



Scanning tunneling microscope image of cobalt atoms (gold) adsorbed on a graphene sheet that covers a Ru(0001) metal substrate. The corrugation of the graphene moiré structure is highlighted with hills (blue) and valleys (green). [F. Donati *et al.*, Phys. Rev. Lett. **113**, 177201 (2014)]

# NEWSPAPER

## PHYSICAL REVIEW LETTERS™

### Contents

Articles published 18 October–24 October 2014

VOLUME 113, NUMBER 17

24 October 2014

### EDITORIALS AND ANNOUNCEMENTS

|                                            |        |
|--------------------------------------------|--------|
| Editorial: A Marketplace for Physics ..... | 170001 |
| Pierre Meystre                             |        |

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

|                                                                                                            |        |
|------------------------------------------------------------------------------------------------------------|--------|
| Observable Measure of Quantum Coherence in Finite Dimensional Systems .....                                | 170401 |
| Davide Girolami                                                                                            |        |
| Experimental Detection of Entanglement with Optimal-Witness Families .....                                 | 170402 |
| Jibo Dai, Yink Loong Len, Yong Siah Teo, Berthold-Georg Englert, and Leonid A. Krivitsky                   |        |
| Relaxation Dynamics of a Fermi Gas in an Optical Superlattice .....                                        | 170403 |
| D. Pertot, A. Sheikhan, E. Cocchi, L. A. Miller, J. E. Bohn, M. Koschorreck, M. Köhl, and C. Kollath       |        |
| Experimental Generation of Continuous-Variable Hyperentanglement in an Optical Parametric Oscillator ..... | 170501 |
| Kui Liu, Jun Guo, Chunxiao Cai, Shuaifeng Guo, and Jiangrui Gao                                            |        |
| Fast Thermalization and Helmholtz Oscillations of an Ultracold Bose Gas .....                              | 170601 |
| D. J. Papoular, L. P. Pitaevskii, and S. Stringari                                                         |        |

### Gravitation and Astrophysics

|                                                                                                                                                                           |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Asymptotic Freedom in Hořava-Lifshitz Gravity .....                                                                                                                       | 171101 |
| Giulio D'Odorico, Frank Saueressig, and Marrit Schutten                                                                                                                   |        |
|  Mechanism for Thermal Relic Dark Matter of Strongly Interacting Massive Particles ..... | 171301 |
| Yonit Hochberg, Eric Kuflik, Tomer Volansky, and Jay G. Wacker                                                                                                            |        |

### Elementary Particles and Fields

|                                                                                                                                                                                                                                 |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|  Scattering of Massless Particles in Arbitrary Dimensions .....                                                                                | 171601 |
| Freddy Cachazo, Song He, and Ellis Ye Yuan                                                                                                                                                                                      |        |
|  Search for Scalar Diphoton Resonances in the Mass Range 65–600 GeV with the ATLAS Detector in $pp$ Collision Data at $\sqrt{s} = 8$ TeV ..... | 171801 |
| G. Aad <i>et al.</i> (ATLAS Collaboration)                                                                                                                                                                                      |        |
|  Strong Constraints on Sub-GeV Dark Sectors from SLAC Beam Dump E137 .....                                                                     | 171802 |
| Brian Batell, Rouven Essig, and Ze'ev Surujon                                                                                                                                                                                   |        |
| Baryogenesis from Strong $CP$ Violation and the QCD Axion .....                                                                                                                                                                 | 171803 |
| Géraldine Servant                                                                                                                                                                                                               |        |
| Measurement of the $\bar{B}_s^0$ Meson Lifetime in $D_s^+ \pi^-$ Decays .....                                                                                                                                                   | 172001 |
| R. Aaij <i>et al.</i> (LHCb Collaboration)                                                                                                                                                                                      |        |

(Continued Inside)

 Selected for a Viewpoint in *Physics*. Please visit <http://physics.aps.org/>.

By suggesting a few manuscripts each week, we hope to promote reading across fields. Please see our Announcement Phys. Rev. Lett. 98, 010001 (2007).

