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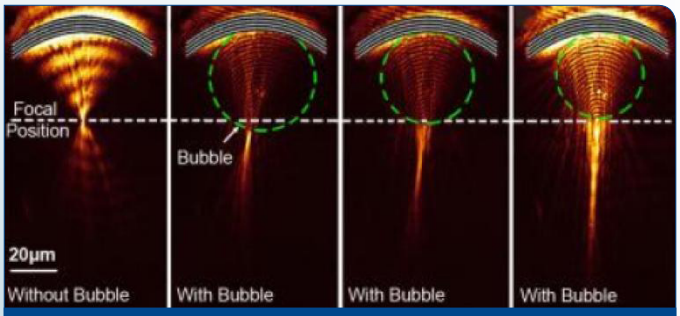
S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

Feature Articles

Bubbles are the new lenses for nanoscale light beams



These are laboratory images of a light beam without a bubble lens, followed by three examples of different bubble lenses altering the light. (Credit: Tony Jun Huang, Penn State)

Science Daily, 09AUG2013

Penn State researchers have demonstrated that a few tiny liquid bubbles may be all that is necessary to open the doors for next-generation, high-speed circuits and displays. The main advantage of a bubble lens is just how quickly and easily researchers can reconfigure the bubble's location, size, and shape. TECHNICAL ARTICLE

Tags: Imaging technology, Featured Article

Magnetic nano-knots for data storage

Nanowerk, 08AUG2013

Physicists in Germany managed for the first time to individually write and delete single skyrmions, a knot-like magnetic entity. Such vortex-shaped magnetic structures exhibit unique properties which make them promising candidates for future data storage devices.

Tags: Information Technology, Materials science, Featured Article

Q-Glasses Could Be a New Class of Solids

Science Daily, 07AUG2013

Researchers in the US and France have analyzed a solid alloy that they discovered in small discrete patches of a rapidly cooled mixture of aluminum, iron and silicon. The material appears to have none of the extended ordering of atoms found in crystals, which would make it a glass, except that it has a very defined composition and grows outward from "seeds"—things that glasses most assuredly do not do. TECHNICAL ARTICLE

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

S&T News Articles

ADVANCED MATERIALS

Chemists develop 'fresh, new' approach to making alloy nanomaterials

Nanowerk, 09AUG2013

Researchers in the US have figured out how to synthesize nanomaterials with stainless steel-like interfaces. Their discovery may change how the form and structure of nanomaterials are manipulated, particularly those used for gas storage, heterogeneous catalysis and lithium-ion batteries. TECHNICAL ARTICLE

Tags: Advanced materials

Development of new heat insulating paint using irregular silica

PhysOrg.com, 08AUG2013

The paint developed by researchers in Japan deteriorates less than any other conventional paint when exposed to heat and a paint film 0.2 mm in thickness exhibits a heat insulating effect. It has a good heat insulating effect when it is applied to shipping containers.

Tags: Advanced materials, S&T Japan

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Robot Fighting, Slime Mold Faces, and RoboSub 2013

IEEE Spectrum, 09AUG2013

Curiosity has been on Mars for an entire year now. NASA held a special event at JPL featuring members of the rover team, talking about how crazy the landing was and what Curiosity has been up to since then.

Tags: Autonomous systems & robotics

continued...

BACK TO TOP

BIOTECHNOLOGY

A powerful strategy for developing microbial cell factories by employing synthetic small RNAs

e! Science News, 08AUG2013

Researchers in Korea describe the detailed step-by-step protocol for synthetic sRNA-based gene expression control, including the sRNA design principles. The method may prove useful for metabolic engineering and synthetic biology studies. TECHNICAL ARTICLE

Tags: Biotechnology

ENERGY

Regulating electron 'spin' may be key to making organic solar cells competitive

Science Daily, 07AUG2013

Researchers in the US and UK developed sensitive laser-based techniques to track the motion and interaction of electrons in organic solar cells. To their surprise, the team found that the performance differences between materials could be attributed to the quantum property of 'spin'. TECHNICAL ARTICLE

Tags: Energy, Solar energy

Self-Healing Solar Cells 'Channel' Natural Processes

Science Daily, 07AUG2013

Researchers at North Carolina State University show that creating solar cell devices with channels that mimic organic vascular systems can effectively reinvigorate solar cells whose performance deteriorates due to degradation by the sun's ultraviolet rays. TECHNICAL ARTICLE

Tags: Energy, Solar energy

Synthetic Polymers Enable Cheap, Efficient, Durable Alkaline Fuel Cells

Science Daily, 07AUG2013

Researchers at Penn State have developed a new polymer which is a unique anion exchange membrane—a new type of fuel cell and battery membrane—that allows the use of much more cost-efficient non-precious metal catalysts and does not compromise either durability or efficiency like previous anion exchange membranes. TECHNICAL ARTICLE

Tags: Energy, Battery

ENVIRONMENTAL SCIENCE

New insights into the one-in-a-million lightning called 'ball lightning'

