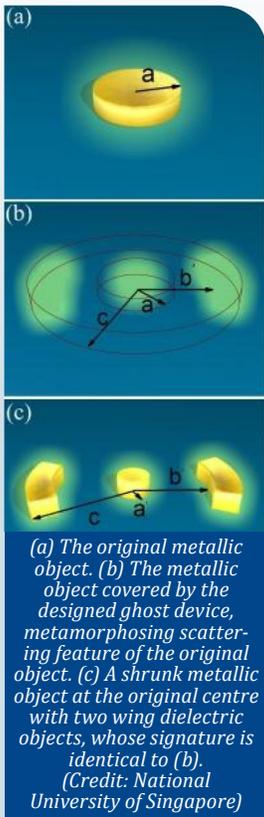


[Advanced manufacturing \(1\)](#)[Big data \(1\)](#)[Foreign S&T \(1\)](#)[Materials science \(6\)](#)[Advanced materials \(3\)](#)[Biotechnology \(2\)](#)[Government S&T \(1\)](#)[Microelectronics \(2\)](#)[Autonomous systems & robotics \(1\)](#)[Communications technology \(1\)](#)[Imaging technology \(3\)](#)[Quantum science \(5\)](#)[Forecasting \(2\)](#)[Information technology \(1\)](#)[Science without borders \(2\)](#)

FEATURE ARTICLES



Engineering 'ghost' objects: Breakthrough in scattering illusion

[Science Daily, 19FEB2013](#)

Researchers at the University of Singapore have developed a device which is capable of creating more than one virtual "ghost" image from the actual object. The geometric shape, position and equivalent material properties of these "ghost" images can be pre-designed and controlled—and are also able to appear in distributed places away from the location of the real object. This technology would have wide applications in defence and security. [TECHNICAL ARTICLE \(IN PRESS\)](#)

Tags: [Imaging technology](#), [Featured Article](#)

Combining quantum information communication and storage

[Science Daily, 18FEB2013](#)

Researchers in Finland have successfully connected a superconducting quantum bit, or qubit, with a micrometer-sized drum head. Thus they transferred information from the qubit to the resonator and back again.

[TECHNICAL ARTICLE](#)

Tags: [Communications Technology](#), [S&T Finland](#), [Featured Article](#)

Quantum computers turn mechanical

[Physics World, 15FEB2013](#)

Ultra-fast computers of the future might consist of tiny pieces of superconducting material linked electrically to equally small mechanical resonators, the former providing the processing power and the latter the memory. That is the prospect raised by new work carried out by an international group of physicists, showing that quantum information can be passed between the two kinds of components in such a way that this delicate information might be protected from environmental interference. [TECHNICAL ARTICLE](#)
Tags: [Quantum science](#), [Featured Article](#)

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

The Future of 3-D Printing: University of Virginia Expert Weighs In

[Newswise, 15FEB2013](#)

Increasingly, with user-friendly computer programs and 3-D printers, the designer can be anybody. Eventually, almost any object or parts for objects may become 3-D printable, including body implants, in a range of materials.

Tags: [Advanced manufacturing](#)

ADVANCED MATERIALS

New material interface improves functioning of non-silicon-based electronic devices

[EurekaAlert, 19FEB2013](#)

Researchers at Penn State have designed and tested an alternative way of creating a device that is compatible with non-silicon technology and that combines into one device both an electronic and a magnetic junction. "Magnetic tunnel junctions"—which include two magnetic metallic layers with a very thin insulator barrier in between—have

been used for binary-state devices, such as magnetic random-access memories (MRAM). Tunneling itself is a quantum-mechanical effect.

Tags: Advanced materials

Dopants dramatically alter electronic structure of superconductor

[Science Daily, 18FEB2013](#)

An international team of scientists—including physicists from the U.S. Department of Energy’s Brookhaven National Laboratory and Cornell University—demonstrates that doping an iron-based superconductor dramatically alters the atomic-scale electronic structure of the parent of a high-temperature superconductor. The key observation—that dopant atoms introduce elongated impurity states which scatter electrons in the material in an asymmetric way—helps explain most of the unusual properties.

[TECHNICAL ARTICLE](#)

Tags: Advanced materials, Government S&T, Materials science

Using plasma as a tool for producing nanoparticles

[Nanowerk, 17FEB2013](#)

DOE scientists will explore low-temperature plasmas that are frequently used to synthesize nanomaterials. The facility has produced test batches of nanoparticles that include carbon nanotubes and nanofibers. Both have widespread uses. Future applications could range from body armor to cancer treatments to flexible computer screens.

Tags: Advanced materials, Government S&T

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Back Rubs, Scrum Simulators, and Robot Theater

[IEEE Spectrum, 15FEB2013](#)

Here’s a hexapod that is unambiguously real, from Trossen Robotics: it’s the PhantomX Hexapod Mark II.

