Abstracta

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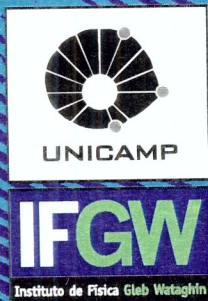## Trabalhos Aceitos para Publicação em Periódicos

Trabalhos Aceitos para Publicação em Conferências

TRABALHOS ACEITOS PARA PUBLICAÇÃO EM PERIÓDICOS

A 001-00 Ferromagnetic-and Superconducting-like Behavior of Graphite.

Y. Kopelevich, P. Esquinazi, J. H. S. Torres and S. Moehlecke

We have identified ferromagnetic- and superconducting-like magnetization hysteresis loops in highly oriented pyrolytic samples below and above room temperature. Wee also found that both behaviors are very sensitive to low-temperature -as compared to the sample synthesis temperature - heat treatment. The possible contribution of magnetic impurities and why these do not appear to be the reason for the observed phenomena is discussed.

A 002-00 Modulation Instabiliy Effects on Tree-Channel Optically Multiplexed Communication Systems.

D. F. Grosz, J. M. Chávez Boggio, H. L. Fragnito.

Four-wave mixing dynanics are analyzed on a three-channel optically multiplexed communicaton systems. In the anomalous propation regime, where modulation instability effects are much stronger, energy interchange among signal channels tends to favor the central channel as opposed to the normal propagation regime where the central channel is depleted. These results are explained both in terms of the phase-matched growth of generated spectral sidebands and the tree-channel modulation instability gain spectrum.

A 003-00 On the Propagation of Electromagnetic Signals in Wires and Coaxial Cables according to Weber´s Electrodynamics.

A. K. T. Assis

We derive the equation describing the flow of a variable current in straight wires and in coaxial cables from Newton´s second law of motion plus Weber´s electrodynamics. We show that in both cases the signal propagates at light velocity.

A 004 - 00 XPS Study of the Chemical Bonding in Hydrogenated Amorphous Germanium Carbon Alloys.

J. Vilcarromero´ and F.C. Marques

A systematic study of the chemical bonding in hydrogenated amorphous germanium carbon (a-Ge$_{1-x}$C$_x$:H) alloys using X-ray photoelectron spectroscopy (XPS) is presented. The films, with carbon content ranging from 0 at. % to 100 at. %, were prepared by the rf co-sputtering technique. Raman spectroscopy was used to investigate the carbon hybridization. Rutherford back-scattering spectroscopy (RBS) and XPS were used to determine the film stoichiometry. The Ge 3d and C 1s core levels were used for investigating the bonding properties of germanium and carbon atoms, respectively. The relative concentrations of C-Ge, C-C and C-H bonds were calculated using the intensities of the chemically shifted C 1s components. It was observed that the carbon atoms enter the germanium network with different hybridization, which depends on the carbon concentration. For concentrations lower than 20 at.%, the carbon atoms are preferentially sp^3 hybridized, and approximately randomly distributed. As the carbon content increases the concentration of sp^2 sites also increases and the films are more graphitic-like.

A 005-00 Compact Hydrogenated Amorphous Germanium Films by Ion-beam Sputtering Deposition.

D. Comedi. F. Dondeo. I. Chambouleyron, Z. L. Peng, and P. Mascher.

We explore reactive ion-beam sputtering deposition (IBSD) for the growth of a-Ge:H films. It is shown that rather compact a-Ge:H films can be obtained by IBSD at substrate temperatures between 180o and 220oC by minimizing the ion bombardment of the growth surface. The infrared (IR) spectra of the best materials, as far as device applications are concerned, so-far obtained show no poly-hydride nor surface-like contributions to the Ge-H dipole vibration bands. Positron annihilation (PA) spectroscopy studies of these samples reveal smaller valence (S) parameters and larger core (W) parameters as compared with films grown under less-favorable conditions, which indicate a relatively smaller concentration of the largest voids, the annihilation process being controlled mainly by trapping at small vacancy clusters or monovacancies. Similar IR and PA measurements on in-situ ion-bombarded IBSD and rf- sputtered samples indicate that ion irradiation is a main factor in large void formation.

A 006 - 00   Local Coordination Electronic Doping of Colums III Metals in Hydrogenated Amorphous Germanium.

