

Recent Articles

FILTER

1 - 20 of 2,844 Results

Recent Issues

Vol. 15, Iss. 1
January - March 2025

Vol. 14, Iss. 4
October - December 2024

Vol. 14, Iss. 3
July - September 2024

Vol. 14, Iss. 2
April - June 2024

Category

☒ ALL

☐ Open Access (2,831)

☐ Featured in Physics (386)

Article Type

☒ ALL

☐ Article (2,751)

☐ Erratum (61)

☐ Editorial (18)

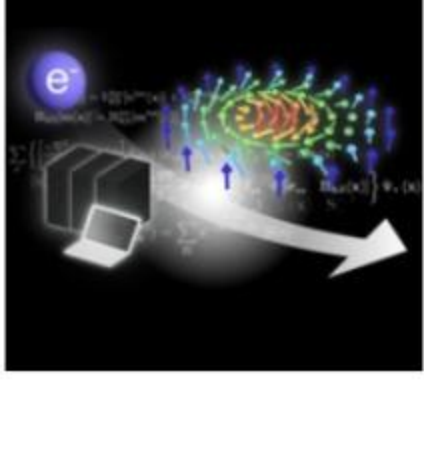
☐ Comment (4)

☐ Perspective (4)

☐ Reply (3)

☐ Announcement (2)

☐ Retraction (1)



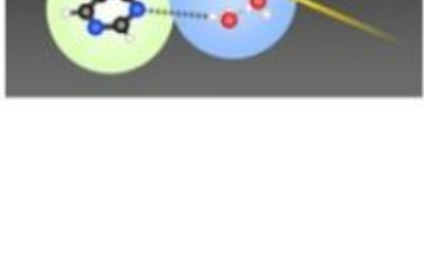
Topological Hall Effect of Skyrmions from first Principles

Hsiao-Yi Chen, Takuya Nomoto, Max Hirschberger, and Ryotaro Arita
Phys. Rev. X **15**, 011054 (2025) - Published 11 March, 2025

A new density functional theory approach to accurately model skyrmions and the topological Hall effect could improve material predictions for energy-efficient data storage and next-generation computing.

Show Abstract

PDF



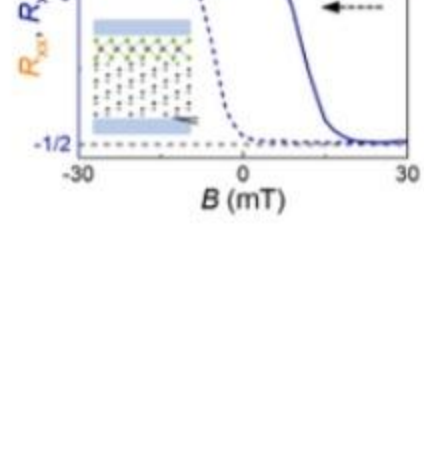
Damaging Intermolecular Relaxation Processes Initiated by Heavy-Ion Irradiation of Hydrated Biomolecules

Yue Gao *et al.*
Phys. Rev. X **15**, 011053 (2025) - Published 11 March, 2025

Experiments have shown that heavy-ion irradiation of biomolecules in aqueous environments efficiently triggers DNA-destroying cascades.

Show Abstract

PDF



Electric-Field Switchable Chirality in Rhombohedral Graphene Chern Insulators Stabilized by Tungsten Diselenide

Jing Ding, Hanxiao Xiang, Jiannan Hua, Wenqiang Zhou, Naitian Liu, Le Zhang, Na Xin, Bing Wu, Kenji Watanabe, Takashi Taniguchi, Zdeněk Šafer, Wei Zhu, and Shuigang Xu
Phys. Rev. X **15**, 011052 (2025) - Published 10 March, 2025

Multilayer graphene can host quantum anomalous Hall states with edge currents controllable via an electric field, offering new possibilities for low-power electronics and quantum computing.

Show Abstract

PDF



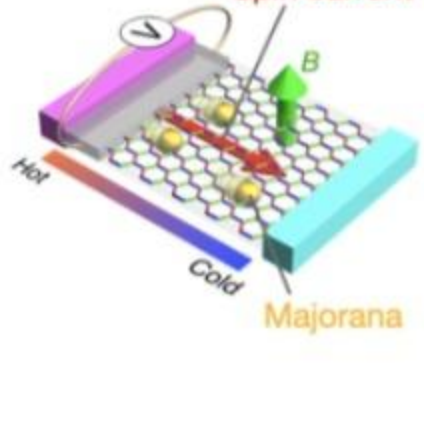
Exploring Atom-Ion Feshbach Resonances below the -Wave Limit

Fabian Thielemann, Joachim Siemund, Daniel von Schoenfeld, Wei Wu, Pascal Weckesser, Krzysztof Jachymski, Thomas Walker, and Tobias Schaetz
Phys. Rev. X **15**, 011051 (2025) - Published 7 March, 2025

Hybrid atom-ion systems provide a powerful platform for exploring long-range quantum interactions. By tuning the collision energy, new quantum resonances emerge, advancing control over ultracold scattering processes.

