

Calculated momentum distribution for the strong-field ionization of atomic hydrogen by a three-cycle laser pulse. The distribution rotates with the phase of the pulse. See article 093001.

# PHYSICAL REVIEW LETTERS

*Contents*

*Articles published 26 August–1 September 2006*

VOLUME 97, NUMBER 9 1 September 2006

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

Can One Count the Shape of a Drum? ..... 090201
Sven Gnutzmann, Panos D. Karageorge, and Uzy Smilansky
Bosonic Molecules in Rotating Traps ..... 090401
Igor Romanovsky, Constantine Yannouleas, Leslie O. Baksmaty, and Uzi Landman
Intermediate-Temperature Superfluidity in an Atomic Fermi Gas with Population Imbalance ..... 090402
Chih-Chun Chien, Qijin Chen, Yan He, and K. Levin
Methods for Scalable Optical Quantum Computation ..... 090501
Tal Mor and Nadav Yoran
Globally Controlled Quantum Wires for Perfect Qubit Transport, Mirroring, and Computing ..... 090502
Joseph Fitzsimons and Jason Twamley
Toy Model of Hydrodynamic Fluctuations ..... 090601
Hans Christian Öttinger
Active Nematics Are Intrinsically Phase Separated ..... 090602
Shradha Mishra and Sriram Ramaswamy
Reconstruction of Complex Dynamical Systems Affected by Strong Measurement Noise ..... 090603
Frank Böttcher, Joachim Peinke, David Kleinhans, Rudolf Friedrich, Pedro G. Lind, and Maria Haase

**Gravitation and Astrophysics**

Neutrino Signals from the Formation of a Black Hole: A Probe of the Equation of State of Dense Matter ..... 091101
K. Sumiyoshi, S. Yamada, H. Suzuki, and S. Chiba
Measuring the Primordial Deuterium Abundance during the Cosmic Dark Ages ..... 091301
Kris Sigurdson and Steven R. Furlanetto

**Elementary Particles and Fields**

Holographic Phase Transitions with Fundamental Matter ..... 091601
David Mateos, Robert C. Myers, and Rowan M. Thomson

**Nuclear Physics**

Low-Energy Dynamics in Ultradegenerate QCD Matter ..... 092301
Thomas Schäfer and Kai Schwenzer
Reduction of the Spin-Orbit Splittings at the $N = 28$ Shell Closure ..... 092501
L. Gaudefroy, O. Sorlin, D. Beaumel, Y. Blumenfeld, Z. Dombrádi, S. Fortier, S. Franchoo, M. Gélin, J. Gibelin, S. Grévy, F. Hammache, F. Ibrahim, K. W. Kemper, K.-L. Kratz, S. M. Lukyanov, C. Monrozeau, L. Nalpas, F. Nowacki, A. N. Ostrowski, T. Otsuka, Yu.-E. Penionzhkevich, J. Piekarewicz, E. C. Pollacco, P. Roussel-Chomaz, E. Rich, J. A. Scarpaci, M. G. St. Laurent, D. Sohler, M. Stanoiu, T. Suzuki, E. Tryggestad, and D. Verney

*(Continued on Third Cover)*

**Copyright 2006 by The American Physical Society**

0031-9007(20060901)97:9;1-S

Enhanced Effect of Temporal Variation of the Fine Structure Constant and the Strong Interaction in $^{229}$Th ..... 092502
V. V. Flambaum

**Atomic, Molecular, and Optical Physics**

Symmetry of Carrier-Envelope Phase Difference Effects in Strong-Field, Few-Cycle Ionization of Atoms and Molecules ..... 093001
Christian Per Martiny and Lars Bojer Madsen

Low Velocity Quantum Reflection of Bose-Einstein Condensates ..... 093201
T. A. Pasquini, M. Saba, G.-B. Jo, Y. Shin, W. Ketterle, D. E. Pritchard, T. A. Savas, and N. Mulders

Unexpected Higher-Order Effects in Charged Particle Impact Ionization at High Energies ..... 093202
M. Foster, J. L. Peacher, M. Schulz, D. H. Madison, Zhangjin Chen, and H. R. Walters

Spontaneous Emission of an Atom in a Cavity with Nonorthogonal Eigenmodes ..... 093601
Yuh-Jen Cheng

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

Stable Control of Pulse Speed in Parametric Three-Wave Solitons ..... 093901
Antonio Degasperis, Matteo Conforti, Fabio Baronio, and Stefan Wabnitz

Mode-Coupling Control in Resonant Devices: Application to Solid-State Ring Lasers ..... 093902
Sylvain Schwartz, Gilles Feugnet, Philippe Bouyer, Evguenii Lariontsev, Alain Aspect, and Jean-Paul Pocholle

Bistable Phase Locking of a Nonlinear Optical Cavity via Rocking: Transmuting Vortices into Phase Patterns ..... 093903
Adolfo Esteban-Martín, Manuel Martínez-Quesada, Victor B. Taranenko, Eugenio Roldán, and Germán J. de Valcárcel