Tags: Autonomous systems & robotics

BIG DATA

Complex systems made simple

[PhysOrg.com, 18FEB2013](#)

Researchers at Northeastern University have developed an algorithm capable of identifying the subset of components—or nodes—that are necessary to reveal a complex system’s overall nature. [TECHNICAL ARTICLE](#)

Tags: Big data, Mathematics

BIOTECHNOLOGY

Brain prostheses create a sense of touch: Infrared signaling could create sense of touch in artificial limbs

[Science Daily, 18FEB2013](#)

The rats sensed the light as a sensation of touch after Duke University researchers fitted the animals with an infrared detector wired to electrodes implanted in the part of the mammalian brain that processes information related to the sense of touch. Infrared sensing might be built into a whole-body prosthesis for paraplegics so patients wearing the “exoskeleton” could have sensory information about where their limbs are and how objects feel when they touch them. [TECHNICAL ARTICLE 1, 2, 3, 4](#)

Tags: Biotechnology

Designer Blood Clots Could Improve Soldier Survival

[Newswise, 15FEB2013](#)

Researchers at Georgia Institute of Technology are developing new biomaterials, including synthetic platelets, made from hydrogels, which could be injected into the bloodstream where they would circulate until activated by the body’s own clotting processes.

Tags: Biotechnology, Military technology

FORECASTING

The 50 Disruptive Companies of 2013

[MIT Technology Review, 20FEB2013](#)

Each company on this list has done something over the past year that will strengthen its hold on a market, challenge the leaders of a market, or create a new market.

Tags: Forecasting, Disruptive technology

Christine Peterson Looks into the Future of Nanotechnology

[IEEE Spectrum, 15FEB2013](#)

Co-founder of the Foresight Institute, Christine Peterson, gives an intriguing and sometimes confounding interview on the future of nanotechnology.

Tags: Forecasting, Nanotechnology

FOREIGN S&T

China’s Next Target: Solar Probe

[Chinese Academy of Science, 20FEB2013](#)

The “Kuafu” project is aimed to build a space weather forecasting system composed of three satellites. Other strategic space projects phased into development stage include hard X-rays probe, quantum science experiment satellite, dark matter detector and recoverable science experiment satellite.

Tags: Foreign S&T, S&T China

“Somewhere, something incredible is waiting to be known.”

CARL SAGAN

GOVERNMENT S&T

Radio Telescope, GPS Use Ionosphere to Detect Nuclear Tests

Naval Research Laboratory, 18FEB2013

Analyzing data of the ionosphere recorded by radio telescope interferometry and GPS, scientists at the Naval Research Laboratory are able to detect acoustic-gravity waves from surface and underground nuclear explosions.

Tags: Government S&T, Nuclear energy

IMAGING TECHNOLOGY

Future science: Using 3D worlds to visualize data

PhysOrg.com, 20FEB2013

Researchers at the University of Illinois at Chicago are pushing science fiction closer to reality with a wraparound virtual world. In the system, known as CAVE2, an 8-foot-high screen encircles the viewer 320 degrees. A panorama of images springs from 72 stereoscopic liquid crystal display panels, conveying a dizzying sense of being able to touch what's not really there.

Tags: Imaging technology

China no longer reliant on foreign satellite images

China NOST News, 19FEB2013

Ziyuan III is a Chinese Earth observation satellite launched in January 2012. It is China's first high-resolution stereo mapping satellite. China plans to build a remote-sensing mapping satellite system in 10 to 15 years. Three follow-up mapping satellites are already in the pipeline. The Ziyuan III 02 satellite is likely to be launched in early 2014.

Tags: Imaging technology, Military technology, S&T China, Satellite technology

INFORMATION TECHNOLOGY

Researchers invent 'acoustic-assisted' magnetic information storage

EurekAlert, 14FEB2013

Researchers at Oregon State University have discovered a way to use high-frequency sound waves to enhance the magnetic storage of data. Ultrasound is directed at a highly specific location while data is being stored, creating elasticity that literally allows a tiny portion of the material to bend or stretch. It immediately resumes its shape when the ultrasound waves stop. The data can be stored reliably without the concerns around heating.

Tags: Information Technology

MATERIALS SCIENCE

New technology to join steel and aluminum with world's first application to the door panel of mass production vehicles

PhysOrg.com, 19FEB2013

Honda Motor Co. announced that it has newly developed a technology to join steel and aluminum and applied it to enable adoption of aluminum for an outer door panel, which has conventionally been made of steel.

Tags: Materials science

Weird new property of quantum electronic material breaks all the rules

Nanowerk, 19FEB2013

Researchers at Rutgers University have discovered that in an exotic material made with uranium cooled to 17.5 degrees above absolute zero or lower, the flow of electricity through the material changes subtly. Electrons come out with their magnetic fields aligned with the material's main Ecrystal axis. The new discovery may lead to enhanced computer displays and data storage systems and more powerful superconducting magnets for medical imaging and levitating high-speed trains. TECHNICAL ARTICLE

Tags: Materials science

Exploring supercapacitors to improve their structure

Science Daily, 18FEB2013

Researchers in France have explored the molecular rearrangements at play in commercially available supercapacitors while in operation. The technique devised by the scientists provides a new tool for optimizing and improving tomorrow's supercapacitors. TECHNICAL ARTICLE

Tags: Materials science, S&T France

Forging a new periodic table using nanostructures: Artificial atoms and bonds provide a new set of building blocks for future materials

Science Daily, 18FEB2013

Using nanoparticles and DNA, researchers at Northwestern University have built more than 200 different crystal structures with 17 different particle arrangements. Some of the lattice types can be found in nature, but they have also built new structures that have no naturally occurring mineral counterpart. For the first time it provides nanotechnologists the ability to tailor properties of materials in a highly programmable way from the bottom up.