Show Abstract

PDF



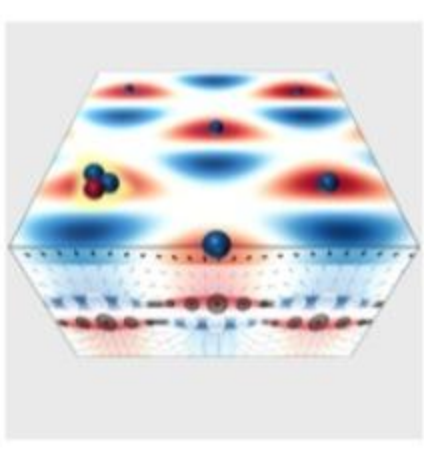
Spin Seebeck Effect as a Probe for Majorana Fermions in Kitaev Spin Liquids

Yasuyuki Kato, Joji Nasu, Masahiro Sato, Tsuyoshi Okubo, Takahiro Misawa, and Yukitoshi Motome
Phys. Rev. X **15**, 011050 (2025) - Published 5 March, 2025

The spin Seebeck effect in two-dimensional quantum spin liquids enables the creation and control of non-Abelian anyons, potentially offering a new approach for fault-tolerant topological quantum computing.

Show Abstract

PDF



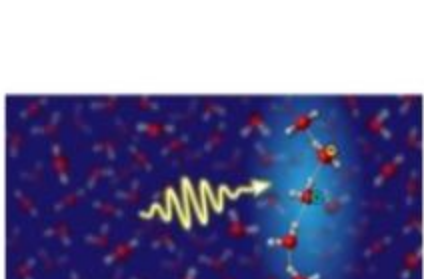
Confined Trions and Mott-Wigner States in a Purely Electrostatic Moiré Potential

Natasha Kiper, Haydn S. Adlong, Arthur Christianen, Martin Kroner, Kenji Watanabe, Takashi Taniguchi, and Atac Imamoglu
Phys. Rev. X **15**, 011049 (2025) - Published 5 March, 2025

A moiré pattern in bilayer hexagonal boron nitride enhances the role of Coulomb interactions in a transition metal dichalcogenide, revealing strong electron correlations and offering insights into quantum materials and related exotic phenomena.

Show Abstract

PDF



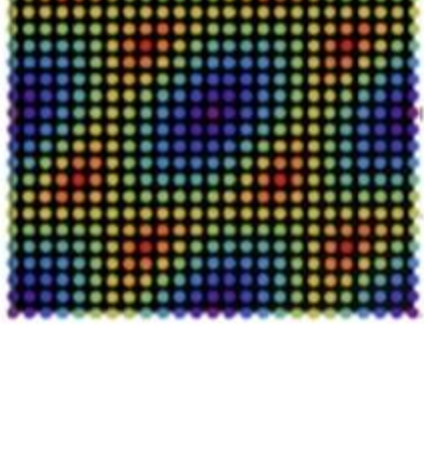
Optical Absorption Spectroscopy Probes Water Wire and Its Ordering in a Hydrogen-Bond Network

Fujie Tang, Diana Y. Qiu, and Xifan Wu
Phys. Rev. X **15**, 011048 (2025) - Published 5 March, 2025

Computational spectroscopy reveals a possible signature of strongly hydrogen-bonded wires in water and ice.

Show Abstract

PDF



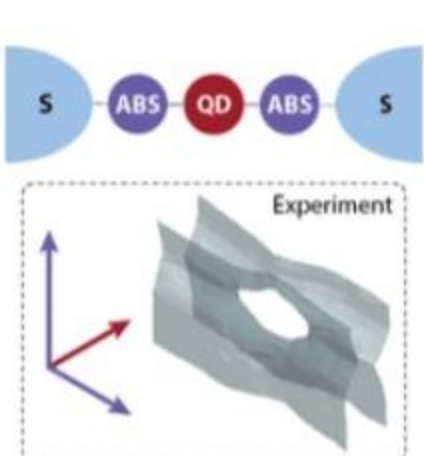
Spin- Kagome Heisenberg Antiferromagnet: Machine Learning Discovery of the Spinon Pair-Density-Wave Ground State

Tanja Đurić, Jia Hui Chung, Bo Yang, and Pinaki Sengupta
Phys. Rev. X **15**, 011047 (2025) - Published 3 March, 2025

A machine-learning-based analysis uncovers novel paired spinon states in the kagome Heisenberg antiferromagnet, offering insights into certain quantum materials and electron pairing in high-temperature superconductors.