Copyright 2014 American Physical Society



0031-9007(20141024)113:17;1-T

## Nuclear Physics

|                                                                                   |        |
|-----------------------------------------------------------------------------------|--------|
| QCD Sum Rules for Magnetically Induced Mixing between $\eta_c$ and $J/\psi$ ..... | 172301 |
| Sungtae Cho, Koichi Hattori, Su Houn Lee, Kenji Morita, and Sho Ozaki             |        |

## Atomic, Molecular, and Optical Physics

|                                                                                                                                                                                                                    |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|  Nonlinear Interaction between Single Photons .....                                                                                | 173601 |
|  T. Guerreiro, A. Martin, B. Sanguinetti, J. S. Pelc, C. Langrock, M. M. Fejer, N. Gisin, H. Zbinden, N. Sangouard, and R. T. Thew |        |

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

|                                                                                                                         |        |
|-------------------------------------------------------------------------------------------------------------------------|--------|
| Full Transmission and Reflection of Waves Propagating through a Maze of Disorder .....                                  | 173901 |
| Benoît Gérardin, Jérôme Laurent, Arnaud Derode, Claire Prada, and Alexandre Aubry                                       |        |
|  Classical Dynamical Localization ..... | 174101 |
| Italo Guarneri, Giulio Casati, and Volker Karle                                                                         |        |
| Grueneisen Relaxation Photoacoustic Microscopy .....                                                                    | 174301 |
| Lidai Wang, Chi Zhang, and Lihong V. Wang                                                                               |        |

## Plasma and Beam Physics

|                                                                                    |        |
|------------------------------------------------------------------------------------|--------|
| Plasma-Resistivity-Induced Strong Damping of the Kinetic Resistive Wall Mode ..... | 175001 |
| Yuling He, Yueqiang Liu, Yue Liu, Guangzhou Hao, and Aike Wang                     |        |

## Condensed Matter: Structure, etc.

|                                                                                                                                                                      |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|  Phonon Localization by Mass Disorder in Dense Hydrogen-Deuterium Binary Alloy ..... | 175501 |
| Ross T. Howie, Ioan B. Magdău, Alexander F. Goncharov, Graeme J. Ackland, and Eugene Gregoryanz                                                                      |        |
| Stability, Energetics, and Magnetic States of Cobalt Adatoms on Graphene .....                                                                                       | 175502 |
| Yudistira Virgus, Wirawan Purwanto, Henry Krakauer, and Shiwei Zhang                                                                                                 |        |
|  Programmable Mechanical Metamaterials .....                                         | 175503 |
| Bastiaan Florijn, Corentin Coullais, and Martin van Hecke                                                                                                            |        |
| Unexpected Reconstruction of the $\alpha$ -Boron (111) Surface .....                                                                                                 | 176101 |
| Xiang-Feng Zhou, Artem R. Oganov, Xi Shao, Qiang Zhu, and Hui-Tian Wang                                                                                              |        |

## Condensed Matter: Electronic Properties, etc.

|                                                                                                                                                                 |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Phonon-Assisted Crossover from a Nonmagnetic Peierls Insulator to a Magnetic Stoner Metal .....                                                                 | 176401 |
| Yongcheng Liang, Xun Yuan, Yanfeng Gao, Wenqing Zhang, and Peihong Zhang                                                                                        |        |
| Quantum Phases of the Shastry-Sutherland Kondo Lattice: Implications for the Global Phase Diagram of Heavy-Fermion Metals .....                                 | 176402 |
| J. H. Pixley, Rong Yu, and Qimiao Si                                                                                                                            |        |
| Damping of Confined Modes in a Ferromagnetic Thin Insulating Film: Angular Momentum Transfer across a Nanoscale Field-Defined Interface .....                   | 176601 |
| Rohan Adur, Chunhui Du, Hailong Wang, Sergei A. Manuilov, Vidya P. Bhallamudi, Chi Zhang, Denis V. Pelekhov, Fengyuan Yang, and P. Chris Hammel                 |        |
| Hybrid Spin and Valley Quantum Computing with Singlet-Triplet Qubits .....                                                                                      | 176801 |
| Niklas Rohling, Maximilian Russ, and Guido Burkard                                                                                                              |        |
| First-Principles Approach to Calculating Energy Level Alignment at Aqueous Semiconductor Interfaces .....                                                       | 176802 |
| Neerav Kharche, James T. Muckerman, and Mark S. Hybertsen                                                                                                       |        |
| Theoretical Prediction of a Time-Reversal Broken Chiral Superconducting Phase Driven by Electronic Correlations in a Single $\text{TiSe}_2$ Layer .....         | 177001 |
| R. Ganesh, G. Baskaran, Jeroen van den Brink, and Dmitry V. Efremov                                                                                             |        |
| Neutron-Scattering Evidence for a Periodically Modulated Superconducting Phase in the Underdoped Cuprate $\text{La}_{1.905}\text{Ba}_{0.095}\text{CuO}_4$ ..... | 177002 |
| Zhijun Xu, C. Stock, Songxue Chi, A. I. Kolesnikov, Guangyong Xu, Genda Gu, and J. M. Tranquada                                                                 |        |

(Continued on Preceding Page)



Selected for a Viewpoint in *Physics*. Please visit <http://physics.aps.org/>.

