



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

[Advanced manufacturing \(4\)](#)

[Advanced materials \(3\)](#)

[Autonomous systems & robotics \(2\)](#)

[Biotechnology \(1\)](#)

[Communications technology \(3\)](#)

[Cyber security \(2\)](#)

[Energy \(2\)](#)

[Forecasting \(1\)](#)

[Information technology \(1\)](#)

[Materials science \(7\)](#)

[Microelectronics \(1\)](#)

[Neuroscience \(1\)](#)

[Quantum science \(1\)](#)

[S&T policy \(3\)](#)

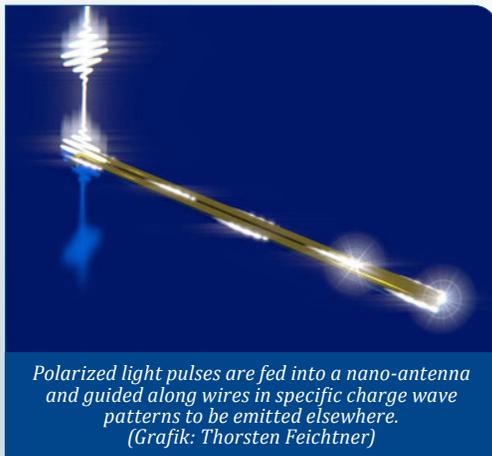
[Science without borders \(2\)](#)

[Sensors \(2\)](#)

FEATURE ARTICLES

[Progress in nano-optics](#)

[Nanowerk, 25NOV2013](#)



Researchers in Germany have introduced the world's first simple plasmonic circuit. It consists of an approximately 200-nano-meter-

long antenna, which efficiently captures free photons and converts them to plasmons. This phenomenon might be used in the future to control the direction of the movement of plasmons, which is not possible in the case of electrons. This might lead to new developments in information technology. [TECHNICAL ARTICLE](#)

Tags: Communications Technology, S&T Germany, Featured Article

[Will 2-D Tin Be the Next Super Material?](#)

[Science Daily, 21NOV2013](#)

Researchers at DOE Laboratory and Stanford University have shown that a single layer of tin is a topological insulator at and above room temperature and therefore has the property to conduct electricity with 100 percent efficiency. It could be the world's first material to conduct electricity with 100 percent efficiency at the temperatures computer chips operate. [TECHNICAL ARTICLE](#)

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

[Scientists create perfect solution to iron out kinks in surfaces](#)

[Nanowerk, 20NOV2013](#)

Researchers in the UK coated a curved surface with a medium where the refractive index varies depending on the position of the wave. Although the coating is only a fraction of a wavelength thick, it can make the curvature appear invisible to surface waves. The discovery could hail a step-change in how antennas are tailored to each platform. [TECHNICAL ARTICLE](#)

Tags: Sensors, Materials science, S&T UK, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Breakthrough adds a new dimension to printing \(w/ Video\)](#)

[PhysOrg.com, 22NOV2013](#)

Researchers in Canada have developed a process called i3DP (initiator integrated 3D printing), an approach to printing materials with easy-to-modify surfaces. Normally, different inks—and different layers—require multiple 3D printers. The development of this process, however, puts it all in one machine.

Tags: Advanced manufacturing, S&T Canada

[3-D Printing Hits Fast Lane: Engineers Cut Time to 3-D-Print Heterogeneous Objects from Hours to Minutes](#)

[Science Daily, 20NOV2013](#)

Researchers at the University of Southern California improved an additive manufacturing-related process called mask-image-projection-based stereolithography (MIP-SL) in which a 3D digital model of an object is sliced by a set of horizontal planes and each slice is converted into a two-dimensional mask image. The mask image is then projected onto a photocurable liquid resin surface and light is projected onto the resin to cure it in the shape of the related layer.

Tags: Advanced manufacturing

continued...

