

PHYSICAL REVIEW E

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

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

THIRD SERIES, VOLUME 69, NUMBER 4

CONTENTS

APRIL 2004

PART 1: SOFT MATTER AND BIOLOGICAL PHYSICS

RAPID COMMUNICATIONS

Polymers

- Stringlike structure formed in thin films of a lamella-forming diblock copolymer (*4 pages*) 040801(R)
Kenji Fukunaga and Takeji Hashimoto

Biological physics

- Diffuse scattering provides material parameters and electron density profiles of biomembranes (*4 pages*) 040901(R)
Yufeng Liu and John F. Nagle

ARTICLES

Statistical physics of soft matter

- Harmonic oscillator with fluctuating damping parameter (*4 pages*) 041101
M. Gitterman
- Curvature-induced defect unbinding in toroidal geometries (*12 pages*) 041102
Mark Bowick, David R. Nelson, and Alex Travesset
- Nonequilibrium orientational patterns in two-component Langmuir monolayers (*10 pages*) 041103
Ramon Reigada, Alexander S. Mikhailov, and Francesc Sagués
- Potential-energy-landscape-based extended van der Waals equation (*9 pages*) 041104
T. Keyes and J. Chowdhary
- Average trajectory of returning walks (*11 pages*) 041105
Francesca Colaiori, Andrea Baldassarri, and Claudio Castellano
- Optimal paths and the calculation of state selection probabilities (*10 pages*) 041106
Alan J. McKane and Martin B. Tarlie
- Quasisymplectic integrators for stochastic differential equations (*8 pages*) 041107
R. Mannella

Equilibrium and linear transport properties of fluids

- Density functional study of the phase behavior of asymmetric binary dipolar mixtures (*12 pages*) 041201
Gabriel M. Range and Sabine H. L. Klapp



Copyright 2004 by The American Physical Society

(Continued)



1539-3755(200404)69:4;1-O

Mean-field theory, mode-coupling theory, and the onset temperature in supercooled liquids (5 pages)	041202
Yisroel Brumer and David R. Reichman	
Granular materials	
Clustering in a one-dimensional inelastic lattice gas (7 pages)	041301
Srdjan Ostojic, Debabrata Panja, and Bernard Nienhuis	
NMR experiments on a three-dimensional vibrofluidized granular medium (13 pages)	041302
Chao Huan, Xiaoyu Yang, D. Candela, R. W. Mair, and R. L. Walsworth	
Colloidal dispersions, suspensions, and aggregates	
Ordering of agarose near the macroscopic gelation point (9 pages)	041401
Donatella Bulone, Daniela Giacomazza, Vincenzo Martorana, Jay Newman, and Pier L. San Biagio	
Theory of one-dimensional swelling dynamics of polymer gels under mechanical constraint (5 pages)	041402
Tatsuya Yamaue and Masao Doi	
Dynamics of two-dimensional colloids on a disordered substrate (5 pages)	041403
Jiangxing Chen, Yigang Cao, and Zhengkuan Jiao	
Depletion force between two large spheres suspended in a bath of small spheres: Onset of the Derjaguin limit (14 pages)	041404
M. Oettel	
Directional locking effects and dynamics for particles driven through a colloidal lattice (10 pages)	041405
C. Reichhardt and C. J. Olson Reichhardt	
Rotational dynamics of semiflexible paramagnetic particle chains (9 pages)	041406
Sibani Lisa Biswal and Alice P. Gast	
Structured and complex fluids	
Thermodynamic model of electric-field-induced pattern formation in binary dielectric fluids (7 pages)	041501
M. D. Johnson, X. Duan, Brett Riley, Aniket Bhattacharya, and Weili Luo	
Glass transition in a simple stochastic model with back-reaction (13 pages)	041502
František Slanina and Petr Chvosta	
Free energy and configurational entropy of liquid silica: Fragile-to-strong crossover and polyamorphism (13 pages)	041503
Ivan Saika-Voivod, Francesco Sciortino, and Peter H. Poole	
Shear-induced grain boundary motion for lamellar phases in the weakly nonlinear regime (9 pages)	041504
Zhi-Feng Huang and Jorge Viñals	
Films, interfaces, and crystal growth	
Late stage kinetics for various wicking and spreading problems (5 pages)	041601
Patrick B. Warren	
Kinetic complete wetting of a planar defect close to a bulk tricritical point (3 pages)	041602
Alexander L. Korzhenevskii, Richard Bausch, and Rudi Schmitz	
Influence of self-affine roughness on Parsons-Zobel plots for electrical double layers (5 pages)	041603
G. Palasantzas and G. M. E. A. Backx	

