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 82, NUMBER 3 *CONTENTS* **SEPTEMBER 2010**

NONLINEAR AND PLASMA PHYSICS, FLUID DYNAMICS, AND RELATED TOPICS

RAPID COMMUNICATIONS

Interdisciplinary physics

Annealed and mean-field formulations of disease dynamics on static and adaptive networks *(4 pages)* . . . . . 035101(R)
Beniamino Guerra and Jesús Gómez-Gardeñes

Attractor and basin entropies of random Boolean networks under asynchronous stochastic update *(4 pages)* . . . . . 035102(R)
Amer Shreim, Andrew Berdahl, Florian Greil, Jörn Davidsen, and Maya Paczuski

Chaos and pattern formation

Synchronization of quasiperiodic oscillations to a periodic force studied with semiconductor lasers *(4 pages)* . . . . . 035201(R)
A. Loose, H.-J. Wünsche, and F. Henneberger

Phase transitions in mixed populations composed of two types of self-oscillatory elements with different periods *(4 pages)* . . . . . 035202(R)
Gouhei Tanaka, Yusuke Okada, and Kazuyuki Aihara

Effective Perron-Frobenius eigenvalue for a correlated random map *(4 pages)* . . . . . 035203(R)
Roman R. Pool and Manuel O. Cáceres

Particle focusing in oscillating dissipative billiards *(4 pages)* . . . . . 035204(R)
Christoph Petri, Florian Lenz, Fotis K. Diakonos, and Peter Schmelcher

Self-emerging and turbulent chimeras in oscillator chains *(4 pages)* . . . . . 035205(R)
Grigory Bordyugov, Arkady Pikovsky, and Michael Rosenblum

Plasma physics

Possibility of nonexistence of hot and superhot hydrogen atoms in electrical discharges *(4 pages)* . . . . . 035401(R)
J. Loureiro and J. Amorim

Copyright 2010 by The American Physical Society

(Continued)

1539-3755(201009)82:3:2;1-L

PHYSICAL REVIEW E THIRD SERIES, VOLUME 82, NUMBER 3 SEPTEMBER 2010

ARTICLES

Interdisciplinary physics

Cavity analysis on the robustness of random networks against targeted attacks: Influences of degree-degree correlations *(10 pages)* 036101
Yoshifumi Shiraki and Yoshiyuki Kabashima

Scaling of load in communications networks *(5 pages)* 036102
Onuttom Narayan and Iraj Saniee

Snow metamorphism: A fractal approach *(5 pages)* 036103
Anna Carbone, Bernardino M. Chiaia, Barbara Frigo, and Christian Türk

Noise as control parameter in networks of excitable media: Role of the network topology *(10 pages)* 036104
Pablo Kaluza, Charlotte Strege, and Hildegard Meyer-Ortmanns

Anomalous fluctuations of vertical velocity of Earth and their possible implications for earthquakes *(9 pages)* 036105
Pouya Manshour, Fatemeh Ghasemi, T. Matsumoto, J. Gómez, Muhammad Sahimi, J. Peinke, A. F. Pacheco, and M. Reza Rahimi Tabar

Hyperbolic geometry of complex networks *(18 pages)* 036106
Dmitri Krioukov, Fragkiskos Papadopoulos, Maksim Kitsak, Amin Vahdat, and Marián Boguñá

Statistical thermodynamics of liquid-liquid phase separation in ternary systems during complex coacervation *(9 pages)* 036107
Nisha Pawar and H. B. Bohidar

Origin of broad polydispersion in functionalized dendrimers and its effects on cancer-cell binding affinity *(6 pages)* 036108
Jack N. Waddell, Douglas G. Mullen, Bradford G. Orr, Mark M. Banaszak Holl, and Leonard M. Sander

Bose-Einstein distribution, condensation transition, and multiple stationary states in multiloci evolution of diploid populations *(11 pages)* 036109
Ginestra Bianconi and Olaf Rotzschke

