Volume 20 Issue 5, May 2026

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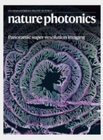

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Panoramic super-resolution imaging

The cover presents a centimetre-scale, super-resolution panorama of a whole-slice mouse small intestinal Swiss roll, captured by a digital array modulation microscope. By applying digital array modulation and single-spectrum reconstruction, Li et al. were able to conduct artefact-free 3D imaging at 100 nm lateral/300 nm axial resolution, with fast reconstruction and high signal-to-background ratio. This enables seamless imaging of samples ranging from subcellular organelles to tissue.

See Li et al.

Image: Jing Yuan and Sijie Li from Huazhong University of Science and Technology, and Chaoyang Zhao. Cover design: Bethany Vukomanovic

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07 May 2026

Hard disk drive capacity limits smashed by nanofocusing of plasmons

About two decades ago, proof-of-principle demonstrations used light to enable heat-assisted magnetic recording (HAMR). Now, with over a million HAMR drives in the market, *Nature Photonics* spoke to Seagate VP of Research Ed Gage about what is arguably one of the greatest commercial success stories in plasmonics.

David Pile

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News & Views

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Colloidal quantum dots shine in the mid-infrared

By placing colloidal quantum dots emitting in the mid-infrared within a plasmonic resonant cavity, scientists achieve a 270-fold improvement in emission efficiency, with a power conversion efficiency of 6.8% for emission at 5 μm.

Dong-Kyun Ko

News & Views
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Unveiling the nanoscale dynamics of electroluminescence

When looked at using super-resolution optical microscopy, organic light-emitting devices are found to emit electroluminescence that is spatially heterogeneous on nanometre scales and fluctuates strongly in time.

Martin Vacha

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Ytterbium spectroscopy for new physics searches

Highly precise measurements of inner-shell transitions in ytterbium atoms can help test our understanding of physics and the existence and properties of new fundamental particles.

Julian Berengut

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Vectorial ultrafast chiroptical microscopy

Ultrafast chiroptical signals are notoriously difficult to image in space and time simultaneously. Now, multiplexed off-axis holography, which encodes polarization information, enables ultrafast wide-field imaging of the transient optical activity, phase and absorption of samples.

Honghui He & Chao He

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Fourier ptychography sharpens terahertz imaging

Anastasiia Vasylchenkova

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Review Articles

Review Article
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Integrated photonics for continuous-variable quantum optics

In this Review the authors cover the latest efforts to integrate sources and detectors of continuous-variable quantum light states into chip-scale photonic integrated circuits.

Rachel N. Clark, Bethany Puzio … Jonathan C. F. Matthews

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Articles

Article
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Orders-of-magnitude improvement in precision spectroscopy of an inner-shell orbital clock transition in neutral ytterbium

Precision spectroscopy of an inner-shell orbital clock transition in Yb is developed. It reveals the transition moment, the intrinsic lifetime of the excited state and the interorbital Feshbach resonance. Isotope shifts with uncertainties below 10 Hz are also measured.

Taiki Ishiyama, Koki Ono … Yoshiro Takahashi

Article
26 Mar 2026

Three-dimensional super-resolution imaging with suppressed background via digital array modulation microscopy

Digital array modulation microscopy uses natural Gaussian illumination and virtual detection modulation, together with a single-spectrum reconstruction algorithm, for three-dimensional super-resolution imaging with 300-nm and 100-nm axial and lateral resolution, respectively.

Sijie Li, Rui Jin … Jing Yuan

Article
12 Mar 2026

Hyperspectral quantum-dot image sensors via in-pixel reconfigurable band-alignment

Bias-voltage-tuneable colloidal quantum dots junctions enable short-wave infrared hyperspectral imagers with megapixel spatial resolution and nanometre-scale spectral resolution for food quality monitoring and materials discrimination.

Ge Mu, Cheng Bi … Xin Tang

Article
11 Mar 2026

Simulation of a Floquet non-Abelian topological insulator with photonic quantum walks

A three-band time-multiplexed photonic quantum walk simulates a Floquet non-Abelian topological insulator. The observation of the anomalous non-Abelian phase confirms the bulk-boundary correspondence using the topological configuration of phase-band singularities.

Quan Lin, Tianyu Li … Peng Xue

Article
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Local and remote synthesis of single-photon space-time wave packets

By projecting the multimoded, spatiotemporally structured signal photon onto a single spatial mode to herald the arrival of the idler photon, a diffraction-free single-photon space-time wave packet in the idler that did not traverse the spectral modulator is remotely prepared.

Bryan L. Turo, Bahaa E. A. Saleh & Ayman F. Abouraddy

Article
24 Feb 2026

Purcell-enhanced mid-infrared cascade light-emitting diodes

The electroluminescent intraband emission of HgSe/CdS colloidal quantum dots is enhanced by plasmonic bowtie nanoantennas, resulting in light-emitting diodes emitting at 5 μm with a power conversion efficiency of 5%.

Augustin Caillas, Xingyu Shen & Philippe Guyot-Sionnest

Article
11 Mar 2026

Efficient white light-emitting diodes based on all-perovskite triple-junction tandems

All-perovskite tandem white LEDs fabricated via a solid–liquid interface transfer-printing technique achieve minimized voltage loss, a peak certified external quantum efficiency of 16.4% and maximum luminance beyond 67,000 cd m^{-2}.

Cong Geng, Changjiu Sun … Mingjian Yuan

Article
13 Mar 2026

Nanoscale electroluminescence inhomogeneity and blinking in organic light-emitting diodes

Super-resolution imaging of organic light-emitting diodes reveals that their electroluminescence emission is spatially non-uniform and blinking when observed at the submicrometre length scale.

Joshua D. Springsteen, Noel C. Giebink & Stephen R. Forrest

Article
19 Mar 2026

Dipole-assisted functionalization enables long-range ordering of ZnTeSe quantum dots for efficient and stable deep-blue electroluminescence

Functionalization of ZnTeSe quantum dots via ordering arrangement and energy-level modulation enables deep-blue quantum dot light-emitting diodes with a peak external quantum efficiency of 23.6% and a half-lifetime exceeding 50,000 h at an initial luminance of 100 cd m^{-2}.

Wan-Shan Shen, Li-Ming Xie … Liang-Sheng Liao

Article
10 Mar 2026

A 1-km photonic link connecting superconducting circuits in two dilution refrigerators

The microwave-to-optical transduction between two superconducting circuits over a 1-km telecom link is implemented. The transduced signal preserves classical coherence with the original microwave signal, showing the feasibility of microwave distribution via optical carriers.

Yiyu Zhou, Yufeng Wu … Hong X. Tang

Article
Open Access
11 Mar 2026

Ground-state exciton–polariton condensation via coherent Floquet driving

The researchers use gigahertz acoustic waves to control the gain and loss of confined modes of an exciton–polariton condensate in a microcavity, enabling dynamic population transfer. Selective transfer to the ground state yields single-level emission consisting of a spectral frequency comb with gigahertz repetition rates.

Alexander S. Kuznetsov, Ignacio Carraro-Haddad … Paulo V. Santos

Article
Open Access
08 Apr 2026

Ultrafast holographic chiroptical microscopy

Encoding polarization information using multiplexed off-axis holography yields a scheme for performing ultrafast chiroptical microscopy.

Martin Hörmann, Federico Visentin … Franco V. A. Camargo

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