Growth model with disaggregation of islands having an odd number of particles (5 pages)	041604
K. I. Mazzitello, H. O. Martín, and C. M. Aldao	
Liquid crystals	
Saddle-splay-term-induced orientational instability in nematic-liquid-crystal cells and director fluctuations at substrates (13 pages)	041701
A. D. Kiselev	
Experimental investigations of one liquid-crystal compound exhibiting the no-layer-shrinkage effect near the Sm-A–Sm-C* transition (4 pages)	041702
C. C. Huang, S. T. Wang, X. F. Han, A. Cady, R. Pindak, W. Caliebe, K. Ema, K. Takekoshi, and H. Yao	
Isotropic-nematic transition in hard-rod fluids: Relation between continuous and restricted-orientation models (5 pages)	041703
Kostya Shundyak and René van Roij	
Controlling disorder in liquid crystal aerosol dispersions (12 pages)	041704
Tao Jin and Daniele Finotello	
Bistable nematic and smectic anchoring in the liquid crystal octylcyanobiphenyl (8CB) adsorbed on a MoS ₂ single crystal (8 pages)	041705
Emmanuelle Lacaze, Jean Philippe Michel, Michel Goldmann, Marc Gailhanou, Marc de Boissieu, and Michel Alba	
Interaction between two spherical particles in a nematic liquid crystal (10 pages)	041706
Jun-ichi Fukuda, Holger Stark, Makoto Yoneya, and Hiroshi Yokoyama	
Line tension vector thermodynamics of anisotropic contact lines (9 pages)	041707
Alejandro D. Rey	
Micellar anisometry in lyotropic uniaxial nematic phases studied by transversal NMR relaxation dispersion (9 pages)	041708
C. R. Rodriguez, D. J. Pusiol, A. M. Figueiredo Neto, and C. A. Martin	
Polymers	
Interaction between irreversibly adsorbed polymer layers: Is the mean field picture really inadequate? (5 pages)	041801
Alexander I. Chervanyov and Sergei A. Egorov	
Effects of temperature and pressure on the stability and mobility of phases in rigid rod poly (<i>p</i> -phenylenes) (8 pages)	041802
A. Gitsas, G. Floudas, and G. Wegner	
Biological physics	
Fields and forces acting on a planar membrane with a conducting channel (12 pages)	041901
Isak Bivas and Christophe Danelon	
Transcription rate of RNA polymerase under rotary torque (5 pages)	041902
H. Kiryu	
Thermodynamic modeling of donor splice site recognition in pre-mRNA (4 pages)	041903
Jeffrey A. Garland and Daniel P. Aalberts	

CONTENTS - Continued

PHYSICAL REVIEW E

THIRD SERIES, VOLUME 69, NUMBER 4

APRIL 2004

Attraction between DNA molecules mediated by multivalent ions (<i>13 pages</i>)	041904
E. A. Allahyarov, G. Gompper, and H. Löwen	
Nonlinear effects in the torsional adjustment of interacting DNA (<i>14 pages</i>)	041905
A. A. Kornyshev and A. Wynveen	
Relaxation channels of two-vibron bound states in α -helix proteins (<i>12 pages</i>)	041906
V. Pouthier and C. Falvo	
Population dynamics in the Penna model (<i>5 pages</i>)	041907
J. B. Coe and Y. Mao	
Discrete molecular dynamics simulations of peptide aggregation (<i>7 pages</i>)	041908
S. Peng, F. Ding, B. Urbanc, S. V. Buldyrev, L. Cruz, H. E. Stanley, and N. V. Dokholyan	
Learning in neural networks by reinforcement of irregular spiking (<i>10 pages</i>)	041909
Xiaohui Xie and H. Sebastian Seung	
Analysis of the noise-induced bursting-spiking transition in a pancreatic β -cell model (<i>16 pages</i>)	041910
Jacobo Aguirre, Erik Mosekilde, and Miguel A. F. Sanjuán	

