



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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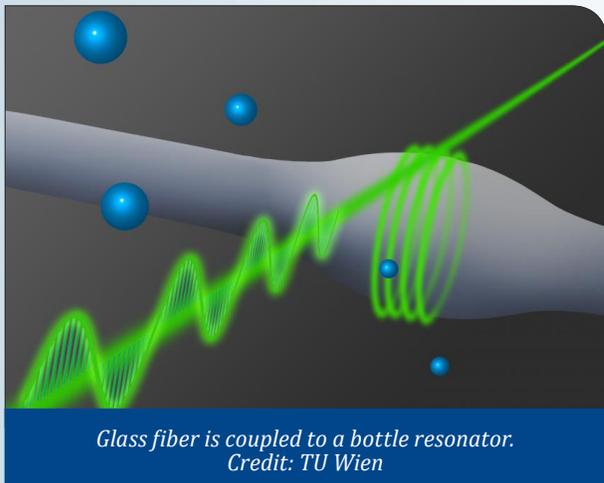
FEATURE ARTICLES

[Two photons strongly coupled by glass fiber](#)

[PhysOrg.com, 02NOV2014](#)

In a system built by researchers in Austria, the interaction between two photons is so strong that the phase of the photons is changed by 180 degrees. The new system is based on glass fibre technology and achieved the strongest possible interaction with the smallest possible intensity of light. The targeted creation of a strong photon-photon-interaction opens up completely new possibilities for quantum optics. [TECHNICAL ARTICLE](#)

Tags: Quantum science, Communications Technology, Featured Article



Glass fiber is coupled to a bottle resonator.
Credit: TU Wien

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Fully 3D-printed quantum dot LEDs](#)

[Nanowerk, 05NOV2014](#)

Researchers at Princeton University show that they can print interwoven structures of quantum dots, polymers, metal nanoparticles, etc, to create the first fully 3D printed LEDs, in which every component is 3D printed. [TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, Quantum science

ADVANCED MATERIALS

[Graphene growth substrate tailors metal atom magnetism](#)

[Nanotechweb, 31OCT2014](#)

Researchers in Switzerland have found that the magnetic properties of transition metal atoms can be tailored depending on the substrate on which the graphene has been grown. This proves that the substrate plays a much more important role than previously thought—something that may ultimately prove useful for information storage, making qubits or quantum computing, albeit at very low temperatures. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, S&T Switzerland

[Tough electronics based on ALD-coated Kevlar](#)

[Nanowerk, 31OCT2014](#)

Researchers are able to “weave” high-strength, highly conductive yarns made of tungsten metal on Kevlar by using atomic layer deposition, a process commonly used for producing memory and logic devices. The entire surface of the yarn—made of nearly 600 fibers, each 12 microns in diameter—is evenly coated. The yarn is expected to find applications in multifunctional protective electronics materials for electromagnetic shielding and communications, as well as erosion-resistant antistatic fabrics for space and automated technologies.

Tags: Advanced materials

[Tiny carbon nanotube pores make big impact](#)

[Science Daily, 29OCT2014](#)

Researchers at DOE’s Lawrence Livermore National Laboratory have created a new kind of ion channel based on short carbon nanotubes, which can be inserted into synthetic bilayers and live cell membranes to form tiny pores that transport water, protons, small ions and DNA. These carbon nanotube “porins” have significant implications for future health care and bioengineering applications. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Government S&T

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AUTONOMOUS SYSTEMS & ROBOTICS

A Brain-Inspired Chip Takes to the Sky

MIT Technology Review, 04NOV2014

An experiment involving a chip on a small drone shows how hardware modeled on the brain could provide useful intelligence. In the experiment, the prototype chip, with 576 silicon neurons, took in data from the aircraft's optical, ultrasound, and infrared sensors as it flew between three different rooms. The flight test was a part of the DARPA's Systems of Neuromorphic Adaptive Plastic Scalable Electronics SyNAPSE project.

