# PHYSICAL REVIEW LETTERS

*Contents*

VOLUME 81, NUMBER 20 16 November 1998

**General Physics**

Phase Transition in the Number Partitioning Problem ..... 4281
Stephan Mertens

Characterizing Greenberger-Horne-Zeilinger Correlations in Nondegenerate Parametric Oscillation via Phase Measurements ..... 4285
W. J. Munro and G. J. Milburn

Fractals at $T = T_c$ due to Instantonlike Configurations ..... 4289
N. G. Antoniou, Y. F. Contoyiannis, F. K. Diakonos, and C. G. Papadopoulos

**Gravitation and Astrophysics**

Bohr's Correspondence Principle and the Area Spectrum of Quantum Black Holes ..... 4293
Shahar Hod

Quantum Structure of Spacetime and Entropy of Schwarschild Black Holes ..... 4297
T. Padmanabhan

$\gamma$-Ray Bursts and Afterglows from Rotating Strange Stars and Neutron Stars ..... 4301
Z. G. Dai and T. Lu

Tau Neutrino Appearance with a 1000 Megaparsec Baseline ..... 4305
F. Halzen and D. Saltzberg

**Elementary Particles and Fields**

First Observation of the Rare Decay Mode $K_L^0 \to e^+e^-$ ..... 4309
D. Ambrose, C. Arroyo, M. Bachman, P. de Cecco, D. Connor, M. Eckhause, K. M. Ecklund, S. Graessle, A. D. Hancock, K. Hartman, M. Hebert, C. H. Hoff, G. W. Hoffmann, G. M. Irwin, J. R. Kane, N. Kanematsu, Y. Kuang, K. Lang, R. Lee, R. D. Martin, J. McDonough, A. Milder, W. R. Molzon, M. Pommot-Maia, P. J. Riley, J. L. Ritchie, P. D. Rubin, V. I. Vassilakopoulos, C. B. Ware, R. E. Welsh, S. G. Wojcicki, E. Wolin, and S. Worm (BNL E871 Collaboration)

Searching for New Physics in $b \to ss\bar{d}$ Decays ..... 4313
Katri Huitu, Cai-Dian Lü, Paul Singer, and Da-Xin Zhang

**Nuclear Physics**

Microscopic Calculation of $^6$Li Elastic and Transition Form Factors ..... 4317
R. B. Wiringa and R. Schiavilla

Lifetime Measurement of $^{12}_{\Lambda}$C, $^{28}_{\Lambda}$Si, and $_{\Lambda}$Fe Hypernuclei ..... 4321
H. Bhang, S. Ajimura, K. Aoki, T. Hasegawa, O. Hashimoto, H. Hotchi, Y. D. Kim, T. Kishimoto, K. Maeda, H. Noumi, Y. Ohta, K. Omata, H. Outa, H. Park, Y. Sato, M. Sekimoto, T. Shibata, T. Takahashi, and M. Youn

Excited States of $^{11}$Li ..... 4325
M. G. Gornov, Yu. Gurov, S. Lapushkin, P. Morokhov, V. Pechkurov, T. K. Pedlar, Kamal K. Seth, J. Wise, and D. Zhao

*(Continued on Third Cover)*

CODEN: PRLTAO 81 (20), 4281–4532 (16 November 1998)



**Copyright 1998 by The American Physical Society**

**Atomic, Molecular, and Optical Physics**

Nuclear-Electronic Wave-Packet Dynamics in Perturbed Rydberg States of Molecular Hydrogen ..... 4329
F. Texier and Ch. Jungen

Double and Triple Photoionization of Ground-State Lithium ..... 4333
Hugo W. van der Hart and Chris H. Greene

Ultralow-Energy Electrons from Fast Heavy-Ion Helium Collisions: The "Target Cusp" ..... 4337
W. Schmitt, R. Moshammer, F. S. C. O'Rourke, H. Kollmus, L. Sarkadi, R. Mann, S. Hagmann, R. E. Olson, and J. Ullrich

**Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.**

Spurious Lyapunov Exponents in Attractor Reconstruction ..... 4341
Timothy D. Sauer, Joshua A. Tempkin, and James A. Yorke

Smoothness Implies Determinism in Time Series: A Measure Based Approach ..... 4345
Guillermo J. Ortega and Enrique Louis

Systematic Computation of the Least Unstable Periodic Orbits in Chaotic Attractors ..... 4349
Fotis K. Diakonos, Peter Schmelcher, and Ofer Biham

Stability of Walking Vector Solitons ..... 4353
Dumitru Mihalache, Dumitru Mazilu, and Lluis Torner

