

Plot of the differential conductance of a quantum dot with up to four electrons as a function of gate and source-drain voltages, allowing spectroscopy of its quantum states. The dark band in the (upper-image) two-electron region shows the onset of tunneling through the triplet excited state and gives a direct measure of the singlet-triplet splitting in "quantum-dot helium". This splitting is reduced in a magnetic field (bottom image). See article 256801.

PRL 93 (25), 250401–259902, 17 December 2004 (320 total pages)

PHYSICAL REVIEW LETTERS

Contents

Articles published 11 December–17 December 2004

VOLUME 93, NUMBER 25 17 December 2004

General Physics: Statistical and Quantum Mechanics, Quantum Information, etc.

Roton-Rotation Coupling of Acetylene in ^{4}He 250401
R. E. Zillich, Y. Kwon, and K. B. Whaley
Zero Sound in a Mixture of a Single-Component Fermion Gas and a Bose-Einstein Condensate 250402
D. H. Santamore, Sergio Gaudio, and Eddy Timmermans
Creating a Stable Molecular Condensate Using a Generalized Raman Adiabatic Passage Scheme 250403
Hong Y. Ling, Han Pu, and Brian Seaman
Quantum Phase Transitions and Bipartite Entanglement 250404
L.-A. Wu, M. S. Sarandy, and D. A. Lidar
Implementation of Spin Hamiltonians in Optical Lattices 250405
J. J. García-Ripoll, M. A. Martin-Delgado, and J. I. Cirac
Vortex Molecules in Coherently Coupled Two-Component Bose-Einstein Condensates 250406
Kenichi Kasamatsu, Makoto Tsubota, and Masahito Ueda
Quantum Calibration of Measurement Instrumentation 250407
Giacomo Mauro D'Ariano, Lorenzo Maccone, and Paoloplacido Lo Presti
Universal Properties of Two-Dimensional Boson Droplets 250408
H.-W. Hammer and D. T. Son
Radiative Corrections and Quantum Gates in Molecular Systems 250501
John H. Reina, Ray G. Beausoleil, Tim P. Spiller, and William J. Munro
Nearly Deterministic Linear Optical Controlled-NOT Gate 250502
Kae Nemoto and W. J. Munro
Experimental Demonstration of Unconditional Entanglement Swapping for Continuous Variables 250503
Xiaojun Jia, Xiaolong Su, Qing Pan, Jiangrui Gao, Changde Xie, and Kunchi Peng
Generalized Constraints on Quantum Amplification 250601
U. Gavish, B. Yurke, and Y. Imry
Thermal-Noise Limit in the Frequency Stabilization of Lasers with Rigid Cavities 250602
Kenji Numata, Amy Kemery, and Jordan Camp
Stability Properties of Nonhyperbolic Chaotic Attractors with Respect to Noise 250603
Suso Kraut and Celso Grebogi

Gravitation and Astrophysics

Energy Conservation for Dynamical Black Holes 251101
Sean A. Hayward

(Continued on Third Cover)

Copyright 2004 by The American Physical Society

0031-9007(20041217)93:25;1-U

Contents (Continued)

Elementary Particles and Fields

Scalar Quantum Field Theory with a Complex Cubic Interaction 251601
Carl M. Bender, Dorje C. Brody, and Hugh F. Jones

Neutrino Superfluidity 251801
J. I. Kapusta

Universality of Soft and Collinear Factors in Hard-Scattering Factorization 252001
John C. Collins and Andreas Metz

Nuclear Physics

Azimuthal Anisotropy and Correlations at Large Transverse Momenta in $p + p$ and Au + Au Collisions at $\sqrt{s_{NN}} = 200$ GeV 252301
J. Adams *et al.* (STAR Collaboration)

Atomic, Molecular, and Optical Physics

Correlated Multielectron Dynamics in Ultrafast Laser Pulse Interactions with Atoms 253001
A. Rudenko, K. Zrost, B. Feuerstein, V. L. de Jesus, C. D. Schröter, R. Moshammer, and J. Ullrich

Imaging the Translational Dynamics of CF_3 in Liquid Helium Droplets 253401
Andreas Braun and Marcel Drabbels

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.

