PHYSICAL REVIEW E

For editorial and subscription correspondence, please see inside front cover
(ISSN: 1063-651X)

PERIODICALS
Postmaster send address changes to:
American Institute of Physics
Suite 1NO1
2 Huntington Quadrangle
Melville, NY 11747-4502

THIRD SERIES, VOLUME 61, NUMBER 3 ***CONTENTS*** **MARCH 2000**

RAPID COMMUNICATIONS

General methods of statistical physics

Particle systems with stochastic passing R2163
I. Ispolatov and P. L. Krapivsky

Scaling behavior of the Abelian sandpile model R2168
Barbara Drossel

Dynamics of a harmonic oscillator on the Bethe lattice R2172
Jangil Kim and Isao Sawada

Chaos and nonlinear dynamical systems

Dual synchronization of chaos R2176
Yun Liu and Peter Davis

Trace formula for products of diagonal matrix elements in chaotic systems R2180
Sanjay Hortikar and Mark Srednicki

Oscillations and chaos in catalytic reactions on the nm scale R2184
V. P. Zhdanov and B. Kasemo

Classical fluids

Freezing transition of a strongly dipolar simple fluid R2188
G. T. Gao and X. C. Zeng

Liquid crystals

Temperature variation of film tension measured by a vibrating membrane tensiometer R2192
M. Veum, C. Pettersen, P. Mach, P. A. Crowell, and C. C. Huang

Complex fluids, polymers, and granular materials

Measuring the rotational viscosity of ferrofluids without shear flow R2196
J. Embs, H. W. Müller, C. Wagner, K. Knorr, and M. Lücke

Ordering of viscous liquid mixtures under a steady shear flow R2200
Zhenyu Shou and Amitabha Chakrabarti

Measurement of aqueous foam rheology by acoustic levitation R2204
J. Gregory McDaniel and R. Glynn Holt

Copyright 2000 by The American Physical Society

(Continued)

1063-651X(200003)61:3;1-6

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Lattice model for cold and warm swelling of polymers in water R2208
Pierpaolo Bruscolini and Lapo Casetti

Biological physics

Simulated coevolution in a mutating ecology R2212
J. S. Sá Martins
Scale-invariant fluctuations at different levels of organization in developing heart cell networks R2216
Yoav Soen and Erez Braun

Plasma physics

Ponderomotive acceleration of electrons at the focus of high intensity lasers R2220
Wei Yu, M. Y. Yu, J. X. Ma, Z. M. Sheng, J. Zhang, H. Daido, S. B. Liu, Z. Z. Xu, and R. X. Li
Emission of MeV multiple-charged ions from metallic foils irradiated with an ultrashort laser pulse R2224
A. Zhidkov, A. Sasaki, and T. Tajima

Classical physics, including nonlinear media

Model for urban and indoor cellular propagation using percolation theory R2228
G. Franceschetti, S. Marano, N. Pasquino, and I. M. Pinto

ARTICLES

General methods of statistical physics

Tricritical points in the Sherrington-Kirkpatrick model in the presence of discrete random fields 2232
João M. de Araújo, Fernando D. Nobre, and Francisco A. da Costa
Self-similar domain growth, localized structures, and labyrinthine patterns in vectorial Kerr resonators 2241
Rafa Gallego, Maxi San Miguel, and Raúl Toral
Closed-loop phase equilibria of a symmetrical associating mixture of square-well molecules examined by Gibbs ensemble Monte Carlo simulation 2245
Lowri A. Davies, George Jackson, and Luis F. Rull
Depinning of kinks in a Josephson-junction ratchet array 2257
E. Trías, J. J. Mazo, F. Falo, and T. P. Orlando
Sliding blocks with random friction and absorbing random walks 2267
A. R. Lima, C. F. Moukarzel, I. Grosse, and T. J. P. Penna
General response function for interacting quantum liquids 2272
Klaus Morawetz and Uwe Fuhrmann
Thermodynamics of fractal spectra: Cantor sets and quasiperiodic sequences 2281
P. Carpena, A. V. Coronado, and P. Bernaola-Galván
Second virial coefficient for the Landau diamagnetism of a two-component plasma 2290
M. Steinberg, W. Ebeling, and J. Ortner
Exact results for a fully asymmetric exclusion process with sequential dynamics and open boundaries 2300
Jordan Brankov, Nina Pesheva, and Nikola Valkov
Hopping motion of lattice gases through nonsymmetric potentials under strong bias conditions 2319
K. W. Kehr and Z. Koza
Statistical mechanics of random two-player games 2327
J. Berg
Number of distinct sites visited by N random walkers on a Euclidean lattice 2340
S. B. Yuste and L. Acedo
Steady-state cracks in viscoelastic lattice models. II 2348
David A. Kessler

