

# Abstracta

Ano IV - N.05

Out2002



Trabalhos Aceitos para Publicação em Periódicos.

A 021- 02 Reply to 'Comment on "Semiclassical Approximations in Phase Space with Coherent States"'

A 022 - 02 Specific heat at low temperatures and magnetic measurements in  $\text{Nd}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$  and  $\text{R}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$  (R=Nd, Sm, Dy and Ho) samples.

A 023- 02 Critical current density anisotropy of aligned  $\text{MgB}_2$  crystallites.

A 024 - 02 Nonclassical effects in cold trapped ions inside a cavity.

TRABALHOS PUBLICADOS  
SETEMBRO/OUTUBRO 2002

P 086-02 à P114-02

## Trabalhos aceitos para publicação em Periódicos

### A 021- 02 Reply to 'Comment on "Semiclassical Approximations in Phase Space with Coherent States"

M. Baranger, M.A.M. de Aguiar, F. Keck, H.J. Korsch and B. Schellaas.

The Herman—Kluk (HK) formula was shown in \cite{Bar01} not to be a correct semiclassical limit of an exact quantum mechanical formula. Two previous attempts to derive it using semiclassical arguments contain serious errors. These statements are left totally untouched by Herman and Grossmann's comment. They argue that the formula which we found to be at fault is not the one that should be called the HK formula. However, the formula we criticized is definitely one of the steps, in fact the main step, in these two published derivations of the HK formula. Very recently, a new derivation was published by Miller. It is interesting, but it is not semiclassical either.

J. Phys. A, accepted on september 2002.

### A 022 - 02 Specific heat at low temperatures and magnetic measurements in $\text{Nd}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$ and $\text{R}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ (R=Nd, Sm, Dy and Ho) samples.

J. López, O. F. de Lima, P. N. Lisboa-Filho and F. M. Araujo-Moreira

We studied the magnetization as a function of temperature and magnetic field in the compounds  $\text{Nd}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$ ,  $\text{Nd}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ ,  $\text{Sm}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ ,  $\text{Dy}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$  and  $\text{Ho}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ . Ferromagnetic, antiferromagnetic and charge ordering transition in our samples agreed with previous reports. We also did specific heat measurements with applied magnetic fields between 0 and 9 T and temperatures between 2 and 30 K in all five samples. Below 10 K the specific heat measurements evidenced a Schottky-like anomaly for all samples. However, we could not successfully fit the curves to either a two level nor a distribution of two-level Schottky anomaly.

Physical Review B, accepted on October 2002.

### A 023- 02 Critical current density anisotropy of aligned $\text{MgB}_2$ crystallites.

O. F. de Lima, C. A. Cardoso

We have obtained the induced critical current density,  $J_c \mu\text{DM}$ , with DM taken from hysteretic magnetization loops measured for temperatures between 5 K and 35 K, in a sample of aligned  $\text{MgB}_2$  crystallites. We found an almost temperature independent ratio  $J_{ab}/J_c \sim 1.5$ , between the critical current density parallel and perpendicular to the  $ab$  planes. This latter result follows closely the expected dependence of  $J_{ab}/J_c \gg x_{ab}/x_c \sim 1.7$ , where  $x_{ab}$  and  $x_c$  are the corresponding coherence length values. Uncertainties related to the evaluation of geometric factors and subtraction of a magnetic background are also discussed.

Physica C, accepted on October 2002.

### A 024 - 02 Nonclassical effects in cold trapped ions inside a cavity.

F.L. Semião, A. Vidiella-Barranco, and J.A. Roversi

We investigate the dynamics of a cold trapped ion coupled to the quantized field inside a high-finesse cavity, considering exact resonance between the ionic internal levels and the field (carrier transition). We derive an intensity-dependent hamiltonian in which terms proportional to the square of the Lamb-Dicke parameter ( $\eta$ ) are retained. We show that different nonclassical effects arise in the dynamics of the ionic population inversion, depending on the initial states of the vibrational motion/field and on the values of ( $\eta$ ).

