



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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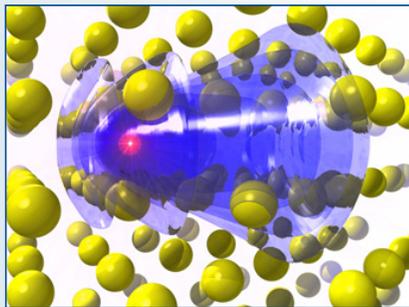
FEATURE ARTICLES

[Lawrence Livermore research identifies precise measurement of radiation damage](#)

[Lawrence Livermore Laboratory, 05JUN2012](#)

Researchers simulated the passage of a fast proton through crystalline aluminum. By accounting for the energy absorbed by the electrons and the magnitude of the impulse given to the aluminum atoms, the team was able to predict the rate at which the proton is stopped and the amount of momentum transferred. This is a precise atomistic simulation of the deposited energy and momentum, which is ultimately responsible for the damage that is produced in the material.

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



Model of the electronic wake (blue surfaces) generated by an energetic proton (red sphere) traveling in an aluminum crystal (yellow spheres). The resulting change in electronic density is responsible for modification of chemical bonds between the atoms and consequently for a change in their interactions.

[Splitting the unsplitable: Physicists split an atom using quantum mechanics precision](#)

[Science Daily, 05JUN2012](#)

The laws of quantum mechanics allow objects to exist in several states simultaneously. This is what the so-called double-slit experiment is based on, where a particle can go through two slits at the same time. Researchers at the University of Bonn, Germany, have succeeded in keeping a single atom simultaneously in two places that were more than ten micrometers apart. This is an enormous distance for an atom. Afterwards, the atom was put back together undamaged.

Tags: Quantum science, S&T Germany

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Singapore Establishes the First-Of-Its-Kind Remanufacturing R&D Centre in Asia](#)

[Asia Research News, 31MAY2012](#)

Six industry leaders, namely Boeing, Rolls-Royce plc, Siemens Industry Software, ABB, FUCHS Lubricants and Carl Zeiss, have signed a Memorandum of Understanding with the Centre to look into collaborative R&D to bridge technological gaps in remanufacturing for the aerospace, oil & gas, marine, energy, automotive and engineering industries. These technologies will enable companies and businesses to translate end-of-life products into "good as new" ones for the market through a sustainable process, contributing to greater cost and materials savings, and potentially higher profit margins. *Tags: Advanced manufacturing*

[Wyss Institute Develops New Nanodevice Manufacturing Strategy Using Self-Assembling DNA "Building Blocks"](#)

[Harvard University, 30MAY2012](#)

Researchers at the Harvard University have developed a method for building complex nanostructures out of short synthetic strands of DNA. The interlocking DNA "building blocks, called single-stranded tiles (SSTs), are akin to Legos and can be programmed to assemble themselves into precisely designed shapes, such as letters and emoticons. Further development of the technology could enable the creation of new nanoscale devices, such as those that deliver drugs directly to disease sites.

Tags: Advanced manufacturing

ADVANCED MATERIALS

[Nanoparticles seek and destroy groundwater toxins](#)

[Nanowerk, 04JUN2012](#)

The iron particles are injected directly into contaminated soil where they flow to the contaminants and initiate a redox reaction, whereby electrons are transferred between the particle and the pollutant. This reaction changes the

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oxidation state of the pollutant and diminishes its overall toxicity to safer levels.

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

Virtual Soldier

[Armed with Science](#), 05JUN2012

The high-tech gear and equipment that will arm the military forces of tomorrow are undergoing rigorous testing today – not on people, but on Santos, a virtual soldier coming to life in a University of Iowa lab. Santos serves as a test bed for a range of applications: clothing, protective gear, packs, vehicles and even Harley-Davidson motorcycles, according to the report. [VIDEO](#)

Tags: Autonomous systems & robotics, Military technology

Boeing Phantom Eye Completes 1st Autonomous Flight

[Boeing](#), 04JUN2012

Phantom Eye climbed to an altitude of 4,080 feet and reached a cruising speed of 62 knots. Phantom Eye's liquid-hydrogen propulsion system will allow the aircraft to stay on station for up to four days while providing persistent monitoring over large areas at a ceiling of up to 65,000 feet, creating only water as a byproduct. The demonstrator, with its 150-foot wingspan, is capable of carrying a 450-pound payload.