BRIEF REPORTS

Statistical physics of soft matter

From deterministic dynamics to kinetic phenomena (<i>4 pages</i>)	042101
S. Denisov, A. Filoppov, J. Klafter, and M. Urbakh	

Equilibrium and linear transport properties of fluids

Molecular gas dynamics observations of Chapman-Enskog behavior and departures therefrom in nonequilibrium gases (<i>4 pages</i>)	042201
M. A. Gallis, J. R. Torczynski, and D. J. Rader	

Colloidal dispersions, suspensions, and aggregates

Dynamics of core-shell particles in concentrated suspensions (<i>4 pages</i>)	042401
G. Petekidis, J. Gapinski, P. Seymour, J. S. van Duijneveldt, D. Vlassopoulos, and G. Fytas	

Structured and complex fluids

Landscape equivalent of the shoving model (<i>4 pages</i>)	042501
Jeppe C. Dyre and Niels Boye Olsen	

Biological physics

Contracted Fisher equation (<i>3 pages</i>)	042901
S. Harris	
Optimum ion channel properties in the squid giant axon (<i>3 pages</i>)	042902
Robert K. Adair	

PHYSICAL REVIEW E

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

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

THIRD SERIES, VOLUME 69, NUMBER 4

CONTENTS

APRIL 2004

PART 2: CHAOS, HYDRODYNAMICS, PLASMAS, AND RELATED TOPICS

RAPID COMMUNICATIONS

General methods of statistical physics

- Performance of networks of artificial neurons: The role of clustering (*4 pages*) 045101(R)
Beom Jun Kim
- Global spatiotemporal order and induced stochastic resonance due to a locally applied signal (*4 pages*) 045102(R)
A. Samoletov, M. Chaplain, and V. Levi
- Critical exponents of isotropic-hexatic phase transition in the hard-disk system (*4 pages*) 045103(R)
Hiroshi Watanabe, Satoshi Yukawa, Yukiyasu Ozeki, and Nobuyasu Ito
- Model for cascading failures in complex networks (*4 pages*) 045104(R)
Paolo Crucitti, Vito Latora, and Massimo Marchiori
- Numerical study of the Langevin theory for fixed-energy sandpiles (*4 pages*) 045105(R)
José J. Ramasco, Miguel A. Muñoz, and Constantino A. da Silva Santos

Chaos and pattern formation

- Chaotic behaviors of operational amplifiers (*4 pages*) 045201(R)
Geo-Su Yim, Jung-Wan Ryu, and Young-Jai Park
- Nonextensive Pesin identity: Exact renormalization group analytical results for the dynamics
at the edge of chaos of the logistic map (*4 pages*) 045202(R)
F. Baldovin and A. Robledo

Physics of beams

- Statistical theory of high-gain free-electron laser saturation (*4 pages*) 045501(R)
Julien Barré, Thierry Dauxois, Giovanni De Ninno, Duccio Fanelli, and Stefano Ruffo
- Suppression of the pulsed regimes appearing in free-electron lasers using feedback control of an unstable
stationary state (*4 pages*) 045502(R)
S. Bielawski, C. Bruni, G. L. Orlandi, D. Garzella, and M. E. Couprie



Copyright 2004 by The American Physical Society

(Continued)



1539-3755(200404)69:4;2;1-N

Classical physics, including nonlinear media and photonic materials

- Observation of millimeter-wave radiation generated by the interaction between an electron beam and a photonic crystal (*4 pages*) 045601(R)
 K. Yamamoto, R. Sakakibara, S. Yano, Y. Segawa, Y. Shibata, K. Ishi, T. Ohsake, T. Hara,
 Y. Kondo, H. Miyazaki, F. Hinode, T. Matsuyama, S. Yamaguti, and K. Ohtaka