Physical Review A, accepted on October 2002

## Trabalhos Publicados

### P 086- 02 Anisotropic unstable and stable growth of homoepitaxial (100) InP films.

Bortoleto, J. R. R., Cotta, M. A., and de Carvalho, M. M. G.

An extended study on the dynamics of growth of homoepitaxial InP films by chemical beam epitaxy is presented. Different morphologies (from layered to mounded) were achieved by changing growth temperature. In particular, ripples were observed at an intermediary temperature value. Their shape and evolution depend on both the direction and miscut angle of substrates used. Time and scale behavior of roughness and height-difference correlation functions calculated from atomic force microscopy data show that the average mound size increases during growth while the ripple wavelength remains approximately constant. Once ripples are present on the surface, growth becomes more stable due to surface faceting. Our experimental and simulation results indicate that competition between diffusion with anisotropic spatial bias and faceting play an important role in the growth process, giving rise to several different law regimes. When the film morphology is mounded, however, no stable temporal law regime is observed although a roughness exponent can still be measured, as expected for unstable growth with spatial diffusion bias. (C) 2002 Elsevier Science B.V. All rights reserved

Surface Science 515[1], 117-125. 2002.

### P 087- 02 A proposal of quantum logic gates using cold trapped ions in a cavity.

Semião F.L., Vidiella-Barranco A., Roversi J. A

We propose a scheme for implementation of logical gates in a trapped ion inside a high finesse cavity. The ion is interacting with a (classical) laser field as well as with the (quantized) cavity field. We demonstrate that simply by tuning the ionic internal levels with the frequencies of the fields, it is possible to construct a controlled-NOT gate in a three step procedure, having the ion's internal levels as well as vibrational (motional) levels as qubits. The cavity field is used as an auxiliary qubit and basically remains in the vacuum state. (C) 2002 Elsevier Science B.V. All rights reserved.

PHYSICS LETTERS A 299 (5-6): 423-426 JUL 15 2002.

**P 088- 02 Conduction electron spin resonance evidence for internal field in graphite.**

Sercheli, M. S., Kopelevich, Y., da Silva, R. R., Torres, J. H. S., and Rettori.

We report conduction electron spin resonance measurements performed on highly oriented pyrolytic graphite samples between 10 and 300 K using S ( $\nu = 4$  GHz), X ( $\nu = 9.4$  GHz), and Q ( $\nu = 34.4$  GHz) microwave bands for the external DC-magnetic field applied parallel (Hparallel toc) and perpendicular (Hperpendicular toc) to the sample hexagonal c-axis. The results obtained in the Hparallel toc geometry are interpreted in terms of the presence of an effective internal ferromagnetic-like field, H-int(eff) (T, H), that increases as the temperature decreases and the applied DC-magnetic field increases. We associate the occurrence of the H-int(eff) (T, H) with the field-induced metal-insulator transition in graphite and discuss its origin in the light of relevant theoretical models. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* 320[1-4], 413-415. 2002.

**P 089- 02 "Diffractive effects in spin-flip pp amplitudes and predictions for relativistic energies"**

Martini, A. F. and Predazzi, E.

We analyze the diffractive (Pomeron) contribution to the pp spin-flip amplitude and discuss the possible scenarios for energies available at the Relativistic Heavy-Ion Collider (RHIC). In particular, we show that RHIC data will be instrumental in assessing the real contribution of diffraction to spin amplitudes

*Physical Review D* 66[3], art-034029. 2002.

**P 090- 02 "Electronic structure of poly(tri-heterocycle) based on furan and thiophene: The role of the syn links"**

Doretto, R. L. and Laks, B.

