



Abstracta

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TRABALHOS PUBLICADOS

P 001- 05 "Analysis of on-axis wave focusing through the use of non annular slits"

Nobrega, K. Z. and Dartora, C. A

In this paper we use the scalar diffraction theory to obtain an analytical procedure allowing someone to localize waves around a spatial range. In fact, we have studied the use of different slits profiles to obtain axial localization considering a simple optical setup. To do this, three kinds of slits named Cube root, Exponential and Sinusoidal were analyzed. (C) 2004 Elsevier B.V. All rights reserved

Optics Communications 242[1-3], 221-226. 2004.

P 002- 05 "Aniline polymerization into montmorillonite clay: A spectroscopic investigation of the intercalated conduct-ling polymer"

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

The polymerization of aniline intercalated into montmorillonite clay was monitored by in situ UV-vis-NIR and resonance Raman spectroscopies and in situ small-angle X-ray scattering. In the initial stages of the polymerization, it is observed the PANI-ES polaronic band at 750 nm in the UV-vis-NIR spectrum and also the characteristic PANI-ES resonance Raman spectrum (excited at 632.8 nm), which indicate that the head-to-tail coupling reactions between anilinium radical cations are occurring. Nevertheless, the resonance Raman spectrum excited at 488.0 nm presents bands at 1211, 1370, 1455, and 1608 cm^{-1} , assigned to the benzidine dication species, which suggests that tail-to-tail coupling reactions are also occurring. In the final stages of polymerization, the presence of electronic absorption bands at 670 and 620 nm indicates the formation of new chromophoric species, which is also confirmed by its peculiar resonance Raman spectrum at 632.8 nm wavelength. The in situ SAXS results show that, during the anilinium polymerization in aqueous clay suspension, the interlayer spacing is ca. 19 Angstrom. XRD diffraction pattern and SEM images of the powder PANI-MMT nanocomposites indicate that the polymerization occurs mainly between the clay layers, and the basal spacing is ca. 13.2 Angstrom. While the IR spectra of nanocomposites show only bands due to PANI-ES-like segments, resonance Raman and nitrogen XANES techniques lead to the presence of PANI-ES-like chains, benzidine segments, azo bonds, and phenazine-like rings in the structure of the confined conducting polymers. The XPS technique detects only PANI-ES segments of the polymeric structure, suggesting that on the external surface and/or on the edge of clay crystal they are predominant in the chains

Macromolecules 37[25], 9373-9385. 2004.

P 003- 05 "Benzo[c]quinolizin-3-ones theoretical investigation: SAR analysis and application to nontested compounds"

Braga, S. F. and Galvao, D. S

We investigate with the use of theoretical methodologies the activity of a set of 41 benzo[c]quinolizin-3-ones (BC3), some of them explored as selective inhibitors of the human 5 α -reductase steroid. For the structure-activity study we have considered dividing the molecules into groups of tested and nontested compounds. Semiempirical calculations and pattern recognition methods such as Electronic Indices Methodology (EIM), Principal Components Analysis (PCA), Hierarchical Cluster Analysis (HCA), and K-Nearest Neighbors (KNN) have been applied to search for a correlation between experimental activity and theoretical descriptors. Our results show that it is possible to directly correlate some molecular quantum descriptors with BC3 biological activity. This information can be used in principle to identify active/inactive untested compounds and/or to design new active compounds

Journal of Chemical Information and Computer Sciences 44[6], 1987-1997. 2004.

P 004- 05 "CNGS beam monitor with the LVD detector"

Aglietta, M., Antonioli, P., Bari, G., Castagnoli, C., Fulgione, W., Galeotti, P., Garbini, M., Ghia, P. L., Giusti, P., Kemp, E., Malguin, A. S., Menghetti, H., Pesci, A., Pless, I. A., Porta, A., Rzasny, V. G., Ryazhskaya, O. G., Saavedra, O., Sartorelli, G., Selvi, M., Vigorito, C., Votano, L., Yakushev, V. F., Zatsepin, G. T., and Zichichi, A.

The importance of an adequate CNGS beam monitor at the Gran Sasso Laboratory has been stressed in many papers. Since the number of internal $\nu(\mu)$ CC and NC interactions in the various detectors will not allow rapid collection of statistics, one should also be able to detect the ν , CC interactions in the upstream rock. In this study we have investigated the performances of the LVD detector as a monitor for the CNGS neutrino beam. Thanks to its wide area (13 x 11 m^2) orthogonal to the beam direction), LVD can detect about 120 muons per day originated by $\nu(\mu)$ CC interactions in the rock. The LVD total mass is similar to 2 kt. This allows obtaining 30 more CNGS events per day as internal (NC + CC) $\nu(\mu)$ interactions. for a total of similar to 150 events per day. A 3% statistical error can be reached in 7 days. Taking into account the time characteristics of the CNGS beam, the cosmic muon background can be reduced to a negligible level, of the order of 1.5 events per day

Nuclear Physics B-Proceedings Supplements 138, 424-426. 2005.

P005- 05 "Crystal structures and magnetic order of $\text{La}(\text{O}_{0.5+\delta})\text{A}(\text{O}_{0.5-\delta})\text{Mn}(\text{O}_{0.5+\epsilon})\text{Ru}(\text{O}_{0.5-\epsilon})\text{O}_3$ (A=Ca,Sr,Ba): Possible orbital glass ferromagnetic state"

Granado, E., Huang, Q., Lynn, J. W., Gopalakrishnan, J., and Ramesha, K.

The crystallographic and magnetic properties of $\text{La}(\text{O}_{0.5+\delta})\text{A}(\text{O}_{0.5-\delta})\text{Mn}(\text{O}_{0.5+\epsilon})\text{Ru}(\text{O}_{0.5-\epsilon})\text{O}_3$ (A=Ca,Sr,Ba) were investigated by means of neutron powder diffraction. All studied samples show the orthorhombic perovskite crystal structure, space group $Pnma$, with regular (Mn,Ru)O₆ octahedra and no chemical ordering of the Mn³⁺ and Ru⁴⁺ ions. Ferromagnetic spin structures were observed below T(c) similar to 200-250 K, with an average ordered moment of similar to 1.8-2.0 μ_B /(Mn,Ru). The observation of long-range ferromagnetism and the absence of orbital ordering are rationalized in terms of a strong Mn-Ru hybridization, which may freeze the orbital degree of freedom and broaden the e(g) valence band, leading to an orbital glass state with carrier-mediated ferromagnetism

Physical Review B 70[21]. 2004.

