

# Abstracta

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**Trabalhos Publicados**

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**P030-11 à P069 -11**

## Trabalhos Publicados

### [P030-11] "Absence of Exchange Interaction Between Localized Magnetic Moments and Conduction-Electrons in Magnetic Ions Diluted in Ag-Nanoparticles"

Vargas, J. M., Iwamoto, W., Holanda, L. M., Oseroff, S. B., Pagliuso, P. G., and Rettori, C.

The Electron Spin Resonance (ESR) of diluted magnetic ions (MI) of Er<sup>3+</sup>, Yb<sup>3+</sup> and Mn<sup>2+</sup> in Ag nanoparticles (NPs) is reported. Monodisperse samples of Ag NPs doped with these MI were synthesized by reducing silver nitrate and MI-oxides. This simple method can be extended to all rare-earths. The measurements of the g-values and hyperfine splittings indicates that the MI are located at cubic sites in the Ag:MI NPs. The ESR spectra show that there is no g-shift and Korringa-relaxation due to the exchange interaction between the MI and the conduction electrons, suggesting that the exchange interaction is absent in the Ag:MI NPs. Thus, the nature of this interaction needs to be reexamined at the nanoscale range

*Journal of Nanoscience and Nanotechnology* 11[3], 2126-2131. 2011.

### [P031-11] "Activity of SiDbCl in the Electrooxidation of Ascorbic Acid, Dopamine, and Uric Acid"

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

Selective electroanalytical responses for ascorbic acid, dopamine and uric acid at a carbon modified electrode based on 3-n-propyl-1-azonia-4-azabicyclo[2.2.2]octane silsesquioxane chloride (SiDbCl) is reported. The overlapped peaks observed at an unmodified electrode are resolved into three well defined voltammetric peaks allowing the simultaneous determination of the three species. Detection limits of 37, 0.3 and 0.1  $\mu\text{mol L}^{-1}$  of ascorbic acid, dopamine and uric acid, respectively, were calculated from calibration curves based on differential pulse voltammetric experiments performed in Britton-Robinson buffer solution at pH 7.04

*Electroanalysis* 23[2], 334-338. 2011.

### [P032-11] "A non-extensive equilibrium analysis of $\delta^+$ pT spectra at RHIC"

Chinellato, D. D. Takahashi J. Bediaga I.

By analyzing the dynamical properties of particle production in relativistic heavy ion collisions, it is possible to characterize the final stage of the equilibration process occurring in the collision fireball. In this work, we use the Hagedorn model coupled with non-extensive statistics to evaluate the transverse momentum spectra of positive pions for various event centrality classes in Au+Au collisions at RHIC with center-of-mass energies of 62.4 GeV  $\text{A}^{-1}$  and 200 GeV  $\text{A}^{-1}$ . We find that, by assuming an energy distribution that incorporates particle correlations, it is possible to explain the entire  $\delta^+$  p<sub>T</sub> spectrum as measured by RHIC. We find that spectra from central collisions, when compared to peripheral collisions, are consistent with a system that has smaller values of the non-extensivity parameter 'q' and higher values of temperature. Comparison between different beam energies also shows a variation of the 'q' parameter. The result is discussed using the interpretation that the 'q' parameter is a measure of particle correlations within the system. Under this assumption, our results show that more central collisions are consistent with a system with less particle correlations. © 2010 IOP Publishing Ltd.

*Journal of Physics G: Nuclear and Particle Physics* 37[9], 094042. 2010.

### [P033-11] "Biomass briquetting and its perspectives in Brazil"

Felfli, F. F., Mesa, J. M., Rocha, J. D., Filippetto, D., Luengo, C. A., and Pippo, W. A.

A study of the status of biomass briquetting and its perspectives in Brazil was conducted including determination of the availability and characteristics of the agro-residues for briquetting. Wood residues, rice husk and coffee husk were characterized and identified as the more promising agro-residues for briquetting in the short-term in Brazil. A survey was carried out in order to determine the number of briquetting factories in Brazil, and also to determine: used briquetting technologies, briquettes production, briquettes sale prices, the status of biomass briquetting market and its future perspectives. (C) 2010 Elsevier Ltd. All rights reserved

*Biomass & Bioenergy* 35[1], 236-242. 2011.

### [P034-11] "Broadband single-polarization guidance in hybrid photonic crystal fibers"

Cerqueira, A. S., Lona, D. G., de Oliveira, I., Hernandez-Figueroa, H. E., and Fragnito, H. L.

We present hybrid photonic crystal fibers that provide broadband single-polarization guidance based on two different propagation mechanisms, namely, total internal reflection and the photonic bandgap effect. Experimental results demonstrate polarization dependent loss as high as 26.7 dB and the bandwidth of single-polarization behavior over 225 nm. (C) 2011 Optical Society of America

*Optics Letters* 36[2], 133-135. 2011.

### [P035-11] "Centrality Dependence of the Charged-Particle Multiplicity Density at Midrapidity in Pb-Pb Collisions at root s(NN)=2.76 TeV"

Aamodt, K., Quintana, A. A., Adamova, D., Adare, A. M., Aggarwal, M. M., Rinella, G. A., Agocs, A. G., Salazar, S. A., Ahammed, Z., Ahmad, N., Masoodi, A. A., et al

The centrality dependence of the charged-particle multiplicity density at midrapidity in Pb-Pb collisions at root s(NN) = 2: 76 TeV is presented. The charged-particle density normalized per participating nucleon pair increases by about a factor of 2 from peripheral (70%-80%) to central (0%-5%) collisions. The centrality dependence is found to be similar to that observed at lower collision energies. The data are compared with models based on different mechanisms for particle production in nuclear collisions

*Physical Review Letters* 106[3]. 032301. 2011.