The electronic structures of poly(OSO) oligomers were theoretically analyzed. Models based on neutral and charged oligomers whose all rings ( $3 < n < 15$ ) are linked to have syn or anti chains were considered. Geometrical optimizations were carried out at the semiempirical level using the parametric method 3 (PM3). The results indicated that the chain of the syn oligomer have a small curvature. For singly oxidized oligomers, the positive charge is concentrated around furan rings with a quinoid bond alternation pattern that extends at most six rings. For doubly oxidized oligomers, we also found a quinoid structure which extends up to eight rings. The energy of the electronic transitions and their associated oscillator strength values were also calculated for neutral and charged oligomers, so the UV-vis absorption spectra is presented. The calculations were done using the intermediate neglect of differential overlap Hamiltonian in combination with the single configuration-interaction technique in order to include correlations effects. The results indicated that the difference between the lowest unoccupied molecular orbital and highest occupied molecular orbital energies of the neutral oligomers are weakly correlated to the kind of their chains, although the different intensities of the lowest energy absorption peaks can be related to rings linked at the syn form. (C) 2002 American Institute of Physics.

*Journal of Chemical Physics* 117[11], 5437-5442. 2002.

**P 091- 02 "Electronic structure of Sr2FeMoO6"**

Moreno, M. S., Gayone, J. E., Abbate, M., Caneiro, A., Niebieskikwiat, D., Sanchez, R. D., de Siervo, A., Landers, R., and Zampieri, G.

We have used electron spectroscopies to investigate the electronic structure of the double perovskite Sr2FeMoO6. The valence-band photoemission spectra present a well-defined cut-off at the Fermi level, indicative of the metallic character of the material. The O 1s X-ray absorption spectrum presents three peaks, which are in good correspondence with the main structures in the unoccupied density-of-states of DF-LDA calculations. The electron energy-loss spectra present two structures which are also interpreted in terms of transitions between the bands obtained in the DF-LDA calculations. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* 320[1-4], 43-46. 2002.

**P 092- 02 "ESR of different Gd3+ sites in CaB6"**

Urbano, R. R., Rettori, C., Barberis, G. E., Torelli, M., Bianchi, A., Fisk, Z., Pagliuso, P. G., Malinowski, A., Hundley, M. F., Sarrao, J. L., and Oseroff, S. B.

The environment of Gd3+ ( $4f(7), S = 7/2$ ) ions in single crystals of Ca1-xGdxB6 ( $0.0001 \leq x \leq 0.01$ ) is studied by electron spin resonance (ESR). The spectra for  $x < 0.001$  or  $x = 0.001$  show a split spectrum due to cubic crystal field effects (CFE). The line shape of each fine structure line is Lorentzian, indicating an insulating environment for the Gd3+ ions. For  $0.003 \leq x \leq 0.01$ , the spectra show a single resonance (approximately  $1.992(4)$ ,  $\Delta H(1/2)$  approximately  $60$  Oe) with no CFE and Dysonian line shape indicating metallic environment for the Gd3+ ions. For intermediate concentrations, a coexistence of spectra corresponding to insulating and metallic regions is observed. Most of the measured samples show the weak ferromagnetism (WF) as reported for Ca0.995La0.005B6, but, surprisingly, this WF has no effect in our ESR spectra either for metallic or insulating environments. This result suggests that the WF in these systems might be isolated in clusters (defect-rich regions) and its relationship with metallicity is nontrivial. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* 320[1-4], 419-422. 2002.

**P 093- 02 "Hybrid simulations of extensive air showers"**

Alvarez-Muniz, J., Engel, R., Gaisser, T. K., Ortiz, J. A., and Stanev, T.

We present a fast one dimensional hybrid method to efficiently simulate extensive air showers up to the highest observed energies. Based on precalculated pion showers and a bootstrap technique, our method predicts the average shower profile, the number of muons at detector level above several energy thresholds as well as the fluctuations of the electromagnetic and hadronic components of the shower. We study the main characteristics of proton-induced air showers up to ultra high energy, comparing the predictions of three different hadronic interaction models: SIBYLL 1.7, SIBYLL 2.1 and QGSJET98. The influence of the hadronic interaction models on the shower evolution, in particular the elongation rate, is discussed and the applicability of analytical approximations is investigated

*Physical Review D* 66[3], art-033011. 2002.