Tags: Materials science

continued...

An introduction to nanoscale flexoelectricity

Nanowerk, 15FEB2013

Flexoelectricity is a sizedependent effect which becomes more significant in nanoscale systems. While piezoelectricity requires crystalline structures with no inversion symmetry, flexoelectricity does not carry this requirement, since the effect is caused by inhomogeneous strains.

TECHNICAL ARTICLE*Tags: Materials science, Nanotechnology***Force is the key to granular state-shifting**

PhysOrg.com, 15FEB2013

Granular materials—like sand or dirt—can change their behavior, or state. Sand can both run through an hourglass like a liquid and be solid enough to support buildings. Researchers from North Carolina State University have found that the forces individual grains exert on one another are what most affect that transition. They found that it is possible to take the temperature of a granular system and find out more about what makes it change its state. The ‘thermometer’ for this temperature is actually the particles themselves.

*Tags: Materials science***FEATURED RESOURCE****e! Science News**

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MICROELECTRONICS**New technology for the magnetic cooling of chips**

Nanowerk, 20FEB2013

Researchers at Cambridge University have discovered that by straining the material and then relaxing it, an effect similar to that of a magnetic field is created, thus inducing the magnetocaloric effect responsible for cooling.

TECHNICAL ARTICLE*Tags: Microelectronics, S&T UK***Researchers fabricate a transistor with a channel length of 3 nanometers**

Nanowerk, 19FEB2013

Researchers in Japan developed a transistor which was fabricated employing a V-shaped groove created by anisotropic dissolution of silicon crystal in an alkaline solution. By controlling the conditions of dissolution, a groove with a sharp tip measuring 3 nm was prepared and the groove tip was used as the channel. Junctions were formed by a new technique whereby impurities are uniformly distributed on the entire silicon crystal.

*Tags: Microelectronics, S&T Japan***QUANTUM SCIENCE****Efficient distributed quantum computing**

Nanowerk, 20FEB2013

Researchers at the University of Bristol, UK, have shown that a quantum computer doesn't need to be a single large device but could be built from a network of small parts. The key breakthrough was learning how to efficiently move quantum data between the many sites without causing a collision or destroying the delicate superposition needed in the computation. This allows the different sites to communicate with each other during the computation in much the same way a parallel classical computer would do.

TECHNICAL ARTICLE*Tags: Quantum science, S&T UK***Curves in spacetime violate Heisenberg's uncertainty principle**

PhysOrg.com, 19FEB2013

Researchers at the University of Queensland in Australia have theoretically shown that Open Timelike Curves (OTCs) can allow scientists to measure a pair of conjugate variables of a quantum state to an arbitrary degree of accuracy forbidden by the uncertainty principle. The finding could have implications for quantum gravity and change the way scientists view quantum uncertainty.

TECHNICAL ARTICLE*Tags: Quantum science, Breakthrough technology***Playing quantum tricks with measurements**

Science Daily, 18FEB2013

Researchers at the University of Innsbruck, Austria, have performed an experiment that seems to contradict the foundations of quantum theory—at first glance. The team reversed a quantum measurement in a prototype quantum information processor. The experiment is enabled by a technique that has been developed for quantum error correction in a future quantum computer.

TECHNICAL ARTICLE*Tags: Quantum science*

Researchers propose breakthrough architecture for quantum computers

Nanowerk, 15FEB2013

A team of researchers at the University of Waterloo, Canada proposes using multi-particle quantum walks for universal computation. In a multi-particle quantum walk, particles live on the vertices of a graph and can move between vertices joined by an edge. Furthermore, nearby particles can interact with each other. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T Canada

SCIENCE WITHOUT BORDERS

Global Innovation Index 2012 Edition

INSEAD, 20FEB2013

The GII has evolved into a valuable benchmarking tool to facilitate public-private dialogue, whereby policymakers, business leaders and other stakeholders can evaluate progress on a continual basis. [REPORT](#), [PRESENTATION](#), [SLIDES](#)

Tags: Science without borders

We know when we're being lazy thinkers: Human thinkers are conscious cognitive misers

Science Daily, 19FEB2013

A new study by researchers in France shows that human thinkers are conscious cognitive misers. Contrary to what psychologists believe, we are aware that we occasionally answer easier questions rather than the more complex ones we were asked, and we are also less confident about our answers when we do. [TECHNICAL ARTICLE](#)

Tags: Science without borders, S&T France ■

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