P 006- 05 "Dissipative dynamics of spins in quantum dots"

Westfahl, H., Caldeira, A. O., Medeiros-Ribeiro, G., and Cerro, M.

We present a theory for the dissipation of electronic spins trapped in quantum dots due to their coupling to the host lattice acoustic phonon modes. Based on the theory of dissipative two level systems for the spin dynamics, we derive a relation between the spin dissipative bath, the electron confinement, and the electron-phonon interaction. We find that there is a sharp bath resonance at an energy which is typically much smaller than the electronic lateral confinement energy. We show that this resonance can be easily tuned to the Zeeman frequency of the spins, and that it sets the boundary between two different dissipative regimes

Physical Review B 70[19]. 2004.

P 007- 05 "Double-pumped parametric amplifier with strained fibre to suppress SBS"

Marconi, J. D., Boggio, J. M. C., Callegari, F. A., Guimaraes, A., Arradi, R., and Fragnito, H. L.

A double-pumped parametric amplifier where stimulated Brillouin scattering is suppressed by applying a strain distribution along the fibre plus a low-frequency (140 MHz) pump phase modulation is presented. The good performance of the amplifier, confirmed by eye measurements at 10 Gbit/s, indicates that the method of straining fibres to eliminate completely SBS may be effectively implemented, improving these devices

Electronics Letters 40[24], 1522-1523. 2004.

P 008- 05 "Effect of a magnetic field on the magnetostructural phase transition of MnAs films on GaAs"

Iikawa, F., Knobel, M., Santos, P. V., Adriano, C., Couto, O. D. D., Brasil, M. J. S. P., Giles, C., Magalhaes-Paniago, R., and Daweritz, L.

We present a systematic investigation of the effect of an external magnetic field on the first order structural (hexagonal/orthorhombic) and magnetic (ferromagnetic/paramagnetic) phase transition of MnAs films grown epitaxially on GaAs(001). The experimental results obtained using x-ray diffraction, magneto-optical Kerr effect, and SQUID magnetometry clearly show two magnetic field regimes where the temperature evolution of the magnetic and structural macroscopic properties of the films exhibit different behavior near the phase transition. The different evolution of the magnetic and structural properties fades away when an external magnetic field larger than 1 kOe is applied along the easy magnetization axis. These results are attributed to two effects induced by the external magnetic field. The first one is the field-induced phase transition, similar to that reported in MnAs bulk. The second one, which dominates for fields below 1 kOe, is attributed to the effect of the geometry of the microstructured domains formed during the phase transition on the macroscopic magnetic properties of the film. As a result, the changes in the magnetic properties detected by macroscopic measurements take place at temperatures lower than those observed by structural measurements, even though structural and magnetic phase transitions must occur simultaneously

Physical Review B 71[4]. 2005.

P 009- 05 "Effective model of the electronic Griffiths phase"

Tanaskovic, D., Miranda, E., and Dobrosavljevic, V.

We present simple analytical arguments explaining the universal emergence of electronic Griffiths phases as precursors of disorder-driven metal-insulator transitions in correlated electronic systems. A simple effective model is constructed and solved within dynamical mean field theory. It is shown to capture all the qualitative and even quantitative aspects of such Griffiths phases

Physical Review B 70[20]. 2004.

P 010- 05 "Elastic scattering of low-energy electrons by OCS"

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

We present integral and differential cross sections for elastic scattering of electrons by OCS molecules for energies between 0.1 and 10 eV. We employ the Schwinger multichannel method with pseudopotentials in the static-exchange plus polarization approximation. We compare our results with available theoretical and experimental results and find good agreement in general. Our calculated integral cross section is strongly enhanced near zero energy which is an indication of a possible existence of an s-wave virtual state

Physical Review A 70[6]. 2004.

P 011- 05 "Entanglement and chaos in a square billiard with a magnetic field"

Novaes, M. and de Aguiar, M. A. M.

We study the dynamical entanglement between the spin and the spatial degrees of freedom for a spin-1/2 charged particle in a square billiard, subject to a nonhomogeneous magnetic field, a system which is classically nonintegrable. This system has three degrees of freedom, one of them being strictly quantum, and we consider initial states which are coherent states with spin in the x direction. The center of the coherent state can be chosen to lie on classically chaotic or regular initial conditions. We show that for chaotic initial conditions the entanglement is rather fast and increases monotonically, while for the regular ones it may present strong recoherences, whose period is related to the classical motion. We also show that this system exhibits special initial conditions which entangle, even faster than a typical chaotic one

Physical Review e 70[4]. 2004.

P 012- 05 "First principles study of the ferromagnetism in Ga1-xMnxAs semiconductors"

da Silva, A. J. R., Fazzio, A., dos Santos, R. R., and Oliveira, L. E.

We have performed ab initio calculations within the density-functional theory for Ga1-xMnxAs diluted semiconductors. Total energy results unambiguously show that a quasi-localized hole, with predominant p-like character, surrounds the fully polarized Mn up arrow d(5)-electrons. The calculations indicate that the holes form a relatively dispersionless impurity band, thus rendering effective-mass descriptions of hole states open to challenge. We obtain estimates both for the $s = 1/2$ hole and $S = 5/2$ Mn exchange coupling, and for the distance dependence of the effective Mn-Mn exchange interaction. The results demonstrate that the effective Mn-Mn coupling is always ferromagnetic, and thus non-RKKY, and is intermediated by the antiferromagnetic coupling of each Mn spin to the holes

Journal of Physics-Condensed Matter 16[46], 8243-8250. 2004.

P 013- 05 "Growth study of Cu/Pd(111) by RHEED and XPS"

de Siervo, A., Paniago, R., Soares, E. A., Pfannes, H. D., Landers, R., and Kleiman, G. G.

An X-ray photoelectron spectroscopy (XPS) and reflection high-energy electron diffraction (RHEED) investigation of the growth of Cu films on a Pd(1 11) single crystal at room temperature is presented. Dynamically taken XPS-data as function of the deposition time show a linear variation of $ICu-3pII Pd-(3d)$ and a periodic change of its slope indicating a nearly layer-by-layer growth process. RHEED oscillations are seen for the 3-4 first layers, also suggesting a smooth growth mode. From the evolution of the RHEED-streaks separation the in-plane Cu-atom spacing is precisely determined. Up to a coverage of ca. 2-3 monolayers (ML) Cu grows pseudomorphously on Pd(1 11), despite the -7.1% strain imposed by the substrate lattice parameter. Non-pseudomorphous epitaxial growth is evidenced above ca. 3-4 ML by a discontinuous change in lateral lattice spacing observed by RHEED which indicates a relaxation to the Cu(1 11) "natural" surface lattice parameter. In addition it is concluded that surface alloying does not take place at least at room temperature (RT)-XPS spectra taken dynamically during annealing show that alloying occurs only above RT. (C) 2004 Elsevier B.V. All rights reserved

Surface Science 575[1-2], 217-222. 2005.

