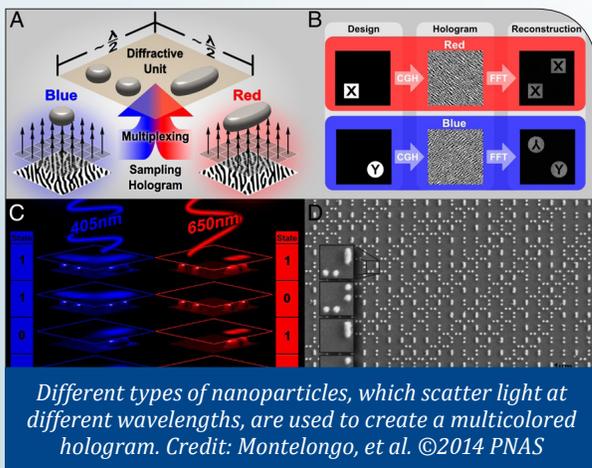


[Advanced manufacturing \(1\)](#)[Advanced materials \(4\)](#)[Autonomous systems & robotics \(4\)](#)[Biotechnology \(1\)](#)[Communications technology \(1\)](#)[Cyber security \(1\)](#)[Energy \(1\)](#)[Environmental science \(1\)](#)[Forecasting \(1\)](#)[Imaging technology \(2\)](#)[Materials science \(2\)](#)[Microelectronics \(3\)](#)[Quantum science \(5\)](#)[S&T policy \(1\)](#)[Science without borders \(2\)](#)[Sensors \(2\)](#)

FEATURE ARTICLES

[Color hologram uses plasmonic nanoparticles to store large amounts of information](#)

[PhysOrg.com, 21AUG2014](#)

Similar to the Lycurgus cup, the new holograms constructed by researchers in the UK can change colors due to light scattering off silver nanoparticles of specific sizes and shapes. Due to their ability to simultaneously create two colors and to store large amounts of information, the new holograms could have applications in 3D displays and information storage devices.

TECHNICAL ARTICLE*Tags: Advanced materials, S&T UK, Featured Article*

[Magnons control magnons: Next-generation transistors](#)

[Nanowerk, 21AUG2014](#)

Researchers in Germany propose the usage of magnons to carry and process information instead of electrons as it is done in electronics. They have realized the transistor solely based on magnons. As data are processed without motion of any real particles like electrons, heat loss and energy consumption are minimized.

TECHNICAL ARTICLE*Tags: Microelectronics, S&T Germany, Featured Article*

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Researchers create engineered energy absorbing material](#)

[PhysOrg.com, 21AUG2014](#)

Through additive manufacturing, researchers at Lawrence Livermore National Laboratory have found a way to design and fabricate, at the microscale, new cushioning materials with a broad range of programmable properties and behaviors that exceed the limitations of the material's composition. **TECHNICAL ARTICLE**

Tags: Advanced manufacturing, Advanced materials, Government S&T

ADVANCED MATERIALS

[Biomimetic photodetector 'sees' in color](#)

[Nanowerk, 25AUG2014](#)

Researchers at Rice University have created a CMOS-compatible, biomimetic color photodetector that directly responds to red, green and blue light in much the same way the human eye does. The technique uses aluminum grating that can be added to silicon photodetectors with CMOS. **TECHNICAL ARTICLE**

Tags: Advanced materials

[Copper shines as flexible conductor](#)

[Nanowerk, 22AUG2014](#)

Researchers in Australia developed copper aerogel monoliths which are conductive. They could be embedded into polymeric elastomers to obtain conducting rubbers. **TECHNICAL ARTICLE**

Tags: Advanced materials, S&T Australia

[Highly conductive organic metal looks promising for disposable electronic devices](#)

[PhysOrg.com, 19AUG2014](#)

Researchers in France have developed a new class of organic materials that are highly conductive yet very soft and flexible. When irradiated with a light pulse, the material reorganizes its molecules to correct structural

continued...[BACK TO TOP](#)

defects. The new material can therefore be assembled with low crystallinity and then transformed via a light pulse into a material with high electrical conductivity. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, S&T France

[‘Robo Brain’ will teach robots everything from the Internet](#)

[PhysOrg.com, 25AUG2014](#)

Robo Brain—a large-scale computational system that learns from publicly available Internet resources—is currently downloading and processing about 1 billion images, 120,000 YouTube videos, and 100 million how-to documents and appliance manuals. According to a team of researchers from US universities (Cornell, Stanford, Brown, UC Berkeley) working on the Robo Brain, it will process images to pick out the objects in them, and by connecting images and video with text, it will learn to recognize objects and how they are used, along with human language and behavior.

