



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Do cloaked objects shine brightly?](#)

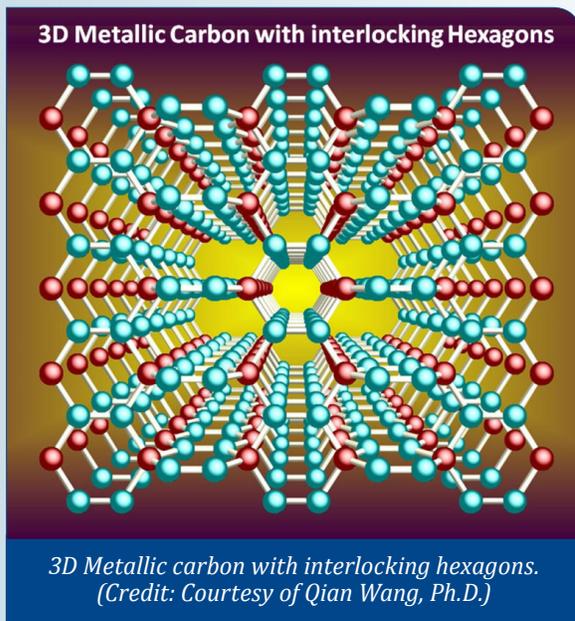
[Physics World, 07NOV2013](#)

A recent study by researchers at the University of Texas, Austin, has shown that while existing cloaking concepts might have the potential to render objects invisible to specific electromagnetic frequencies, when integrating over the entire spectrum, the combined scattering of the cloak is always greater than the original uncloaked object. [TECHNICAL ARTICLE](#)

Tags: Imaging technology, Featured Article

[Three-Dimensional Carbon Goes Metallic](#)

[Science Daily, 06NOV2013](#)



An international team of scientists (USA, China) have discovered a theoretical, three-dimensional form of carbon that is metallic under ambient temperature and pressure. The findings may significantly advance carbon science. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Materials science, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Researchers add another tool to their directed assembly toolkit](#)

[Nanowerk, 12NOV2013](#)

University of Pennsylvania researchers have already developed a technique for controlling liquid crystals by means of physical templates and elastic energy, rather than the electromagnetic fields. Now they have added a new kind of template for rearranging particles and a new set of patterns that can be formed with them. Being able to control the spacing and arrangement of these secondary materials could allow for making new types of antennas, sensors or displays. [TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, Advanced materials

[GE researchers experiment with 3D painting to build up and repair parts \(w/ Video\)](#)

[PhysOrg.com, 08NOV2013](#)

General Electric researchers announced the use of a process called “cold spray,” in which metal powders are sprayed at high velocities to build a part or add material to repair an existing part.

Tags: Advanced manufacturing

[Solid Concepts 3D prints world’s first metal gun \(w/ Video\)](#)

[PhysOrg.com, 08NOV2013](#)

Solid Concepts, a 3D printing company, has announced that it has 3D printed the world’s first metal gun—other guns printed using 3D printers have been made of plastic. They fired their weapon over 50 times, with no apparent problems.

Tags: Advanced manufacturing

[Inkjet-Based Circuits Created at Fraction of Time and Cost](#)

[Science Daily, 06NOV2013](#)

An international team of researchers (USA, Japan) have developed a novel method to rapidly and cheaply make electrical circuits by printing them with commodity inkjet printers and off-the-shelf materials. For about \$300 in

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equipment costs, anyone can produce working electrical circuits in the 60 seconds it takes to print them.

Tags: Advanced manufacturing, Microelectronics

ADVANCED MATERIALS

Nanogrid, activated by sunlight, breaks down pollutants in water, leaving biodegradable compounds

[PhysOrg.com](#), 11NOV2013

Researchers at the State University of New York (SUNY) Stony Brook created a novel “nanogrid,” a large net consisting of metal grids made of a copper tungsten oxide, that, when activated by sunlight, can break down oil from a spill, leaving only biodegradable compounds behind.