### [P036-11] "Characterization of Ultra-Thin Films of Pd Deposited on Au(111)"

Pancotti, A., Nascente, P. A. P., de Siervo, A., Landers, R., Carazzolle, M. F., Tallarico, D. A., and Kleiman, G. G.

Ultra-thin films (1 and 3 monolayers) of Pd were deposited on the Au(111) surface and then characterized by X-ray photoelectron spectroscopy (XPS), X-ray excited Auger

spectroscopy (XAES), low-energy electron diffraction (LEED), and X-ray photoelectron diffraction (XPD). For the 1 ML Pd film annealed at 450 A degrees C, XPS and XAES results indicated that Pd had diffused into the Au substrate. For the 3 ML Pd film deposited at room temperature, the comparison between experimental and theoretical XPD results indicated approximately 30% of the surface was formed by 2 ML Au layers, and 70% of the surface, by 1 ML Au layers

*Topics in Catalysis* 54[1-4], 70-76. 2011.

**[P037-11] “Degenerate Fermi gas perturbations at standard background cosmology”**

Bernardini, A. E. and Perico, E. L. D.

The hypothesis of a tiny fraction of the cosmic inventory evolving cosmologically as a degenerate Fermi gas test fluid at some dominant cosmological background is investigated. Our analytical results allow for performing preliminary computations to the evolution of perturbations for relativistic and non-relativistic test fluids. The density fluctuation,  $\delta$ , the fluid velocity divergence,  $\theta$ , and an explicit expression for the dynamics of the shear stress,  $\sigma$ , are obtained for a degenerate Fermi gas in the background regime of radiation. Extensions to the dominance of matter and to the Lambda CDM cosmological background are also investigated and lessons concerning the formation of large structures of degenerate Fermi gas are depicted

*Journal of Cosmology and Astroparticle Physics* [1]. 010. 2011.

**[P038-11] “Drainage kinetics of nanochannels fabricated in water films a few molecules thick on mica at room temperature”**

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

Nanochannels of the order of 20 nm in diameter and forming arrangements that were a few micrometres wide were fabricated on nanometre-thick ice-like deposits on planar mica surfaces at room temperature. Because an atomic force microscopy tip can write lines on ice-like layers covering mica substrates in air that are stable under invariant conditions of humidity and temperature, the water films were modulated with nanochannels. By analysing the shape and morphology of the material removed after channel fabrication for various time intervals, the channel profile was shown to vary with a scale of a tenth of a second. In this configuration (hydrophobic tip and hydrophilic substrate, 65% RH), at the channel top region there were only aggregates of loose flakes formed after the film inscription but no liquid. Apparently, the Kelvin effect is responsible for the nanochannel profile variation with time, but the calculated and measured values of the drainage time constant are at variance by six orders of magnitude. This reduction of the mass transfer is associated with the small dimensions of the similar to 10 nm-wide channels

*Nanotechnology* 22[16]. 165304. 2011.

**[P039-11] “Efficient implementation of the Hellmann-Feynman theorem in a diffusion Monte Carlo calculation”**

Vitiello, S. A.

Kinetic and potential energies of systems of He-4 atoms in the solid phase are computed at  $T = 0$ . Results at two densities of the liquid phase are presented as well. Calculations are performed by the multiweight extension to the diffusion Monte Carlo method that allows the application of the Hellmann-Feynman theorem in a robust and efficient way. This is a general method that can be applied in other situations of interest as well.

(C) 2011 American Institute of Physics. [doi:10.1063/1.3532411]

*Journal of Chemical Physics* 134[5]. 054102. 2011.

**[P040-11] “Electromagnetically-induced phase grating: A coupled-wave theory analysis”**

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

We use a coupled-wave theory analysis to describe an atomic phase grating based on the giant Kerr nonlinearity of an atomic medium under electromagnetically induced transparency. An analytical expression is found for the diffraction efficiency of the grating. Efficiencies greater than 70% are predicted for incidence at the Bragg angle. (C) 2011 Optical Society of America

*Optics Express* 19[3], 1936-1944. 2011.

**[P041-11] “Field induced phase transitions on NdRhIn5 and Nd2RhIn8 antiferromagnetic compounds”**

Duque, J. G. S., Serrano, R. L., Garcia, D. J., Bufaical, L., Ferreira, L. M., Pagliuso, P. G., and Miranda, E.

In this work, we have investigated the low temperature magnetic phase diagram of the tetragonal NdRhIn5 and Nd2RhIn8 single crystals by means of temperature and field dependent heat capacity and magnetic susceptibility measurements. These compounds order antiferromagnetically with a Neel temperature (T-N) of 11 and 10.7 K for NdRhIn5 and Nd2RhIn8, respectively. The constructed magnetic phase of both compounds are anisotropic and show, as expected, a decrease of T-N as a function of the magnetic field for c crystallographic direction. However when the magnetic field is applied along of the c-axis, which is the magnetic easy axis, first-order-like field induced transitions are observed within the antiferromagnetic state. We compare the phase diagrams obtained for NdRhIn5 and Nd2RhIn8 with those for their cubic relative NdIn3. (C) 2010 Elsevier B.V. All rights reserved

*Journal of Magnetism and Magnetic Materials* 323[7], 954-956. 2011.

