

Abstracta

Ano I - N. 08

Agosto-97



Trabalhos Aceitos para Publicação

A041-97 à A049-97

[A041.97] "Phase-Controlled Photorefractive Running Holograms"

A. A. Freschi, P. M. Garcia, J. Frejlich

We report the use of phase modulation in two-wave mixing with negative feed-back to record stabilized photorefractive running holograms with arbitrarily fixed phase shift between the transmitted and the diffracted beams behind the crystal. By adequately choosing this phase one can select the running hologram speed and associated properties like diffraction efficiency. This technique is an alternative to the classical frequency detuning one with the advantage that the recording is at the same time actively stabilized referred to the own hologram being recorded. We describe the setup, analyse its behavior and report experimental results for a $\text{Bi}_{12}\text{TiO}_{20}$ crystal.

Optics Communications, 143 (4-6), 257-260, 1997

[A042.97] "Secondary Photon Emission in Plasma Processing"

S. Moshkalyov, M. Machida, D. Campos, A. Dulkan

Optical emission spectroscopy with high spatial resolution was applied for the study of plasma-material interaction in low-pressure reactive ion etching. Atomic and molecular emission by sputtered material has been found to be strongly localized near the surface. Excited particles are produced during sputtering by energetic ions, with the mechanisms being different for atoms and molecules. In atomic secondary photon emission, a cascade from highly excited levels is shown to be important. The method can be used as a probe during plasma processing.

Applied Physics Letters 70 (18), 2478-2480, 1997

[A043.97] "Experimental Study of the Pseudospark-Produced Electron Beam For Material Processing"

S.V. Lebedev, M. Machida, S. A. Moshkalyov, D.O. Campos

A pseudospark-produced electron beam has been experimentally investigated. The measurements of spatial current distribution for free-running mode (~100 Hz) showed spatial instabilities of the beam propagation. The effect of dielectric channel used for stabilization of the beam propagation was studied. The beam interaction with metal targets was investigated, and substantial part (about 50%) of the beam current was found to be reflected from the target inclined at angle of 30-60° with respect to the beam axes.

IEEE Transactions on Plasma Science 25 (4), 754-757, 1997

[A044.97] "Spatially Resolved Optical Emission Study of Sputtering in Reactive Plasma"

S. A. Moshkalyov, M. Machida, D. O. Campos, A. Dulkan

Study of material sputtering under reactive ion etching conditions in various gases (Cl_2 , SiCl_4 , O_2) was carried out using optical emission spectroscopy. Sputtering-induced secondary photon emission (atomic and molecular) from the processed materials (Si, Al_2O_3 , GaAs) was studied. A spatial distribution of atomic emission was shown to be non-monotonical with distance from the surface. This effect was explained by a cascade feeding from upper lying atomic levels which is enhanced in plasma (collisional) environment. A model accounting for cascading was developed, and velocities of sputtered excited atoms ($2\text{-}7 \times 10^6$ cm/s) and molecules ($2\text{-}5 \times 10^5$ cm/s) were evaluated from the emission spatial decay parameters.

Journal of Vacuum Science and Technology 16 (2), 514-523,

[A045.97] "Deposition of Silicon Nitride by Low-Pressure ECR-CVD in $\text{N}_2/\text{Ar}/\text{SiH}_4$ "

S. A. Moshkalyov, J. A. Diniz, J. W. Swart, P. J. Tatsch, M. Machida

Plasma deposition of silicon nitride on silicon substrates in a microwave electron cyclotron resonance $\text{N}_2/\text{Ar}/\text{SiH}_4$ discharge was studied as a function of gas pressure, gas composition and discharge power. Dependencies of deposition parameters on discharge parameters obtained at 1 mTorr appear to be essentially different from those at higher pressures. It is shown that the contribution of ionized species to film deposition is comparable with that of neutral ones under high power and low pressure conditions. The best quality of films was obtained at a moderate rather than the highest available dissociation degree of silane.

Journal of Vacuum Science and Technology 15 (6), 2682-2687, 1997

[A046.97] "Positive-Feedback-Enhanced Fröhlich's Bose-Einstein-Condensation in Biosystems"

M. V. Mesquita, A. R. Vasconcellos, R. Luzzi

We present a mechano-statistical study of the so-called Fröhlich effect, namely nonthermal amplification of polar vibrations leading to complex behavior in biosystems, like biopolymers and large aggregates of macro-molecules. Fröhlich condensation is considered to be of relevance for a certain class of biological processes, in particular in connection with the problem of long range propagation of signals at physiological temperature. Resorting to a thermo-mechanical theory appropriate to deal with irreversible processes in systems far from equilibrium, earlier results are extended. We perform an analysis of the case when production of a double excitation of polar vibrations, generated by the action of an external pumping source of metabolic energy, is possible. It is shown that, when this is the case, the process involves a positive feedback mechanism that greatly facilitates and enhances the phenomenon of Fröhlich's condensation, and consequently the possible accompanying biological processes. The results are discussed and eventual connection with experimental observations pointed out.

International Journal of Quantum Chemistry 66 (2), 177-187, 1998

[A047.97] "Effects of Solar Magnetosonic Waves in New Solar Neutrino Observations"

J. H. Colonia, M. M. Guzzo, N. Reggiani

Assuming a nonvanishing neutrino magnetic moment, we investigate the consequences of the appearance of solar magnetosonic waves on the solar neutrino spin-flavour conversion. We analyze the resulting distortions of the solar neutrino flux to be measured by new solar neutrino detectors to conclude that, with the time and energy resolution to be available in these experiments, magnetosonic waves in the Sun can be tested. We discuss how to distinguish this experimental signal coming from magnetosonic waves from other sources of time modulation of neutrino flux like the effect of seasonal variation of the Sun-Earth distance on vacuum oscillations, MSW effect inside the Earth, and solar activity related to the appearance of sunspots on the solar surface.

Journal of Astroparticle Physics 8 (1-2), 51-57, 1997

[A048.97] "Spin-Flavor Precession Solution to the Solar Neutrino Problem and Magnetohydrodynamics Spectrum in the Sun"

M. M. Guzzo, N. Reggiani, J. H. Colonia

We argue that solar neutrino observations have to be sensible to the effects of magnetohydrodynamics fluctuations in the Sun if the resonant spin-flavor precession mechanism is the solution to the solar neutrino problem. We find that the required solar magnetic field for this solution presents global and localized magnetic waves with typical period of order 1 to order 10 days, which can generate corresponding periodical time modulation of the solar neutrino observations. These effects can be thought as a test to the spin-flavor precession solution. Periodicity of this order is not excluded by available experimental data although only with the high statistics of future real time experiments a precise test can be realized. We discuss also that these magnetic fluctuations can be used to obtain informations about the structure of the magnetic field in the solar interior.

Physical Review D 56 (2), 588-595, 1997

[A049.97] "Magneto-Impedance Relaxation in Amorphous Wires and Ribbons"

M. L. Sartorelli, M. Knobel, J. P. Sinnecker

Measurements of the impedance decay after the removal of a saturating magnetic field ($H=7.9$ kA/m) for amorphous wire and ribbons are presented, for different frequencies and amplitudes of the driving field.

Journal of Magnetism and Magnetic Materials 177-181, Parte 1, 121-122, Jan 1998

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Abstracta

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