Abstracta

Trabalhos Aceitos para Publicação em Periódicos

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A 019-00 Experimental verification for a scaling law relating amplitude and frequency in the complex susceptibility of type-II superconductors.

A 020-00 Optically pumped far-infrared laser lines of methanol isotopomers: $^{12}CD_3OH$, $^{12}CH_3OD$, and $^{12}CH_2DOH$.

A 021-00 Optically Pumped Far-Infrared laser Lines in Hydrazine, Methanol, Heavy Water, and Ammonia: new laser lines and frequency measurements.

A 022-00 Possible electrical-current-driven superconductor-insulator transition.

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A 018-00 Neutron diffraction on $Er_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$($0.0 \leq x \leq 0.3$) system: Possible oxygen vacancies in CuO_2 planes.

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

In the system $Er_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$ with x = 0.0 to 0.3,the superconducting transition temperature (T_c), asmeasured 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 also slightly with increasing x. Both, the buckling angle [Cu(2)-O(2)-Cu(2) angle] and the planar distance Cu(2)-O(2), in the CuO_2 planes, increase with increasing x. Increased Cu(2)-O(2) bond distance indicates a slight decrease in p-type hole carriers in CuO_2 planes. On comparison with reported results on T_c vs. p-type carriers concentration it is inferred that a decrease in p-type carriers alone can not account for the sharp T_c depression observed in $Er_{1-x}Ca_xBa_2Cu_3O_{7-\delta}$, with increasing x. In this case oxygen vacancies are created in CuO_2 planes which, along with increased buckling angle, might be partly responsible for a T_c suppression in this system.

Physica C, accepted on April 2000.

A 019-00 Experimental verification for a scaling law relating amplitude and frequency in the complex susceptibility of type-II superconductors.

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

In this work we present complex susceptibility measurements $\chi(h,\nu)$, for a large range of field amplitudes h and frequencies ν, taken in two Nb samples (one single crystal and one polycrystal) and one melt-textured $YBa_2Cu_3O_{7-\delta}$ sample. A predicted scaling law for c(h,n) is verified for several sets of data, plotted against the scaling variable $h(n_{ref}/n)^{1/(n-1)}$, where n_{ref} is an arbitrary reference frequency and n is a creep exponent. Data taken closer to T_c revealed a useful scaling applied directly to the critical current density J_c, evaluated through the peak position of the imaginary component χ''. An unexpected frequency dependence of n was observed for the $YBa_2Cu_3O_{7-\delta}$ sample. This is associated with a failure of the logarithmic approximation for the activation energy $U = U_c \ln(J_c/J)$, which is assumed in the scaling formalism. A more accurate description in this case is obtained with $U = U_c(J/J_c)^{-\mu}$, from the collective creep theory. This type of analysis led us to propose an effective creep exponent n_{eff}, in an attempt to keep the original scaling law.

Physica C, accepted on April 2000.

A 020-00 Optically pumped far-infrared laser lines of methanol isotopomers: $^{12}CD_3OH$, $^{12}CH_3OD$, and $^{12}CH_2DOH$.

Vasconcellos, E. C. C., Zerbetto, S. C., Zink, L. R., and Evenson, K. M.

Twenty-seven new FIR, far-infrared, laser lines from the isotopomers of methanol: $^{12}CD_3OH$, $^{12}CH_3OD$, and $^{12}CH_2DOH$ were obtained by optically pumping the molecules with an efficient cw CO_2 laser. The CO_2 laser provided pumping from regular, sequence, and hot-band CO_2 laser transitions. The 2 m long far-infrared cavity was a metal-dielectric waveguide closed by two, hat end mirrors. Several short-wavelength (below 100 mu m) lines were observed. The frequencies of 28 laser lines observed in this cavity (including new lines and already known lines) were measured with a fractional uncertainty limited by the fractional resetability of the far-infrared laser cavity, of 2 parts in 10^7.

International Journal of Infrared and Millimeter Waves, accepted on April 2000.

A 021-00 Optically Pumped Far-Infrared laser Lines in Hydrazine, Methanol, Heavy Water, and Ammonia: new laser lines and frequency measurements.

E. C. C. Vasvoncellos, M. D. Allen, L. R. Zink, and K. M. Evenson.

A far-infrared laser cavity designed to favor shortwavelength laser lines was used to generate optically pumped far-infrared laser radiation. New far-infrared laser lines were discovered in hydrazine, heavy water, and ammonia and several short wavelength lines previously discovered in methanol were observed. The pump laser was a high-Q Fabry Perot resonator oscillating in 275 laser lines. Wavelength, frequency, and relative intensity measurements were performed in laser lines in the wavelength range 42.4 to 253.7 μm. Each far-infrared frequency measurement was obtained by mixing the far-infrared radiation with radiation from two reference CO_2 lasers and from a microwave synthesizer in a metal-insulator-metal diode.

