

PHYSICAL REVIEW LETTERS

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HIGHLIGHTED ARTICLES

Featured in Physics Editors' Suggestion

Two Fermions in a Double Well: Exploring a Fundamental Building Block of the Hubbard Model

Simon Murmann, Andrea Bergschneider, Vincent M. Klinkhamer, Gerhard Zürn, Thomas Lompe, and Selim Jochim

Phys. Rev. Lett. **114**, 080402 (2015) – Published 23 February 2015

A simple system consisting of a pair of atoms in a two-site “minicrystal” is able to reproduce the physics of a widely used model of electrons in a solid.

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Possible Indication of Momentum-Dependent Asymmetric Dark Matter in the Sun

Aaron C. Vincent, Pat Scott, and Aldo Serenelli

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The presence of a certain type of dark matter in the Sun’s core may solve discrepancies between standard solar models and observations.

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Microwave Quantum Illumination

Shabir Barzanjeh, Saikat Guha, Christian Weedbrook, David Vitali, Jeffrey H. Shapiro, and Stefano Pirandola

Phys. Rev. Lett. **114**, 080503 (2015) – Published 27 February 2015

A proposed device would extend a quantum entanglement scheme previously demonstrated for visible photons into the microwave regime, where it could boost radar performance.

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Gravitational Casimir Effect

James Q. Quach

Phys. Rev. Lett. **114**, 081104 (2015) – Published 25 February 2015

Evidence that gravitational waves induce an attractive force between two closely spaced mirrors could confirm gravity’s quantum nature.

Editors' Suggestion

Quantum Thermodynamics: A Nonequilibrium Green's Function Approach

Massimiliano Esposito, Maicol A. Ochoa, and Michael Galperin

Phys. Rev. Lett. **114**, 080602 (2015) – Published 25 February 2015

A thermodynamic description for an open quantum system coupled to its surroundings is provided using nonequilibrium Green's functions.

Editors' Suggestion

Turbulent Black Holes

Huan Yang, Aaron Zimmerman, and Luis Lehner

Phys. Rev. Lett. **114**, 081101 (2015) – Published 23 February 2015

A rapidly rotating black hole can have a horizon instability, where certain modes become excited and grow. The behavior is analogous to turbulence in high Reynolds number fluids.

Editors' Suggestion

Observing Inflationary Reheating

Jérôme Martin, Christophe Ringeval, and Vincent Vennin

Phys. Rev. Lett. **114**, 081303 (2015) – Published 26 February 2015

Recently available high-precision measurements of the cosmic microwave background constrain the kinematic properties of the reheating era for most of the inflationary scenarios proposed so far.

Editors' Suggestion

Search for Higgs Boson Pair Production in the $\gamma\gamma b\bar{b}$ Final State Using pp Collision Data at $s\sqrt{=8}$ TeV from the ATLAS Detector

G. Aad *et al.* (ATLAS Collaboration)

Phys. Rev. Lett. **114**, 081802 (2015) – Published 26 February 2015

A search for new physics in production of a pair of Higgs bosons finds a modest excess of events, 2.4 standard deviations above the background-only hypothesis.

LETTERS

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

Tensor Representation of Spin States

O. Giraud, D. Braun, D. Baguette, T. Bastin, and J. Martin

Phys. Rev. Lett. **114**, 080401 (2015) – Published 25 February 2015

Featured in Physics Editors' Suggestion

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Simon Murmann, Andrea Bergschneider, Vincent M. Klinkhamer, Gerhard Zürn, Thomas Lompe, and Selim Jochim

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A simple system consisting of a pair of atoms in a two-site “minicrystal” is able to reproduce the physics of a widely used model of electrons in a solid.