I. Chambouleyron [1], D. Comedi [1], G. Dalba [2], P. Fornasini [2], R.Grisenti [2] and F. Rocca [3]

The relationship between the local coordination NGa and NIn of gallium and indium atoms in a-Ge:H, as a function of impurity content ([Ga], [In]), and the transport and optical properties, is discussed. Extended X-ray Absorption Fine Structure (EXAFS) data indicate that for [Ga], [In] £1.5´1018 cm-3, the impurity atoms are always 4-fold coordinated. As [Ga], [In] increase, N decreases from 4 to less than 3, the behavior of NGa being different than that of NIn. The analysis of the EXAFS phase indicates that the Ga-Ge first shell distance in a-Ge:H films is always larger than in Ga doped c-Ge, yet it decreases with increasing [Ga]. The change from 4-fold to 3-fold Gacoordination is attributed to therelaxation of compressive stress added by Ga to the a-Ge:H network. A rough calculation indicates that only ca. 1% of 4-fold coordinated Ga is electronically active, probably due to a rather large ionization energy of the acceptor state (estimated to be » 120 meV). The observed NIn changes are consistent with the compressive stress mechanism suggested for Ga. The smaller doping activity of In4, as compared to that of Ga4, indicates an even deeper acceptor state for In. The static disorder around the impurities (EXAFS Debye-Waller factor) decreases with increasing doping.

A 007 - 00   Cavity Field Reconstruction at Finite Temperature.

H. Moya-Cessa, A. Vidiella-Barranco, P. Tombesi, and J.A. Roversi.

We present a scheme to reconstruct the quantum state of a field prepared inside a lossy cavity at finite temperature. Quantum coherences are normally destroyed by the interaction with an environment, but we show that it is possible to recover complete information about the initial state (before interaction with its environment), making possible to reconstruct any s-parametrized quasi probability distribution, in particular, the Wigner function.

A 008 - 00   Vortex Lattice Depinning vs. Vortex Lattice Melting: a pinning-based explanation of the equilibrium magnetization jump.

Y. Kopelevich and P. Esquinazi

In this communication we argue that Vortex Lattice Melting scenario fails to explain several key experimental results published in the literature. From a care-full analysis of these results we conclude that the Flux Line Lattice (FLL) does not melt along a material and sample-dependent boundary H_j (T) but the opposite, it de-couples from the superconducting matrix becoming more ordered. When the FLL depinning is sharp, the difference between the equilibrium magnetization M_{eq} (T, H) of the pinned and unpinned FLL leads to the observed step-like change ΔM_{eq} (T, H). We demonstrate that experimental obtained ΔM_{eq} (T, H) can be well accounted for by a variation of the pinning efficiency of vortices along the H_j (T) boundary.

A 009 - 00   Experimental study on scaling laws for the complex susceptibility of type-II superconductors.

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

Measurements of the nonlinear complex susceptibility χ, taken as a function of amplitude h and frequency ν of the ac field, can collapse into a single universal curve if they are plotted against the scaling variable $hJ(\nu^*)/J(\nu)$, where J is a shielding current density and n is an arbitrary reference frequency. In this work we present $\chi(h,\nu)$ data for a large range of amplitudes and frequencies, measured in two Nb samples (one single crystal and one polycrystal) and one melt-textured $YBa_2Cu_3O_7$.d sample. The predicted scaling relation is verified for several sets of data taken at different temperatures below T_c and applied magnetic fields well above the first critical field H_{c1}. Data taken closer to T_c revealed a useful scaling applied directly to the critical current density, evaluated from the peak positions of the imaginary component χ''. The occurrence of different regimes of collective vortex creep is also discussed for the $YBa_2Cu_3O_7$.d sample.

C 001- 00   Study of collective flux creep in directionally solidified YBCO.

R. A. Ribeiro[1], O. F. de Lima[1], T. Puig[2], B. Martinez[2], X. Obradors[2]

We present a magnetic flux creep study, in a directionally solidified YBCO (82% Y123 + 17% Y211 + 1% CeO_2) sample. Two different procedures have been used: the standard Maley's procedure (elastic regime) and the general vortex-creep analysis, which admits both, elastic and plastic creep regimes. The exponent μ has been determined from both methods for two different fields (0.6 T, 3 T). Maley's procedure gives $\mu > 0$, indicating a possible crossover from single vortex to the small bundle and large bundle regimes that are predicted in the collective creep theory. The general vortex creep analysis produces $\mu < 0$ indicating however a plastic creep regime. This latter analysis apparently gives a better description of our data, in view of the particular characteristics of the melt-textured sample.