International Journal of Infrared and Millimeter Waves, accepted on April 2000.

A 022-00 Possible electrical-current-driven superconductor-insulator transition.

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

In this work we have studied the effect of applied electrical current on the resistive behavior of single phase $Y_{1-X}Pr_xBa_2Cu_3O_{7-Y}$ [Y(Pr)123] polycrystaline samples with x close to the critical Pr concentration $x_c \approx 0.57$ above which the superconductivity vanishes. The obtained results suggest the occurrence of a superconducting-insulator transition (SIT) driven by the electrical current. In particular, a crossing of current-voltage (I-V) isotherms at magnetic-field-dependent current $I_C(H)$ is found, and the scaling behavior of nonlinear resistance R(I,T)=V(T)/ I similar to that predicted in the scaling theory of SIT is obtained, We speculate that this possible current-induced SIT can be considered as the dynamical counterpart of the magnetic-field-tuned SIT.

Physica C, accepted on May 2000.

A 023-00 Fabrication of dielectric hollow submicrometric pipes.

L. L. Soares, L. Cescato, N. C. Cruz and M. B. Moraes

A simple technique to obtain an array of hollow submicrometric titanium oxide pipes is described. Initially a submicrometric stucture is formed in a positive photoresist by holographic exposure, followed by the deposition of the titanium oxide film and the removal of the photoresist by an appropiate solvent. These structures may be useful as wave-guides for X-ray and neutron capillary optics

Journal of Vaccum Science and Technology B - Microelectronics and Nanometer Structures, accepted on May 2000.

A 024-00 Velocity overshoot onset in nitride semiconductors.

C. G. Rodrigues, V. N. Freire, A. R. Vasconcellos and R. Luzzi

We present a theoretical study on the electron drift velocity and some nonequilibrium thermodynamic characteristics of wurtzite GaN, AlN and InN. It is based on a nonlinear quantum kinetic theory which provides the details of the dissipative phenomena developing in the system. The time evolution of the electron drift velocity and quasitemperature is obtained, both presenting overshoot effects whose onsets are shown to occur at 20 kV/cm in GaN, 60 kV/cm in AlN and 10kV/cm in InN, which are considerably smaller than those of the electron drift velocity derived recently thorough Monte Carlo simulations.

Applied Physics Letters, accepted on May 2000.

A 025-00 Periodic Orbits in Magnetic Billiards

L.G.G.V.Dias da Silva, M.A.M. de Aguiar

We propose a simple method to calculate periodic orbits in two-dimensional
systems with no symbolic dynamics. The method is based on a line by line
scan of the Poincar\'e surface of section and is particularly useful for
billiards. We have applyed it to the Square and Sinai's billiards subjected
to a uniform orthogonal magnetic field and we obtained about 2000 orbits for
both systems using abolutely no information about their symbolic dynamics.

European Physical Journal, accepted on May 2000.

Trabalhos Aceitos para Publicação em Conferências

C 009-00 $^{12}CD_3OH$ optically pumped far-infrared laser: a good source of high frequency lines of interest to spectroscopy.

E.C.C. Vasconcellos

$^{12}CD_3OH$ is one of the most important methanol isotopomers for the generation of high frequency laser lines in the far-infrared region (FIR) in the wavelength range 22 to 160 m m . Over 400 FIR laser lines have been discovered in this molecule in the range 22 to 3030 m m by optically pumping it with CO_2 lasers. Forty-five percent of those have wavelengths shorter than 160 m m. In this work we will present these FIR 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. Therefore, effort should be directed to the measurement of the frequencies of the remainder lines in order to make these coherent sources available, for example, for spectroscopic applications.

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Abstracta

Instituto de Física
Diretor: Prof. Dr. Carlos Henrique de Brito Cruz
Universidade Estadual de Campinas - UNICAMP
Cidade Universitária C.P. 6165
CEP: 13081-970 - Campinas - SP - Brasil
e-mail: secdir@ifi.unicamp.br
Fone: 0XX 19 788-5300 / Fax: 0XX 19 788-3127

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Elaboração
Tânia Macedo Folegatti
abstract@ifi.unicamp.br

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Instituto de Física Gleb Wataghin