Tags: Autonomous systems & robotics

Robotic jellyfish could patrol oceans, clean oil spills, and detect pollutants

[R&D Magazine](#), 04JUN2012

Virginia Tech College of Engineering researchers are working on a multi-university, nationwide project for the U.S. Navy that one day will put life-like autonomous robot jellyfish in waters around the world. The main focus of the program is to understand the fundamentals of propulsion mechanisms utilized by nature. Future uses of the robot jellyfish could include conducting military surveillance, cleaning oil spills, and monitoring the environment.

Tags: Autonomous systems & robotics

BIOTECHNOLOGY

Computer-designed proteins programmed to disarm variety of flu viruses

[EurekaAlert](#), 01JUN2012

Researchers at the University of Washington are demonstrating that proteins found in nature, but that do not normally bind the flu, can be engineered to act as broad-spectrum antiviral agents against a variety of flu virus strains, including H1N1 pandemic influenza. The proteins are constructed via computer modeling to fit neatly onto a nano-sized target on flu viruses.

Tags: Biotechnology

COMMUNICATIONS TECHNOLOGY

Flexible channel width improves user experience on wireless systems

[Science Daily](#), 04JUN2012

Researchers at the North Carolina State University have developed a technique that improves network performance by determining how much channel width each user needs in order to run his or her applications. The channel width may change—becoming larger or smaller—as the data travels between nodes in the network. The amount of channel width allotted to users is constantly being modified to maximize the efficiency of the system and avoid what are, basically, data traffic jams.

Tags: Communications Technology

Boeing SOTM technology is a leap forward in Ka-band satellite network communication capabilities for the warfighter

[Boeing Company](#), 30MAY2012

During a demonstration, High Mobility Multipurpose Wheeled Vehicles (Humvees) fitted with cameras and handheld radios successfully connected to test labs in Australia and the United States, simultaneously combining videoconferencing with military radio and telephones. The integrated SOTM demonstration proved core elements of a seamless, secure and deployable communications system.

Tags: Communications Technology

ENERGY

Chemical engineers devise a new way to split water

[R&D Magazine](#), 05JUN2012

Providing a possible new route to hydrogen-gas production, researchers at the California Institute of Technology have devised a series of chemical reactions that allows them, for the first time, to split water in a nontoxic, noncorrosive way, at relatively low temperatures.

Tags: Energy, Materials science

The Bionic Snail

[Science](#), 25MAY2012

By implanting enzyme-coated electrodes into a snail, researchers have turned the invertebrate into a tiny fuel cell. The enzyme coating in one electrode triggers a chemical reaction that consumes glucose produced by the snail and generates electrons. A different enzyme coating the other electrode takes spare electrons and gives them to positive ions in the snail's hemolymph, the invertebrate equivalent of blood. Together, these reactions created a voltage difference between the electrodes of a little more than 0.53 volts, generating power of a few microwatts. [TECHNICAL ARTICLE](#)

Tags: Energy

“Most institutions demand unqualified faith; but the institution of science makes skepticism a virtue.” ROBERT K. MERTON

ENVIRONMENTAL SCIENCE

Geoengineering could disrupt rainfall patterns Science Daily, 06JUN2012

A geoengineering solution to climate change could lead to significant rainfall reduction in Europe and North America, a team of European scientists concludes. The researchers studied how models of the Earth in a warm, CO₂-rich world respond to an artificial reduction in the amount of sunlight reaching the planet's surface.

Tags: Environmental science

Understanding a novel form of turbulence PhysOrg.com, 05JUN2012

A new class of three-dimensional turbulence known as zig-zag instability (ZZI) has recently been shown to be the cause of decoupling of horizontal layers in stably stratified fluids, those with layers of densities decreasing in the vertical direction. Such systems are common both in the atmosphere and the oceans.