P 014-05 "Influence of the solar and density perturbations on the neutrino parameters"

Reggiani, N., Guzzo, M. M., and de Holanda, P. C.

There are reasons to believe that the solar matter density fluctuates around an equilibrium profile. One of these reasons is a resonance between the Alfvén waves and the g-modes inside the Sun that creates spikes in the density profile. The neutrinos are created in the solar core and passing through these spikes feel them as a noisy perturbation, whose correlation length is given by the distance between the spikes. When we consider these perturbations on the density profile, the values of the neutrino parameters necessary to obtain a solution to the solar neutrino problem are affected. In particular, in the present work, we show that the values of the parameters of mass and mixing angle that satisfy both the Large Mixing Angle solution to the solar neutrinos and the data from KamLAND - that observes neutrinos created in earth nuclear reactors - are shifted in the direction of lower values as the amplitude of the density noise increases. This means that, depending on the new data of KamLAND and other detectors, it can be necessary to invoke random perturbations in the Sun to recover compatibility with solar neutrino observations. In this case, the neutrino observations will be used as a real probe of the solar interior, giving information of the density profile in the central part of the Sun, which can not be observed directly

Brazilian Journal of Physics 34[4B], 1729-1733. 2004.

P 015-05 "Influence of zero dispersion wavelength variations on cross-talk in single-pumped fiber optic parametric amplifiers"

Boggio, J. M. C., Callegari, F. A., Marconi, J. D., Guimaraes, A., and Fragnito, H. L.

We show that variations of the zero dispersion wavelength ($\lambda(0)$) in single-pumped fiber optic parametric amplifiers (FOPAs), greatly enhances four-wave mixing induced cross-talk in a two-channel wavelength division multiplexed system. We compare experimentally the performance of two FOPAs with identical gains but differing in their standard deviations of $\lambda(0)$ (similar to 0.1 and similar to 2 nm) and we obtain a power penalty of 3.8 dB larger in the FOPA with the larger fluctuations of $\lambda(0)$. (C) 2004 Elsevier B.V. All rights reserved

Optics Communications 242[4-6], 471-478. 2004.

P 016-05 "Interaction effects in magnetic granular systems"

Knobel, M., Nunes, W. C., Brandl, A. L., Vargas, J. M., Socolovsk, L. M., and Zanchet, D.

Interactions in magnetic granular systems are difficult to address in real systems. Several experimental results have been obtained along the last 50 years, but few theoretical approaches have been developed to account for these extremely complex systems. A brief review on the role of interactions on the magnetic properties of granular magnetic systems is given, with a focus on a novel approach known as interacting superparamagnetic model. Two different systems are tested, and the results are discussed in terms of such phenomenological model. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 80-87. 2004.

P 017-05 "Investigating strongly correlated electron systems with synchrotron X-ray diffraction at LNLS"

Granado, E.

Recent X-ray diffraction measurements of strongly correlated electron systems performed at the Brazilian synchrotron light laboratory (LNLS) are described. These include the observation, by means of high-resolution powder diffraction, of small structural distortions likely associated with orbital ordering phenomena in transition-metal oxides, and magnetic diffraction of the intermetallic series $GdMnIn_{3m+2n}$ ($M = Rh$ or Ir). These preliminary results illustrate the opportunities offered by the

open facilities installed at the LNLS to investigations on strongly correlated systems. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 320-325. 2004.

P 018-05 "KamLAND data and the solution to the solar neutrino problem"

de Holanda, P. C. and Smirnov, A. Y

The first KamLAND results are in a very good agreement with the predictions made on the basis of the solar neutrino data and the LMA realization of the MSW mechanism. We perform a combined analysis of the KamLAND (rate, spectrum) and the solar neutrino data with a free boron neutrino flux $f(B)$. The best fit values of neutrino parameters are $\Delta m^2 = 7.1 \cdot 10^{-5} \text{ eV}^2$, $\tan^2 \theta = 0.40$ and $f(B) = 1.04$ with the 1sigma intervals: $\Delta m^2 = (6.4 - 8.4) \cdot 10^{-5} \text{ eV}^2$, $\tan^2 \theta = 0.33 - 0.48$. We find the 3sigma upper bounds: $\Delta m^2 < 1.7 \cdot 10^{-4} \text{ eV}^2$ and $\tan^2 \theta < 0.64$, and the lower bound $\Delta m^2 > 4.8 \cdot 10^{-5} \text{ eV}^2$. In the best fit point we predict for SNO: $CC/NC = 0.32(-0.07)(+0.08)$ and $A(DN)(SNO) = 3.0 \pm 0.8\%$ (68% C.L.), and $A(DN)(SNO) < 6\%$ at the 3sigma level. Further improvements in the determination of the oscillation parameters are discussed and implications of the solar neutrino and KamLAND results are considered

Brazilian Journal of Physics 34[4A], 1416-1423. 2004.

P 019-05 "Liquid carbon, carbon-glass beads, and the crystallization of carbon nanotubes"

de Heer, W. A., Poncharal, P., Berger, C., Gezo, J., Song, Z. M., Bettini, J., and Ugarte, D.

The formation of carbon nanotubes in a pure carbon arc in a helium atmosphere is found to involve liquid carbon. Electron microscopy shows a viscous liquid-like amorphous carbon layer covering the surfaces of nanotube-containing millimeter-sized columnar structures from which the cathode deposit is composed. Regularly spaced, submicrometer-sized spherical beads of amorphous carbon are often found on the nanotubes at the surfaces of these columns. Apparently, at the anode, liquid-carbon drops form, which acquire a carbon-glass surface due to rapid evaporative cooling. Nanotubes crystallize inside the supercooled, glass-coated liquid-carbon drops. The carbon-glass layer ultimately coats and beads on the nanotubes near the surface

Science 307[5711], 907-910. 2005.

P 020-05 "Local atomic and electronic structure in LaMnO3 across the orbital ordering transition"

Souza, R. A., Souza-Neto, N. M., Ramos, A. Y., Tolentino, H. C. N., and Granado, E.

