

Volume 114, Issue 3 23 January 2015

HIGHLIGHTED ARTICLES

Featured in Physics **Editors' Suggestion**

Holographic Generation of Highly Twisted Electron Beams

Vincenzo Grillo, Gian Carlo Gazzadi, Erfan Mafakheri, Stefano Frabboni, Ebrahim Karimi, and Robert W. Boyd

Phys. Rev. Lett. **114**, 034801 (2015) – Published 23 January 2015

Researchers generated an electron beam with very high orbital angular momentum—potentially good for atomic-scale images of the magnetism in materials.

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Acoustic Black Hole in a Stationary Hydrodynamic Flow of Microcavity Polaritons

H. S. Nguyen, D. Gerace, I. Carusotto, D. Sanvitto, E. Galopin, A. Lemaître, I. Sagnes, J. Bloch, and A. Amo

Phys. Rev. Lett. **114**, 036402 (2015) – Published 22 January 2015

The flow of hybrid electron-photon states through a black-hole-like “acoustic horizon” may produce an observable signature of Hawking radiation.

Editors' Suggestion

Sound Velocity Bound and Neutron Stars

Paulo Bedaque and Andrew W. Steiner

Phys. Rev. Lett. **114**, 031103 (2015) – Published 21 January 2015

A conjectured bound on the nonrelativistic sound velocity may be violated in a massive enough neutron star.

Editors' Suggestion

Quasiparticle Interference, Quasiparticle Interactions, and the Origin of the Charge Density Wave in 2H-NbSe₂

C.J. Arguello, E.P. Rosenthal, E.F. Andrade, W. Jin, P.C. Yeh, N. Zaki, S. Jia, R.J. Cava, R.M. Fernandes, A.J. Millis, T. Valla, R.M. Osgood, Jr., and A.N. Pasupathy

Phys. Rev. Lett. **114**, 037001 (2015) – Published 21 January 2015

Photoemission and tunneling measurements show that the charge-density wave in 2H-NbSe₂ is governed by quasiparticles coupling to phonon modes.

Editors' Suggestion

Critical Casimir Forces and Colloidal Phase Transitions in a Near-Critical Solvent: A Simple Model Reveals a Rich Phase Diagram

John R. Edison, Nikos Tasios, Simone Belli, Robert Evans, René van Roij, and Marjolein Dijkstra

Phys. Rev. Lett. **114**, 038301 (2015) – Published 21 January 2015

Computer simulations of the phase behavior of dense colloidal suspensions in a near-critical solvent show that the solvent mediated interactions can drive colloidal gas-liquid and fluid-solid phase transitions.

Editors' Suggestion

Explosive Synchronization in Adaptive and Multilayer Networks

Xiyun Zhang, Stefano Boccaletti, Shuguang Guan, and Zonghua Liu

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In networks of coupled oscillators, the condition for explosive synchronization is shown not be correlations between the networks' nodes, but rather that giant synchronized cluster formation is suppressed.

LETTERS

Gravitation and Astrophysics

Classifying Linearly Shielded Modified Gravity Models in Effective Field Theory

Lucas Lombriser and Andy Taylor

Phys. Rev. Lett. **114**, 031101 (2015) – Published 22 January 2015

Disordered Nuclear Pasta, Magnetic Field Decay, and Crust Cooling in Neutron Stars

C.J. Horowitz, D.K. Berry, C.M. Briggs, M.E. Caplan, A. Cumming, and A.S. Schneider

Phys. Rev. Lett. **114**, 031102 (2015) – Published 22 January 2015

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A conjectured bound on the nonrelativistic sound velocity may be violated in a massive enough neutron star.

