Trabalhos Aceitos para Publicação em Periódicos

A 047-00   Irreversible thermodynamics in a nonequilibrium statistical ensemble formalism.

A 048-00   Weighted oscillator strengths and lifetimes for the Ar III spectrum.

A 049-00   Weighted oscillator strengths and lifetimes for the Si VIII spectrum.

A 050-00   Quasi-Atomic MVV auger spectra of Pd Metal: cascade processes.

Trabalhos Publicados

P 005 - 00   Properties of ultraviolet light in extensive air showers.

P 006-00   Interfacial aqueous solutions dielectric constant measurements using atomic force microscopy.

P 007-00   The spontaneous fission decay constant of U-238 using SSNTD.

P 008-00   Derivation in a nonequilibrium ensemble formalism of a for- reaching generalization of a quantum Boltzmann theory.

P 009-00   MSM photodetector with an integrated microlens array for improved optical coupling.

P 010-00   Electrical and optical characteristics of a Si-doped (Al)GaInAs digital alloy/AlInAs-distributed Bragg mirrors on InP.

P 011-00   Dipole moments in Langmuir monolayers from aromatic carboxylic acids.

P 012 -00   Thermo-mechanical and optical properties of calcium aluminosilicate glasses doped with Er^{3+} and Yb^{3+}.

P 013-00   Neutron diffraction on $Er_{1-x}Ca_xBa_2Cu_3O_7$-delta (0.0 <= x <= 0.3) system: possible oxygen vacancies in Cu-O-2 planes.

L 001-00   Tópicos em termodinâmica estatística de processos dissipativos.

Trabalhos aceitos para publicação em periódicos

A 047-00   Irreversible thermodynamics in a nonequilibrium statistical ensemble formalism.

Roberto Luzzi, Áurea R. Vasconcellos and J. Galvão Ramos.

We describe a stastistical approach to irreversible thermodynamics based on a construction formulated in terms of a generalization of Gibbs ensemble formalism to arbitrary (nonlinear, nonlocal, memory-dependent) nonequilibrium situations, namely, the Nonequilibrium Statistical Operator Method. A brief summarized description of the of the posits and explicit construction of the formalism, including a nonlinear quantum transport theory and a response function theory which connects theory and experiment, is presented. A derivation of the so-called Informational-Stastical Thermodynamics, with particular attention centered on a thermodynamic function consisting in the so-called informational-statistical entropy, is described. The main characteristics and properties of the latter are presented, namely: the nonequilibrium equations of state which introduce a description in terms of intensive variables; a generalized *H*-theorem or weak principle of informational-entropy production; generalized criteria for evolution and (in)stability; a generalized Clausius-like relation and pseudo-Carnot principle; fluctuations, Maxwell-like relations, and complementarity principles; and a generalized Boltzmann-like relation. Resorting to the use of the nonlinear kinetic theory and response function theory that the formalism provides studies of the ultrafast relaxation processes that develop in the photoinjected highly excited plasma in semiconductors are reviewed, and comparison with experimental data is shown.

A 048- 00   Weighted oscillator strengths and lifetimes for the Ar III spectrum.

F. R. T. Luna, F. Bredice, G. H. Cavalcanti, and A. G. Trigueiros.

The weighted oscillator strengths (gf) and the lifetimes for Ar III presented in this work were carried out in a multiconfiguration Hartree-Fock relativistic (HFR) approach. In this calculation, the electrostatic parameters were optimized by a least-squares procedure in order to improve the adjustmen to experimental energy levels. This method produces gf-values that are in better agreement with intensity observations and lifetimes values that are closer to the experimental ones. In this work we presented all the experimentally known electric dipole Ar III spectral lines.

A 049-00   Weighted oscillator strengths and lifetimes for the Si VIII spectrum.

R. V. Orloski and A. G. Trigueiros.

The weighted oscillator strengths (GF) and the lifetimes for Si VIII presented in this work were carried out in a multiconfiguration Hartree-Fock relativistic (HFR) approach. In this calculation, the electrostatic parameters were optimized by a least-squares procedure, in order to improve the adjustment to experimental energy levels. This method produces gf-values that are in better agreement with intensity observations and lifetime values that are closer to the experimental ones. In this work we present all the experimentally known electric dipole Si VIII spectral lines.

A 050- 00   Quasi-Atomic MVV auger spectra of Pd metal: cascade processes.

