

**Solid evaporative levitation**

The conventional Leidenfrost effect occurs when a liquid is in contact with a hot surface. Now, in a paper by Zhang and colleagues, this phenomenon has been extended to capillary structures, showing that the microchannels in balsa wood and cuttlebone (pictured) serve as reservoirs for liquid storage and transport. This enables the capillary Leidenfrost effect, where the generated vapour levitates the natural structure, analogous to a traditional Leidenfrost droplet.

See [Zhang et al.](#)

Image: Zhi Zhang, City University of Hong Kong. Cover design: Laïse Mac Gabhann

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15 May 2026

**From data to dialogue**

Most researchers would agree that science communication is important. Still, academia would benefit from a more proactive approach — one that embeds communication in research culture.

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**Hidden dependencies**

Mark Buchanan

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**News & Views**  
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**Topology uncovered in real space**

There are theoretical predictions that topologically non-trivial states in materials leave tell-tale signs in the spatial structure of their wave functions. These have now been observed in monolayer materials.

Sathwik Bharadwaj

**News & Views**  
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**Quantum random access memory put to the test**

Specialized quantum memories will be required to achieve quantum speedups for data-intensive problems. Now, a proof-of-principle demonstration of such a quantum memory has been performed with a superconducting processor.

Connor T. Hann

**News & Views**  
16 Apr 2026

**Motorized paperclip learns functional reflexes**

A wire of motorized hinges learns, forgets, and relearns automatic responses on demand, uncovering the physical principles necessary to emulate autonomous learning of living matter.

Karen Alim

**News & Views**  
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**Wetting beyond equilibrium**

Wetting is well understood for equilibrium conditions. Simulations probing wetting by active matter now demonstrate the emergence of stabilizing particle currents and provide the basis for a formalism describing wetting for non-equilibrium systems.

Takumi Matsuzawa

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**Tissue shape design**

Elizaveta Dubrovina

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**Precision meets portability**

Sonal Mistry

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**Research Briefing**  
06 May 2026

**Amplitude fluctuations reshape the lattice chiral response in a ferroaxial electronic crystal**

Helicity-resolved Raman spectroscopy reveals dynamical coupling between charge-density-wave amplitude fluctuations and symmetry-distinct phonons in a ferroaxial van der Waals crystal. This resonant dressing amplifies the material's planar chiral lattice response through the underlying electronic order.

**Research Briefing**  
20 Apr 2026

**Optical excitations reshape the spin-wave spectrum in antiferromagnets**

Charge-transfer excitations, which define the optical bandgap in many insulators, also contribute to magnetic exchange in antiferromagnets. Femtosecond optical pumping of these transitions in canted antiferromagnet DyFeO<sub>3</sub> reshapes the spin-wave spectrum — the set of collective spin excitations that define the dynamics of the antiferromagnet — without destroying the long-range order.

**Research Briefing**  
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**Squeezed, trisqueezed and quadsqueezed states via spin-oscillator coupling**

A method applied to a single trapped ion combines two linear spin-dependent interactions to generate nonlinear couplings in the ion's motion: squeezing, trisqueezing and quadsqueezing interactions are demonstrated. The approach can be applied to any spin-oscillator system, produces stronger unitary interactions with the flexibility to switch quickly between orders, and scales seamlessly to higher orders and multiple oscillators.

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**Article**  
14 Apr 2026

**Detection of atmospheric <sup>42</sup>Ar at the 10<sup>-21</sup> level by atom counting**

Argon-42 is a background in experiments that search for dark matter or neutrinoless double-beta decay. Now, the isotope's abundance is measured by combining a laser-based atom trapping technique with isotope pre-enrichment.

Z.-F. Wan, J. W. Liang ... G. M. Yang

**Article**  
06 Apr 2026

**Length-scale dependence of the anomalous atomic motion in metallic glasses**

Synchrotron experiments show that the anomalous hyper-diffusive atomic motion in metallic glasses corresponds to a regime of medium-length-scale order, resulting from internal stresses developed throughout the glass transition.

Jie Shen, Fan Yang ... Beatrice Ruta

**Article**  
31 Mar 2026

**Real-space imaging of the band topology of transition metal dichalcogenides**

Two distinct types of atomic insulator can be distinguished by the distribution of charges within the unit cell. Now, real-space imaging of WSe<sub>2</sub> shows that it is a so-called obstructed insulator.

Madsen Holbrook, Julian Ingham ... Abhay N. Pasupathy

**Article**  
31 Mar 2026

**Observation of an obstructed atomic band in a transition metal dichalcogenide**

Atomic insulators come in two varieties: so-called unobstructed and obstructed types. The former are common and now scanning tunnelling microscopy experiments provide evidence for the latter.

Dumitru Călugăru, Yi Jiang ... Miguel M. Ugeda

**Article**  
07 Apr 2026

**Double-edged role of interactions in superconducting twisted bilayer graphene**

It is unclear whether the superconducting pairing in moiré graphene is driven primarily by electronic interactions. Now, by tuning the electrostatic environment, the authors show that these interactions may play a crucial role in both mediating the pairing and screening it.

Xueshi Gao, Alejandro Jimeno-Pozo ... Chun Ning Lau

**Article**  
24 Mar 2026

**Symmetry-broken Kondo screening and zero-energy mode in a kagome superconductor**

Defects in quantum materials can reveal hidden electronic behaviour. Now a hidden chiral current state intertwined with a charge density wave has been observed in a kagome superconductor doped with magnetic impurities.

