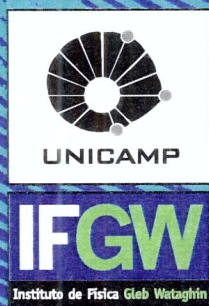


Abstracta

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Trabalhos Aceitos para Publicação em Periódicos

- A 026-00 Optical properties of semiconductors via pump-probe experiments: statistical-thermodynamical approach, hot plasma, and coherent phonon states.
- A 027-00 Superconducting $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ films on SrTiO_3 via electrodeposition process.
- A 028-00 Investigation of geometry and some electronic properties of AZA analogues of the ellipticine and olivacine derivatives.
- A 029-00 Feedback-controlled running holograms in strongly absorbing photorefractive materials.
- A 030-00 Josephson coupling between superconducting clusters in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+d}$ crystals.
- A 031-00 Considerations on nonequilibrium entropy and temperature.
- A 032-00 Effect of band anisotropy on electronic structure of PbS, PbSe, and PbTe quantum dots.

Trabalhos Aceitos para Publicação em Conferências

- C 010-00 $^{13}\text{CD}_3\text{OH}$ molecule: a good laser source of far-infrared radiation in the spectral range 22 to 3030 microns.
- C 011-00 News Schemes for quantum state generation.

Trabalhos aceitos para publicação em periódicos

A 026-00 Optical properties of semiconductors via pump-probe experiments: statistical-thermodynamical approach, hot plasma, and coherent phonon states.

A. R. Vasconcellos, R. Luzzi, and J. R. Madureira.

We present an analysis of the nonequilibrium thermodynamics and, mainly, a response function theory for the study of optical properties in ultrafast-spectroscopy pump-probe experiments. These experiments give rise to the formation of a photoinjected plasma in semiconductors in far-from-equilibrium conditions. The dissipative processes that evolve in this medium greatly influence optical and transport properties. The theory is centered on the application to the study of the phenomenon of modulated changes in the time-resolved reflectivity spectrum. In particular, we show that this phenomenon consists in the coupled effect of coherent-LO-phonons and carrier-charger-density motions, which are driven through the action of the coherent photons of the laser electromagnetic radiation. In the given conditions the modulation effect decays in time and has associated a frequency close to the zone-center upper LO phonon-optical plasma hybrid mode, as experimentally observed.

Journal of Physics: Condensed Matter, accepted on May 2000.

A 027-00 Superconducting $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ films on SrTiO_3 via electrodeposition process.

A. J. S. Machado, S. Moehlecke, Y. Kopelevich, A. Robin, and C. A. M. dos Santos.

An ac electrodeposition (ED) process to obtain good quality $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ (YBCO) high-temperature superconductor (HTS) films was developed. These films were deposited on SrTiO_3 (100) single crystal substrates previously coated with a thin silver layer (800 Å) that was deposited by chemical reduction. A small amount of Ag (0.7% in weight) added to the electrolyte bath show to improve the quality of the deposited films. YBCO films after an appropriate heat treatment present single phase material with an onset T_c -90 K, ΔT_c -2K, homogeneous grain morphology and strong biaxial texture. Transport measurements show a metallic behavior in the normal state and a self-field critical current densities $\sim 105 \text{ A/cm}^2$ at 4.2 K and $\sim 104 \text{ A/cm}^2$ at 77K.

Physica C, accepted on May 2000.

A 028-00 Investigation of geometry and some electronic properties of AZA analogues of the ellipticine and olivacine derivatives.

A. C. M. Carvalho, B. Laks

Aza analogues of ellipticine and olivacine derivatives constitute a new material class of organic molecules with intense antitumor activity. In this work we report a theoretical electronic structure calculus based on the semiempirical method PM3 for these compounds. The calculated electronic structure allow to find some relationship between electronic indexes and the biological selectivity, like the dipole moment, which decrease with increase of citotoxicity. Furthermore we calculate the electrostatic fields and determinate a correlation between high charge density in some sites and the apparent affinity indexes.

Journal of Molecular Structure- Special Issue, accepted on April 2000.

A 029-00 Feedback-controlled running holograms in strongly absorbing photorefractive materials.

J. Frejlich, A. A. Freschi, And P. M. Garcia, E. Shamonina, V. Ya. Gayvoronsky, and K. H. Ringhofer.

We propose a mathematical model for the movement of photorefractive holograms under feedback constraints in absorbing materials. We use this model to analyse the speed of a fringe-locked running hologram in photorefractive sillenite crystals that usually exhibit strong absorption effect. Fringe-locked experiments allow computing the quantum efficiency for the photo-generation of charge carriers in photorefractive crystals if the effect of bulk absorption and the effective value of the externally applied field are adequately taken into consideration. A $\text{Bi}_{12}\text{TiO}_{20}$ sample was measured using the 532nm laser wavelength and a quantum efficiency $\Phi = 0.37$ was obtained. Not considering absorption leads to large errors in Φ .

Journal of Optical Soc. of America B, accepted on May 2000.