ARTICLES**General methods of statistical physics**

- Lattice theory of trapping reactions with mobile species (*11 pages*) 046101
 M. Moreau, G. Oshanin, O. Benichou, and M. Coppey
- Inelastically scattering particles and wealth distribution in an open economy (*7 pages*) 046102
 František Šlanina
- Hydrodynamic limit of multichain driven diffusive models (*5 pages*) 046103
 V. Popkov and M. Salerno
- Computation of the Ising partition function for two-dimensional square grids (*19 pages*) 046104
 Roland Häggkvist, Anders Rosengren, Daniel Andrén, Petras Kundrotas, Per Håkan Lundow,
 and Klas Markström
- Stationary motion of active Brownian particles (*9 pages*) 046105
 Mao Lin Deng and Wei Qiu Zhu
- Statistical analysis of airport network of China (*6 pages*) 046106
 W. Li and X. Cai
- Accelerated growth in outgoing links in evolving networks: Deterministic versus stochastic picture
 (*6 pages*) 046107
 Parongama Sen
- Effects of additive noise on vibrational resonance in a bistable system (*7 pages*) 046108
 J. Casado-Pascual and J. P. Baltanás
- Rate description of Fokker-Planck processes with time-dependent parameters (*10 pages*) 046109
 Peter Talkner and Jerzy Łuczka
- Neural cryptography with feedback (*7 pages*) 046110
 Andreas Rutter, Wolfgang Kinzel, Lanir Shacham, and Ido Kanter
- Improved statistical test for nonstationarity using recurrence time statistics (*9 pages*) 046111
 Christoph Rieke, Ralph G. Andrzejak, Florian Mormann, and Klaus Lehnertz
- Stochastic cellular automata model for stock market dynamics (*7 pages*) 046112
 M. Bartolozzi and A. W. Thomas
- Finite-size fluctuations in interacting particle systems (*7 pages*) 046113
 E. Ben-Naim and P. L. Krapivsky
- Kinetic phase transition in $A_2 + B_2 \rightarrow 2AB$ reaction system (*5 pages*) 046114
 Da-yin Hua, Shi-jie Shao, and Su Lin
- Two-phase phenomena, minority games, and herding models (*6 pages*) 046115
 B. Zheng, T. Qiu, and F. Ren

Behavior of coupled automata (<i>10 pages</i>)	046116
Reuben Gann, Jessica Venable, Eric J. Friedman, and A. S. Landsberg	
Statistical mechanics of topological phase transitions in networks (<i>12 pages</i>)	046117
Gergely Palla, Imre Derényi, Illés Farkas, and Tamas Vicsek	
Quantum statistical calculations and symplectic corrector algorithms (<i>7 pages</i>)	046118
Siu A. Chin	
Critical Casimir force and its fluctuations in lattice spin models: Exact and Monte Carlo results (<i>20 pages</i>)	046119
Daniel Dantchev and Michael Krech	
Enhanced winning in a competing population by random participation (<i>7 pages</i>)	046120
K. F. Yip, T. S. Lo, P. M. Hui, and N. F. Johnson	
Solvable biological evolution model with a parallel mutation-selection scheme (<i>8 pages</i>)	046121
David B. Saakian and Chin-Kun Hu	
Chaos and pattern formation	
Formation of an information network in a self-pulsating multimode laser (<i>5 pages</i>)	046201
Kenju Otsuka, Yoshihiko Miyasaka, Tamaki Kubota, and Jing-Yuan Ko	
Chaotic control and synchronization for system identification (<i>7 pages</i>)	046202
T. L. Carroll	
Thermodynamic formalism for field-driven Lorentz gases (<i>9 pages</i>)	046203
Oliver Mülken and Henk van Beijeren	
Asymmetrical dripping (<i>8 pages</i>)	046204
A. D'Innocenzo, F. Paladini, and L. Renna	
Control of Turing pattern formation by delayed feedback (<i>4 pages</i>)	046205
Qian Shu Li and Lin Ji	
Synchronized states in a ring of mutually coupled self-sustained electrical oscillators (<i>9 pages</i>)	046206
P. Wofo and H. G. Enjieu Kadji	
Delay-induced resonances in an optical system with feedback (<i>5 pages</i>)	046207
J. M. Buldú, J. García-Ojalvo, and M. C. Torrent	
Tunable Fano resonances in transport through microwave billiards (<i>4 pages</i>)	046208
S. Rotter, F. Libisch, J. Burgdörfer, U. Kuhl, and H.-J. Stöckmann	
Hopf bifurcation cascade in small- α laser diodes subject to optical feedback (<i>9 pages</i>)	046209
M. Sciamanna, P. Mégret, and M. Blondel	
Fluid dynamics	
Influence of a magnetic field on the Soret-effect-dominated thermal convection in ferrofluids (<i>10 pages</i>)	046301
Andrey Ryskin and Harald Pleiner	
Dynamics of a drop at a fluid interface under shear (<i>6 pages</i>)	046302
K. A. Smith, J. M. Ottino, and M. Olvera de la Cruz	
Canonical description of ideal magnetohydrodynamic flows and integrals of motion (<i>11 pages</i>)	046303
A. V. Kats	