PhysOrg.com, 07AUG2013

Ball lightning occurs only once in every million lightning bolts and glows for up to 10 seconds. Natural ball lightning cannot be studied with scientific instruments. Researchers in the US describe experiments that led to more effective ways of making ball lightning, essential for further insights into the phenomenon, and techniques that made the fireball last longer so that observations could continue. TECHNICAL ARTICLE

Tags: Environmental science, Government S&T

INFORMATION TECHNOLOGY

Breakthrough in memory technologies could bring faster computing, smaller memory device

PhysOrg.com, 12AUG2013

Researchers in Israel have developed a simple magnetization progress that, by eliminating the need for permanent magnets in memory devices, opens the door to many technological applications. With this technique, the researchers showed it is possible to create a magnetic-based memory device that does not require a permanent magnet, and which could allow for the miniaturization of memory bits down to a single nanoparticle. TECHNICAL ARTICLE

Tags: Information Technology, Materials science

Meshnet activists rebuilding the Internet from scratch

KurzweilAI, 12AUG2013

These wireless networks are intended to permit secure communication without surveillance or any centralized organization, and ultimately, if their designers get their way, they will span the country. Hyperboria, the virtual layer that underpins meshnet efforts in the U.S., is a virtual meshnet because it runs through the existing Internet, but is purely peer-to-peer.

Tags: Information Technology

How to Turn Your Bathtub Into a Giant iPad

IEEE Spectrum, 08AUG2013

It could be a little like the surreal, interactive "AquaTop display" experience, created by researchers in Japan. The prototype model is just a tank of water, but the plan is for the AquaTop to turn your everyday bathtub into an immersive touchscreen, allowing the bather to watch movies, look at photos and play games.

Tags: Information Technology

Visualization tool helps researchers see their data like never before

Science Daily, 08AUG2013

Researchers at Missouri University have developed a visualization tool called Visualizing Four Dimensions in Rolla (V4DiR) which allows researchers to view their data in 3-D over various time spans. It allows us to use our natural pattern-recognition capabilities to isolate interesting groupings of information.

Tags: Information Technology

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"If you thought that science was certain – well, that is just an error on your part."

RICHARD FEYNMAN

MATERIALS SCIENCE

Researchers discover a tiny twist in bilayer graphene that may solve a mystery

PhysOrg.com, 12AUG2013

Researchers at Berkeley Lab have discovered that in the stacking of graphene monolayers subtle misalignments arise, creating an almost imperceptible twist in the final bilayer graphene. Tiny as it is—as small as 0.1 degree—this twist can lead to surprisingly strong changes in the bilayer graphene's electronic properties. TECHNICAL ARTICLE

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

Computer simulations reveal universal increase in electrical conductivity

Nanowerk, 11AUG2013

An international team of researchers (Germany, France, UK) succeeded for the first time in using computer simulations to look at the second Wien effect. They have revealed how the electrical conductivity of many materials increases with a strong electrical field in a universal way. This development could have significant implications for practical systems in electrochemistry, biochemistry, electrical engineering and beyond. TECHNICAL ARTICLE

Tags: Materials science

New physics in a copper-iridium compound

PhysOrg.com, 08AUG2013

Researchers at Argonne National Laboratory report unexpected magnetic behavior within Sr_3CuIrO_6. These results indicate that mixing certain transition metal systems can yield TMCs with surprising physical properties unattainable with these systems alone, and may eventually lead to new materials for applications such as electronic memory devices and quantum computation.

Tags: Materials science, Government S&T

Carbon Under Pressure Exhibits Interesting Traits

Science Daily, 07AUG2013

Researchers at Arizona State University used an electron beam to shrink and thereby squeeze minuscule capsules containing carbon. When combined with heating of the samples, new features were observed in the enclosed materials. TECHNICAL ARTICLE

Tags: Materials science

Unruly Plasmas

Science Daily, 06AUG2013

In computer simulations, researchers in Germany found that a liquid layer of charged particles remained fluid for a long time when cooled rapidly in the presence of a magnetic filed. This could have far-reaching consequences for a large number of systems that are subject to strong magnetic fields—compact stars and fluids in the laboratory. TECHNICAL ARTICLE

Tags: Materials science, S&T Germany

MEDICAL SCIENCES

First probable person to person transmission of new bird flu virus in China

e! Science News, 06AUG2013

According to researchers limited transmission between humans is not surprising, and does not necessarily indicate that the virus is on course to develop sustained transmission among humans.

Tags: Medical Sciences

MICROELECTRONICS

Researchers speed up transistors by embedding tunneling field-effect transistor

PhysOrg.com, 09AUG2013

Researchers in China have discovered a way to speed up traditional computer transistors by embedding tunneling field-effect transistors (TFETs) in them. Such transistors run faster with less power. TECHNICAL ARTICLE

Tags: Microelectronics, S&T China

IBM Scientists Show Blueprints for Brain-like Computing

MIT Technology Review, 08AUG2013

Using simulations of enormous complexity IBM researchers showed that the architecture, named TrueNorth, could lead to a new generation of machines that function more like biological brains. With TrueNorth, the researchers demonstrated a way to use chips that use a network of "neurosynaptic cores" for specific tasks, and they showed that the approach could be used to build, among other things, a more efficient biologically inspired visual sensor.