Tags: Autonomous systems & robotics, Artificial intelligence

[Video Friday: Ice Bucket Challenge With Robots, Dancing Drones, and Automata Movie](#)

[IEEE Spectrum, 22AUG2014](#)

The Lockheed Martin Squad Mission Support System Unmanned Ground Vehicle surveillance sensor was flown by sling load into the “hostile” area and a tactical resupply and surveillance mission was conducted in autonomous and tele-operated modes.

Tags: Autonomous systems & robotics

[Engineer leads effort to develop computer systems that can see better than humans](#)

[PhysOrg.com, 21AUG2014](#)

Smart cameras don’t take into account complex, cluttered environments. The goal of Penn State research team is to help computerized systems understand and interact with their surroundings and intelligently analyze complex scenes to build a context of what’s going on around them.

Tags: Autonomous systems & robotics, Artificial intelligence

[New algorithm lets drones monitor their own health during long package-delivery missions](#)

[PhysOrg.com, 21AUG2014](#)

Researchers at MIT have developed an algorithm that enables a drone to monitor aspects of its “health” in real time. It can predict its fuel level and the condition of its propellers, cameras, and other sensors throughout a mission, and take proactive measures. The researchers also devised a method for a drone to efficiently compute its possible future locations offline, before it takes off.

[TECHNICAL ARTICLE](#)

Tags: Autonomous systems & robotics

BIOTECHNOLOGY

[Bionanotechnology: Arrays in the future prospects of the field](#)

[Nanotechweb, 19AUG2014](#)

In a review article, researchers in Denmark describe some of the advances that have been made in cellular applications of arrays of one-dimensional nanostructures. The review highlights the progress in the field so far and trends that are emerging from the literature. [TECHNICAL ARTICLE](#)

Tags: Biotechnology, Emerging technology

COMMUNICATIONS TECHNOLOGY

[Teaching light new tricks](#)

[MIT News, 22AUG2014](#)

Researchers at MIT have demonstrated a new way to confine light on the surface of a photonic crystal slab. At a certain angle (35 degrees in the study), light stays bound to the surface, oscillating indefinitely. This phenomenon is called an embedded eigenstate, also known as a “Bound State in the Continuum”. The discovery may have potential use in optical communication. [TECHNICAL ARTICLE](#)

Tags: Communications Technology, Photonics

CYBER SECURITY

[How to Break Cryptography With Your Bare Hands](#)

[MIT Technology Review, 20AUG2014](#)

The “ground” electrical potential in many computers fluctuates according to the computation that is being performed by its processor. According to researchers in Israel, measuring the electrical potential leaked to your skin when you touch the metal chassis of such laptops, and analyzing that signal using sophisticated software, can be enough to determine the keys stored within.

Tags: Cyber security

ENERGY

[Organic photovoltaic cells of the future](#)

[Nanowerk, 19AUG2014](#)

To maneuver around the problem of charge formation and transport processes in organic photovoltaics, a team of researchers in Japan has developed a method to determine the absolute value of the charge formation efficiency. The secret of their method is the combination of two types of spectroscopy. [TECHNICAL ARTICLE](#)

Tags: Energy, S&T Japan, Solar energy

“For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.” RICHARD FEYNMAN

ENVIRONMENTAL SCIENCE

[Laser ‘Lightning rods’ channel electricity through thin air](#)

PhysOrg.com, 19AUG2014

By zapping air with a pair of powerful laser bursts, researchers at the University of Arizona have created highly focused pathways that can channel electricity through the atmosphere. The new technique can potentially direct an electrical discharge up to 10 meters away or more, shattering previous distance records for transmitting electricity through air. It also raises the intriguing possibility of one day channeling lightning with laser power.