Show Abstract

PDF



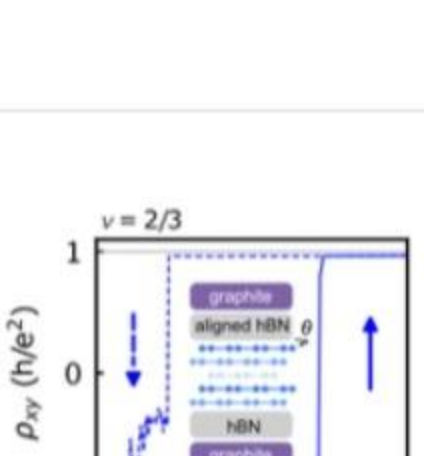
Impact of Andreev Bound States within the Leads of a Quantum Dot Josephson Junction

Alberto Bordin, Florian J. Bennebroek Everts, Gorm O. Steffensen, Tom Dvir, Grzegorz P. Mazur, David van Driel, Nick van Loo, Jan Cornelis Wolff, Erik P. A. M. Bakkers, Alfredo Levy Yeyati, and Leo P. Kouwenhoven
Phys. Rev. X **15**, 011046 (2025) - Published 3 March, 2025

Andreev bound states in an artificial molecule control the supercurrent in a tunable Josephson junction, offering new insights for enhancing superconducting devices and advancing quantum technologies.

Show Abstract

PDF



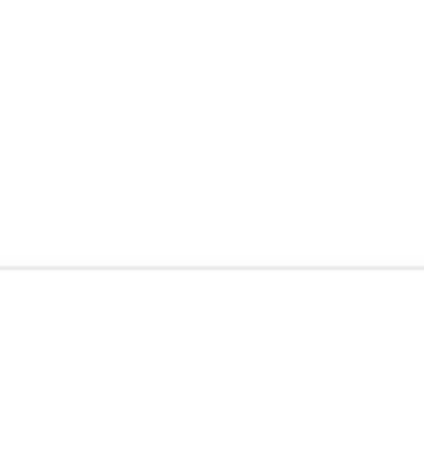
Chern Insulators at Integer and Fractional Filling in Moiré Pentalayer Graphene

Dacen Waters, Anna Okounkova, Ruiheng Su, Boran Zhou, Jiang Yao, Kenji Watanabe, Takashi Taniguchi, Xiaodong Xu, Ya-Hui Zhang, Joshua Folk, and Matthew Yankowitz
Phys. Rev. X **15**, 011045 (2025) - Published 27 February, 2025

Electric-field control of topological states in a pentalayer graphene moiré system reveals tunable quantum phases, correlated insulating states, and evidence of fractional charge quasiparticles.

Show Abstract

PDF



Light-Induced Reorientation Transition in an Antiferromagnetic Semiconductor

Bryan T. Fichera, Baiqing Lv, Karna Morey, Zongqi Shen, Changmin Lee, Elizabeth Donoway, Alex Liebman-Pelaez, Anshul Kogar, Takashi Kurumaji, Martin Rodríguez-Vega, Rodrigo Humberto Aguilera del Toro, Mikel Arruabarrena, Batyr Ilyas, Tianchuang Luo, Peter Müller, Aritz Leonardo, Andres Ayuela, Gregory A. Fiete, Joseph G. Checkelsky, Joseph Orenstein, and Nuh Gedik
Phys. Rev. X **15**, 011044 (2025) - Published 26 February, 2025

A demonstration of ultrafast optical manipulation of antiferromagnetic order in CaMnBi reveals a metastable spin state that persists for more than 150 ps, paving the way for advanced spintronic and ultrafast magnetic-device technologies.

Show Abstract

PDF



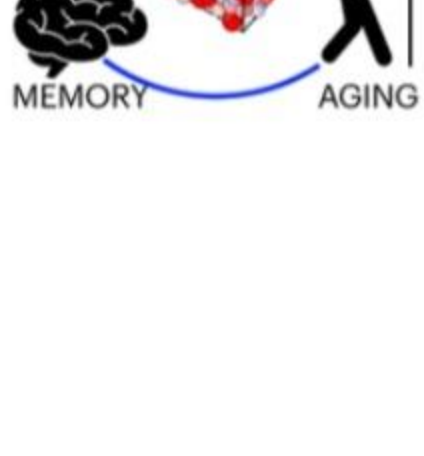
Mechanical Tuning of Residual Stress, Memory, and Aging in Soft Glassy Materials

Paolo Edera, Minaspi Bantawa, Stefano Aime, Roger T. Bonnecaze, and Michel Cloitre
Phys. Rev. X **15**, 011043 (2025) - Published 25 February, 2025

Pasty materials store mechanical memory through local stress distributions. By periodically shearing them, their memory can be controlled or erased, offering insights for optimizing materials in coatings, composites, and consumer products.

