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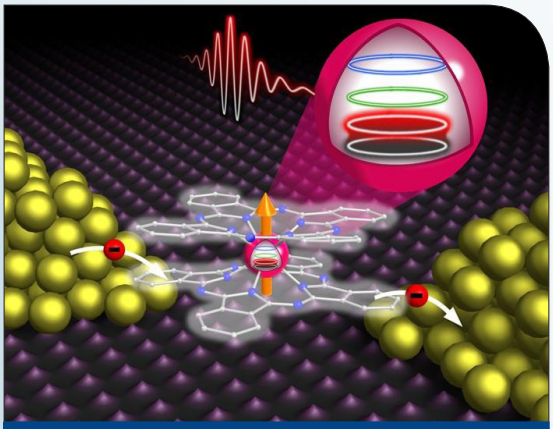
S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

FEATURE ARTICLES

Electrical control of nuclear spin qubits: Important step towards quantum computers

Science Daily, 06JUN2014



Single-molecule magnet, consisting of a metal ion and contacting organic molecules between the electrodes. The nuclear spin states (colored circles) can electrically be manipulated and read out. Credit: S. Thiele, CNRS, C. Grupe, KIT

An international team of researchers (France, Germany) has demonstrated how nuclear spins can be manipulated with electric fields using a spin cascade in single-molecule magnet. Electric manipulation allows for a quick and specific switching of quantum bits. TECHNICAL ARTICLE

Tags: Quantum science, Featured Article

Optical invisibility cloak built for diffusive media (like fog)

Science Daily, 06JUN2014

In diffusive media, light is scattered permanently by the particles in the medium. Using this property researchers in Germany have succeeded in manufacturing an ideal invisibility cloak for diffusive light-scattering media. TECHNICAL ARTICLE

Tags: Sensors, S&T Germany, Featured Article

S&T NEWS ARTICLES

ADVANCED MATERIALS

Nanoparticle thin-films that self-assemble in one minute

Nanowerk, 09JUN2014

Researchers at DOE's Lawrence Berkeley National Laboratory combined supramolecules based on block copolymers with gold nanoparticles to create nanocomposites that under solvent annealing, quickly self-assembled into hierarchically-structured thin films spanning an area of several square centimeters. This technique could open new avenues for fabricating metamaterials and artificial nanoconstructs. TECHNICAL ARTICLE

Tags: Advanced materials, Government S&T

Carbon-based electronics in sight?

Nanowerk, 05JUN2014

An international team of researchers (UK, Germany, Finland) has introduced carbon nitride, a structural analogue of graphene made of carbon and nitrogen that appears to exhibit semiconducting properties. The team has now been able to make such a material for the first time. This may be a step on the way to the post-silicon era of electronics. TECHNICAL ARTICLE

Tags: Advanced materials

Carbon sheets go magnetoelectric

Nanotechweb, 03JUN2014

Graphene can be made magnetic by functionalizing the material with certain organic radicals. Stanford University researchers have calculated that this magnetism could be controlled using an electric field. The result could be important for developing low-power spintronics applications from graphene in the future. TECHNICAL ARTICLE

Tags: Advanced materials, Materials science

continued...

BACK TO TOP

Nanoporous material leads to carbon-capture breakthrough (w/video)

Nanowerk, 03JUN2014

A porous material invented by researchers at Rice University sequesters carbon dioxide at ambient temperature with pressure provided by the wellhead and lets it go once the pressure is released. The material shows promise to replace more costly and energy-intensive processes.
TECHNICAL ARTICLE

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

A new robot can read your emotions

Science Alert (Australia), 09JUN2014

Pepper, a 1.2m, 28kg humanoid robot developed by a company in Japan gets feedback about our moods via facial-recognition technology, cameras, audio records and sensors in its head. Instead of being programmed, Pepper learns how to behave over time. Their feedback is also uploaded to cloud storage so other units can modify their behaviour accordingly.

