PHYSICAL REVIEW E

For editorial and subscription correspondence, please see inside front cover
(ISSN: 1539-3755)

PERIODICALS
Postmaster send address changes to:
APS Subscription Services
Suite 1NO1
2 Huntington Quadrangle
Melville, NY 11747-4502

THIRD SERIES, VOLUME 75, NUMBER 3 *CONTENTS* **MARCH 2007**

PART 2: NONLINEAR AND PLASMA PHYSICS, FLUID DYNAMICS, AND RELATED TOPICS

RAPID COMMUNICATIONS

Chaos and pattern formation

Experimental observation of different types of chaotic synchronization in an electrochemical cell *(4 pages)* . . . . . 035201(R)
J. M. Cruz, M. Rivera, and P. Parmananda

Subharmonic transitions in a bistable oscillator with bimodal periodic excitation *(4 pages)* . . . . . 035202(R)
Agnessa Kovaleva

Spectral properties of Bunimovich mushroom billiards *(4 pages)* . . . . . 035203(R)
B. Dietz, T. Friedrich, M. Miski-Oglu, A. Richter, and F. Schäfer

Fractional behavior in nonergodic reaction processes of isomerization *(4 pages)* . . . . . 035204(R)
Akira Shojiguchi, Chun-Biu Li, Tamiki Komatsuzaki, and Mikito Toda

Fluid dynamics

Route to non-Gaussian statistics in convective turbulence *(4 pages)* . . . . . 035301(R)
Roberto Festa, Andrea Mazzino, and Marco Tizzi

Computational physics

Improved Monte Carlo estimators for the one-body density *(4 pages)* . . . . . 035701(R)
Roland Assaraf, Michel Caffarel, and Anthony Scemama

ARTICLES

Interdisciplinary physics

Enhancing robustness and immunization in geographical networks *(6 pages)* 036101
Liang Huang, Kongqing Yang, and Lei Yang

Phase transition and hysteresis in scale-free network traffic *(4 pages)* 036102
Mao-Bin Hu, Wen-Xu Wang, Rui Jiang, Qing-Song Wu, and Yong-Hong Wu

Unified Green's function retrieval by cross-correlation; connection with energy principles *(14 pages)* 036103
Roel Snieder, Kees Wapenaar, and Ulrich Wegler

Copyright 2007 by The American Physical Society

(Continued)

1539-3755(200703)75:3:2;1-J

PHYSICAL REVIEW E THIRD SERIES, VOLUME 75, NUMBER 3 MARCH 2007

Low-cost search in scale-free networks *(4 pages)* 036104
Jieun Jeong and Piotr Berman

Structural bottlenecks for communication in networks *(4 pages)* 036105
Sameet Sreenivasan, Reuven Cohen, Eduardo López, Zoltán Toroczkai, and H. Eugene Stanley

Geographical networks evolving with an optimal policy *(8 pages)* 036106
Yan-Bo Xie, Tao Zhou, Wen-Jie Bai, Guanrong Chen, Wei-Ke Xiao, and Bing-Hong Wang

Athermal shear-transformation-zone theory of amorphous plastic deformation. I. Basic principles *(7 pages)* 036107
Eran Bouchbinder, J. S. Langer, and Itamar Procaccia

Athermal shear-transformation-zone theory of amorphous plastic deformation. II. Analysis of simulated amorphous silicon *(9 pages)* 036108
Eran Bouchbinder, J. S. Langer, and Itamar Procaccia

Cascading dynamics in modular networks *(4 pages)* 036109
Aram Galstyan and Paul Cohen

Weighted network analysis of high-frequency cross-correlation measures *(7 pages)* 036110
Giulia Iori and Ovidiu V. Precup

Chaos and pattern formation

Role of unstable periodic orbits in phase transitions of coupled map lattices *(12 pages)* 036201
Kazumasa Takeuchi and Masaki Sano

Wave trains in an excitable FitzHugh-Nagumo model: Bistable dispersion relation and formation of isolas *(6 pages)* 036202
Georg Röder, Grigory Bordyugov, Harald Engel, and Martin Falcke

Convection patterns in colloidal solutions *(10 pages)* 036203
B. Huke, H. Pleiner, and M. Lücke

Nodal domains in open microwave systems *(7 pages)* 036204
U. Kuhl, R. Höhmann, H.-J. Stöckmann, and S. Gnutzmann

Two types of phase synchronization destruction *(9 pages)* 036205
Alexander E. Hramov, Alexey A. Koronovskii, and Maria K. Kurovskaya

Triggering and enhancing chaos with a prescribed target Lyapunov exponent using optimized perturbations of minimum power *(10 pages)* 036206
C. Y. Soong and W. T. Huang

