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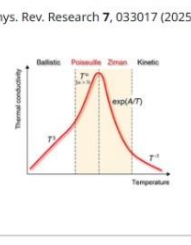
Browse Issues: Prev

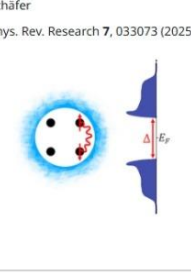
HIGHLIGHTED ARTICLES

EDITORS' SUGGESTION
Phonon hydrodynamic regimes in sapphire
Takuya Kawabata, Kosuke Shimura, Yuto Ishii, Minatsu Koike, Kentaro Yoshida, Shu Yonehara, Kohei Yokoi, Alaska Subedi, Kamran Behnia, and Yo Machida
Phys. Rev. Research **7**, 033017 (2025) - Published 7 July, 2025



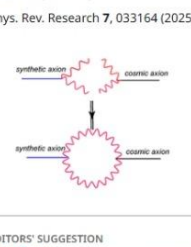
Experiments scanning a temperature window spread over 4 orders of magnitude find that thermal conductivity in sapphire peaks to 35 000 W/Km. This amplitude occurs at a temperature that marks the boundary between Ziman and Poiseuille hydrodynamic regimes. Such a large magnitude in the presence of natural isotopic impurity distinguishes sapphire from other simpler solids in which dimensionless thermal conductivity displays a universal scaling with isotopic impurity.

EDITORS' SUGGESTION
Disentangling real space fluctuations: The diagnostics of metal-insulator transitions beyond single-particle spectral functions
Michael Meixner, Marcel Krämer, Nils Wentzell, Pietro M. Bonetti, Sabine Andergassen, Alessandro Toschi, and Thomas Schäfer
Phys. Rev. Research **7**, 033073 (2025) - Published 18 July, 2025



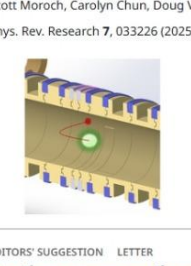
The mutual Coulomb interaction between electrons may cause a gap in the spectral function via different effective channels, such as spin, charge, or pairing fluctuations. This work clarifies that an effective dynamic nearest-neighbor spin boson causes the Mott metal-insulator transition in the two-dimensional Hubbard model. This cellular dynamical mean-field theory study analyzes the impact of the fermion-boson coupling vertex on the fermionic spectrum for different physical channels, an approach dubbed real-space fluctuation diagnostics.

EDITORS' SUGGESTION
Synthetic and cosmological axion hybridization: Entangled photons, Hanbury Brown–Twiss, and quantum beats
Daniel Boyanovsky
Phys. Rev. Research **7**, 033164 (2025) - Published 18 August, 2025



Synthetic axions, excitations in topological materials, and the cosmological axion, a compelling dark matter candidate, both couple to two-photon states with a Chern-Simons interaction. The common two-photon intermediate state hybridizes the two excitations and displays quantum beats from interference accessible via intensity interferometry, thereby harnessing synthetic axions to probe the cosmological candidate.

EDITORS' SUGGESTION
Half-life measurements of highly charged radioisotopes by nuclear recoil in a Penning trap
Scott Moroch, Carolyn Chun, Doug VanDerwerken, Ariana Shearin, Brian L. Beaudoin, Klaus Blaum, and Timothy W. Koeth
Phys. Rev. Research **7**, 033226 (2025) - Published 5 September, 2025

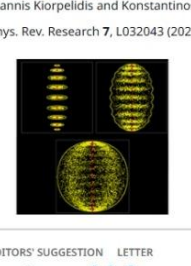


A technique is introduced to measure the half-life of highly charged radioactive ions using nondestructive nuclear recoil detection in a cryogenic Penning trap. Simulations and statistical analyses are performed for Be, which plays a critical role in stellar evolution and the production of solar neutrinos.

EDITORS' SUGGESTION LETTER
Continuous generation of confined bubbles: Viscous effect on the gravito-capillary pinch off
Haruka Hitomi and Ko Okumura
Phys. Rev. Research **7**, L032019 (2025) - Published 18 July, 2025

Continuous generation of bubbles is achieved in a confined space by a simple experimental setup, leading to substantial physics content. The convincing agreement between experiment and theory elucidates the dominant viscous force competing with buoyancy, while yet another viscous force plays a vital role for replacing in confined geometry the conventional pinch-off mechanism of Tate, proposed in 1864, in which buoyancy competes with capillarity.

EDITORS' SUGGESTION LETTER
Scaling of pseudospectra in exponentially sensitive lattices
Ioannis Kiorpelidis and Konstantinos G. Makris
Phys. Rev. Research **7**, L032043 (2025) - Published 22 August, 2025



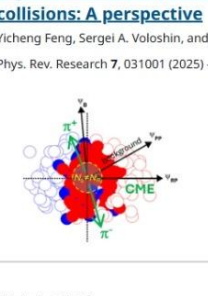
Lattices with asymmetric couplings have ultrastrong non-normality and thus exhibit exponential sensitivity and directed topological amplification. An analysis shows that the scaling laws of the associated pseudospectra determine the underlying physics of these effects and provide a unified framework for spectral and dynamical exponential sensitivity.

EDITORS' SUGGESTION LETTER
Fracton models from product codes
Yi Tan, Brenden Roberts, Nathanan Tantivasadakarn, Beni Yoshida, and Norman Y. Yao
Phys. Rev. Research **7**, L032062 (2025) - Published 22 September, 2025

A systematic expansion of topological fracton order to settings without lattice translation invariance is shown via the hypergraph product. Using this construction, a geometrically local but noncrystalline Type-II fracton model on an aperiodic tiling is conjectured to confine point particle excitations.

PERSPECTIVES

PERSPECTIVE
Experimental search for the chiral magnetic effect in relativistic heavy-ion collisions: A perspective
Yicheng Feng, Sergei A. Voloshin, and Fuqiang Wang
Phys. Rev. Research **7**, 031001 (2025) - Published 9 July, 2025



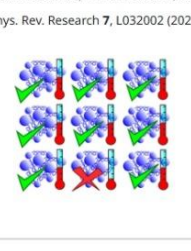
The chiral magnetic effect is one of the most intriguing and important physics in quantum chromodynamics. This Perspective provides a comprehensive and rigorous review of the latest experimental progress in the search for the chiral magnetic effect in relativistic heavy-ion collisions.

LETTERS

LETTER
Chladni patterns explained by the space-dependent diffusion of bouncing grains
Anaïs Abramian, Suzie Protière, Arnaud Lazarus, and Olivier Devauchelle
Phys. Rev. Research **7**, L032001 (2025) - Published 1 July, 2025

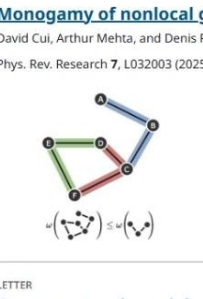
A mechanism for the formation of Chladni patterns is proposed. When a grain bounces on a vibrated membrane, it behaves as a random walker, whose diffusivity increases with the local amplitude of vibration. This provides a simple framework for understanding the collective dynamics of bouncing grains.

LETTER
Thermalization is typical in large classical and quantum harmonic systems
Marco Cattaneo, Marco Baldovin, Dario Lucente, Paolo Muratore-Ginanneschi, and Angelo Vulpiani
Phys. Rev. Research **7**, L032002 (2025) - Published 2 July, 2025



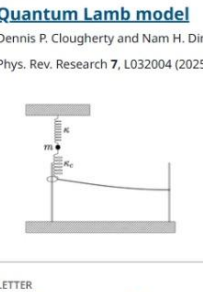
A study shows that in generic large quadratic systems with many degrees of freedom—both classical and quantum—almost all states in the microcanonical energy shell exhibit thermal behavior when observables involving many normal modes are considered. Moreover, the work demonstrates that the energies of a random rotation of the normal modes approach equipartition for typical initial conditions, even though the model possesses an extensive number of conserved quantities.

LETTER
Monogamy of nonlocal games
David Cui, Arthur Mehta, and Denis Rochette
Phys. Rev. Research **7**, L032003 (2025) - Published 7 July, 2025



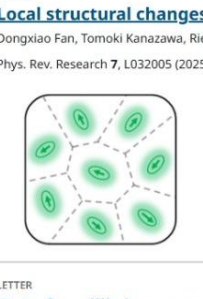
This work presents a general method for extending Bell monogamy relations to arbitrary multiplayer configurations and explicitly characterizes scenarios in which quantum nonlocality can arise. It also identifies novel multipartite Bell monogamy constraints and provides an example of a nonlocal game that remains unaffected by monogamy constraints.

