

COVER

Graphic representation of an integrated quantum optics controlled-NOT chip. Single photons (represented as flashes) propagate on the chip, confined by silica waveguides, and are then coupled into optical fibers for detection. See page 646.

Image: W. Amery/Bristol University

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SCIENCE EXPRESS

www.sciencexpress.org

MATERIALS SCIENCE

Dislocation-Driven Nanowire Growth and Eshelby Twist

M. J. Bierman, Y. K. A. Lau, A. V. Kvit, A. L. Schmitt, S. Jin

A screw dislocation drives the growth of a nanowire pine tree, in which branches regularly extend from the trunk in a spiral, confirming Eshelby's theory of dislocations.

10.1126/science.1157131

MEDICINE

A Polymorphism Within the *G6PC2* Gene Is Associated with Fasting Plasma Glucose Levels

N. Bouatia-Naji et al.

Variation in a gene for a protein in the pancreas may help explain why people have different levels of fasting blood glucose, a factor that affects disease risk.

10.1126/science.1156849

MOLECULAR BIOLOGY

The Transcriptional Landscape of the Yeast Genome Defined by RNA Sequencing

U. Nagalakshmi et al.

A more complete catalog of transcribed DNA of yeast is assembled by shotgun sequencing of messenger RNA and reveals numerous previously unknown transcribed regions.

10.1126/science.1158441

CELL BIOLOGY

The Serine Protease *TMPRSS6* Is Required to Sense Iron Deficiency

X. Du et al.

A cell-surface enzyme that cleaves proteins is unexpectedly necessary for sensing when iron levels are low and thereby triggering compensatory absorption of iron from food.

10.1126/science.1157121

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Comment on "Long-Lived Giant Number Fluctuations in a Swarming Granular Nematic" 612

I. S. Aranson, A. Snezhko, J. S. Olafsen, J. S. Urbach

full text at www.sciencemag.org/cgi/content/full/320/5876/612c

Response to Comment on "Long-Lived Giant Number Fluctuations in a Swarming Granular Nematic"

V. Narayan, S. Ramaswamy, N. Menon

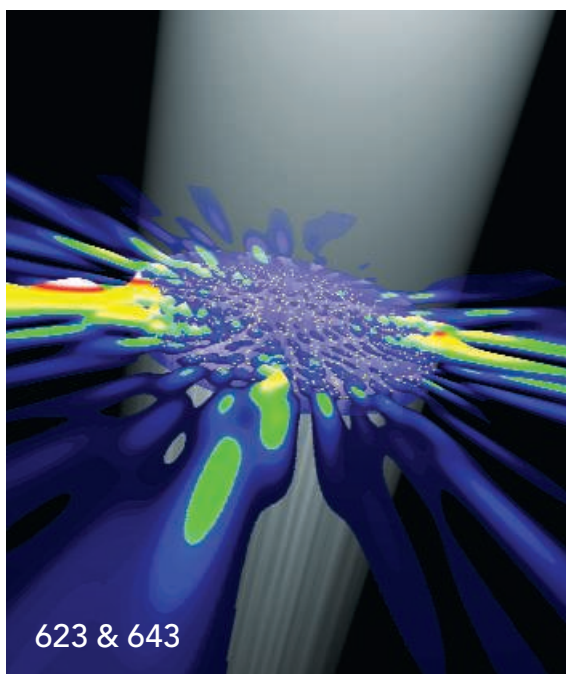
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E. J. Garnero and A. K. McNamara



BREVIA

CLIMATE CHANGE

Fire-Derived Charcoal Causes Loss of Forest Humus 629

D. A. Wardle, M.-C. Nilsson, O. Zackrisson

Charcoal enhances the microbial activity in soils, which in turn decreases the amount of carbon and humus in forests over time.

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A Specialized Forebrain Circuit for Vocal Babbling 630

D. Aronov, A. S. Andalman, M. S. Fee

The babbling of young zebra finches learning to sing is produced by a brain region distinct from the adult song center, a pattern that may also apply to other motor systems.

MATERIALS SCIENCE

High-Thermoelectric Performance of Nanostructured Bismuth Antimony Telluride Bulk Alloys 634

B. Poudel et al.

Milling a thermoelectric alloy, which produces electricity from a thermal gradient, into a nanopowder, then pressing it into a bulk form, greatly improves its performance.

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Coherent Control of Decoherence 638

M. P. A. Branderhorst et al.

Iterative shaping of a laser pulse using feedback from a fluorescence signal extends the phase stability of a molecular vibration in the face of rotational jostling.

PHYSICS

Strong Interactions in Multimode Random Lasers 643

H. E. Türeci, L. Ge, S. Rotter, A. D. Stone

A theoretical approach describes lasing in strongly disordered media where multiple excitation modes may switch on and off to emit light over a range of wavelengths.

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A. Politi, M. J. Cryan, J. G. Rarity, S. Yu, J. L. O'Brien

Quantum circuits—in which individual photons interfere, entangle, and form logic gates—have been realized on silicon chips.