Show Abstract

PDF



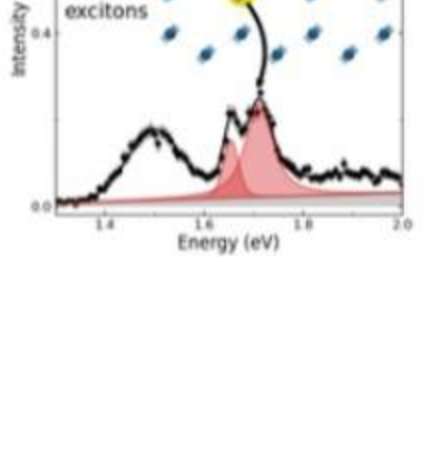
Dispersive Dark Excitons in van der Waals Ferromagnet

W. He, J. Sears, F. Barantani, T. Kim, J. W. Villanova, T. Berlijn, M. Lajer, M. A. McGuire, J. Pelliciari, V. Bisogni, S. Johnston, E. Baldini, M. Mitrano, and M. P. M. Dean
Phys. Rev. X **15**, 011042 (2025) - Published 25 February, 2025

Resonant inelastic x-ray scattering reveals elusive "dark excitons" in CrI. With long lifetimes and unique spin interactions, these controllable quasiparticles offer novel prospects for quantum technologies and optoelectronic devices.

Show Abstract

PDF



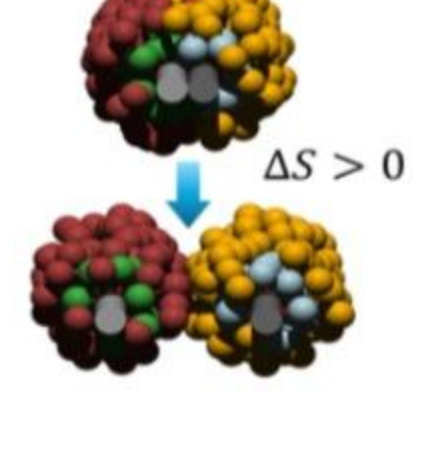
Chaperone-Driven Entropic Separation of Amyloid Nanofilament Bundles

Jose M. G. Vilac, J. Miguel Rubi, and Leonor Saiz
Phys. Rev. X **15**, 011041 (2025) - Published 24 February, 2025

New insight into how molecular chaperones break apart toxic protein deposits that form amyloid fibrils sheds light on strategies to target these deposits in diseases like Alzheimer's and Parkinson's.

Show Abstract

PDF



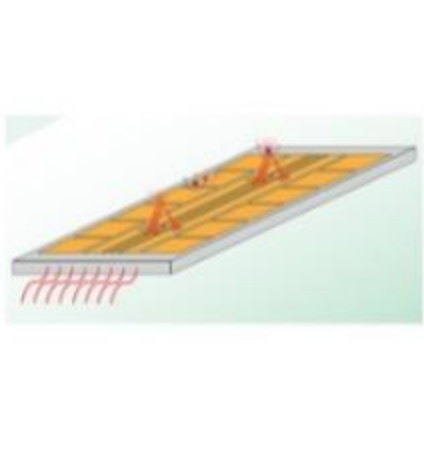
Multizone Trapped-Ion Qubit Control in an Integrated Photonics QCCD Device

Carmelo Mordini, Alfredo Ricci Vasquez, Yuto Motohashi, Mose Müller, Maciej Malinowski, Chi Zhang, Karan K. Mehta, Daniel Kienzler, and Jonathan P. Home
Phys. Rev. X **15**, 011040 (2025) - Published 24 February, 2025

The demonstration that ions can be precisely manipulated in a trap containing integrated photonics paves the way for a large-scale trapped-ion quantum processor.

Show Abstract

PDF



Superballistic Conduction in Hydrodynamic Antidot Graphene

Jorge Estrada-Álvarez, Juan Salvador-Sánchez, Ana Pérez-Rodríguez, Carlos Sánchez-Sánchez, Vito Clericó, Daniel Vaquero, Kenji Watanabe, Takashi Taniguchi, Enrique Diez, Francisco Domínguez-Adame, Mario Amado, and Elena Díaz
Phys. Rev. X **15**, 011039 (2025) - Published 21 February, 2025

An array of holes in a 2D material enhances an effect that improves the flow of electric currents.