Yubing Tu, Zongyuan Zhang ... Lei Shan

**Article**  
02 Apr 2026

**Frieze charge stripes in a correlated kagome superconductor**

In a kagome superconductor, sublattice degrees of freedom are shown to govern a distinct density wave phase featuring chiral textures and symmetry properties that align with one of the fundamental frieze symmetry groups.

Siyu Cheng, Keyu Zeng ... Ilija Zeljkovic

**Article**  
Open Access  
03 Apr 2026

**Evidence for odd-parity superconductivity underpinned by antiferromagnetism in heavy-fermion metal YbRh<sub>2</sub>Si<sub>2</sub>**

Odd-parity spin-triplet superconductivity remains difficult to establish experimentally. Now, several distinct magnetic-field-tuned superconducting states—including a possible topological helical phase—have been identified in YbRh<sub>2</sub>Si<sub>2</sub>.

Lev V. Levitin, Jan Knapp ... John Saunders

**Article**  
01 May 2026

**Resonant chiral dressing by amplitude fluctuations in a ferroaxial electronic crystal**

Symmetry rules usually prevent interactions between distinct vibrational modes. Now it is shown that charge order fluctuations can mix modes, enhancing the chiral lattice response in a ferroaxial electronic crystal.

Francesco Barantani, Xinyue Peng ... Edoardo Baldini

**Article**  
14 Apr 2026

**Photoengineering the magnon spectrum in an insulating antiferromagnet**

Controlling the dynamics of magnons at terahertz frequencies is important for fast and efficient information processing devices. Now optical excitation is shown to enable ultrafast manipulation of magnon spectra in an insulating antiferromagnet.

V. Radovskaia, R. Andrei ... D. Afanasiev

**Article**  
Open Access  
21 Apr 2026

**Laser-induced nucleation of magnetic hopfions**

The creation of stable and isolated magnetic hopfions—three-dimensional topological solitons—has remained experimentally challenging. Now the laser-induced nucleation of hopfions has been achieved in a chiral magnet.

Xiaowen Chen, Donghai Yang ... Fengshan Zheng

**Article**  
16 Mar 2026

**A bucket-brigade quantum random access memory**

Random access memory has multiple data registers and uses addresses to specify which register should be read or modified. Now a quantum random access memory has been demonstrated that uses quantum addresses to return data in superposition.

Fanhao Shen, Yujie Ji ... Jianwei Yin

**Article**  
Open Access  
02 Apr 2026

**Noise-induced shallow circuits and the absence of barren plateaus**

Calculations on near-term quantum computers will be limited by the effects of noise. It has now been shown how different kinds of noise limit the achievable computational advantage of many proposed quantum algorithms.

Antonio Anna Mele, Armando Angrisani ... Yihui Quek

**Article**  
Open Access  
01 May 2026

**Squeezing, trisqueezing and quadsqueezing in a hybrid oscillator–spin system**

Higher-order interactions in quantum harmonic oscillator systems can result in useful effects, but they are hard to engineer. An experiment on a single trapped ion now demonstrates how spin can mediate higher-order nonlinear bosonic interactions.

O. Băzskan, S. Saner ... R. Srinivas

**Article**  
21 Apr 2026

**Two-electron quantum walks for probing entanglement and decoherence in an electron microscope**

Entanglement between particles offers insights into quantum behaviour, but methods for studying it in free-electron systems are lacking. Now a two-electron quantum walk is used to probe decoherence of free electrons inside an electron microscope.

Offek Tzperman, David Nabben ... Peter Baum

**Article**  
Open Access  
30 Apr 2026

**The local mechanostuctural properties of protein cargoes regulate nucleocytoplasmic transport**

The mechanical stability of proteins affects their import into the nucleus. Now it is shown that protein transport in and out of the nucleus depends on the local mechanostability of the protein cargo.

Rafael Tapia-Rojas, Natalie Milmo ... Sergi Garcia-Manyès

**Article**  
07 Apr 2026

**Metamaterials that learn to change shape**

Physical networks can learn to accomplish tasks on the fly by adjusting their internal parameters. Now it is shown that such physical learning can be achieved in metamaterials that can learn to change shape.

Yao Du, Ryan van Mastriigt ... Corentin Coullas

**Article**  
14 Apr 2026

**Capillary Leidenfrost effect**

If a surface is hot enough, a liquid droplet can develop an insulating vapour layer that makes it levitate above the surface, which is known as the Leidenfrost effect. A solid structure of liquid-filled capillaries is now shown to display this levitating effect at much lower temperatures.

Zhi Zhang, Zhenwen Zhang ... Steven Wang

**Article**  
01 Apr 2026

**Full space-time ultrafast self-focusing of spherical Airy wavepackets**

Airy beams are promising for applications requiring sharp focusing but have so far been realized in only two dimensions. Now their extension to three dimensions exhibits superior spatiotemporal focusing dynamics than Gaussian beams.

Qian Cao, Nianjia Zhang ... Qiwen Zhan

**Article**  
03 Apr 2026

**Wetting by active fluids**

Theoretical descriptions of surface wetting so far cover only equilibrium situations and therefore do not describe active matter. Now a formalism for the description of the wetting of a surface by self-propelled particles is presented.

Yongfeng Zhao, Ruben Zakine ... Frédéric van Wijland

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**Measure for Measure**  
15 May 2026

**A yardstick for quantum gravity**

Max Planck introduced units of length, time and mass defined solely in terms of fundamental constants. As Saurya Das explains, these units define a system in which quantum mechanics, relativity, gravity and thermodynamics meet on equal footing.

Saurya Das

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