Bistability between Different Localized Structures in Nonlinear Optics 253901
U. Bortolozzo, L. Pastur, P. L. Ramazza, M. Tlidi, and G. Kozyreff

Entrainment of Randomly Coupled Oscillator Networks by a Pacemaker 254101
Hiroshi Kori and Alexander S. Mikhailov

Spectral Statistics of a Quantum Interval-Exchange Map 254102
E. Bogomolny and C. Schmit

Retrieving the Elastodynamic Green's Function of an Arbitrary Inhomogeneous Medium by Cross Correlation 254301
Kees Wapenaar

Air Entrainment by a Viscous Jet Plunging into a Bath 254501
Élise Lorenceau, David Quéré, and Jens Eggers

Plasma and Beam Physics

Relativistic Generalization of the Landau Criterion as a New Foundation of the Vavilov-Cherenkov Radiation Theory 254801
S. G. Chefranov

Stationary Equilibria of Two Fluid Plasmas Having Significant, Internal, Static Electric Fields 255001
W. F. Edwards and E. D. Held

Synergy of Electron-Cyclotron and Lower-Hybrid Current Drive in Steady-State Plasmas 255002
G. Giruzzi, J. F. Artaud, R. J. Dumont, F. Imbeaux, P. Bibet, G. Berger-By, F. Bouquey, J. Clary, C. Darbos, A. Ekedahl, G. T. Hoang, M. Lennholm, P. Maget, R. Magne, J. L. Ségui, A. Bruschi, and G. Granucci

Condensed Matter: Structure, etc.

Energy Landscape Picture of Overaging and Rejuvenation in a Sheared Glass 255501
Daniel J. Lacks and Mark J. Osborne

Formation of Thermal Vacancies in Highly As and P Doped Si 255502
V. Ranki and K. Saarinen

Dynamics of the Magnetic and Structural α-ε Phase Transition in Iron 255503
O. Mathon, F. Baudelet, J. P. Itié, A. Polian, M. d'Astuto, J. C. Chervin, and S. Pascarelli

Theory of Carbon Nanocones: Mechanical Chiral Inversion of a Micron-Scale Three-Dimensional Object 255504
Stephen P. Jordan and Vincent H. Crespi

Lattice Vibrations and Electronic Transitions in the Rare-Earth Metals: Praseodymium under Pressure 255505
Helmut Olijnyk, Walter A. Grosshans, and Andrew P. Jephcoat

Ductile Bulk Metallic Glass 255506
Jan Schroers and William L. Johnson

(Continued on Preceding Page)

Percolation of Immobile Domains in Supercooled Thin Polymeric Films 255701
Arlette R. Baljon, Joris Billen, and Rajesh Khare
Anomalous Scaling at the Quantum Critical Point in Itinerant Antiferromagnets 255702
Ar. Abanov and A. Chubukov
Elastic Behavior of a Two-Dimensional Crystal Near Melting 255703
H. H. von Grünberg, P. Keim, K. Zahn, and G. Maret
Dynamical Scaling of the Structure Factor of Some Non-Euclidean Systems 255704
S. Mazumder, D. Sen, A. K. Patra, S. A. Khadilkar, R. M. Cursetji, R. Loidl, M. Baron, and H. Rauch
Brownian Dynamics in Fourier Space: Membrane Simulations over Long Length and Time Scales 256001
Lawrence C.-L. Lin and Frank L. Brown
Observation of Electronic States on Si(111)-(7 × 7) through Short-Range Attractive Force with Noncontact Atomic Force Spectroscopy 256101
T. Arai and M. Tomitori
Endotaxial Silicide Nanowires 256102
Zhian He, David J. Smith, and P. A. Bennett
Self-Organized Formation of Rhomboidal Nanopyramids on fcc(110) Metal Surfaces 256103
A. Molle, F. Buatier de Mongeot, A. Molinari, F. Xiaerding, C. Boragno, and U. Valbusa

Condensed Matter: Electronic Properties, etc.

