

Abstracta

Ano V - N. 01

Fev.01



Trabalhos Aceitos para Publicação

A001-01 à A005-01

Trabalho Aceito para Congresso

C001-01

Trabalhos Publicados

P001-01 à P006-01

ACCEPTED PAPERS

[A001-01] "An Information-Theoretic-Based (MaxEnt) Approach to Social Dynamical Systems."

Roberto Luzzi, M. V. Mesquita and J. R. Madureira.

Jeffreys-Jaynes' Predictive Statistics appears to provide a promising approach for the study of general dynamical systems. We describe an application of such theory to the analysis of the dynamics of interacting social groups. For that purpose the said statistical theory is redirected towards the construction of an equivalent stochastic theory. The working of the formalism is illustrated by applying it to a simplified case of opinion forming in a two-candidates election.

Journal of Mathematical Sociology 25 (2), 179-224, 2001

[A002-01] "Quantum Theory of Superluminal Pulse Propagation"

P. W. Miloni, K. Furuya, R. Y. Chiao

We consider the propagation in a dielectric medium of radiation emitted by an atom excited slowly compared with the relaxation times of the atoms of the medium. All the atoms are two-state systems, and the emitted light is incident on an ideal broadband detector. It is shown that the detector can "click" sooner than it could if there were no material medium between it and the source atom.

Optics Express 8 (2), 59-65, 2001

[A003-01] "Kinetic Roughening in Etched Si."

M. E. R. Dotto and M. U. Kleinke.

In this work, surface morphology of Si etched surfaces generated with distinct physical constraints for attack, have been investigated by atomic force microscope (AFM). Statistical properties measured from AFM images prove that these surfaces present self-affine behavior; and also suggest that Si chemical attacks can be described like as a $2 + 1$ percolation inner random medium with quenched noise.

Physica A: Statistical Mechanics and its Applications 295 (1-2), 149-153, 2001

[A004-01] "Nonmonotonic Temperature Dependence of the Thermal Hall Angle of YBa₂Cu₃O_{6.95} Single Crystal."

R. Ocaña, A. Taldenkov, P. Esquinazi, and Y. Kopelevich

We have performed high-resolution measurements of the magnetic field ($0 \text{ T} \leq B \leq 9 \text{ T}$) and temperature ($10 \text{ K} \leq T \leq 140 \text{ K}$) dependence of the longitudinal and transverse Hall thermal conductivity of a twinned YBa₂Cu₃O_{6.95} single crystal. We have used and compared two recently published methods to extract the thermal Hall angle $\rho_H(T, B)$. Our results indicate that $\cot(\rho_H)$ varies quite accurately as T^4 in the intermediate temperature range $\sim 0.3 < T/T_c$. It shows a well defined minimum at $T_m = 20 \text{ K}$ which resembles that observed in the c-axis microwave conductivity. The electronic part of the longitudinal and the transverse thermal conductivity show the scaling behavior for transport properties predicted for d-wave superconductors in the temperature range $\sim 18 \text{ K} \leq T \leq 30 \text{ K}$.

Journal of Low Temperature Physics 123 (3-4), 181-196, 2000

[A005-01] "Griffiths phase of the Kondo insulator fixed point"

E. Miranda and V. Dobrosavljevic

Heavy fermion compounds have long been identified as systems which are extremely sensitive to the presence of impurities and other imperfections. In recent years, both experimental and theoretical work has demonstrated that such disorder can lead to unusual, non-Fermi liquid behavior for most physical quantities. In this paper, we show that this anomalous sensitivity to disorder, as well as the resulting Griffiths phase behavior, directly follow from the proximity of metallic heavy fermion systems to the Kondo insulator fixed point.

Journal of Magnetism and Magnetic Materials 226-230 (1), 110-114, 2001

PUBLISHED PAPERS

[P001-01] "Tokamak, reversed field pinch and intermediate structures as minimum-dissipative relaxed states."

R. Bhattacharyya, M.S. Janaki and B. Dasgupta

The principle of minimum energy dissipation rate is utilized to develop a unified model for relaxation in toroidal discharges. The Euler-Lagrange equation for such relaxed states is solved in toroidal coordinates for an axisymmetric torus by expressing the solutions in terms of Chandrasekhar-Kendall (C-K) eigenfunctions analytically continued in the complex domain. The C-K eigenfunctions are hypergeometric functions that are solutions of the scalar Helmholtz equation in toroidal coordinates in the large-aspect-ratio approximation. Equilibria are constructed by assuming the total current $J=0$ at the edge. This yields the eigenvalues for a given aspect-ratio. The most novel feature of the present model is that solutions allow for tokamak, low- q as well as reversed field pinch-like behavior with a change in the eigenvalue characterizing the relaxed state.

Physics of Plasmas 7 [12], 4801-4804. 2000.

[P002-01] "Influence of substrate temperature on formation of an SiC buffer layer by reaction of Si(100) with silane-methane plasma."

C. Bittencourt

A clean Si(100) surface was reacted at temperatures over the range 750-1050 degreesC with methane-silane-hydrogen plasma. The reaction products on the surface were investigated using x-ray photoelectron spectroscopy, reflection high-energy electron diffraction, infrared absorption spectroscopy and atomic force microscopy. The results indicate that using substrate temperatures higher than 800 degreesC the reaction products on the surface are epitaxial islands that have a beta-silicon carbide crystalline structure. For lower temperatures a more planar layer with a loss in the crystalline quality was observed.