Tags: Autonomous systems & robotics, S&T Japan

Report Identifies Barriers to Successful Incorporation of Increasingly Autonomous Unmanned Aircraft in the Nation's Aviation System, Outlines Research Priorities to Overcome Hurdles

National Research Council, 08JUN2014

The NRC report identifies specific technological, regulatory, and other barriers that must be overcome before autonomous aircraft and other systems can reach their full potential ensuring that they will perform with the high level of safety and reliability expected of civil aviation systems.
REPORT

Tags: Autonomous systems & robotics, S&T Policy

BIOTECHNOLOGY

Researchers use living systems as a guide to develop advanced technologies

Nanowerk, 06JUN2014

In a recent book, researchers at the University of South Carolina suggest that biologically driven design leads to the development of novel multi-functional materials, miniaturized electromechanical systems, and reliable living tissues as a more sustainable solution to pressing technological problems facing the human race.

Tags: Biotechnology, Biomimetics

CYBER SECURITY

Are squiggly lines the future of password security?

Science Daily, 04JUN2014

A new study by researchers at Rutgers University shows that free-form gestures can be used to unlock phones and grant access to apps. These gestures are less likely to be observed and reproduced by 'shoulder surfers' who spy on users to gain unauthorized access.

Tags: Cyber security

Making a covert channel on the Internet

PhysOrg.com, 04JUN2014

Researchers at Cornell University created a covert channel at the hardware level, using a network interface card that allows precise software control over optical signals. A receiver with similar capability can detect the timing variations and read the message. Off-the-shelf hardware used by most networks discards the idle characters before passing packets along to the receiving computer, so the message is invisible to an administrator's monitoring software.

Tags: Cyber security, Communications Technology

Passwords No More? Mechanisms Enables Users to Log in Securely Without Passwords

Science Daily, 04JUN2014

Researchers at the University of Alabama at Birmingham have developed a secure log in system called zero-interaction authentication through which access is granted when the verifying system can detect the user's security token—such as a mobile phone or a car key—using an authentication protocol over a short-range, wireless communication channel, such as Bluetooth.

Tags: Cyber security

ENERGY

Cluster-based distributed controller technology for failure-tolerant networking

PhysOrg.com, 05JUN2014

Researchers in Japan have developed a load-balancing technology that automatically redistributes control loads in a cluster-based distributed controller, and a recovery technology that automatically reassigns controllers without interruption when one fails.

Tags: Energy, S&T Japan

continued...

"The great tragedy of science - the slaying of a beautiful hypothesis by an ugly fact."

THOMAS HENRY HUXLEY

Lithium sulfur: A battery revolution on the cheap?

PhysOrg.com, 04JUN2014

An international team of researchers (USA, South Korea) have combined common ingredients to make an inexpensive, high-capacity lithium-sulfur battery that can be cycled hundreds of times without losing functionality. TECHNICAL ARTICLE

Tags: Energy, Battery, Government S&T

ENVIRONMENTAL SCIENCE

Could Pulses in Earth's Magnetic Field Forecast Earthquakes?

Science Magazine, 06JUN2014

Researchers at San Jose State University have proposed that brief low-frequency pulses in Earth's magnetic field which seemed to become stronger and more frequent just before the earthquakes occurred could serve as an early warning sign for impending seismic activity. The team has come up with a model for how these magnetic pulses might be generated.

Tags: Environmental science, Forecasting

MATERIALS SCIENCE

Quantum criticality observed in new class of materials

Science Daily, 04JUN2014

An international team of researchers (USA, China, France, Sweden) has found "quantum critical points" in a class of iron superconductors known as "oxypnictides". The discovery could allow physicists to develop a classification scheme for quantum criticality, a strange electronic state that may be intimately related to high-temperature superconductivity. TECHNICAL ARTICLE

Tags: Materials science

MEDICAL SCIENCES

Quest for long-lasting blood: Scientists developing one-size-fits-all artificial blood

Science Daily, 09JUN2014

Researchers in the UK are developing an artificial blood substitute that is a safe, long-lasting, virus-free alternative to current blood transfusions available to all countries and immediately accessible at the site of natural disasters.