**[P042-11] “Helium Atoms Kinetic Energy at Temperature T=0”**

Vitiello, S. A.

Kinetic energies for systems formed from He-4 atoms at T=0 in the solid and liquid phases are reported. The “exact” results are obtained by an extension of the diffusion Monte Carlo method. The overall agreement of the results with experimental values and calculations at finite temperatures is very good

*Journal of Low Temperature Physics* 162[3-4], 154-159. 2011.

**[P043-11] “Human Nek6 is a monomeric mostly globular kinase with an unfolded short N-terminal domain”**

Meirelles, G. V., Silva, J. C., Mendonca, Y. D., Ramos, C. H. I., Torriani, I. L., and Kobarg, J.

Background: The NIMA-related kinases (Neks) are widespread among eukaryotes. In mammals they represent an evolutionarily conserved family of 11 serine/threonine kinases, with 40-45% amino acid sequence identity to the *Aspergillus nidulans* mitotic regulator NIMA within their catalytic domains. Neks have cell cycle-related functions and were recently described as related to pathologies, particularly cancer, consisting in potential chemotherapeutic targets. Human Nek6, -7 and -9

are involved in the control of mitotic spindle formation, acting together in a mitotic kinase cascade, but their mechanism of regulation remain elusive. Results: In this study we performed a biophysical and structural characterization of human Nek6 with the aim of obtaining its low resolution and homology models. SAXS experiments showed that hNek6 is a monomer of a mostly globular, though slightly elongated shape. Comparative molecular modeling together with disorder prediction analysis also revealed a flexible disordered N-terminal domain for hNek6, which we found to be important to mediate interactions with diverse partners. SEC-MALS experiments showed that hNek6 conformation is dependent on its activation/phosphorylation status, a higher phosphorylation degree corresponding to a bigger Stokes radius. Circular dichroism spectroscopy confirmed our in silico predictions of secondary structure content and thermal stability shift assays revealed a slightly higher stability of wild-type hNek6 compared to the activation loop mutant hNek6(S206A). Conclusions: Our data present the first low resolution 3D structure of hNek6 protein in solution. SAXS, comparative modeling and SEC-MALS analysis revealed that hNek6 is a monomeric kinase of slightly elongated shape and a short unfolded N-terminal domain

**Bmc Structural Biology 11. 12. 2011.**

**[P044-11] “Lagrangian-Hamiltonian formulation of paraxial optics and applications: Study of gauge symmetries and the optical spin Hall effect”**

Dartora, C. A., Cabrera, G. G., Nobrega, K. Z., Montagner, V. F., Matielli, M. H. K., de Campos, F. K. R., and Filho, H. T. S.

In the context of the paraxial regime, usually valid for optical frequencies and also in the microwave spectrum of guided waves, the propagation of electromagnetic fields can be analyzed through a paraxial wave equation, which is analogous to the nonrelativistic Schrodinger equation of quantum mechanics but replacing time  $t$  with spatial coordinate  $z$ . Considering that, here it is shown that for lossless media in optical frequencies it is possible to construct a Lagrangian operator with an one-to-one correspondence with nonrelativistic quantum mechanics, which allows someone to use the same mathematical methods and techniques for solving problems. To demonstrate that, we explore a few applications in optics with increasing levels of complexity. In the spirit of a Hamiltonian formulation, the ray-tracing trajectories of geometric optics in paraxial regime are obtained in a clear manner. Following that, the gauge symmetries of the optical-field Lagrangian density is discussed in a detailed way, leading to the general form of the interaction Hamiltonian. Through the use of perturbation theory, we discuss a classical analog for a quantum NOT gate, making use of mode coupling in an isotropic chiral medium. At last, we explore the optical spin Hall effect and its possible applications using an effective geometric optics equation derived from an interaction Hamiltonian for the optical fields. We also predict within the framework of paraxial optics a spin Hall effect of light induced by gravitational fields

**Physical Review A 83[1]. 012110. 2011.**

**[P045-11] “Making holograms at school and at home”**

Toledo, R. S., Yeras, A. M., Magalhaes, D. S. F., Muramatsu, M., and Lemus, J. B.

The scientific community that deals with the problems related with the teaching-learning process of Physics has devoted many efforts in its perfectioning in the last years motivated, in the first instance, by renewal demands that the rapidly scientific-technological development currently requests in the teaching of science. In the last few years a rapid development in the production of visible-emission diode lasers has been made, this

has allowed their increasing use in many applications and makes possible their utilization in the teaching-learning of the physics in the university and particularly of holography, for their great advantages over the high-cost conventional lasers and difficult handling. In this work we describe the portable experimental setup designed for the obtainment of holograms at school and at home using diode laser, the working methodology to be followed, the processing methods used for different types of holographic emulsions and an analysis of frequent defects in the recording and how to detect and eradicate them.