Dynamically generated cyclic dominance in spatial prisoner's dilemma games *(7 pages)* 036110
Attila Szolnoki, Zhen Wang, Jinlong Wang, and Xiaodan Zhu

Effect of private information on indirect reciprocity *(8 pages)* 036111
Satoshi Uchida

Epidemic spreading in evolving networks *(8 pages)* 036112
Yonathan Schwarzkopf, Attila Rákos, and David Mukamel

Reciprocal relation between the fractal and the small-world properties of complex networks *(7 pages)* 036113
F. Kawasaki and K. Yakubo

Market dynamics immediately before and after financial shocks: Quantifying the Omori, productivity, and Bath laws *(11 pages)* 036114
Alexander M. Petersen, Fengzhong Wang, Shlomo Havlin, and H. Eugene Stanley

Propagation dynamics on networks featuring complex topologies *(9 pages)* 036115
Laurent Hébert-Dufresne, Pierre-André Noël, Vincent Marceau, Antoine Allard, and Louis J. Dubé

Adaptive networks: Coevolution of disease and topology *(10 pages)* 036116
Vincent Marceau, Pierre-André Noël, Laurent Hébert-Dufresne, Antoine Allard, and Louis J. Dubé

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 82, NUMBER 3 SEPTEMBER 2010

Master equation approach to friction at the mesoscale *(19 pages)* 036117
O. M. Braun and M. Peyrard

Competitive market for multiple firms and economic crisis *(8 pages)* 036118
Yong Tao

Optimization of transport protocols with path-length constraints in complex networks *(8 pages)* 036119
José J. Ramasco, Marta S. de La Lama, Eduardo López, and Stefan Boettcher

Description of stochastic and chaotic series using visibility graphs *(11 pages)* 036120
Lucas Lacasa and Raul Toral

Tempo and mode of evolution in the tangled nature model *(6 pages)* 036121
Dominic Jones, Henrik Jeldtoft Jensen, and Paolo Sibani

Frustrated drift of an anchored scroll-wave filament and the geodesic principle *(10 pages)* 036122
Marcel Wellner, Christian Zemlin, and Arkady M. Pertsov

Chaos and pattern formation

Hub synchronization in scale-free networks *(4 pages)* 036201
Tiago Pereira

Vortices and the entrainment transition in the two-dimensional Kuramoto model *(10 pages)* 036202
Tony E. Lee, Heywood Tam, G. Refael, Jeffrey L. Rogers, and M. C. Cross

Combined effect of chemical and electrical synapses in Hindmarsh-Rose neural networks on synchronization and the rate of information *(12 pages)* 036203
M. S. Baptista, F. M. Moukam Kakmeni, and C. Grebogi

Experimental verification of Pyragas-Schöll-Fiedler control *(6 pages)* 036204
Clemens von Loewenich, Hartmut Benner, and Wolfram Just

Structure of characteristic Lyapunov vectors in anharmonic Hamiltonian lattices *(6 pages)* 036205
M. Romero-Bastida, Diego Pazó, Juan M. López, and Miguel A. Rodríguez

Synchronization of uncoupled oscillators by common gamma impulses: From phase locking to noise-induced synchronization *(12 pages)* 036206
Shigefumi Hata, Takeaki Shimokawa, Kensuke Arai, and Hiroya Nakao

Microwave fidelity studies by varying antenna coupling *(9 pages)* 036207
B. Köber, U. Kuhl, H.-J. Stöckmann, T. Gorin, D. V. Savin, and T. H. Seligman

Periodic patterns in a ring of delay-coupled oscillators *(12 pages)* 036208
P. Perlikowski, S. Yanchuk, O. V. Popovych, and P. A. Tass

Devaney's chaos on recurrence plots *(6 pages)* 036209
Yoshito Hirata and Kazuyuki Aihara

Analytical studies of fronts, colonies, and patterns: Combination of the Allee effect and nonlocal competition interactions *(12 pages)* 036210
M. G. Clerc, D. Escaff, and V. M. Kenkre

