NEWSPAPER 77

PHYSICAL REVIEW LETTERS

Contents

VOLUME 77, NUMBER 12 16 September 1996

General Physics

Asymptotic Integrability of Water Waves 2347
A. S. Fokas and Q. M. Liu

Complementarity and Fundamental Limit in Precision Phase Measurement 2352
Z. Y. Ou

Multiple Beam Atomic Interferometer 2356
M. Weitz, T. Heupel, and T. W. Hänsch

Collective Excitations of a Trapped Bose-Condensed Gas 2360
S. Stringari

Thermal Ratchets in 1 + 1 Dimensions 2364
F. Marchesoni

Gravitation and Astrophysics

Counting States of Near-Extremal Black Holes 2368
Gary T. Horowitz and Andrew Strominger

Gamma Rays from SN 1987A due to Pseudoscalar Conversion 2372
J. A. Grifols, E. Massó, and R. Toldrà

Elementary Particles and Fields

Quarkonium Decay Matrix Elements from Quenched Lattice QCD 2376
G. T. Bodwin, D. K. Sinclair, and S. Kim

Search for the Flavor Changing Neutral Current Decay $D^0 \rightarrow \mu^+ \mu^-$ in 800 GeV Proton-Silicon Interactions 2380
T. Alexopoulos *et al.* (Fermilab E771 Collaboration)

Search for $D^0 \overline{D}^0$ Mixing in Semileptonic Decay Modes 2384
E. M. Aitala *et al.* (Fermilab E791 Collaboration)

Forward Cross Sections for Production of D^+, D^0, D_s, D^{*+}, and Λ_c in 250 GeV $\pi^\pm$, $K^\pm$, and p Interactions with Nuclei 2388
G. A. Alves, S. Amato, J. C. Anjos, J. A. Appel, J. Astorga, S. B. Bracker, L. M. Cremaldi, W. D. Dagenhart, C. L. Darling, R. L. Dixon, D. Errede, H. C. Fenker, C. Gay, D. R. Green, R. Jedicke, P. E. Karchin, C. Kennedy, S. Kwan, L. H. Lueking, J. R. T. de Mello Neto, J. Metheny, R. H. Milburn, J. M. de Miranda, H. da Motta Filho, A. Napier, D. Passmore, A. Rafatian, A. C. dos Reis, W. R. Ross, A. F. S. Santoro, M. Sheaff, M. H. G. Souza, W. J. Spalding, C. Stoughton, M. E. Streetman, D. J. Summers, S. F. Takach, A. Wallace, and Z. Wu (Fermilab E769 Collaboration)

Feynman-x and Transverse Momentum Dependence of D Meson Production in 250 GeV π, K, and p Interactions with Nuclei 2392
G. A. Alves, S. Amato, J. C. Anjos, J. A. Appel, J. Astorga, S. B. Bracker, L. M. Cremaldi, W. D. Dagenhart, C. L. Darling, R. L. Dixon, D. Errede, H. C. Fenker, C. Gay, D. R. Green, R. Jedicke, P. E. Karchin, C. Kennedy, S. Kwan, L. H. Lueking, J. R. T. de Mello Neto, J. Metheny, R. H. Milburn, J. M. de Miranda, H. da Motta Filho, A. Napier, D. Passmore, A. Rafatian, A. C. dos Reis, W. R. Ross, A. F. S. Santoro, M. Sheaff, M. H. G. Souza, W. J. Spalding, C. Stoughton, M. E. Streetman, D. J. Summers, S. F. Takach, A. Wallace, and Z. Wu (Fermilab E769 Collaboration)

(Continued on Third Cover)

CODEN: PRLTAO 77 (12), 2347–2594 (16 September 1996)

12

Contents (Continued)

Nuclear Physics

Forward-Angle ^{3}He$(e, e'\pi^{\pm})$ Coincident Electroproduction and the Search for Δ's in the Ground State of ^{3}He 2396
K. I. Blomqvist, W. U. Boeglin, R. Böhm, M. Distler, R. Edelhoff, J. Friedrich, R. Geiges, M. Kahrau, M. Korn, H. Kramer, K. W. Krygier, V. Kunde, M. Kuss, J. M. Laget, A. Liesenfeld, K. Merle, R. Neuhausen, E. A. J. M. Offermann, Th. Pospischil, M. Potokar, C. Rangacharyulu, A. Rokavec, A. Richter, A. W. Richter, G. Rosner, P. Sauer, St. Schardt, G. Schrieder, T. Suda, B. Vodenik, A. Wagner, Th. Walcher, and St. Wolf

Mass Measurement of ^{100}Sn 2400
M. Chartier, G. Auger, W. Mittig, A. Lépine-Szily, L. K. Fifield, J. M. Casandjian, M. Chabert, J. Fermé, A. Gillibert, M. Lewitowicz, M. Mac Cormick, M. H. Moscatello, O. H. Odland, N. A. Orr, G. Politi, C. Spitaels, and A. C. C. Villari