**Revista Brasileira de Ensino de Fisica 32[3]. 3502. 2010.**

**[P046-11] “Measurement of the Parity-Violating Longitudinal Single-Spin Asymmetry for  $W^{+/-}$  Boson Production in Polarized Proton-Proton Collisions at  $\sqrt{s}=500$  GeV”**

Aggarwal, M. M., Ahammed, Z., Alakhverdyants, A. V., Alekseev, I., Alford, J., Anderson, B. D., Anson, C. D., Arkhipkin, D., Averichev, G. S., Balewski, J., Beavis, D. R., Bellwied, R., Betancourt, M. J., Betts, R. R., Bhasin, A., Bhati, A. K., et al

We report the first measurement of the parity-violating single-spin asymmetries for midrapidity decay positrons and electrons from  $W^+$  and  $W^-$  boson production in longitudinally polarized proton-proton collisions at  $\sqrt{s} = 500$  GeV by the STAR experiment at RHIC. The measured asymmetries,  $A(L)(W^+) = -0.27 \pm 0.10(\text{stat.}) \pm 0.02(\text{syst.}) \pm 0.03(\text{norm.})$  and  $A(L)(W^-) = 0.14 \pm 0.19(\text{stat.}) \pm 0.02(\text{syst.}) \pm 0.01(\text{norm.})$ , are consistent with theory predictions, which are large and of opposite sign. These predictions are based on polarized quark and antiquark distribution functions constrained by polarized deep-inelastic scattering measurements

**Physical Review Letters 106[6]. 062002. 2011.**

**[P047-11] “Measurement of the underground atmospheric muon charge ratio using the MINOS Near Detector”**

Adamson, P., Andreopoulos, C., Auty, D. J., Ayres, D. S., Backhouse, C., Barr, G., Barrett, W. L., Bhattarai, P., Bishai, M., Blake, A., Bock, G. J., Boehnlein, D. J., Bogert, D., Budd, S., Cavanaugh, S., Cherdack, D., Childress, S., Choudhary, B. C., et al

The magnetized MINOS Near Detector, at a depth of 225 mwe, is used to measure the atmospheric muon charge ratio. The ratio of observed positive to negative atmospheric muon rates, using 301 days of data, is measured to be  $1.266 \pm 0.001(\text{stat.})(-0.014)(+0.015)(\text{syst.})$ . This measurement is consistent with previous results from other shallow underground detectors and is  $0.108 \pm 0.019(\text{stat} + \text{syst})$  lower than the measurement at the functionally identical MINOS Far Detector at a depth of 2070 mwe. This increase in charge ratio as a function of depth is consistent with an increase in the fraction of muons arising from kaon decay for increasing muon surface energies

**Physical Review D 83[3]. 032011 . 2011.**

**[P048-11] “Measuring vortex charge with a triangular aperture”**

de Araujo, L. E. E. and Anderson, M. E

A triangular aperture illuminated with a vortex beam creates a truncated lattice diffraction pattern that identifies the charge of the vortex. In this Letter, we demonstrate the measurement of vortex charge via this approach for vortex beams up to charge  $\pm 7$ . We also demonstrate the use of this technique

for measuring femtosecond vortices and noninteger vortices, comparing these results with numerical modeling. It is shown that this technique is simple and reliable, but care must be taken when interpreting the results for the noninteger case. (C) 2011 Optical Society of America

*Optics Letters* 36[6], 787-789. 2011.

**[P049-11] “Mechanical Deformation of Nanoscale Metal Rods: When Size and Shape Matter”**

Lagos, M. J., Sato, F., Galvao, D. S., and Ugarte, D.

Face centered cubic metals deform mainly by propagating partial dislocations generating planar fault ribbons. How do metals deform if the size is smaller than the fault ribbons? We studied the elongation of Au and Pt nanorods by in situ electron microscopy and ab initio calculations. Planar fault activation barriers are so low that, for each temperature, a minimal rod size is required to become active for releasing elastic energy. Surface effects dominate deformation energetics; system size and shape determine the preferred fault gliding directions which induce different tensile and compressive behavior

*Physical Review Letters* 106[5]. 055501. 2011.

**[P050-11] “MR Imaging Texture Analysis of the Corpus Callosum and Thalamus in Amnesic Mild Cognitive Impairment and Mild Alzheimer Disease”**

de Oliveira, M. S., Balthazar, M. L. F., D’Abreu, A., Yasuda, C. L., Damasceno, B. P., Cendes, F., and Castellano, G.

Background and purpose: Ta is a branch of image processing that seeks to reduce image information by extracting texture descriptors from the image. Ta of mr images of anatomic structures in mild ad and amci is not well-studied. Our objective was to attempt to find differences among patients with amci and mild ad and normal-aging subjects, by using ta applied to the mr images of the cc and the thalami of these groups of subjects. Materials and methods: Ta was applied to the mr images of 17 patients with amci, 16 patients with mild ad, and 16 normal-aging subjects. The ta approach was based on the glcm. Mr images were t1-weighted and were obtained in the sagittal and axial planes. The cc and thalami were manually segmented for each subject, and 44 texture parameters were computed for each of these structures. Results: Ta parameters showed differences among the 3 groups for the cc and thalamus. A pairwise comparison among groups showed differences for ad-control and amci-ad for the cc; And for ad-control, amci-ad, and amci-control for the thalamus. Conclusions: Ta is a useful technique to aid in the detection of tissue alterations in mr images of mild ad and amci and has the potential to become a helpful tool in the diagnosis and understanding of these pathologies

*American Journal of Neuroradiology* 32[1], 60-66. 2011.

**[P051-11] “Muon life time measurement”**

Fauth, A. C., Grover, A. C., and Consalter, D. M.