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Path-ensemble averages in systems driven far from equilibrium 2361
Gavin E. Crooks
Exactly solvable path integral for open cavities in terms of quasinormal modes 2367
Alec Maassen van den Brink
Statistics of a confined, randomly accelerated particle with inelastic boundary collisions 2376
Theodore W. Burkhardt, Jerrold Franklin, and Richard R. Gawronski
Self-organized criticality in two-variable models 2382
Stefan Hergarten and Horst J. Neugebauer
Universal aspects of vacancy-mediated disordering dynamics: The effect of external fields 2386
Wannapong Triampo, Timo Aspelmeier, and Beate Schmittmann
Energy transport in the integrable system in contact with various types of phonon reservoirs 2397
K. Saito, S. Takesue, and S. Miyashita
Realizing the canonical ensemble in highly entropic inhomogeneous materials 2410
B. Joós and Z. Zhou
Linear pattern dynamics in nonlinear threshold systems 2418
John B. Rundle, W. Klein, Kristy Tiampo, and Susanna Gross
Renormalization group treatment of correlated percolation 2432
Kenneth S. Mendelson
Nonlinear analysis of stationary patterns in convection-reaction-diffusion systems 2436
Olga A. Nekhamkina, Alexander A. Nepomnyashchy, Boris Y. Rubinstein, and Moshe Sheintuch
Rhythm in a saline oscillator 2445
Mina Okamura and Kenichi Yoshikawa
Disordered totally asymmetric simple exclusion process: Exact results 2453
Kiran M. Kolwankar and Alexander Punnoose
Breakdown of the bounding properties of variational transition state theory and the Rayleigh quotient method . . . 2457
Alexander N. Drozdov and Susan C. Tucker
Energy equipartition starting from high-frequency modes in the Fermi-Pasta-Ulam β oscillator chain 2471
K. Ullmann, A. J. Lichtenberg, and G. Corso
Fluctuation formalism for elastic constants in hard-spheres-and-tethers systems 2478
Oded Farago and Yacov Kantor
Recurrence time statistics in deterministic and stochastic dynamical systems in continuous time: A comparison 2490
V. Balakrishnan, G. Nicolis, and C. Nicolis

Chaos and nonlinear dynamical systems

Tracking unstable steady states by large-amplitude low-frequency periodic modulation of a control parameter: Phase-space analysis 2500
A. Kul'minskii, R. Vilaseca, and R. Corbalán
Cross-Newell equations for hexagons and triangles 2506
Rebecca B. Hoyle
High-Q cavity-induced synchronization in oscillator arrays 2513
Giovanni Filatrella, Niels Falsig Pedersen, and Kurt Wiesenfeld
Spatial-feedback control of dispersive chaos in binary-fluid convection 2519
Paul Kolodner and Georg Flätgen
Characterization of sensitivity to finite perturbations 2533
Tobias Letz and Holger Kantz
Excited eigenstates and strength functions for isolated systems of interacting particles 2539
V. V. Flambaum and F. M. Izrailev
Critical states of transient chaos 2543
Z. Kaufmann, A. Németh, and P. Szépfalusy

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Origin of multikinks in dispersive nonlinear systems 2551
Alan Champneys and Yuri S. Kivshar
Quantum response of finite Fermi systems and the relation of the Lyapunov exponent to transport coefficients . . . 2555
Klaus Morawetz
Phase synchronization in discrete chaotic systems 2559
J. Y. Chen, K. W. Wong, Z. X. Chen, S. C. Xu, and J. W. Shuai
Testing for general dynamical stationarity with a symbolic data compression technique 2563
Matthew B. Kennel and Alistair I. Mees
Assessing optimality and robustness for the control of dynamical systems 2569
Metin Demiralp and Herschel Rabitz
Response of a nonlinear Hamiltonian system to the external harmonic field: Resonant and chaotic cases 2579
P. V. Elyutin and B. V. Pavlov-Verevkin