Tags: Advanced materials, Environment

A New Solar Material Shows Its Potential

[MIT Technology Review](#), 10NOV2013

According to researchers at the University of Pennsylvania, unlike conventional solar cell materials, the new material, perovskite, doesn’t require an electric field to produce an electrical current. This reduces the amount of material needed and produces higher voltages, which can help increase power output. Perovskite is the first material to respond to visible light, making it relevant for solar cells.

Tags: Advanced materials

Snap to Attention: Polymers That React and Move to Light

[Science Daily](#), 09NOV2013

Researchers at the University of Pittsburgh are investigating polymers that “snap” when triggered by light, thereby converting light energy into mechanical work and potentially eliminating the need for traditional machine components such as switches and power sources. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Materials science

Graphene: Wonder Material for Electronics, Computers and Beyond...

[Science Daily](#), 07NOV2013

Bringing together multiple disciplines and addressing research across a whole range of issues, from the fundamental understanding of material properties to graphene production, the GRAPHENE (1) Flagship was launched in October 2013 by the EU. The proposed research includes electronics, spintronics, photonics, plasmonics and mechanics—all based on graphene.

Tags: Advanced materials, S&T EU, S&T Policy

Wireless Device Converts ‘Lost’ Energy Into Electric Power: Metamaterial Cells Provide Electric Power as Efficiently as Solar Panels

[Science Daily](#), 07NOV2013

Using inexpensive materials configured and tuned to capture microwave signals, researchers at Duke University have designed a power-harvesting device with efficiency similar to that of modern solar panels. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Energy, Solar energy

BIG DATA

The Secret Ingredient in Computational Creativity

[MIT Technology Review](#), 11NOV2013

IBM has built a computational creativity machine that creates entirely new and useful stuff from its knowledge of existing stuff. And the secret sauce in all this? Big data, say the computer scientists behind it. [TECHNICAL ARTICLE](#)

Tags: Big data

World’s largest disease database will use artificial intelligence to find new cancer treatments

[EurekAlert](#), 10NOV2013

The system, called CanSAR, is the biggest disease database of its kind anywhere in the world and condenses more data than would be generated by 1 million years of use of the Hubble space telescope. The open access database containing 1.7 billion experimental results was developed by researchers in the UK. [CanSAR](#)

Tags: Big data, Biotechnology, S&T UK

BIOTECHNOLOGY

Changing the Conversation: Polymers Disrupt Bacterial Communication

[Science Daily](#), 11NOV2013

Researchers in the UK have shown that artificial materials based on simple synthetic polymers can disrupt the way in which bacteria communicate with each other. The findings could further our knowledge on how better to control and exploit bacteria in the future and will have implications for work in the emerging field of synthetic biology. [TECHNICAL ARTICLE](#)

Tags: Biotechnology, Advanced materials, S&T UK

“In science we must be interested in things, not in persons.”

MARIE CURIE

Self-assembling nanoscale transport networks, powered by nanomotors

Nanowerk, 10NOV2013

Researchers in the UK have developed tiny self-assembling transport networks, powered by nano-scale motors and controlled by DNA. The system can construct its own network of tracks spanning tens of micrometres in length, transport cargo across the network and even dismantle the tracks. [TECHNICAL ARTICLE](#)

Tags: *Biotechnology, S&T UK*

COMMUNICATIONS TECHNOLOGY

Warning System for All Crisis Situations

Science Daily, 11NOV2013

Eleven research teams from six European countries taking part in the Alert4All project spent over three years developing a system capable of getting alerts out to people across national borders through many different media in a variety of languages. The system allows new alert channels to be added at any time and can send out fully automated, multi-lingual notifications to the general public.

Tags: *Communications Technology, S&T EU*

A Reconfigurable Antenna Array Integrated With RF Switches

Science Daily, 10NOV2013

Researchers in Malaysia propose Reconfigurable Antenna Array (RAA) whose behavior with respect to the beam shaping characteristics has been investigated. Two different beam patterns were achieved by reconfiguring the number of patches element.