LETTER
Quantum Lamb model
Dennis P. Clougherty and Nam H. Dinh
Phys. Rev. Research **7**, L032004 (2025) - Published 7 July, 2025



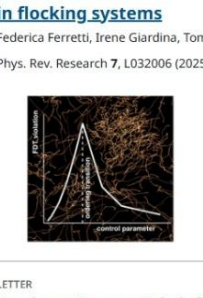
An exact solution to the dissipative quantum dynamics of a nanomechanical system is found by employing a multimode Bogoliubov transformation. The ground state is always a multimode squeezed-vacuum state whose displacement uncertainty is reduced with increasing damping.

LETTER
Local structural changes associated with relaxor behavior in Sn-doped
Dongxiao Fan, Tomoki Kanazawa, Rie Haruki, Youngmin Kim, and Shunsuke Nozawa
Phys. Rev. Research **7**, L032005 (2025) - Published 7 July, 2025



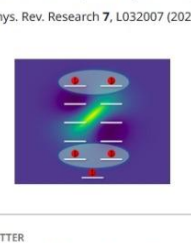
Local structural changes associated with polar nanoregions in Sn-doped BaTiO relaxor ferroelectrics are investigated by Ti -edge XANES spectroscopy.

LETTER
Out-of-equilibrium response and fluctuation-dissipation violations across scales in flocking systems
Federica Ferretti, Irene Giardina, Tomas Grigera, Giulia Pisegna, and Mario Veca
Phys. Rev. Research **7**, L032006 (2025) - Published 7 July, 2025



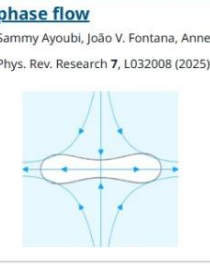
How directional perturbations affect the response of flocking systems is investigated, and the fluctuation-dissipation relation is found to be violated at all scales, with maximum effect at the ordering transition. By linking these violations to the entropy production, the study reveals how local activity and cooperative interactions drive global out-of-equilibrium responses, shedding light on the energetic costs of collective behavior in natural systems.

LETTER
Bardeen-Cooper-Schrieffer state representation and pairing detection in the fermionic Tonks-Girardeau gas
Francesc Sabater, Abel Rojo-Francàs, Grigori E. Astrakharchik, and Bruno Juliá-Díaz
Phys. Rev. Research **7**, L032007 (2025) - Published 7 July, 2025



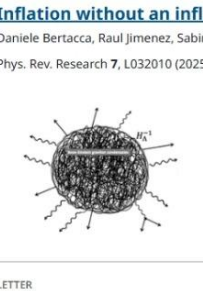
This work shows that the ground state of the fermionic Tonks-Girardeau gas can be described as a number-conserving Bardeen-Cooper-Schrieffer state. The corresponding second-quantized wave function is constructed using natural orbitals and exact coefficients for pairing detection under arbitrary external potentials are provided.

LETTER
Control-based continuation maps out unstable equilibria in laboratory two-phase flow
Sammy Ayoubi, João V. Fontana, Anne Juel, and Alice B. Thompson
Phys. Rev. Research **7**, L032008 (2025) - Published 8 July, 2025



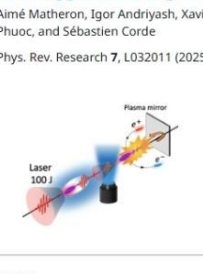
Noninvasive control of laboratory dynamical systems using control-based continuation (CBC) enables tracking of unstable equilibria experimentally without the need for a mathematical model. By controlling the shape and position of a bubble in flow, this study uses the test bed of fluid dynamics to extend the scope of CBC to spatially extended complex systems.

LETTER
Inflation without an inflaton
Daniele Bertacca, Raul Jimenez, Sabino Matarrese, and Angelo Ricciardone
Phys. Rev. Research **7**, L032010 (2025) - Published 8 July, 2025



A novel mechanism of inflation is proposed where, starting only from a preexisting de Sitter background, no scalar fields are present, and density perturbations arise from the nonlinear evolution of gravitational waves, which unavoidably arise as quantum vacuum oscillations of the metric. This model-free picture of the early Universe gives concrete predictions that can be tested against cosmological observations.

LETTER
Self-triggered strong-field QED collisions in laser-plasma interaction
Aimé Matheron, Igor Andriyash, Xavier Davoine, Laurent Gremillet, Mattys Pouyez, Mickael Grech, Livia Lancia, Kim Ta Phuoc, and Sébastien Corde
Phys. Rev. Research **7**, L032011 (2025) - Published 8 July, 2025

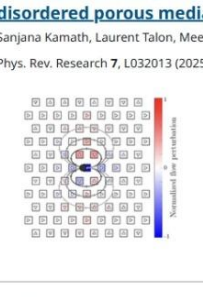


This work explores a concept combining a laser-plasma accelerator, a laser intensity booster, and a plasma mirror, which enables reaching strong-field quantum electrodynamics with electric fields reaching up to 5 times the Schwinger critical field in the rest frame of an electron beam.

LETTER
Quantum magnetic skyrmions on Kondo-type lattices
Zhen Zhao, Emil Östberg, Ferdi Aryasetiawan, and Claudio Verdozzi
Phys. Rev. Research **7**, L032012 (2025) - Published 10 July, 2025

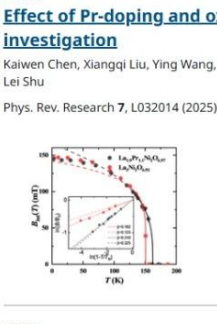
A theoretical scheme is presented to describe quantum skyrmions in contact with electronic reservoirs. Calculations of the ground-state and dynamical properties of the system are performed, with the spin-electron exchange approximated at the mean-field level. The effect of itinerant electrons on the properties of quantum nanoskyrmions is demonstrated. Numerical results show that the approach has an advantage over classical or mean-field treatments of local spins in a broad range of physical parameters.

LETTER
Getting out of a tight spot: Cooperative unclogging of hydrogel particles in disordered porous media
Sanjana Kamath, Laurent Talon, Meera Ramaswamy, Christopher A. Browne, and Sujit S. Datta
Phys. Rev. Research **7**, L032013 (2025) - Published 11 July, 2025



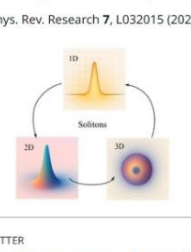
Event-driven pore network modeling of hydrogel particles moving in disordered porous media helps to identify a dimensionless "squeezing parameter" that quantitatively predicts particle penetration depth across diverse conditions. It also reveals, counterintuitively, that increasing particle concentration enhances penetration through cooperative effects, where individual particles redirect fluid flow to help nearby particles squeeze through tight pores that would otherwise cause clogging.

LETTER
Effect of Pr-doping and oxygen vacancies on spin density wave in : A investigation
Kaiwen Chen, Xiangqi Liu, Ying Wang, Jiyuan Han, Ziyi Zhu, Jiachen Jiao, Chengyu Jiang, Yanfeng Guo, Changlin Zheng, and Lei Shu
Phys. Rev. Research **7**, L032014 (2025) - Published 15 July, 2025



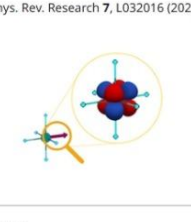
A SR study investigates the magnetic ground state of Pr-doped LaPrNiO and oxygen-deficient LaNiO polycrystals. This research confirms that Pr doping does not significantly alter the microscopic magnetism of LaNiO and reveals the destructive effect of apical-oxygen deficiencies on both intraplane and interplane magnetic correlation.

LETTER
Transdimensional dynamics of Kerr cavity solitons
Yifan Sun, Pedro Parra-Rivas, Francois Leo, Carles Milián, and Stefan Wabnitz
Phys. Rev. Research **7**, L032015 (2025) - Published 15 July, 2025



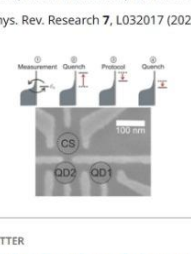
How dimensionality affects the existence and stability of radially symmetric Kerr cavity solitons in damped-driven nonlinear systems is systematically explored, revealing increased instability with higher dimensions.