Excitation of Solitons by Adiabatic Multiresonant Forcing ..... 4357
L. Friedland and A. G. Shagalov

Emergence of Structural Anisotropy in Optical Glasses Treated to Support Second Harmonic Generation ..... 4361
C. Cabrillo, G. J. Cuello, P. García-Fernández, F. J. Bermejo, V. Pruneri, P. G. Kazansky, S. M. Bennington, and W. S. Howells

Reverse Buoyancy in Shaken Granular Beds ..... 4365
Troy Shinbrot and Fernando J. Muzzio

Clustering, Order, and Collapse in a Driven Granular Monolayer ..... 4369
J. S. Olafsen and J. S. Urbach

Structures and Multipoint Correlators for Turbulent Advection: Predictions and Experiments ..... 4373
Laurent Mydlarski, Alain Pumir, Boris I. Shraiman, Eric D. Siggia, and Zellman Warhaft

Turbulence and Multiscaling in the Randomly Forced Navier-Stokes Equation ..... 4377
Anirban Sain, Manu, and Rahul Pandit

Vortex Heating in Superfluid Helium at Low Temperatures ..... 4381
David C. Samuels and Carlo F. Barenghi

Spatial and Temporal Dynamics of Two Interacting Modes in Parametrically Driven Surface Waves ..... 4384
H. Arbell and J. Fineberg

**Plasma and Beam Physics**

Direct Observation of the Fast Beam-Ion Instability ..... 4388
J. Y. Huang, M. Kwon, T.-Y. Lee, I. S. Ko, Y. H. Chin, and H. Fukuma

Rapid Inward Impurity Transport during Impurity Pellet Injection on the DIII-D Tokamak ..... 4392
D. G. Whyte, T. E. Evans, A. W. Hyatt, T. C. Jernigan, R. L. Lee, A. G. Kellman, P. B. Parks, R. Stockdale, and P. L. Taylor

Phase Space of Tokamak Edge Turbulence, the *L-H* Transition, and the Formation of the Edge Pedestal ..... 4396
B. N. Rogers, J. F. Drake, and A. Zeiler

**Condensed Matter: Structure, etc.**

Roles of Repulsive and Attractive Forces in Determining the Structure of Nonuniform Liquids: Generalized Mean Field Theory ..... 4400
John D. Weeks, Kirill Katsov, and Katharina Vollmayr

How Does the Relaxation of a Supercooled Liquid Depend on Its Microscopic Dynamics? ..... 4404
Tobias Gleim, Walter Kob, and Kurt Binder

*(Continued on Preceding Page)*

Antiferroelectricity and Chiral Order in New Liquid Crystals of Nonchiral Molecules Studied by Optical Second Harmonic Generation ..... 4408
R. Macdonald, F. Kentischer, P. Warnick, and G. Heppke
Localization Transition of Random Copolymers at Interfaces ..... 4412
Semjon Stepanow, Jens-Uwe Sommer, and Igor Ya. Erukhimovich
Pressure Effects on Hydrogen Bonding in the Disordered Phase of Solid HBr ..... 4416
Takashi Ikeda, Michiel Sprik, Kiyoyuki Terakura, and Michele Parrinello
Evidence for Distinct Polymer Chain Orientations in $KC_{60}$ and $RbC_{60}$ ..... 4420
P. Launois, R. Moret, J. Hone, and A. Zettl
Effect of Surface Steps on the Plastic Threshold in Nanoindentation ..... 4424
J. D. Kiely, R. Q. Hwang, and J. E. Houston
Evidence for the Role of Propagating Stress Waves during Fracture ..... 4428
L. C. Krysac and J. D. Maynard
Collective Excitations in Crystals Composed of Disparate Mass Particles ..... 4432
E. Enciso, N. G. Almarza, M. A. Gonzalez, F. J. Bermejo, R. Fernández-Perea, and F. Bresme
Slow Stress Relaxation in Randomly Disordered Nematic Elastomers and Gels ..... 4436
S. M. Clarke and E. M. Terentjev
Optical Excitation of Atomic Hydrogen Bound to the Surface of Liquid Helium ..... 4440
A. P. Mosk, M. W. Reynolds, T. W. Hijmans, and J. T. M. Walraven
Spiral Surface Growth without Desorption ..... 4444
Alain Karma and Mathis Plapp
Atomic Process of Point Contact in Gold Studied by Time-Resolved High-Resolution Transmission Electron Microscopy 4448
Tokushi Kizuka