The authors discuss one type of general forward-backward stochastic differential equations (FBSDEs) with It’s stochastic delayed equations as the forward equations and anticipated backward stochastic differential equations as the backward equations. The existence and uniqueness results of the general FBSDEs are obtained. In the framework of the general FBSDEs in this paper, the explicit form of the optimal control for linearquadratic stochastic optimal control problem with delay and the Nash equilibrium point for nonzero sum differential games problem with delay are obtained.

*Revista Brasileira de Ensino de Fisica* 32[4]. 4502. 2010.

**[P052-11] “Observation in the MINOS far detector of the shadowing of cosmic rays by the sun and moon”**

Adamson, P., Andreopoulos, C., Ayres, D. S., Backhouse, C., Barr, G., Barrett, W. L., Bishai, M., Blake, A., Bock, B., Bock, G. J., Boehnlein, D. J., Bogert, D., Bower, C., Budd, S., Cavanaugh, S., Cherdack, D., Childress, S., Choudhary, B. C., et all

The shadowing of cosmic ray primaries by the moon and sun was observed by the MINOS far detector at a depth of 2070 mwe using 83.54 million cosmic ray muons accumulated over 1857.91 live-days. The shadow of the moon was detected at the 5.6 sigma level and the shadow of the sun at the 3.8 sigma level using a log-likelihood search in celestial coordinates. The moon shadow was used to quantify the absolute astrophysical pointing of the detector to be 0.17 +/- 0.12 degrees. Hints of interplanetary magnetic field effects were observed in both the sun and moon shadow. Published by Elsevier B.V

*Astroparticle Physics* 34[6], 457-466. 2011.

**[P053-11] “Optical and physical properties of Er3+-doped oxy-fluoride tellurite glasses”**

Chillce, E. F., Mazali, I. O., Alves, O. L., and Barbosa, L. C.

In this manuscript we present the effects of ZnF2 concentration on the optical and physical properties of Er3+-doped oxy-fluoride tellurite glasses (7500 ppm Er2O3-(80-x)TeO2-xZnF2-20ZnO, where x = 5, 10, 15, 20, 25 and 30 mol%). In general, as the concentration of ZnF2 increases: (i) the thermal stability, the optical transparency window, and the lifetime of the I-4(13/2) level increase; (ii) the density, the linear refractive index, the Rayleigh scattering loss, and the OH- ion concentration decrease; and (iii) the Er3+ ion emission cross section spectrum is quenched and the bandwidth is reduced. The I-4(13/2) level lifetime increase may be associated with the luminescence re-absorption and the radiative transition (S-4(3/2) - I-4(13/2)) processes, since both processes may contribute to the I-4(13/2) level population. The Er3+ ion emission cross section spectrum (at around 1550 nm) of oxy-fluoride tellurite glass containing 30 mol% of ZnF2 was very similar to those of Fluoride glasses. (C) 2010 Elsevier B.V. All rights reserved

*Optical Materials* 33[3], 389-396. 2011.

**[P054-11] “Optical recording mechanisms in undoped titanosillenite crystals”**

Jerez, V., de Oliveira, I., and Frejlich, J.

We show that optical recording in undoped photorefractive titanosillenite Bi12TiO20 (BTO) crystals involve electrons, holes and ions, depending on the experimental conditions. Holographic recording and erasure at higher than room temperature was carried out on an undoped crystal sample, showing the presence of a fast photosensitive electron-based hologram and a slower compensating one of nonphotosensitive nature that is responsible for hologram fixing in BTO and is likely to be based on H+ ions. The fixed grating showed a diffraction efficiency eta approximate to 0.002 and a characteristic activation energy of 0.85 +/- 0.05 eV. A strong light-induced (darkening) photochromic effect was also detected, that had to be accounted on for diffraction efficiency measurement. Holes are shown to participate in the optical recording process when selectively photoexcited with infrared light. (C) 2011 American Institute of Physics. [doi:10.1063/1.3533421]

*Journal of Applied Physics* 109[2]. 024901. 2011.

**[P055-11] "Ordered Oxide Surfaces on Metals: Chromium Oxide"**

Pancotti, A., de Siervo, A., Carazzolle, M. F., Landers, R., and Kleiman, G. G.

We present X-ray photoelectron spectroscopy (XPS) and X-ray photoelectron diffraction (XPD) investigations of ordered chromium oxide ultrathin films prepared on a Pd(111) single-crystal surface. The films were grown by thermal evaporation of Cr under an oxygen atmosphere and sample temperature of 600 K. The ordered films produced are strongly dependent on the film thickness and annealing treatment. Films with thickness below 5 Å, produced at low coverages, display a  $p(2 \times 2)$  structure relative to Pd(111). Thicker films (thickness > 10 Å) always have a  $(\sqrt{3} \times \sqrt{3})R30^\circ$  structure. The photoemission measurements were done using conventional X-ray sources as well as synchrotron radiation taken at the Laboratorio Nacional de Luz Síncrotron. The XPD data were interpreted through the use of a multiple scattering calculation approach combined with a genetic algorithm for surface structure optimization. Combining the information from XPS, low energy electron diffraction and XPD measurements we have determined the surface structure of the  $(\sqrt{3} \times \sqrt{3})R30^\circ$  phase. Elsewhere, we report on the structure of the  $p(2 \times 2)$  phase

*Topics in Catalysis* 54[1-4], 90-96. 2011.

**[P056-11] "Plasma transport coefficients: An application of SO(3) group"**

Braga, F. L.