Classical fluids

Anisotropic spectra of acoustic turbulence 2586
V. S. L'vov, Yu. V. L'vov, and A. Pomyalov
Universality classes for self-similarity of noiseless multidimensional Burgers turbulence and interface growth 2595
S. N. Gurbatov
Heisenberg's eddy-viscosity approximation, the distant-interaction algorithm, and the ϵ expansion in turbulence 2605
Malay K. Nandy
Bremsstrahlung of nitrogen and noble gases in single-bubble sonoluminescence 2611
Ning Xu, Long Wang, and Xiwei Hu
Passive scalar transport in a random flow with a finite renewal time: Mean-field equations 2617
Tov Elperin, Nathan Kleeorin, Igor Rogachevskii, and Dmitry Sokoloff
Dynamical aspect of entropy transfer in free convection turbulence 2626
Sadayoshi Toh and Makoto Iima
Vortex reconnection as the dissipative scattering of dipoles 2640
L. Moriconi
Adaptive lattice Boltzmann model for compressible flows: Viscous and conductive properties 2645
Chenghai Sun
Nonperturbative spectrum of anomalous scaling exponents in the anisotropic sectors of passively advected magnetic fields 2654
Itai Arad, Luca Biferale, and Itamar Procaccia
Theoretical analysis of a dynamic thermoconvective pattern in a circular container 2663
P. C. Dauby, P. Colinet, and D. Johnson
Contactless viscosity measurement by oscillations of gas-levitated drops 2669
M. Perez, L. Salvo, M. Suéry, Y. Bréchet, and M. Papoular
Numerical simulation of double-diffusive convection in a rectangular box 2676
Y. Young and R. Rosner
Bifurcation analysis of the plane sheet pinch 2695
Jörg Schumacher and Norbert Seehafer
High-order direct correlation functions of uniform fluids and their application to the high-order perturbative density functional theory 2704
Shiqi Zhou and Eli Ruckenstein
Dissipative and dispersive behaviors of lattice-based models for hydrodynamics 2712
Yue-Hong Qian and Shi-Yi Chen
Ballistic versus diffusive pair dispersion in the Richardson regime 2717
I. M. Sokolov, J. Klafter, and A. Blumen

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Structural properties of liquid Al_2O_3: A molecular dynamics study 2723
Gonzalo Gutiérrez, A. B. Belonoshko, Rajeev Ahuja, and Börje Johansson
Propylene carbonate reexamined: Mode-coupling β scaling without factorization? 2730
J. Wuttke, M. Ohl, M. Goldammer, S. Roth, U. Schneider, P. Lunkenheimer, R. Kahn, B. Ruffĺe, R. Lechner, and M. A. Berg
Magnetic resonance imaging of convection in laser-polarized xenon 2741
R. W. Mair, C.-H. Tseng, G. P. Wong, D. G. Cory, and R. L. Walsworth

Liquid crystals

Concentration dependence of the scalar order parameter in liquid-crystalline systems with variable molecular shape 2749
G. Barbero and L. R. Evangelista
Novel surface state in a class of incommensurate systems 2753
A. E. Jacobs, D. Mukamel, and D. W. Allender
Influence of fluctuations on the phase diagram of chiral nematic liquid crystals 2759
J. Englert, H. Stark, L. Longa, and H.-R. Trebin
Pattern formation of chevrons in the conduction regime in homeotropically aligned liquid crystals 2769
Jong-Hoon Huh, Yoshiki Hidaka, Axel G. Rossberg, and Shoichi Kai
van der Waals interactions in cholesteric liquid crystals 2777
S. A. Issaenko and A. B. Harris
Substrate-induced order in the isotropic phase of a smectogenic liquid crystal: A deuteron NMR study 2792
P. Ziherl, M. Vilfan, N. Vrbančič-Kopač, S. Žumer, R. J. Ondris-Crawford, and G. P. Crawford
Switching dynamics in homeotropic ferroelectric liquid crystals 2799
N. Pereda, C. L. Folcia, J. Etxebarria, and J. Ortega

Complex fluids, polymers, and granular materials

Dynamic heterogeneous structure relaxation of supercooled liquids 2805
Wen-Bing Zhang, Xian-Wu Zou, Zhun-Zhi Jin, and De-Cheng Tian
Deviation from Maxwell distribution in granular gases with constant restitution coefficient 2809
Nikolai V. Brilliantov and Thorsten Pöschel
Criticality of the ''critical state'' of granular media: Dilatancy angle in the Tetris model 2813
Marina Piccioni, Vittorio Loreto, and Stéphane Roux
Anisotropic magnetism in field-structured composites 2818
James E. Martin, Eugene Venturini, Judy Odinek, and Robert A. Anderson
Temperature-induced flocculation of colloidal particles immersed into the isotropic phase of a nematic liquid crystal 2831
A. Borštnik, H. Stark, and S. Žumer
Dynamics of a polymer chain in an elongational flow 2840
T. Hofmann, R. G. Winkler, and P. Reineker
Defects in lamellar diblock copolymers: Chevron- and Ω-shaped tilt boundaries 2848
Yoav Tsori, David Andelman, and M. Schick
Surfactant-assisted entanglement of interfacial polymer chains 2859
Peng Wei Zhu and Donald H. Napper
Critical dynamics of Heisenberg fluids at the gas-liquid transition 2864
R. Folk and G. Moser
Diffusing-wave-spectroscopy investigation of latex particle motion in polymer gels 2879
G. Nisato, P. Hébraud, J.-P. Munch, and S. J. Candau
Poisson bracket formulation of nematic polymer dynamics 2888
Randall D. Kamien