Emergent Gravity Requires Kinematic Nonlocality

Donald Marolf

Phys. Rev. Lett. **114**, 031104 (2015) – Published 22 January 2015

Gravitational Wave Consistency Relations for Multifield Inflation

Layne C. Price, Hiranya V. Peiris, Jonathan Frazer, and Richard Easther

Phys. Rev. Lett. **114**, 031301 (2015) – Published 22 January 2015

Elementary Particles and Fields

Field-Theory Representation of Gauge-Gravity Symmetry-Protected Topological Invariants, Group Cohomology, and Beyond

Juven C. Wang, Zheng-Cheng Gu, and Xiao-Gang Wen

Phys. Rev. Lett. **114**, 031601 (2015) – Published 22 January 2015

Longitudinal Target-Spin Asymmetries for Deeply Virtual Compton Scattering

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

Phys. Rev. Lett. **114**, 032001 (2015) – Published 22 January 2015

Nuclear Physics

Nature of Isomerism in Exotic Sulfur Isotopes

Yutaka Utsuno, Noritaka Shimizu, Takaharu Otsuka, Tooru Yoshida, and Yusuke Tsunoda

Phys. Rev. Lett. **114**, 032501 (2015) – Published 21 January 2015

Atomic, Molecular, and Optical Physics

Accurate Ab Initio Calculation of Ionization Potentials of the First-Row Transition Metals with the Configuration-Interaction Quantum Monte Carlo Technique

Robert E. Thomas, George H. Booth, and Ali Alavi

Phys. Rev. Lett. **114**, 033001 (2015) – Published 21 January 2015

Interatomic Coulombic Decay as a New Source of Low Energy Electrons in Slow Ion-Dimer Collisions

W. Iskandar, J. Matsumoto, A. Leredde, X. Fléchar, B. Gervais, S. Guillous, D. Hennecart, A. Méry, J. Rangama, C.L. Zhou, H. Shiromaru, and A. Cassimi

Phys. Rev. Lett. **114**, 033201 (2015) – Published 22 January 2015

Nonlinear Dynamics, Fluid Dynamics, Classical Optics, etc.

Transmission Eigenchannels and the Densities of States of Random Media

Matthieu Davy, Zhou Shi, Jing Wang, Xiaojun Cheng, and Azriel Z. Genack

Phys. Rev. Lett. **114**, 033901 (2015) – Published 23 January 2015

Clustering as a Prerequisite for Chimera States in Globally Coupled Systems

Lennart Schmidt and Katharina Krischer

Phys. Rev. Lett. **114**, 034101 (2015) – Published 22 January 2015

Localized States in Periodically Forced Systems

Punit Gandhi, Edgar Knobloch, and Cédric Beauce

Phys. Rev. Lett. **114**, 034102 (2015) – Published 22 January 2015

Nonlinearity-Induced Synchronization Enhancement in Micromechanical Oscillators

Dario Antonio, David A. Czaplewski, Jeffrey R. Guest, Daniel López, Sebastián I. Arroyo, and Damián H. Zanette

Phys. Rev. Lett. **114**, 034103 (2015) – Published 23 January 2015

Decay of Turbulence at High Reynolds Numbers

Michael Sinhuber, Eberhard Bodenschatz, and Gregory P. Bewley

Phys. Rev. Lett. **114**, 034501 (2015) – Published 23 January 2015

Plasma and Beam Physics

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Resistive Reduced MHD Modeling of Multi-Edge-Localized-Mode Cycles in Tokamak X-Point Plasmas

F. Orain, M. Bécoulet, G. T. A. Huijsmans, G. Dif-Pradalier, M. Hoelzl, J. Morales, X. Garbet, E. Nardon, S. Pamela, C. Passeron, G. Latu, A. Fil, and P. Cahyna

Phys. Rev. Lett. **114**, 035001 (2015) – Published 22 January 2015

Condensed Matter: Structure, etc.