**Condensed Matter: Electronic Properties, etc.**

Polarization and Strong Infrared Activity in Compressed Solid Hydrogen ..... 4452
Ivo Souza and Richard M. Martin
Extending Linear Response: Inferences from Electron-Ion Structure Factors ..... 4456
A. A. Louis and N. W. Ashcroft
Exciton-Exciton Interactions in AlAs/GaAs Coupled Quantum Wire Arrays ..... 4460
T. Mélin and F. Laruelle
Surface-State Lifetime Measured by Scanning Tunneling Spectroscopy ..... 4464
Jiutao Li, Wolf-Dieter Schneider, Richard Berndt, O. R. Bryant, and S. Crampin
Level Statistics of Quantum Dots Coupled to Reservoirs ..... 4468
Jürgen König, Yuval Gefen, and Gerd Schön
Essential Role of Correlations in Governing Charge Transport in Disordered Organic Materials ..... 4472
S. V. Novikov, D. H. Dunlap, V. M. Kenkre, P. E. Parris, and A. V. Vannikov
Revision of the Phase Diagram of Superconducting $U_{1-x}Th_xBe_{13}$ ..... 4476
F. Kromer, R. Helfrich, M. Lang, F. Steglich, C. Langhammer, A. Bach, T. Michels, J. S. Kim, and G. R. Stewart
Femtosecond Time-Resolved Study of the Energy and Temperature Dependence of Hot-Electron Lifetimes in $Bi_2Sr_2CaCu_2O_{8+\delta}$ ..... 4480
W. Nessler, S. Ogawa, H. Nagano, H. Petek, J. Shimoyama, Y. Nakayama, and K. Kishio
Haldane Gap and Fractional Oscillations in Gated Josephson Arrays ..... 4484
Ehud Altman and Assa Auerbach
Ground State Properties of Fluxlines in a Disordered Environment ..... 4488
Heiko Rieger
Incoherent Interlayer Transport and Angular-Dependent Magnetoresistance Oscillations in Layered Metals ..... 4492
Ross H. McKenzie and Perez Moses
Liquid-Gas Critical Behavior in a Frustrated Pyrochlore Ferromagnet ..... 4496
M. J. Harris, S. T. Bramwell, P. C. W. Holdsworth, and J. D. M. Champion

*(Continued on Preceding Page)*

*Contents (Continued)*

Magnetically Ordered fcc Structure at the Relaxed Grain Boundaries of Pure Nanocrystalline Fe ..... 4500
L. Del Bianco, C. Ballesteros, J. M. Rojo, and A. Hernando
Infrared Absorption from Charge Density Waves in Magnetic Manganites ..... 4504
P. Calvani, G. De Marzi, P. Dore, S. Lupi, P. Maselli, F. D'Amore, S. Gagliardi, and S-W. Cheong
Shell Effect in Exchange Coupling of Transition Metal Dots and Their Arrays ..... 4508
V. N. Kondratyev and H. O. Lutz
Magnetization Reversal in Micron-Sized Magnetic Thin Films ..... 4512
R. H. Koch, J. G. Deak, D. W. Abraham, P. L. Trouilloud, R. A. Altman, Yu Lu, W. J. Gallagher, R. E. Scheuerlein, K. P. Roche, and S. S. P. Parkin
Consequences of Spin-Flop Coupling in Exchange Biased Films ..... 4516
T. C. Schulthess and W. H. Butler
Long-Lived Dynamic Heterogeneity in a Relaxor Ferroelectric ..... 4520
O. Kircher, B. Schiener, and R. Böhmer

**Interdisciplinary Physics: Biological Physics, Quantum Information, etc.**
Chain Deformation for a Polymer Melt under Shear ..... 4524
P. T. Callaghan, M. L. Kilfoil, and E. T. Samulski

**Comments**
Comment on "Selection of the Saffman-Taylor Finger Width in the Absence of Surface Tension: An Exact Result" ... 4528
Armand Sarkissian and Herbert Levine
Mineev-Weinstein Replies ..... 4529
M. Mineev-Weinstein

**Errata**
Erratum: What is a Gauge Transformation in Quantum Mechanics? [Phys. Rev. Lett. **80**, 4613 (1998)] ..... 4530
Carlo Rovelli
Dynamics of Component Separation in a Binary Mixture of Bose-Einstein Condensates [Phys. Rev. Lett. **81**, 1539 (1998)] ..... 4531
D. S. Hall, M. R. Matthews, J. R. Ensher, C. E. Wieman, and E. A. Cornell
Measurements of Relative Phase in Two-Component Bose-Einstein Condensates [Phys. Rev. Lett. **81**, 1543 (1998)] .... 4532
D. S. Hall, M. R. Matthews, C. E. Wieman, and E. A. Cornell