**P 094- 02 "Magnetic and magnetotransport properties of nanostructured magnetic materials"**

Knobel, M., Denardin, J. C., and Brandl, A. L

In this work, an overview on magnetic and magnetotransport properties of nanostructured magnetic materials is presented, with particular emphasis on the basic features displayed by granular nanomagnetic solids and soft magnetic nanocrystalline materials. Recent results and trends on the area are briefly discussed.

*Metastable and Nanostructured Materials - Nanomat-2001, Proceedings 403, 117-125. 2002.*

**P 095- 02 "Magnetic properties of oxygenated carbon nitride films from RF- discharge in an acetylene, nitrogen, and oxygen mixture environments"**

Garcia-Quiroz, A., Azevedo, D. L., and da Silva, E. C.

Properties of oxygenated carbon nitride films have attracted the attention of physics researchers due to their magnetic and physical properties, as well as for their usefulness in the industry. The free radicals were investigated using electron paramagnetic resonance applied in the study of spin concentration due to the different mechanism of preparation of carbon nitride films by RF-discharge with different kinds of plasma. Unpaired spin concentrations, in the order of  $10^{20}$  per  $\text{cm}^3$ , were measured and their time recombination dependency was important in those films. The films were grown by plasma enhanced chemical vapor deposition using mixtures of hydrocarbons, N-2 and O-2 in different proportions. (C) 2002 Elsevier Science Ltd. All rights

*Journal of Physics and Chemistry of Solids 63[10], 1863-1866. 2002.*

**P096- 02 "Magnetoexciton electroabsorption in T shaped semiconductor quantum wires"**

Madureira, J. R., Maialle, M. Z., and Degani, M. H.

This work presents a calculation of the optical absorption spectra of magnetoexcitons in T-shaped semiconductor quantum wires. The calculation is performed using the semiconductor Bloch equations in the real-space and time domains. The peak and the linewidth of the fundamental exciton transition are investigated as functions of the applied magnetic and electric fields. For increasing magnetic field the exciton has its binding energy enhanced. The absorption spectra in the presence of a static electric field along the wire axis show a line broadening, an energy shift, and oscillations characteristic of the Franz-Keldysh effect. An introductory study of the effects on the absorption spectra of phase space occupation by photocreated carriers was done and we found that optical gain occurs for carrier density above similar to  $1.5 \times 10^{16}/\text{cm}^3$

*Physical Review B 66[7], art-075332. 2002.*

**P097- 02 "Micro- and nanocomposites of Keggin heteropolymetalates in cellulose esters"**

Oliveira, F. D., Schneider, J., Siervo, A., Landers, R., Plepis, A. M. G., Pireaux, J. J., and Rodrigues, U. P.

Composites of Keggin heteropolymetalates have been prepared and characterized by SEM, XPS, P-31-magic angle spinning/nuclear magnetic resonance and differential scanning calorimetry. The phosphotungstic acid and phosphomolybdic acid form nanocomposites where the oxocluster structure is preserved and is highly dispersed over the material, probably inserted between the polymeric chains. Phosphovanadotungstic clusters suffer partial decomposition during composite formation, resulting in a biphasic microcomposite. The decomposition product, phosphotungstic acid presents surface segregation as shown by comparison of XPS and nuclear magnetic resonance results. Copyright (C) 2002 John Wiley Sons, Ltd

*Surface and Interface Analysis 34[1], 580-582. 2002.*

**P098- 02 "Microstructure and magnetic properties of Co films on Si: Thickness and roughness dependence"**

de Carvalho, H. B., Brasil, M. J. S. P., Knobel, M., and Cotta, M. A.

