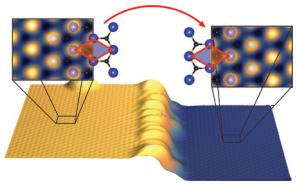

A scanning tunneling microscope topography scan across a half 4H-SiC unit cell step edge shows two indenene domains (insets) that are mutually rotated by 180°. Selected for an Editors' Suggestion. [Jonas Erhardt *et al.*, Phys. Rev. Lett. **132**, 196401 (2024)]

NEWSPAPER

PHYSICAL REVIEW LETTERS

Contents

Articles published 4 May–10 May 2024

VOLUME 132, NUMBER 19 10 May 2024

Editorials, Essays, and Announcements

Essay: Quantum Sensing with Atomic, Molecular, and Optical Platforms for Fundamental Physics 190001
Jun Ye and Peter Zoller

Quantum Information, Science, and Technology

Bell Nonlocality in Classical Systems Coexisting with Other System Types 190201
Giulio Chiribella, Lorenzo Giannelli, and Carlo Maria Scandolo
Quantum Work Statistics at Strong Reservoir Coupling 190401
Owen Diba, Harry J. D. Miller, Jake Iles-Smith, and Ahsan Nazir
Experimental Direct Quantum Fidelity Learning via a Data-Driven Approach 190801
Haiyang Qin, Liangyu Che, Chao Wei, Feng Xu, Yulei Huang, and Tao Xin

Cosmology, Astrophysics, and Gravitation

Hubble Tension as a Window on the Gravitation of the Dark Matter Sector 191001
Cyril Pitrou and Jean-Philippe Uzan
First Results of the Laser-Interferometric Detector for Axions (LIDA) 191002
Joscha Heinze, Alex Gill, Artemiy Dmitriev, Jiří Smetana, Tianliang Yan, Vincent Boyer, Denis Martynov, and Matthew Evans
Mitigating the Counterpart Selection Effect for Standard Sirens 191003
Hsin-Yu Chen, Colm Talbot, and Eve A. Chase
Coupling Constants as Conserved Charges in Black Hole Thermodynamics 191401
Kamal Hajian and Bayram Tekin
Nonlocal Massive Gravity from Einstein Gravity 191402
Pablo Bueno, Pablo A. Cano, and Robie A. Hennigar
Constraints on Neutrino Natal Kicks from Black-Hole Binary VFTS 243 191403
Alejandro Vigna-Gómez, Reinhold Willcox, Irene Tamborra, Ilya Mandel, Mathieu Renzo, Tom Wagg, Hans-Thomas Janka, Daniel Kresse, Julia Bodensteiner, Tomer Shenar, and Thomas M. Tauris
Geometry and Unitarity of Scalar Fields Coupled to Gravity 191501
Minxi He, Kohei Kamada, and Kyohei Mukaida

Particles and Fields

Regge Spectroscopy of Higher-Twist States in $\mathcal{N} = 4$ Supersymmetric Yang-Mills Theory 191601
Rob Klabbers, Michelangelo Preti, and István M. Szécsényi
One-Loop Double Copy Relation in String Theory 191602
S. Stieberger
Covariant Compton Amplitudes in Gravity with Classical Spin 191603
N. Emil J. Bjerrum-Bohr, Gang Chen, and Marcos Skowronek

(Continued Inside)

This paper was highlighted in the APS publication *Physics* (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 2024 American Physical Society

0031-9007(20240510)132:19;1-Q

Lattice QCD Calculation of Electroweak Box Contributions to Superallowed Nuclear and Neutron Beta Decays 191901
Peng-Xiang Ma, Xu Feng, Mikhail Gorchtein, Lu-Chang Jin, Keh-Fei Liu, Chien-Yeah Seng, Bi-Geng Wang, and Zhao-Long Zhang

First Observation of a Three-Resonance Structure in $e^+e^- \to$ Nonopen Charm Hadrons 191902
M. Ablikim *et al.* (BESIII Collaboration)

