



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Made in IBM Labs: IBM Scientists Unveil Highly Integrated Millimeter-Wave Transceiver for Mobile Communications and Radar Imaging applications](#)

[IBM News, 04JUN2013](#)

Researchers invent solution that seamlessly brings together 4 integrated chips and 64 antennas in a single package for mobile and transportation solutions. Proven SiGe BiCMOS prototype takes advantage of under-utilized short-wavelength frequency. The newly demonstrated integrated circuits tackle data bottleneck issues for mobile communications applications and allow radar-imaging technology to be scaled down to the size of a computer laptop.

Tags: Breakthrough technology, Featured Article

[Physicists design acoustically invisible walls](#)

[Physics World, 01JUN2013](#)

A rigid wall can be transformed from a total reflector of sound to an almost perfect transmitter by perforating it with tiny, regularly spaced holes covered by a thin elastic membrane, say researchers in Japan and South Korea. The discovery, an acoustic analogue to extraordinary optical transmission (EOT), could potentially be used in microscopes, noise filters, new types of windows, acoustic concentrators and many other applications. [TECHNICAL ARTICLE](#)



An experiment to build an acoustic analogue of a metamaterial that completely transmits light. (Courtesy: iStockphoto.com/3dmentat)

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

[More precision from less predictability: A new quantum trade-off](#)

[Science Daily, 29MAY2013](#)

Researchers at Griffith University, Australia, have demonstrated that, contrary to what the Heisenberg uncertainty relation may suggest, particle properties such as position and momentum can be measured simultaneously with high precision. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T Australia, Featured Article

S&T NEWS ARTICLES

ADVANCED MATERIALS

[Study coaxes nanoclays to make human bone](#)

[Nanowerk, 31MAY2013](#)

Researchers at North Dakota State University, Fargo, are making strides in tissue engineering, designing scaffolds that may lead to ways to regenerate bone. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Biotechnology, Materials science

[Brittle material toughened: Tungsten-fiber-reinforced tungsten](#)

[Science Daily, 30MAY2013](#)

A novel, more resilient compound material has now been developed by Max Planck Institute for Plasma Physics (IPP) at Garching. It consists of homogeneous tungsten with coated tungsten wires embedded.

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

[Hybrid carbon nanotube yarn muscle](#)

[Science Daily, 30MAY2013](#)

Scientists in Korea have created a high capacity yarn muscle that does not require electrolytes or special packaging. It will have a big impact in the motor, biological and robot industry.

Tags: Advanced materials, Biotechnology

Transformation optics for antennas: why limit the bandwidth with metamaterials?

Nature Scientific Reports, 30MAY2013

Researchers in the UK propose a full dielectric implementation of a transformed planar hyperbolic lens which retains the same focusing properties of an original curved lens. The redesigned lens demonstrates operation with high directivity and low side lobe levels for an ultra-wide band of frequencies, spanning over three octaves. The methodology can be applied to revolutionise the design of many electromagnetic devices overcoming bandwidth limitations.

Tags: *Advanced materials, S&T UK*

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: PR1, DARPA Cyborgs, and AR Drones Go Haywire

IEEE Spectrum, 31MAY2013

Robotics has brought a lot of benefits to disabled people, and the next generation of prosthetic limbs will be even better, because they'll be controlled directly through existing nerves. DARPA's been working on some amazing prototypes.

Tags: *Autonomous systems & robotics*

BIG DATA

Big Data ROI Still Tough To Measure

Information Week, 29MAY2013

A recent survey by IDG Research Services and Kapow Software shows a fair amount of disillusionment among big data pioneers. But despite the negativity, businesses still see big data projects as a potential boon that's worth pursuing.

Tags: *Big data*

BIOTECHNOLOGY

The next frontier of wireless tech? Your body

Science Daily, 02JUN2013

For decades, the military has used sonar for underwater communication. Now, researchers at the University of Buffalo are developing a miniaturized version of the same technology to be applied inside the human body to treat diseases such as diabetes and heart failure in real time. The advancement relies on sensors that use ultrasounds to wirelessly share information between medical devices implanted in or worn by people.

Tags: *Biotechnology*

COMMUNICATIONS TECHNOLOGY

One million tiny base stations could provide cellphone connectivity for one billion people and help achieve internet and smartphone connections for everyone in the world

Next Big Future, 30MAY2013

The CompactRAN is in a rugged IP-66 rated outdoor enclosure. Consuming only 50W of power and weighing less than 4 kg this product is ideal for hard to cover outdoor areas such as rural areas in developing markets, spot fill-in on highways or in rugged terrain areas where traditional high sites can only offer spotty coverage.

Tags: *Communications Technology*

Just how secure is quantum cryptography?

Science Daily, 28MAY2013

At an upcoming conference researchers from Germany show how they are working on new ways to calculate the failure probability of certain quantum encryption schemes. The numbers would allow users to estimate how likely it would be that an adversary could read their secret messages.