TECHNICAL ARTICLE

Tags: Environmental science

FORECASTING

[Asian inventions dominate energy storage systems](#)

Science Daily, 19AUG2014

According to a study by researchers in Germany, the largest volume of applications is submitted by developers of lithium batteries. The study offers a first differentiated analysis of which technologies will be viable in the exit from fossil-fuel energy. European and US companies are falling behind economically, as Asian companies apply for a substantially higher number of patents.

TECHNICAL ARTICLE

Tags: Forecasting, Energy

IMAGING TECHNOLOGY

[Superabsorbing ring could make light work of snaps](#)

PhysOrg.com, 22AUG2014

Researchers in the UK have developed a technique by which a quantum effect, in which excited atoms team up to emit an enhanced pulse of light, can be turned on its head to create ‘superabsorbing’ systems to make the ‘ultimate camera pixel’. The technology could pave the way for camera technology that would exceed the human eye’s ability to see clearly both in dark conditions and in bright sunlight.

Tags: Imaging technology, S&T UK

[Water window imaging opportunity](#)

Science Daily, 21AUG2014

A new theoretical study by an international team of researchers (Spain, USA, UK) identifies the physical mechanism needed to efficiently generate harmonic radiations at high laser intensities that occur beyond

the saturation threshold of atoms and molecules. These findings are aimed at improving conventional methods of coherent radiation production to reach the water window.

TECHNICAL ARTICLE

Tags: Imaging technology

MATERIALS SCIENCE

[Future aircraft could have ‘smart skin’ that feels injuries](#)

BAE Systems, 22AUG2014

BAE is investigating a “smart skin” concept that would involve the use of thousands of micro-sensors that would be embedded into aircraft. Those sensors, or motes, would then detect wind speed, temperatures and physical strain. Smart skin will enable aircraft to continually monitor their health, reporting back on potential problems before they become significant.

Tags: Materials science

[First direct evidence of ‘spin symmetry’ in atoms](#)

Science Daily, 21AUG2014

Researchers at NIST have observed the first direct evidence of symmetry in the magnetic properties of atoms. The discovery could spin off practical benefits such as the ability to simulate and better understand exotic materials such as superconductors.

TECHNICAL ARTICLE

Tags: Materials science, Government S&T

MICROELECTRONICS

[An interesting glimpse into how future state-of-the-art electronics might work](#)

PhysOrg.com, 22AUG2014

A technique, developed by researchers in Canada, for visualizing the inner-workings of electronics could open the door for advanced nanoelectronics and devices. It could prove essential for the development of novel sensors for detecting light, magnetic fields and chemicals.

TECHNICAL ARTICLE

Tags: Microelectronics, S&T Canada

[Electrical engineers take major step toward optical computing](#)

Nanowerk, 19AUG2014

Researchers in Canada are designing nano-optical cables small enough to replace the copper wiring on computer chips. They have invented a new, non-metallic metamaterial that enables them to “compress” and contain light waves in smaller cables without creating heat, slowing the signal or losing data.

TECHNICAL ARTICLE

Tags: Microelectronics, S&T Canada

continued...

QUANTUM SCIENCE

[Physicists ‘freeze time’ to manipulate spin information in graphene](#)[PhysOrg.com, 25AUG2014](#)

Researchers in the Netherlands isolated spin information from the influence of the outside world in a nanoscale graphene device, in which they can easily manipulate the information with electric fields. This feature makes their device an attractive candidate for future computer data storage and for logic devices based on spins. [TECHNICAL ARTICLE](#)

Tags: Quantum science

FEATURED RESOURCE

[EurekaAlert](#)

AAAS provides timely, excellent global coverage of developments in all branches of science through topical feeds. Separate feeds cover NSF, NIH and DOE. [RSS](#)

[Quantum meets classical: Qubit fabricated with integrated micromagnet increases speed of quantum manipulation in silicon](#)[PhysOrg.com, 25AUG2014](#)

Researchers at the University of Wisconsin, Madison, have fabricated a qubit in a silicon double-quantum dot in which the qubit basis states are the singlet state and the spin-zero triplet state of two electrons. They integrated a proximal micromagnet allowing them to create a large local magnetic field difference between the two sides of the quantum dot—thereby greatly increasing their ability to manipulate the qubit without injecting noise.