Decay of magnetohydrodynamic turbulence from power-law initial conditions (6 pages)	046304
Chirag Kalelkar and Rahul Pandit	
Pattern formation in weakly forced Taylor-Couette flow (9 pages)	046305
Zhenyu Li and Roger E. Khayat	
Continuum description of finite-size particles advected by external flows: The effect of collisions (6 pages)	046306
Cristóbal López and Andrea Puglisi	
Long-time evolution of a drop size distribution by coalescence in a linear flow (9 pages)	046307
A. E. Ismail and M. Loewenberg	
Plasma physics	
Negative ion formation and motion in a mixture of CCL ₄ and Ar (4 pages)	046401
F. B. Yousif and H. Martínez	
Ion acceleration by beating electrostatic waves: Domain of allowed acceleration (9 pages)	046402
R. Spektor and E. Y. Choueiri	
X-ray emission from z pinches at 10 ⁷ A: Current scaling, gap closure, and shot-to-shot fluctuations (20 pages)	046403
W. A. Stygar, H. C. Ives, D. L. Fehl, M. E. Cuneo, M. G. Mazarakis, J. E. Bailey, G. R. Bennett, D. E. Bliss, G. A. Chandler, R. J. Leeper, M. K. Matzen, D. H. McDaniel, J. S. McGurn, J. L. McKenney, L. P. Mix, D. J. Muron, J. L. Porter, J. J. Ramirez, L. E. Ruggles, J. F. Seamen, W. W. Simpson, C. S. Speas, R. B. Spielman, K. W. Struve, J. A. Torres, and R. A. Vesey	
Energy loss of ions and ion clusters in a disordered electron gas (15 pages)	046404
Hrachya B. Nersisyan and Amal K. Das	
Blowout regimes of plasma wakefield acceleration (13 pages)	046405
K. V. Lotov	
Electron acceleration by a self-diverging intense laser pulse (6 pages)	046406
K. P. Singh, D. N. Gupta, V. K. Tripathi, and V. L. Gupta	
Equation of state for weakly coupled quantum plasmas (8 pages)	046407
J. Vorberger, M. Schlanges, and W. D. Kraeft	
Emission direction of fast electrons in laser-solid interactions at intensities from the nonrelativistic to the relativistic (3 pages)	046408
Jun Zhang, J. Zhang, Z. M. Sheng, Y. T. Li, Y. Qiu, Z. Jin, and H. Teng	
Numerical investigation of recombination gain in the Li III transition to ground state (7 pages)	046409
Y. Avitzour, S. Suckewer, and E. Valeo	
Long-range attraction between particles in dusty plasma and partial surface tension of a dusty phase boundary (7 pages)	046410
A. G. Bashkurov	
Physics of beams	
Simple formulas for the beam lifetime analysis in an electron storage ring (4 pages)	046501
Tae-Yeon Lee	
Angular behavior of synchrotron radiation harmonics (8 pages)	046502
V. G. Bagrov, V. G. Bulenok, D. M. Gitman, Jose Acosta Jara, V. B. Tlyachev, and A. T. Jarovoi	

