False-colored atomic force microscopy image of three carbon nanotubes on a silicon dioxide substrate (composite of scans on three devices). The middle nanotube is disconnected by a ~40-nanometer gap; the outer nanotubes have similar nanogaps bridged by a phase-change material (PCM) bit. Such small bits can be switched by voltage pulses with energy consumption that is one hundred times lower than that of modern PCM data storage. See page 568.

Image: Alex Jerez, Feng Xiong, and Eric Pop, University of Illinois Urbana-Champaign
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555 Microresonator-Based Optical Frequency Combs
T. J. Kippenberg et al.

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560 Topological Phase Transition and Texture Inversion in a Tunable Topological Insulator
S.-Y. Xu et al.
Two types of bulk insulator are realized in the same family of compounds through chemical doping.
>> Perspective p. 546

564 Orbital-Independent Superconducting Gaps in Iron Pnictides
T. Shinjoima et al.
Bulk photoemission studies of iron pnictides suggest a role for orbital fluctuations in creating the superconducting state.

568 Low-Power Switching of Phase-Change Materials with Carbon Nanotube Electrodes
F. Xiong et al.
The crystallinity and resistivity of a compound semiconductor was changed with current pulses delivered by nanoelectrodes.
>> Perspective p. 543

570 Low-Voltage, Low-Power, Organic Light-Emitting Transistors for Active Matrix Displays
M. A. McCarthy et al.
Efficient organic light-emitting transistors use carbon nanotubes as the source electrode.
>> Science Podcast

574 Proton-Catalyzed, Silane-Fueled Friedel-Crafts Coupling of Fluoroarenes
O. Allemann et al.
Silicon-fluorine bond formation expands the range of compounds that can be used in a reaction that forms carbon-carbon bonds.

577 Venus’s Southern Polar Vortex Reveals Precessing Circulation
D. Luz et al.
Observations with the Venus Express Orbiter reveal complex polar atmospheric dynamics.

580 Surface-Generated Mesoscale Eddies Transport Deep-Sea Products from Hydrothermal Vents
D. K. Adams et al.
Deep-reaching eddies transport heat and material hundreds of kilometers from the northern East Pacific Rise.

583 Brain Evolution Triggers Increased Diversification of Electric Fishes
B. A. Carlson et al.
Evolution of the perceptual abilities of mormyrid electric fishes increased signal variation and species diversification.

585 Self-Organizing and Stochastic Behaviors During the Regeneration of Hair Stem Cells
M. V. Plikus et al.
Cycling of active and quiescent states of the hair follicle integrates activator and inhibitor signals for patterning.

589 Conserved Eukaryotic Fusogens Can Fuse Viral Envelopes to Cells
O. Avinoam et al.
A Caenorhabditis elegans cell-surface fusion protein can promote viral fusion with mammalian cells.

592 The Spatial Periodicity of Grid Cells Is Not Sustained During Reduced Theta Oscillations
J. Koenig et al.
Grid cell firing vanished after medial septum inhibition, while most hippocampal place cell firing was retained.

595 Reduction of Theta Rhythm Dissociates Grid Cell Spatial Periodicity from Directional Tuning
M. P. Brandon et al.
Inhibition of neuronal activity in the medial septum stops grid cells in the medial entorhinal cortex from firing in a grid.

598 Trans-Endocytosis of CD80 and CD86: A Molecular Basis for the Cell-Extrinsic Function of CTLA-4
O. S. Qureshi et al.
An inhibitory T cell receptor acts by stripping activating ligands off dendritic cells.
>> Perspective p. 542

601 A Radically Different Mechanism for S-Adenosylmethionine–Dependent Methyltransferases
T. L. Grove et al.
Methylation of the bacterial ribosome by two methyltransferases proceeds by an unusual radical mechanism.
>> Perspective p. 544; Science Express Report by A. K. Boal et al.

604 A Crystal Structure of the Complex Between Human Complement Receptor 2 and Its Ligand C3d
J. M. H. van den Elsen and D. E. Isenman
The topology of this molecular interface provides a foundation for the design of therapeutics against autoreactive B cells.
Human Cytomegalovirus Directly Induces the Antiviral Protein Viperin to Enhance Infectivity
J.-Y. Seo et al.

Antiviral protein viperin to its own advantage.

Human cytomegalovirus uses a host-encoded antiviral protein to its own advantage.

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High-frequency monitoring of manipulated and reference lakes enabled early detection of subsequent catastrophic regime shift.

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