

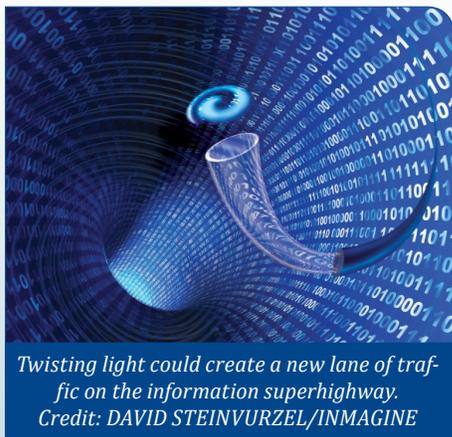


S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES



Twisting light could create a new lane of traffic on the information superhighway.
Credit: DAVID STEINVURZEL/INMAGINE

[‘Corkscrew’ light could turbocharge the Internet](#)

[Nature News, 27JUN2013](#)

A team of researchers from Boston University and the University of Southern

California has found

a way to keep the different light beam shapes separated for a record 1.1 kilometres. The team found that the light output matched the input—light beams of each shape were not getting muddled together.

Tags: Photonics, Featured Article

[Keeping Networks Under Control: New Approach Can Control Large Complex Networks, from Cells to Power Grids](#)

[Science Daily, 27JUN2013](#)

Researchers at Northwestern University have developed the first broadly applicable computational approach identifying interventions that can both rescue complex networks from the brink of failure and reprogram them to a desired task. [TECHNICAL ARTICLE](#)

Tags: Communications Technology, Featured Article

[Prevailing View of How the Brain Is Wired Overturned?](#)

[Science Daily, 27JUN2013](#)

Study by researchers at Columbia University topples convention by showing that sensory information travels to two places at once: not only to the brain’s mid-layer (where most axons lead), but also directly to its deeper layers. [TECHNICAL ARTICLE](#)

Tags: Neuroscience, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[3-D Printing and Additive Manufacturing preview issue publishing Fall 2013](#)

[EurekAlert, 28JUN2013](#)

Mary Ann Liebert, Inc., publishers announces the launch of 3D Printing and Additive Manufacturing. The Journal will include original articles, exclusive interviews with top professionals and innovators in the field, commentaries, opinion pieces, industry reports, a debate section, webinars, videos, and podcasts. To sign up for email alerts for the journal contact journalmarketing2@liebertpub.com.

Tags: Advanced manufacturing

ADVANCED MATERIALS

[Exotic alloys for potential energy applications e! Science News, 27JUN2013](#)

The search for thermoelectrics has received a boost from an international team of researchers (US, Japan) which showed that a relatively simple technique called the “rigid band approximation” can predict a material’s properties more accurately than a competing, more complicated method.

Tags: Advanced materials

[Superstrong carbon nanotube wiring could prevent blackouts \(w/video\)](#)

[Nanowerk, 27JUN2013](#)

The wires are one tenth the weight of copper, and, if used in conventional systems, would also make vehicles more fuel efficient. The wires, developed by researchers at the University of Cambridge can also be joined to conventional metal wires, which until now has not been possible, raising the prospect of hybrid energy networks.

Tags: Advanced materials, S&T UK

[Solar power heads in a new direction: thinner MIT News, 26JUN2013](#)

Most efforts at improving solar cells have focused on increasing the efficiency of their energy conversion, or on lowering the cost of manufacturing. But now MIT

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researchers are opening another avenue for improvement, aiming to produce the thinnest and most lightweight solar panels possible. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Energy, Solar energy

AUTONOMOUS SYSTEMS & ROBOTICS

[Video Friday: Japan's Space Humanoid, Robot Golfer, and Most Destructive Bot Ever](#)

[IEEE Spectrum, 28JUN2013](#)

There are already quite a few robots on the International Space Station (namely, Robonaut and a bunch of SPHEREs), but later this year, a little humanoid from Japan will be joining the team.