The appearance of anisotropy in certain properties such as conductivity and diffusion coefficients could be induced by the application of external magnetic fields. Using the matrixial representation of SO(3) group it was possible to demonstrate that this anisotropy is characterized by a rotation of plasma current. This work presented in a didactical way the relation between the external magnetic field and some plasma parameters with the rotation angle. (C) 2010 Elsevier Ltd. All rights reserved

*Applied Mathematics Letters* 24[5], 653-656. 2011.

**[P057-11] "Plasmon polariton and  $n > 0$  non-Bragg gaps in superlattices with metamaterials"**

de Carvalho, C. A. A., Cavalcanti, S. B., Reyes-Gomez, E., and Oliveira, L. E.

We consider one-dimensional photonic superlattices made up of alternate layers of a right-handed nondispersive material and a metamaterial with Drude-type dielectric permittivity and magnetic permeability. By thoroughly investigating the dispersion relation for the propagation of obliquely incident optical fields obtained from Maxwell's equations and the transfer-matrix technique, we demonstrate that, in the long-wavelength limit, the dispersion is the same that one would obtain by considering a homogeneous effective medium with Drude-type responses at shifted electric and magnetic plasmon frequencies. Moreover, we show that the plasmon polariton and  $n > 0$  non-Bragg gaps correspond to regions of the low-energy spectrum where the effective medium is absorptive, exhibiting an imaginary effective refraction index

*Physical Review B* 83[8]. 081408. 2011.

**[P058-11] "Reversible electron pumping and negative differential resistance in two-step barrier diode under strong terahertz ac field"**

Murillo, G., Schulz, P. A., and Arce, J. C.

A computational study, employing a Floquet-transfer-matrix approach, of the current in a model two-step barrier diode under intense ac fields in the terahertz range is reported. It is demonstrated that the field pumps a net tunnel current through the structure, which can exhibit a negative differential resistance and whose direction can be controlled by the ac-bias amplitude. These behaviors are seen to originate from the inelastic scattering of incoming electrons by absorption or emission of field quanta from a shape resonance present in the field-free structure. (C) 2011 American Institute of Physics. [doi:10.1063/1.3562309]

*Applied Physics Letters* 98[10]. 102108. 2011.

**[P059-11] "Selective Allylic oxidation of Cyclohexene by a Magnetically Recoverable Cobalt Oxide Catalyst"**

Silva, F. P., Jacinto, M. J., Landers, R., and Rossi, L. M.

In this work, we prepared a new magnetically recoverable CoO catalyst through the deposition of the catalytic active metal nanoparticles of 2-3 nm on silica-coated magnetite nanoparticles to facilitate the solid separation from liquid media. The catalyst was fully characterized and presented interesting properties in the oxidation of cyclohexene, as for example, selectivity to the allylic oxidation product. It was also observed that CoO is the most active species when compared to  $Co^{2+}$ ,  $Co_3O_4$  and  $Fe_3O_4$  in the catalytic conditions studied

*Catalysis Letters* 141[3], 432-437. 2011.

**[P060-11] "SiO<sub>2</sub>/SnO<sub>2</sub>/Sb<sub>2</sub>O<sub>5</sub> microporous ceramic material for immobilization of Meldola's blue: Application as an electrochemical sensor for NADH"**

Canevari, T. C., Vinhas, R. C. G., Landers, R., and Gushikem, Y.

The mixed oxide  $SiO_2/SnO_2$ , containing 25 wt% of  $SnO_2$ , determined by X-ray fluorescence, was prepared by the sol-gel method and the porous matrix obtained was then grafted with Sb(V), resulting the solid designated as (SiSnSb). XPS indicated 0.7% of Sb atoms on the surface. Sb grafted on the surface contains Brønsted acid centers (SbOH groups) that can immobilize Meldola's blue (MB<sup>+</sup>) cationic dye onto the surface by an ion exchange reaction, resulting the solid designated as (SiSnSb/MB). In the present case a surface concentration of  $MB^+ = 2.5 \times 10^{-11}$  mol cm<sup>2</sup> on the surface was obtained. A homogeneous mixture of the SiSnSb/MB with ultra pure graphite (99.99%) was pressed in disk format and used to fabricate a working electrode that displayed an excellent specific electrocatalytic response to NADH oxidation, with a formal potential of -0.05 V at pH 7.3. The electrochemical properties of the resulting electrode were investigated thoroughly with cyclic voltammetric and chronoamperometry techniques. The proposed sensor showed a good linear response range for NADH concentrations between  $8 \times 10^{-5}$  and  $9.0 \times 10^{-4}$  mol L<sup>-1</sup>, with a detection limit of  $1.5 \times 10^{-7}$  mol L<sup>-1</sup>. The presence of dopamine and ascorbic acid did not show any interference in the detection of NADH on this modified electrode surface. (C) 2010 Elsevier B.V. All rights reserved

*Biosensors & Bioelectronics* 26[5], 2402-2406. 2011.

**[P061-11] “Spin-dependent resonant quantum tunneling between magnetic nanoparticles on a macroscopic length scale”**

Varalda, J., Dartora, C. A., de Oliveira, A. J. A., Ortiz, W. A., Vodungbo, B., Marangolo, M., Vidal, F., Zheng, Y., Cabrera, G. G., and Mosca, D. H.

