



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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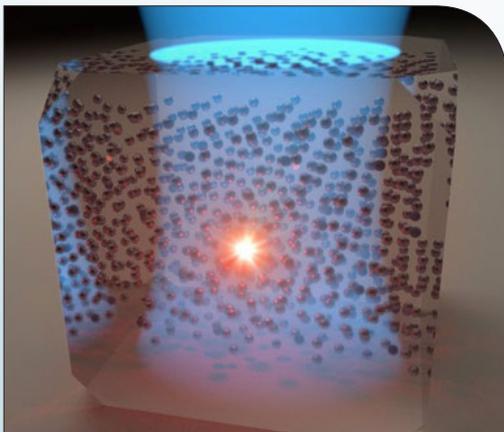
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FEATURE ARTICLES

[A new quantum memory on the horizon](#)

[Nanowerk, 13MAY2014](#)



Researchers in Germany have succeed in precisely locating individual rare earth ions in a crystal and accurately measuring their quantum mechanical energy states. The work may make an important contribution to the

quantum computers of the future—because the ions investigated are suitable for storing and processing quantum information, among other things. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T Germany, Featured Article

[Nonlinear optical materials convert terahertz radiation into infrared light](#)

[PhysOrg.com, 09MAY2014](#)

Commercial use of the technology has been held back by the difficulty in detecting terahertz signals. Researchers in Japan have now developed a system that can upconvert terahertz radiation to higher-frequency infrared light for more efficient detection.

Tags: Sensors, S&T Japan, Terahertz technology, Featured Article

S&T NEWS ARTICLES

ADVANCED MATERIALS

[A simple doping method improves properties of carbon nanotubes](#)

[Nanowerk, 09MAY2014](#)

Researchers at Yale University deposited a small amount of metallocenes (organic compounds with a metal core) in solution on the CNTs, which are then rotated at high speed. This simple “spin coating” process spreads the solution evenly across the surface of the CNTs, resulting in high doping levels that can improve electrical utility.

[TECHNICAL ARTICLE](#)

Tags: Advanced materials

[Graphene photonics breakthrough promises fast-speed, low-cost communications](#)

[Nanowerk, 09MAY2014](#)

Researchers in Australia have created a micrometre thin film with record-breaking optical nonlinearity suitable for high performance integrated photonic devices used in all-optical communications, biomedicine and photonic computing. The high-quality continuous graphene oxide thin film shows potential for ultrafast telecommunications.

[TECHNICAL ARTICLE](#)

Tags: Advanced materials, S&T Australia

[Dipping graphene in solutions to generate electricity](#)

[Nanowerk, 08MAY2014](#)

Researchers in China have developed a new method for generating electricity by simply dipping a piece of graphene sheet into a common ionic solution. They show that the electricity generated is proportional to the size of the graphene sheet and the dipping speed, suggesting that this device may be scalable. [TECHNICAL ARTICLE](#)

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

[Graphene engine goes elastic](#)

[Nanotechweb, 08MAY2014](#)

Researchers in Singapore have made the first ever nanosized heat engine. The device, which is made from nanometre-thick fluorinated graphene, could find use in next-generation nanomachines and nanorobotic

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applications. [TECHNICAL ARTICLE](#)

Tags: Advanced materials

[Plastic material imitates veins to heal itself](#)

[Nature](#), 08MAY2014

Researchers at the University of Illinois at Urbana-Champaign rely on a combination of chemical and mechanical engineering to develop self-healing polymeric materials. The material can patch holes of up to 1 centimetre in diameter, and restore most of its original strength in the process. The advance points the way towards synthetic materials that can repair themselves after potentially catastrophic damage, for example from ballistic impacts or cracks that are difficult to access.

Tags: Advanced materials

[Fabrication of large-area metamaterials](#)

[Nanowerk](#), 07MAY2014

Researchers in Singapore have demonstrated a promising new fabrication technique that can produce large areas of fishnet metamaterials. Fishnet metamaterials usually have several vertically stacked repeat units spread out over much larger lateral dimensions. [TECHNICAL ARTICLE](#)

Tags: Advanced materials

[Moving solitons help make graphene semiconducting](#)

[Nanotechweb](#), 01MAY2014

An international team of researchers (USA, Japan, Spain) has discovered that they can change the stacking order in trilayer graphene using just an electric field. The finding means that semi-metallic graphene can now be transformed into semiconducting graphene using only an applied voltage—something that might make it easier to fabricate devices from the carbon material. [TECHNICAL ARTICLE](#)

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

[Teaching robots right from wrong](#)

[Science Daily](#), 09MAY2014

Researchers at Tufts University will develop unique algorithms and computational mechanisms integrated into an existing and proven architecture for autonomous robots. The augmented architecture will be flexible enough to allow for a robot's dynamic override of planned actions based on moral reasoning.