Tags: *Communications Technology, Quantum science, S&T Germany*

CYBER SECURITY

Under cybersiege: what should America do?

Kaspersky Forum, 02JUN2013

Prepare for the next phase of America's defense against domestic and global cybercriminals by attending the inaugural Kaspersky Government Cybersecurity Forum. Leaders of government, finance and technology identify cyberthreats and discuss new ways to integrate public policies and defensive technologies into a comprehensive national IT security infrastructure. 2013 Government Cybersecurity Forum, Tuesday June 4, 2013, Ronald regan Building, Washington DC.

Tags: *Cyber security*

Hacking for Change Across the U.S.

IEEE Spectrum, 31MAY2013

Twenty-two federal agencies, including the Census Bureau, the Federal Emergency Management Agency, NASA, and the Peace Corps are opening up their data files—at least some of them—to hackers around the United States today as part of the National Day of Civic Hacking. These hackers are the good guys—volunteers around the country who will develop tools and apps to make that data more publicly accessible.

Tags: *Cyber security*

“Man is made for science; he reasons from effects to causes, and from causes to effects; but he does not always reason without error.” JAMES HUTTON

Chinese military to launch cyber war games next month

Digital Trends, 30MAY2013

The official news agency of China has announced that the country's People's Liberation Army will launch a new round of war games next month to test its military readiness. The big difference in this go-around? The inclusion of cyber warfare.

Tags: Cyber security, S&T China

Inside the secret Symantec building that keeps websites safe

PhysOrg.com, 29MAY2013

Dubbed “the vault” by some employees, the bunkerlike operation bristles with guards, sensors, iris- and fingerprint-reading locks, and, deep within its labyrinthine confines, is a room containing the most privileged data. All that is to ensure no one can sneak in and steal the information Symantec maintains to certify that thousands of widely used websites are legitimate, and that whatever is sent to and from the sites is encrypted against cyberattacks.

Tags: Cyber security

ENERGY

Ultrasound ‘Making Waves’ for Enhancing Biofuel Production

Science Newline, 31MAY2013

Researchers at Iowa State University are using high-frequency sound waves to break down plant materials in order to cook up a better batch of biofuel. They have shown that “pretreating” enhances the chemical reactions necessary to convert the biomass into high-value fuels and chemicals.

Tags: Energy

Organic polymers show sunny potential

EurekaAlert, 29MAY2013

A new version of solar cells created by laboratories at Rice and Pennsylvania State universities could open the door to research on a new class of solar energy devices.

Tags: Energy, Solar energy

Stanford scientists develop high-efficiency zinc-air battery

e! Science News, 29MAY2013

Stanford University scientists have developed an advanced zinc-air battery with higher catalytic activity and durability than similar batteries made with costly platinum and iridium catalysts. The results could lead to the development

of a low-cost alternative to conventional lithium-ion batteries widely used today.

Tags: Energy, Battery

FORECASTING

Disruptive technologies: Advances that will transform life, business, and the global economy

McKinsey Global Institute, 31MAY2013

McKinsey Global Institute identifies 12 technologies that could drive truly massive economic transformations and disruptions in the coming years. The report also looks at exactly how these technologies could change our world, as well as their benefits and challenges.

Tags: Forecasting, Disruptive technology, Emerging technology

IMAGING TECHNOLOGY

New graphene sensor is 1000x more sensitive than current camera sensors

Nanowerk, 30MAY2013

Researchers in Singapore have designed a sensor made from graphene which is able to detect broad spectrum light, from the visible to mid-infrared, with high photoresponse. The sensor is 1,000 times more sensitive to light than current imaging sensors found in today's cameras, it also uses 10 times less energy as it operates at lower voltages.

TECHNICAL ARTICLE

Tags: Imaging technology

IBM's Vision For Cognitive Computing Era

Information Week, 29MAY2013

Computers won't replace doctors, traffic analysts or meteorologists anytime soon, but their real-time analytical capabilities can provide essential information, and that will help humans employed in these (and many other) fields make smarter decisions.

Tags: Imaging technology

INFORMATION TECHNOLOGY

Magnetic monopoles erase data

Nanowerk, 31MAY2013

A physical particle postulated 80 years ago, could provide a decisive step toward the realization of novel, highly efficient data storage devices. Scientists in Germany have found that with magnetic monopoles in magnetic vortices, called skyrmions, information can be written and erased.

