



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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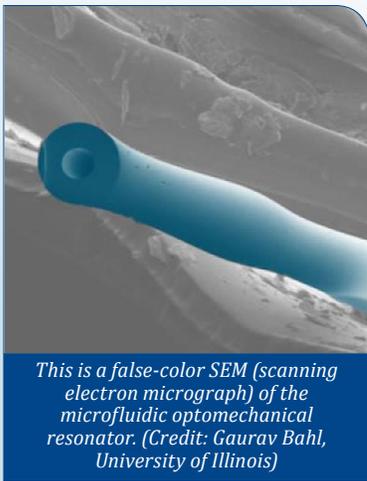
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FEATURE ARTICLES

[Whispering Light Hears Liquids Talk](#)

Science Daily, 07JUN2013



This is a false-color SEM (scanning electron micrograph) of the microfluidic optomechanical resonator. (Credit: Gaurav Bahl, University of Illinois)

According to researchers at the University of Illinois at Urbana-Champaign, in glass microcavities that function as optical whispering galleries, miniscule optical forces can be enhanced by many orders-of-magnitude, which enables 'conversations' between light (photons) and vibration (phonons). These

devices enable experiments targeting quantum information storage, quantum-mechanical ground state, and ultra-sensitive force measurements past the standard quantum limit. [TECHNICAL ARTICLE](#)

Tags: [Communications Technology](#), [Featured Article](#)

[Human-Scale Invisibility Cloak Unveiled](#)

MIT Technology Review, 06JUN2013

Researchers at the University of Rochester demonstrate an invisibility cloak that can be scaled to almost any size and say it could be used to hide orbiting satellites. [TECHNICAL ARTICLE](#), Related [ARTICLE FROM NATURE](#)

Tags: [Sensors](#), [Disruptive technology](#), [Emerging technology](#), [Featured Article](#)

[Quantum Teleportation Between Atomic Systems Over Long Distances](#)

Science Daily, 06JUN2013

Researchers in Denmark have succeeded in teleporting information between two clouds of gas atoms and to carry out the teleportation—not just one or a few times, but successfully every single time. [TECHNICAL ARTICLE](#)

Tags: [Quantum science](#), [Featured Article](#)

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Boeing Completes New Spacecraft, Rocket Milestones](#)

Science Daily, 01JUN2013

The Boeing Company recently performed wind tunnel testing of its CST-100 spacecraft and integrated launch vehicle, the United Launch Alliance (ULA) Atlas V rocket. The testing is part of NASA's Commercial Crew Integrated Capability (CCiCap) initiative, intended to make commercial human spaceflight services available for government and commercial customers.

Tags: [Advanced manufacturing](#), [Military technology](#)

AUTONOMOUS SYSTEMS & ROBOTICS

[Video Friday: TurtleBots, Kilobots, and \(More\) Ikea Furniture Assembly](#)

IEEE Spectrum, 07JUN2013

WPI's robot for the NASA Sample Return Robot Challenge consists of a Clearpath Husky A200 as a base, with a Kinova JACO 6-DOF manipulator arm. The competition itself started yesterday, and it looks like WPI has a pretty decent shot.

Tags: [Autonomous systems & robotics](#)

BIG DATA

[Hop limited epidemic-like information spreading in mobile social networks with selfish nodes](#)

Institution of Physics, 05JUN2013

Researchers in China propose a theoretical model to evaluate the performance of an epidemic-like spreading algorithm, in which the maximal hop count of the information is limited. The model can be used to evaluate the impact of users' selfish behavior.

Tags: [Big data](#), [S&T China](#)

continued...

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BIOTECHNOLOGY

Air bubbles could be the secret to artificial skin

PhysOrg.com, 07JUN2013

Using foam substrates, researchers in Switzerland were able to make a flexible electronic circuit board. This discovery could lead to the creation of deformable and stretchable circuits. Their goal is to be able to make circuit boards that are flexible enough to be integrated into artificial skin. Connected to the nervous system, these electronic circuits could become a true sense organ, allowing people to experience touches, tickles, and pain.