The local atomic disorder and electronic structure in the environment of manganese atoms in LaMnO3 has been studied by x-ray absorption spectroscopy over a temperature range (300-870 K) covering the orbital ordering transition (similar to 710 K). The Mn-O distance splitting into short and long bonds (1.95 and 2.15 Angstrom) is kept across the transition temperature, so that the MnO6 octahedra remain locally Jahn-Teller distorted. Discontinuities in the Mn local structure are identified in the extended x-ray fine structure spectra at this temperature, associated with a reduction of the disorder in the superexchange angle and to the removal of the anisotropy in the radial disorder within the coordination shell. Subtle changes in the electronic local structure also take place at the Mn site at the transition temperature. The near-edge spectra show a small drop of the Mn 4p hole count and a small enhancement in the pre-edge structures at the transition temperature. These features are associated with an increase of the covalence of the Mn-O bonds. Our results shed light on the local electronic and structural phenomena in a model of order-disorder transition, where the cooperative distortion is overcome by the thermal disorder

Physical Review B 70[21]. 2004.

P 021- 05 "Lowest Landau level bosonization"

Doretto, R. L., Caldeira, A. O., and Girvin, S. M.

We develop a bosonization scheme for the two-dimensional electron gas in the presence of a uniform magnetic field perpendicular to the two-dimensional system when the filling factor is one ($\nu=1$). We show that the elementary neutral excitations of this system, known as magnetic excitons, can be treated approximately as bosons and we apply the method to the interacting system. We show that the Hamiltonian of the fermionic system is mapped into an interacting bosonic Hamiltonian, where the dispersion relation of the bosons agrees with previous calculations of Kallin and Halperin. The interaction term accounts for the formation of bound states of two-bosons. We discuss a possible relation between these excitations and the skyrmion-antiskyrmion pair, in analogy with the ferromagnetic Heisenberg model. Finally, we analyze the semiclassical limit of the interacting bosonic Hamiltonian and show that the results are in agreement with those derived from the model of Sondhi for the quantum Hall skyrmion

Physical Review B 71[4]. 2005.

P 022- 05 "Magnetic-field effects on quasi-two-dimensional excitons in coupled GaAs-(Ga,Al)As quantum wells"

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

We have used the variational procedure in the effective-mass and nondegenerate parabolic band approximations in order to investigate the effects of a magnetic field on the exciton effective mass and dispersion in semiconductor heterostructures. Calculations are performed for bulk GaAs, and two-dimensional and quasi-two-dimensional excitons in coupled GaAs-(Ga,Al)As quantum wells for applied magnetic fields perpendicular to the layers. A simple hydrogenlike envelope wave function provides the expected behavior for the exciton dispersion in a wide range of the center-of-mass momenta, and an analytical expression for the exciton effective mass is obtained. Present results lead to a magnetic-field dependent exciton effective mass and dispersion in quite good agreement with available experimental measurements in coupled GaAs-(Ga,Al)As quantum wells

Physical Review B 71[4]. 2005.

P 023- 05 "Magnetic characterization of the mechanically induced thermite reaction between Fe₂O₃ and Al"

Cuadrado-Laborde, C., Damonte, L. C., Mendoza-Zelis, L., Socolovsky, L. M., and Torriani, I. L.

We have investigated the mechanically induced self-propagating reaction between Fe₂O₃ and Al. In this reaction the final phases, Al₂O₃ and Fe, are formed by an in situ chemical reaction. The evolution of the system was characterized as a function of the milling time using X-ray diffraction, magnetometry (300 and 5 K) and Mossbauer spectroscopy (300 and 77 K). After reaction, Fe particles in a crystalline Al₂O₃ matrix have been formed. At larger milling times, a rather wide Fe grain size distribution of around 20 nm was obtained according to the diffraction patterns. Mossbauer spectra were constituted of both paramagnetic and ferromagnetic contributions. The former was attributed to small grains of superparamagnetic Fe (within the Mossbauer characteristic time $\tau(M)$ approximate to 10^{-8} s) and FeAl₂O₄, whereas the latter was associated to larger Fe grains. Saturation magnetization, coercivity field and remanent magnetization rapidly reached a stationary value with the milling time. A correlation between the microstructural characteristics of the sample and its magnetic properties before and after reaction is described. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 125-128. 2004.

P 024- 05 "Magnetic polaron and Fermi surface effects on the ESR spin-flip scattering of EuB₆ above T-C approximate to 15 K"

Urbano, R. R., Pagliuso, P. G., Rettori, C., Oseroff, S. B., Sarrao, J. L., Schlottmann, P., and Fisk, Z.

The spin-flip scattering (SFS) between conduction and Eu(2+)4f(7) (S-8(7/2)) electrons in the paramagnetic phase of EuB₆ (T greater than or equal to T-C approximate to 15 K) is studied by electron spin resonance (ESR) and magneto-resistance (MR) experiments. The observed Dysonian resonance suggests a metallic environment for the Eu²⁺ ions. ESR at high field, H congruent to 12.05 kG (ν congruent to 33.9 GHz), shows an anisotropic line width with cubic symmetry. ESR at low-field, 1.46 kG (4.1 GHz) and 3.35 kG (9.5 GHz), shows broader line width and smaller anisotropy than at higher field. The narrowing and anisotropy of the line width at high fields are indicative of a homogeneous resonance where the line width is mainly governed by the SFS mechanism due to the exchange interaction between Eu²⁺ 4f(7) and conduction electrons. Besides the negative MR, we found an anisotropic MR with cubic symmetry. These results are interpreted in terms of magnetic polaron and Fermi surface effects. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 326-330. 2004.

P 025- 05 "Magnetic study of Fe₆₅Ni₂₀Nb₆B₉ nanocomposite alloys"

Cabrera, A. F., Torres, C. E. R., Zelis, P. M., Van Raap, M. F., Socolovsky, L. M., Pasquevich, G., and Sanchez, F. H.

The alloy Fe₆₅Ni₂₀Nb₆B₉ was obtained from the elemental constituents in a high-energy planetary ball mill and subsequently thermally treated at 873 and 900 K in order to obtain the equilibrium phases. The as-prepared nanocrystalline alloy consists primarily of metastable BCC alpha-Fe(Ni) nanocrystals while the treated ones consist of a mixture of BCC (ferromagnetic) and FCC (paramagnetic at room temperature) phases. Hysteresis loops at 5 and 300 K present low remanence and coercivity. As-prepared sample exhibits the best soft magnetic properties. In all samples, the susceptibility curves suggest magnetic collective (long-range order) behavior with a maximum between 70 and 90 K. This feature is caused by nanometric-sized magnetic particles. The huge difference between blocking and irreversibility temperatures in the field cooling and zero-field cooling scans indicates a wide grain-size distribution. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 129-132. 2004.