Systematic Errors in Current Quantum State Tomography Tools

Christian Schwemmer, Lukas Knips, Daniel Richart, Harald Weinfurter, Tobias Moroder, Matthias Kleinmann, and Otfried Gühne

Phys. Rev. Lett. **114**, 080403 (2015) – Published 26 February 2015

High-Contrast Qubit Interactions Using Multimode Cavity QED

David C. McKay, Ravi Naik, Philip Reinhold, Lev S. Bishop, and David I. Schuster

Phys. Rev. Lett. **114**, 080501 (2015) – Published 27 February 2015

Efficient Synthesis of Universal Repeat-Until-Success Quantum Circuits

Alex Bocharov, Martin Roetteler, and Krysta M. Svore

Phys. Rev. Lett. **114**, 080502 (2015) – Published 27 February 2015

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Exact Overlaps in the Kondo Problem

Sergei L. Lukyanov, Hubert Saleur, Jesper L. Jacobsen, and Romain Vasseur

Phys. Rev. Lett. **114**, 080601 (2015) – Published 24 February 2015

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Gravitation and Astrophysics

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Orbital Resonances Around Black Holes

Jeandrew Brink, Marisa Geyer, and Tanja Hinderer

Phys. Rev. Lett. **114**, 081102 (2015) – Published 23 February 2015

Effective Potentials and Morphological Transitions for Binary Black Hole Spin Precession

Michael Kesden, Davide Gerosa, Richard O'Shaughnessy, Emanuele Berti, and Ulrich Sperhake

Phys. Rev. Lett. **114**, 081103 (2015) – Published 24 February 2015

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Gravitational Casimir Effect

James Q. Quach

Phys. Rev. Lett. **114**, 081104 (2015) – Published 25 February 2015

Evidence that gravitational waves induce an attractive force between two closely spaced mirrors could confirm gravity's quantum nature.

Constraints on an Annihilation Signal from a Core of Constant Dark Matter Density around the Milky Way Center with H.E.S.S.

A. Abramowski *et al.* (H.E.S.S. Collaboration)

Phys. Rev. Lett. **114**, 081301 (2015) – Published 24 February 2015

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Elementary Particles and Fields

Simulation of Black Hole Collisions in Asymptotically Anti-de Sitter Spacetimes

Hans Bantilan and Paul Romatschke

Phys. Rev. Lett. **114**, 081601 (2015) – Published 23 February 2015

Study of CP Asymmetry in B_0-B^0 Mixing with Inclusive Dilepton Events

J.P. Lees *et al.* (BABAR Collaboration)

Phys. Rev. Lett. **114**, 081801 (2015) – Published 25 February 2015

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Static Quark-Antiquark Potential in the Quark-Gluon Plasma from Lattice QCD

Yannis Burnier, Olaf Kaczmarek, and Alexander Rothkopf

Phys. Rev. Lett. **114**, 082001 (2015) – Published 23 February 2015

New Limits on Intrinsic Charm in the Nucleon from Global Analysis of Parton Distributions

P. Jimenez-Delgado, T.J. Hobbs, J.T. Londergan, and W. Melnitchouk

Phys. Rev. Lett. **114**, 082002 (2015) – Published 27 February 2015

Nuclear Physics

Ballistic Protons in Incoherent Exclusive Vector Meson Production as a Measure of Rare Parton Fluctuations at an Electron-Ion Collider

T. Lappi, H. Mäntysaari, and R. Venugopalan

Phys. Rev. Lett. **114**, 082301 (2015) – Published 25 February 2015

Transverse Wobbling in Pr^{135}

J.T. Matta *et al.*

Phys. Rev. Lett. **114**, 082501 (2015) – Published 23 February 2015

Power Counting of Contact-Range Currents in Effective Field Theory

M. Pavón Valderrama and D.R. Phillips

Phys. Rev. Lett. **114**, 082502 (2015) – Published 27 February 2015

Atomic, Molecular, and Optical Physics

Tunneling Dynamics in Multiphoton Ionization and Attoclock Calibration

Michael Klaiber, Karen Z. Hatsagortsyan, and Christoph H. Keitel

Phys. Rev. Lett. **114**, 083001 (2015) – Published 23 February 2015

Disorder-Induced Localization in a Strongly Correlated Atomic Hubbard Gas

S.S. Kondov, W.R. McGehee, W. Xu, and B. DeMarco

Phys. Rev. Lett. **114**, 083002 (2015) – Published 26 February 2015

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.