Classical physics, including nonlinear media and photonic materials

Nonlinear stability of oscillatory wave fronts in chains of coupled oscillators (13 pages)	046601
A. Carpio	
Timing jitter of femtosecond solitons in single-mode optical fibers: A perturbation model (12 pages)	046602
Shihua Chen, Dufang Shi, and Lin Yi	
Theory of photon statistics and optical coherence in a multiple-scattering random-laser medium (16 pages) . . .	046603
Lucia Florescu and Sajeev John	
Numerical analysis of the one-mode solutions in the Fermi-Pasta-Ulam system (10 pages)	046604
A. Cafarella, M. Leo, and R. A. Leo	
Influence of a defect particle on the structure of a classical two-dimensional cluster (6 pages)	046605
K. Nelissen, B. Partoens, and F. M. Peeters	
Emission stimulation in a directional band gap of a CdTe-loaded opal photonic crystal (4 pages)	046606
S. G. Romanov, D. N. Chigrin, C. M. Sotomayor Torres, N. Gaponik, A. Eychmüller, and A. L. Rogach	
Efficient control of the energy exchange due to the Manakov vector-soliton collision (8 pages)	046607
R. Radhakrishnan, Patrice Tchofo Dinda, and Guy Millot	
Tunable filtering and demultiplexing in phononic crystals with hollow cylinders (6 pages)	046608
Y. Pennec, B. Djafari-Rouhani, J. O. Vasseur, A. Khelif, and P. A. Deymier	
Mode matching interface for efficient coupling of light into planar photonic crystals (12 pages)	046609
Jeremy Witzens, Michael Hochberg, Thomas Baehr-Jones, and Axel Scherer	
Extracting the Green's function from the correlation of coda waves: A derivation based on stationary phase (8 pages)	046610
Roel Snieder	
Forward scattering of light in thin opal films (6 pages)	046611
S. G. Romanov and C. M. Sotomayor Torres	
Radiation-induced interaction of optical solitons in fibers with randomly varying birefringence (16 pages)	046612
Y. Chung, V. V. Lebedev, and S. S. Vergeles	
Seminumerical method for tracking multibreathers in Klein-Gordon chains (8 pages)	046613
Vassilis Koukoulouyannis	

Computational physics

Underlying mechanism of numerical instability in large-eddy simulation of turbulent flows (9 pages)	046701
Masato Ida and Nobuyuki Taniguchi	
Computing induced charges in inhomogeneous dielectric media: Application in a Monte Carlo simulation of complex ionic systems (10 pages)	046702
Dezső Boda, Dirk Gillespie, Wolfgang Nonner, Douglas Henderson, and Bob Eisenberg	

BRIEF REPORTS

General methods of statistical physics

- Explanation of power law behavior of autoregressive conditional duration processes based on the random multiplicative process (*4 pages*) 047101
 Aki-Hiro Sato

Chaos and pattern formation

- Modulated amplitude waves in Bose-Einstein condensates (*4 pages*) 047201
 Mason A. Porter and Predrag Cvitanović
- Convective instabilities of synchronization manifolds in spatially extended systems (*4 pages*) 047202
 C. Mendoza, S. Boccaletti, and A. Politi

Fluid dynamics

- Scalar gradient fields by geometric measure theory (*4 pages*) 047301
 Jörg Schumacher

Plasma physics

- Generation of zonal magnetic fields by low-frequency dispersive electromagnetic waves in a nonuniform dusty magnetoplasma (*4 pages*) 047401
 P. K. Shukla

ERRATA

- Erratum: Wake field in dielectric acceleration structures [Phys. Rev. E **68**, 036502 (2003)] (*1 page*) 049901(E)
 L. Schächter
- Erratum: Critical properties of loop percolation models with optimization constraints [Phys. Rev. E **67**, 056113 (2003)] (*1 page*) 049902(E)
 Frank O. Pfeiffer and Heiko Rieger
- Erratum: Lattice-Boltzmann algorithm for simulating thermal two-phase flow [Phys. Rev. E **61**, 5295 (2000)] (*2 pages*) 049903(E)
 Bruce J. Palmer and David R. Rector
- Erratum: Modulation on coherent vortex structures by dispersed solid particles in a three-dimensional mixing layer [Phys. Rev. E **68**, 036309 (2003)] (*2 pages*) 049904(E)
 Jianren Fan, Kun Luo, Youqu Zheng, Hanhui Jin, and Kefa Cen
- Publisher's Note: Long-range interactions in the quantum many-body problem in one dimension: Ground state [Phys. Rev. E **69**, 036118 (2004)] (*1 page*) 049905(E)
 Saugata Ghosh

- Cumulative Author Index** i