Tags: *Communications Technology*

Tiny laser gives big boost to high speed data transmission

PhysOrg.com, 06NOV2013

New laser devices called oxide VCSELs, developed at the University of Illinois, transmit error-free data over fiber optic networks at a blazing fast 40 gigabits per second – the fastest in the United States. They can carry data faster and in greater quantities than traditional electrical cables. [TECHNICAL ARTICLE](#)

Tags: *Communications Technology*

CYBER SECURITY

Cybersecurity Algorithms, Techniques Being Developed Through Anthropology Methods

Science Daily, 07NOV2013

Experts in anthropology and cybersecurity at Kansas State University are examining the unspoken knowledge shared by cybersecurity analysts as a way to develop new automated tools that help analysts strengthen their cyberdefenses.

Tags: *Cyber security*

ENERGY

Key Processes of Photosynthesis Simulated On Quantum Level

Science Daily, 08NOV2013

Researchers in Germany have simulated key processes of photosynthesis on a quantum level with high spatial and temporal resolution. The work is an important step towards answering the question of how quantum physics can contribute to the efficiency of energy conversion in synthetic systems, for example in photovoltaics.

[TECHNICAL ARTICLE](#)

Tags: *Energy, Quantum science, S&T Germany*

Wearable textile battery can be recharged by sunlight

Nanowerk, 08NOV2013

Researchers in Korea developed and demonstrated a fully functional wearable textile battery by finding unconventional materials for all of the key battery components and integrating them systemically: Nickel-coated polyester yarn as a current collector for efficient stress release, polyurethane binder for strong adhesion of active materials, and polyurethane separator with superior mechanical, electrochemical, and thermal properties. [TECHNICAL ARTICLE](#)

Tags: *Energy, Flexible electronics*

ENVIRONMENTAL SCIENCE

Researchers find tie between global precipitation and global warming

PhysOrg.com, 11NOV2013

In a new study by Lawrence Livermore National Laboratory, scientists show that observed changes in global (ocean and land) precipitation are directly affected by human activities and cannot be explained by natural variability alone. [TECHNICAL ARTICLE](#)

Tags: *Environmental science, Climatology, Government S&T*

continued...

Russian Fireball Yields Scientific Treasure Trove: Researchers Obtain Crucial Data from Meteoroid Impact

Science Daily, 06NOV2013

By calibrating the video images using the position of the stars in the night sky, an international team of researchers led by NASA calculated the impact speed of the meteor at 42,500 mph (19 kilometers per second). As the meteor penetrated through the atmosphere, it efficiently fragmented into pieces, peaking at 19 miles (30 kilometers) above the surface. At that point the light of the meteor appeared brighter than the sun, even for people 62 miles (100 kilometers) away. [CHELYABINSK FIELD STUDY](#)
Tags: Environmental science, Science without borders

Comprehensive study shows cosmic rays are not causing global warming

Physics World, 05NOV2013

In an analysis of more than 50 years' worth of climate data, researchers in Norway have found scant evidence for a controversial theory that attempts to link cosmic rays and global warming. [TECHNICAL ARTICLE](#)
Tags: Environmental science, Climatology

FEATURED RESOURCE

Fraunhofer Research News

Fraunhofer is Europe's largest application-oriented research organization. Our research efforts are geared entirely to people's needs: health, security, communication, energy and the environment. [RSS](#)

FORECASTING

The Experiments Most Likely to Shake Up the Future of Physics

Wired, 11NOV2013

Over the next few years, experimentalists will be churning out new results, which may be able to answer questions about dark matter, the properties of neutrinos, the nature of the Higgs, and perhaps what the next era of physics will look like.

Tags: Forecasting

IMAGING TECHNOLOGY

Novel Radar Technology Developed

Science Daily, 07NOV2013

Using technology developed by the University of Oslo, a Norwegian company has developed chips that are extremely fast, highly precise, run on very low power, and can be placed directly onto objects rather than metres away. Applications include robot vision and consumer-oriented radars in televisions, smoke detectors, thermostats, telephones and portable computer devices.