Macroscopic quantum phenomena are common features observed in superconductors, superfluid helium, and Bose-Einstein condensates. However, most of quantum transport studies are based on a small number of dots and are not in long-range electron transport length scale. Here we show that spin-dependent resonant quantum tunneling is achieved in the macroscopic length scale (a few millimeters) corresponding to an array of up to 10(4) junctions in a series consisting of Co nanoparticles embedded in an oxygen-deficient TiO<sub>2</sub> matrix. This phenomenon is observed by magnetoresistance measurements at 5 K in a Coulomb blockade regime. We further present a model based on resonant spin-polarized quantum tunneling of electrons of Co particles. It occurs through resonant continuous spin-polarized defect band states located near the Fermi level of the defective TiO<sub>2</sub>, which acts as a magnetic tunnel barrier. These results might be potentially useful for future designs of spintronic quantum devices

**Physical Review B 83[4]. 045205. 2011.**

**[P062-11] “Strange and multistrange particle production in Au plus Au collisions at root s(NN)=62.4 GeV”**

Aggarwal, M. M., Ahammed, Z., Alakhverdyants, A. V., Alekseev, I., Alford, J., Anderson, B. D., Anson, C. D., Arkhipkin, D., Averichev, G. S., Balewski, J., Beavis, D. R., Bellwied, R., Betancourt, M. J., Betts, R. R., Bhasin, A., Bhati, A. K., et al

We present results on strange and multistrange particle production in Au + Au collisions at root s(NN) = 62.4 GeV as measured with the STAR detector at RHIC. Midrapidity transverse momentum spectra and integrated yields of K-S(0), Lambda, Xi, and Omega and their antiparticles are presented for different centrality classes. The particle yields and ratios follow a smooth energy dependence. Chemical freeze-out parameters, temperature, baryon chemical potential, and strangeness saturation factor obtained from the particle yields are presented. Intermediate transverse momentum (p(T)) phenomena are discussed based on the ratio of the measured baryon-to-meson spectra and nuclear modification factor. The centrality dependence of various measurements presented show a similar behavior as seen in Au + Au collisions at root s(NN) = 200 GeV

**Physical Review C 83[2]. 024901. 2011.**

**[P063-11] “Structural and Magnetic Study of a Diluted Magnetic Semiconductor: Fe-Doped CeO<sub>2</sub> Nanoparticles”**

Kumar, S., Kim, G. W., Koo, B. H., Sharma, S. K., Knobel, M., Chung, H., and Lee, C. G.

This paper reports the effect of Fe doping on the structure and room temperature ferromagnetism of CeO<sub>2</sub> nanoparticles. X-ray diffraction and the selective area electron diffraction measurements performed on the Ce<sub>1-x</sub>Fe<sub>x</sub>O<sub>2</sub> (0 ≤ x ≤ 0.07) nanoparticles showed a single-phase nature with a cubic structure, and none of the samples showed the presence of any secondary phase. The mean particle size, which was calculated using transmission electron microscopy, increased with the increase in the Fe content. The DC magnetization measurements that were performed at room temperature showed that all the samples exhibited ferromagnetism. The saturation magnetic moment increased with the increase in the Fe content

**Journal of Nanoscience and Nanotechnology 11[1], 555-559. 2011.**

**[P064-11] “Suppression of charged particle production at large transverse momentum in central Pb-Pb collisions at root s(NN)=2.76 TeV”**

Aamodt, K., Quintana, A. A., Adamova, D., Adare, A. M., Aggarwal, M. M., Rinella, G. A., Agocs, A. G., Salazar, S. A., Ahammed, Z., Ahmad, N., Masoodi, A. A., Ahn, S. U., Akimov, A., Aleksandrov, D., Alessandro, B., Molina, R. A., Alici, A., Alkin, A., et al

Inclusive transverse momentum spectra of primary charged particles in Pb-Pb collisions at root s(NN) = 2.76 TeV have been measured by the ALICE Collaboration at the LHC. The data are presented for central and peripheral collisions, corresponding to 0-5% and 70-80% of the hadronic Pb-Pb cross section. The measured charged particle spectra in |eta| < 0.8 and 0.3 < p(T) < 20 GeV/c are compared to the expectation in pp collisions at the same root s(NN), scaled by the number of underlying nucleon-nucleon collisions. The comparison is expressed in terms of the nuclear modification factor R-AA. The result indicates only weak medium effects (R-AA approximate to 0.7) in peripheral collisions. In central collisions, R-AA reaches a minimum of about 0.14 at p(T) = 6-7 GeV/c and increases significantly at larger p(T). The measured suppression of high-p(T) particles is stronger than that observed at lower collision energies, indicating that a very dense medium is formed in central Pb-Pb collisions at the LHC. (C) 2010 CERN. Published by Elsevier B.V. All rights reserved

**Physics Letters B 696[1-2], 30-39. 2011.**

**[P065-11] “The exposure of the hybrid detector of the Pierre Auger Observatory”**

Abreu, P., Aglietta, M., Ahn, E. J., Allard, D., Allekotte, I., Allen, J., Castillo, J. A., Alvarez-Muniz, J., Ambrosio, M., Aminaev, A., Anchordoqui, L., Andringa, S., Anticic, T., Anzalone, A., Aramo, C., Arganda, E., Arisaka, K., Arqueros, F., Asorey, H., et al

The Pierre Auger Observatory is a detector for ultra-high energy cosmic rays. It consists of a surface array to measure secondary particles at ground level and a fluorescence detector to measure the development of air showers in the atmosphere above the array. The “hybrid” detection mode combines the information from the two subsystems. We describe the determination of the hybrid exposure for events observed by the fluorescence telescopes in coincidence with at least one water-Cherenkov detector of the surface array. A detailed knowledge of the time dependence of the detection operations is crucial for an accurate evaluation of the exposure. We discuss the relevance of monitoring data collected during operations, such as the status of the fluorescence detector, background light and atmospheric conditions, that are used in both simulation and reconstruction. (C) 2010 Elsevier B.V. All rights reserved

**Astroparticle Physics 34[6], 368-381. 2011.**

**[P066-11] “The isothermal variation of the entropy (Delta S-T) may be miscalculated from magnetization isotherms in some cases: MnAs and Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compounds as examples”**

Carvalho, A. M. G., Coelho, A. A., von Ranke, P. J., and Alves, C. S.