LETTER
Antiferro octupolar order in the double perovskite and its spectroscopic signatures
Dario Fiore Mosca and Leonid V. Pourovskii
Phys. Rev. Research **7**, L032016 (2025) - Published 15 July, 2025



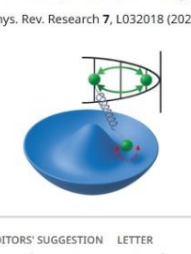
An antiferroic order of magnetic octupoles in the 5 double perovskite SrMgReO stabilized by a dominant tetragonal crystal field is uncovered. Characteristic signatures of this order in neutron-scattering experiments are predicted, providing insights into hidden multipolar phases in spin-orbit coupled systems.

LETTER
Rapid optimal work extraction from a quantum-dot information engine
Kushagra Aggarwal, Alberto Rolandi, Yikai Yang, Joseph Hickie, Daniel Jirovec, Andrea Ballabio, Daniel Chrastina, Giovanni Isella, Mark T. Mitchison, Martí Perarnau-Llobet, and Natalia Ares
Phys. Rev. Research **7**, L032017 (2025) - Published 15 July, 2025



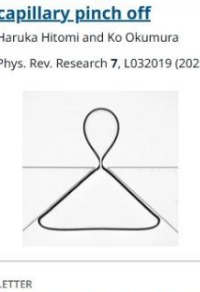
The realization and optimization of an information engine that allows work to be extracted from the measurement of thermal fluctuations is studied. The optimization enables maximal work extraction and maximal efficiency at any driving speed and is realized in a quantum-dot system.

LETTER
Hybridization of the amplitude mode in a confined fermionic superfluid
C. R. Cabrera, R. Henke, L. Broers, J. Skulte, H. P. Ojeda Collado, H. Biss, L. Mathey, and H. Moritz
Phys. Rev. Research **7**, L032018 (2025) - Published 17 July, 2025



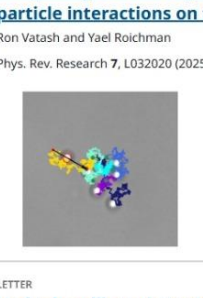
This work reveals how confinement affects fundamental excitations in a fermionic superfluid. In particular, the hybridization of the amplitude mode with a spatial breathing mode of the condensed part across the BCS-BEC crossover is observed.

EDITORS' SUGGESTION LETTER
Continuous generation of confined bubbles: Viscous effect on the gravito-capillary pinch off
Haruka Hitomi and Ko Okumura
Phys. Rev. Research **7**, L032019 (2025) - Published 18 July, 2025



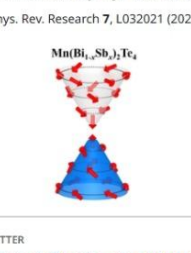
Continuous generation of bubbles is achieved in a confined space by a simple experimental setup, leading to substantial physics content. The convincing agreement between experiment and theory elucidates the dominant viscous force competing with buoyancy, while yet another viscous force plays a vital role for replacing in confined geometry the conventional pinch-off mechanism of Tate, proposed in 1864, in which buoyancy competes with capillarity.

LETTER
Many-body colloidal dynamics under stochastic resetting: Competing effects of particle interactions on the steady-state distribution
Ron Vatash and Yael Roichman
Phys. Rev. Research **7**, L032020 (2025) - Published 24 July, 2025



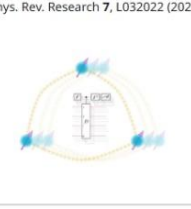
Experiments and simulations are combined to explore how interparticle interactions shape the steady-state distribution of six colloidal particles under finite-time stochastic resetting. Pronounced competing effects of hard-core repulsion and hydrodynamic interactions appear when particles are reset one at a time.

LETTER
Hedgehog-like spin texture in Sb-doped
Meng Zeng, Shu Mo, Ke Zhang, Yu-Jie Hao, Yu-Peng Zhu, Xiang-Rui Liu, Cheng Zhang, Ming-Yuan Zhu, Shiv Kumar, Takuma Iwata, Koji Miyamoto, Taichi Okuda, Kenya Shimada, Kenta Kuroda, Xiao-Ming Ma, and Chang Liu
Phys. Rev. Research **7**, L032021 (2025) - Published 24 July, 2025



The spin texture of the antimony-doped magnetic topological insulator MnBiTe, a promising platform for realizing the quantum anomalous Hall effect, is investigated. Using spin-resolved and circular-dichroism ARPES, this work reveals evidence of time-reversal symmetry breaking and uncovers a distinctive hedgehog-like spin texture in the system.

LETTER
Generalized concentratable entanglement via parallelized permutation tests
Xiaoyu Liu, Johannes Knörzer, Zherui Jerry Wang, and Jordi Tura
Phys. Rev. Research **7**, L032022 (2025) - Published 25 July, 2025

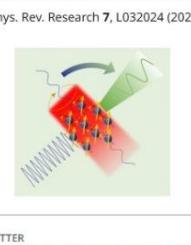


A family of multipartite entanglement measures, generalized concentratable entanglement (GCE), is proposed and shown to be efficiently estimable using parallelized permutation tests across multiple state copies. GCE exhibits a natural correspondence to quantum Tsallis entropies, and a related entropic inequality is conjectured.

LETTER
Nonreciprocal coupling triggers pinning-depinning transitions of wavefronts in bistable systems chains
L. B. Ramirez-Moya, M. Diaz-Zuniga, M. G. Clerc, and P. J. Aguilera-Rojas
Phys. Rev. Research **7**, L032023 (2025) - Published 1 August, 2025

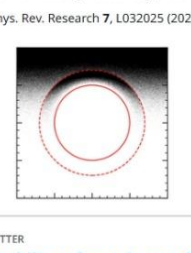
A nonlinear wave failure front velocity is caused by nonreciprocal coupling, which leads to the front connecting two states to no longer propagate. To perform experimental studies of nonlinear wave propagation between two nonreciprocally coupled equilibrium states, a liquid crystal valve with optical back-injection is used.

LETTER
Zero-field atomic magnetometer to extract longitudinal magnetic field
Shuying Wang, Jixi Lu, Kaixuan Zhang, Le Zhao, Yibo Qi, and Jiancheng Fang
Phys. Rev. Research **7**, L032024 (2025) - Published 1 August, 2025



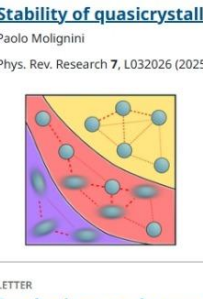
A longitudinal sensitivity of 16 fT/√Hz in a zero-field atomic magnetometer is demonstrated, overcoming its inherent dead zone using weak parametric modulation to amplify field response and suppress spin-exchange relaxation.

LETTER
Stochastic cloaking: Concealing a region from diffusive particles
Connor Roberts, Ziluo Zhang, Helder Rojas, Stefano Bo, Carlos Escudero, Sébastien Guenneau, and Gunnar Pruessner
Phys. Rev. Research **7**, L032025 (2025) - Published 4 August, 2025



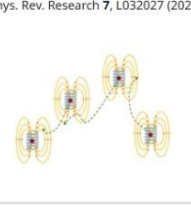
Stochastic cloaking is the concealment of a region from diffusing particles governed by Langevin dynamics. The cloak is derived via a coordinate transformation that maps uniform diffusion to an annular layer of spatially varying diffusivity. Simulations reveal that cloaking performance depends on the stochastic interpretation, with the Itô convention achieving near-perfect cloaking.

LETTER
Stability of quasicrystalline ultracold fermions to dipolar interactions
Paolo Molignini
Phys. Rev. Research **7**, L032026 (2025) - Published 5 August, 2025



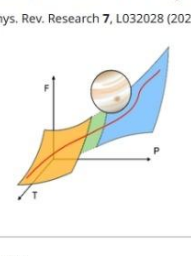
The dynamics of ultracold fermions in one-dimensional quasiperiodic optical lattices under dipolar interactions is investigated, revealing that long-range interactions stabilize a coexistence phase of localized and extended states and can induce disorder-free localization even in fully periodic setups.

