

# Abstracta

Ano II - N. 11

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Trabalhos Aceitos para Publicação

A078-98 à A085-98

**A 078-98 Surface Charges and Electric Field in a Two-Wire Resistive Transmission Line.**

A. K. T. Assis and A. J. Mania

We consider a two-wire resistive transmission line carrying a constant current. We calculate the potential and electric field outside the wires showing that they are different from zero even for stationary wires carrying dc currents. We also calculate the surface charges giving rise to these fields and compare the magnetic force between the wires with the electric force between them. Finally we compare our calculations with Jefimenko's experiment.

Revista Brasileira de Ensino de Física 21 (4), Dez 1999

**A 079-98 The Influence of Joule-Heating on Magnetostriction and GMI effect in a Glass-Covered CoFeSiB Microwire.**

L. Krauss and M. Knobel, S. N. Kane, H. Chiriac

The influence of annealing parameters (time  $t_a$ , current  $I_a$  and applied stress  $s_a$ ) on magnetic properties of Joule heated amorphous Co<sub>68.15</sub>Fe<sub>4.35</sub>Si<sub>12.5</sub>B<sub>15</sub> glass covered microwire (13  $\mu$ m) was investigated. The DC hysteresis loops revealed hard-wire-axis anisotropy in all the samples. From initial permeability the anisotropy field  $H_k$  was calculated and its stress dependence was used to determine the saturation magnetostriction constant  $\lambda_s$ . The anisotropy can be explained by an internal tensile stress caused mainly by the glass coating (about 250 MPa), which remains practically unchanged after Joule heating. Annealing under applied stress induces additional anisotropy which is proportional to  $s_a$  and can be removed by subsequent heating without stress. The magnetoimpedance, measured on the sample with the lowest anisotropy field ( $H_k \gg 120 \text{ Am}^{-1}$ ), shows sharp maxima at  $H = \pm H_k$ . For driving currents higher than 0.2 mA nonlinear behavior is observed, and the magnitude of GMI significantly decreases. The maximum relative change of impedance (60%), observed for the highest frequency, 900 kHz, compares well with the values reported on conventional wires.

Journal of Applied Physics 85 (8), 5435-5437, 1999

**A 080-98 Pressure Dependence of Spin-Orbit Levels of Co<sup>2+</sup> in KZnF<sub>3</sub>.**

P. T. C. Freire, V. Lemos, O. Pilla and N. D. Vieira Jr.

Low temperature emission measurements were performed at atmospheric and high pressures in KZnF<sub>3</sub>:Co<sup>2+</sup>. Comparing the zero-phonon line positions and using the phonon dispersion relation of the host material the fine structure in the emission spectrum was identified. Pressure coefficients were obtained for several among the emission lines from which the values for zero-phonon lines were deduced. Analysis show that the spin-orbit parameter changes with pressure are negligible in this material.

Journal of Chemical Physics 110 (8), 3995-3999, 1999

**A 081-98 A Silicon Micromechanical Galvanometric Scanner.**

L. O. S. Ferreira and S. Moehlecke

The design, fabrication, characterization and modeling of a micromechanical optical scanner driven electromagnetically is described. This microscanner, based on the galvanometric principle, consists of a thin film mirror surrounded by a planar coil deposited on a Si base that is able to rotate around suspended torsion bars and all is immersed in an external magnetic field. This design has no transverse force acting on the rotation axis during scanning, which provides good mechanical characteristics as low distortion and damping, high optical angular deflection ( $\approx 22$  degrees peak to peak) and large Q quality factor at the resonant frequency. Variations in the design are presented and shown to enhance the deflection

angle, the speed response and decrease the power consumption.

Sensors and Actuators A: Physical 73 (3), 252-260, Mar 1999

**A 082-98 Deceleration of a Calcium Atomic Beam with a Frequency-Doubled Diode Laser.**

Germano Woehl Jr., Guilherme A. Garcia, Flávio C. Cruz, Daniel Pereira, And Artemio Scalabrin.

A calcium atomic beam has been decelerated by using a single extended cavity diode laser, frequency doubled to 423 nm. A potassium niobate crystal is placed in an external power build-up cavity and the second harmonic laser beam, counterpropagating with the atomic beam, is tuned into resonance with the strong  $1S_0 - 1P_1$  transition of calcium. For an input power of 78 mW, at 846 nm, we generate 22 mW at 423nm, after correction for the reflectivity of our cavity output coupler. To keep the atoms always in resonance, during the deceleration process, the Zeeman tuning technique has been used.

Applied Optics 38 (12), 2540-2544, 1999

**A 083-98 Dressed-State Approach to Population Trapping in the Jaynes-Cummings Model.**

D. Jonathan, K. Furuya, and A. Vidiella Barranco

The phenomenon of atomic population trapping in the Jaynes-Cummings Model is analysed from a dressed-state point of view. A general condition for the occurrence of partial or total trapping from an arbitrary, pure initial atom-field state is obtained in the form of a bound to the variation of the atomic inversion. More generally, it is found that in the presence of initial atomic or atom-field coherence the population dynamics is governed not by the field's initial photon distribution, but by a "weighted dressedness" distribution characterising the joint atom-field state. In particular, individual revivals in the inversion can be analytically described to a good approximation in terms of that distribution, even in the limit of large population trapping. This result is obtained through a generalisation of the Poisson Summation Formula method for analytical description of revivals developed by Fleischhauer and Schleich.

Journal of Modern Optics 46, 1697-1721, 1999

**A 084-98 Long-time-scale Revivals in Ion Traps.**

H. Moya-Cessa, A. Vidiella-Barranco, J. A. Roversi, Dagoberto S. Freitas and S. M. Dutra.

In this contribution we investigate the interaction of a single ion in a trap with laser beams. Our approach, based on unitary transforming the Hamiltonian, allows its exact diagonalization without performing the Lamb-Dicke approximation. We obtain a transformed Jaynes-Cummings type Hamiltonian, and we demonstrate the existence of super-revivals in that system.

Physical Review A 59 (3), 2518-2520, 1999

**A 085-98 Structural Properties and Raman Modes of Zincblende InN Epitaxial Layers.**

A. Tabata, A. P. Lima, L. K. Teles, L. M. R. Scolfaro, and J. R. Leite, V. Lemos, B. Schottekter, T. Frey, D. Schikora, and K. Lischka.

We report on X-ray diffraction and micro-Raman scattering studies on zincblende InN epitaxial films. The samples were grown by molecular beam epitaxy on GaAs(001) substrates using a InAs layer as a buffer. The transverse-optical (TO) and longitudinal-optical (LO) phonon frequencies at G of c-InN are determined and compared to the corresponding values for c-GaN. Ab initio self-consistent calculations are carried out for the c-InN and c-GaN lattice parameters and TO phonon frequencies. A good agreement between theory and experiment is found.

Applied Physics Letters 74 (3), 362-364, 1999

## ERRATA

A 077-98 Multilevel Granular Structure and its Coupling Distribution in Melt Textured YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-d</sub>

F. M. Araújo-Moreira and W. A. Ortiz and O. F. de Lima.

Physica C 311 (1-2), 98-106, 1998

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