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Practical Synthesis of Prostratin, DPP, and Their Analogs, Adjuvant Leads Against Latent HIV 649

P. A. Wender, J.-M. Kee, J. M. Warrington

A four-step synthesis starting from an abundant natural material yields large quantities of prostratin, a scarce natural product that may be useful in combating HIV.

OCEAN SCIENCE

Marine Polyphosphate: A Key Player in Geologic Phosphorus Sequestration 652

J. Diaz et al.

Polyphosphates derived from diatoms may help crystallize calcium phosphate (apatite) in marine sediments globally, explaining how this large sink for phosphorus forms.

OCEAN SCIENCE

Expanding Oxygen-Minimum Zones in the Tropical Oceans 655

L. Stramma, G. C. Johnson, J. Sprintall, V. Mohrholz

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S. Allesina, D. Alonso, M. Pascual

A model based on likelihood analysis is able to replicate the actual structure of food web networks derived from experimental data.

MEDICINE

ROS-Generating Mitochondrial DNA Mutations Can Regulate Tumor Cell Metastasis 661

K. Ishikawa et al.

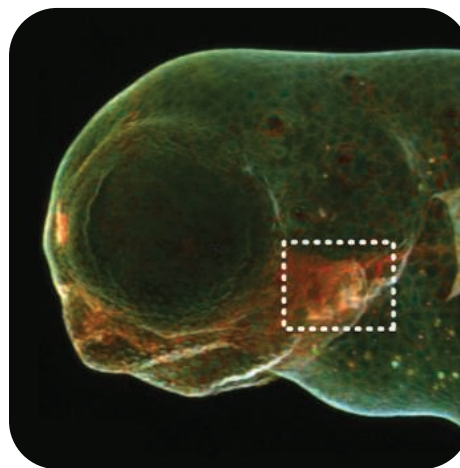
Mutations in mitochondrial DNA that cause enhanced production of reactive oxygen species can increase the propensity of tumor cells to metastasize.

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In Vivo Imaging of Membrane-Associated Glycans in Developing Zebrafish 664

S. T. Laughlin, J. M. Baskin, S. L. Amacher, C. R. Bertozzi

Imaging of cell-surface sugars in developing zebrafish reveals dramatic bursts of sugar production in the jaw, olfactory organ, and pectoral fin 60 to 72 hours after fertilization.



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T. M. Thornton et al.

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A long protein may tether vesicles to the Golgi apparatus by binding the positively curved vesicle membrane to its N terminus and flat membranes to its C terminus.

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Innate Immune Activation Through Nalp3 Inflammasome Sensing of Asbestos and Silica 674

C. Dostert et al.

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IMMUNOLOGY

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B. Vanhollebeke et al.

A lipoprotein in human blood protects against an African parasite by binding to a parasite receptor and triggering uptake of the lipoprotein, which contains a toxic component.



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Treatment could potentially be applied to host of blindness disorders.

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High-resolution ocean map reveals a worldwide pattern of striated currents.

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Analysis links blood-replacement products to higher risk of heart attack and death.



Exercise, a natural antidepressant.

SCIENCE SIGNALING

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PERSPECTIVE: VGF, a New Player in Antidepressant Action?

J. E. Malberg and L. M. Monteggia

The neuropeptide VGF appears to play a role in the antidepressant effects of exercise, the neurotrophic factor BDNF, and the neurotransmitter serotonin.

PERSPECTIVE: Synaptic Patterning by Morphogen Signaling

W. R. Williamson and P. R. Hiesinger

The morphogen Activin acts as a permissive and local motility restriction signal around individual photoreceptor terminals.

PODCAST

E. M. Adler and A. M. VanHook

Some glial cells can generate action potentials and are hypersensitive to ischemic injury.



New structure for university careers in Europe.

SCIENCE CAREERS

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FREE CAREER RESOURCES FOR SCIENTISTS

Structuring Academic Careers in Europe

C. Wald

Several European universities have begun defining tenure-like career structures.

Taken for Granted: Lost in Space

B. L. Benderly

A severe disconnect separates some policy-makers from scientists' real lives.

Mastering Your Ph.D.: Exploring Nonprofit Organizations

P. Gosling

The values and culture of nonprofit organizations make them an exciting and rewarding career choice.

May 2008 Funding News

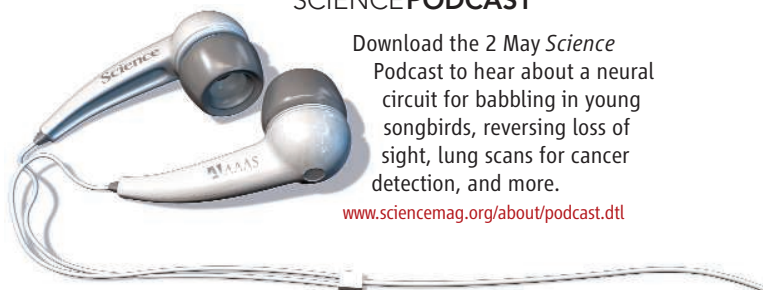
J. Fernández

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