Nuclear Physics

Production of p Nuclei from r-Process Seeds: The νr Process 192701
Zewei Xiong, Gabriel Martínez-Pinedo, Oliver Just, and Andre Sieverding

Atomic, Molecular, and Optical Physics

Universal Composite Boson Formation in Strongly Interacting One-Dimensional Fermionic Systems 193401
Francesc Sabater, Abel Rojo-Francàs, Grigori E. Astrakharchik, and Bruno Juliá-Díaz

Direct Laser Cooling of Rydberg Atoms with an Isolated-Core Transition 193402
A. Bouillon, E. Marin-Bujedo, and M. Génévriez

Magnon-Skyrmion Hybrid Quantum Systems: Tailoring Interactions via Magnons 193601
Xue-Feng Pan, Peng-Bo Li, Xin-Lei Hei, Xichao Zhang, Masahito Mochizuki, Fu-Li Li, and Franco Nori

Nonreciprocal Superradiant Phase Transitions and Multicriticality in a Cavity QED System 193602
Gui-Lei Zhu, Chang-Sheng Hu, Hui Wang, Wei Qin, Xin-You Lü, and Franco Nori

Approaching Maximal Precision of Hong-Ou-Mandel Interferometry with Nonperfect Visibility 193603
O. Meskine, E. Descamps, A. Keller, A. Lemaître, F. Baboux, S. Ducci, and P. Milman

Universally Robust Quantum Control 193801
Pablo M. Poggi, Gabriele De Chiara, Steve Campbell, and Anthony Kiely

Optical Kinetic Theory of Nonlinear Multimode Photonic Networks 193802
Arkady Kurnosov, Lucas J. Fernández-Alcázar, Alba Ramos, Boris Shapiro, and Tsampikos Kottos

Measuring the Optical Concurrence of Vector Beams with an Atomic-State Interferometer 193803
Jinwen Wang, Sphinx J. Svensson, Thomas W. Clark, Yun Chen, Mustafa A. Al Khafaji, Hong Gao, Niclas Westerberg, and Sonja Franke-Arnold

Self-Hybridized Vibrational-Mie Polaritons in Water Droplets 193804
Adriana Canales, Oleg V. Kotov, Betül Küçüköz, and Timur O. Shegai

Physics of Fluids, Earth & Planetary Science, and Climate

Simple Mechanism for the Observed Breakdown of the Nernst-Einstein Relation for Ions in Carbon Nanotubes 194001
A. W. C. Lau and J. B. Sokoloff

Plasma and Solar Physics, Accelerators and Beams

Multi-GeV Electron Acceleration in Wakefields Strongly Driven by Oversized Laser Spots 195001
K. Põder, J. C. Wood, N. C. Lopes, J. M. Cole, S. Alatabi, M. P. Backhouse, P. S. Foster, A. J. Hughes, C. Kamperidis, O. Kononenko, S. P. D. Mangles, C. A. J. Palmer, D. Rusby, A. Sahai, G. Sarri, D. R. Symes, J. R. Warwick, and Z. Najmudin

Condensed Matter and Materials

Energy Formulation for Infinite Structures: Order Parameter for Percolation, Critical Bonds, and Power-Law Scaling of Contact-Based Transport 196101
Samarth Agrawal, Sandra Galmarini, and Martin Kröger

Structure of Graphene Grown on Cu(111): X-Ray Standing Wave Measurement and Density Functional Theory Prediction 196201
Matthew A. Stoodley, Luke A. Rochford, Tien-Lin Lee, Benedikt P. Klein, David A. Duncan, and Reinhard J. Maurer

Strong-Coupling Phases of Trions and Excitons in Electron-Hole Bilayers at Commensurate Densities 196202
David D. Dai and Liang Fu

High-Temperature Atomic Diffusion and Specific Heat in Quasicrystals 196301
Yuki Nagai, Yutaka Iwasaki, Koichi Kitahara, Yoshiki Takagiwa, Kaoru Kimura, and Motoyuki Shiga