Tags: Autonomous systems & robotics

BIOTECHNOLOGY

[New Palm-Sized Microarray Technique Grows 1,200 Individual Cultures of Microbes](#)

[Science Daily, 25JUN2013](#)

Scientists at the University of Texas at San Antonio and the U.S. Army Institute of Surgical Research at Fort Sam Houston have developed a microarray platform for culturing fungal biofilms and validated one potential application of the technology to identify new drugs. [TECHNICAL ARTICLE](#)

Tags: Biotechnology

BREAKTHROUGH TECHNOLOGY

[Novel nanoscale biosensing technique measures thermal conductivity of a single cell](#)

[Nanowerk, 28JUN2013](#)

Researchers in Korea have discovered a way to measure the "thermal conductivity" of three types of cells taken from human and rat tissues and placed them in individual micro-wells. They showed that they could detect uniform heat signatures from the various cells and measured significant difference between dead and living ones, suggesting a new way to probe cells for biological activity. [TECHNICAL ARTICLE](#)

Tags: Breakthrough technology, Biology

[Key Step in Protein Synthesis Revealed](#)

[Science Daily, 27JUN2013](#)

Scientists at the University of California, Santa Cruz, have trapped the ribosome, a protein-building molecular machine essential to all life, in a key transitional state. Now, for the first time, scientists can see how the ribosome performs the precise mechanical movements needed to translate genetic code into proteins without making mistakes. [TECHNICAL ARTICLE](#)

Tags: Breakthrough technology

COMMUNICATIONS TECHNOLOGY

[Don't Cry over Broken Entanglement](#)

[PhysOrg.com, 01JUL2013](#)

Using a technique called quantum illumination, researchers at MIT established a secure channel of communication between two parties that relied on sending one of a pair of entangled photons through a noisy environment. Even though the initial entanglement didn't survive the passage, it was enough to guarantee the communicated signal was secure. [TECHNICAL ARTICLE](#)

Tags: Communications Technology, Quantum science

[Nanotechnology research to advance optical computing](#)

[Nanowerk, 20JUN2013](#)

Researchers in Australia have overcome a fundamental law of optical science that could lead to faster and more energy-efficient optical computing. The new technique produces a focal spot that is one ten thousandth of a human hair, enabling more data to be written to disc. [TECHNICAL ARTICLE](#)

Tags: Communications Technology, Optical communication

CYBER SECURITY

[Seven clues to use to ID who's behind a malware attack](#)

[Dark Reading, 26JUN2013](#)

The keyboard layout, malware metadata, embedded fonts, DNS registration, written language, remote administration tools (RATs), and behavior patterns all can provide clues to ID attackers, according to FireEye, which built the seven-item checklist from some 1,500 attack campaigns it tracks.

Tags: Cyber security

ENVIRONMENTAL SCIENCE

[Searching for objects in turbulent seas](#)

[PhysOrg.com, 28JUN2013](#)

After several years of developing a means of producing turbulence, and developing computer algorithms for tracking a large number of particles, researchers in Australia obtained results of great practical and fundamental importance. They found that particles obey the law of diffusion similar to that predicted in 1905 by Albert Einstein. [TECHNICAL ARTICLE](#)

Tags: Environmental science, Ocean science, S&T Australia

[Tsunamis could be spotted from magnetic anomalies](#)

[Physics World, 28MAY2013](#)

Magnetic anomalies created by tsunamis could be detected by satellites. That's the claim of researchers in China, who have created a model that simulates the effect of huge ocean waves on the Earth's magnetic field. The team believes that its work could lead to an early-warning

continued...

“My own personal belief is that we will, in the end, understand everything about how cells actually work ...” SIR JOHN B. GURDON

system that can detect the deadly waves in real time.

Tags: Environmental science, S&T China

FORECASTING

Breakthrough in El Nino Forecasting

[Science Daily](#), 01JUL2013

In order to extend forecasting from six months to one year or even more, scientists in Germany have proposed a novel approach employing network analysis which is a cutting-edge methodology at the crossroads of physics and mathematics. Data from more than 200 measurement points in the Pacific, available from the 1950s on, were crucial for studying the interactions between distant sites that cooperate in bringing about the warming. [TECHNICAL ARTICLE](#)

Tags: Forecasting, Climatology, S&T Germany

Seismic Data Set Could Improve Earthquake Forecasting

[Science Magazine](#), 28JUN2013

This week, researchers added a potentially powerful new tool to their kit: the largest seismic database of its kind ever constructed, based on tens of thousands of earthquake records stretching back more than 1000 years. Together with a new global map of strain accumulation at plate boundaries, the data sets will form the core of an international public-private partnership intended to reshape the science of earthquake forecasting.