Observation of Fine Structure in Nuclear Level Densities and γ-Ray Strength Functions 2404
T. S. Tveter, L. Bergholt, M. Guttormsen, E. Melby, and J. Rekstad

Pionic Fusion of Heavy Ions 2408
D. Horn, G. C. Ball, D. R. Bowman, W. G. Davies, D. Fox, A. Galindo-Uribarri, A. C. Hayes, G. Savard, L. Beaulieu, Y. Larochelle, and C. St-Pierre

Atomic, Molecular, and Optical Physics

Photonic Band Structure of Atomic Lattices 2412
D. V. van Coevorden, R. Sprik, A. Tip, and A. Lagendijk

Product State Control through Interfering Excitation Routes 2416
Feng Wang, Ce Chen, and D. S. Elliott

New States of Hydrogen in a Circularly Polarized Electromagnetic Field 2420
Maciej Kalinski and J. H. Eberly

Multiphoton Resonance with One to Many Cycles 2424
R. B. Watkins, W. M. Griffith, M. A. Gatzke, and T. F. Gallagher

New Method for Treating Slow Multielectron, Multicenter Atomic Collisions 2428
Predrag S. Krstić, Gary Bent, and David R. Schultz

Branching Ratios for Dissociative Recombination of $^{15}N^{14}N^+$ 2432
D. Kella, P. J. Johnson, H. B. Pedersen, L. Vejby-Christensen, and L. H. Andersen

Evolution of the Electronic Structure of Small Vanadium Clusters from Molecular to Bulklike 2436
Hongbin Wu, Sunil R. Desai, and Lai-Sheng Wang

Plasmon Enhanced Electron and Atom Emission from a Spherical Sodium Cluster: Na_{91}^- 2440
Thomas Reiners and Hellmut Haberland

Sum Rule for Modified Spontaneous Emission Rates 2444
Stephen M. Barnett and Rodney Loudon

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, Etc.

Quasiclassical Random Matrix Theory 2447
R. E. Prange

Phase Diffusion in Localized Spatiotemporal Amplitude Chaos 2451
Glen D. Granzow and Hermann Riecke

Walking Solitons in Quadratic Nonlinear Media 2455
Lluis Torner, Dumitru Mazilu, Dumitru Mihalache

Elastic Instability and Curved Streamlines 2459
Peyman Pakdel and Gareth H. McKinley

Symmetry and Scaling of Turbulent Mixing 2463
Boris I. Shraiman and Eric D. Siggia

Crossover from Two- to Three-Dimensional Turbulence 2467
Leslie M. Smith, Jeffrey R. Chasnov, and Fabian Waleffe

Radiographic Evidence for $k^{-5/3}$ Scaling of Density Power Spectra 2471
R. N. Silver, R. Gore, J. Greene, F. Harlow, and R. Whitman

(Continued on Preceding Page)

Chaotic Localized States near the Onset of Electroconvection 2475
Michael Dennin, Guenter Ahlers, and David S. Cannell

Plasma and Beam Physics

Ion Transport in Turbulent Edge Plasmas 2479
P. Helander, R. D. Hazeltine, and Peter J. Catto

Interaction Physics of the Fast Ignitor Concept 2483
C. Deutsch, H. Furukawa, K. Mima, M. Murakami, and K. Nishihara

High Confinement and High Density with Stationary Plasma Energy and Strong Edge Radiation in the TEXTOR-94 Tokamak 2487
A. M. Messiaen, J. Ongena, U. Samm, B. Unterberg, G. Van Wassenhove, F. Durodie, R. Jaspers, M. Z. Tokaŕ, P. E. Vandenplas, G. Van Oost, J. Winter, G. H. Wolf, G. Bertschinger, G. Bonheure, P. Dumortier, H. Euringer, K. H. Finken, G. Fuchs, B. Giesen, R. Koch, L. Könen, C. Königs, H. R. Koslowski, A. Krämer-Flecken, A. Lyssoivan, G. Mank, J. Rapp, N. Schoon, G. Telesca, R. Uhlemann, M. Vervier, G. Waidmann, and R. R. Weynants

Condensed Matter: Structure, Etc.