Semiconductor Science and Technology 15[12], 1115-1118. 2000.

[P003-01] "Model absorption potential for electron-molecule scattering in the intermediate-energy range"

M.T. Lee, I. Iga, L.E. Machado and L.M. Brescansin

Calculated elastic differential, integral, and momentum transfer cross sections as well as total (elastic + inelastic) cross sections for electron-CH₄ collisions are reported in the (20-500)-eV energy range. Four model potentials of both a nonempirical and semiempirical nature are used to represent absorption effects.

equations. Through the comparison of our calculated results with available experimental data, two of these model absorption potentials are recommended as more convenient for treating electron-molecule collision problems

Physical Review A 6206[6], 2710-+. 2000.

[P004-01] "Electron heating and acceleration by Alfvén waves with varying phase velocity."

I.F. Potapenko, C.A. de Azevedo and P.H. Sakanaka

The influence of the Alfvén wave on the electron distribution function is studied by numerical simulations. A quasi-linear operator models the electron Landau damping of any plasma eigenmodes: kinetic Alfvén, whistlers, and lower hybrid waves. Weak collisions are taken into account via 2D in the velocity space nonlinear Fokker-Planck kinetic equation. It is shown that due to the variation of phase velocity, as seen by the Alfvén wave in the course of propagation in the nonuniform magnetic field the noninductive current induced by the Alfvén wave and the dissipated wave power may be several times larger in comparison with the case when the phase velocity is constant. The results might be applied in coronal regions, magnetosphere, tokamaks, stellarators

Physica Scripta 62[6], 486-490. 2000.

[P005-01] "Spectroscopic analysis of the 4p4d configuration of KrVII"

M. Raineri, A.G. Trigueiros, M. Gallardo and J.G.R. Almandos

The spectrum of six times ionized krypton, (KrVII) has been observed in the 300-2100 Å wavelength range. We propose 11 new energy level values for the 4p4d configuration and we adjusted the previously known energy level values for the 4s5p, 4s4f, 4s5s and 4s5d configurations. A total of 56 new lines in this spectra have been classified. The observed configurations were theoretically interpreted by means of Hartree-Fock relativistic, (HFR) calculations and least-squares fit of the energy parameters to the observed levels.

Physica Scripta 62[6], 474-478. 2000.

[P006-01] "Thermochemical properties of Cuban biomass"

J.A. Suarez, C.A. Luengo, F.F. Felfli, G. Bezzon and P.A. Beaton

This study provides information on proximate analysis, heating values, and ultimate analysis for seven kinds of biomass from agriculture and forest sources, such as rice husk, coffee husk sugar cane bagasse and straw, and firewood. The results have shown excessive volatile content ranging from 61.2% to 82.6%, fixed carbon content ranging from 14.6% to 20.7%, and high ash contents over 22.5% for rice husk and 93% for sugar cane straw. Other biomass studied did not reach 3%. The lower heating values ranged from 15.2 to 21.2 MJ/kg (dry weight basis), with firewood presenting higher values. The ultimate analysis indicated that the weight fraction of carbon ranged from 38.2% to 48.8%,

the hydrogen fraction ranged from 5.6% to 7.0%, and the oxygen fraction ranged from 33.8% to 43.7%. Estimates have indicated that the energy potential of agricultural residues is around 366,700 tonnes of oil annually, which is almost 25% of the Cuban annual crude oil production.

Energy Sources 22[10], 851-857. 2000.

ACCEPTED PAPERS FOR CONFERENCE

[C001-01] "A Generalized Roosbroeck-Schokley Relation for III-Nitrides in Far-from-Equilibrium Conditions"

A.R. Vasconcellos, R. Luzzi, C.G. Rodríguez, V.N. Freire, A.P. da Costa

We consider the behavior of the absorption coefficient and luminescence spectrum in the steady state when III-nitrides semiconductors (compounds GaN, AlN and InN) are in far-from-equilibrium conditions created by an electric field. We analyze the high frequency part of the spectra obtaining a generalization of the Roosbroeck-Schokley relation, $LRS(w, EF)$, the ratio between the frequency dependent luminescence $I(w)$ and the absorption coefficient $a(w)$, for nonequilibrium conditions which are dependent on the electric field intensity EF . We show that the carrier's temperature within a small error is proportional to $|\frac{d \ln[LRS(w, EF)]}{dw}|$.

Proceedings of the 2000 - Fall Materials Research Society Meeting.

Abstracta

Instituto de Física

Diretor: Prof. Dr. Carlos Henrique de Brito Cruz

Universidade Estadual de Campinas - UNICAMP

Cidade Universitária Zeferino Vaz

13083-859 - Campinas - SP - Brasil

e-mail: secdir@ifi.unicamp.br

Fone: OXX 19 3521-5300

Publicação

Biblioteca do Instituto de Física Gleb Wataghin

<http://webbif.ifi.unicamp.br>

Diretora Técnica: Rita Aparecida Sponchiado

Elaboração

Tânia Macedo Folegatti

abstract@ifi.unicamp.br

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