Phase Diagram of Coulomb Interactions across the Metal-Insulator Transition in Si:B 256401
Mark Lee
Temperature and Magnetic-Field-Enhanced Hall Slope of a Dilute 2D Hole System in the Ballistic Regime 256402
X. P. Gao, G. S. Boebinger, A. P. Mills, Jr., A. P. Ramirez, L. N. Pfeiffer, and K. W. West
Glass Transition and the Coulomb Gap in Electron Glasses 256403
M. Müller and L. B. Ioffe
Quantum Phase Transitions in the Itinerant Ferromagnet $ZrZn_2$ 256404
M. Uhlarz, C. Pfleiderer, and S. M. Hayden
Inelastic Scattering and Local Heating in Atomic Gold Wires 256601
Thomas Frederiksen, Mads Brandbyge, Nicolás Lorente, and Antti-Pekka Jauho
Identification of Transverse Spin Currents in Noncollinear Magnetic Structures 256602
Jianwei Zhang, Peter M. Levy, Shufeng Zhang, and Vladimir Antropov
Cotunneling Spectroscopy in Few-Electron Quantum Dots 256801
D. M. Zumbühl, C. M. Marcus, M. P. Hanson, and A. C. Gossard
An Elastic "Sieve" to Probe Momentum Space: Gd Chains on W(110) 256802
O. Rader and A. M. Shikin
Effect of Dephasing on the Current Statistics of Mesoscopic Devices 256803
Marco G. Pala and Giuseppe Iannaccone
Propagation of Surface Plasmon Polaritons on Semiconductor Gratings 256804
J. Gómez Rivas, M. Kuttge, P. Haring Bolivar, H. Kurz, and J. A. Sánchez-Gil
Role of Surface Anisotropy for Magnetic Impurities in Electron Dephasing and Energy Relaxation and their Size Effect 256805
O. Újsághy, A. Jakovác, and A. Zawadowski
Subgap Density of States in Superconductor-Normal Metal Bilayers in the Cooper Limit 257001
Zhenyi Long, M. D. Stewart, Jr., Taejoon Kouh, and James M. Valles, Jr.
Experimental Evidence for Giant Vortex States in a Mesoscopic Superconducting Disk 257002
A. Kanda, B. J. Baelus, F. M. Peeters, K. Kadowaki, and Y. Ootuka
Pressure-Induced Quantum Phase Transition in the Spin-Liquid $TlCuCl_3$ 257201
Ch. Rüegg, A. Furrer, D. Sheptyakov, Th. Strässle, K. W. Krämer, H.-U. Güdel, and L. Mélési
Domain-Wall Induced Phase Shifts in Spin Waves 257202
Riccardo Hertel, Wulf Wulfhekel, and Jürgen Kirschner
Magnetic Domain Wall Propagation unto the Percolation Threshold across a Pseudorectangular Disordered Lattice .. 257203
J. P. Attané, Y. Samson, A. Marty, J. C. Toussaint, G. Dubois, A. Mougin, and J. P. Jamet

(Continued on Preceding Page)