[BACK TO TOP](#)

[Liquid Metal Printer Lays Electronic Circuits on Paper, Plastic, and Even Cotton](#)

MIT Technology Review, 20NOV2013

Researchers in China have worked out how to print electronic circuits on a wide range of materials using an inkjet printer filled with liquid metal. And they've demonstrated the technique on paper, plastic, glass, rubber, cotton cloth and even an ordinary leaf. [TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, S&T China

[New Modelling Technique Could Bypass the Need for Engineering Prototypes](#)

Science Daily, 19NOV2013

Researchers in the UK present a general mechanical model and describe a model reduction technique. The new model includes a memory term to account for effects that traditional models ignore. The study has also discussed the convergence of the method and its implications to non-smooth systems. [TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, S&T UK, Simulation and modeling

ADVANCED MATERIALS

[Infrared Vision Lets Researchers See Through—And Into—Multiple Layers of Graphene](#)

Science Daily, 21NOV2013

Researchers at the University of Buffalo and NRL have developed a technique for “seeing through” a stack of graphene sheets to identify and describe the electronic properties of each individual sheet—even when the sheets are covering each other up. Applying a voltage would allow for fast modulation, which opens up the possibility for new optical devices using graphene for communications, imaging and signal processing. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Government S&T

[European ‘Ultrawire’ project aims to develop ultraconductive copper](#)

Nanowerk, 19NOV2013

A consortium of 14 companies and universities is working on the EU sponsored project [Ultrawire](#), which aims to bring ultraconductive copper, a material that conducts electricity better than any known electrical conductor, within three years, to a level where pilot manufacturing can be planned.

Tags: Advanced materials, S&T EU

AUTONOMOUS SYSTEMS & ROBOTICS

[China tests stealth drone](#)

Defense Update, 23NOV2013

The tailless, delta-wing stealth drone appears to be similar to the U.S. Navy's X-47B drone now undergoing aircraft carrier flight testing. Photos and video of the test flight were published by the Chinese state media. [VIDEO](#)

Tags: Autonomous systems & robotics, Military technology, S&T China

[Video Friday: Everything That Happened For the Last Two Weeks, and More](#)

IEEE Spectrum, 22NOV2013

Here's a video from Lockheed Martin about the future of robotics and AI, which reveals that they may or may not be working on some sort of space-jellyfish-robot-thing.

Tags: Autonomous systems & robotics

BIOTECHNOLOGY

[Hybrid nanomaterials that could replace human tissue or today's pills](#)

Nanowerk, 21NOV2013

Researchers at New York University have uncovered critical information that could help scientists understand how protein polymers interact with other self-assembling biopolymers. The research helps explain naturally occurring nano-material within cells and could one day lead to engineered bio-composites for drug delivery, artificial tissue, bio-sensing, or cancer diagnosis.

[TECHNICAL ARTICLE](#)

Tags: Biotechnology, Materials science

COMMUNICATIONS TECHNOLOGY

[The Challenges of Lasers in Space](#)

Technology Org, 22NOV2013

LLCD manager discusses the challenges and successes they've had so far in this new [video](#).

Tags: Communications Technology, Government S&T, NASA

[Optical Fiber Networks: Channeling Light to Greater Heights](#)

Science Daily, 20NOV2013

Optical fibers of the network transmit light simultaneously over many channels by using different optical wavelengths. These networks could be expanded by utilizing light's polarization. Using the basic geometric principles, researchers in Singapore have developed an optical signal-processing device that is able to filter light with different polarization and fits on a silicon chip.

Tags: Communications Technology

CYBER SECURITY

[Engineers Use Keyboard, Mouse and Mobile Device ‘Fingerprints’ to Protect Data](#)

Science Daily, 19NOV2013

Researchers at Iowa State University are tracking individual typing patterns which they say are unique to individuals. Through their experiments they can identify differences in typing rhythms and are able to distinguish legitimate users versus imposters. The technology operates behind the scenes and is invisible to computer users. It doesn't require any additional hardware.

Tags: Cyber security

“For me, it is far better to grasp the Universe as it really is than to persist in delusion, however satisfying and reassuring.” CARL SAGAN

Internet Engineers Plan a Fully Encrypted Internet

MIT Technology Review, 18NOV2013

In response to the public outcry over mass Internet surveillance the Internet Engineering Task Force, or IETF, an informal organization of engineers that changes Internet code and operates by rough consensus is deep into an effort to encrypt all Web traffic. They expect to have a revamped system ready to roll out by the end of next year.

Tags: *Cyber security*

ENERGY

Researchers use nanomaterial to develop a renewable alternative for crude oil

Nanowerk, 20NOV2013

The process developed by researchers in Israel to convert carbon dioxide and hydrogen into a renewable alternative for crude oil could transform fuels used in gas and diesel-powered vehicles and jets. The advance is made possible in part using nanomaterials that significantly reduce the amount of energy required in the catalytic process to make the crude oil.