Tags: Autonomous systems & robotics, Artificial intelligence

Video Friday: Beams for Sale, Drone on a Leash, and Open Source Humanoid

IEEE Spectrum, 31OCT2014

Poppy is a large, entirely open source, mostly 3D printed humanoid robot. It's designed to be very easy to modify, so that users can quickly invent and test out all kinds of parts.

Tags: Autonomous systems & robotics

Google's Secretive DeepMind Startup Unveils a "Neural Turing Machine"

MIT Technology Review, 29OCT2014

A prototype computer attempts to mimic some of the properties of the human brain's short-term working memory. The new computer is a type of neural network that has been adapted to work with an external memory. The result is a computer that learns as it stores memories and can later retrieve them to perform logical tasks beyond those it has been trained to do.

Tags: Autonomous systems & robotics, Artificial intelligence

CYBER SECURITY

Computers Could Talk Themselves into Giving Up Secrets

MIT Technology Review, 30OCT2014

Researchers at Georgia Tech found that they could sidestep security protocols by using voice controls to enter text or click buttons. In a paper on the work, the researchers describe 12 ways to attack phones with Android, iOS, Windows, or Ubuntu Linux operating systems, including some that would not require physical access to the device.

Tags: Cyber security

ENERGY

Chemists gain edge in next-gen energy: Flexible film can catalyze production of hydrogen

Science Daily, 04NOV2014

Researchers at Rice University have turned molybdenum disulfide's two-dimensional form into a nanoporous film that can catalyze the production of hydrogen or be used for energy storage. TECHNICAL ARTICLE

Tags: Energy, Materials science

Supersonic laser-propelled rockets: Hybrid approach may help power rockets, launch satellites, push future aircraft past Mach 10

Science Daily, 30OCT2014

Researchers in Russia describe a new system that integrates a laser-ablation propulsion system with the gas blasting nozzles of a spacecraft which can increase the speed of the gas flow out of the system to supersonic speeds while reducing the amount of burned fuel. TECHNICAL ARTICLE

Tags: Energy, S&T Russia, Space technology

GOVERNMENT S&T

First Terahertz Amplifier "Goes to 11"

IEEE Spectrum, 04NOV2014

The world's first radio amplifier operating at terahertz frequencies could lead to communications systems with much higher data rates, better radar, and high-resolution imaging that could penetrate smoke and fog, and better ways of identifying dangerous substances. The device was built as part of DARPA's Terahertz Electronics Program.

Tags: Government S&T

IMAGING TECHNOLOGY

Harnessing error-prone chips: New system would allow programmers to easily trade computational accuracy for energy savings

Science Daily, 30OCT2014

Researchers at MIT present a new system that lets programmers identify sections of their code that can tolerate a little error. The system then determines which program instructions to assign to unreliable hardware components, to maximize energy savings while still meeting the programmers' accuracy requirements.

Tags: Imaging technology

MATERIALS SCIENCE

Team develops computational model for predicting superconductivity

PhysOrg.com, 03NOV2014

Researchers at Rutgers University computed the dynamic spin structure factors of 15 iron-based materials, including several high-temperature superconductors. This approach could expedite the search for new or modified materials that conduct electricity with little or no resistance at higher temperatures. TECHNICAL ARTICLE

Tags: Materials science

Ultracold disappearing act (w/video)

Nanowerk, 02NOV2014

Researchers at Rice University expected to observe the property that a pair of colliding solitons would pass

“Sometimes when you innovate, you make mistakes. It is best to admit them quickly, and get on with improving your other innovations.” STEVE JOBS

though one another without slowing down or changing shape. However, they found that in certain collisions, the solitons approached one another, maintained a minimum gap between them, and then appeared to bounce away from the collision. The experiment confirmed the theory that solitons do pass through one another, even in cases where they are out-of-phase and only appear to bounce away from each other. [TECHNICAL ARTICLE](#)

Tags: Materials science

[Understanding springs at the nanoscale: a step towards nanorobots](#)

[Nanowerk](#), 31OCT2014

Nanotechnology researchers have proposed nanoscale helically coiled morphology for enabling elastic memory devices, flexible electronics, impact protection, nanoinductors, and efficient electromagnetic shielding.