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Deformation of a stretched polymer knot 2895
Yu-Jane Sheng, Pik-Yin Lai, and Heng-Kwong Tsao
Heat flow through an insulating nanocrystal 2902
David M. Leitner and Peter G. Wolynes
Evolution of a sandpile in a thick-flow regime 2909
S. N. Dorogovtsev and J. F. F. Mendes
Dynamics of a one-dimensional inelastic particle system 2920
Junzhong Yang
Hydrodynamic interactions in microphase separation of block copolymer films: Stability and spirals 2924
Y. Shiwa
Fabrication of large-area face-centered-cubic hard-sphere colloidal crystals by shear alignment 2929
R. M. Amos, J. G. Rarity, P. R. Tapster, T. J. Shepherd, and S. C. Kitson
Dynamics of stable viscous displacement in porous media 2936
Eyvind Aker, Knut Jørgen Måløy, and Alex Hansen
Counterions in the growth of ionic micelles in aqueous electrolyte solutions: A small-angle neutron scattering study 2947
V. K. Aswal and P. S. Goyal
Universality of the island density exponent in growth models of monomer and dimer chains in two dimensions . . 2954
K. Mazzitello, J. L. Iguain, C. M. Aldao, and H. O. Mártin
Dynamical Monte Carlo study of equilibrium polymers: Effects of high density and ring formation 2959
A. Milchev, J. P. Wittmer, and D. P. Landau
Diffusion of concentrated neutral hard-sphere colloidal suspensions 2967
R. Verberg, I. M. de Schepper, and E. G. D. Cohen
Orientation fluctuation-induced spinodal decomposition in polymer–liquid-crystal mixtures 2977
Akihiko Matsuyama, R. M. L. Evans, and M. E. Cates

Biological physics

Synchronization due to common pulsed input in Stein's model 2987
Jianfeng Feng, David Brown, and Guibin Li
Error propagation in the hypercycle 2996
P. R. A. Campos, J. F. Fontanari, and P. F. Stadler
Small-angle neutron scattering from large unilamellar vesicles: An improved method for membrane thickness determination 3003
J. Pencer and F. R. Hallett
Multiplicity of species in some replicative systems 3009
Adam Lipowski

Plasma physics

Highly charged ion densities and ion confinement properties in an electron-cyclotron-resonance ion source 3015
G. Douysset, H. Khodja, A. Girard,, and J. P. Briand
Collisional effects on diffusion scaling laws in electrostatic turbulence 3023
M. Vlad, F. Spineanu, J. H. Misguich, and R. Balescu
Single-particle Langevin model of particle temperature in dusty plasmas 3033
R. A. Quinn and J. Goree
Observations of the ultraviolet and x-ray brightness profiles and cooling rates of Kr and Ar in magnetically confined fusion plasmas 3042
M. J. May, K. B. Fournier, D. Pacella, H. Kroegler, J. E. Rice, B. Gregory, M. Finkenthal, H. W. Moos, G. Mazzitelli, and W. H. Goldstein
Mobility of He^+, Ne^+, Ar^+, $N_2{}^+$, $O_2{}^+$, and $CO_2{}^+$ in their parent gas 3053
E. Basurto, J. de Urquijo, I. Alvarez, and C. Cisneros

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Transverse dynamics of a collisionless plasma column in a homogeneous magnetic field 3058
D. S. Dorozhkina and V. E. Semenov
Experimental investigations of quenching of ionization states in a freely expanding, recombining laser-produced plasma 3063
Andrea Thum-Jaeger, B. K. Sinha, and K. P. Rohr
Linear magnetohydrodynamic waves in a finely stratified plasma 3069
Enzo Lazzaro, Maurizio Lontano, and Dmitri D. Ryutov
Strong pattern selection and amplitude equation of higher order for ionization waves in a neon glow discharge 3078
B. Bruhn and B.-P. Koch