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

The study of Auger spectra of atoms affected by cascade processes has attacted considerable interest because of the availability of tunable photon energies of synchrotron radiation. We present results for the XAES MVV spectra of Pd and Ag measured, with synchrotron radiation,before and after ionization of the respective L3 levels. The respective spectra change dramatically upon ionization and we attribute the extra structure produced after ionization as corresponding to the M45M45 *M45VV transition, which is subsequent to the L3M45M45 transition. The extra structure for Pd is markedly similar to that of Ag, indicating its quasi-atomic nature. These results allow us to interpret the extra spectral structure of Pd as quasi-atomic and to attribute its origin to a bound state of the two final-state holes in the full Pd d-band. We believe the filling of the band to be produced by d-valence electrons which screen the two initial M45 holes.

Trabalhos Publicados

P 005 - 00 Properties of ultraviolet light in extensive air showers.

Biral, A. R. P. and Chinellato, J. A.

We investigate some properties of Cherenkov light in the range 20002400 Angstrom, produced by 1-10 TeV extensive air showers. The attenuation of these photons in the atmosphere strongly changes the capabilities of a typical Cherenkov array, when compared with those that operate in the visible region. We simulate the development of air showers in the 1-10 TeV region, with a careful description of the attenuation of the Cherenkov photons in the atmosphere.

Journal of Physics G-Nuclear and Particle Physics 26[8], 1255-1270. 2000

P 006-00 Interfacial aqueous solutions dielectric constant measurements using atomic force microscopy.

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

The exchange of the volume of a region of the electric double layer of a mica surface immersed in aqueous solutions, with a dielectric constant epsilon(DL), by a nanosized radius tip, with a dielectric constant epsilon(Tip), is responsible for the repulsion at large distances from the surface (starting at similar to 100 nm, diffuse layer) and followed by an attraction when the tip is immersed in the inner layer (similar to 10 nm). The calculated dielectric constant as a function of the distance to the charged interface obtained by fitting the force versus distance curves, allows the mapping of the inner layer dielectric constant profiles with a nanometer resolution.

Chemical Physics Letters 326[3-4], 328-334. 2000.

P 007-00 The spontaneous fission decay constant of U-238 using SSNTD.

Guedes, S., Hadler, J. C., Innes, P. J., Paulo, S. R., and Zuniga, A.

This work reports the results of 5 measurements of the U-238 decay constant for spontaneous fission, lambda(f)(-), carried out using solid state nuclear track detectors (SSNTD), resulting in a mean value of lambda(f) = (8.35+/-0.24).10(-17) y(-1). The neutron fluence of the irradiations needed for these measurements were monitored with thin films of natural uranium.

Journal of Radioanalytical and Nuclear Chemistry 245[2], 441-442. 2000.

P 008-00 Derivation in a nonequilibrium ensemble formalism of a for- reaching generalization of a quantum Boltzmann theory.

Ramos, J. G., Vasconcellos, A. R., and Luzzi, R

Within the framework of the nonequilibrium statistical ensemble formalism provided by the nonequilibrium statistical operator method, we derive a quantum Boltzmann-style transport theory of a broad scope. This is done by choosing the single- and two- particle dynamical density operators as the basic informational-statistical variables. The equations of evolution for their average values over the nonequilibrium ensemble, the nonequilibrium-reduced Dirac-Landau-Bogoliubov-type density matrices, are obtained. From the resulting generalized nonlinear quantum transport theory, after resorting to perturbative-like expansions, a far-reaching generalization of Boltzmann equation for the single-particle distribution function is derived. A type of traditional Boltzmann equation follows after using stringent approximations, whose limits of validity are evaluated.

Physica A 284[1-4], 140-160. 2000.

P 009-00 MSM photodetector with an integrated microlens array for improved optical coupling.

Ozelo, H. F. B., de Barros, L. E. M., Nabet, B., Neto, L. G., Romero, M. A., Ramos, A. C. S., and Swart, J. W

A novel technique to enhance the optical coupling efficiency of planar photodetectors is described. It consists of the fabrication of an array of integrated cylindrical microlenses on top of an MSM. Results show an 11% increase in the photocurrent and it is demonstrated how total optical coupling may be achieved.

Microwave and Optical Technology Letters 26[6], 357-360. 2000.

P 010-00 Electrical and optical characteristics of a Si-doped (Al)GaInAs digital alloy/AlInAs-distributed Bragg mirrors on InP.

