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Program of the 103rd Statistical Mechanics Conference

Statistical Mechanics: From Nanomaterials to Social Structures Rutgers University, Busch Campus, Hill Center, Room 114 Sunday, Monday, Tuesday, May 9–11, 2010

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Copies of the presentations of the invited talks as well as information about past meetings, positions wanted and available, can be obtained at: http://www.math.rutgers.edu/events/smm/.

The next Statistical Mechanics Conferences the 104th and 105th is scheduled to take place December 19–21, 2010 and May 8–10, 2011.

Invited Talks

L. Bunimovich, Georgia Tech.
Which hole is leaking the most: topological approach to open systems and dynamical networks

T. Kennedy, University of Arizona
Renormalization group maps for Ising models in lattice gas variables

L.-P. Arguin, M. Damron, C. Newman* and D. Stein, Courant Institute
Ground states of the 2D Edwards-Anderson spin glass

L. Chayes, UCLA
The McKean-Vlasov equation in finite volume

E. Ben-Naim, Los Alamos
Strong mobility in disordered systems

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J. Machta, University of Massachussetts
Monte Carlo methods for rough free energy landscapes

P. Chaikin, NYU
Self-replication without life

V. Yakovenko, University of Maryland
Statistical mechanics of money, income, and wealth

M. Lipkin, Columbia University/Katama Trading, LLC
Hard-to-borrow stocks. Why restrictions on shorting lead to higher prices, higher volatilities, crashes and bubbles!

P. Krapivsky, Boston University
Kinetics of cell division

B. Chazelle, Princeton University
The total S-energy: an analytical tool for multiagent dynamics

J. Gollub, Haverford College
Statistical mechanics of swimming microorganisms

H. Levine, University of California, San Diego
Information limits on eukaryotic chemotaxis

E. Shakhnovich, Harvard University
Dynamics of evolution and adaptation: insights from ab initio multiscale models

A. Chakraborty, MIT
Why people with certain genes can control HIV without therapy: from statistical mechanics to the clinic

V. Rom-Kedar, Weizmann Institute
Models of the innate immune system: theory and medical implications

D. Nelson, Harvard University
Life at low Reynolds number

P. W. Anderson, Princeton University
What is wrong with QMC?

E. Chudnovsky, Lehman College
Self-organized tunneling dynamics of molecular nanomagnets

K. Rabe, Rutgers University
Spin-lattice coupling in magnetic perovskite thin films and superlattices

N. Berker, Sabanci University
Anisotropy effects and impurity induced antiferromagnetism: renormalization-group theory of $d = 3$ electronic models

E. Andrei, Rutgers University
Electronic properties of graphene

R. Ecke, Los Alamos
Unstable diffusion layers: from thermal convection and material dissolution to sequestration of CO_2

M. Alber, University of Notre Dame
Multiscale modeling in biology

J. Marko, Northwestern University
Linking topology of large DNA molecules

C. Callan, Princeton University
Deep sequencing, mutual information and the thermodynamics of gene regulation

D. Pine, NYU
Non-equilibrium phase transitions and random ordering in driven suspensions of rods

A. Libchaber, Rockefeller University
From geophysics to biology, the effect of temperature and pressure gradients

R. Car, Princeton University
Quantum protons and hydrogen bonds

P. Debenedetti, Princeton University
Thermodynamic and kinetic models of the appearance and amplification of biological chirality

D. Haldane, Princeton University
Dissipationless "Hall viscosity" and its relation to incompressibility of quantum Hall fluids

D. Vanderbilt, Rutgers University
Orbital magnetoelectric effects and topological insulators

D. Weitz, Harvard University
Fast crystals and strong glasses

R. Kohn, Courant Institute
Surface relaxation below the roughening temperature: steps, pde's and self-similarity

J. Sethna*, Y.S. Chen, W. Choi and S. Papanikolaou, Cornell University
Bending crystals: the evolution of self-similar dislocation structures

F. Family, Emory University
Physics of age-related macular degeneration

L. Blum, Rutgers University
Hyperscaling theory for charged complex systems

M. Kiessling, Rutgers University
On the N dependence of classical and quantum N-body ground state energies

Short Talk (Identifies speaker*)**

S. Boettcher, Emory University
Finite-size corrections in mean-field and lattice spin glasses at $T = 0$

S. Burkhardt* and J. Machta, University of Massachusetts, Amherst
Efficiency of parallel tempering in asymmetric free energy landcsapes

B. Yucesoy*, H. Katzgraber and J. Machta University of Massachusetts, Amherst
Efficiency of parallel tempering for spin glasses

