glasses"

Chillcce, E. F., Ramos-Gonzales, R. E., Cruz, F. C., Cordeiro,

In this work, we present results of broadband emissions ranging from 800 to 1500 nm generated by using Photonic Crystal Fibres (PCFs) made from borosilicate glasses. The borosilicate PCFs, fabricated by the Stack-and-Draw technique, consist of five hollow ring periods around the solid core. The solid core is based on the lead-doped borosilicate glass. The PCFs with their external diameters ranging from about 3.8 to 6 microns were excited with a commercial pulsed diode laser (wavelength at 1065 nm, Power <100mW). The PCF length used to generate broadband emissions was less than a meter. The Optical Attenuation of these PCFs was measured via the Cut-Back method and their Dispersion Spectra were calculated by using the Finite Element Method (FEM) and the scanning electronic microscope images. Finally, we believe that short borosilicate PCFs with lead-doped cores (related to high non-linear properties) may be used in broadband emissions, supercontinuum generations or other non-linear applications.

[P225-11] "VIS-NIR Bend loss Sensitive Photonic Crystal Fibers"

Chillcce, E. F., Allan, T. Cordeiro, C. M. B., Barbosa, L. C.

In this work we present bend loss characteristics of silica Photonic Crystal Fibers (PCFs) in the VIS-NIR-IR region. The PCFs made using the Stack-and-Draw technique consist of triangular and rectangular hollow lattices. The bend loss dependency of these PCFs was characterized by using an optical spectrum analyzer (OSA) and a white light source. The optical transmittance spectra were measured for different bend radius. These PCFs are sensitive to bending losses in the VIS-NIR region, but insensitive in the IR region. These PCFs may be used to bend sensors or optical filters.

Capítulo de livro

"Newton and Inverse Problems"

Assis, A. K. T.