Tags: Microelectronics

Scientists seek silicon's successor

PhysOrg.com, 08AUG2013

Using the lab's high-powered Linac Coherent Light Source X-ray laser, researchers at SLAC National Accelerator Lab found that it takes just one-trillionth of a second to switch magnetite's electrical conductivity from "on" to "off." That's thousands of times faster than silicon chip transistors.

Tags: Microelectronics, Government S&T

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Will it be possible someday to build a 'Fab-on-a-Chip'?

Nanowerk Spotlight, 08AUG2013

In this article we discuss the possibility of putting the entire functionality of such a fab onto a single silicon chip. We demonstrate a path forward where, for certain applications, especially at the nanometer scale, one might consider using a single chip approach for building devices, both integrated circuits and nano-electromechanical systems.

Tags: Microelectronics

Scientists Create Tiny Bendy Power Supply for Even Smaller Portable Electronics

Science Daily, 07AUG2013

Researchers in Germany have developed a powerful micro-supercapacitor. The tiny power supply measures less than half a centimetre across and is made from a flexible material, opening up the possibility for wearable electronics. TECHNICAL ARTICLE

Tags: Microelectronics

Featured Resource

EurekAlert

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

NEUROSCIENCE

Brain's Flexible Hub Network Helps Humans Adapt

Science Newsline, 12AUG2013

Researchers at Washington University in St. Louis have found evidence that a well-connected core brain network based in the lateral prefrontal cortex and the posterior parietal cortex contains "flexible hubs" that coordinate the brain's responses to novel cognitive challenges.

Tags: Neuroscience

New Tools to Organize Information-Overload Threatening Neuroscience

Science Daily, 08AUG2013

A UCLA team has invented research maps to help with the overload of data. Equipped with an online app, the maps help neuroscientists quickly scan what is already known and plan their next study. The map allows scientists to zero in and out of areas that interest them. By tracking published findings, researchers can determine what's missing and pinpoint worthwhile experiments to pursue. TECHNICAL ARTICLE

Tags: Neuroscience

Scientists Find Key Signal That Guides Brain Development

Science Daily, 07AUG2013

Researchers in the US and UK have decoded an important molecular signal that guides the development of a key region of the brain. With studies such as this one, we're starting to understand the normal functions of molecules whose disruption by gene mutations can cause developmental brain disorders. TECHNICAL ARTICLE

Tags: Neuroscience

UCSB Study Reveals That Overthinking Can Be Detrimental to Human Performance

Science Daily, 07AUG2013

UC Santa Barbara researchers report that there are two kinds of memory: implicit, a form of long-term memory not requiring conscious thought and expressed by means other than words; and explicit, another kind of long-term memory formed consciously that can be described in words. Disrupting the function of these two regions shed light on why paying attention can be a distraction and affect performance outcomes. TECHNICAL ARTICLE

Tags: Neuroscience

PHOTONICS

Caltech team produces squeezed light using a silicon micromechanical system

EurekAlert, 07AUG2013

Researchers at Caltech have engineered a miniature silicon system that produces a type of light that is quieter at certain frequencies—meaning it has fewer quantum fluctuations—than what is usually present in a vacuum. This system should enable a new set of precision microsensors capable of beating standard limits set by quantum mechanics. TECHNICAL ARTICLE

Tags: Photonics

QUANTUM SCIENCE

Atomic clock can simulate quantum magnetism

Science Daily, 08AUG2013

For the first time, researchers at NIST, Boulder Colorado, have used an atomic clock as a quantum simulator, mimicking the behavior of a different, more complex quantum system. TECHNICAL ARTICLE

Tags: Quantum science

SCIENCE WITHOUT BORDERS

On the Trail of Dark Energy: Physicists Propose Higgs Boson 'Portal'

Science Daily, 10AUG2013

Researchers in the US suggest that the recently discovered Higgs boson could provide a possible "portal" to physics that could help explain some of the attributes of the

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enigmatic dark energy, and help resolve the cosmological constant problem. TECHNICAL ARTICLE

Tags: Science without borders

SENSORS

Device for capturing signatures uses tiny LEDs created with piezo-phototronic effect

PhysOrg.com, 11AUG2013

The sensor device could provide an artificial sense of touch, offering sensitivity comparable to that of the human skin. Beyond collecting signatures and fingerprints, the technique could also be used in biological imaging and MEMS systems. Ultimately, it could provide a new approach for human-machine interfaces. TECHNICAL ARTICLE

Tags: Sensors, Medical Sciences

Fast detector for a wide wavelength range

PhysOrg.com, 08AUG2013

Researchers in Germany have developed a robust and fast detector which can measure the arrival of a terahertz pulse with great accuracy. This technology can be applied in all comparable FELs. It is based on a tiny flake of graphene. TECHNICAL ARTICLE

Tags: Sensors, S&T Germany

STEM

Just-in-time physics

Digital PC, 08AUG2013

Can advanced physics be taught in a project-based curriculum? Robert P Crease drops in at an innovative, new US engineering college to find out.

Tags: STEM ■

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