Tags: Autonomous systems & robotics

[Video Friday: 3D-Printing Drones, Telepresence Robots at Home, and Baxter Does Magic](#)

[IEEE Spectrum](#), 09MAY2014

Using mobile robots for construction is a concept that we've only just started to see being explored in research environments. Researchers have taken this idea airborne, with a quadcopter equipped with a foam dispenser that can be used to build or repair structures.

Tags: Autonomous systems & robotics

BIG DATA

[Who did what?](#)

[MIT News](#), 14MAY2014

Researchers at MIT have developed action-detection algorithms to enable computers to efficiently search videos for actions. The algorithm's execution time scales linearly with the size of the video file it's searching, it is able to make good guesses about partially completed actions, and the amount of memory the algorithm requires is fixed.

Tags: Big data

[The Emerging Science of Superspreaders \(And How to Tell If You're One Of Them\)](#)

[MIT Technology Review](#), 13MAY2014

Researchers in China have studied the way information flows around various networks ranging from the Livejournal blogging network to the network of scientific publishing at the American Physical Society's, as well as on subsets of the Twitter and Facebook networks. They've discovered the key indicator that identifies superspreaders in these networks. [TECHNICAL ARTICLE](#)

Tags: Big data, S&T China

COMMUNICATIONS TECHNOLOGY

[World's First Covert Communications System with Camouflage Guaranteed](#)

[MIT Technology Review](#), 08MAY2014

Researchers at the University of Massachusetts, Amherst, have built the first operational system that provides mathematically proven covert communication over a physical channel. The technique relies on pulse position modulation. This divides each second (or other unit of time) into a number of time bands which correspond to a symbol. [TECHNICAL ARTICLE](#)

Tags: Communications Technology

GOVERNMENT S&T

[Carbon nanotube-infused clothing may protect against chemical weapons](#)

[Nanowerk](#), 07MAY2014

Researchers at NIST have shown that nanotubes can be combined with a copper-based catalyst to break apart a key chemical bond in the class of nerve agents that includes Sarin. A small amount of catalyst can break this bond in a large number of molecules, potentially rendering a nerve agent far less harmful. Nanotubes can be woven into fabric easily. [TECHNICAL ARTICLE](#)

Tags: Government S&T, Advanced materials

“Science does not know its debt to imagination.”

RALPH WALDO EMERSON

IMAGING TECHNOLOGY

[Algorithm Fixes Weather Radar Images Distorted by Wi-Fi](#)

MIT Technology Review, 09MAY2014

Researchers in Austria have been working on an image analysis algorithm that automatically identifies various kinds of interference in weather radar images and removes it, pixel by pixel. At the same time, it looks for shadows in the images where the terrain prevents weather-related echoes from reaching the receiver. It then fills in the gaps.

TECHNICAL ARTICLE

Tags: *Imaging technology*

[Innovative underwater camera could transform future submarines' sensors](#)

Defense Update, 08MAY2014

Researchers in Israel are developing a 'virtual periscope' that could enable submariners to look at objects floating or flying above the sea without using a periscope.

Tags: *Imaging technology*

[Researchers build acoustic tractor beam](#)

PhysOrg.com, 08MAY2014

An international team of researchers (UK, Scotland, USA) has developed an experimental acoustic tractor beam generated by an ultrasonic array operating on macroscopic targets (>1 cm) to demonstrate the negative radiation forces and to map out regimes over which they dominate. The result and the geometrically simple configuration show that the effect is due to nonconservative forces. TECHNICAL ARTICLE

Tags: *Imaging technology*

INFORMATION TECHNOLOGY

[IBM Unveils Software Defined Storage Technology for Era of Big Data](#)

IBM, 12MAY2014

The portfolio of software defined storage products announced by IBM deliver improved economics at the same time they enable organizations to access and process any type of data, on any type of storage device, anywhere in the world.