Temperature Dependent Magnetic Anisotropy in Metallic Magnets from an *Ab Initio* Electronic Structure Theory: $L1_0$-Ordered FePt 257204
J. B. Staunton, S. Ostanin, S. S. Razee, B. L. Gyorffy, L. Szunyogh, B. Ginatempo, and Ezio Bruno
Phonon Superradiance and Phonon Laser Effect in Nanomagnets 257205
E. M. Chudnovsky and D. A. Garanin
Low-Temperature Broken-Symmetry Phases of Spiral Antiferromagnets 257206
Luca Capriotti and Subir Sachdev
Determination of the Orbital Polarization in $YTiO_3$ by Using Soft X-Ray Linear Dichroism 257207
F. Iga, M. Tsubota, M. Sawada, H. B. Huang, S. Kura, M. Takemura, K. Yaji, M. Nagira, A. Kimura, T. Jo, T. Takabatake, H. Namatame, and M. Taniguchi
Surface and Bulk Spin Ordering of Antiferromagnetic Materials: NiO(111) 257208
Antoine Barbier, Cristian Mocuta, Wolfgang Neubeck, Mattia Mulazzi, Flora Yakhou, Karine Chesnel, Albéric Sollier, Christian Vettier, and François de Bergevin
Experimental Evidence for Exciton Scaling Effects in Self-Assembled Molecular Wires 257401
P. G. Lagoudakis, M. M. de Souza, F. Schindler, J. M. Lupton, J. Feldmann, J. Wenus, and D. G. Lidzey
Photothermal Heterodyne Imaging of Individual Nonfluorescent Nanoclusters and Nanocrystals 257402
Stéphane Berciaud, Laurent Cognet, Gerhard A. Blab, and Brahim Lounis
Temperature and Field Dependence of the Order Parameter in the Antiferroquadrupolar Phase of CeB_6 from μ^+ Knight Shift Measurements 257601
A. Schenck, F. N. Gygax, G. Solt, O. Zaharko, and S. Kunii

Soft Matter, Biological, and Interdisciplinary Physics

Strain-Dependent Localization, Microscopic Deformations, and Macroscopic Normal Tensions in Model Polymer Networks 257801
Carsten Svaneborg, Gary S. Grest, and Ralf Everaers
Mode-Selective Dynamic Light Scattering Spectroscopy: Application to the Isotropic Phase of Liquid Crystals 257802
Shinsaku Takagi and Hajime Tanaka
Analytical Soft-Core Potentials for Macromolecular Fluids and Mixtures 257803
G. Yatsenko, E. J. Sambriski, M. A. Nemirovskaya, and M. Guenza
Stepwise Elastic Behavior in a Model Elastomer 257804
Dhananjay M. Bhawe, Claude Cohen, and Fernando A. Escobedo
Hydrodynamics within the Electric Double Layer on Slipping Surfaces 257805
Laurent Joly, Christophe Ybert, Emmanuel Trizac, and Lydéric Bocquet
Droplets of Fine Powders Running Uphill by Vertical Vibration 258001
Leonardo Caballero and Francisco Melo
Nonlinear Structures and Thermodynamic Instabilities in a One-Dimensional Lattice System 258101
Nikos Theodorakopoulos, Michel Peyrard, and Robert S. MacKay
Fluid Vesicles with Viscous Membranes in Shear Flow 258102
Hiroshi Noguchi and Gerhard Gompper
High-Fidelity DNA Sensing by Protein Binding Fluctuations 258103
Tsvi Tlusty, Roy Bar-Ziv, and Albert Libchaber
Dendritic Branching and Homogenization of Actin Networks Mediated by Arp2/3 Complex 258104
Yiider Tseng and Denis Wirtz
Routes to Gelation in a Clay Suspension 258301
B. Ruzicka, L. Zulian, and G. Ruocco

Comments

Comment on "Geometrical Dependence of High-Bias Current in Multiwalled Carbon Nanotubes" 259701
W. A. de Heer, P. Poncharal, and C. Berger
Bachtold and Bourlon Reply 259702
A. Bachtold and B. Bourlon

(Continued on Preceding Page)

Errata

Publisher's Note: Lattice Dynamics and Electron-Phonon Interaction in (3, 3) Carbon Nanotubes [Phys. Rev. Lett. **93**, 245501 (2004)] 259901
K.-P. Bohnen, R. Heid, H. J. Liu, and C. T. Chan

Publisher's Note: Angular Distributions for ${}^{3,4}_{\Lambda}$H Bound States in the ^{3,4}He$(e, e'K^+)$ Reaction [Phys. Rev. Lett. **93**, 242501 (2004)] 259902
F. Dohrmann *et al.*

Physical Review Focus

Brief explanations of selected papers from this and other APS journals appear regularly at the *Phys. Rev. Focus* web site (http://focus.aps.org). Readers can also sign up for weekly e-mail summaries of *Focus* stories.