LETTER
Synthetic mutual gauge field in microwave-shielded polar molecular gases
Bei Xu, Fan Yang, Ran Qi, Hui Zhai, and Peng Zhang
Phys. Rev. Research **7**, L032027 (2025) - Published 7 August, 2025



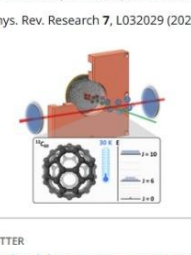
Recently, microwave-shielded polar molecules have been cooled to reach quantum degeneracy. A novel type of mutual gauge field emerges in the gas of such molecules, where each molecule experiences a synthetic magnetic field produced by other molecules, as if a solenoid were attached to it, pointing to novel quantum many-body physics.

LETTER
Accurate and thermodynamically consistent hydrogen equation of state for planetary modeling with flow matching
Hao Xie, Saburo Howard, and Guglielmo Mazzola
Phys. Rev. Research **7**, L032028 (2025) - Published 7 August, 2025



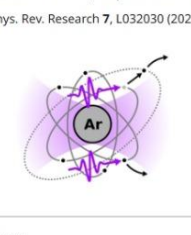
A new equation of state of dense hydrogen over a broad range of conditions relevant to the interiors of giant planets, such as Jupiter and Saturn, is presented. The accuracy of the resulting entropy data is guaranteed by stitching together free energy surfaces from various phase regions in an inherently thermodynamically consistent way. This aspect has been shown to be the dominant source of error behind the discrepancies among widely used equation-of-state models over the past decade.

LETTER
Full confirmation of icosahedral Bose-Einstein statistics in cold
Ya-Chu Chan, Lee R. Liu, Andrew Scheck, David J. Nesbitt, Jun Ye, and Dina Rosenberg
Phys. Rev. Research **7**, L032029 (2025) - Published 7 August, 2025



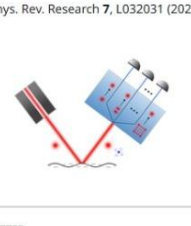
Cooling of gas-phase C to 30 K is reported, enabling observation of low- (< 30) rovibrational transitions in the 8.4 μm band. The wave-function exchange symmetry of 60 identical bosonic nuclei leads to the absence of 15 lines, resulting in a rigorous test of Bose statistics.

LETTER
Coincidence measurement of two-photon double ionization of argon through an autoionizing resonance
Sebastian Hell, Julian Späthe, Morten Førre, Robert Klas, Jan Rothhardt, Jens Limpert, Robert Moshammer, Christian Ott, Gerhard G. Paulus, Stephan Fritzsche, and Matthias Kübel
Phys. Rev. Research **7**, L032030 (2025) - Published 8 August, 2025



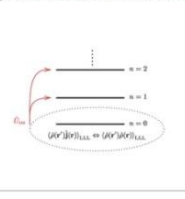
Using a high-harmonic generation light source, argon is doubly ionized by absorption of two photons around 26.5 eV. The measured photoelectron spectra reveal strong electron-electron interaction in the dominant pathway, which involves the excitation and prompt ionization of an autoionizing resonance.

LETTER
Quantum-limited imaging of a nanomechanical resonator with a spatial mode sorter
M. E. Choi, C. M. Pluchar, W. He, S. Guha, and D. J. Wilson
Phys. Rev. Research **7**, L032031 (2025) - Published 8 August, 2025



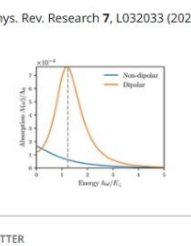
Spatial mode demultiplexing (SPADE) is a powerful, next-generation imaging tool. This work shows how SPADE can be used to readout a nanomechanical resonator with near-ideal quantum efficiency, opening the door to a new class of multimode optomechanical sensors.

LETTER
Correlations of the current density in many-body Landau level states
Daniel Spasic-Mlacak and Nigel R. Cooper
Phys. Rev. Research **7**, L032032 (2025) - Published 12 August, 2025



This work determines theoretically what information can be extracted from current-density correlations of many-body states formed in Landau levels or in vortexable Aharonov-Casher bands. It shows that measurements of such correlations can reveal the system's interaction energy, offering a new probe of many-body structure in quantum simulators.

LETTER
Optical response of the supersolid polaron
Laurent H. A. Simons, Ralf Klemt, Tilman Pfau, Michiel Wouters, and Jacques Tempere
Phys. Rev. Research **7**, L032033 (2025) - Published 13 August, 2025

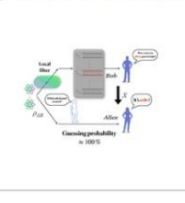


This article studies the optical response of an impurity embedded in a dipolar supersolid. The authors observe several distinct features and postulate that these can be used as signatures of supersolid excitations.

LETTER
Ubiquitous mechanism of creep-quake cycles in porous media
Leonardo A. Crespo Parraga, Itai Einav, and François Guillard
Phys. Rev. Research **7**, L032034 (2025) - Published 13 August, 2025

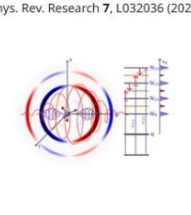
Ever wondered what breakfast cereals, salt, sand, and ice may have in common? Under the right conditions, they can all undergo creep-quake cycles—recurring sudden collapses following slow buildups. Through hands-on experiments and a simple theoretical model, this work explains the shared physics of this behavior across diverse porous materials.

LETTER
Experimentally enhancing high-dimensional subchannel discrimination via optimal local filtering
Yen-An Shih, Wan-Guan Chang, Gelo Noel M. Tabia, Hao-Cheng Weng, Tsung-Ying Tsai, Chih-Sung Chuu, Huan-Yu Ku, and Costantino Budroni
Phys. Rev. Research **7**, L032035 (2025) - Published 13 August, 2025



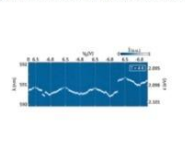
Enhanced discrimination of high-dimensional quantum subchannels via optimal local filtering, guided by semidefinite programming, is demonstrated in a one-sided device-independent photonic experiment. The method is theoretically capable of achieving a perfect success probability.

LETTER
Continuum-electron interferometry for enhancement of photoelectron circular dichroism and measurement of bound, free, and mixed contributions to chiral response
R. Esteban Goetz, Alexander Blech, Corbin Allison, Christiane P. Koch, and Loren Greenman
Phys. Rev. Research **7**, L032036 (2025) - Published 14 August, 2025



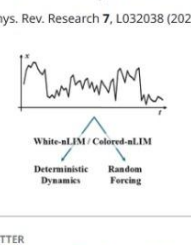
Coherent control of photoelectron circular dichroism, a chiral-sensitive observable obtained upon photoionization of chiral molecules in the gas phase, is shown to be readily realized by shining an XUV frequency comb together with an IR field onto the molecular ensemble. The delay between the two fields controls the strength of the chiral observable, and adjusting the polarization directions of the two fields allows for separating chiral signatures from the bound and continuum part of the electronic spectrum.

LETTER
Current-induced brightening of vacancy-related emitters in hexagonal boron nitride
Corinne Steiner, Rebecca Rahmel, Frank Volmer, Rika Windisch, Lars H. Janssen, Patricia Pesch, Kenji Watanabe, Takashi Taniguchi, Florian Libisch, Bernd Beschoten, Christoph Stampfer, and Annika Kurzmann
Phys. Rev. Research **7**, L032037 (2025) - Published 19 August, 2025



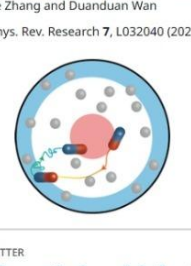
This article presents photoluminiscence measurements of vacancy-related emitters in hexagonal boron nitride (hBN) gated via few-layer graphene electrodes, and show a gate-dependent brightening of the emitter and a dependence of the brightness with the intensity of the laser used to induce the excitation.

LETTER
Nonlinear extensions of linear inverse models under memoryless or persistent random forcing
Justin Lien and Hiroyasu Ando
Phys. Rev. Research **7**, L032038 (2025) - Published 20 August, 2025



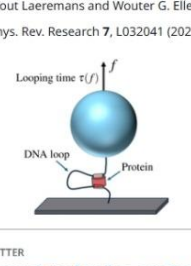
A correlation-based framework is presented for stochastic modeling and parameter estimation in dynamical systems subject to additive persistent noise. Its effectiveness is demonstrated through applications to the ideal Lorenz 63 system and real-world El Niño-Southern Oscillation data.