H. Castillo* and A. Parsaeian, Ohio University
Fluctuations in the relaxation of glasses

E. Vedmedenko*, N. Mikuszeit, T. Stapelfeldt, R. Wieser, M. Potthoff, A. Lichtenstein and R. Wiesendanger, University of Hamburg, Germany
Crossover temperature of finite samples at finite observation times

S. Huntsman, Equilibrium Networks & US Naval Postgraduate School
Limiting effective temperature of 2D hyperbolic toral automorphisms

V. Tkachenko, Ben-Gurion University of the Negev
An inverse problem for 1d periodic differential operator of high order

R. Batten*, F.H. Stillinger and S. Torquato, Princeton University
Novel low temperature behavior in classical many particle systems

Y. Jiao, Princeton University
Dense packings of regular tetrahedra

A. Hopkins*, F.H. Stillinger and S. Torquato, Princeton University
Spherical codes, maximal local packing density, and the golden ratio

C. Zachary* and S. Torquato, Princeton University
Hyperuniformity in point patterns and heterogeneous media

N. Maric*, T. Cox and R. Schinazi, University of Missouri
Contact process in a wedge

B. Daniels* and J.P. Sethna, Cornell University
Nucleation at the DNA supercoiling transition

O.S. Sariyer* and C. Guven, Koc University
Amino acid sequence alignment using simulated annealing

L. Chayes, UCLA
Ballistic Behavior for Biased SAW

C.N. Kaplan*, H. Tu, R. Pelcovits and R.B. Meyer, Brandeis University
Theory of depletion induced phase transition from chiral smectic A twisted ribbons to semi-infinite flat membranes

H. Lei*, I. Binder and L. Chayes, UCLA
Cardy's formula and convergence to SLE_6 for a (correlated) percolation model

M. Drake*, J. Machta, D. Abraham and C. Newman, University of Massachussetts
Monte Carlo simulations of an equilibrium random surface model

T. Dorlas, Dublin Institute for Advanced Studies
A simple analysis of global warming

S. Ji, Rutgers University
Are there three more laws of thermodynamics?

A. Shekhawat*, S. Papanikolaou, S. Zapperi and J.P. Sethna, Cornell University
Theory of phase transition and avalanches in non-equilibrium Mott transition

M. Novotny*, J. Yancey, S. Gwaltney, C. Varghese, L. Solomon, X. Zhang and S. Boettcher, Mississippi University
Are social-network-based nanomaterials possible?

M. Keskin*, B. Devirenb and Y. Kocakaplan, Erciyes University
Topology of the correlation networks among major currencies using hierarchical structure methods

R. Fisch, Princeton University
From collective pinning to dilute strong pinning: glassy freezing in the 3D random-field XY model

G. Gor* and A.V. Neimark, Rutgers University
Coupling adsorption and deformation: thermodynamic approach

M. Krüger* and M. Fuchs, MIT
Fluctuation dissipation relations for brownian particles under shear

A. Kosmrlj*, A. Chakraborty and M. Kardar, MIT
Thymic selection of T cells as a diffusion with intermittent traps

S.J. Rahi*, S. Zaheer, T. Emig, R. Jaffe and M. Kardar, MIT
Casimir interaction of an object with a cavity

R. Kerr, University of Warwick
Numerical generation of a vortex ring cascade in quantum turbulence

M. F. Maghrebi, MIT
Feynman graphs for computing the Casimir energy in a multiple-reflection expansion

S.J. Rahi, MIT
Casimir interaction of an object with a cavity

D. Gonzalez*, A. Pimpinelli and T.L. Einstein, University of Maryland
Statistical distribution of many-particle systems: multi-neighbors spacings

P. Patrone*, T. Einstein and D. Margetis, University of Maryland
Vicinal surfaces with singular step interactions: 1D stochastic model

M. Hawkins* and T.L. Einstein, University of Maryland-College Park
Relaxation of terrace width distribution of vicinal (001) with zigzag [110] steps

S. Muir* and M. Urbanski, University of North Texas
Local energy vs. interaction approach to Gibbs/equilibrium states

M. Schmiedeberg* and A. Liu, University of Pennsylvania
Dynamics of soft spheres beyond the hard-sphere limit

R. Ziff, University of Michigan
Explosive percolation on lattices

M. Kardar* and Y. Kantor, MIT
Universality in the jamming limit for elongated hard particles in one dimension

D. Blair* and J. Machta, University of Massachusetts Amherst
Diameter of random clusters in Potts models

L. Lafuerza*, P. Colet and R. Toral, IFISC
Non-equilibrium transition in a model of coupled active rotators

W. Choi*, Y.S. Chen, S. Papanikolaou and J.P. Sethna, Cornell University
Linear stability analysis of turbulent behaviors in plastic flow

Y. Chen*, W. Choi, S. Papanikolaou and J.P. Sethna, Cornell University
Scaling theory of continuum dislocation dynamics