Dias, I. F. L., Duarte, J. L., Laureto, E., Gelamo, R. V., Menezes, E. A., and Harmand, J. C.

We report electrical and optical characteristics of a Si-doped (Al)GaInAs digital alloy/AlInAs Bragg mirror lattice matched to InP grown by molecular beam epitaxy, A 98.2% reflectivity with a 107 nm stop band width centred at 1.54 mu m is obtained. An average voltage drop of 16 mV per period at a current density of 1 KA cm(-2) is observed for a mean electron concentration of about 5.5 x 10(18) cm(-3). The influence of structural and intrinsic properties of the heterostructure on the electrical resistivity and optical reflectivity is analysed.

Superlattices and Microstructures 28[1], 29-33. 2000.

Trabalhos Publicados

P 011-00   Dipole moments in Langmuir monolayers from aromatic carboxylic acids.

Dynarowicz-Latka, P., Cavalli, A., Silva, D. A., dos Santos, M. C., and Oliveira, O. N.

The three-layer capacitor model proposed by Demchak and Fort [J. Colloid Interface Sci. 46 (1974) 191] is employed to relate measured surface potentials of Langmuir monolayers from a series of polyphenyl carboxylic acids to molecular dipole moments calculated using semiempirical quantum methods. The effective dielectric constant at the air/monolayer interface is 3.0 +/- 0.6, very close to that estimated for aliphatic compounds. Good agreement between theory and experiment is obtained by adopting a dielectric constant of 6.4 for the monolayer/water interface and a contribution from the water reorientation of -0.064 +/- 0.006 D, which shows that the parameters in the DF model are essentially the same as for aliphatic amphiphiles, such as esters, acids, alcohols and ethers.

P 012 -00   Thermo-mechanical and optical properties of calcium aluminosilicate glasses doped with Er3+ and Yb3+.

Sampaio, J. A., Catunda, T., Coelho, A. A., Gama, S., Bento, A. C., Miranda, L. C. M., and Baesso, M. L.

In this work a series of Er_2O_3 and Yb_2O_3 doped and Er_2O_3-Yb_2O_3 co-doped low silica calcium aluminosilicate glasses have been melted at 1470 degrees C under vacuum conditions. Measurements of optical absorption coefficient, mass density, refractive index, Vickers micro-hardness, glass transformation temperature (T-g) and crystallization temperature (T-x) have been carried out. The results showed that these glasses dissolved similar to 1.5 mol% Er_2O_3 and similar to 1.1 mol% Yb_2O_3 in their structure without devitrification and also that only small changes (similar to 10%) have been measured in their thermal, mechanical and optical properties.

P 013-00   Neutron diffraction on Er1-xCaxBa2Cu3O7-delta (0.0 <= x <= 0.3) system: possible oxygen vacancies in Cu-O-2 planes.

Awana, V. P. S., Malik, S. K., Yelon, W. B., Cardoso, C. A., De Lima, O. F., Gupta, A., Sedky, A., and Narlikar, A. V.

In the system Er1-xCaxBa2Cu3O7-delta with x = 0.0 to 0.3, the superconducting transition temperature (T-c), as measured from AC susceptibility, decreases with increasing Ca substitution, x. Detailed analysis of the powder neutron diffraction patterns of these samples shows a decrease in oxygen content with increasing x. The orthorhombic distortion decreases slightly and the c-parameter increases slightly with increasing x. Both, the buckling angle [(Cu(2)-O(2)-Cu(2) angle)] and the planer Cu(2)-O(2) distance in Cu-O-2 planes, increase with increasing x. Increased Cu(2)-O(2) bond distance indicates a slight decrease in p-type hole carriers in Cu-O-2 planes. On comparison with reported results on T-c vs. p-type carriers in high T-c superconducting compounds, it is inferred that decrease in p-type carriers alone cannot account for sharp T-c depression with increasing n in Er1-xCaxBa2Cu3O7-delta system. With increasing x, oxygen vacancies are created in Cu-O-2 planes, which along with increased buckling angle might be partly responsible for T-c suppression in this system.

Livro Publicado

L 001-00   Tópicos em termodinâmica estatística de processos dissipativos.

Roberto Luzzi

Este texto é um primeiro volume do autor numa série de publicações dedicadas à mecânica estatística dos sistemas dissipativos. Este volume refere-seà assim chamada Teoria da Função-Resposta, concentrada no caso dito linear.