Classical physics, including nonlinear media

Systematic construction of multicomponent optical solitons 3093
Q-Han Park and H. J. Shin
Three-dimensional spinning solitons in dispersive media with the cubic-quintic nonlinearity 3107
Anton Desyatnikov, Andrey Maimistov, and Boris Malomed
Bifurcation of internal solitary wave modes from the essential spectrum 3114
P. G. Kevrekidis and C. K. R. T. Jones
Unified model for partially coherent solitons in logarithmically nonlinear media 3122
Wiesław Królikowski, Darran Edmundson, and Ole Bang
Averaged model and integrable limits in nonlinear double-periodic Hamiltonian systems 3127
Sergei K. Turitsyn, Elena G. Turitsyna, Sergei B. Medvedev, and Michail P. Fedoruk
Propagation of solitons in the Toda lattice with an impure segment 3133
Yoji Kubota and Takashi Odagaki
Strong four-photon conversion regime of cross-phase-modulation-induced modulational instability 3139
Emmanuel Seve, Guy Millot, and Stefano Trillo

Computational physics

Highly accurate eigenvalues for the distorted Coulomb potential 3151
L. Gr. Ixaru, H. De Meyer, and G. Vanden Berghe
Self-consistent kinetic simulation of plasmas 3160
J. Feng and W. N. G. Hitchon
Geometric discretization scheme applied to the Abelian Chern-Simons theory 3174
Samik Sen, Siddhartha Sen, James C. Sexton, and David H. Adams
Rigid body molecular dynamics with nonholonomic constraints: Molecular thermostat algorithms 3186
Ramzi Kutteh and R. B. Jones
Interaction-round-a-face density-matrix renormalization-group method applied to rotational-invariant quantum spin chains 3199
Wada Tatsuaki

BRIEF REPORTS

General methods of statistical physics

Discrete velocity random motion in an external field 3207
A. V. Plyukhin and K. S. Kim
Discerning influences of orientational instability on anomalously roughened interfaces 3212
Ning-Ning Pang and Wen-Jer Tzeng
Universal scaling and nonlinearity in surface layer fragmentation 3216
Ulrich A. Handge, Igor M. Sokolov, and Alexander Blumen

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 61, NUMBER 3 MARCH 2000

Effect of periodicity restrictions on the ground state of quantum systems with periodic potentials 3220
Balázs Hetényi

Chaos and nonlinear dynamical systems

Quantum noise-induced chaotic oscillations 3223
Bidhan Chandra Bag and Deb Shankar Ray
Turbulence of nonlocally coupled oscillators in the Benjamin-Feir stable regime 3227
Dorjsuren Battogtokh and Yoshiki Kuramoto
Noise scaling of phase synchronization of chaos 3230
Victor Andrade, Ruslan L. Davidchack, and Ying-Cheng Lai

Classical fluids

Energy dissipation statistics in a shell model of turbulence 3234
G. Boffetta, A. Celani, and D. Roagna
Analysis of fully developed turbulence in terms of Tsallis statistics 3237
T. Arimitsu and N. Arimitsu

Complex fluids, polymers, and granular materials

Green-Kubo relations for granular fluids 3241
I. Goldhirsch and T. P. C. van Noije
Kink motion in the barrier crossing of a chain molecule 3245
K. L. Sebastian
Density functional theory of phase coexistence in weakly polydisperse fluids 3249
Hong Xu and Marc Baus
Pinning of phase separation in a model of binary polymer blends 3252
Claudio Castellano and Federico Corberi

Biological physics

Pendulum as a model system for driven rotation in molecular nanoscale machines 3256
A. V. Zolotaryuk, P. L. Christiansen, B. Nordén, A. V. Savin, and Y. Zolotaryuk

Plasma physics

Plasma oscillations and nonextensive statistics 3260
J. A. S. Lima, R. Silva , Jr., and Janilo Santos

Classical physics, including nonlinear media

Analytical solution of Maxwell's equations in lossy and optically active crystals 3264
Haijun Yuan, Weinan E, and Peter Palffy-Muhoray
Double-hump solitary waves in quadratically nonlinear media with loss and gain 3267
S. Darmanyan, L. Crasovan, and F. Lederer

COMMENTS

Comment on ''Critical behavior of a traffic flow model'' 3270
D. Chowdhury, J. Kertész, K. Nagel, L. Santen, and A. Schadschneider
Reply to ''Comment on 'Critical behavior of a traffic flow model' '' 3272
L. Roters, S. Lübeck, and K. D. Usadel

(Continued)

PHYSICAL REVIEW E **THIRD SERIES, VOLUME 61, NUMBER 3** **MARCH 2000**

ERRATA

Erratum: Relation of shear viscosity and self-diffusion coefficient for simple liquids [Phys. Rev. E **60**, 4105 (1999)] 3275
Kyunil Rah and Byung Chan Eu

Selected Abstracts from Other Physical Review Journals 3276

Cumulative Author Index 3277