Researchers at Clemson University provide a detailed understanding of nanocoil mechanical properties. Their protocol is applicable to any size of the coil. [TECHNICAL ARTICLE](#)

Tags: Materials science, Nanotechnology

[Graphene boundaries heat up](#)

[Nanotechweb](#), 30OCT2014

Researchers at the University of Illinois Urbana-Champaign and Oak Ridge National Laboratory have discovered that the grain boundaries in a graphene sheet heat up when the material is made into a functioning transistor which could lead to early device failure. But the defects themselves might also be exploited to make phase-change memories as well as better sensors from graphene. [TECHNICAL ARTICLE](#)

Tags: Materials science, Advanced materials

NEUROSCIENCE

[Scientists develop a brain decoder that can hear your inner thoughts](#)

[Digital Trends](#), 02NOV2014

Researchers at UC Berkeley have invented a brain decoder device that is able to work out what you're thinking based on neuron activity inside the brain. The hardware required for this sophisticated decoding is still at the developmental stage and isn't accurate enough to be used outside of the lab yet, but the signs are promising.

Tags: Neuroscience

[Random Image Experiment Reveals The Building Blocks of Human Imagination](#)

[MIT Technology Review](#), 30OCT2014

Researchers at MIT have discovered how to extract the template images that the human mind uses to recognize objects, such as balls, cars and people. One extraordinary feature of imagination is that it allows humans to visualize objects they have never seen. The research provides an important new way to train machine vision algorithms to behave more like humans. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

PHOTONICS

[Lord of the microrings: Breakthrough in microring laser cavities reported](#)

[Science Daily](#), 30OCT2014

Researchers at DOE's Lawrence Berkeley National Laboratory report the development of a unique microring laser cavity that can produce single-mode lasing on demand. This advance holds ramifications for a wide range of optoelectronic applications including metrology and interferometry, data storage and communications, and high-resolution spectroscopy. [TECHNICAL ARTICLE](#)

Tags: Photonics, Government S&T

[Plasmons convert light into a voltage](#)

[Physics World](#), 30OCT2014

An international team of researchers (USA, the Netherlands) has developed a new way of creating a voltage by shining light on a solid. Unlike most photovoltaic devices, the new system does not rely on semiconductors but rather on surface plasmons in tiny metal nanostructures. The team is now working to create new types of devices that convert light into electrical energy. [TECHNICAL ARTICLE](#)

Tags: Photonics

QUANTUM SCIENCE

[Bell's theorem still tolls](#)

[Physics World](#), 04NOV2014

The famous proof of entanglement by John Bell is half a century old. Robert P Crease recalls the strange story of its origin and history.

Tags: Quantum science

String field theory could be the foundation of quantum mechanics: Connection could be huge boost to string theory

Science Daily, 03NOV2014

Researchers at the University of Southern California showed that a set of fundamental quantum mechanical principles, known as “commutation rules,” may be derived from the geometry of strings joining and splitting. The commutation rules don’t have an explanation from a more fundamental perspective, but have been experimentally verified down to the smallest distances probed by the most powerful accelerators. [TECHNICAL ARTICLE](#)

Tags: Quantum science

FEATURED RESOURCE

Academia.edu

Academics use Academia.edu to share their research, monitor deep analytics around the impact of their research, and track the research of academics they follow – 15,020,614 academics, 3,626,431 papers and 1,301,200 research interests.