We present an investigation of the microscopic and magnetic properties of Co films with thickness ranging from 30 to 950 Angstrom deposited by magnetron sputtering onto Si (100). The film microstructure was characterized by x-ray diffraction and Atomic Force Microscopy (AFM). We have used transversal Surface Magneto-Optical Kerr Effect (SMOKE) to investigate the hysteresis loops and the in-plane switching behavior as a function of the applied magnetic field orientation. The magnetic domains characterization was carried out by longitudinal magneto-optical Kerr microscopy. The x-ray results indicate that the grains of the polycrystalline film present a hcp structure. Even though the grains seem to have a random orientation, the SMOKE results show a strong planar uniaxial anisotropy. We discuss the correlation between roughness, thickness and magnetic properties of the Co films

*Metastable and Nanostructured Materials - Nanomat-2001, Proceedings 403, 111-116. 2002.*

**P099- 02 "Nuclear spin-lattice relaxation due to dissipative domain walls"**

Ferrer, A. V. and Caldeira, A. O.

The influence of the dissipative motion of domain walls in the nuclear spin-lattice relaxation rate is studied as a function of the external magnetic field and the temperature. Although only the specific case of the TMMC antiferromagnet below T-N is presented, the results are valid for all magnets described within the semiclassical approach by a double sine-Gordon equation for the spin degree of freedom. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B 320[1-4], 348-350. 2002.*

**P100- 02 "Optical constants and thickness determination of very thin amorphous semiconductor films"**

Chambouleyron, I., Ventura, S. D., Birgin, E. G., and Martinez, J. M

This contribution addresses the relevant question of retrieving, from transmittance data, the optical constants, and thickness of very thin semiconductor and dielectric films. The retrieval process looks for a thickness that, subject to the physical input of the problem, minimizes the difference between the measured and the theoretical spectra. This is a highly underdetermined problem but, the use of approximate-though simple-functional dependencies of the index of refraction and of the absorption coefficient on photon energy, used as an a priori information, allows surmounting the ill posedness of the problem. The method is illustrated with the analysis of transmittance data of very thin amorphous silicon films. The method enables retrieval of physically meaningful solutions for films as thin as 300 Å. The estimated parameters agree well with known data or with optical parameters measured by independent methods. The limitations of the adopted model and the shortcomings of the optimization algorithm are presented and discussed. (C) 2002 American Institute of Physics

*Journal of Applied Physics* 92[6], 3093-3102. 2002.

**P 101-02 "Polar and axial vectors versus quaternions"**

Silva, C. C. and Martins, R. D.

Vectors and quaternions are quite different mathematical quantities because they have different symmetry properties. Gibbs and Heaviside created their vector system starting from the quaternion system invented by Hamilton. They identified a pure quaternion as a vector and introduced some changes in the product of two vectors defined by Hamilton without realizing that the scalar product and vector product cannot be interpreted as the scalar part and vector part of the quaternion product. Toward the end of the 19th century some authors realized that there was an incompatibility between the vector and quaternion formalisms, but the central problem was not altogether clear. This paper will show that the main difficulty arose from Hamilton's contradictory use of *i*, *j*, and *k* both as versors and as vectors. (C) 2002 American Association of Physics Teachers

*American Journal of Physics* 70[9], 958-963. 2002.

**P 102-02 "Recent experiments and models on giant magnetoimpedance"**

Pirota, K. R., Knobel, M., and Gomez-Polo, C.

An overview of the giant magnetoimpedance phenomenon is given in this work. The effect, that consists of drastic changes of the complex impedance of soft magnetic materials upon the application of an external magnetic field, has attracted attention owing to the increasing perspectives of applications on magnetic and stress sensor technology. In particular, asymmetric response is specially indicated for specific applications, and many experimental and theoretical results have been developed so far. A novel approach to investigate the GMI, based on the Fourier analysis of the time derivative of magnetization, will be discussed in further detail. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* 320[1-4], 127-134. 2002.

**P 103- 02 "Red and green light emission from samarium-doped amorphous aluminum nitride films"**

Ribeiro, C. T. M., Alvarez, F., and Zanatta, A. R.