Tags: Medical Sciences, Biotechnology, S&T UK

Researchers shut down SARS cloaking system; Findings could lead to SARS, MERS vaccines

Science Daily, 03JUN2014

Researchers at Purdue University figured out how to disable a part of the SARS virus responsible for hiding it from the immune system—a critical step in developing a vaccine against the deadly disease. The findings also have potential applications in the creation of vaccines against other coronaviruses, including MERS. TECHNICAL ARTICLE

Tags: Medical Sciences, Biology

MICROELECTRONICS

Researchers create nanoscale structure for computer chips that could yield higher-performance memory

Nanowerk, 05JUN2014

Researchers at UCLA created an effective magnetic field by varying the angle of the structure by just a few atoms in a shape resembling a cheese wedge. Although the height difference between the two ends is only a few tenths of a nanometer the new configuration generates significant additional spin-orbit torque, which could potentially use one-hundredth the amount of energy used by the chips in today's consumer electronics. TECHNICAL ARTICLE

Tags: Microelectronics, Advanced materials

Molecular self-assembly scales up from nanometers to millimeters

Nanowerk, 04JUN2014

Researchers in Finland demonstrated that it is possible to align molecular self-assemblies from nanometers to millimeters without the intervention of external stimuli. This concept opens up new avenues in large area nanoconstruction, for example in templating nanowires, which is currently under investigation. TECHNICAL ARTICLE

Tags: Microelectronics, S&T Finland

Prototype of new transistor for lower power consumption

PhysOrg.com, 04JUN2014

By enveloping a transistor with a shell of piezoelectric material, which distorts when voltage is applied, researchers in the Netherlands in collaboration with industry were able to reduce this leakage by a factor of five. The piezoelectric material expands when you apply a voltage to it and compresses the silicon in the transistor with a pressure of about 10,000 atmospheres. TECHNICAL ARTICLE

Tags: Microelectronics

continued...

Spintronic interconnect modeling for beyond-CMOS computing

PhysOrg.com, 04JUN2014

To analyze spintronic interconnects, researchers at the Georgia Institute of technology and their industry partners have developed compact models for spin transport in copper and aluminum. The work will help establish a much more realistic and accurate prediction of computing performance and power with spintronics.

Tags: Microelectronics

First fully 2-D field effect transistors: 2-D transistors promise a faster electronics future

Science Daily, 03JUN2014

DOE's Lawrence Berkeley National Laboratory researchers fabricated the first fully 2D field-effect transistor from layers of molybdenum disulfide, hexagonal boron nitride and graphene held together by van der Waals bonding. Unlike conventional FETs made from silicon, these 2D FETs suffer no performance drop-off under high voltages and provide high electron mobility, even when scaled to a monolayer in thickness. TECHNICAL ARTICLE

Tags: Microelectronics, Advanced materials, Government S&T

Featured Resource

Asia Research News

ResearchSEA is a one-stop centre where journalists and members of the public can gain access to news and local experts from the research world in Asia. RSS Science, Technology

NEUROSCIENCE

New research explains how we use the GPS inside our brain to navigate

PhysOrg.com, 05JUN2014

Researchers in the UK report that at the beginning of a journey, one region of the brain calculates the straight-line to the destination but during travel a different area of the brain computes the precise distance along the path to get there. The research is a substantial step towards understanding how we use our brain in real world environments. TECHNICAL ARTICLE

Tags: Neuroscience, S&T UK

PHOTONICS

A new way to make laser-like beams using 1,000 times less power

Science Daily, 05JUN2014

Researchers at the University of Michigan paired the right material—the hard, transparent semiconductor gallium nitride—with a unique design to maintain the controlled circumstances that encourage polaritons to form and then emit light. As polariton lasers don't rely on population inversions, they don't need a lot of start-up energy to excite electrons. This work could advance efforts to put lasers on computer circuits to replace wire connections, leading to smaller and more powerful electronics. TECHNICAL ARTICLE