Fluid dynamics

Optimal harmonic response in a confined Bödewadt boundary layer flow *(8 pages)* 036301
Younghae Do, Juan M. Lopez, and Francisco Marques

(Continued)

PHYSICAL REVIEW E **THIRD SERIES, VOLUME 82, NUMBER 3** **SEPTEMBER 2010**

Thin film formation during splashing of viscous liquids *(7 pages)* 036302
Michelle M. Driscoll, Cacey S. Stevens, and Sidney R. Nagel

Drying of a model soil *(12 pages)* 036303
P. Faure and P. Coussot

Magnetic traveling-stripe forcing: Enhanced transport in the advent of the Rosensweig instability *(5 pages)* 036304
Thomas Friedrich, Ingo Rehberg, and Reinhard Richter

Hydrodynamic interactions of spherical particles in a fluid confined by a rough no-slip wall *(7 pages)* 036305
Somaye Hosseini Rad and Ali Najafi

Vortex statistics in turbulent rotating convection *(12 pages)* 036306
R. P. J. Kunnen, H. J. H. Clercx, and B. J. Geurts

Green's function for a generalized two-dimensional fluid *(9 pages)* 036307
Takahiro Iwayama and Takeshi Watanabe

Origin of Knudsen forces on heated microbeams *(6 pages)* 036308
Taishan Zhu and Wenjing Ye

Slowing of vortex rings by development of Kelvin waves *(4 pages)* 036309
Robert E. Hershberger, Diogo Bolster, and Russell J. Donnelly

Flow pattern transition accompanied with sudden growth of flow resistance in two-dimensional curvilinear viscoelastic flows *(13 pages)* 036310
Hiroki Yatou

Synthetic turbulence constructed by spatially randomized fractal interpolation *(7 pages)* 036311
Ke-Qi Ding, Zhi-Xiong Zhang, Yi-Peng Shi, and Zhen-Su She

Different behaviors of delayed fusion between drops with miscible liquids *(5 pages)* 036312
Rodica Borcia and Michael Bestehorn

Periodic homogenization and consistent estimates of transport parameters through sphere and polyhedron packings in the whole porosity range *(18 pages)* 036313
Claude Boutin and Christian Geindreau

Elastic waves and transition to elastic turbulence in a two-dimensional viscoelastic Kolmogorov flow *(10 pages)* 036314
S. Berti and G. Boffetta

X-ray studies of interlayer water absorption and mesoporous water transport in a weakly hydrated clay *(11 pages)* 036315
H. Hemmen, L. R. Alme, J. O. Fossum, and Y. Meheust

Four-point correlation function of a passive scalar field in rapidly fluctuating turbulence: Numerical analysis of an exact closure equation *(9 pages)* 036316
Y. Mizuno, K. Ohi, T. Sogabe, Y. Yamamoto, and Y. Kaneda

Hydrothermal coupling in a self-affine rough fracture *(14 pages)* 036317
A. Neuville, R. Toussaint, and J. Schmittbuhl

Stationary shapes of confined rotating magnetic liquid droplets *(9 pages)* 036318
Sérgio A. Lira, José A. Miranda, and Rafael M. Oliveira

Crater evolution after the impact of a drop onto a semi-infinite liquid target *(11 pages)* 036319
Alfio Bisighini, Gianpietro E. Cossali, Cameron Tropea, and Ilia V. Roisman

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 82, NUMBER 3 SEPTEMBER 2010

Renormalization group approach to interfacial motion in incompressible Richtmyer-Meshkov instability *(9 pages)* 036320
Chihiro Matsuoka

Optimally amplified large-scale streaks and drag reduction in turbulent pipe flow *(11 pages)* 036321
Ashley P. Willis, Yongyun Hwang, and Carlo Cossu

Three-dimensional localized coherent structures of surface turbulence: Model validation with experiments and further computations *(18 pages)* 036322
E. A. Demekhin, E. N. Kalaidin, S. Kalliadasis, and S. Yu. Vlaskin

Data collapse of the spectra of water-based stable single-bubble sonoluminescence *(9 pages)* 036323
Mogens T. Levinsen