Theory for the Spatiotemporal Dynamics of Domain Walls close to a Nonequilibrium Ising-Bloch Transition

Damià Gomila, Pere Colet, and Daniel Walgraef

Phys. Rev. Lett. **114**, 084101 (2015) – Published 27 February 2015

Reduction of $SO(2)$ Symmetry for Spatially Extended Dynamical Systems

Nazmi Burak Budanur, Predrag Cvitanović, Ruslan L. Davidchack, and Evangelos Siminos

Phys. Rev. Lett. **114**, 084102 (2015) – Published 27 February 2015

Plasma and Beam Physics

Multichromatic Narrow-Energy-Spread Electron Bunches from Laser-Wakefield Acceleration with Dual-Color Lasers

M. Zeng, M. Chen, L.L. Yu, W.B. Mori, Z.M. Sheng, B. Hidding, D.A. Jaroszynski, and J. Zhang

Phys. Rev. Lett. **114**, 084801 (2015) – Published 24 February 2015

Suppression of Laser Nonuniformity Imprinting Using a Thin High-Z Coating

Max Karasik, J.L. Weaver, Y. Aglitskiy, J. Oh, and S.P. Obenschain

Phys. Rev. Lett. **114**, 085001 (2015) – Published 26 February 2015

Statistical Simulation of the Magnetorotational Dynamo

J. Squire and A. Bhattacharjee

Phys. Rev. Lett. **114**, 085002 (2015) – Published 26 February 2015

Simultaneous Acceleration of Protons and Electrons at Nonrelativistic Quasiparallel Collisionless Shocks

Jaehong Park, Damiano Caprioli, and Anatoly Spitkovsky

Phys. Rev. Lett. **114**, 085003 (2015) – Published 27 February 2015

Finding the Elusive $E \times B$ Staircase in Magnetized Plasmas

G. Dif-Pradalier, G. Hornung, Ph. Ghendrih, Y. Sarazin, F. Clairet, L. Vermare, P.H. Diamond, J. Abiteboul, T. Cartier-Michaud, C. Ehrlacher, D. Estève, X. Garbet, V. Grandgirard, Ö.D. Gürçan, P. Hennequin, Y. Kosuga, G. Latu, P. Maget, P. Morel, C. Norscini, R. Sabot, and A. Storelli

Phys. Rev. Lett. **114**, 085004 (2015) – Published 27 February 2015

Condensed Matter: Structure, etc.

Wetting Transition for Carbon Nanotube Arrays under Metal Contacts

V. Perebeinos and J. Tersoff

Phys. Rev. Lett. **114**, 085501 (2015) – Published 27 February 2015

Condensed Matter: Electronic Properties, etc.

Pressure-Induced Valence Crossover and Novel Metamagnetic Behavior near the Antiferromagnetic Quantum Phase Transition of $YbNi_3Ga_9$

K. Matsubayashi, T. Hirayama, T. Yamashita, S. Ohara, N. Kawamura, M. Mizumaki, N. Ishimatsu, S. Watanabe, K. Kitagawa, and Y. Uwatoko

Phys. Rev. Lett. **114**, 086401 (2015) – Published 24 February 2015

Impact of Electron-Hole Correlations on the $1T-TiSe_2$ Electronic Structure

G. Monney, C. Monney, B. Hildebrand, P. Aebi, and H. Beck

Phys. Rev. Lett. **114**, 086402 (2015) – Published 24 February 2015

Crossover from Super- to Subdiffusive Motion and Memory Effects in Crystalline Organic Semiconductors

G. De Filippis, V. Cataudella, A.S. Mishchenko, N. Nagaosa, A. Fierro, and A. de Candia

Phys. Rev. Lett. **114**, 086601 (2015) – Published 24 February 2015

Oscillatory Behavior of Vortex-Lattice Melting Transition Line in Mesoscopic $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+y}$ Superconductors

S. Ooi, T. Mochiku, M. Tachiki, and K. Hirata

Phys. Rev. Lett. **114**, 087001 (2015) – Published 27 February 2015

Surface Aligned Magnetic Moments and Hysteresis of an Endohedral Single-Molecule Magnet on a Metal

Rasmus Westerström, Anne-Christine Uldry, Roland Stania, Jan Dreiser, Cinthia Piamonteze, Matthias Muntwiler, Fumihiko Matsui, Stefano Rusponi, Harald Brune, Shangfeng Yang, Alexey Popov, Bernd Büchner, Bernard Delley, and Thomas Greber

Phys. Rev. Lett. **114**, 087201 (2015) – Published 23 February 2015

Magnetic Moments of Chromium-Doped Gold Clusters: The Anderson Impurity Model in Finite Systems