Critical Role of a Buried Interface in the Stranski-Krastanov Growth of Metallic Nanocrystals: Quantum Size Effects in Ag/Si(111)-(7×7)

Yiyao Chen, M. W. Gramlich, S. T. Hayden, and P. F. Miceli

Phys. Rev. Lett. **114**, 035501 (2015) – Published 22 January 2015

Disordered Solids without Well-Defined Transverse Phonons: The Nature of Hard-Sphere Glasses

Xipeng Wang, Wen Zheng, Lijin Wang, and Ning Xu

Phys. Rev. Lett. **114**, 035502 (2015) – Published 23 January 2015

Negative Thermal Expansion in Hybrid Improper Ferroelectric Ruddlesden-Popper Perovskites by Symmetry Trapping

M.S. Senn, A. Bombardi, C.A. Murray, C. Vecchini, A. Scherillo, X. Luo, and S.W. Cheong

Phys. Rev. Lett. **114**, 035701 (2015) – Published 22 January 2015

Two-Dimensional Melting: From Liquid-Hexatic Coexistence to Continuous Transitions

Sebastian C. Kapfer and Werner Krauth

Phys. Rev. Lett. **114**, 035702 (2015) – Published 22 January 2015

Condensed Matter: Electronic Properties, etc.

Interaction Driven Subgap Spin Exciton in the Kondo Insulator SmB₆

W.T. Fuhrman, J. Leiner, P. Nikolić, G.E. Granroth, M.B. Stone, M.D. Lumsden, L. DeBeer-Schmitt, P.A. Alekseev, J.-M. Mignot, S.M. Koohpayeh, P. Cottingham, W. Adam Phelan, L. Schoop, T.M. McQueen, and C. Broholm

Phys. Rev. Lett. **114**, 036401 (2015) – Published 21 January 2015

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Acoustic Black Hole in a Stationary Hydrodynamic Flow of Microcavity Polaritons

H.S. Nguyen, D. Gerace, I. Carusotto, D. Sanvitto, E. Galopin, A. Lemaître, I. Sagnes, J. Bloch, and A. Amo

Phys. Rev. Lett. **114**, 036402 (2015) – Published 22 January 2015

The flow of hybrid electron-photon states through a black-hole-like “acoustic horizon” may produce an observable signature of Hawking radiation.

Scalable Tight-Binding Model for Graphene

Ming-Hao Liu (劉明豪), Peter Rickhaus, Péter Makk, Endre Tóvári, Romain Maurand, Fedor Tkatschenko, Markus Weiss, Christian Schönenberger, and Klaus Richter

Phys. Rev. Lett. **114**, 036601 (2015) – Published 22 January 2015

Manipulation of the Charge State of Single Au Atoms on Insulating Multilayer Films

W. Steurer, J. Repp, L. Gross, I. Scivetti, M. Persson, and G. Meyer

Phys. Rev. Lett. **114**, 036801 (2015) – Published 22 January 2015

Optical Stark Effects in J-Aggregate–Metal Hybrid Nanostructures Exhibiting a Strong Exciton–Surface-Plasmon-Polariton Interaction

P. Vasa, W. Wang, R. Pomraenke, M. Maiuri, C. Manzoni, G. Cerullo, and C. Lienau

Phys. Rev. Lett. **114**, 036802 (2015) – Published 21 January 2015

Editors' Suggestion

Quasiparticle Interference, Quasiparticle Interactions, and the Origin of the Charge Density Wave in 2H-NbSe₂

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Phys. Rev. Lett. **114**, 037001 (2015) – Published 21 January 2015

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Interface Ferroelectric Transition near the Gap-Opening Temperature in a Single-Unit-Cell FeSe Film Grown on Nb-Doped SrTiO₃ Substrate

Y.-T. Cui, R.G. Moore, A.-M. Zhang, Y. Tian, J.J. Lee, F.T. Schmitt, W.-H. Zhang, W. Li, M. Yi, Z.-K. Liu, M. Hashimoto, Y. Zhang, D.-H. Lu, T.P. Devereaux, L.-L. Wang, X.-C. Ma, Q.-M. Zhang, Q.-K. Xue, D.-H. Lee, and Z.-X. Shen

Phys. Rev. Lett. **114**, 037002 (2015) – Published 22 January 2015

Andreev Bound-State Dynamics in Quantum-Dot Josephson Junctions: A Washing Out of the 0- π Transition

R. Avriller and F. Pistolesi

Phys. Rev. Lett. **114**, 037003 (2015) – Published 22 January 2015

Show Abstract

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Distinct Spin Liquids and Their Transitions in Spin-1/2 XXZ Kagome Antiferromagnets