LETTER
Self-propelled particles undergoing cyclic transitions
Ye Zhang and Duanduan Wan
Phys. Rev. Research **7**, L032040 (2025) - Published 21 August, 2025



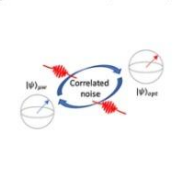
Cyclic transitions between active and passive states are central to many natural and synthetic systems—from light-driven active particles to animal migrations. This work investigates a minimal model of self-propelled Brownian particles undergoing such transitions, showing that the state-switching time varies nonmonotonically with particle number and that an emergent clustering phenomenon appears above a threshold value.

LETTER
Theoretical models for tension-dependent DNA looping time
Wout Laeremans and Wouter G. Ellenbroek
Phys. Rev. Research **7**, L032041 (2025) - Published 22 August, 2025



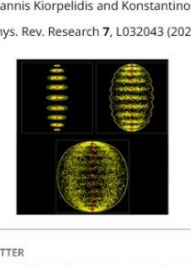
The looping time of DNA under tension is studied by comparing theoretical models with simulations and experimental data. A model is introduced in which the looping time scales inversely with the equilibrium looping probability and which matches simulation results for long semiflexible chains.

LETTER
Correlated noise can be beneficial to quantum transducers
Yu-Bo Hou, Xiaoan Ai, Ruizhe You, and Changchun Zhong
Phys. Rev. Research **7**, L032042 (2025) - Published 22 August, 2025



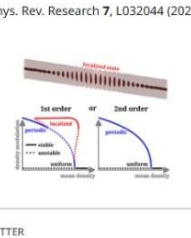
While environmental noise typically degrades the performance of quantum transducers, it is demonstrated that exploiting noise correlations allows a practical transducer with tunable coupling phase to benefit from such correlated noise.

EDITORS' SUGGESTION LETTER
Scaling of pseudospectra in exponentially sensitive lattices
Ioannis Kiorpelidis and Konstantinos G. Makris
Phys. Rev. Research **7**, L032043 (2025) - Published 22 August, 2025



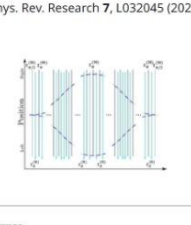
Lattices with asymmetric couplings have ultrastrong non-normality and thus exhibit exponential sensitivity and directed topological amplification. An analysis shows that the scaling laws of the associated pseudospectra determine the underlying physics of these effects and provide a unified framework for spectral and dynamical exponential sensitivity.

LETTER
Localized states in dipolar Bose-Einstein condensates: To be or not to be of second order
A. B. Steinberg, F. Maucher, S. V. Gurevich, and U. Thiele
Phys. Rev. Research **7**, L032044 (2025) - Published 22 August, 2025



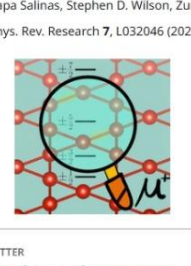
The existence of localized states in tubular dipolar Bose-Einstein condensates is shown, and their importance for the determination of the order of the occurring phase transition is discussed.

LETTER
Large momentum transfer Raman atom interferometer without -reversal
Guanchen Peng, Bryony Lanigan, R. Shah, J. Lim, A. Kaushik, J. P. Cotter, E. A. Hinds, and B. E. Sauer
Phys. Rev. Research **7**, L032045 (2025) - Published 25 August, 2025



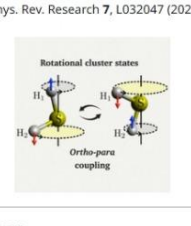
The sensitivity of an atom interferometer increases with increasing path separation. By combining light and microwave radiation, a way to increase this separation without rapid switching of the effective direction of the light is demonstrated. This technical simplification could lead to interferometers of greater sensitivity.

LETTER
Unveiling the nature of electronic transitions in with avoided level crossing
Pietro Bonfà, Francis Pratt, Diego Valenti, Ifeanyi John Onuorah, Anshu Kataria, Peter J. Baker, Stephen Cottrell, Andrea Capa Salinas, Stephen D. Wilson, Zurab Guguchia, and Samuele Sanna
Phys. Rev. Research **7**, L032046 (2025) - Published 2 September, 2025



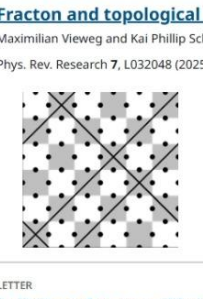
Charge order in RbVSb is investigated using avoided level crossing μSR under near-zero-field conditions. A combination of experimental and computational approaches reveals an additional charge redistribution within the kagome plane, which accompanies the transition observed in zero-field μSR measurements.

LETTER
Nuclear spin symmetry breaking and spin polarization in rotational energy level clusters
Andrey Yachmenev and Guang Yang
Phys. Rev. Research **7**, L032047 (2025) - Published 4 September, 2025



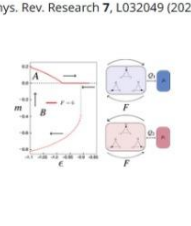
Centrifugal forces can break molecular symmetry at high rotational excitations, an effect known as rotational energy level clustering. In the case of the HS molecule, this is shown to simultaneously break nuclear spin symmetry, leading to strong ortho-para interaction and nuclear spin polarization.

LETTER
Fracton and topological order in the XY checkerboard toric code
Maximilian Vieweg and Kai Phillip Schmidt
Phys. Rev. Research **7**, L032048 (2025) - Published 3 September, 2025



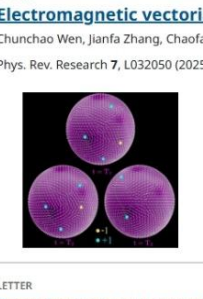
The XY checkerboard toric code is introduced as a generalization of the conventional toric code with two types of star operators and two anisotropic star sublattices forming a checkerboard lattice. The quantum phase diagram is deduced exactly, displaying topological and fracton phases with exotic properties.

LETTER
Splitting of nonequilibrium phase transitions in driven Ising models
Gustavo A. L. Forão, Fernando S. Filho, André P. Vieira, Bart Cleuren, Daniel M. Busiello, and Carlos E. Fiore
Phys. Rev. Research **7**, L032049 (2025) - Published 4 September, 2025



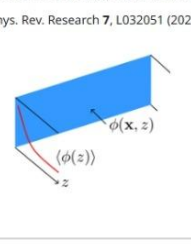
In equilibrium many-body systems, a phase transition typically occurs at a single point in parameter space, separating an ordered, broken-symmetry phase from a disordered one. Here, it's shown that, under the action of multiple heat baths combined with competing nonconservative forces, a nonequilibrium phase transition may be split into two transition points, associated with distinct ordered phases. One of the ordered phases can in principle be used to build a heat engine that is less dissipative, shows reduced fluctuations, and can operate near maximum power and maximum efficiency over a wide parameter range.

LETTER
Electromagnetic vectoriality beyond polarization
Chunchao Wen, Jianfa Zhang, Chaofan Zhang, Shiqiao Qin, Zhihong Zhu, and Wei Liu
Phys. Rev. Research **7**, L032050 (2025) - Published 8 September, 2025



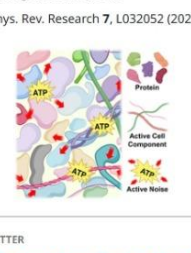
With a complementary perspective of steady polarization fields and instantaneous vector fields, it is discovered that radiation patterns without dark directions of zero scattering must have directions of both circular and linear polarizations and that radiation patterns without directions of circular polarizations or linear polarizations must have dark directions.

LETTER
Boundary operator product expansion coefficients of the three-dimensional Ising universality class
Dorian Przetakiewicz, Stefan Wessel, and Francesco Parisen Toldin
Phys. Rev. Research **7**, L032051 (2025) - Published 8 September, 2025



In a critical system bounded by surfaces, the boundary operator product expansion (BOPE) coefficients describe the expansion of the bulk scaling operator in the vicinity of the surface and represent universal amplitudes of one- and two-point functions. State-of-the-art Monte Carlo simulations are used to extract unbiased, accurate estimates of BOPE coefficients for the fundamental three-dimensional Ising universality class in the presence of a surface, for all known surface universality classes.