Tags: Environmental science, S&T France

EXPLOSIVES

Nuclear Weapon Simulations Show Performance in Detail Newsweek, 05JUN2012

U.S. researchers are perfecting simulations that show a nuclear weapon's performance in molecular detail, which is critical because international treaties forbid the detonation of nuclear test weapons.

Tags: Explosives

FOREIGN S&T

Iran's new space center to be launched Science Daily, 04JUN2012

This new space center which is 80 percent complete will be used for sending satellites made by Iran and other Muslim countries into space.

Tags: Foreign S&T, S&T Iran

GOVERNMENT S&T

4 technologies that transformed government Federal Computer Week, 05JUN2012

In the stories that follow, we take a closer look at some world-changing technology developments of the past 25 years, including the Internet, a game changer if there ever was one, and GPS, which has revolutionized the way we interact with our world and underscored the power of place.

Tags: Government S&T

FFRDC Research and Development Expenditures: Fiscal Year 2010 NSF, 05JUN2012

The detailed statistical tables presented in this report contain data on R&D expenditures for federally funded research and development centers (FFRDCs) from the FY 2010 FFRDC Research and Development Survey.

Tags: Government S&T, R&D Funding, S&T Policy

Emerging optics technology to fly on microsatellite

EurekaAlert, 04JUN2012

NASA and Air Force researchers are collaborating to build a small solar observatory equipped with the so-called “photon sieve,” an eight-inch (20-centimeter) diffractive optic. A version of this technology was successfully demonstrated in a ground test, paving the way for its flight on a tiny CubeSat satellite in 2014—the Air Force-sponsored FalconSat-7 mission.

Tags: Government S&T, Satellite technology

Special Ops Wants Weapons to Stop Ships, Paralyze People Wired, 04JUN2012

Special Operations and Command (SOCOM) is looking to make a few upgrades. Among them: new weapons with adjustable intensity levels—from non-lethal to lethal—that are capable of doing everything from thwarting enemy ships to paralyzing, disorienting or barricading individuals. That request is only one part of a new, wide-ranging SOCOM bid for research proposals aimed at the “advancement of technologies” for special ops forces. BAA

Tags: Government S&T

INFORMATION TECHNOLOGY

A search engine for social networks based on ants

R&D Magazine, 04JUN2012

Researchers in Spain are developing an algorithm, based on ants' behavior when they are searching for food, which accelerates the search for relationships among elements that are present in social networks.

Tags: Information Technology

Latest in Army training: How to write your own apps

Federal Computer Week, 01JUN2012

The Mobile Applications Branch has written some 90 applications that have been downloaded nearly 1.4 million times. Two thirds of these applications were published

through iTunes or on Android mobile stores. Some limited work on secure applications designed to run on classified networks.

Tags: Information Technology, Government S&T

Could Sarcastic Computers Be in Our Future? New Math Model Can Help Computers Understand Inference

[Science Daily](#), 30MAY2012

Stanford University researchers describe a quantitative theory of pragmatics that promises to help open the door to more human-like computer systems, ones that use language as flexibly as we do. The mathematical model they created helps predict pragmatic reasoning and may eventually lead to the manufacture of machines that can better understand inference, context and social rules.

Tags: Information Technology

FEATURED RESOURCE

Armed with Science (DOD)

In January 2009, the Defense Media Activity launched, “Armed with Science: Research and Applications for the Modern Military,” a weekly webcast highlighting the importance of science and technology to the modern military. In January 2010 it was expanded into a science and technology blog. [RSS](#)

MATERIALS SCIENCE

Corning Launches Ultra-Slim Flexible Glass

[Corning](#), 04JUN2012

Advances in fusion forming have made it possible to produce glass that is 100 microns thick – about the thickness of a sheet of copy paper. Even at that thickness, it provides hermetic sealing to sensitive components, while also providing excellent optical, thermal, and surface properties. Willow Glass can be processed at temperatures up to 500° C. High temperature processing capability is essential for today’s high-end displays, and is a processing condition that cannot be supported with polymer films.