The determination of the isothermal variation of the entropy (Delta S-T) is discussed in the present work. We show that Delta S-T has very different profiles and magnitudes when calculated from M vs. H or M vs. T experimental data. For MnAs compound, Delta S-T A obtained from M vs. T data does not present a colossal peak. This result and the agreement between theoretical and experimental non-colossal magnetocaloric effect indicate

that the colossal peak may be miscalculated from M vs. H experimental data. For Gd<sub>5</sub>Ge<sub>2</sub>Si<sub>2</sub> compound, Delta S-T obtained from M vs. T data does not present the peak observed in Delta S-T from M vs. H data. (c) 2011 Elsevier B.V. All rights reserved

*Journal of Alloys and Compounds* 509[8], 3452-3456. 2011.

**[P067-11] "The Missing Part of Seed Dispersal Networks: Structure and Robustness of Bat-Fruit Interactions"**

Mello, M. A. R., Marquitti, F. M. D., Guimaraes, P. R., Kalko, E. K. V., Jordano, P., and de Aguiar, M. A. M.

Mutualistic networks are crucial to the maintenance of ecosystem services. Unfortunately, what we know about seed dispersal networks is based only on bird-fruit interactions. Therefore, we aimed at filling part of this gap by investigating bat-fruit networks. It is known from population studies that: (i) some bat species depend more on fruits than others, and (ii) that some specialized frugivorous bats prefer particular plant genera. We tested whether those preferences affected the structure and robustness of the whole network and the functional roles of species. Nine bat-fruit datasets from the literature were analyzed and all networks showed lower complementary specialization ( $H-2' = 0.3760.10$ , mean  $\pm 6$  SD) and similar nestedness (NODF = 0.5660.12) than pollination networks. All networks were modular ( $M=0.32 \pm 0.07$ ), and had on average four cohesive subgroups (modules) of tightly connected bats and plants. The composition of those modules followed the genus-genus associations observed at population level (Artibeus-Ficus, Carollia-Piper, and Sturnira-Solanum), although a few of those plant genera were dispersed also by other bats. Bat-fruit networks showed high robustness to simulated cumulative removals of both bats ( $R = 0.55 \pm 0.10$ ) and plants ( $R = 0.68 \pm 0.09$ ). Primary frugivores interacted with a larger proportion of the plants available and also occupied more central positions; furthermore, their extinction caused larger changes in network structure. We conclude that bat-fruit networks are highly cohesive and robust mutualistic systems, in which redundancy is high within modules, although modules are complementary to each other. Dietary specialization seems to be an important structuring factor that affects the topology, the guild structure and functional roles in bat-fruit networks

*Plos One* 6[2]. e17395. 2011.

**[P068-11] "Two-pion Bose-Einstein correlations in central Pb-Pb collisions at  $\sqrt{s_{NN}}=2.76$  TeV"**

Aamodt, K., Quintana, A. A., Adamova, D., Adare, A. M., Aggarwal, M. M., Rinella, G. A., Agocs, A. G., Salazar, S. A., Ahammed, Z., Ahmad, N., Masoodi, A. A., Ahn, S. U., Akindinov, A., Aleksandrov, D., Alessandro, B., Molina, R. A., Alici, A., Alkin, A., et al

The first measurement of two-pion Bose-Einstein correlations in central Pb-Pb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV at the Large Hadron Collider is presented. We observe a growing trend with energy now not only for the longitudinal and the outward but also for the sideward pion source radius. The pion homogeneity volume and the decoupling time are significantly larger than those measured at RHIC. (C) 2010 CERN. Published by Elsevier B.V. All rights reserved

*Physics Letters B* 696[4], 328-337. 2011.

**[P069-11] "Y cross section in p+p collisions at  $\sqrt{s}=200$  GeV"**

Abelev, B. I. Aggarwal M. M. Ahammed Z. Alakhverdyants A. V. Anderson B. D. Arkhipkin D.

We report on a measurement of the  $\bar{O}(1S+2S+3S) \rightarrow e^+e^-$  cross section at midrapidity in p+p collisions at  $\sqrt{s}=200$  GeV. We find the cross section to be  $114 \pm 38(\text{stat+fit}) - 24 + 23(\text{syst}) \text{pb}$ . Perturbative QCD calculations at next-to-leading order in the color evaporation model are in agreement with our measurement, while calculations in the color singlet model underestimate it by 26%. Our result is consistent with the trend seen in world data as a function of the center-of-mass energy of the collision and extends the availability of  $\bar{O}$  data to RHIC energies. The dielectron continuum in the invariant-mass range near the  $\bar{O}$  is also studied to obtain a combined yield of  $e^+e^-$  pairs from the sum of the Drell-Yan process and b-b production. © 2010 The American Physical Society.

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# Abstracta

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