Tags: Photonics

Continuous terahertz sources at room temperature demonstrated by scientists

Science Daily, 05JUN2014

Researchers at Northwestern University generated terahertz radiation through nonlinear frequency mixing of two mid-infrared wavelengths at 8.8 microns and 9.8 microns from a single QCL chip. 3 microwatts of emission was achieved by improving thermal conductance with epilayer-down bonding and a buried ridge waveguide, as well as by decreasing optical loss with a buried composite grating for stable, single mode operation. TECHNICAL ARTICLE

Tags: Photonics, Terahertz technology

S&T POLICY

Most comprehensive 'world map of research' yet: Researchers analyze 15 million scientific articles

Science Daily, 06JUN2014

Researchers in Spain analysed the scientific production of over 80 countries spanning more than 10 years (1996-2006). They found that worldwide there are three major 'clusters' of countries, defined by the thematic areas they investigate and their governments invest in most: Biomedical cluster, Basic science, and developing countries which have not yet developed a national research system. TECHNICAL ARTICLE

Tags: S&T policy, Science without borders

SCIENCE WITHOUT BORDERS

Turing's theory of chemical morphogenesis validated 60 years after his death

Science Daily, 10JUN2014

Researchers at Brandeis University have provided the first experimental evidence that validates Turing's theory of chemical morphogenesis in cell-like structures. This

continued...

research could impact not only the study of biological development and how similar patterns form in nature, but materials science as well. Turing's model could help grow soft robots with certain patterns and shapes. TECHNICAL ARTICLE

Tags: Science without borders

Lasers ignite 'supernovae' in the lab

Physics World, 06JUN2014

An international team of researchers (UK, Switzerland, USA, Japan) has created tiny versions of supernova explosions in the laboratory to gain insight into one of the most energetic and unpredictable events in the universe. The researchers also hope that their experiments could lead to a better understanding of the role played by cosmic turbulence in creating the powerful magnetic fields. TECHNICAL ARTICLE

Tags: Science without borders, Particle physics

Experiments in Second Life Reveal Alternative Laws of Physics

MIT Technology Review, 05JUN2014

Second Life is an online world which allows the behavior of objects to be modified in various ways. Researchers in Brazil allow students to study and experience laws of motion that are entirely different from the ones that work in our universe. VIDEO, TECHNICAL ARTICLE

Tags: Science without borders

Light from huge explosion 12 billion years ago reaches Earth

Science Daily, 04JUN2014

Known as a gamma-ray burst, light from the rare, high-energy explosion traveled for 12.1 billion years before it was detected and observed by researchers at Southern Methodist University Dallas. They used their ROTSE-IIIb telescope. Observational data from gamma-ray bursts allows scientists to understand structure of the early universe.

Tags: Science without borders

SENSORS

Intel's gesture control promises hands-free life at Taiwan show

PhysOrg.com, 05JUN2014

The advances are the latest developments in Intel's sense technology which uses a camera with both 2-D and 3-D capabilities embedded into devices, enabling them to "see" depth and recognise facial expressions and movements.

Tags: Sensors

Ultrasensitive flexible and wearable bionic sensors

Printed Electronics World, 05JUN2014

Researchers in China have developed a simple and low-cost method for the fabrication of large-area uniformly microstructured polydimethylsiloxane (PDMS) thin films on which sensing nanomaterials are deposited. It is based on molding thin flexible PDMS on high-quality textiles such as silk.

Tags: Sensors, Flexible electronics

Plasmonic nanoantennas — Hot spots for molecules

Nanowerk, 04JUN2014

The most promising devices for achieving ultrahigh-precision detection are nanoscale sensors where molecules are placed accurately within the gaps between small gold plates. Researchers in Singapore have developed a method to selectively bind the molecules to the electromagnetic hot spots in the nanoantenna structure for maximum amplification. TECHNICAL ARTICLE

Tags: Sensors ■

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