(Continued on Preceding Page)

This paper was highlighted in the APS publication *Physics* (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)

Bias-Free Access to Orbital Angular Momentum in Two-Dimensional Quantum Materials 196401
Jonas Erhardt, Cedric Schmitt, Philipp Eck, Matthias Schmitt, Philipp Keßler, Kyungchan Lee, Timur Kim, Cephise Cacho, Iulia Cojocariu, Daniel Baranowski, Vitaliy Feyer, Louis Veyrat, Giorgio Sangiovanni, Ralph Claessen, and Simon Moser

Chirality-Driven Orbital Angular Momentum and Circular Dichroism in CoSi 196402
Stefanie Suzanne Brinkman, Xin Liang Tan, Bjørnulf Brekke, Anders Christian Mathisen, Øyvind Finnseth, Richard Justin Schenk, Kenta Hagiwara, Meng-Jie Huang, Jens Buck, Matthias Kalläne, Moritz Hoesch, Kai Rossnagel, Kui-Hon Ou Yang, Minn-Tsong Lin, Guo-Jiun Shu, Ying-Jiun Chen, Christian Tusche, and Hendrik Bentmann

Strong Terahertz Third-Harmonic Generation by Kinetic Heavy Quasiparticles in $CaRuO_3$ 196501
Chris Reinhoffer, Sven Esser, Sebastian Esser, Evgeny A. Mashkovich, Semyon Germanskiy, Philipp Gegenwart, Frithjof Anders, Paul H. M. van Loosdrecht, and Zhe Wang

Topological Quantum Synchronization of Fractionalized Spins 196601
Christopher W. Wächtler and Joel E. Moore

Fermi Surface Spin Texture and Topological Superconductivity in Spin-Orbit Free Noncollinear Antiferromagnets 196602
Seung Hun Lee, Yuting Qian, and Bohm-Jung Yang

Quantum-Geometric Origin of Out-of-Plane Stacking Ferroelectricity 196801
Benjamin T. Zhou, Vedangi Pathak, and Marcel Franz

Crossover from Linear to Quadratic Electro-optic Behavior in $BaTiO_3$ and $(Ba, Sr)TiO_3$ Solid Solution 196901
Sergey Prosandeev, Charles Paillard, and L. Bellaiche

Distance Dependence of the Energy Transfer Mechanism in WS_2-Graphene Heterostructures 196902
David Tebbe, Marc Schütte, K. Watanabe, T. Taniguchi, Christoph Stampfer, Bernd Beschoten, and Lutz Waldecker

Statistical Physics; Classical, Nonlinear, and Complex Systems

Machine-Learning Optimized Measurements of Chaotic Dynamical Systems via the Information Bottleneck 197201
Kieran A. Murphy and Dani S. Bassett

Demonstration of Acoustic Higher-Order Topological Stiefel-Whitney Semimetal 197202
Xiao Xiang, Yu-Gui Peng, Feng Gao, Xiaoxiao Wu, Peng Wu, Zhaoxian Chen, Xiang Ni, and Xue-Feng Zhu

Combining Reinforcement Learning and Tensor Networks, with an Application to Dynamical Large Deviations 197301
Edward Gillman, Dominic C. Rose, and Juan P. Garrahan

Errata

Erratum: Spontaneous Domain Formation in Spherically Confined Elastic Filaments [Phys. Rev. Lett. **123**, 047801 (2019)] 199901
Tine Curk, James Daniel Farrell, Jure Dobnikar, and Rudolf Podgornik

Erratum: Current-Induced Creation of Topological Vortex Rings in a Magnetic Nanocylinder [Phys. Rev. Lett. **132**, 126701 (2024)] 199902
Yizhou Liu and Naoto Nagaosa

This paper was highlighted in the APS publication *Physics* (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).

Physics
spotlighting exceptional research

The American Physical Society's free online publication, *Physics* (physics.aps.org), provides thought-provoking analysis and spotlights exceptional research.