Tags: *Biotechnology, S&T Switzerland*

Positive or negative? Nanoparticle surface charge affects cell-membrane interactions

Physics World, 07JUN2013

An international team of researchers (US, Australia, France) report that positively charged gold nanoparticles can penetrate deep into cell membranes while negatively charged particles do not enter the cell wall at all, but instead prevent it breaking down under certain conditions. This new result could help design nanoparticles for biomedical applications such as drug delivery and anti-cancer treatments.

Tags: *Biotechnology*

COMMUNICATIONS TECHNOLOGY

China Reveals First Space-Based Quantum Communications Experiment

MIT Technology Review, 10JUN2013

Researchers in China claim they've bounced single photons off an orbiting satellite and detected them back on Earth. That's significant because it simulates a satellite sending single photons from orbit to the surface, crossing off another proof-of-principle milestone in their quantum checklist. **TECHNICAL ARTICLE**

Tags: *Communications Technology, S&T China*

'Temporal Cloaking' Could Bring More Secure Optical Communications

Science Daily, 05JUN2013

The technique developed by researchers at Purdue University works by manipulating the phase, or timing, of light pulses. The propagation of light can be likened to waves in the ocean. If one wave is going up and interacts with another wave that's going down, they cancel each other and the light has zero intensity. The phase determines the level of interference between these waves.

TECHNICAL ARTICLE

Tags: *Communications Technology, Optical communication*

CYBER SECURITY

How a Simple Google Search Unmasked a Chinese Cyber Espionage Network

MIT Technology Review, 04JUN2013

One of the major centers for forensic work into computer espionage has been the Citizen Lab, an interdisciplinary research center at the University of Toronto. A new book, *Black Code: Inside the Battle for Cyberspace*, by lab director Ron Deibert is shedding further light into how espionage artists have been unmasked.

Tags: *Cyber security, China espionage, S&T China*

ENERGY

New Framework for Understanding the Energetics of Ionic Liquids

Science Daily, 07JUN2013

A new study by researchers at UC Santa Barbara provides clues into the understanding of the behavior of the charged molecules or particles in ionic liquids. The new framework may lead to the creation of cleaner, more sustainable, and nontoxic batteries, and other sources of chemical power.

TECHNICAL ARTICLE

Tags: *Energy, Materials science*

FORECASTING

Making Sense of Patterns in the Twitterverse

Science Daily, 07JUN2013

Researchers at PNNL have created a powerful digital system, "SALSA" (SociAL Sensor Analytics), capable of analyzing billions of tweets and other social media messages in just seconds, in an effort to discover patterns and make sense of all the information.

Tags: *Forecasting, Big Data, Government S&T*

INFORMATION TECHNOLOGY

Securing the cloud: New algorithm solves major problem with homomorphic encryption

PhysOrg.com, 10JUN2013

Homomorphic encryption is one of the most exciting new research topics in cryptography, which promises to make cloud computing perfectly secure. With it, a Web user would send encrypted data to a server in the cloud, which would process it without decrypting it and send back a still-encrypted result.

Tags: *Information Technology*

“We have the satisfaction to find, that in nature there is wisdom, system and consistency” JAMES HUTTON

Computers are gaining the ability to remember what things look like

Digital Trends, 06JUN2013

Researchers in the UK have developed a new improved version of the system that incorporates the object recognition element called SLAM++ (Simultaneous Location And Mapping), and allows the computer to not only recognize what an object looks like if it's in the database, but also have access to information about that object, such as the object's name, weight, and traditional purpose in some cases.

Tags: Information Technology

Intel unveils 'world's fastest' Thunderbolt thumb drive at Computex

Digital Trends, 06JUN2013

It is a key-shaped 128GB portable thumb drive that plugs directly into a Thunderbolt port, rather than a traditional USB slot. According to Intel, this will allow you to transfer data at a much faster rate than is possible with traditional flash drives.