Show Abstract

PDF



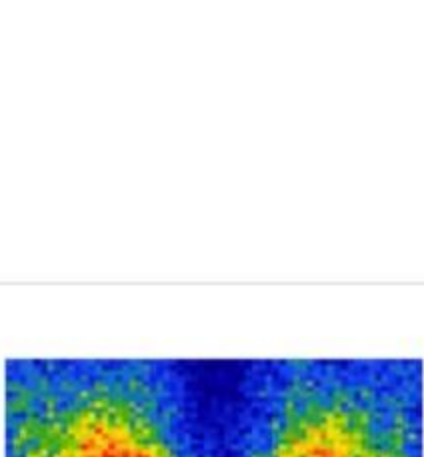
Anomalous Quasielastic Scattering Contribution in the Centrosymmetric Multi- Helimagnet

Nikita D. Andriushin, Justus Grumbach, Anton A. Kulbakov, Yulia V. Tymoshenko, Yevhen A. Onyikienko, Reza Firoozmandi, Erjan Cheng, Sergey Granovsky, Yuri Skourski, Jacques Ollivier, Helen C. Walker, Vilmos Kocsis, Bernd Büchner, Bernhard Keimer, Mathias Doerr, Dmytro S. Inosov, and Darren C. Peets
Phys. Rev. X **15**, 011038 (2025) - Published 20 February, 2025

SrFeO₃, a compound with long-range, helical magnetic order, exhibits unique spin fluctuations that are likely caused by chiral domain walls, making it a valuable material for studying complex magnetic behaviors and spin dynamics.

Show Abstract

PDF



Sketched Nanoscale -Based Superconducting Quantum Interference Device

Muqing Yu, Nicholas Houglund, Qianheng Du, Junyi Yang, Sayanwita Biswas, Ranjani Ramachandran, Dengyu Yang, Anand Bhattacharya, David Pekker, Patrick Irvin, and Jeremy Levy
Phys. Rev. X **15**, 011037 (2025) - Published 20 February, 2025

Potassium tantalate enables superconducting weak links with high, tunable inductance, making it a promising material for quantum devices, and its AFM-based nanoscale patterning offers new possibilities for reconfigurable quantum circuits.

Show Abstract

PDF



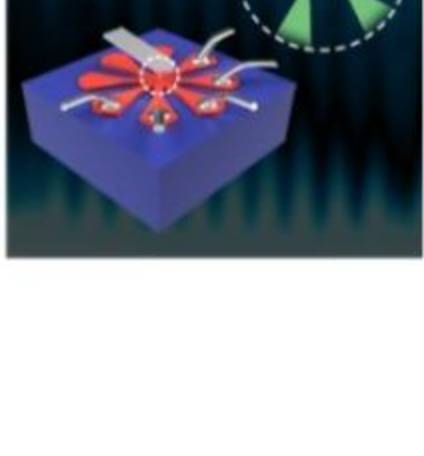
Phonon Thermal Hall Effect in Mott Insulators via Skew Scattering by the Scalar Spin Chirality

Taekoo Oh and Naoto Nagaosa
Phys. Rev. X **15**, 011036 (2025) - Published 19 February, 2025

Spins have been long thought to be the primary contributor to the thermal Hall effect in insulators. Theoretical work shows that vibrations can contribute just as much.

Show Abstract

PDF



Observation of Quantum Thermalization Restricted to Hilbert Space Fragments and Scars

Luheng Zhao, Prithvi Raj Datla, Weikun Tian, Mohammad Mujahid Aliyu, and Huanqian Loh
Phys. Rev. X **15**, 011035 (2025) - Published 18 February, 2025

In an out-of-equilibrium Rydberg atom array, chosen subsets of atoms freeze in their initial state, while the rest thermalize, a finding that probes an exotic form of quantum thermalization.

Show Abstract

PDF

Recent Articles

FILTER

21 - 40 of 2,844 Results

Recent Issues

[Vol. 15, Iss. 1](#)
January - March 2025

[Vol. 14, Iss. 4](#)
October - December 2024

[Vol. 14, Iss. 3](#)
July - September 2024

[Vol. 14, Iss. 2](#)
April - June 2024

Category

☒ ALL

☐ Open Access (2,831)

☐ Featured in Physics (386)

Article Type

☒ ALL

☐ Article (2,751)

☐ Erratum (61)

☐ Editorial (18)

☐ Comment (4)

☐ Perspective (4)

☐ Reply (3)

☐ Announcement (2)

☐ Retraction (1)



FEATURED IN PHYSICS

[Photon-Counting Interferometry to Detect Geotropic Space-Time Fluctuations with GQuEST](#)

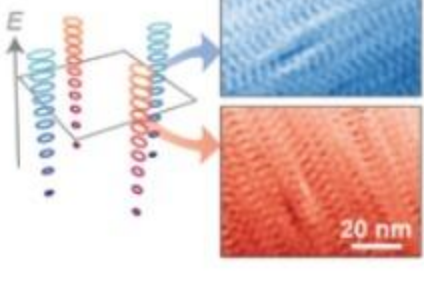
Sander M. Vermeulen, Torrey Cullen, Daniel Grass, Ian A. O. MacMillan, Alexander J. Ramirez, Jeffrey Wack, Boris Korzh, Vincent S. H. Lee, Kathryn M. Zurek, Chris Stoughton, and Lee McCuller

Phys. Rev. X **15**, 011034 (2025) - Published 14 February, 2025

Predictions of theories that combine quantum mechanics with gravity could be observed using highly sensitive photon detection in a tabletop experiment.