LETTER
Tuning of cytoplasmic effective viscosity via active noise
Ziming Zhao and Jie Lin
Phys. Rev. Research **7**, L032052 (2025) - Published 9 September, 2025

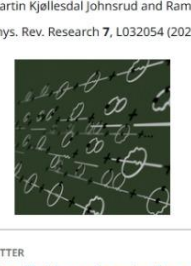


This work models cytoplasm as a soft colloidal suspension with active noise. It's found that to reproduce the 1/2 frequency scaling of the experimental complex shear moduli, the cytoplasm should be slightly above the jamming transition and be fluidized by active noise. The results suggest that the cell actively regulates volume fraction into this regime, allowing its viscoelastic properties to be sensitively tuned by intracellular active processes.

LETTER
Fluctuation dissipation relations for active field theories
Martin Kjøllesdal Johnsrud and Ramin Golestanian
Phys. Rev. Research **7**, L032053 (2025) - Published 9 September, 2025

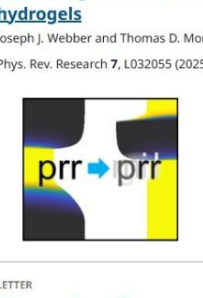
Active matter does not follow the fluctuation dissipation theorem of equilibrium systems, as it intrinsically breaks time-reversal symmetry. This work derives fluctuation dissipation relations valid far from equilibrium and investigates the physical consequences of these identities for various active field theories.

LETTER
Fluctuation dissipation relations for the nonreciprocal Cahn-Hilliard model
Martin Kjøllesdal Johnsrud and Ramin Golestanian
Phys. Rev. Research **7**, L032054 (2025) - Published 9 September, 2025



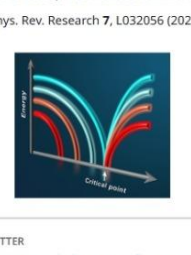
Recently derived exact fluctuation-dissipation relations formally connect the correlation and linear response functions of field theories far from equilibrium. This work develops and applies diagrammatic techniques for evaluating such relations in the context of the nonreciprocal Cahn-Hilliard model of active matter.

LETTER
Oscillating chemical reactions enable communication between responsive hydrogels
Joseph J. Webber and Thomas D. Montenegro-Johnson
Phys. Rev. Research **7**, L032055 (2025) - Published 9 September, 2025



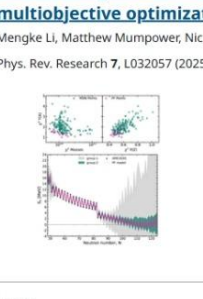
Chemically responsive hydrogels coupled with oscillating chemical reactions act like coupled oscillators when the products of the reactions can diffuse between them, swelling and deswelling in predictable patterns as the concentrations evolve in time. External manipulation of the gels can control the rate of these oscillations and facilitate signaling between gels in a manner akin to intracellular communication in biology.

LETTER
Observation of a zero-energy excitation mode in the open Dicke model
Anton Bölian, Phatthamon Kongkhambut, Christoph Georges, Roy D. Jara, Jr., José Vargas, Jens Klinder, Jayson G. Cosme, Hans Keßler, and Andreas Hemmerich
Phys. Rev. Research **7**, L032056 (2025) - Published 10 September, 2025



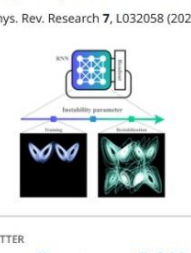
Using an atom-cavity platform operating in the regime of ultralow dissipation, an experiment has observed a quasiparticle composed of light and matter—a polariton—with zero excitation energy at a pump strength well below the critical value of the system's phase transition point. Hence, this polariton can be excited with zero energy cost, while the system remains stable.

LETTER
Constraining nuclear mass models using -process observables with multiobjective optimization
Mengke Li, Matthew Mumpower, Nicole Vassh, William Samuel Porter, and Rebecca Surman
Phys. Rev. Research **7**, L032057 (2025) - Published 11 September, 2025



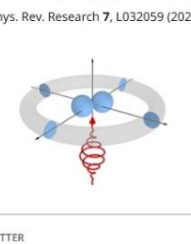
Extrapolating mass models to unstable regions of the nuclear chart remains a key challenge in nuclear physics. Though the majority of these unstable species have yet to be measured in the laboratory, they are accessed in nature through the rapid neutron capture process of nucleosynthesis. Here a multiobjective optimization strategy is introduced that leverages astrophysical -process abundances to guide machine learning models, enabling more reliable mass predictions for exotic nuclei.

LETTER
Crisis-induced intermittency in reservoir computing
Tempei Kabayama, Motomasa Komuro, Yasuo Kuniyoshi, Kazuyuki Aihara, and Kohei Nakajima
Phys. Rev. Research **7**, L032058 (2025) - Published 12 September, 2025



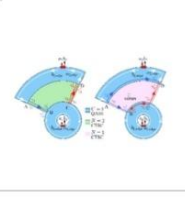
This study analyzes symmetric models to show that adjusting a global parameter in random neural networks—which develop multistability through reservoir computing—induces a crisis with intermittency.

LETTER
Decoding strong-field ionization of via photoelectron momentum torus
Daimu Ikeya, Hikaru Fujise, Minami Takahashi, Kyoichiro Yasui, Akitaka Matsuda, Mizuho Fushitani, Hirokazu Matsui, Hiroka Hasegawa, Oleg I. Tolstikhin, Toru Morishita, and Akiyoshi Hishikawa
Phys. Rev. Research **7**, L032059 (2025) - Published 12 September, 2025



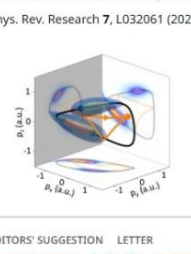
A quantitative decoding of strong-field ionization of H from its photoelectron momentum torus is demonstrated, providing a precise and robust framework for extracting molecular ionization potentials and laser field parameters directly from the photoelectron momentum distribution.

LETTER
Laughlin charge pumping from interplay of chiral Dirac and chiral Majorana modes
Zhan Cao, Yang Feng, Zhi-Hai Liu, and Ke He
Phys. Rev. Research **7**, L032060 (2025) - Published 17 September, 2025



Laughlin charge pumping arising from the interplay between chiral Dirac and chiral Majorana modes is investigated, predicting fractional pumping features with topological origins that reflect the charge-neutral and zero-momentum character of zero-energy chiral Majorana modes.

LETTER
Chiral electron momentum distribution upon strong-field ionization of atoms
A. Geyer, J. Stindl, I. Dwojak, M. Hofmann, N. Anders, P. Roth, P. Daum, J. Kruse, S. Jacob, S. Gurevich, N. Wong, M. S. Schöffler, L. Ph. H. Schmidt, T. Jahnke, M. Kunitski, R. Dörner, and S. Eckart
Phys. Rev. Research **7**, L032061 (2025) - Published 18 September, 2025

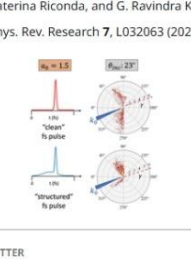


A scheme for the synthetization of a three-dimensional laser field for the strong-field ionization of atoms is presented. Despite the spatial dependence of the field, only a small region of the focal volume contributes to the ionization process. For suitable laser parameters, this results in a volume-averaged electron momentum distribution that is chiral.

EDITORS' SUGGESTION LETTER
Fracton models from product codes
Yi Tan, Brenden Roberts, Nathanan Tantivasadakarn, Beni Yoshida, and Norman Y. Yao
Phys. Rev. Research **7**, L032062 (2025) - Published 22 September, 2025

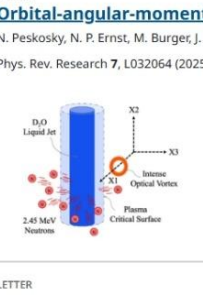
A systematic expansion of topological fracton order to settings without lattice translation invariance is shown via the hypergraph product. Using this construction, a geometrically local but noncrystalline Type-II fracton model on an aperiodic tiling is conjectured to confine point particle excitations.