Tags: Materials science, Advanced materials

NEUROSCIENCE

Scientists hit major milestone in whole-brain circuit mapping project

[R&D Magazine](#), 04JUN2012

This week neuroscientists at Cold Spring Harbor Laboratory will be publicly releasing the first installment out of 500 TB of data so far collected in their groundbreaking project to construct the first whole-brain wiring diagram of a vertebrate brain, that of the mouse.

Tags: Neuroscience

S&T POLICY

House Defense Authorization Bill Recommends Reduced Funding for S&T Programs

[American Institute of Physics](#), 04JUN2012

The House-passed version of the National Defense Authorization Act for FY 2013 recommends an overall 4.4 percent decrease in funding for the 6.1 Basic Research, 6.2 Applied Research, and 6.3 Advanced Technology Development programs. The House passed this bill, H.R. 4310, on May 18. The counterpart bill in the Senate was passed in committee but the accompanying report has not been issued.

Tags: S&T policy, R&D Funding

‘Synthetic Biology for the Next Generation’

[EurekAlert](#), 04JUN2012

At this National Academy of Sciences and National Academy of Engineering symposium, stakeholders will examine the tools, platforms, and infrastructure needed for continued advances in synthetic biology; political and social strategies to pursue these advances; and research applications in key areas.

Tags: S&T policy, Synthetic biology

SCIENCE WITHOUT BORDERS

How To Build A Maxwell’s Fishpond

[MIT Technology Review](#), 05JUN2012

Researchers in the UK have built a two dimensional version of Maxwell’s fisheye lens which works with water waves rather than electromagnetic ones. When filled with water, waves on the surface behave in a remarkable way. It turns out that a circular wave pattern does not simply spread out and disperse. Instead, it always reconverges to a point on the other side of the dish, regardless of where it formed in the first place. [TECHNICAL ARTICLE](#)

Tags: Science without borders

Mosquitoes don’t let the rain get them down (w/video)

[Nature News](#), 05JUN2012

The mosquito combines with the raindrop and makes this drop-cum-mosquito package that falls down together for up to 20 body lengths. The mosquitoes then separate from the raindrop and go buzzing about their business. The investigation could prove useful in implementing mosquito controls for disease or for designing miniature robots that can mimic mosquitoes in flight.

Tags: Science without borders

Scientists: your number is up

[Nature News](#), 30MAY2012

ORCID (Open Researcher and Contributor ID) aims to reliably attribute research outputs to their true author by assigning every scientist on the planet a machine-readable, 16-digit unique digital identifier. So far, some 280 organizations, including major research bodies, funding agencies

and publishers, have become members of the ORCID committee, which was set up in 2010 as an independent non-profit organization in Wilmington, Delaware. US federal research agencies, such as the NIH and NSF are in discussions to integrate ORCID with a planned identifier scheme called the Science Experts Network Curriculum Vitae (SciENCv). They could track the publications or patents that have resulted from grants, or check for duplicate funding.

Tags: Science without borders, Bibliometrics

The Right Way to Get It Wrong

Scientific American, 29MAY2012

Mistakes can push scientific understanding forward. Errors that touch on deep features of the world can be more valuable in the long run than narrowly correct ideas. Famously important scientific mistakes include Niels Bohr's atomic model, the theory of continental drift (in its original form) and the experiments of Enrico Fermi that led to nuclear fission.

Tags: Science without borders

SENSORS

UMD scientists create faster, more sensitive photodetector by tricking graphene

e! Science News, 05JUN2012

Researchers developed the bolometer using bilayer graphene--two atomic-thickness sheets of carbon. Due to graphene's unique properties, the bolometer is expected to be sensitive to a very broad range of light energies, ranging from terahertz frequencies or submillimeter waves through the infrared to visible light.

Tags: Sensors

New type of biosensor is fast, super-sensitive

Nanowerk, 04JUN2012

The biochemiresistor uses gold-coated magnetic nanoparticles modified with antibodies that are selective for the chemical constituent of interest. The nanoparticles are dispersed into the sample for analysis and if the analyte is present some of the antibodies detach from the nanoparticles. Using a magnet, the nanoparticles are then assembled into a film between two electrodes and the electrical resistance is measured. **TECHNICAL ARTICLE**

Tags: Sensors ■

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