Show Abstract

PDF



[Valley Polarization of Landau Levels in the ZrSiS Surface Band Driven by Residual Strain](#)

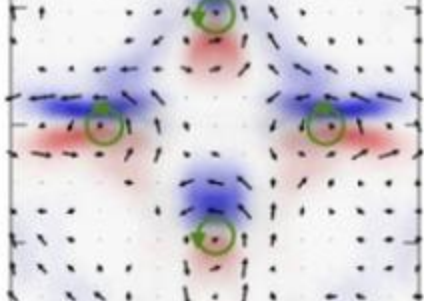
Christopher J. Butler, Masayuki Murase, Shunki Sawada, Ming-Chun Jiang, Daisuke Hashizume, Guang-Yu Guo, Ryotaro Arita, Tetsuo Hanaguri, and Takao Sasagawa

Phys. Rev. X **15**, 011033 (2025) - Published 13 February, 2025

Scanning tunneling microscopy reveals the cause for one kind of electronic symmetry breaking, suggesting avenues for how to exploit it in future, novel devices.

Show Abstract

PDF



[Imaging Orbital Vortex Lines in Three-Dimensional Momentum Space](#)

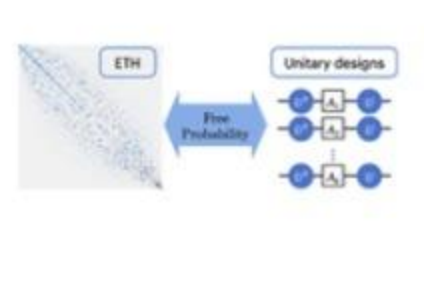
T. Figgemeier, M. Ünzelmann, P. Eck, J. Schusser, L. Crippa, J. N. Neu, B. Geldiyev, P. Kagerer, J. Buck, M. Kalläne, M. Hoesch, K. Rossnagel, T. Siegrist, L.-K. Lim, R. Moessner, G. Sangiovanni, D. Di Sante, F. Reinert, and H. Bentmann

Phys. Rev. X **15**, 011032 (2025) - Published 13 February, 2025

Real-space quantum vortices are key to many phenomena in modern physics. New experiments provide the first proof of vortices in momentum space, raising the prospect of exploring novel orbitronic phenomena.

Show Abstract

PDF



[Designs via Free Probability](#)

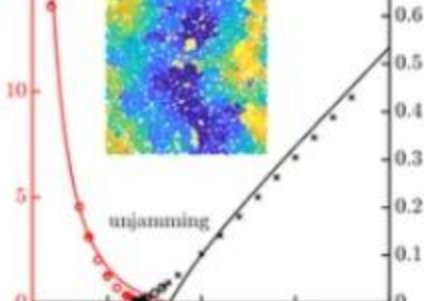
Michele Fava, Jorge Kurchan, and Silvia Pappalardi

Phys. Rev. X **15**, 011031 (2025) - Published 12 February, 2025

A tool that bridges the gap between designs, which simulate quantum randomness, and quantum chaos and thermalization sheds new light on how quantum systems evolve into randomness.

Show Abstract

PDF



[Self-Consistent Current Response Theory of Unjamming and Vibrational Modes in Low-Temperature Amorphous Solids](#)

Florian Vogel, Philipp Baumgärtel, and Matthias Fuchs

Phys. Rev. X **15**, 011030 (2025) - Published 12 February, 2025

A self-consistent theory of the unjamming transition, applied to a model of amorphous solids described using Euclidean random matrices, elucidates universal vibrational properties.

Show Abstract

PDF



FEATURED IN PHYSICS

[Entanglement-Enhanced Atomic Gravimeter](#)

Christophe Cassens, Bernd Meyer-Hoppe, Ernst Rasel, and Carsten Klempt

Phys. Rev. X **15**, 011029 (2025) - Published 11 February, 2025

The first measurement of gravity using quantum mechanically entangled atoms demonstrates the potential of the approach.

Show Abstract

PDF



FEATURED IN PHYSICS

[Multiscale Physics of Atomic Nuclei from First Principles](#)

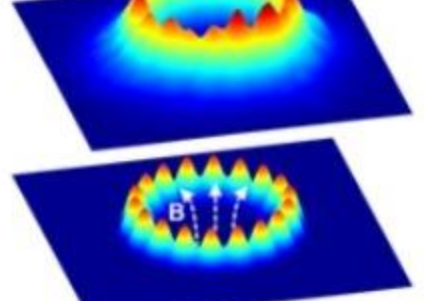
Z. H. Sun, A. Ekström, C. Forssén, G. Hagen, G. R. Jansen, and T. Papenbrock

Phys. Rev. X **15**, 011028 (2025) - Published 10 February, 2025

A new computational method could help scientists understand the shapes of deformed nuclei from first principles.

