Cover
Optical or electrical pulses can rapidly locate and manipulate the spin of a single electron in a quantum dot or of a nitrogen vacancy in diamond. Such techniques represent progress toward solid-state quantum computing (see pages 349 and 352).

Image: Peter Allen and Jesse Berezovsky

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The Mad Dash to Make Light Crystals
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CLIMATE CHANGE
Seasonal Speedup Along the Western Flank of the Greenland Ice Sheet
I. Joughin et al.
Measurements of ice motion from Greenland show that summer melt water accelerates ice sheet flow by 50 to 100% overall but has less effect in the faster outlet glaciers.

>> News story p. 301; Science Express Report by S. B. Das et al.

10.1126/science.1153288

CLIMATE CHANGE
Fracture Propagation to the Base of the Greenland Ice Sheet During Supraglacial Lake Drainage
S. B. Das et al.
A large lake on the surface of the Greenland Ice Sheet drained out through and along the base of the Ice Sheet within 2 hours, revealing an efficient basal hydrological system.

>> News story p. 301; Science Express Report by I. Joughin et al.

10.1126/science.1153360

PERSPECTIVE: Marine Calcifiers in a High-CO\textsubscript{2} Ocean
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A tubulin homolog from prokaryotes can, without other proteins, assemble into rings around liposomes and constrict, suggesting a primordial cell division mechanism.

10.1126/science.1154520

PHYSICS
Quasi-Particle Properties from Tunneling in the $\nu = \frac{5}{2}$ Fractional Quantum Hall State
I. P. Radu, J. B. Miller, C. M. Marcus, M. A. Kastner, L. N. Pfeiffer, K. W. West
Tunneling measurements between the conduction channels in the fractional quantum Hall effect confirm that the charge is quantized in units of $\frac{1}{4}$ of an electron charge.

10.1126/science.1157560

RESEARCH ARTICLES

CLIMATE CHANGE
Phytoplankton Calcification in a High-CO\textsubscript{2} World
M. D. Iglesias-Rodriguez et al.
Experiments show that a coccolithophore grows better at elevated carbon dioxide levels, in contrast to predictions for most plankton, and is already increasing in abundance.

>> Science Express Perspective by V. J. Fabry

M. D. Iglesias-Rodriguez et al.

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MEDICINE
The Global Circulation of Seasonal Influenza A (H3N2) Viruses
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Recent seasonal flu strains constantly evolved in overlapping epidemics in Asia, then erupted to periodically sweep the world, ending in South America 6 to 18 months later.

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A geometric representation of Western music theory, in which distance represents similarity of chord types, reveals relations among diverse musical concepts.

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Picosecond Coherent Optical Manipulation of a Single Electron Spin in a Quantum Dot
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APPLIED PHYSICS
Chaotic Dirac Billiard in Graphene Quantum Dots
L. A. Ponomarenko et al.
Graphene quantum dots vary with their size: Large dots form molecular-scale transistors, intermediate ones show quantum chaos, and the smallest act as single-electron detectors.

CHEMISTRY
Atomlike, Hollow-Core–Bound Molecular Orbitals of C60
M. Feng, J. Zhao, H. Petek
Scanning tunneling microscopy and density functional theory reveal that C60 acts as a superatom in which its unoccupied orbitals are atomlike and delocalized in aggregates.

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The Chemical Genomic Portrait of Yeast: Uncovering a Phenotype for All Genes
M. E. Hillenmeyer et al.
Exposing yeast cultures to an extensive variety of small molecules and environmental stresses indicates that almost all genes have a demonstrable biological function.

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E. S. Witze et al.
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A Model for Neuronal Competition During Development
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Modeling and experiments show that neurons survive during development when neuronal sensitization to survival signals outweighs antagonistic signals for cell death.

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Reconstitution of Pilus Assembly Reveals a Bacterial Outer Membrane Catalyst
M. Nishiyama, T. Ishikawa, H. Rechsteiner, R. Glockshuber
The cell-free formation of the protruberant pilus of a pathogenic bacteria is accelerated by a protein that catalyzes supramolecular assembly without input of cellular energy.

BIOCHEMISTRY
Divergence of Quaternary Structures Among Bacterial Flagellar Filaments
V. E. Galkin et al.
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BIOCHEMISTRY
Divergence of Quaternary Structures Among Bacterial Flagellar Filaments
V. E. Galkin et al.
Flagellar proteins from two bacterial species diverge in their coiled-coil regions; only one triggers an immune response, which may have driven their evolutionary divergence.

MEDICINE
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R. M. Anthony et al.
By identifying the sugar modifications responsible for the therapeutic, anti-inflammatory effect of immunoglobulin, an improved recombinant version can be formulated.
Financial trading can wreak havoc on physiology.

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**Tooling Up: On Headhunters**
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**From the Archives: What’s Love Got to Do With It?**
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Our Mind Matters expert studies the pros and cons of scientists tying the knot.

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