[TECHNICAL ARTICLE](#)

Tags: Quantum science

[Quantum nonlinear optics—photon by photon](#)
[Nature Photonics, 24AUG2014](#)

This review article summarizes the emerging field of quantum nonlinear optics. Three major approaches to generate optical nonlinearities based on cavity quantum electrodynamics, atomic ensembles with large Kerr nonlinearities and strong atomic interactions are reviewed. Applications of quantum nonlinear optics and many-body physics with strongly interacting photons are also discussed.

Tags: Quantum science

[X-ray laser probes tiny quantum tornadoes in superfluid droplets](#)[Science Daily, 21AUG2014](#)

Experiments by researchers at DOE’s SLAC National Accelerator Laboratory revealed a well-organized 3-D grid of quantum ‘tornadoes’ inside microscopic droplets of supercooled liquid helium. The findings provide new insight into the strange nanoscale traits of a so-called ‘superfluid’ state of liquid helium. [TECHNICAL ARTICLE](#)

[The Next Battleground In The War Against Quantum Hacking](#)[MIT Technology Review, 20AUG2014](#)

Ever since the first hack of a commercial quantum cryptography device, security specialists have been fighting back. Researchers in Germany show how the changes still leave the equipment open to attack but at the same time reveal how the next generation of quantum cryptography could be made better. [TECHNICAL ARTICLE](#)

Tags: Quantum science, Cyber Security, S&T Germany

S&T POLICY

[Chinese Academy of Sciences to Lead Reform CAS \(China\), 22AUG2014](#)

The CAS rolled out a complete restructuring program for more than 100 subordinate institutes, sorting them into four functional categories—applied technology for industry; academic research; engineering; and basic research that requires long-term investment. The government hopes more commercial enterprises will work with research institutes. At least 25 companies listed on China’s A-share market are controlled by universities and research institutes with a total market value of about 187.8 billion yuan (30.49 billion US dollars).

Tags: S&T policy, S&T China

SCIENCE WITHOUT BORDERS

[Seven Over 70](#)[MIT Technology Review, 19AUG2014](#)

To complement the list of young innovators, listed are several who have been at it for decades. Innovation isn’t a chauvinist when choosing her servants: older people are as capable of new thinking as the young. Listed in the article, in order of age, are seven innovators over the age of 70.

Tags: Science without borders

[Bacterial nanowires: ‘Electric bacteria’ not what we thought they were](#)[Science Daily, 18AUG2014](#)

Researchers at the University of Southern California have discovered that bacterial nanowires are actually extensions

of the bacteria's outer membrane. Understanding the way these electric bacteria work has the potential to address some of the big questions about the nature of life itself, including what types of lifeforms we might find in extreme environments, like space. [TECHNICAL ARTICLE](#), [VIDEO](#)

Tags: Science without borders

SENSORS

[Novel Sensing Technique Developed for Graphene Electronics Manufacturing](#)

[IEEE Spectrum](#), 21AUG2014

An international team of researchers (USA, Japan) developed a method for detecting impurities in graphene using terahertz waves. It involves the use of indium phosphide which emits a terahertz signal when it becomes excited. [TECHNICAL ARTICLE](#)

Tags: Sensors, S&T Canada, Terahertz technology

[Electronic 'noses' to detect chemical warfare gases](#)

[Science Daily](#), 19AUG2014

Researchers in Spain have developed a prototype of electronic "nose" for the detection of chemical warfare gases, fundamentally nerve gases (Sarin, Soman and Tabun). The "nose" consists of fifteen commercial sensors, a data acquisition system and a computer connected to this system. The system responds to gases in a characteristic way. [TECHNICAL ARTICLE](#)

Tags: Sensors, Chemical agent countermeasures ■

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