Show Abstract

PDF



[Necklacelike Pattern of Vortex Bound States](#)

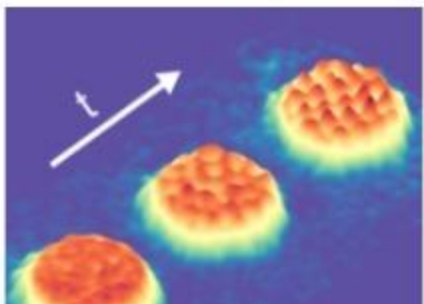
Zhiyong Hou, Kailun Chen, Wenshan Hong, Da Wang, Wen Duan, Huan Yang, Shiliang Li, Huiquan Luo, Qiang-Hua Wang, Tao Xiang, and Hai-Hu Wen

Phys. Rev. X **15**, 011027 (2025) - Published 7 February, 2025

A newly seen magnetic vortex pattern in an iron-based superconductor—neither theoretically predicted nor previously observed—could offer new insights into certain quantum phenomena in superconducting condensates.

Show Abstract

PDF



[Observation of Pattern Stabilization in a Driven Superfluid](#)

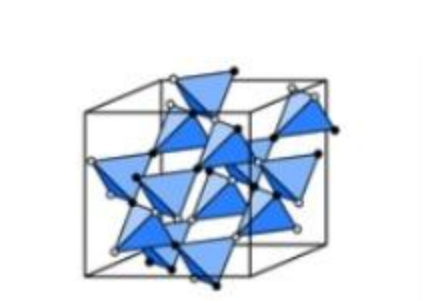
Nikolas Liebster, Marius Sparr, Elinor Kath, Jelte Duchene, Keisuke Fujii, Sarah L. Görlitz, Tilman Enss, Helmut Strobel, and Markus K. Oberthaler

Phys. Rev. X **15**, 011026 (2025) - Published 7 February, 2025

The emergence of square lattice patterns in an otherwise round superfluid of potassium after varying the interactions of its atoms hints at a new state of driven quantum matter.

Show Abstract

PDF



[Quantum Spin Ice in Three-Dimensional Rydberg Atom Arrays](#)

Jeet Shah, Gautam Nambiar, Alexey V. Gorshkov, and Victor Galitski

Phys. Rev. X **15**, 011025 (2025) - Published 6 February, 2025

A novel proposal for realizing a type of quantum spin liquid uses 3D Rydberg atom arrays, paving the way to probe a phase of matter that has largely eluded physicists for decades.

Show Abstract

PDF



[High-Dimensional Quantum Key Distribution by a Spin-Orbit Microlaser](#)

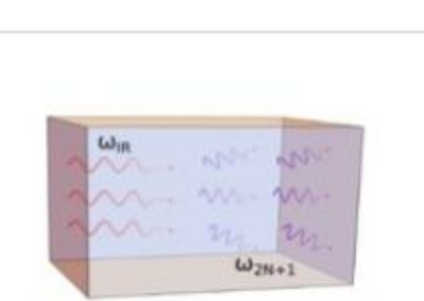
Yichi Zhang, Haoqi Zhao, Tianwei Wu, Ziheng Gao, Li Ge, and Liang Feng

Phys. Rev. X **15**, 011024 (2025) - Published 5 February, 2025

A first-of-its-kind demonstration of microlaser-enabled, high-dimensional quantum communication relies on multilevel, spin-orbit photon qubits to enhance information capacity and noise resilience.

Show Abstract

PDF



[Generation of Massively Entangled Bright States of Light during Harmonic Generation in Resonant Media](#)

Sili Yi, Nikolai D. Klimkin, Graham Gardiner Brown, Olga Smirnova, Serguei Patchkovskii, Ihar Babushkin, and Misha Ivanov

Phys. Rev. X **15**, 011023 (2025) - Published 5 February, 2025

High-harmonic generation is generally assumed to be classical. A new analysis shows how quantum correlations can give rise to nontrivial quantum states of harmonic light.

Show Abstract

PDF



[Collective Deformation Modes Promote Fibrous Self-Assembly in Deformable Particles](#)

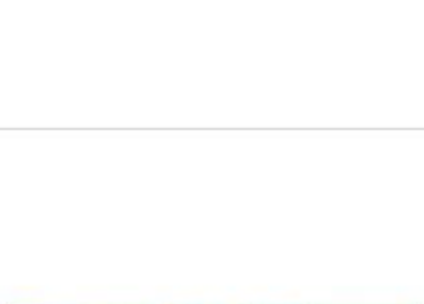
Hugo Le Roy, M. Mert Terzi, and Martin Lenz

Phys. Rev. X **15**, 011022 (2025) - Published 4 February, 2025

Fibrous aggregates provide an effective way for self-assembling particles to minimize energetically costly self-deformations.