Tags: *Energy, Advanced materials*

Stanford study could lead to paradigm shift in organic solar cell research

EurekAlert, 19NOV2013

A typical organic solar cell consists of two semiconducting layers made of plastic polymers and other flexible materials. The idea is that the electron carries extra energy when it drops from material A to material B. That added energy gives the excited (“hot”) electron enough velocity to escape from the hole. But Stanford researchers think that the disordered arrangement of the plastic polymers in the semiconductor might help the electron get away.

Tags: *Energy, Materials science, Solar energy*

FORECASTING

Software Mines Science Papers to Make New Discoveries

MIT Technology Review, 25NOV2013

Software developed by IBM and Baylor College of Medicine that can read tens of thousands of research papers and then predict new discoveries about the workings of a protein that is key to cancer, could herald a faster approach to developing new drugs. Scientists currently rely in part on the reputation of the people, institutions, and journals involved, and the number of times a paper is cited by others. Software that gleans meaning from all the information published within a field could offer a better way.

Tags: *Forecasting, Bibliometrics*

INFORMATION TECHNOLOGY

Faster and Cheaper Technique to Cool Electronic Systems Developed

Science Daily, 19NOV2013

Researchers in Singapore successfully combined the use of two types of heat sinks, known as “microgaps” and “stepped fin microchannels.” Each microgap, ranging from 80 to 1000 microns, is structured over surfaces to facilitate easy and rapid dissipation of heat which is further enhanced by microchannels. According to the researchers, the innovative technique can potentially achieve up to 50 per cent more effectiveness in cooling electronic systems compared to current cooling systems.

Tags: *Information Technology*

MATERIALS SCIENCE

Copper Promises Cheaper, Sturdier Fuel Cells

Science Daily, 22NOV2013

Researchers at Duke University have created copper nanowires fused in a see-through film to transform sunlight and water into a chemical fuel. Copper nanowire catalysts also cost less to produce than their commonly used ITO (indium titanium oxide) counterparts because they can be “printed” on pieces of glass or plastic in a liquid ink form, using a machine that functions much like a printing press. Copper is 1000 times more plentiful and 100 times less expensive than indium. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Energy*

What Can Happen When Graphene Meets a Semiconductor

Science Daily, 21NOV2013

Researchers at the University of Wisconsin-Milwaukee demonstrated that when electrons are rerouted at the interface of the graphene and its semiconducting substrate, they encounter Schottky barrier. If it’s deep enough, electrons don’t pass, unless rectified by applying an electric field—a promising mechanism for turning a graphene-based device on and off. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Advanced materials*

How Metamaterials Could Hold the Key to High Temperature Superconductivity

MIT Technology Review, 20NOV2013

Researchers at the University of Maryland in College Park say metamaterials may be formally linked to another area of physics: superconductivity. In particular, they say that superconductors may be a special form of metamaterial that steer electrons instead of light. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

continued...

[Scientists Break a Theoretical Time Barrier On Bouncing Droplets](#)

MIT News, 20NOV2013

MIT researchers have found a way to burst through that perceived barrier, reducing the contact time by at least 40 percent. The time that the drop stays in contact with a surface is important because it controls the exchange of mass, momentum, and energy between the drop and the surface. The longer a droplet stays in contact with a surface before bouncing off, the greater its chances of freezing in place, for example ice build up on aircraft. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

[Electrified nanodiamonds: Physicists on the trail of quantum information](#)

Nanowerk, 19NOV2013

Researchers from Switzerland and France discovered extra currents at specific voltages when diamond crystals were illuminated by green light. These extra currents are related to the presence of defects in the carbon lattice of diamonds, so called Nitrogen-vacancy centers (NV-centers) that are optically active. These centers are promising candidates for future applications in quantum information processing systems, spin-magnetometry sensors or single photon sources. [TECHNICAL ARTICLE](#)

Tags: *Materials science, S&T France, S&T Switzerland*

FEATURED RESOURCE

[Science.gov](#)

Science.gov searches over 55 databases and over 2100 selected websites from 15 federal agencies, offering 200 million pages of authoritative U.S. government science information including research and development results.