Tags: Imaging technology

Nanostructures Filter Light to Order

Science Daily, 06NOV2013

An international team of researchers (USA, Singapore, China) has fabricated arrays of silver nanoscale pillars that can selectively reflect light of any desired color. The discovery could have applications in photography, color displays and other imaging techniques. [TECHNICAL ARTICLE](#)

Tags: Imaging technology, Photonics

MATERIALS SCIENCE

Cooling when there's too much heat

MIT News, 11NOV2013

MIT researchers have come up with a way to cool hot surfaces more effectively by keeping droplets from bouncing. Their solution: Decorate the surface with tiny structures and then coat it with particles about 100 times smaller. Using that approach, they produced textured surfaces that could be heated to temperatures at least 100 degrees Celsius higher than smooth ones before droplets bounced.

Tags: Materials science

High-Energy Physicists Predict New Family of Four-Quark Objects

Science Daily, 08NOV2013

An international team (USA, Germany, Russia, China) of high-energy physicists says the discovery of an electrically charged subatomic particle called Zc(4020) is a sign that they have begun to unveil a whole new family of four-quark objects. [TECHNICAL ARTICLE](#)

Tags: Materials science, Particle physics

Volume of Nuclear Waste Could Be Reduced by 90 Percent, Says New Research

Science Daily, 06NOV2013

Researchers in the UK have shown that mixing plutonium-contaminated waste with blast furnace slag and turning it into glass reduces its volume by 85-95 per cent. It also effectively locks in the radioactive plutonium, creating a stable end product. [TECHNICAL ARTICLE](#)

Tags: Materials science

MICROELECTRONICS

Next-Generation Semiconductors Synthesis

Science Daily, 08NOV2013

One promising alternative to silicon is semiconductors made from combinations of aluminum, gallium, and indium with nitrogen to form aluminum nitride (AlN). Conventional processes for producing AlN layers run at temperatures as high as 1150 degrees Celsius, and offer limited control over the thickness of the layers. A new technique developed by Naval Research Laboratory researchers offers a way to produce high-quality AlN layers

with atomic-scale thickness and at half the temperature of other methods. [TECHNICAL ARTICLE](#)

Tags: Microelectronics, Government S&T, Semiconductors

NEUROSCIENCE

[New Study Decodes Brain's Process for Decision Making](#)

[Science Daily, 08NOV2013](#)

Combining computer simulations with brain-imaging data to compare two different types of decision-making models, researchers at the University of Texas, Austin, found that when faced with a choice, the brain retrieves specific traces of memories, rather than a generalized overview of past experiences. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

[Anticipation and Navigation: Do Your Legs Know What Your Tongue Is Doing?](#)

[Science Magazine, 06NOV2013](#)

In their experiment to understand the connection between the two fundamental behaviors of navigation and the anticipation of a reward in animals, UCLA researchers found that depending on the environmental cue, different areas of the brain can work together, or be in disarray. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

[Monkeys Use Minds to Move Two Virtual Arms](#)

[Science Daily, 06NOV2013](#)

In a study led by Duke University researchers, monkeys have learned to control the movement of both arms on an avatar using just their brain activity. The study suggests that very large neuronal ensembles—not single neurons—define the underlying physiological unit of normal motor functions. Until now brain-machine interfaces could only control a single prosthetic limb.

Tags: Neuroscience

SCIENCE WITHOUT BORDERS

[Open-Access Group Sanctions Three Publishers After Science 'Sting'](#)

[Science Magazine, 11NOV2013](#)

A leading trade association for the publishers of free, open-access (OA) scientific journals announced today on its blog that it is terminating the memberships of publishers Hikari Ltd. and Dove Medical Press and placing the membership of SAGE Publications “under review” for 6 months as a result of a controversial investigative journalism project published earlier this year by Science.

Tags: Science without borders

SENSORS

[Laser as sniffer dog for explosives](#)

[PhysOrg.com, 08NOV2013](#)

Researchers in the UK have developed a new compact sensor system based on an LED pumped polymer laser which detects explosive vapors quickly and sensitively. The sensor is based on a distributed feedback polymer laser pumped by a commercial InGaN light-emitting diode. The laser emits a 533 nm pulsed output beam of ~10 ns duration perpendicular to the polymer film. [TECHNICAL ARTICLE](#)

Tags: Sensors, Explosives, S&T UK ■

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