Multipeaked probability distributions of recurrence times *(5 pages)* 036207
Patrick Grete and Mario Markus

Mode locking of a driven Bose-Einstein condensate *(5 pages)* 036208
Alexandru I. Nicolin, Mogens H. Jensen, and R. Carretero-González

Noise-induced turbulence in nonlocally coupled oscillators *(17 pages)* 036209
Yoji Kawamura, Hiroya Nakao, and Yoshiki Kuramoto

Failure of maximum likelihood methods for chaotic dynamical systems *(7 pages)* 036210
Kevin Judd

Noise effects on gap wave propagation in a nonlinear discrete *LC* transmission line *(7 pages)* 036211
Serge Bruno Yamgoué, Savério Morfu, and Patrick Marquié

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 75, NUMBER 3 MARCH 2007

Resonant forcing of multidimensional chaotic map dynamics *(9 pages)* 036212
Glenn Foster, Alfred W. Hübler, and Karin Dahmen

Fractal properties of anomalous diffusion in intermittent maps *(14 pages)* 036213
Nickolay Korabel, Rainer Klages, Aleksei V. Chechkin, Igor M. Sokolov, and Vsevolod Yu. Gonchar

Dynamics of Bose-Einstein condensates under the influence of periodic and harmonic potentials *(9 pages)* 036214
N. Hawk Berry and J. Nathan Kutz

Curved structures in recurrence plots: The role of the sampling time *(8 pages)* 036215
A. Facchini and H. Kantz

Signature of ray chaos in quasibound wave functions for a stadium-shaped dielectric cavity *(4 pages)* 036216
Susumu Shinohara and Takahisa Harayama

Recovery of classical chaoticlike behavior in a conservative quantum three-body problem *(6 pages)* 036217
M. J. Everitt

Singular unlocking transition in the Winfree model of coupled oscillators *(10 pages)* 036218
D. Dane Quinn, Richard H. Rand, and Steven H. Strogatz

Analytic approach for controlling quantum states in complex systems *(10 pages)* 036219
Toshiya Takami and Hiroshi Fujisaki

Heterogeneity-induced defect bifurcation and pulse dynamics for a three-component reaction-diffusion system *(12 pages)* 036220
Xiaohui Yuan, Takashi Teramoto, and Yasumasa Nishiura

Quantum entropy dynamics for chaotic systems beyond the classical limit *(4 pages)* 036221
Arnaldo Gammal and Arjendu K. Pattanayak

Recurrence analysis of strange nonchaotic dynamics *(8 pages)* 036222
E. J. Ngamga, A. Nandi, R. Ramaswamy, M. C. Romano, M. Thiel, and J. Kurths

Fluid dynamics

Intrusion of nonwetting liquid in paper *(4 pages)* 036301
J. Hyväluoma, T. Turpeinen, P. Raiskinmäki, A. Jäsberg, A. Koponen, M. Kataja, J. Timonen, and S. Ramaswamy

Eigenfrequencies of vortex-pair equilibria near an elliptic cylinder or a flat plate in uniform flow *(8 pages)* 036302
T. W. G. de Laat

Critical parameters for the partial coalescence of a droplet *(14 pages)* 036303
T. Gilet, K. Mulleners, J. P. Lecomte, N. Vandewalle, and S. Dorbolo

Dynamic van der Waals theory *(15 pages)* 036304
Akira Onuki

Forced imbibition in natural porous media: Comparison between experiments and continuum models *(9 pages)* 036305
Amir Riaz, Guo-Qing Tang, Hamdi A. Tchelepi, and Anthony R. Kovscek

Role of base flows on surfactant-driven interfacial instabilities *(6 pages)* 036306
Hsien-Hung Wei

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 75, NUMBER 3 MARCH 2007

Role of pressure in nonlinear velocity gradient dynamics in turbulence *(8 pages)* 036307
Ravi K. Bikkani and Sharath S. Girimaji

Abnormal mixing of passive scalars in chaotic flows *(6 pages)* 036308
O. V. Popovych, A. Pikovsky, and B. Eckhardt

Attractor crisis and bursting in a fluid flow with two no-slip directions *(7 pages)* 036309
D. Molenaar, H. J. H. Clercx, G. J. F. van Heijst, and Z. Yin

Fingering patterns in the lifting flow of a confined miscible ferrofluid *(10 pages)* 036310
Ching-Yao Chen, S.-Y. Wu, and José A. Miranda

Fluid pinch-off in superfluid and normal ^{4}He *(6 pages)* 036311
J. C. Burton, J. E. Rutledge, and P. Taborek

Maximal oil recovery by simultaneous condensation of alkane and steam *(16 pages)* 036312
J. Bruining and D. Marchesin