Theory of the Anomalous Rayleigh Dispersion at H/W(110) Surfaces 2491
Claudia Bungaro, Stefano de Gironcoli, and Stefano Baroni

Mechanical Instability of Oxidized Metal Clusters 2495
Massimo Celino, Fabrizio Cleri, Gregorio D'Agostino, and Vittorio Rosato

Frequency Dependent Electrorheological Properties: Origin and Bounds 2499
Hongru Ma, Weijia Wen, Wing Yim Tam and Ping Sheng

Self-Organization and Annealed Disorder in a Fracturing Process 2503
Guido Caldarelli, Francesco D. Di Tolla, and Alberto Petri

First-Order Transitions and Hexatic Ordering in the Aerogel-Confined Liquid Crystal 650BC 2507
Tommaso Bellini, Aaron G. Rappaport, Noel A. Clark, and Britt N. Thomas

Observation of 2D Polarons and Magnetopolarons on Superfluid Helium Films 2511
O. Tress, Yu. P. Monarkha, F. C. Penning, H. Bluyssen, and P. Wyder

Evidence of ^{4}He Crystallization via Quantum Tunneling at mK Temperatures 2514
J. P. Ruutu, P. J. Hakonen, J. S. Penttilä, A. V. Babkin, J. P. Saramäki, and E. B. Sonin

Experimental and Theoretical Study of the Rotation of Si Ad-dimers on the Si(100) Surface 2518
B. S. Swartzentruber, A. P. Smith, and H. Jónsson

Real-Time Microscopy of Two-Dimensional Critical Fluctuations: Disordering of the Si(113)-(3 $\times$ 1) Reconstruction 2522
R. M. Tromp, W. Theis, and N. C. Bartelt

Growth of Wetting Layers from Liquid Mixtures 2526
Ullrich Steiner and Jacob Klein

Condensed Matter: Electronic Properties, Etc.

Direct Observation of the Magnetic-Breakdown Induced Quantum Interference in the Quasi-Two-Dimensional Organic Metal κ-(BEDT-TTF)$_2$CU(NCS)$_2$ 2530
M. V. Kartsovnik, G. Yu. Logvenov, T. Ishiguro, W. Biberacher, H. Anzai, and N. D. Kushch

Far-Infrared Radiation Generated by Current Carrying Nanowires 2534
V. L. Gurevich, V. B. Pevzner, and G. Iafrate

Observation of Chiral Luttinger Behavior in Electron Tunneling into Fractional Quantum Hall Edges 2538
A. M. Chang, L. N. Pfeiffer, and K. W. West

Direct Observation of the Current-Phase Relation of an Adjustable Superconducting Point Contact 2542
M. C. Koops, G. V. van Duyneveldt, and R. de Bruyn Ouboter

Phonon-Induced Spin Flip in Extremely Thin Superconducting Al Tunneling Junctions in High Magnetic Fields 2546
J. Lang, W. Eisenmenger, and P. Fulde

Spin-Orbit Scattering Effects on the Phonon Emission and Absorption in Superconducting Tunneling Junctions 2550
Claudio Grimaldi and Peter Fulde

(Continued on Preceding Page)

Contents (Continued)

Spin Diffusion in 2D *XY* Ferromagnet with Dipolar Interaction 2554
A. Kashuba, Ar. Abanov, and V. L. Pokrovsky
Origin of Spin Gap in CaV_4O_9: Effects of Frustration and Lattice Distortions 2558
O. A. Starykh, M. E. Zhitomirsky, D. I. Khomskii, R. R. P. Singh, and K. Ueda
Chaos in the Ferromagnetic Phase of a Reentrant Ferromagnet 2562
K. Jonason, J. Mattsson, and P. Nordblad
Film Stress and Domain Wall Pinning in Sesquilayer Iron Films on W(110) 2566
D. Sander, R. Skomski, C. Schmidthals, A. Enders, and J. Kirschner
Symmetry-Induced Magnetic Anisotropy in Fe Films Grown on Stepped Ag(001) 2570
R. K. Kawakami, Ernesto J. Escorcia-Aparicio, and Z. Q. Qiu

Cross-Disciplinary Physics
Coherent Control of Collisional Events: Bimolecular Reactive Scattering 2574
Moshe Shapiro and Paul Brumer
Observations of First-Order Liquid-to-Hexatic and Hexatic-to-Solid Phase Transitions in a Confined Colloid Suspension 2577
Andrew H. Marcus and Stuart A. Rice
Radial Distribution Function of Semiflexible Polymers 2581
Jan Wilhelm and Erwin Frey
Quantum Error Correction for Communication 2585
Artur Ekert and Chiara Macchiavello

Comments
Comment on "Thermodynamics of Anomalous Diffusion" 2589
Manuel O. Cáceres and Carlos E. Budde
Zanette and Alemany Reply 2590
D. H. Zanette and P. A. Alemany
Comment on "Ground State Structural Anomalies in Cuprous Halides: CuCl" 2591
A. Göbel, T. Ruf, M. Cardona, C. T. Lin, and J. C. Merle
Park and Chadi Reply 2592
C. H. Park and D. J. Chadi
Comment on "Detection of Compressible and Incompressible States in Quantum Dots and Antidots by Far-Infrared Spectroscopy" 2593
T. Darnhofer, M. Suhrke, and U. Rössler
Bollweg, Kurth, Heitmann, and Gudmundsson Reply 2594
K. Bollweg, T. Kurth, D. Heitmann, and V. Gudmundsson