Scarring by Homoclinic and Heteroclinic Orbits ..... 094101
D. A. Wisniacki, E. Vergini, R. M. Benito, and F. Borondo

Characterizing the Dynamical Importance of Network Nodes and Links ..... 094102
Juan G. Restrepo, Edward Ott, and Brian R. Hunt

Thermal Rectification in Billiardlike Systems ..... 094301
Jean-Pierre Eckmann and Carlos Mejía-Monasterio

Instability and Evolution of Nonlinearly Interacting Water Waves ..... 094501
P. K. Shukla, I. Kourakis, B. Eliasson, M. Marklund, and L. Stenflo

Cavitation Bubble Dynamics inside Liquid Drops in Microgravity ..... 094502
D. Obreschkow, P. Kobel, N. Dorsaz, A. de Bosset, C. Nicollier, and M. Farhat

**Plasma and Beam Physics**

Trapped-Particle-Mediated Collisional Damping of Nonaxisymmetric Plasma Waves ..... 095001
A. A. Kabantsev and C. F. Driscoll

Observation of Instability-Induced Current Redistribution in a Spherical-Torus Plasma ..... 095002
J. E. Menard, R. E. Bell, D. A. Gates, S. M. Kaye, B. P. LeBlanc, F. M. Levinton, S. S. Medley, S. A. Sabbagh, D. Stutman, K. Tritz, and H. Yuh

Experimental Confirmation of Stable, Small-Debye-Length, Pure-Electron-Plasma Equilibria in a Stellarator ..... 095003
J. P. Kremer, T. Sunn Pedersen, R. G. Lefrancois, and Q. Marksteiner

Surface Acceleration of Fast Electrons with Relativistic Self-Focusing in Preformed Plasma ..... 095004
H. Habara, K. Adumi, T. Yabuuchi, T. Nakamura, Z. L. Chen, M. Kashihara, R. Kodama, K. Kondo, G. R. Kumar, L. A. Lei, T. Matsuoka, K. Mima, and K. A. Tanaka

**Condensed Matter: Structure, etc.**

Exotic Behavior of Hydrogen Atoms in Solid $H_2$ at Temperatures below 1 K ..... 095301
J. Ahokas, J. Järvinen, V. V. Khmelenko, D. M. Lee, and S. Vasiliev

Bulk-Driven Nonequilibrium Phase Transitions in a Mesoscopic Ring ..... 095701
Hauke Hinsch and Erwin Frey

Cooperativity beyond Caging: Generalized Mode-Coupling Theory ..... 095702
Peter Mayer, Kunimasa Miyazaki, and David R. Reichman

*(Continued on Preceding Page)*

Nonlinear Dielectric Response and Thermodynamic Heterogeneity in Liquids ..... 095703
Ranko Richert and Susan Weinstein
How Does Crystalline Substrate Plasticity Modify Thin Film Buckling? ..... 096101
Frédéric Foucher, Christophe Coupeau, Jérôme Colin, Alain Cimetière, and Jean Grilhé
Continuum Theory of Nanostructure Decay Via a Microscale Condition ..... 096102
Dionisios Margetis, Pak-Wing Fok, Michael J. Aziz, and Howard A. Stone