LETTER
Role of femtosecond prestructure of intense harmonic pulses in relativistic laser-solid interactions
C. Aparajit, Anandam Choudhary, Ankit Dulat, Mickael Grech, Samuel Marini, Amit D. Lad, Yash M. Ved, Michèle Raynaud, Caterina Riconda, and G. Ravindra Kumar
Phys. Rev. Research **7**, L032063 (2025) - Published 22 September, 2025



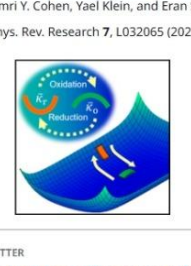
Second-harmonic generation is an effective approach to enhance the laser contrast in the nanosecond and picosecond range; however, a femtosecond-scale structure in the rising edge persists. It is experimentally and theoretically demonstrated that the presence of this structure critically modifies the fundamental surface interactions of such pulses with flat and sub-λ grating solid targets.

LETTER
Orbital-angular-momentum-enhanced laser absorption and neutron generation
N. Peskosky, N. P. Ernst, M. Burger, J. Murphy, J. Nees, I. Jovanovic, A. G. R. Thomas, and K. Krushelnick
Phys. Rev. Research **7**, L032064 (2025) - Published 22 September, 2025



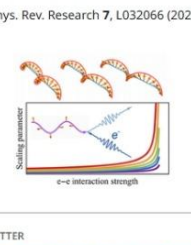
Employing high-intensity optical vortex rings, this work experimentally demonstrates enhanced laser absorption and fast neutron generation when compared to a standard Gaussian pulse. The enhanced laser absorption is associated with the excitation of orbital angular momentum carrying plasma waves during vortex ring pulse filamentation.

LETTER
Surfing locomotion of elastic sheets driven by curvature mismatch
Omri Y. Cohen, Yael Klein, and Eran Sharon
Phys. Rev. Research **7**, L032065 (2025) - Published 22 September, 2025



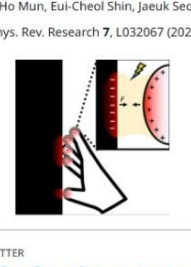
The autonomous surfing of curved active gels on a curved fluid-fluid interface is studied experimentally and theoretically, demonstrating locomotion that arises from geometric mismatch. A theoretical model combining incompatible elasticity and capillarity accurately captures the observed trajectories and reveals the generality of this mode of locomotion, which can appear in various biological and mechanical systems.

LETTER
Quasi-two-dimensional spin helix and magnon-induced singularity in twisted bilayer graphene
Yung-Yeh Chang, Kazuma Saito, and Chen-Hsuan Hsu
Phys. Rev. Research **7**, L032066 (2025) - Published 22 September, 2025



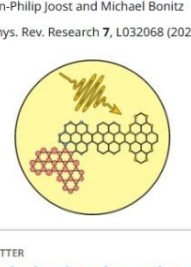
In twisted bilayer graphene, electrons flowing through domain wall networks interact with localized spins placed on the graphene. This interaction leads to a two-dimensional helical spin pattern, whose collective spin waves scatter the electrons and give rise to an electrically tunable singularity detectable in magnetic resonance and spin response measurements.

LETTER
Triboelectric charge transfer theory driven by thermoelectric effect
Ji-Ho Mun, Eui-Cheol Shin, Jaeuk Seo, and Yong-Hyun Kim
Phys. Rev. Research **7**, L032067 (2025) - Published 22 September, 2025



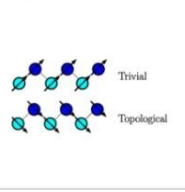
Interfacial heat promotes triboelectric charge transfer through the thermoelectric effect. When the heat-generated triboelectric charges accumulate on sharp surfaces, they generate powerful electrostatic forces, enabling sticky adhesion.

LETTER
Ultrafast charge separation induced by a uniform field in graphene nanoribbons
Jan-Philip Joost and Michael Bonitz
Phys. Rev. Research **7**, L032068 (2025) - Published 23 September, 2025



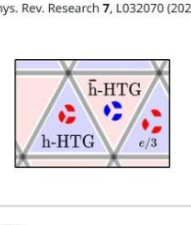
Graphene nanostructures can undergo subnanometer, localized, femtosecond electronic excitations, even under spatially uniform light, because of their topology-driven electronic structure. Nonequilibrium Green's function simulations indicate that by tuning geometry and laser parameters, like photon energy, polarization, and carrier-envelope phase, this effect could enable ultrafast nanoelectronic control and potentially petahertz switching.

LETTER
Polarization-dependent topology in quantum emitter chains
Jonathan Sturm and Adriana Pálffy
Phys. Rev. Research **7**, L032069 (2025) - Published 26 September, 2025



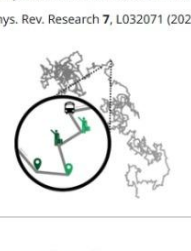
The orientation of the transition dipole moment strongly influences the dipole-dipole couplings between quantum emitters. This principle is used to actively control the topology of zigzag-shaped Su-Schrieffer-Heeger chains without changing the chain geometry.

LETTER
Fractional Chern mosaic in supermoiré graphene
Yves H. Kwan, Tixuan Tan, and Trithep Devakul
Phys. Rev. Research **7**, L032070 (2025) - Published 29 September, 2025



The fractional Chern mosaic, a state characterized by spatially varying topological order, is introduced, and its relevance for supermoiré platforms such as helical trilayer graphene is demonstrated.

LETTER
Multitimescale diffusion in ridepooling dynamics
Philip Marszal, Nora Molkenthin, Marc Timme, and Malte Schröder
Phys. Rev. Research **7**, L032071 (2025) - Published 29 September, 2025



Routes of ridepooling vehicles constitute a stochastic process that evolves on different timescales. The diffusion dynamics emerging from the underlying routing mechanisms explains scaling laws of ridepooling performance metrics.

ARTICLES

Optimal cell shape for accurate chemical gradient sensing in eukaryote chemotaxis
Daiqiu Mou and Yuansheng Cao
Phys. Rev. Research **7**, 033001 (2025) - Published 1 July, 2025

How to realize compact and noncompact localized states in disorder-free hypercube networks
Ievgen I. Arkhipov, Fabrizio Minganti, and Franco Nori
Phys. Rev. Research **7**, 033002 (2025) - Published 1 July, 2025

Hydrodynamic stresses in a multi-species suspension of active Janus colloids
Gennaro Tucci, Giulia Pisegna, Ramin Golestanian, and Suropriya Saha
Phys. Rev. Research **7**, 033003 (2025) - Published 1 July, 2025

Breaking mechanical holography in combinatorial metamaterials
Chaviva Sirote-Katz, Ofri Palti, Naomi Spiro, Tamás Kálmán, and Yair Shokef
Phys. Rev. Research **7**, 033004 (2025) - Published 1 July, 2025

Defect positioning in combinatorial metamaterials
Chaviva Sirote-Katz, Yotam M. Y. Feldman, Guy Cohen, Tamás Kálmán, and Yair Shokef
Phys. Rev. Research **7**, 033005 (2025) - Published 1 July, 2025

Adiabatic gauge potential as a tool for detecting chaos in classical systems
Nachiket Karve, Nathan Rose, and David Campbell
Phys. Rev. Research **7**, 033006 (2025) - Published 1 July, 2025

Projection optimization method for open-dissipative quantum fluids and its application to a single vortex in a photon Bose-Einstein condensate
Joshua Krauß, Marcos Alberto Gonçalves dos Santos Filho, Francisco Ednilson Alves dos Santos, and Axel Pelster
Phys. Rev. Research **7**, 033007 (2025) - Published 1 July, 2025

Engineering active motion in quantum matter
Alexander P. Antonov, Yuanjian Zheng, Benno Liebchen, and Hartmut Löwen
Phys. Rev. Research **7**, 033008 (2025) - Published 1 July, 2025

Tree networks of real-world data: Analysis of efficiency and spatiotemporal scales
Davide Cipollini and Lambert Schomaker
Phys. Rev. Research **7**, 033009 (2025) - Published 1 July, 2025

Wormlike emulsion droplets
Jatin Abacousnac, Wenjun Chen, Jasna Brujic, and David G. Grier
Phys. Rev. Research **7**, 033010 (2025) - Published 1 July, 2025

Geometric thermodynamics of reaction-diffusion systems: Thermodynamic trade-off relations and optimal transport for pattern formation
Ryuna Nagayama, Kohei Yoshimura, Artemy Kolchinsky, and Sosuke Ito
Phys. Rev. Research **7**, 033011 (2025) - Published 2 July, 2025