Show Abstract

PDF



FEATURED IN PHYSICS

[Hybrid Josephson Rhombus: A Superconducting Element with Tailored Current-Phase Relation](#)

L. Banszerus, C. W. Andersson, W. Marshall, T. Lindemann, M. J. Manfra, C. M. Marcus, and S. Vaitiekėnas

Phys. Rev. X **15**, 011019 (2025) - Published 4 February, 2025

A circuit containing four superconducting devices called Josephson junctions can be finely tuned for various technological applications.

Show Abstract

PDF



FEATURED IN PHYSICS

[Theory of Robust Quantum Many-Body Scars in Long-Range Interacting Systems](#)

Alessio Lerose, Tommaso Parolini, Rosario Fazio, Dmitry A. Abanin, and Silvia Pappalardi

Phys. Rev. X **15**, 011020 (2025) - Published 3 February, 2025

A demonstration of quantum many-body scars arising from long-range interactions implies a surprising breakdown of conventional thermal equilibrium.

Show Abstract

PDF



[Plasmonic Polarization Sensing of Electrostatic Superlattice Potentials](#)

Shuai Zhang, Jordan Fonseca, Daniel Bennett, Zhiyuan Sun, Junhe Zhang, Ran Jing, Suheng Xu, Leo He, S. L. Moore, S. E. Rossi, Dmitry Ovchinnikov, David Cobden, Pablo Jarillo-Herrero, M. M. Fogler, Philip Kim, Ethimios Kaxiras, Xiaodong Xu, and D. N. Basov

Phys. Rev. X **15**, 011019 (2025) - Published 31 January, 2025

In a heterostructure of graphene and twisted boron nitride, the plasmonic response of the former can be used to probe the electric polarization of the latter, opening a new path for exploring a broad range of exotic ferroelectric or polar materials.

Show Abstract

PDF



[Flux Fractionalization Transition in Anisotropic Antiferromagnets and Dimer-Loop Models](#)

Souvik Kundu and Kedar Damle

Phys. Rev. X **15**, 011018 (2025) - Published 31 January, 2025

A system of spin-1 moments on a kagome lattice produces intriguing spin-liquid behavior, offering clues for progress toward realizing such spin liquids in experiments.

Show Abstract

PDF



FEATURED IN PHYSICS

[Positive Oscillating Magnetoresistance in a van der Waals Antiferromagnetic Semiconductor](#)

Xiaohanwen Lin, Fan Wu, Nicolas Ubrig, Menghan Liao, Fengrui Yao, Ignacio Gutiérrez-Lezama, and Alberto F. Morpurgo

Phys. Rev. X **15**, 011017 (2025) - Published 30 January, 2025

At low temperatures the resistance of a layered magnetic semiconductor shoots up and down in response to an increasing magnetic field.

Show Abstract

PDF



FEATURED IN PHYSICS

[Interfacial Morphodynamics of Proliferating Microbial Communities](#)

Alejandro Martinez-Calvo, Carolina Trenado-Yuste, Hyunseok Lee, Jeff Gore, Ned S. Wingreen, and Sujit S. Datta

Phys. Rev. X **15**, 011016 (2025) - Published 29 January, 2025

The shape of interfaces between domains of differing cell types arises from differences in cell proliferation rates and substrate friction, an insight that offers a biophysical basis for understanding such interfaces in microbial communities.

Show Abstract

PDF



PERSPECTIVE

[Generalized Hydrodynamics: A Perspective](#)

Benjamin Doyon, Sarang Gopalakrishnan, Frederik Møller, Jörg Schmiedmayer, and Romain Vasseur

Phys. Rev. X **15**, 010501 (2025) - Published 29 January, 2025

Show Abstract

PDF

Authors

- [General Information](#)
- [Submit a Manuscript](#)
- [Publication Rights](#)
- [Article Publication Charge](#)
- [Policies & Practices](#)
- [Tips for Authors](#)
- [Professional Conduct](#)

Referees

- [General Information](#)
- [Submit a Report](#)
- [Update Your Information](#)
- [Policies & Practices](#)
- [Referee FAQ](#)
- [Guidelines for Referees](#)
- [Outstanding Referees](#)

Librarians

- [General Information](#)
- [Subscriptions](#)
- [Online License Agreement](#)
- [Usage Statistics](#)
- [Your Account](#)

Students

- [Physics](#)
- [PhysicsCentral](#)
- [Student Membership](#)

Connect

- [Privacy](#)
- [Policies](#)
- [Contact Information](#)
- [Feedback](#)