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

Excitonic Effects and Optical Properties of Passivated CdSe Clusters ..... 096401
Marie Lopez del Puerto, Murilo L. Tiago, and James R. Chelikowsky
Energy- and Momentum-Resolved Exchange and Spin-Orbit Interaction in Cobalt Film by Spin-Polarized Two-Electron Spectroscopy ..... 096402
S. Samarin, O. M. Artamonov, A. D. Sergeant, R. Stamps, and J. F. Williams
Coulomb Blockade and Transport in a Chain of One-Dimensional Quantum Dots ..... 096601
Michael M. Fogler, Sergey V. Malinin, and Thomas Nattermann
Controlled Flow of Spin-Entangled Electrons via Adiabatic Quantum Pumping ..... 096602
Kunal K. Das, Sungjun Kim, and Ari Mizel
Zero-Field Kondo Splitting and Quantum-Critical Transition in Double Quantum Dots ..... 096603
Luis G. Dias da Silva, Nancy P. Sandler, Kevin Ingersent, and Sergio E. Ulloa
Optical Conductivity of a Two-Dimensional Electron Liquid with Spin-Orbit Interaction ..... 096604
Abdel-Khalek Farid and Eugene G. Mishchenko
Generating Spin Currents in Semiconductors with the Spin Hall Effect ..... 096605
V. Sih, W. H. Lau, R. C. Myers, V. R. Horowitz, A. C. Gossard, and D. D. Awschalom
First-Principles Calculation of Alloy Scattering in $Ge_xSi_{1-x}$ ..... 096606
F. Murphy-Armando and S. Fahy
Resonantly Enhanced Nonlinear Conductance in Long Quantum Point Contacts near Pinch-Off ..... 096801
T. Morimoto, M. Henmi, R. Naito, K. Tsubaki, N. Aoki, J. P. Bird, and Y. Ochiai
Phase-Charge Duality of a Josephson Junction in a Fluctuating Electromagnetic Environment ..... 096802
S. Corlevi, W. Guichard, F. W. Hekking, and D. B. Haviland
Variable Orbital Coupling in a Two-Dimensional Quantum-Dot Solid Probed on a Local Scale ..... 096803
Peter Liljeroth, Karin Overgaag, Ana Urbieta, Bruno Grandider, Stephen G. Hickey, and Daniël Vanmaekelbergh
Electron-Magnon Coupling and Nonlinear Tunneling Transport in Magnetic Nanoparticles ..... 096804
Ł. Michalak, C. M. Canali, and V. G. Benza
Spin Excitations in Fluctuating Stripe Phases of Doped Cuprate Superconductors ..... 097001
Matthias Vojta, Thomas Vojta, and Ribhu K. Kaul
Low-Energy Electrodynamics of Superconducting Diamond ..... 097002
M. Ortolani, S. Lupi, L. Baldassarre, U. Schade, P. Calvani, Y. Takano, M. Nagao, T. Takenouchi, and H. Kawarada
Organometallic Benzene-Vanadium Wire: A One-Dimensional Half-Metallic Ferromagnet ..... 097201
Volodymyr V. Maslyuk, Alexei Bagrets, Velimir Meded, Andreas Arnold, Ferdinand Evers, Mads Brandbyge, Thomas Bredow, and Ingrid Mertig
Interface Coupling Transition in a Thin Epitaxial Antiferromagnetic Film Interacting with a Ferromagnetic Substrate 097202
M. Finazzi, A. Brambilla, P. Biagioni, J. Graf, G.-H. Gweon, A. Scholl, A Lanzara, and L. Duò
Ferroelectric Polarization Flop in a Frustrated Magnet $MnWO_4$ Induced by a Magnetic Field ..... 097203
K. Taniguchi, N. Abe, T. Takenobu, Y. Iwasa, and T. Arima
Lattice Disorder and Size-Induced Kondo Behavior in $CeAl_2$ and $CePt_{2+x}$ ..... 097204
S.-W. Han, C. H. Booth, E. D. Bauer, P. H. Huang, Y. Y. Chen, and J. M. Lawrence
Spin Transfer in Magnetic Tunnel Junctions with Hot Electrons ..... 097205
Peter M Levy and Albert Fert
Long-Range Spin-Qubit Interaction Mediated by Microcavity Polaritons ..... 097401
G. F. Quinteiro, J. Fernández-Rossier, and C. Piermarocchi

*(Continued on Preceding Page)*

Dominant Effect of Polariton-Polariton Interactions on the Coherence of the Microcavity Optical Parametric Oscillator ..... 097402
D. N. Krizhanovskii, D. Sanvitto, A. P. Love, M. S. Skolnick, D. M. Whittaker, and J. S. Roberts

**Soft Matter, Biological, and Interdisciplinary Physics**

Attraction Between Like-Charged Walls: Short-Ranged Simulations Using Local Molecular Field Theory ..... 097801
Jocelyn M. Rodgers, Charanbir Kaur, Yng-Gwei Chen, and John D. Weeks
Vortex Flow in Freestanding Smectic Films Driven by Elastic Relaxation of the *c* Director ..... 097802
Ralf Stannarius, Christian Bohley, and Alexey Eremin
Superlattice Formation in a Binary Mixture of Block Copolymer Micelles ..... 097803
Sayeed Abbas and Timothy P. Lodge
Stall, Spiculate, or Run Away: The Fate of Fibers Growing towards Fluctuating Membranes ..... 098101
D. R. Daniels, D. Marenduzzo, and M. S. Turner
Fisher Information for Spike-Based Population Decoding ..... 098102
Taro Toyoizumi, Kazuyuki Aihara, and Shun-ichi Amari
Negative Tension Induced by Lipid Uptake ..... 098103
Jérôme Solon, Jacques Pécréaux, Philippe Girard, Marie-Claude Fauré, Jacques Prost, and Patricia Bassereau
Nanophase-Separated Synchronizing Structure with Parallel Double Periodicity from an Undecablock Terpolymer ... 098301
Jun Masuda, Atsushi Takano, Yutaka Nagata, Atsushi Noro, and Yushu Matsushita
Additive Decomposition of Shear Strength in Cohesive Granular Media from Grain-Scale Interactions ..... 098302
Alfredo Taboada, Nicolas Estrada, and Farhang Radjaï
Screening and Fundamental Length Scales in Semidilute Na-DNA Aqueous Solutions ..... 098303
S. Tomić, T. Vuletić, S. Dolanski Babić, S. Krča, D. Ivanković, L. Griparić, and R. Podgornik
Measuring the Force of Interaction between a Metallic Probe and a Single Molecule ..... 098304
B. Naydenov, P. Ryan, L. C. Teague, and John J. Boland

**Errata**

Publisher's Note: AMANDA Observations Constrain the Ultrahigh Energy Neutrino Flux [Phys. Rev. Lett. **97**, 071101 (2006)] ..... 099901
Francis Halzen and Dan Hooper

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.