P 026- 05 "Multiple ionization of rare gas atoms irradiated with intense VUV radiation"

Wabnitz, H., de Castro, A. R. B., Gurtler, P., Laarmann, T., Laasch, W., Schulz, J., and Moller, T.

The interaction of intense vacuum-ultraviolet radiation from a free-electron laser with rare gas atoms is investigated. The ionization products of xenon and argon atomic beams are analyzed with time-of-flight mass spectroscopy. At 98 nm wavelength and similar to 10^{13} W/cm² multiple charged ions up to Xe⁶⁺ (Ar⁴⁺) are detected. From the intensity dependence of multiple charged ion yields the mechanisms of multiphoton processes were derived. In the range of similar to 10^{12} - 10^{13} W/cm² the ionization is attributed to sequential multiphoton processes. The production of multiple charged ions saturates at 5-30 times lower power densities than at 193 and 564 nm wavelength, respectively

Physical Review Letters 94[2]. 2005.

P 027-05 "Narrow linewidth fibre-optical wavelength converter with strain suppression of SBS"

Marconi, J. D., Boggio, J. M. C., and Fragnito, H. L.

A broadband and efficient fibre-optical wavelength converter pumped by a narrow linewidth laser is presented. The stimulated Brillouin scattering is suppressed by applying strain distributions along the fibre, thus eliminating unnecessary broadening of the converted signal

Electronics Letters 40[19], 1213-1214. 2004.

P 028-05 "Non-Fermi-liquid behavior in CeIrIn5 near a metamagnetic transition"

Capan, C., Bianchi, A., Ronning, F., Lacerda, A., Thompson, J. D., Hundley, M. F., Pagliuso, P. G., Sarrao, J. L., and Movshovich, R.

We present a specific heat and resistivity study of CeIrIn5 in magnetic fields up to 17 T and temperature down to 50 mK. Both quantities were measured with the magnetic field parallel to the c axis (H_{\parallel} to [001]) and within the a-b plane (H_{\perp} perpendicular to [001]). Non-Fermi-liquid (NFL) behavior develops above 12 T for H_{\parallel} to [001]. The Fermi-liquid state is much more robust for H_{\parallel} to [001] and is suppressed only moderately at the highest applied field. Based on the observed trends and the proximity to a metamagnetic phase transition, which exists at fields above 25 T for H_{\parallel} to [001], we suggest that the observed NFL behavior in CeIrIn5 is a consequence of a metamagnetic quantum critical point

Physical Review B 70[18]. 2004

P 029-05 "Nonuniform phases in metals with local moments"

Ghosh, A. and Miranda, E.

The two-dimensional Kondo lattice model with both nearest and next-nearest neighbor exchange interactions is studied within a mean-field approach and its phase diagram is determined. In particular, we allow for lattice translation symmetry breaking. We observe that the usual uniform intersite order parameter is never realized, being unstable towards other more complex types of order. When the nearest neighbor exchange $J(1)$ is ferromagnetic the flux phase is always the most stable state, irrespective of the value of the next-nearest-neighbor interaction $J(2)$. For antiferromagnetic $J(1)$, however, either a columnar or a flux phase is realized, depending on conduction electron filling and the value of $J(2)$

Physical Review B 70[21]. 2004.

P 030-05 "Phase coexistence regimes in $\text{La}_{0.325}\text{Pr}_{0.300}\text{Ca}_{0.375}\text{MnO}_3$ "

Quintero, M., Leyva, A. G., Levy, P., Parisi, F., Aguero, O., Torriani, I., das Virgens, M. G., and Ghivelder, L.

We studied electric and magnetic properties of polycrystalline $\text{La}_{0.325}\text{Pr}_{0.300}\text{Ca}_{0.375}\text{MnO}_3$, a manganese oxide-based compound exhibiting intrinsic multiphase coexistence of submicrometric ferromagnetic, charge-ordered and charge-disordered regions. Time relaxation in both resistivity and magnetization were observed in a broad temperature range, signaling that coexisting phases are out of equilibrium. Different regimes of instability are presented and discussed. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 63-66. 2004.

P 031-05 "Phase diagram of the two-leg Kondo ladder"

Xavier, J. C., Miranda, E., and Dagotto, E.

The phase diagram of the two-leg Kondo ladder is investigated using computational techniques. Ferromagnetism is present, but

only at small conduction electron densities and robust Kondo coupling J . For densities n greater than or similar to 0.4 and any Kondo coupling, a paramagnetic phase is found. We also observed spin dimerization at densities $n=1/4$ and $n=1/2$. The spin-structure factor at small J peaks at (d) over right arrow $= (2n, 0)\pi$ for n less than or similar to 0.5, and at (d) over right arrow $= (n, 1)\pi$ for n greater than or similar to 0.5. The charge structure factor suggests that electrons behave as free particles with spin $-1/2$ (spin-0) for small (large) J

Physical Review B 70[17]. 2004.

P 032-05 "Physical characterization of surface-modified liposomes by incorporation of gangliosides designed for immunotherapies"

Zanin, M. H. A., Torriani, I. C. L., Zollner, R. L., and Santana, M. H. A.

Surface-modified liposomes with gangliosides prolong their half life in blood stream that associated to the poor immunogenic properties of gangliosides are potentially useful for applications as immunotherapeutic vehicles. The physical characteristics of these biocolloids play an important role on their stability and exposition of the ganglioside antigens to the immunological system. The present work describes the physical characterization of liposomes incorporating a monosialoganglioside or a mixture of mono-, di- and trisialogangliosides. The liposomal matrix was composed of either dipalmitoylphosphatidylcholine and cholesterol, or in some preparations dihexadecylphosphate, which was added in order to provide a higher negative charge density on the liposome surface. Both types of liposomes were prepared by the dry phospholipids film hydration method and characterized by their phospholipid and ganglioside content, mean diameter, size distribution, morphology, membrane packing, lamellar structure and phase transition behavior. (C) 2004 Elsevier B.V. All rights reserved

Colloids and Surfaces A-Physicochemical and Engineering Aspects 251[1-3], 175-182. 2004.

P 033-05 "Pierre Auger Observatory: Status report"

de Oliveira, M. A. L.