Prediction and simulation of compressive shocks with lower perturbed density for increasing shock strength in real gases *(5 pages)* 036324
Shigeru Taniguchi, Andrea Mentrelli, Tommaso Ruggeri, Masaru Sugiyama, and Nanrong Zhao

Self-thermophoresis and thermal self-diffusion in liquids and gases *(16 pages)* 036325
Howard Brenner

Plasma physics

Simple method to measure the interaction potential of dielectric grains in a dusty plasma *(7 pages)* 036401
Zhuanhao Zhang, Ke Qiao, Jie Kong, Lorin Matthews, and Truell Hyde

Dynamics of two-dimensional dipole systems *(12 pages)* 036402
Kenneth I. Golden, Gabor J. Kalman, Peter Hartmann, and Zoltán Donkó

Identifying anomalous diffusion and melting in dusty plasmas *(8 pages)* 036403
Yan Feng, J. Goree, and Bin Liu

Viscosity and mutual diffusion of deuterium-tritium mixtures in the warm-dense-matter regime *(10 pages)* . . . 036404
J. D. Kress, James S. Cohen, D. A. Horner, F. Lambert, and L. A. Collins

Divergence of laser-driven relativistic electron beams *(10 pages)* 036405
A. Debayle, J. J. Honrubia, E. d'Humières, and V. T. Tikhonchuk

Hall-magnetohydrodynamic small-scale dynamos *(10 pages)* 036406
Daniel O. Gómez, Pablo D. Mininni, and Pablo Dmitruk

Fluid modes of a spherically confined Yukawa plasma *(10 pages)* 036407
H. Kählert and M. Bonitz

Classical physics

Dynamics of one- and two-dimensional fronts in a bistable equation with time-delayed global feedback: Propagation failure and control mechanisms *(20 pages)* 036601
Yassine Boubendir, Vicenç Méndez, and Horacio G. Rotstein

Limiting phase trajectories and the origin of energy localization in nonlinear oscillatory chains *(9 pages)* 036602
L. I. Manevitch and V. V. Smirnov

Highly nonlinear pulse splitting and recombination in a two-dimensional granular network *(8 pages)* 036603
C. Daraio, D. Ngo, V. F. Nesterenko, and F. Fraternali

Solitary waves in the nonlinear Dirac equation with arbitrary nonlinearity *(14 pages)* 036604
Fred Cooper, Avinash Khare, Bogdan Mihaila, and Avadh Saxena

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 82, NUMBER 3 SEPTEMBER 2010

Magnetoelectric birefringence as a unique effect in isotropic media *(5 pages)* 036605
Vitorio A. De Lorenci and Dante D. Pereira

Design of electromagnetic cloaks with the same scattering patterns of a reduced perfect electric conducting line or ring *(8 pages)* 036606
Yang Luo and Shouzheng Zhu

Elastic scattering of traveling phonons by discrete breathers as a time-periodic scatterer in the one-dimensional discrete nonlinear Schrödinger model: Exact analysis *(11 pages)* 036607
Priyadarshi Majumdar and Subhendu Panda

Nonlinear parameter retrieval from three- and four-wave mixing in metamaterials *(10 pages)* 036608
Alec Rose, Stéphane Larouche, Da Huang, Ekaterina Poutrina, and David R. Smith

Dynamical systems theory for nonlinear evolution equations *(5 pages)* 036609
Amitava Choudhuri, B. Talukdar, and Umapada Das

Three-dimensional rogue waves in nonstationary parabolic potentials *(7 pages)* 036610
Zhenya Yan, V. V. Konotop, and N. Akhmediev

Computational physics

Comparative Monte Carlo efficiency by Monte Carlo analysis *(10 pages)* 036701
B. M. Rubenstein, J. E. Gubernatis, and J. D. Doll

Dynamical simulations of classical stochastic systems using matrix product states *(16 pages)* 036702
T. H. Johnson, S. R. Clark, and D. Jaksch