Tags: Information Technology

MATERIALS SCIENCE

Nanotechnology explores the secret life of knots

Nanowerk, 10JUN2013

According to researchers in Slovenia the study of molecular entanglement is an important field of study as the presence of knots affects its physical properties, for instance the resistance to traction. Previous studies had mainly obtained "static" data on the knotting probability of such molecules.

TECHNICAL ARTICLE

Tags: Materials science

Simple Theory May Explain Mysterious Dark Matter

Science Daily, 10JUN2013

Physicists at Vanderbilt University propose that dark matter, an invisible form of matter that makes up 85 percent of the all the matter in the universe, may be made out of a type of basic particle called the Majorana fermion.

TECHNICAL ARTICLE

Tags: Materials science

Promising Material for Lithium-Ion Batteries

Science Daily, 06JUN2013

Scientists in Germany have synthesized a novel framework structure consisting of boron and silicon, which could serve as electrode material. Similar to the carbon atoms in

diamond, the boron and silicon atoms in the novel lithium borosilicide (LiBSi₂) are interconnected tetrahedrally.

TECHNICAL ARTICLE

Tags: Materials science, S&T Germany

Tiny Bubbles in Your Metallic Glass May Not Be a Cause for Celebration

Science Daily, 05JUN2013

Johns Hopkins researchers used computer simulations to study how tiny bubbles form and expand when a piece of metallic glass is pulled outward by negative pressure, such as the suction produced by a vacuum. Bubbles in the normally high-strength material may indicate that a brittle breakdown is in progress.

Tags: Materials science

Quantum Model Helps Solve Mysteries of Water

Science Daily, 04JUN2013

A research team from the National Physical Laboratory (NPL), the University of Edinburgh and IBM's TJ Watson Research Center reveals a major breakthrough in the modelling of water that could shed light on its mysterious properties.

Tags: Materials science

Nanoengineering boosts efficiency of materials that convert waste heat to electrical energy

Nanowerk, 30MAY2013

Researchers at the University of Michigan have engineered a semiconducting material at the level of its individual atoms, have boosted its ability to convert heat into power by 200 percent and its electrical conductivity by 43 percent.

Tags: Materials science, Energy

MICROELECTRONICS

World's First Large(wafer)-Scale Production of III-V Semiconductor Nanowire

Science Daily, 10JUN2013

A research team from the US and Korea has demonstrated a novel method to epitaxially synthesize structurally and compositionally homogeneous and spatially uniform ternary InAsyP_{1-y} nanowire on Si at wafer-scale using metal-organic chemical vapor deposition (MOCVD).

TECHNICAL ARTICLE

Tags: Microelectronics

NEUROSCIENCE

Mapping the Brain: Researchers Use Signals from Natural Movements to Identify Brain Regions[Science Daily, 06JUN2013](#)

A team of scientists in Germany has now succeeded for the first time in mapping the brain's surface using measurements of everyday movements. Attributing abilities to specific brain regions and identifying pathological areas is especially important in the treatment of epilepsy patients.

[TECHNICAL ARTICLE](#)*Tags: Neuroscience***Helicopter Takes to the Skies With the Power of Human Thought**[Science Daily, 05JUN2013](#)

Using noninvasive electroencephalography (EEG), which recorded the electrical activity of the subjects' brain through a cap fitted with 64 electrodes, researchers at the University of Minnesota have flown a helicopter through a series of hoops around a college gymnasium. [VIDEO](#)

*Tags: Neuroscience, Biotechnology***New nerve and muscle interfaces aid wounded warrior amputees**[PhysOrg.com, 31MAY2013](#)

DARPA's Reliable Neural-Interface Technology (RE-NET) program researched the long-term viability of brain interfaces and continues research to develop high-performance, reliable peripheral interfaces. These new peripheral interfaces use signals from nerves or muscles to both control prosthetics and to provide direct sensory feedback. Ongoing clinical trials present compelling examples of both interface types.