The Pierre Auger Observatory is a large international effort to provide measurements of extensive air showers (EAS) initiated in the upper atmosphere by cosmic rays with energies above 10(18) eV, the Ultra High Energy Cosmic Rays (UHECR's). The explanations for the origin, acceleration processes and composition of the UHECR's face theoretical and experimental difficulties, due to the extremely low flux in this energy region. The full observatory will consist of a hybrid detector using an array of 1600 water Cerenkov tanks spread over an area of 3000 km(2) overlooked by a set of 4 air fluorescence detectors per site. The southern site is being instrumented in Argentina and I will discuss its present status in this paper

Brazilian Journal of Physics 34[4A], 1390-1397. 2004.

P 034-05 "Pressure-induced colossal magnetocaloric effect in MnAs"

Gama, S., Coelho, A. A., de Campos, A., Carvalho, A. M. G., Gandra, F. C. G., von Ranke, P. J., and de Oliveira, N. A.

To present day, the maximum magnetocaloric effect (MCE) at room temperature for a magnetic field change of 5 T is 40 J/(kg K) for MnAs. In this Letter we present colossal MCE measurements on MnAs under pressure, reaching values up to 267 J/(kg K), far greater than the magnetic limit arising from the assumption of magnetic field independence of the lattice and electronic entropy contributions. The origin of the effect is the contribution to the entropy variation coming from the lattice through the magnetoelastic coupling

Physical Review Letters 93[23]. 2004.

P035-05 "Probing two-dimensional magnetic switching in Co/SiO₂ multilayers using reversible susceptibility experiments"

Spinu, L., Pham, H., Radu, C., Denardin, J. C., Dumitru, I., Knobel, M., Dorneles, L. S., Schelp, L. F., and Stancu, A.

The magnetic switching behavior of Co/SiO₂ multilayers has been studied using reversible susceptibility experiments performed along different orientations in the sample's plane. A sensitive method for critical curve determination of two-dimensional magnetic systems was proposed. It was shown that this method, based on reversible susceptibility's singularities detection, is general and can be applied independent of the expression of free energy describing the magnetic system under study. It is found that as the Co/SiO₂ ratio increases in the samples, the switching mechanism is governed by a noncoherent rotation mechanism. (C) 2005 American Institute of Physics

Applied Physics Letters 86[1]. 2005.

P036-05 "Quantum anisotropic Heisenberg chains with superlattice structure: A DMRG study"

Silva-Valencia, J., Xavier, J. C., and Miranda, E.

Using the density matrix renormalization group technique, we study spin superlattices composed of a repeated pattern of two spin-chains with different anisotropy parameters. The magnetization curve can exhibit two plateaus, a nontrivial plateau with the magnetization value given by the relative sizes of the subchains and another trivial plateau with zero magnetization. We find good agreement of the value and the width of the plateaus with the analytical results obtained previously. In the gapless regions away from the plateaus, we compare the finite-size spin gap with the predictions based on bosonization and find reasonable agreement. These results confirm the validity of the Tomonaga-Luttinger liquid superlattice description of these systems

Physical Review B 71[2]. 2005.

P037-05 "Quantum transport in a ferromagnetic nanowire: conductance and MR effect"

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

In this Letter we analyze the general features of quantum transport in a ferromagnetic nanowire based on a simple model. The local spin distribution, provided by well localized d-electrons, is governed by the Heisenberg-Ising ferromagnetic Hamiltonian while for the s-like conduction electron we have considered the Anderson model. The interaction between local spin and itinerant electrons is given by $H-I = -\Delta\sigma(i)S(i)$ ($\Delta = \sigma\Delta(x-x(i))$). The conductance formulae and the giant magnetoresistance effect for a nanowire placed between two ferromagnetic electrodes are obtained. (C) 2004 Elsevier B.V. All rights reserved

Physics Letters A 334[1], 46-54. 2005.

P038-05 "Random antiferromagnetic SU(N) spin chains"

Hoyos, J. A. and Miranda, E.

We analyze random isotropic antiferromagnetic SU(N) spin chains using the real-space renormalization group. We find that they are governed at low energies by a universal infinite randomness fixed point different from the one of random spin-1/2 chains. We determine analytically the important exponents: the energy-length scale relation is Ω similar to $\exp(-L/\psi)$, where $\psi = 1/N$, and the mean correlation function is given by C_{ij} similar to $(-1)^{|i-j|} \psi^{-|i-j|} (\phi)$, where $\phi = 4/N$. Our analysis shows that the infinite-N limit is unable to capture the behavior obtained at any finite N

Physical Review B 70[18]. 2004.

P039-05 "Semiempirical study on the electronic structure of anti-tumor drugs ellipticines, olivacines and isoellipticines"

Braga, S. F., de Melo, L. C., and Barone, P. M. V. B.

Ellipticine [5,11-dimethyl-6H-pyrido[4,3]carbazole] is a planar organic compound isolated from the plant extract of *Ochrosia elliptica*, with a high degree of antitumor and cytotoxic activity. Ellipticine and its derivatives have different modes of action, which may include intercalation or covalent binding to DNA and interference with the activity of topoisomerase II. In the present work we studied the electronic, geometrical and spectroscopic properties of 31 ellipticine derivatives and analogue compounds, using the semiempirical methods Parametric Method 3 and Zerner's Intermediate Neglect of Differential Overlap. The Zero Differential Overlap semiempirical Molecular Electrostatic Potential (MEP) was also calculated in order to interpret the electronic structure of the molecules. For the biologically tested ellipticines and olivacines we have observed a rule based on the dipole moment values and a selective distribution of active sites (coming from the MEP calculations) that can be used to identify the active molecules. These results provide a pattern which can be used to select potentially active molecules from the untested group of molecules and to design new ellipticine derivatives with improved antitumor activity. (C) 2004 Elsevier B.V. All rights reserved

Journal of Molecular Structure-Theochem 710[1-3], 51-59. 2004.

P040-05 "Spin-orbit-induced mixed-spin ground state in RNiO₃ perovskites probed by x-ray absorption spectroscopy: Insight into the metal-to-insulator transition"

Piamonteze, C., de Groot, F. M. F., Tolentino, H. C. N., Ramos, A. Y., Massa, N. E., Alonso, J. A., and Martinez-Lope, M. J

We report on a Ni L-2,L-3 edge x-ray absorption spectroscopy study in RNiO₃ perovskites. These compounds exhibit a metal-to-insulator (MI) transition as temperature decreases. The L-3 edge presents a clear splitting in the insulating state, associated to a less hybridized ground state. Using charge transfer multiplet calculations, we establish the importance of the crystal field and 3d spin-orbit coupling to create a mixed-spin ground state. We explain the MI transition in RNiO₃ perovskites in terms of modifications in the Ni³⁺ crystal field splitting that induces a spin transition from an essentially low-spin to a mixed-spin state

Physical Review B 71[2]. 2005.