K. Hirsch, V. Zamudio-Bayer, A. Langenberg, M. Niemeyer, B. Langbehn, T. Möller, A. Terasaki, B.v. Issendorff, and J.T. Lau

Phys. Rev. Lett. **114**, 087202 (2015) – Published 25 February 2015

Magnon-Driven Domain-Wall Motion with the Dzyaloshinskii-Moriya Interaction

Weiwei Wang, Maximilian Albert, Marijan Beg, Marc-Antonio Bisotti, Dmitri Chernyshenko, David Cortés-Ortuño, Ian Hawke, and Hans Fangohr

Phys. Rev. Lett. **114**, 087203 (2015) – Published 26 February 2015

Hole Properties On and Off Magnetization Plateaus in 2D Antiferromagnets

Imam Makhfudz and Pierre Pujol

Phys. Rev. Lett. **114**, 087204 (2015) – Published 27 February 2015

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K. Suzuki, B. Barbiellini, Y. Orikasa, N. Go, H. Sakurai, S. Kaprzyk, M. Itou, K. Yamamoto, Y. Uchimoto, Yung Jui Wang, H. Hafiz, A. Bansil, and Y. Sakurai

Phys. Rev. Lett. **114**, 087401 (2015) – Published 25 February 2015

Intrinsic Circular Polarization in Centrosymmetric Stacks of Transition-Metal Dichalcogenide Compounds

Qihang Liu, Xiuwen Zhang, and Alex Zunger

Phys. Rev. Lett. **114**, 087402 (2015) – Published 27 February 2015

Polymer, Soft Matter, Biological, and Interdisciplinary Physics

Transition to Chaos in Random Networks with Cell-Type-Specific Connectivity

Johnatan Aljadeff, Merav Stern, and Tatyana Sharpee

Phys. Rev. Lett. **114**, 088101 (2015) – Published 23 February 2015

Pressure-Driven Suspension Flow near Jamming

Sangwon Oh, Yi-qiao Song, Dmitry I. Garagash, Brice Lecampion, and Jean Desroches

Phys. Rev. Lett. **114**, 088301 (2015) – Published 23 February 2015

Snapshots of the Fluctuating Hydrogen Bond Network in Liquid Water on the Sub-Femtosecond Timescale with Vibrational Resonant Inelastic x-ray Scattering

A. Pietzsch, F. Hennies, P.S. Miedema, B. Kennedy, J. Schlappa, T. Schmitt, V.N. Strocov, and A. Föhlisch

Phys. Rev. Lett. **114**, 088302 (2015) – Published 24 February 2015

Ionic Current Inversion in Pressure-Driven Polymer Translocation through Nanopores

Sahin Buyukdagli, Ralf Blossey, and T. Ala-Nissila

Phys. Rev. Lett. **114**, 088303 (2015) – Published 26 February 2015

Foreshock and Aftershocks in Simple Earthquake Models

J. Kazemian, K.F. Tiampo, W. Klein, and R. Dominguez

Phys. Rev. Lett. **114**, 088501 (2015) – Published 25 February 2015

Endogenous Crisis Waves: Stochastic Model with Synchronized Collective Behavior

Stanislao Gualdi, Jean-Philippe Bouchaud, Giulia Cencetti, Marco Tarzia, and Francesco Zamponi

Phys. Rev. Lett. **114**, 088701 (2015) – Published 27 February 2015

COMMENTS

Comment on “Counterintuitive Dispersion Violating Kramers-Kronig Relations in Gain Slabs”

D.G. Baranov, A.A. Zyablovsky, A.V. Dorofeenko, A.P. Vinogradov, and A.A. Lisyansky

Phys. Rev. Lett. **114**, 089301 (2015) – Published 26 February 2015

Wang et al. Reply

Li-Gang Wang, Lin Wang, M. Al-Amri, Shi-Yao Zhu, and M. Suhail Zubairy

Phys. Rev. Lett. **114**, 089302 (2015) – Published 26 February 2015

ERRATA

*Publisher's Note: Longitudinal Target-Spin Asymmetries for Deeply Virtual Compton Scattering [Phys. Rev. Lett. **114**, 032001 (2015)]*

E. Seder *et al.* (CLAS Collaboration)

Phys. Rev. Lett. **114**, 089901 (2015) – Published 25 February 2015