By suggesting a few manuscripts each week, we hope to promote reading across fields. Please see our Announcement Phys. Rev. Lett. 98, 010001 (2007)

## Contents (Continued)

|   |                                                                                                                                                                                                     |        |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|   | Odd-Parity Triplet Superconducting Phase in Multiorbital Materials with a Strong Spin-Orbit Coupling: Application to Doped $\text{Sr}_2\text{IrO}_4$ .....                                          | 177003 |
|   | Zi Yang Meng, Yong Baek Kim, and Hae-Young Kee                                                                                                                                                      |        |
|   | Disorder Driven Metal-Insulator Transition in $\text{BaPb}_{1-x}\text{Bi}_x\text{O}_3$ and Inference of Disorder-Free Critical Temperature .....                                                    | 177004 |
|   | Katherine Luna, Paula Giraldo-Gallo, Theodore Geballe, Ian Fisher, and Malcolm Beasley                                                                                                              |        |
| ✂ | In-Plane Magnetoresistance Obeys Kohler's Rule in the Pseudogap Phase of Cuprate Superconductors .....                                                                                              | 177005 |
|   | M. K. Chan, M. J. Veit, C. J. Dorow, Y. Ge, Y. Li, W. Tabis, Y. Tang, X. Zhao, N. Barišić, and M. Greven                                                                                            |        |
|   | Tailoring the Magnetism of Co Atoms on Graphene through Substrate Hybridization .....                                                                                                               | 177201 |
|   | F. Donati, L. Gragnaniello, A. Cavallin, F. D. Natterer, Q. Dubout, M. Pivetta, F. Patthey, J. Dreiser, C. Piamonteze, S. Rusponi, and H. Brune                                                     |        |
| ✂ | Detection of Up-converted Persistent Luminescence in the Near Infrared Emitted by the $\text{Zn}_3\text{Ga}_2\text{GeO}_8:\text{Cr}^{3+}, \text{Yb}^{3+}, \text{Er}^{3+}$ Phosphor .....            | 177401 |
|   | Feng Liu, Yanjie Liang, and Zhengwei Pan                                                                                                                                                            |        |
|   | Control of a Two-Dimensional Electron Gas on $\text{SrTiO}_3(111)$ by Atomic Oxygen .....                                                                                                           | 177601 |
|   | S. McKeown Walker, A. de la Torre, F. Y. Bruno, A. Tamai, T. K. Kim, M. Hoesch, M. Shi, M. S. Bahramy, P. D. C. King, and F. Baumberger                                                             |        |
|   | <b>Polymer, Soft Matter, Biological, and Interdisciplinary Physics</b>                                                                                                                              |        |
|   | Continuum Modeling of Secondary Rheology in Dense Granular Materials .....                                                                                                                          | 178001 |
|   | David L. Henann and Ken Kamrin                                                                                                                                                                      |        |
| ✂ | Artificial Tribotactic Microscopic Walkers: Walking Based on Friction Gradients .....                                                                                                               | 178101 |
|   | Joshua P. Steimel, Juan L. Aragonés, and Alfredo Alexander-Katz                                                                                                                                     |        |
| ✂ | Gravity Driven Instability in Elastic Solid Layers .....                                                                                                                                            | 178301 |
|   | Serge Mora, Ty Phou, Jean-Marc Fromental, and Yves Pomeau                                                                                                                                           |        |
|   | <b>Comments</b>                                                                                                                                                                                     |        |
|   | Comment on "Formation of Phase Space Holes and Clumps" .....                                                                                                                                        | 179501 |
|   | I. Y. Dodin                                                                                                                                                                                         |        |
|   | Lilley and Nyqvist Reply .....                                                                                                                                                                      | 179502 |
|   | M. K. Lilley and R. M. Nyqvist                                                                                                                                                                      |        |
|   | <b>Errata</b>                                                                                                                                                                                       |        |
|   | Erratum: Continuous Generation of Spinmotive Force in a Patterned Ferromagnetic Film [Phys. Rev. Lett. <b>107</b> , 236602 (2011)] .....                                                            | 179901 |
|   | Y. Yamane, K. Sasage, T. An, K. Harii, J. Ohe, J. Ieda, S. E. Barnes, E. Saitoh, and S. Maekawa                                                                                                     |        |
|   | Publisher's Note: Bulk Signatures of Pressure-Induced Band Inversion and Topological Phase Transitions in $\text{Pb}_{1-x}\text{Sn}_x\text{Se}$ [Phys. Rev. Lett. <b>113</b> , 096401 (2014)] ..... | 179902 |
|   | Xiaoxiang Xi, Xu-Gang He, Fen Guan, Zhenxian Liu, R. D. Zhong, J. A. Schneeloch, T. S. Liu, G. D. Gu, X. Du, Z. Chen, X. G. Hong, Wei Ku, and G. L. Carr                                            |        |