Yin-Chen He and Yan Chen

Phys. Rev. Lett. **114**, 037201 (2015) – Published 22 January 2015

Field-Induced Quantum Criticality and Universal Temperature Dependence of the Magnetization of a Spin-1/2 Heisenberg Chain

Y. Kono, T. Sakakibara, C.P. Aoyama, C. Hotta, M.M. Turnbull, C.P. Landee, and Y. Takano

Phys. Rev. Lett. **114**, 037202 (2015) – Published 22 January 2015

Spontaneous Formation of a Nonuniform Chiral Spin Liquid in a Moat-Band Lattice

Tigran A. Sedrakyan, Leonid I. Glazman, and Alex Kamenev

Phys. Rev. Lett. **114**, 037203 (2015) – Published 21 January 2015

Critical Slowing Down near the Multiferroic Phase Transition in MnWO₄

D. Niermann, C.P. Grams, P. Becker, L. Bohatý, H. Schenck, and J. Hemberger

Phys. Rev. Lett. **114**, 037204 (2015) – Published 23 January 2015

Breaking of Valley Degeneracy by Magnetic Field in Monolayer MoSe₂

David MacNeill, Colin Heikes, Kin Fai Mak, Zachary Anderson, Andor Kormányos, Viktor Zólyomi, Jiwoong Park, and Daniel C. Ralph

Phys. Rev. Lett. **114**, 037401 (2015) – Published 22 January 2015

Topological Photonic Phase in Chiral Hyperbolic Metamaterials

Wenlong Gao, Mark Lawrence, Biao Yang, Fu Liu, Fengzhou Fang, Benjamin Béri, Jensen Li, and Shuang Zhang

Phys. Rev. Lett. **114**, 037402 (2015) – Published 22 January 2015

Polymer, Soft Matter, Biological, and Interdisciplinary Physics

Origin of Metastable Knots in Single Flexible Chains

Liang Dai, C. Benjamin Renner, and Patrick S. Doyle

Phys. Rev. Lett. **114**, 037801 (2015) – Published 22 January 2015

Models of Genetic Drift as Limiting Forms of the Lotka-Volterra Competition Model

George W. A. Constable and Alan J. McKane

Phys. Rev. Lett. **114**, 038101 (2015) – Published 22 January 2015

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COMMENTS

Wetting Transitions in Terms of Effective Potentials

M. Napiórkowski and S. Dietrich

Phys. Rev. Lett. **114**, 039601 (2015) – Published 22 January 2015

Taborek Replies:

P. Taborek

Phys. Rev. Lett. **114**, 039602 (2015) – Published 22 January 2015

ERRATA

*Publisher's Note: First Measurement of Neutrino and Antineutrino Coherent Charged Pion Production on Argon [Phys. Rev. Lett. **113**, 261801 (2014)]*

R. Acciarri *et al.*

Phys. Rev. Lett. **114**, 039901 (2015) – Published 20 January 2015

*Publisher's Note: Stronger Uncertainty Relations for All Incompatible Observables [Phys. Rev. Lett. **113**, 260401 (2014)]*

Lorenzo Maccone and Arun K. Pati

Phys. Rev. Lett. **114**, 039902 (2015) – Published 22 January 2015

*Publisher's Note: Measuring the Biphoton Temporal Wave Function with Polarization-Dependent and Time-Resolved Two-Photon Interference [Phys. Rev. Lett. **114**, 010401 (2015)]*

Peng Chen, Chi Shu, Xianxin Guo, M. M. T. Loy, and Shengwang Du

Phys. Rev. Lett. **114**, 039903 (2015) – Published 22 January 2015

*Publisher's Note: Multiferroic Rhodium Clusters [Phys. Rev. Lett. **113**, 157203 (2014)]*

Lei Ma, Ramiro Moro, John Bowlan, Andrei Kirilyuk, and Walt A. de Heer

Phys. Rev. Lett. **114**, 039904 (2015) – Published 22 January 2015