*Advanced Materials* 14[16], 1154-1157. 2002.

**P 104-02 "Relative stability of hcp and fcc crystalline structures of He- 4"**

Vitiello, S. A.

The relative stability of the hcp and fcc crystalline structures of He-4 is investigated using the Monte Carlo method. The calculations are made for a recent ab initio two-body interatomic potential and a given solid helium model. The results favor the experimentally observed hcp structure. Based on the reweighting technique, the correlated sampling methodology introduced is described. It is quite general and can be applied to other interatomic potentials, models of the solid phase, and quantum many-body systems

*Physical Review B* 65[21], art-214516. 2002.

**P105-02 "Small Fermi surface in the one-dimensional Kondo lattice model"**

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

We study the one-dimensional Kondo lattice model through the density-matrix renormalization group. Our results for the spin-correlation function indicate the presence of a small Fermi surface in large portions of the phase diagram, in contrast to some previous studies that used the same technique. We argue that the discrepancy is due to the open boundary conditions, which introduce strong charge perturbations that strongly affect the spin Friedel oscillations

*Physical Review B* 65[21], art-214406. 2002.

**P 106-02 "Soil characterisation using X-ray diffraction, photoacoustic spectroscopy and electron paramagnetic resonance"**

Manhaes, R. S. T., Auler, L. T., Sthel, M. S., Alexandre, J., Massunaga, M. S. O., Carrio, J. G., dos Santos, D. R., da Silva, E. C., Garcia-Quiroz, A., and Vargas, H.

The optical absorption spectra and chemical composition of soil samples were characterised using photoacoustic spectroscopy (PAS), electron paramagnetic resonance (EPR), X-ray diffraction and X-ray fluorescence. From fluorescence results, the chemical components were identified and an Fe mass concentration varying between 4% and 10% was determined. Besides that, the observed photoacoustic technique (PA) spectra showed transition bands associated with Fe<sup>3+</sup> ions. From the phase behaviour, both the nonradiative relaxation time  $\tau$  and the characteristic thermal diffusion time  $\tau(\beta)$  were determined. The X-ray diffraction analysis showed that kaolinite is a major crystalline phase (86% in mass) followed by minor quantities of anatase, gibbsite and quartz. Rietveld refinements showed that the Fe<sup>3+</sup> cations partially substitute for Al<sup>3+</sup> cations in the octahedral sites of the kaolinite structure. EPR measurements were performed in order to determine the crystalline environment of Fe ions; the observed profiles indicate that Fe sites are embedded in a distorted cubic crystalline field. (C) 2002 Elsevier Science B.V. All rights reserved

*Applied Clay Science* 21[5-6], 303-311. 2002.

**P 107- 02 Stress-induced electron emission from nano-composite amorphous carbon thin films.**

C.H. Poa, R. G. Lacerda, D. C. Cox, S.R.P. Silva , and F. C. Marques.

Traditionally, the emission of electrons from materials have been explained using either the Fowler-Nordheim emission mechanism where high electric fields are used to extract electrons from surfaces or using conventional thermal emission where high currents are used to 'boil' off electrons to vacuum. In this paper, we propose an alternative mechanism for electron emission from highly compressive thin films based on stress-induced Fermi-level crossing in the "band structure" of nano-ordered  $sp^2$  regions in the thin films. Experimental results are recorded which show that the localised compressive stress governs electron emission in the amorphous carbon thin films studied here rather than the surface nanostructures/features or the diamond-like  $sp^3$  hybridised bond component. This analysis is in agreement with the concept of an internal or non-geometric field enhancement from  $sp^2$  nanostructures giving rise to high dielectric inhomogeneity within the carbon thin film. The results presented could be extended to explain the anomalous field emission behaviour of carbon nanotubes.