Quantum simulation of non-Abelian lattice gauge theories: A variational approach to with dynamical matter
Emanuele Gaz, Pavel P. Popov, Guy Pardo, Maciej Lewenstein, Philipp Hauke, and Erez Zohar
Phys. Rev. Research **7**, 033012 (2025) - Published 2 July, 2025

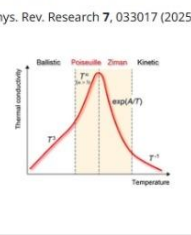
Bypassing the filtering challenges in microwave-optical quantum transduction through optomechanical four-wave mixing
James Schneeloch, Erin Sheridan, A. Matthew Smith, Christopher C. Tison, Daniel L. Campbell, Matthew D. LaHaye, Michael L. Fanto, and Paul M. Alsing
Phys. Rev. Research **7**, 033013 (2025) - Published 2 July, 2025

Quantum approximate optimization algorithms for maximum cut on low-girth graphs
Tongyang Li, Yuexin Su, Ziyi Yang, and Shengyu Zhang
Phys. Rev. Research **7**, 033014 (2025) - Published 2 July, 2025

On-chip pulse shaping of entangled photons
Kaiyi Wu, Lucas M. Cohen, Karthik V. Myilswamy, Navin B. Lingaraju, Hsuan-Hao Lu, Joseph M. Lukens, and Andrew M. Weiner
Phys. Rev. Research **7**, 033015 (2025) - Published 2 July, 2025

Estimating ionization states and continuum lowering from *ab initio* path integral Monte Carlo simulations for warm dense hydrogen
Hannah M. Bellenbaum, Maximilian P. Böhme, Michael Bonitz, Tilo Döppner, Luke B. Fletcher, Thomas Gawne, Dominik Kraus, Zhandos A. Moldabekov, Sebastian Schwalbe, Jan Vorberger, and Tobias Dornheim
Phys. Rev. Research **7**, 033016 (2025) - Published 7 July, 2025

EDITORS' SUGGESTION
Phonon hydrodynamic regimes in sapphire
Takuya Kawabata, Kosuke Shimura, Yuto Ishii, Minatsu Koike, Kentaro Yoshida, Shu Yonehara, Kohei Yokoi, Alaska Subedi, Kamran Behnia, and Yo Machida
Phys. Rev. Research **7**, 033017 (2025) - Published 7 July, 2025



Experiments scanning a temperature window spread over 4 orders of magnitude find that thermal conductivity in sapphire peaks to 35 000 W/Km. This amplitude occurs at a temperature that marks the boundary between Ziman and Poiseuille hydrodynamic regimes. Such a large magnitude in the presence of natural isotopic impurity distinguishes sapphire from other simpler solids in which dimensionless thermal conductivity displays a universal scaling with isotopic impurity.

Operator growth in disordered spin chains: Indications for the absence of many-body localization
A. Weisse, R. Gerstner, and J. Sirker
Phys. Rev. Research **7**, 033018 (2025) - Published 7 July, 2025

Critically-enhanced nonreciprocal electronic transport at magnetic phase boundary in a room temperature helimagnet
Hidetoshi Masuda, Jun-ichiro Ohe, Yoichi Nii, Shojiro Kimura, and Yoshinori Onose
Phys. Rev. Research **7**, 033019 (2025) - Published 7 July, 2025

Emergent cell migration from cell shape deformations and T1 transitions
Harish P. Jain, Richard D. J. G. Ho, and Luiza Angheluta
Phys. Rev. Research **7**, 033020 (2025) - Published 7 July, 2025

Exerting chemical pressure on the kagome lattice as frustration control in the kapellasite family
Jonas Andreas Krieger, Thomas James Hicken, Hubertus Luetkens, Reinhard K. Kremer, and Pascal Puphal
Phys. Rev. Research **7**, 033021 (2025) - Published 7 July, 2025

Making molecules by mergoassociation: The role of center-of-mass motion
Robert C. Bird and Jeremy M. Hutson
Phys. Rev. Research **7**, 033022 (2025) - Published 7 July, 2025

Interlayer interactions in under pressure: From to -wave superconductivity
Lauro B. Braz, George B. Martins, and Luis G. G. V. Dias da Silva
Phys. Rev. Research **7**, 033023 (2025) - Published 7 July, 2025

Neutron matter from local chiral effective field theory interactions at large cutoffs
Ingo Tews, Rahul Somasundaram, Diego Lonardoni, Hannah Göttling, Rodric Seutin, Joseph Carlson, Stefano Gandolfi, Kai Hebeler, and Achim Schwenk
Phys. Rev. Research **7**, 033024 (2025) - Published 7 July, 2025

Quantum fluctuations-driven melting transitions in two-dimensional superconductors
Dong Qiu, Yuting Zou, Chao Yang, Dongxing Zheng, Chenhui Zhang, Deju Zhang, Yuhang Wu, Gaofeng Rao, Peng Li, Yuqiao Zhou, Xian Jian, Haoran Wei, Zhigang Cheng, Xixiang Zhang, Yanning Zhang, Haiwen Liu, Jingbo Qi, Yanrong Li, and Jie Xiong
Phys. Rev. Research **7**, 033025 (2025) - Published 7 July, 2025

Magneto-optical spectra of an organic antiferromagnet as a candidate for an altermagnet
Satoshi Iguchi, Hiroki Kobayashi, Yuka Ikemoto, Tetsuya Furukawa, Hirotake Itoh, Shinichiro Iwai, Taro Moriwaki, and Takahiko Sasaki
Phys. Rev. Research **7**, 033026 (2025) - Published 7 July, 2025

Reexamining circular dichroism in photoemission from a topological insulator
Ittai Sidilkover, Yun Yen, Sunil Wilfred D'Souza, Jakub Schusser, Aki Pulkkinen, Costel R. Rotundu, Makoto Hashimoto, Donghui Liu, Zhi-Xun Shen, Ján Minár, Michael Schüler, Hadas Soifer, and Jonathan A. Sobota
Phys. Rev. Research **7**, 033027 (2025) - Published 7 July, 2025

Mixed-state topological order parameters for symmetry-protected fermion matter
Ze-Min Huang and Sebastian Diehl
Phys. Rev. Research **7**, 033028 (2025) - Published 7 July, 2025

Robust error accumulation suppression for quantum circuits
Tatsuki Odake, Philip Taranto, Nobuyuki Yoshioka, Toshinari Itoko, Kunal Sharma, Antonio Mezzacapo, and Mio Murao
Phys. Rev. Research **7**, 033029 (2025) - Published 8 July, 2025

In vitro living system for streaming flow rectification
Zhi Dou, Liu Hong, Songyuan Cui, Zhengwei Li, Fan Kiat Chan, Yashraj Bhosale, Onur Aydin, Kai-yu Huang, Hyunjoon Kong, Gabriel Juarez, M. Taher A. Saif, Leonardo P. Chamorro, and Mattia Gazzola
Phys. Rev. Research **7**, 033030 (2025) - Published 8 July, 2025

Exploiting chaotic dynamics as deep neural networks
Shuhong Liu, Nozomi Akashi, Qingyao Huang, Yasuo Kuniyoshi, and Kohei Nakajima
Phys. Rev. Research **7**, 033031 (2025) - Published 8 July, 2025

Chemical enhancement of superconductivity in with mode-selective coupling between kagome phonons and flat bands
Ryo Misawa, Markus Kriener, Rinsuke Yamada, Ryota Nakano, Milena Jovanovic, Leslie M. Schoop, and Max Hirschberger
Phys. Rev. Research **7**, 033032 (2025) - Published 8 July, 2025

Wave-particle duality ellipse and application in quantum imaging with undetected photons
Pawan Khatiwada and Xiao-Feng Qian
Phys. Rev. Research **7**, 033033 (2025) - Published 8 July, 2025

Higher-order exceptional points in composite non-Hermitian systems
Jan Wiersig and Weijian Chen
Phys. Rev. Research **7**, 033034 (2025) - Published 8 July, 2025

Mass invariant in a compressible turbulent medium
Pierre Dumond, Jérémy Fensch, Gilles Chabrier, and Etienne Jaupart
Phys. Rev. Research **7**, 033035 (2025) - Published 8 July, 2025

Feature-enriched hyperbolic network geometry
Roya Aliakbarisani, M. Ángeles Serrano, and Marián Boguñá
Phys. Rev. Research **7**, 033036 (2025) - Published 8 July, 2025