P041-05 "Stabilization of substitutional Mn in silicon-based semiconductors"

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

We systematically investigate, using ab initio density-functional theory calculations, the properties of interstitial and substitutional Mn in both Si and Ge, as well as in the Si_{1-x}Ge_x alloy. We show that volume effects are not the main reason Mn prefers to be a substitutional impurity in pure Ge, and chemical effects, therefore, play an important role. Using realistic models of Si_{1-x}Ge_x, we show that for x greater than or similar to 0.16 substitutional Mn in Ge-rich neighborhoods become more stable than interstitial Mn, which may allow the growth of Si-based diluted magnetic semiconductors

Physical Review B 70[19]. 2004.

P042-05 "Stacking-fault based microscopic model for platelets in diamond"

Miranda, C. R., Antonelli, A., and Nunes, R. W.

We propose a new model for {001} platelets in diamond based on the formation of a metastable stacking-fault. The core of the defect is a double layer of threefold coordinated sp² carbon atoms embedded in the sp³ diamond matrix. The properties of the model were determined using ab initio calculations. All significant experimental signatures attributed to the platelets are fully accounted for. The model is also very appealing from the point of view of kinetics, since naturally occurring shearing processes will lead to the formation of the metastable fault

Physical Review Letters 93[26]. 2004.

P 043-05 "Structural study of the Ag(110)c(2x2)-Sb phase by low energy electron diffraction"

Nascimento, V. B., Paniago, R., de Siervo, A., de Castilho, C. M. C., Landers, R., Soares, E. A., and de Carvalho, V. E.

This work concerns the deposition of Sb on the (110) clean surface of silver. Two structured phases have been observed: an Ag(110)(4 x 1)-Sb, with a Sb coverage of about 1.0 ML and an Ag(110)c(2 x 2)-Sb, with half the coverage of the first one. The structural determination of the Ag(110)c(2 x 2)-Sb phase has been performed by a standard LEED analysis and the results obtained indicate the presence of substitutional Sb atoms in the first atomic layer. The presence of the Sb substitutional atoms promotes an expansion in the first interlayer distance without any change in the surface thermal vibrational behaviour. Based on results obtained by this study and previously published ones, the substitutional site seems to be most energetically favourable for Sb atoms, in any of the low index surfaces of silver. (C) 2004 Elsevier B.V. All rights reserved

Surface Science 572[2-3], 337-346. 2004.

P 044-05 "Study of the effect of neutrino oscillation on the supernova neutrino signal with the LVD detector"

Aglietta, M., Antonioli, P., Bari, G., Castagnoli, C., Fulgione, W., Galeotti, P., Garbini, M., Ghis, P. L., Giusti, P., Kemp, E., Malguin, A. S., Menghetti, H., Pesci, A., Pless, I. A., Porta, A., Rzasny, V. G., Ryazhskaya, O. G., Saavedra, O., Sartorelli, G., Selvi, M., Vigorito, C., Vissani, F., Votano, L., Yakushev, V. F., Zatsepin, G. T., and Zichichi, A.

We present an update of our previous study [1] on how *nu* oscillations affect the signal from a supernova core collapse observed in the LVD detector at LNGS. In this paper we use a recent, more precise determination of the cross section [2] to calculate the expected number of inverse beta decay events; we introduce in the simulation also the *nu*-Fe interactions; we include the Earth matter effects; and finally we study also the inverted mass hierarchy case

Nuclear Physics B-Proceedings Supplements 138, 115-118. 2005.

P 045-05 "Surface charges and external electric field in a toroid carrying a steady current"

Hernandes, J. A. and Assis, A. K. T.

We solve the problem of a resistive toroid carrying a steady azimuthal current. We use standard toroidal coordinates, in which case Laplace's equation is R-separable. We obtain the electric potential inside and outside the toroid, in two separate cases: 1) the toroid is solid; 2) the toroid is hollow (a toroidal shell). Considering these two cases, there is a difference in the potential inside the hollow and solid toroids. We also present the electric field and the surface charge distribution in the conductor due to this steady current. These surface charges generate not only the electric field that maintains the current flowing, but generate also the electric field outside the conductor. The problem of a toroid is interesting because it is a problem with finite geometry, with the whole system (including the battery) contained within a finite region of space. The problem is solved in an exact analytical form. We compare our theoretical results with an experimental figure demonstrating the existence of the electric field outside the conductor carrying steady current

Brazilian Journal of Physics 34[4B], 1738-1744. 2004.

P 046-05 "Surface hardness increasing of iron alloys by nitrogen-deuterium ion implanting"

Figuroa, C. A. and Alvarez, F.

In situ x-ray photoemission spectroscopy is used to study the deuterium and hydrogen oxygen etching effect in nitrogen-implanted iron alloys. A suitable deuterium-nitrogen mixture

can increase the surface original steel hardness up to similar to 40%. In similar conditions, hydrogen-nitrogen mixtures improves the hardness by similar to 10%. On deuteration, the main change is the reduction of the zero-point energy of the hydrides bond. Due to this, the lower scission energy of hydrogen-metal bonds as compared with deuterium-metal bonds determines the favorable effect of deuterium on the nitriding process. (C) 2004 American Institute of Physics

Journal of Applied Physics 96[12], 7742-7743. 2004.

P 047-05 "Theoretical analysis of formation and sustainment methods for compact toroids"

Farengo, R., Lifschitz, A. F., Ferrari, H. E., Bouzat, S., and Clemente, R. A.

Recent theoretical studies on the use of neutral beams (NB), rotating magnetic fields (RMF) and helicity injection (HI) to form and sustain compact toroids are reported. A Monte Carlo code was employed to study NB injection in Field Reversed Configurations (FRC) and Spheromaks. The code calculates the ionization of the neutral particles and follows the exact orbits of the ions. The magnetic field and density profiles are determined by solving a Grad-Shafranov equation that includes the beam current. RMF current drive in FRCs was studied using a fully 2D code that solves the two fluid equations with massless electrons and uniform temperature. The ion momentum equation includes viscosity and collisions with electrons and neutrals. The electrons are described using an Ohm's law with the Hall and pressure gradient terms. Ion spin up due to collisions with electrons reduces the current drive efficiency and a large fraction of neutrals is needed to keep the azimuthal ion velocity small. The principle of minimum rate of energy dissipation was employed to calculate relaxed states for a flux core spheromak sustained by helicity injection. States with large regions of closed flux surfaces and significant toroidal current were found. Changing the resistivity profile modifies the safety factor profile, which can change from one that has a maximum at the magnetic axis (for uniform resistivity) to a tokamak-like q-profile

Brazilian Journal of Physics 34[4B], 1621-1628. 2004.