Nanosecond near-spinodal homogeneous boiling of water superheated by a pulsed CO_2 laser *(5 pages)* 036313
Sergey I. Kudryashov, Kevin Lyon, and Susan D. Allen

Width of a ferrofluid finger: Hysteresis and a double energy minimum *(7 pages)* 036314
Narelle J. Hillier and David P. Jackson

Fast chemical reaction and multiple-scale concentration fields in singular vortices *(13 pages)* 036315
D. Martinand and J. C. Vassilicos

Plasma physics

Correlation effects in partially ionized mass asymmetric electron-hole plasmas *(14 pages)* 036401
V. S. Filinov, H. Fehske, M. Bonitz, V. E. Fortov, and P. Levashov

Production of a monoenergetic electron bunch in a self-injected laser-wakefield accelerator *(10 pages)* 036402
C.-L. Chang, C.-T. Hsieh, Y.-C. Ho, Y.-S. Chen, J.-Y. Lin, J. Wang, and S.-Y. Chen

Degenerate four-wave mixing mediated by ponderomotive-force-driven plasma gratings *(6 pages)* 036403
K.-H. Lee, C.-H. Pai, M.-W. Lin, L.-C. Ha, J.-Y. Lin, J. Wang, and S.-Y. Chen

Classical physics, including nonlinear media and photonic materials

Modified Kubelka-Munk equations for localized waves inside a layered medium *(8 pages)* 036601
Matthew M. Haney and Kasper van Wijk

Spatiotemporal bifurcations of a parametrically excited solitary wave *(6 pages)* 036602
Likun Zhang, Xinlong Wang, and Zhiyong Tao

Parallel-plate metamaterials for cloaking structures *(16 pages)* 036603
Mário G. Silveirinha, Andrea Alù, and Nader Engheta

Moving and colliding pulses in the subcritical Ginzburg-Landau model with a standing-wave drive *(6 pages)* 036604
Bakhtiyor B. Baizakov, Giovanni Filatrella, and Boris A. Malomed

Universal fractal structures in the weak interaction of solitary waves in generalized nonlinear Schrödinger equations *(20 pages)* 036605
Yi Zhu and Jianke Yang

Dynamics of scattering on a classical two-dimensional artificial atom *(8 pages)* 036606
H. Peelaers, B. Partoens, D. V. Tatyanenko, and F. M. Peeters

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 75, NUMBER 3 MARCH 2007

Short wavelength approximation of a boundary integral operator for homogeneous and isotropic elastic bodies *(6 pages)* 036607
Gregor Tanner and Niels Søndergaard

Critical ratio between the amplitudes of two overtaking solitary water waves *(8 pages)* 036608
Benlong Wang, Jin E. Zhang, Jingxin Zhang, and Hua Liu

Fibonacci-like photonic structure for femtosecond pulse compression *(7 pages)* 036609
L. N. Makarava, M. M. Nazarov, I. A. Ozheredov, A. P. Shkurinov, A. G. Smirnov, and S. V. Zhukovsky

Acoustic beam invariants *(6 pages)* 036610
John Lekner

Kink dynamics in spatially inhomogeneous media: The role of internal modes *(7 pages)* 036611
Jorge A. González, Sara Cuenda, and Angel Sánchez

Solution of the reduced anisotropic Maxwell-Bloch equations by using the Riemann-Hilbert problem *(7 pages)* 036612
A. A. Zabolotskii

Transverse-average field approach for the characterization of thin metamaterial slabs *(17 pages)* 036613
Mário G. Silveirinha and Carlos A. Fernandes

Terahertz plasmonic composites *(7 pages)* 036614
Syrus C. Nemat-Nasser, Alireza V. Amirkhizi, Willie J. Padilla, Dimitri N. Basov, Sia Nemat-Nasser, Derek Bruzewicz, and George Whitesides

Thermal diffusion of solitons on anharmonic chains with long-range coupling *(10 pages)* 036615
C. Brunhuber, F. G. Mertens, and Y. Gaididei

Breakup of a multisoliton state of the linearly damped nonlinear Schrödinger equation *(9 pages)* 036616
Jaroslaw E. Prilepsky and Stanislav A. Derevyanko

Phase fluctuations of linearly chirped solitons in a noisy optical fiber channel with varying dispersion, nonlinearity, and gain *(14 pages)* 036617
Shihua Chen, Y. H. Yang, Lin Yi, Peixiang Lu, and Dong-Sheng Guo

Computational physics

Physics of symplectic integrators: Perihelion advances and symplectic corrector algorithms *(10 pages)* 036701
Siu A. Chin

Mesoscopic predictions of the effective thermal conductivity for microscale random porous media *(10 pages)* 036702
Moran Wang, Jinku Wang, Ning Pan, and Shiyi Chen