Tags: Neuroscience, DARPA, Government S&T

FEATURED RESOURCE

SciTech Daily

Selected analysis, opinion, features, background and book reviews from international news sources. [RSS](#)

QUANTUM SCIENCE

Spooky Action Put to Order: Different Types of 'Entanglement' Classified[Science Daily, 06JUN2013](#)

Researchers in Germany have developed a method that allows them to assign a given quantum state to a class of possible entanglement states. Such a method is important because, among other things, it helps to predict how potentially useful the quantum state can be in technological applications. [TECHNICAL ARTICLE](#)

*Tags: Quantum science, S&T Germany***First Observation of Spin Hall Effect in a Quantum Gas Is Step Toward 'Atomtronics'**[Science Daily, 05JUN2013](#)

Researchers at NIST have reported the first observation of the "spin Hall effect" in a Bose-Einstein condensate (BEC). Besides offering new insight into the quantum mechanical world, they say the phenomenon is a step toward applications in "atomtronics"—the use of ultracold atoms as circuit components. [TECHNICAL ARTICLE](#)

*Tags: Quantum science, Government S&T***Spintronics Approach Enables New Quantum Technologies**[Science Daily, 04JUN2013](#)

An international team of researchers (US, Germany) highlight the power of emerging quantum technologies. These technologies exploit quantum mechanics to perform disparate tasks such as nanoscale temperature measurement and processing quantum information with lasers. [TECHNICAL ARTICLE 1, 2](#)

*Tags: Quantum science***Violation of Bell's inequality in fluid mechanics**[arXiv.org , 28APR2013](#)

Researchers in the UK show that the quasiparticle solutions to Euler's equation for compressible inviscid fluids are correlated in precisely the same way as the quantum-mechanical particles discussed in Bell's original paper. The violation of Bell's inequality occurs because the fluid motion is correlated over a large distance.

Tags: Quantum science

SCIENCE WITHOUT BORDERS

TED conference sets stage for a week of bright ideas[PhysOrg.com, 10JUN2013](#)

This year's conference, themed "Think Again", will host 900 attendees from 62 countries at the Edinburgh International Conference Center. More than 70 speakers from the worlds of science, business, politics and art will have the opportunity to present their "ideas worth spreading", the group's slogan. [TED](#)

*Tags: Science without borders***Infrared photosynthesis: A potential power source for alien life in sunless places**[PhysOrg.com, 07JUN2013](#)

Researchers in Cuba aim to shed light, as it were, on how organisms could live off of the dim infrared emissions from hydrothermal vents on alien worlds. Tantalizingly, such vents are theorized to exist beneath the surface of Jupiter's ice-covered, oceanic moon Europa.

*Tags: Science without borders**continued...*

SENSORS

Catching Individual Molecules in a Million With Optical Antennas Inside Nano-Boxes

e! Science News, 10JUN2013

Researchers in Spain report the design and fabrication of the smallest optical device, capable of detecting and sensing individual biomolecules at concentrations that are similar to those found in the cellular context. [TECHNICAL ARTICLE](#)

Tags: *Sensors*

Earthquake acoustics can indicate if a massive tsunami is imminent

R&D Magazine, 07JUN2013

Computer simulations by Stanford scientists reveal that sound waves in the ocean produced by the 2011 earthquake in Japan probably reached land tens of minutes before the tsunami. If correctly interpreted, they could have offered a warning that a large tsunami was on the way.

Tags: *Sensors*

Lab Develops New Tool Against Nuclear Smuggling

Global Security Newswire, 07JUN2013

A world record-breaking test of a laser at the Los Alamos National Laboratory in New Mexico has opened the door for using the technology as another tool against trafficking of nuclear weapons materials. The short-pulse device at the Energy Department facility in 2012 demolished the previous record for production of neutrons by a laser beam—in this case, as many as 40 billion particles.

Tags: *Sensors, Government S&T*

Sensitive Flow Sensor: Hair Sensor Uncovers Hidden Signals

Science Daily, 06JUN2013

After a bit of clever tinkering with the flexibility of the “artificial cricket hairs,” researchers in the Netherlands have made it possible to boost the signal-to-noise ratio by a factor of 25. This in turn means that weak flows can now be measured. [TECHNICAL ARTICLE](#)

Tags: *Sensors* ■

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