[Infrared light fills a “gap” in iron-based superconductor research](#)

PhysOrg.com, 19NOV2013

Researchers from DOE’s Brookhaven National Laboratory in collaboration with researchers from Germany investigated an iron pnictide compound composed of lanthanum (La), iron (Fe), arsenic (As), oxygen (O), and an added fluorine (F) “dopant” that replaces about 10 percent of the O atoms. This is the first iron-based superconductor found to operate at temperatures higher than most conventional superconductors. [TECHNICAL ARTICLE](#)

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

[Technique Developed to Convert Thermoelectric Material Into High Performance Electricity](#)

Science Daily, 19NOV2013

Researchers at Clemson University developed a novel nanosizing method in which they first peel n-type Bi_2Te_3 into atomically thin-sheets and reassemble them using a spark plasma sintering process. This method enabled them to suitably tailor the materials properties of n-type Bi_2Te_3 for high TE performance. They found that the ‘interfacial charged defects’ improved its structural and thermoelectric efficiency over a wide temperature window. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

MICROELECTRONICS

[Chips meet Tubes: World’s First Terahertz Vacuum Amplifier](#)

DARPA News, 21NOV2013

Researchers under DARPA’s Terahertz Electronics (THz) program have designed and demonstrated a 0.85 Terahertz power amplifier using a micromachined vacuum tube—a world’s first. The achievement comes from DARPA-funded researchers at Northrop Grumman Electronic Systems, who built the 1 centimeter-wide traveling wave vacuum tube.

Tags: *Microelectronics, DARPA, Government S&T*

NEUROSCIENCE

[Chaotic physics in ferroelectrics hints at brain-like computing](#)

EurekAlert, 18NOV2013

Unexpected behavior in ferroelectric materials explored by researchers at the Department of Energy’s Oak Ridge National Laboratory supports a new approach to information storage and processing.

Tags: *Neuroscience, Government S&T*

QUANTUM SCIENCE

[Quantum Light Harvesting Hints At Entirely New Form of Computing](#)

MIT Technology Review, 25NOV2013

Light harvesting in plants and bacteria cannot be properly explained by classical or quantum processes. Researchers from the University of Vermont and Budapest say the answer is a delicate interplay of both, an idea that could transform computation. [TECHNICAL ARTICLE](#)

Tags: *Quantum science*

S&T POLICY

Research Funding Has Become Prone to Bubble Formation

Science Daily, 22NOV2013

If too much research funding is focused on too few research topics, and all researchers speculate in the same fashionable scientific templates to attract funding, a potential science bubble may be forming, explains a professor from the University of Copenhagen, Germany. When bubbles appear in science, truth and reliability are the first victims. This paper explores how fashions in research funding and research management may turn science into something like a bubble economy. TECHNICAL ARTICLE

Tags: S&T policy, Science without borders

A powerful new class of lasers is in the making
EU R&D News, 19NOV2013

To boost scientific research and economic competitiveness the EU is backing a bold new project to create the world's most powerful lasers and build related research infrastructure in three European countries. ELI (Extreme Light Infrastructure) is a partnership charged with creating the ELI-Beamlines Facility in the Czech Republic, the ELI-Attosecond Facility in Hungary and the ELI-Nuclear Physics Facility in Romania. ELI

Tags: S&T policy, S&T EU

Singapore-Finland Partnership to Develop Technology Capabilities for Manufacturing Factories of the Future

Asia Research News, 19NOV2013

The initiative aims to build FoF (Factories of the Future) technology innovation and capabilities of the respective research entities to help manufacturing enterprises in Singapore and Finland to advance their technological competencies and address manufacturing challenges.

Tags: S&T policy

SCIENCE WITHOUT BORDERS

Developing a Fax Machine to Copy Life on Mars
New York Times, 19NOV2013

J. Craig Venter wants to detect life on Mars and bring it to Earth using a device called a digital biological converter, or biological teleporter.

Tags: Science without borders, Biology

Beyond the Higgs boson: Five reasons physics is still interesting

The Conversation, 16NOV2013

With the boson in the can, the Nobel gongs handed out, and the particle collider where it was discovered offline for a two-year upgrade, why are we still doing physics? Here are five possible reasons.

Tags: Science without borders

SENSORS

Sixth Sense in Mechanical Engineering: Sensor Screw Measures Forces Inside Machines

Science Daily, 20NOV2013

Researchers in Germany have developed a brilliantly simple solution to precisely measure the forces that act between two components inside a machine or, for example, on the sail of a boat without drilling holes or sticking on a sensor: a screw with an integrated sensor. The sensor screw can provide measurement data at certain points in time, but also continuously. Among other things, this makes precise quality controls possible.

Tags: Sensors, S&T Germany ■

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