Tags: Forecasting

GOVERNMENT S&T

Standoff Detection of IEDs—with DARPA’s MEDS Program

[Defense Update](#), 26JUN2013

Last week DARPA awarded the biggest contract under the MEDS (Methods for Explosive Detection at Standoff) program to NIITEK, Inc. The \$2.13 million contract will span over 18-months. This thrust aims to develop novel sensors capable of detecting explosives by tracing their unique signatures from a distance. The current development is defined as a ‘proof-of-principle’ experimentation.

Tags: Government S&T, Explosives

The semiconductor industry gets a sharper vision of the future

[Nanowerk](#), 25JUN2013

The world’s most advanced extreme-ultraviolet microscope is about to go online at DOE’s Lawrence Berkeley Lab. The much-anticipated SHARP microscope (SEMATECH High-NA Actinic Recticle review Project) was conceived and built by scientists at Berkeley Lab’s Center for X-ray Optics (CXRO)

and will provide semiconductor companies with the means to push their chip-making technology to new levels of miniaturization and complexity.

Tags: Government S&T, Microelectronics

IMAGING TECHNOLOGY

Rocket-Launched Camera Reveals Highways and Sparkles in the Solar Atmosphere

[Science Daily](#), 30JUN2013

Using an innovative new camera on board a sounding rocket, an international team of scientists observed the Sun in extreme ultraviolet light and focused on a large, magnetically-active sunspot region. Images from Hi-C reveal a number of new features in the corona, including ‘blobs’ of gas ricocheting along ‘highways’ and bright dots that switch on and off rapidly which the group call ‘sparkles.’

Tags: Imaging technology

New system uses low-power Wi-Fi signal to track moving humans—even behind walls

[MIT News](#), 28JUN2013

The system, called “Wi-Vi,” being developed by researchers at MIT is based on a concept similar to radar and sonar imaging. But in contrast to radar and sonar, it transmits a low-power Wi-Fi signal and uses its reflections to track moving humans. It can do so even if the humans are in closed rooms or hiding behind a wall. [PROJECT WEBSITE](#)

Tags: Imaging technology

Bell Labs improves lensless camera with additional pixel on sensor

[PhysOrg.com](#), 26JUN2013

A research team from Bell Labs that developed a lensless camera has now improved upon the design by adding a second pixel to the sensor used to read data coming through an aperture array. They added a second pixel to the sensor that reads incoming light from the aperture array.

[TECHNICAL ARTICLE](#)

Tags: Imaging technology

New Laser Shows What Substances Are Made Of; Could Be New Eyes for Military

[Science Daily](#), 25JUN2013

Researchers at the University of Michigan developed a system using off-the-shelf telecommunications technology, which emits a broadband beam of infrared light. While broadband infrared lasers do exist, this one is more powerful. They’ve built a 25.7 watt version. And they’re now working on a 50-watt prototype, which is scheduled to be field tested later this year. [TECHNICAL ARTICLE](#)

Tags: Imaging technology, Military technology

continued...

INFORMATION TECHNOLOGY

[New approach to mobile video fuses streaming and downloading to dodge delays, improve quality](#)

EurekAlert, 25JUN2013

A technique, called streamloading, developed by researchers at New York University, makes use of a video format that splits the video into two layers—a base layer, which contains a coarse representation of the video, and an enhancement layer, which completes the image quality and includes the fine-grain details. Streamloading allows users to pre-download the enhancement layer onto their devices in a location where wireless signal is strong—at home, for example—and stream only the base layer at the time of viewing.

Tags: Information Technology

MICROELECTRONICS

[High-performance graphene transistor with high room-temperature mobility](#)

Nanowerk, 26JUN2013

Researchers at King Abdullah University of Science and Technology in Saudi Arabia, have shown integration of a scaled (10 nm) high- κ gate dielectric aluminum oxide (Al_2O_3) with atmospheric pressure chemical vapor deposition (APCVD) derived graphene channel composed of multiple 0.25 μm stripes to repeatedly realize room temperature mobility of 11,000 $cm^2/V\cdot s$ or higher. TECHNICAL ARTICLE

Tags: Microelectronics

FEATURED RESOURCE

[Oxford Science Blog](#)

Latest breaking news of scientific developments at Oxford University [RSS](#)

NEUROSCIENCE

[Breaking habits before they start](#)

MIT News, 27JUN2013

Researchers at MIT first demonstrated that activity in two distinct brain regions is necessary in order for habits to crystallize. Then, they were able to block habits from forming by interfering with activity in one of the brain regions—the infralimbic (IL) cortex, which is located in the prefrontal cortex.