P 048-05 "Thermopower of an intermediate valence model of Tl2Mn2O7"

Foglio, M. E. and Barberis, G. E.

In this work we calculate the thermopower of Tl2Mn2O7, together with its static resistivity and dynamical conductivity. This compound exhibits colossal magneto resistance, which is not adequately explained by the double-exchange mechanism. We use Hubbard operators to reformulate a previous model of Ventura and Alascio that describes the 3d orbitals of Mn with two magnetic configurations, hybridized with a conduction band associated to the Tl. We reformulate a previous treatment to obtain approximate one-electron Green's functions (GF) for the model. We have employed these GF to calculate the properties mentioned above for several values of the system parameters and obtained a qualitative agreement with the experimental results. (C) 2004 Elsevier B.V. All rights reserved

Physica B-Condensed Matter 354[1-4], 35-38. 2004.

P 049- 05 "Use of amorphous hydrogenated carbon as high-pressure cell for investigating trapped noble gases as a function of pressure"

Oliveira, M. H., Barbieri, P. F., Lacerda, R. G., and Marques, F. C.

In this work, we investigated electronic and structural properties of xenon (Xe) atoms implanted into amorphous carbon (a-C) matrix prepared by ion-beam-assisted deposition (IBAD) as a function of stress. X-ray absorption spectroscopy (XAS) indicates the formation of xenon clusters in the solid carbon matrix induced by the network stress. This biaxial pressure shifts the core level energy of xenon atoms. The results demonstrate the capability of using highly stressed diamond-like carbon network as a cell for trapping noble gases, allowing the investigation of phenomenon involving clusters of noble gases. (C) 2004 Published by Elsevier B.V

Thin Solid Films 469-70, 112-114. 2004.

P 050- 05 "Vortex dynamics differences due to twin-boundary pinning anisotropy in YBa₂Cu₃O_x at low temperatures for H parallel to ab planes"

Salem-Sugui, S., Alvarenga, A. D., Friesen, M., Goretta, K. C., Schilling, O. F., Gandra, F. G., Veal, B. W., and Paulikas, P.

We measured the magnetization M of a twin-aligned single crystal of YBa₂Cu₃O_x (YBaCuO), with $T_c=91$ K, as a function of temperature T and magnetic field H , with H applied along the ab planes. Isothermal M -vs- H and M -vs-time curves were obtained with H applied parallel (parallel to) and perpendicular (perpendicular to) to the twin boundary (TB) direction. M -vs- H curves exhibited two minima below 38 K, which resembled similar curves that have been obtained in YBaCuO for $H_{parallel}$ to c axis. Above 12 K, the field positions of the minima for $H_{parallel}$ to TB and $H_{perpendicular}$ to TB were quite similar. Below 12 K, the position of the second minimum H -min occurred at a higher field value with $H_{parallel}$ to TB. Below 6 K, only one minimum appeared for both field directions. At low temperatures, these minima in the M -vs- H curves produced maxima in the critical current. It was determined that vortex lines were expelled more easily for $H_{parallel}$ to TB than for $H_{perpendicular}$ to TB and, therefore, below a certain field value, that $J(c)(H_{perpendicular}$ to TB) was larger than $J(c)(H_{parallel}$ to TB). At $T < 12$ K with $H_{parallel}$ to TB, the relaxation rate for flux lines leaving the crystal was found to be different from that for flux entering the crystal. We also observed flux jumps at low temperatures, with their sizes depending on the orientation of magnetic field with respect to the TB's

Physical Review B 71[2]. 2005.

P 051- 05 "Water molecular arrangement at air/water interfaces probed by atomic force microscopy"

Teschke, O. and de Souza, E. F.

Different points along hydrophobic surfaces like air bubble interfaces in water when probed by atomic force microscope tips reveal distinct behaviors. At some points along the interface the tip suffers a strong attraction within a range of similar to 250 nm away from the interface plane; at other points the interface exerts a medium range repulsive force growing stepwise as the tip approaches the interface plane; consequently, the hydrophobic force is a strong function of position. To explain these results, we propose that the water interface structure is formed by a network of nanosized hydrogen-bond connected cages of water molecules of different sizes. (C) 2004 Elsevier B.V. All rights reserved

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EDIÇÃO COMEMORATIVA- ANO MUNDIAL DA FÍSICA - 2005

Prof. Dr. Marcelo Knobel
Instituto de Física Gleb Wataghin - DFMC
Coordenador do NUDECRI - UNICAMP

No início do século XX era simplesmente inimaginável para onde a idéia revolucionária de quantização de energia, proposta inicialmente por Max Planck, poderia nos levar. Hoje, quando comemoramos um século da aplicação, por parte de Albert Einstein, das idéias revolucionárias de Planck para explicar o fenômeno do efeito fotoelétrico, podemos olhar para o passado e ver que quase a totalidade dos objetos "modernos" de nosso cotidiano deve sua existência à Física Quântica. Ninguém que viveu no primeiro quarto do século XX poderia sequer desconfiar que estudos aparentemente tão longínquos da realidade, como espectros de corpo-negro, efeito fotoelétrico, espectros de emissão e absorção atômicos, e outros objetos de estudo daquele período, formariam a base de uma teoria, que seria responsável direta pelo futuro desenvolvimento do laser, do transistor e da microeletrônica, dos computadores e uma enorme quantidade de outras maravilhas que auxiliam nosso dia a dia. Este ano foi declarado o "Ano Mundial da Física", em comemoração ao centenário da publicação de uma série de artigos científicos fundamentais publicados por Albert Einstein em 1905. Uma série de eventos e comemorações estão sendo organizados no Brasil e no Mundo para festejar esta data, e com isso estimular a divulgação da Física, despertando o interesse por seus mistérios e fascínios. Qualquer manifestação é bem-vinda e importante, por parte de todos. No IFGW estão sendo programados diversos eventos relacionados com o "Ano Mundial da Física". Participe e colabore!!

Mais informações sobre os eventos programados no IFGW em: <http://www.ifi.unicamp.br/extensao/wyp-2005/wyp.html>



Abstracta

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