*Applied Physics Letters*, **81 (5), 853-855 (2002).**

**P 108-02 "Strong charge carrier effect on the magnetic coupling of La- doped  $\text{CaMnO}_3$ "**

Martinho, H., Granado, E., Moreno, N. O., Garcia, A., Torriani, I., Rettori, C., Neumeier, J. J., and Oseroff, S. B.

The exchange interactions in polycrystalline samples of  $\text{Ca}_{1-x}\text{La}_x\text{MnO}_3$  ( $0.00 \leq x \leq 0.05$ ) are studied by means of Raman scattering and electron paramagnetic resonance. Dramatic reductions in the spin-phonon interactions and magnetic correlations are observed for La doping levels as small as similar to 2-3%. These results show that the charge carriers play an important role in the overall exchange coupling in the electron-doped manganites, even at very low doping levels. (C) 2002 Elsevier Science B.V. All rights reserved.

*Physica B* **320[1-4], 40-42. 2002.**

**P 109-02 "Structural changes in  $\text{RNiO}_3$  perovskites (R=rare earth) across the metal insulator transition"**

Piamonteze, C., Tolentino, H. C. N., Ramos, A. Y., Massa, N. E., Alonso, J. A., Martinez-Lopez, M. J., and Casais, M. T.

Rare earth nickel oxide perovskites ( $\text{RNiO}_3$ , R=rare earth) have, except for  $\text{LaNiO}_3$ , a metal-insulator (MI) phase transition as temperature decreases. The transition temperature (T-MI) increases as the R-ion becomes smaller. They also present, at low temperatures, a complex antiferromagnetic order. For lighter R-ions (e.g. Pr and Nd), the antiferromagnetic transition temperature (T-N) is close to T-MI, while for heavier R-ions (e.g. Eu, Sm), T-MI and T-N are very far apart, suggesting that

the magnetic and electronic behaviors are not directly coupled. Even though  $\text{Ni}^{3+}$  is a Jahn-Teller ion, no distortion in the  $\text{NiO}_6$  octahedra was found for  $\text{RNiO}_3$  perovskites with R = Pr, Nd, Sm and Eu. In this work we have measured EXAFS at Ni K edge for samples of  $\text{PrNiO}_3$ ,  $\text{NdNiO}_3$  and  $\text{EuNiO}_3$ . The Fourier transform spectra for the three samples show a clear splitting in the first peak at the insulating phase. This splitting corresponds to two or more different Ni-O distances. This indicates that there is either a distortion in the  $\text{NiO}_6$  octahedra or there are two different Ni sites at the insulating phase. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* **320[1-4], 71-74. 2002.**

**P 110-02 "Structural and electrical characterisation of  $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$  thin films grown by pulsed laser deposition"**

Rubi, D., Duhalde, S., Terzzoli, M. C., Leyva, G., Polla, G., Levy, P., Parisi, F., and Urbano, R. R

Thin films of perovskite manganite, with nominal composition  $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ , have been prepared by pulsed laser deposition on (100)  $\text{SrTiO}_3$ , (100)  $\text{LaAlO}_3$ , (100) Si and YSZ/ $\text{CeO}_2$ -buffered (100) Si substrates. Structural and electrical characterisation was performed on the films. The magneto-transport properties of all the thin films depart from the bulk behaviour. The LCMO film grown on buffered Si shows an insulator-metallic transition around 130-150 K while the one deposited directly on Si displayed a similar behaviour under a melting field of 1 T. However, that transition is absent in the films grown on LAO and STO. We suggest that appropriate stress values induced by the substrate favour the formation of metallic percolative paths. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* **320[1-4], 86-89. 2002.**

**P 111-02 "Structural evolution of Co clusters on  $\text{Cu}_{90}\text{Co}_{10}$  upon annealing"**

Vergara, M. P. C., Cezar, J. C., Tolentino, H. C. N., and Knobel, M

A granular alloy, composed of cobalt embedded in a copper matrix, was studied by using EXAFS and magnetotransport measurements as function of annealing parameters (temperature and annealing time). The results suggest that different annealing routes can reach the same final state. For annealing temperatures up to 450degreesC, the results indicate the coalescence of cobalt atoms, resulting in magnetic particles with increasing size. On the other hand, the annealing at 500degreesC shows a rapid formation of cobalt particles and then the re-dissolution of cobalt atoms in the copper matrix. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* **320[1-4], 143-145. 2002.**