TECHNICAL ARTICLE

Tags: Information Technology, Materials science, S&T Germany

An electrical switch for magnetism

MIT News, 29MAY2013

Researchers at MIT have developed a new way of controlling the motion of magnetic domains—the key technology in magnetic memory systems, such as a computer’s hard disk. The new approach requires little power to write and no power to maintain the stored information, and could lead to a new generation of extremely low-power data storage. [TECHNICAL ARTICLE](#)

Tags: *Information Technology*

FEATURED RESOURCE**Digital Trends**

Digital Trends believes that the ubiquitous integration of technology into our everyday lives is both immensely empowering and often confounding, and we resolve to help our audience make informed decisions that allow them to maximize its potential. [RSS](#)

MATERIALS SCIENCE**New imaging tool directly measures liquid surfaces**

PhysOrg.com, 03JUN2013

Designed and built at PNNL the imaging tool is relevant to understanding liquid/solid heterogeneous catalysis and energy storage techniques. [TECHNICAL ARTICLE 1, 2](#)

Tags: *Materials science, Government S&T*

Printing innovations provide 10-fold improvements in organic electronics

Science Daily, 02JUN2013

A team from the U.S. Department of Energy and Stanford University have developed a printing process they call FLUENCE—fluid-enhanced crystal engineering—that for some materials results in thin films capable of conducting electricity 10 times more efficiently than those created using conventional methods. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Government S&T, Microelectronics*

A new kind of chemical ‘glue’

MIT News, 30MAY2013

A new approach developed by researchers at MIT uses a family of chemicals called carbenes to attach other substances to gold—and potentially to other material surfaces as well. Carbenes can overcome two significant hurdles in binding other materials to gold, namely weak binding and non-conducting connections. This could lead to the development of molecular electronics.

Tags: *Materials science*

Extremely high-accuracy correction of air refractive index using two-colour optical frequency combs

Nature Scientific Reports, 30MAY2013

Optical frequency combs have become an essential tool for distance metrology, showing great advantages compared with traditional laser interferometry. Researchers in Japan and China developed a novel heterodyne interferometry technique based on two-colour frequency combs for air refractive index correction.

Tags: *Materials science, S&T Japan*

Discovery furthers understanding of superconductivity

PhysOrg.com, 28MAY2013

Researchers in the US and Asia found that the way electrons form in superconductive material—known as the Zhang-Rice singlet state—was present in a chemical compound that is very different from conventional superconductors. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

Innovation Could Bring Flexible Solar Cells, Transistors, Displays

Science Daily, 22MAY2013

Researchers at Purdue University have created a new type of transparent electrode that might find uses in solar cells, flexible displays for computers and consumer electronics and future “optoelectronic” circuits for sensors and information processing. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Information technology*

QUANTUM SCIENCE**Einstein’s ‘Spooky Action’ Common in Large Quantum Systems**

Science Daily, 28MAY2013

Researchers at Case Western University show entanglement is actually prevalent in large quantum systems and have identified the threshold at which it occurs.

[TECHNICAL ARTICLE](#)

Tags: *Quantum science*

Physics team entangles photons that never coexisted in time

PhysOrg.com, 28MAY2013

Researchers in Israel have succeeded in causing entanglement swapping between photons that never coexisted in time. Being able to entangle particles that don’t exist at the same time opens up the door to new encryption techniques for building ultra-secure networks—communications could occur between physical locations, for example, that never actually sent an encrypted key directly to one another.

[TECHNICAL ARTICLE](#)

Tags: *Quantum science*

Hydrogen atoms under the magnifying glass

Nanowerk, 27MAY2013

An international team of scientists (USA, Greece, France, Germany, Netherlands) has succeeded in building a microscope that allows magnifying the wave function of excited electronic states of the hydrogen atom by a factor of more than twenty-thousand, leading to a situation where the nodal structure of these electronic states can be visualized on a two-dimensional detector. The experiment provides a demonstration of the intricacies of quantum mechanics, advances research where fundamental implications of quantum mechanics can be further explored.

TECHNICAL ARTICLE*Tags: Quantum science***S&T POLICY****Harvard's Whitesides Gives Brilliant Critique of Mammoth U.S. Brain Project**

Scientific American, 30MAY2013

At a planning meeting earlier this month, George Whitesides, the eminent Harvard chemist and veteran of big government ventures in support of nanotechnology, weighed in on how the project appeared to an informed outsider.

*Tags: S&T policy, Government S&T, Neuroscience***Scientific societies unite to announce National Photonics Initiative**

EurekAlert, 29MAY2013

The American Physical Society, IEEE Photonics Society, Laser Institute of America, the Optical Society, and SPIE, the international society for optics and photonics, today announced the launch of the National Photonics Initiative, a collaborative alliance seeking to unite industry, academia and government experts to identify and advance areas of photonics critical to maintaining US competitiveness and national security. **WHITE PAPER**

*Tags: S&T policy, Photonics***SENSORS****How do we locate the spatial position of sounds? Mechanism responsible for creation of giant synapses discovered**

Science Daily, 27MAY2013

The brain has developed a circuit that's rapid enough to detect the tiny lag that occurs between the moment the auditory information reaches one of our ears, and the moment it reaches the other. The mastermind of this circuit is the "Calyx of Held," the largest known synapse in the brain. Researchers in Switzerland have revealed the role that a certain protein plays in initiating the growth of these giant synapses. **TECHNICAL ARTICLE**

*Tags: Sensors, S&T Switzerland ■***ABOUT THIS PUBLICATION**

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