Quantum annealing of an Ising spin-glass by Green's function Monte Carlo *(6 pages)* 036703
Lorenzo Stella and Giuseppe E. Santoro

Thermal lattice Boltzmann equation for low Mach number flows: Decoupling model *(15 pages)* 036704
Zhaoli Guo, Chuguang Zheng, Baochang Shi, and T. S. Zhao

Automatic algorithm for monotone trend removal *(16 pages)* 036705
Călin Vamoş

Alternative method to construct equilibrium distribution functions in lattice-Boltzmann method simulation of inviscid compressible flows at high Mach number *(13 pages)* 036706
K. Qu, C. Shu, and Y. T. Chew

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 75, NUMBER 3 MARCH 2007

Accurate numerical solutions of the time-dependent Schrödinger equation *(10 pages)* 036707
W. van Dijk and F. M. Toyama

Lattice-based Monte Carlo method for telechelic chain molecules *(6 pages)* 036708
Behnaz Bozorgui and Daan Frenkel

Simulating time harmonic flows with the lattice Boltzmann method *(7 pages)* 036709
Lilit Axner, Alfons G. Hoekstra, and Peter M. A. Sloot

Multigrid contact detection method *(7 pages)* 036710
Kejing He, Shoubin Dong, and Zhaoyao Zhou

Stability and stabilization of the lattice Boltzmann method *(17 pages)* 036711
R. A. Brownlee, A. N. Gorban, and J. Levesley

Entropic lattice Boltzmann representations required to recover Navier-Stokes flows *(11 pages)* 036712
Brian Keating, George Vahala, Jeffrey Yepez, Min Soe, and Linda Vahala

Reptational dynamics in dissipative particle dynamics simulations of polymer melts *(7 pages)* 036713
Petri Nikunen, Ilpo Vattulainen, and Mikko Karttunen

BRIEF REPORTS

Interdisciplinary physics

Power-law distributions for the areas of the basins of attraction on a potential energy landscape *(4 pages)* 037101
Claire P. Massen and Jonathan P. K. Doye

Chaos and pattern formation

Accelerator dynamics of a fractional kicked rotor *(4 pages)* 037201
Alexander Iomin

Experimental investigation of electric field distributions in a chaotic three-dimensional microwave rough billiard *(4 pages)* 037202
Oleg Tymoshchuk, Nazar Savytskyy, Oleh Hul, Szymon Bauch, and Leszek Sirko

Synchronization threshold of a coupled time-delay system *(2 pages)* 037203
Shangbo Zhou, Hua Li, and Zhongfu Wu

Classical physics, including nonlinear media and photonic materials

Anomalous oscillations in the spectra of light backscattered by inhomogeneous microparticles *(4 pages)* 037601
Xu Li, Allen Taflove, and Vadim Backman

Accurate modeling of the optical properties of left-handed media using a finite-difference time-domain method *(4 pages)* 037602
Yan Zhao, Pavel Belov, and Yang Hao

Perturbative analytical treatment of adiabatically moderated soliton self-frequency shift *(4 pages)* 037603
A. M. Zheltikov

COMMENTS

Comment on "Calculation of electromagnetic field components for a fundamental Gaussian beam" *(2 pages)* 038501
Hong Luo and Shiyang Liu

(Continued)

PHYSICAL REVIEW E **THIRD SERIES, VOLUME 75, NUMBER 3** **MARCH 2007**

Reply to "Comment on 'Calculation of electromagnetic field components for a fundamental Gaussian beam' " *(2 pages)* 038502
Guozhong Wang and J. F. Webb

Comment on "Exact solutions of the derivative nonlinear Schrödinger equation for a nonlinear transmission line" *(3 pages)* 038601
J. Nickel and H. W. Schürmann

ERRATA

Publisher's Note: Dynamics and instabilities of defects in two-dimensional crystals on curved backgrounds [Phys. Rev. E **75**, 021404 (2007)] *(1 page)* . . . . . 039901(E)
Mark Bowick, Homin Shin, and Alex Travesset

Publisher's Note: Transient nucleation near the mean-field spinodal [Phys. Rev. E **75**, 031102 (2007)] *(1 page)* . . . . . 039902(E)
A. O. Schweiger, K. Barros, and W. Klein

Erratum: Effect of supercoiling on formation of protein-mediated DNA loops [Phys. Rev. E **74**, 061907 (2006)] *(1 page)* . . . . . 039903(E)
P. K. Purohit and P. C. Nelson

Erratum: Metropolis simulations of Met-Enkephalin with solvent-accessible area parametrizations [Phys. Rev. E **69**, 026703 (2004)] *(1 page)* . . . . . 039904(E)
Bernd A. Berg and Hsiao-Ping Hsu