Tags: Neuroscience

[Past Brain Activation Revealed in Scans: Brain Activity Patterns Preserve Traces of Previous Cognitive Activity](#)

Science Daily, 25JUN2013

Researchers in Israel hint at the possibility of digging into the brain, like archaeologists, and uncovering the history of past experiences. Their study shows that such a scenario is within the realm of possibility. It shows that spontaneous waves of neuronal activity in the brain bear the imprints of earlier events for at least 24 hours after the experience has taken place. TECHNICAL ARTICLE

Tags: Neuroscience

[A Look Inside Children's Minds](#)

Science Daily, 15JUN2013

For the first time, psychologists led by the University of Iowa have peered inside the brain with optical neuroimaging to quantify how much 3- and 4-year-old children are grasping when they survey what's around them and to learn what areas of the brain are in play. The study looks at "visual working memory," a core cognitive function in which we stitch together what we see at any given point in time to help focus attention.

Tags: Neuroscience

QUANTUM SCIENCE

[High-efficiency photon source brings day of reckoning closer for a famous quantum test](#)

PhysOrg.com, 26JUL2013

Researchers at NIST have developed a source that provides the most efficient delivery of a particularly useful sort of paired photons which represents a new high-water mark in a long-term effort toward two very different and important goals, a definitive test of a key feature of quantum theory and improved security for Internet transactions.

TECHNICAL ARTICLE

Tags: Quantum science, Government S&T

[Large-Scale Quantum Chip Validated: Prototype Quantum Optimization Chip Operates as Hoped](#)

Science Daily, 28JUN2013

Researchers at USC demonstrated that the D-Wave processor behaves in a manner that indicates that quantum mechanics plays a functional role in the way it works. The demonstration involved a small subset of the chip's 128 qubits. TECHNICAL ARTICLE

Tags: Quantum science

[Improving Measurements by Reducing Quantum Noise](#)

Science Daily, 27JUN2013

Researchers in Austria have built a new interferometer for trapped, ultracold atomic gases. By strongly suppressing the quantum noise, which ultimately limits the

performance of interferometers, they were able to curb the effect of atomic interactions, and increase the interrogation time of their interferometer. [TECHNICAL ARTICLE](#)

Tags: Quantum science

[Quantum Engines Must Break Down](#)

[Science Daily](#), 26JUN2013

In a study, researchers in the UK used results from quantum information theory to adapt the laws of thermodynamics for small systems, such as microscopic motors, nanoscale devices and quantum technologies. The work establishes new laws in the rapidly emerging field of quantum thermodynamics. [TECHNICAL ARTICLE](#)

Tags: Quantum science

[New scheme for quantum computing](#)

[PhysOrg.com](#), 25JUN2013

Researchers at UC San Diego have proposed a new algorithm for quantum computing, that will speed a particular type of problem. But their analysis has determined the swifter calculations would come at the cost of greater physical resources devoted to precise timekeeping. [TECHNICAL ARTICLE](#)

Tags: Quantum science

[Proof mooted for quantum uncertainty](#)

[Nature News](#), 25JUN2013

Researchers at New York University show that you can't measure something with an accuracy any better than the fundamental quantum uncertainty. Not only does the work place this measurement aspect of the uncertainty principle on solid ground—something that researchers had started to question—but it also suggests that quantum-encrypted messages can be transmitted securely.

Tags: Quantum science

S&T POLICY

[NIST Announces Plan to Create Center of Excellence for Advanced Materials Research](#)

[NIST TechBeat](#), 24JUN2013

The planned center, which NIST expects to fund at approximately \$25 million over five years, will emphasize innovations in measurement technology, modeling, simulation, and data and informatics tools related to advanced materials. NIST plans to hold a competition this summer to select an organization to host the new center.

Tags: S&T policy, Government S&T ■

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