Tags: *Information Technology*

MATERIALS SCIENCE

[Exploring the magnetism of a single atom](#)

Science Daily, 08MAY2014

For the first time, researchers in Switzerland have shown the maximum theoretical limit of energy needed to control

the magnetization of a single atom. The fundamental work can have great implications for the future of magnetic research and technology. TECHNICAL ARTICLE

Tags: *Materials science, S&T Switzerland*

[New research shows unlimited heat conduction in graphene](#)

Nanowerk, 08MAY2014

With computer simulation, a team of researchers from Germany and Singapore were able to predict that the thermal conductivity of graphene diverges with the size of the samples. This feature stems from the combination of reduced dimensionality and stiff chemical bonding. The discovery challenges fundamental laws of heat conduction for extended materials. TECHNICAL ARTICLE

Tags: *Materials science, S&T Germany*

[MagLab scientists publish trailblazing superconductivity study](#)

PhysOrg.com, 07MAY2014

From a study of lanthanum, strontium, copper, and oxygen compound ($\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$) researchers at Florida State University discovered that high-temperature superconductivity is destroyed by strong magnetic fields. The results of this experimental study will drive the theorists back to the drawing board. We'll have to re-think the basic many-body physics of quantum vortices. TECHNICAL ARTICLE

Tags: *Materials science*

NEUROSCIENCE

[Human learning altered by electrical stimulation of dopamine neurons](#)

Science Daily, 13MAY2014

According to researchers at the University of Pennsylvania human learning can be modified by stimulation of dopamine-containing neurons in a deep brain structure known as the substantia nigra.

Tags: *Neuroscience*

[How the Brain Deletes Old Memories](#)

Science Magazine, 08MAY2014

A team of researchers from Canada and Japan report that neurogenesis (the process where the brain stops producing new neurons) may contribute to the clearing out of old memories. Although it's pure speculation at this point it's possible that this is one way that antidepressants help people with depression, a condition linked to reduced neurogenesis, "is to promote some sort of clearing or forgetting." TECHNICAL ARTICLE

Tags: *Neuroscience, S&T Canada, S&T Japan*

continued...

PHOTONICS

The direct approach to microcavities

Science Daily, 09MAY2014

Researchers in Singapore have developed an optical-fiber-based structure that harnesses the potential of light trapped in a microcavity. The novel design also provides a robust route to advanced devices for filtering and sensing light. [TECHNICAL ARTICLE](#)

Tags: Photonics

FEATURED RESOURCE

Asia Research News

ResearchSEA is a one-stop centre where journalists and members of the public can gain access to news and local experts from the research world in Asia. [RSS](#)

S&T POLICY

China Rolling out Global high speed rail plans and projects – From Pan-asian plan to future Africa projects and proposed China-Russia-Canada-US line

Next Big Future, 09MAY2014

China plans to have 50,000 kilometers of high speed rail network built inside of China by 2020. The external line to the US via Russia and Canada would be an added 12,000 km outside of China and a line to Europe via India would be of similar length.

Tags: S&T policy, S&T China

National coordination needed to advance convergent research, report finds

Science Daily, 07MAY2014

Convergent research could spur innovation and help tackle societal challenges, but greater national coordination is needed, says a new report. Convergent science still faces hurdles and requires a culture shift for research institutions, which have traditionally organized research around separate disciplines. [REPORT](#)

Tags: S&T policy

SCIENCE WITHOUT BORDERS

Radiation from early universe found key to answer major questions in physics

Science Daily, 13MAY2014

Astrophysicists at UC San Diego have measured the minute gravitational distortions in polarized radiation from the early universe and discovered that these ancient microwaves can provide an important cosmological test of Einstein's theory of general relativity. These measurements have the potential to narrow down the estimates for the mass of neutrinos.

Tags: Science without borders

Does light experience time?

PhysOrg.com, 08MAY2014

Have you ever noticed that time flies when you're having fun? Well, not for light. In fact, photons don't experience any time at all. Photons can take hundreds of thousands of years to travel from the core of the Sun until they reach the surface and fly off into space. And yet, that final journey, that could take it billions of light years across space, was no different from jumping from atom to atom.

Tags: Science without borders

SENSORS

Novel technique enables air-stable water droplet networks

Science Daily, 13MAY2014

A simple new technique to form interlocking beads of water in ambient conditions could prove valuable for applications in biological sensing, membrane research and harvesting water from fog. [TECHNICAL ARTICLE](#)

Tags: Sensors, Government S&T

Detecting trace amounts of explosives with light

Nanowerk, 08MAY2014

Researchers in Australia describe a novel optical fibre sensor which can detect explosives in concentrations as low as 6.3 ppm. It requires an analysis time of only a few minutes. [TECHNICAL ARTICLE](#)

Tags: Sensors, Explosives, S&T Australia

Luminescent nanocrystal tags enable rapid detection of multiple pathogens in a single test

Science Daily, 08MAY2014

Using tunable luminescent nanocrystals as tags to advance medical and security imaging, a team of researchers from Australia and Purdue University have successfully applied them to high-speed scanning technology and detected multiple viruses within minutes. [TECHNICAL ARTICLE](#)

Tags: Sensors ■

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