Application of the discrete dipole approximation to very large refractive indices: Filtered coupled dipoles revived *(12 pages)* 036703
Maxim A. Yurkin, Michiel Min, and Alfons G. Hoekstra

Numerical integration of variational equations *(19 pages)* 036704
Ch. Skokos and E. Gerlach

BRIEF REPORTS

Interdisciplinary physics

Dynamics of noncontact rack-and-pinion device: Periodic back-and-forth motion of the rack *(4 pages)* 037101
Mojtaba Nasiri, Ali Moradian, and MirFaez Miri

Measuring degree-degree association in networks *(4 pages)* 037102
Mathias Raschke, Markus Schläpfer, and Roberto Nibali

Chaos and pattern formation

Influence of interaction delays on noise-induced coherence in excitable systems *(4 pages)* 037201
Nikola Burić, Kristina Todorović, and Nebojša Vasović

Non-Shilnikov cascades of spikes and hubs in a semiconductor laser with optoelectronic feedback *(4 pages)* 037202
Joana G. Freire and Jason A. C. Gallas

(Continued)

PHYSICAL REVIEW E THIRD SERIES, VOLUME 82, NUMBER 3 SEPTEMBER 2010

Fluid dynamics

Thermocapillary flow on superhydrophobic surfaces *(4 pages)* 037301
Tobias Baier, Clarissa Steffes, and Steffen Hardt

High-growth-rate magnetohydrodynamic instability in differentially rotating compressible flow *(4 pages)* 037302
Mradul Sharma

Simulation of droplet trains in microfluidic networks *(4 pages)* 037303
Mehran Djalali Behzad, Hamed Seyed-allaei, and Mohammad Reza Ejtehadi

Plasma physics

Double-layer shocks in a magnetized quantum plasma *(4 pages)* 037401
A. P. Misra and S. Samanta

COMMENTS

Comment on "Cooperation in an evolutionary prisoner's dilemma on networks with degree-degree correlations" *(2 pages)* 038101
Yun Zhu, Yuting Li, and Junzhong Yang

Reply to "Comment on 'Cooperation in an evolutionary prisoner's dilemma on networks with degree-degree correlations' " *(1 page)* 038102
Stephen Devlin and Thomas Treloar

ERRATA

Erratum: Temperature-dependent structural behavior of self-avoiding walks on three-dimensional Sierpinski sponges [Phys. Rev. E **81**, 051119 (2010)] *(1 page)* . . . . . 039901(E)
Miriam Fritsche and Dieter W. Heermann

Publisher's Note: Nonequilibrium dynamics of stochastic point processes with refractoriness [Phys. Rev. E **82**, 021129 (2010)] *(1 page)* . . . . . 039902(E)
Moritz Deger, Moritz Helias, Stefano Cardanobile, Fatihcan M. Atay, and Stefan Rotter

Erratum: RNA matrix models with external interactions and their asymptotic behavior [Phys. Rev. E **79**, 061903 (2009)] *(1 page)* . . . . . 039903(E)
I. Garg and N. Deo

Publisher's Note: Bursting of a thin film in a confined geometry: Rimless and constant-velocity dewetting [Phys. Rev. E **82**, 030601 (2010)] *(1 page)* . . . . . 039904(E)
Ayako Eri and Ko Okumura

Publisher's Note: Highly nonlinear pulse splitting and recombination in a two-dimensional granular network [Phys. Rev. E **82**, 036603 (2010)] *(1 page)* . . . . . 039905(E)
C. Daraio, D. Ngo, V. F. Nesterenko, and F. Fraternali

Erratum: Molecular transport across fluid interfaces: Coupling between solute dynamics and interface fluctuations [Phys. Rev. E **78**, 041605 (2008)] *(1 page)* . . . . . 039906(E)
Ashish Gupta, Anuj Chauhan, and Dmitry I. Kopelevich

Erratum: Abrupt grain boundary melting in ice [Phys. Rev. E **70**, 061606 (2004)] *(1 page)* . . . . . 039907(E)
E. S. Thomson, L. Benatov, and J. S. Wettlaufer