Flying qubits make for a highly resilient quantum memory

PhysOrg.com, 31OCT2014

Researchers in the UK have designed a quantum memory that is resilient to decoherence and various other imperfections. The design is based on qubits that are mobile, called “flying qubits,” which move along a chain of quantum processors that store the qubits’ states. They anticipate that it will be possible to experimentally implement the quantum memory chain using ultracold “flying” atoms in optical traps. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T UK

How Entanglement-Generating Satellites Will Make the Quantum Internet Global

MIT Technology Review, 30OCT2014

Researchers in Canada outline a plan to distribute entanglement around the planet from satellites orbiting a couple of hundred kilometers above the Earth. According to the researchers, their proposed scheme relies on realistic advances in quantum memories and quantum non-demolition measurements and only requires a moderate number of satellites equipped with a tangled photon pair sources. [TECHNICAL ARTICLE](#)

Tags: Quantum science, Communications Technology, S&T Canada

Physicists pave the way for quantum interfaces

Science Daily, 30OCT2014

Researchers in Germany have succeeded in directing the fluorescence of ultracold atoms into surface plasmons. They aim to create tiny systems in which things such as the interplay of light and matter may be observed at the level of individual photons. Such controlled systems hold the promise of applications such as transistors and switches depending on a single photon. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T Germany

Scientists propose existence and interaction of parallel worlds: Many Interacting Worlds theory challenges foundations of quantum science

Science Daily, 30OCT2014

Researchers in Australia propose that parallel universes really exist, and that they interact. They show that such an interaction could explain everything that is bizarre about quantum mechanics. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T Australia

S&T POLICY

China unveils ‘laser to shoot down low-flying drones’

PhysOrg.com, 03NOV2014

The machine has a two-kilometre range and can bring down “various small aircraft” within five seconds of locating its target. It is effective up to a maximum altitude of 500 metres and against aircraft flying at up to 50 metres per second (112 mph). It is expected to “play a key role in ensuring security during major events in urban areas” and address concerns on unlicensed mapping activities.

Tags: S&T policy, S&T China

Fundamental overhaul of China’s competitive funding

Nature, 23OCT2014

By 2017, the main competitive government funding initiatives will be eliminated. This includes the ‘863’ and ‘973’ programmes, two channels for large grants that have been at the heart of modern China’s development of science and technology infrastructure since being established in 1986 and 1997, respectively.

Tags: S&T policy, S&T China

SCIENCE WITHOUT BORDERS

A blueprint to boost reproducibility of results

Nature, 29OCT2014

A researcher at Stanford University suggests a blueprint for making scientific results more reliable, including increasing the statistical certainty of discoveries, giving more weight to negative results and changing how researchers earn kudos.

Tags: Science without borders

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Bibliometrics: Is your most cited work your best?

Nature, 29OCT2014

Highly cited papers are nodes in the network of the dissemination and discussion of scientific information. But citation counts alone cannot reveal why a paper is considered so important as to attract repeated mention by other researchers.

Tags: Science without borders, Bibliometrics

The top 100 papers

Nature, 29OCT2014

The discovery of high-temperature superconductors, the determination of DNA's double-helix structure, the first observations that the expansion of the Universe is accelerating — all of these breakthroughs won Nobel prizes and international acclaim. Yet none of the papers that announced them comes anywhere close to ranking among the 100 most highly cited papers of all time.

Tags: Science without borders

SENSORS

Better bomb-sniffing technology

EurekaAlert, 04NOV2014

Researchers at the University of Utah found a way to break up bundles of the carbon nanotubes with a polymer and then deposit a microscopic amount on electrodes in a prototype handheld scanner that can detect toxic gases such as sarin or chlorine, or explosives such as TNT. When the sensor detects molecules from an explosive, deadly gas or drugs such as methamphetamine, they alter the electrical current through the nanotube materials, signaling the presence of any of those substances.

Tags: Sensors

Finding nukes faster

Federal Computer Week, 03NOV2014

The system, developed by researchers at Sandia National Laboratory weighing in at 90 pounds and standing 3 feet tall, called MINER is a battery-operated version of the lab's 5-foot-tall neutron scatter camera. Both systems can discern between threatening forms of radiation, background radiation and radiation used in legitimate applications.

Tags: Sensors, Government S&T ■

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