A 030-00 Josephson coupling between superconducting clusters in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ crystals

O. F. de Lima, V. P. S. Awana, R. A. Ribeiro, and M. A. Avila.

Diamagnetic moment for two $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ crystals were measured at different fields H and temperatures. For the higher fields two distinct transition temperatures T_g and T_j are seen, with $T_g > T_j$. By increasing H the line $T_g(H)$ shifts very slowly while $T_j(H)$ shifts much faster to lower temperatures, displaying a clear upward curvature well described by a theory based on Josephson coupling between superconducting clusters. We show further that $T_j(H)$ is dependent on sample homogeneity, which is correlated with oxygen distribution in the high T_c superconductors.

Europhysics Letters, accepted on May 2000.

A 031-00 Considerations on nonequilibrium entropy and temperature.

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

Several aspects of the Thermodynamics of systems away from equilibrium are considered. Particular attention is given to the question of the concepts of entropy and temperature in arbitrary nonequilibrium conditions. Even though such state function and thermodynamic variable are elusive in such conditions, it is elaborated and discussed an approach to them that can be obtained in the framework of the so-called Informational Statistical Thermodynamics. This is the approach to Thermodynamics based on the statistical-mechanical foundations provided by a Gibbs ensemble-like algorithm in nonequilibrium situations. The resulting nonequilibrium temperature-like variable- dubbed as quasitemperature- is shown to be a quantity measurable with appropriate "thermometric devices". A comparison of quasitemperatures that arise in different approximated nonequilibrium statistical-thermodynamic descriptions of the dissipative system is done. The validity of these different approximations is evaluated, and (in the framework of the theory) generalized Gibbs, Clausius, and Boltzmann's relations, as well as properties of the corresponding entropy-like function (or informational entropy in Jaynes-Shannon sense), that the theory introduces, are presented. Conceptual and physical aspects of the question are also discussed, and a partial comparison of these concepts with those arising in other approaches to irreversible thermodynamics is briefly attempted. This article is an enlargement of a paper in Fortschritte der Physik/ Progress of Physics, 47, 9 (1999), where have been added extensive comments on the subject.

Brazilian Journal of Physics, accepted on May 2000.

A 032- 00 Effect of band anisotropy on electronic structure of PbS,PbSe, and PbTe quantum dots.

Tudury,G.E., Marquezini,M.V., Ferreira,L.G.,Barbosa, L. C., Cesar,C.L.

We have calculated the electronic structure of spherical PbS, PbSe and PbTe quantum dots using a four band envelope function formalism that accounts for band anisotropy. By comparing our results with an analytical calculation that assumes a spherical approximation of the $(\mathbf{K.P})$ Hamiltonian, we show that the effects of band anisotropy are more pronounced for the excited states and increases with the confinement. We also show how the same technique can be applied to ellipsoidal quantum dots.

Physical Review B, accepted on June 2000.

Trabalhos Aceitos para Publicação em Conferências

C 010-00 $^{12}\text{CD}_3\text{OH}$ molecule: a good laser source of far-infrared radiation in the spectral range 22 to 3030 microns.

E.C.C. Vasconcellos, M. Jackson, M. D. Allen and K. M. Evenson.

$^{12}\text{CD}_3\text{OH}$ is one of the most important methanol isotopomers for the generation of high frequency laser lines in the far-infrared region in the wavelength range 22 to 160 μm . Over 400 far-infrared laser lines have been discovered in this molecule in the range 22 to 3030 μm by optically pumping it with CO_2 lasers. Forty-five percent of those have wavelengths shorter than 160 μm . In this work we will present these far-infrared laser lines along with their frequency measurements to highlight the availability of these high-energy laser lines ready to be used in applications. Less than half of the laser lines in this wavelength range have been frequency measured. We will also present all the laser lines found in this molecule, including some new lines discovered in a new far-infrared laser cavity.

55th Ohio State International Symposium on Molecular Spectroscopy, Columbus, Ohio, June 12-16, 2000, accepted on May 2000.

C 011-00 New Schemes for quantum state generation.

Vidiella-Barranco, A.

The generation of quantum states of light has been one of the most discussed topics in quantum optics. Nevertheless, quantum state generation is a difficult task that requires extreme control. Several methods have been proposed, and it has been already accomplished the generation of highly nonclassical states, such as Schrodinger cat states and Fock states within high-Q cavities. In general, quantum states are build up from the vacuum state. Here, I am going to discuss different schemes of generation of pure quantum states. Firstly I will present a method of quantum state engineering that could be applied to running waves, based on the construction of a nonlinear hamiltonian and by choosing appropriate interaction times [A. Vidiella-Barranco and J.A. Roversi, Phys. Rev. A, 58, 3349 (1998)]. I will also explore the possibility of having non-vacuum initial fields, for instance, statistical mixtures of coherent states, and thermal fields. In the former case, I will present a case of field purification occurring in a simple model of quantum optical resonance, that leads to the generation of a Schrodinger cat state [Dagoberto de S. Freitas, A. Vidiella-Barranco, and J.A. Roversi, Phys. Lett. A, 249, 275 (1998)]. As a second example of quantum state generation from mixed fields, I will discuss the production of pure states in a two-photon micromaser without the need of performing conditional measurements [A.F. Gomes, J.A. Roversi, and A. Vidiella-Barranco, J. Mod. Optics, 46, 1421, (1999)].

International Conference on Quantum Optics 2000, Raubichi, Bielo-Russia- 28-31, accepted on may 2000.

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