**P 112-02 "Study of interactions in CO-SiO<sub>2</sub> granular films by means of MFM and magnetization measurements"**

Brandl, A. L., Denardin, J. C., Knobel, M., Dotto, M. E. R., and Kleinke, M. U.

A study Of CO[SiO<sub>2</sub>] granular films using magnetic force microscopy (MFM), transmission electron microscopy and DC magnetization is presented. MFM shows large strip magnetic domains in the percolated system and allows a more direct investigation of the magnetic interaction among grains in the film with the lowest metal volume fraction. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* 320[1-4], 213-216. 2002.

**P 113-02 "Theory and experiment of the ESR of Co<sup>2+</sup> in Zn-2(OH)PO<sub>4</sub> and Mg-2(OH)AsO<sub>4</sub>"**

Foglio, M. E., dos Santos, M. C., Barberis, G. E., Rojo, J. M., Mesa, J. L., Lezama, L., and Rojo, T.

Powder samples of Zn-2(OH)PO<sub>4</sub> and Mg-2(OH)AsO<sub>4</sub> were prepared with Co<sup>2+</sup> substituting Zn<sup>2+</sup> and Mg<sup>2+</sup>, respectively. These compounds are iso-structural, and both contain the Co<sup>2+</sup> in two environments of approximately octahedral and trigonal bipyramid structures. Experiments of electron spin resonance were performed on these two compounds, and the observed resonances are described with a theoretical model that considers the departures from the two perfect structures. It is shown that the resonance in the penta-coordinated complex is allowed, and the small intensity observed for this complex is explained assuming that it is much less populated than the octahedral one. This assumption was verified by a molecular calculation of the energies of the two environments, with both Co and Zn as central ions in Zn-2(OH)PO<sub>4</sub>. (C) 2002 Elsevier Science B.V. All rights reserved

*Physica B* 320[1-4], 423-426. 2002.

**P 114-02 "Unconventional metallic magnetism in LaCrSb<sub>3</sub>"**

Granado, E., Martinho, H., Sercheli, M. S., Pagliuso, P. G., Jackson, D. D., Torelli, M., Lynn, J. W., Rettori, C., Fisk, Z., and Oseroff, S. B.

Neutron-diffraction measurements in LaCrSb<sub>3</sub> show a coexistence of ferromagnetic and antiferromagnetic sublattices below T<sub>C</sub>=126 K, with ordered moments of 1.65(4) and 0.49(4) $\mu$ (B)/formula unit, respectively (T=10 K), and a spin- reorientation transition at approximate to 95 K. No clear peak or step was observed in the specific heat at T<sub>C</sub>. Coexisting localized and itinerant spins are suggested.

*Physical Review Letters* 89[10], art-107204. 2002.

# Abstracta

Instituto de Física

Diretor: Prof. Dr. Daniel Pereira

Universidade Estadual de Campinas - UNICAMP

Cidade Universitária C.P. 6165

CEP: 13081-970 - Campinas - SP - Brasil

e-mail: [secdir@ifi.unicamp.br](mailto:secdir@ifi.unicamp.br)

Fone: 0XX 19 3788-5300 / Fax: 0XX 19 3788-3127

Publicação

Biblioteca do Instituto de Física Gleb Wataghin

<http://www.ifi.unicamp.br/bif>

Diretora Técnica: Rita Aparecida Sponchiado

Elaboração

Tânia Macedo Folegatti

[abstract@ifi.unicamp.br](mailto:abstract@ifi.unicamp.br)

Projeto Gráfico

ÍgneaDesign

Impressão

Gráfica Central - Unicamp

