



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Taking the 'Random' out of a Random Laser](#)

[Science Daily, 15JUL2013](#)

Random lasers are tiny structures emitting light irregularly into different directions. Researchers in Austria have presented a method to steer the radiation emitted by a random laser into a pre-determined direction. What has started out as a curious idea now has the potential to become a useful new type of light source.

[TECHNICAL ARTICLE](#)

Tags: Breakthrough technology, Photonics, Featured Article

[Graphene Could Make Telecommunication Speeds One Hundred Times Faster](#)

[Science Daily, 12JUL2013](#)

For the first time, researchers at the Universities of Bath and Exeter have demonstrated incredibly short optical response rates using graphene, which could pave the way for a revolution in telecommunications.

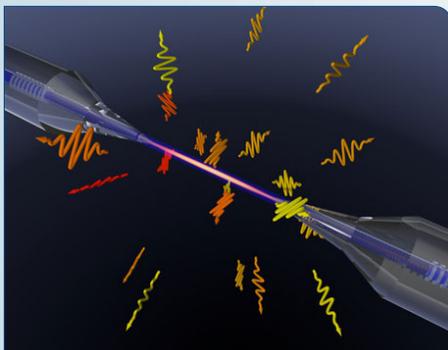
[TECHNICAL ARTICLE](#)

Tags: Communications Technology, S&T UK, Featured Article

[Heat radiation of small objects: Beyond Planck's equations](#)

[Nanowerk, 10JUL2013](#)

Radiation emitted by objects can be described very accurately using Planck's law. If, however, the radiating object is smaller than the thermal wavelength, it behaves according to different rules and cannot emit the energy efficiently. This has now



An ultra-thin glass fiber emits light of different wavelengths. Theories going beyond Planck's law can describe this emission very accurately.

been confirmed by a team of researchers at the Vienna University, Austria. [TECHNICAL ARTICLE](#)

Tags: Materials science, Featured Article

S&T NEWS ARTICLES

ADVANCED MATERIALS

[Researchers grow half-meter long carbon nanotubes](#)

[Nanowerk Spotlight, 15JUL2013](#)

A team of researchers from China have found that the growth of ultralong carbon nanotubes could be described using Schulz-Flory distribution, which is very common in polymer science. They found that catalysts play a key role in the growth of ultralong CNTs. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, CNT, S&T China

[Researchers Identify a New Form of Carbon: Grossly Warped 'Nanographene'](#)

[Science Daily, 15JUL2013](#)

Researchers from the US and Japan have synthesized a new material which consists of multiple identical pieces of grossly warped graphene, each containing exactly 80 carbon atoms joined together in a network of 26 rings, with 30 hydrogen atoms decorating the rim. Electrochemical measurements revealed that the planar and the warped nanographenes are equally easily oxidized, but the warped nanographene is more difficult to reduce. [TECHNICAL ARTICLE](#)

Tags: Advanced materials

[For perfect nano-crystals, just add water](#)

[PhysOrg.com, 11JUL2013](#)

An international team of researchers (Australia, Germany, Japan) have shown that nano-crystals form naturally when a precursor material—Cerium (IV)—is dissolved and hydrolysed in water. The study provides a basic concept to simplify the production process; we only need to adjust the pH of the aqueous solution without heating or adding chemicals. [TECHNICAL ARTICLE](#)

Tags: Advanced materials

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Imperfect graphene renders ‘electrical highways’

Nanowerk, 11JUL2013

Combining experiment and theory, Cornell researchers have moved a step closer to making graphene a useful, controllable material. They showed that when grown in stacked layers, graphene produces some specific defects that influence its conductivity.

Tags: Advanced materials

The new superstrong

PhysOrg.com, 11JUL2013

Adding small amounts of carbon nanotubes to polymer fibers increases their strength marginally. Now researchers at Northeastern University have shown that it's the crystallization process that drives the remarkable properties. They showed that they could easily turn these properties on or off. By changing nothing but the pattern of heating and cooling the material, they were able to increase the strength and toughness of fibers made with the very same ingredients. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Materials science

Jagged graphene edges can slice into cell membranes

e! Science News, 10JUL2013

Researchers from Brown University have shown that sharp corners and jagged protrusions along the edges of graphene sheets can easily pierce cell membranes. After the membrane is pierced, an entire graphene sheet can be pulled inside the cell where it may disrupt normal function.

[TECHNICAL ARTICLE](#)

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS**Video Friday: Drone Touchdown, Giant RoboCrab, and Sphero Invades Japan**

IEEE Spectrum, 12JUL2013

GROVER, the Goddard Remotely Operated Vehicle for Exploration and Research, also known as the Greenland Rover or the most adorable little snowbot ever, has been managing not to die up in the cold northern wilderness.

Tags: Autonomous systems & robotics

DARPA's ATLAS Robot Unveiled

DARPA News, 11JUL2013

Seven teams that progressed from [DARPA's Virtual Robotics Challenge \(VRC\)](#) will meet and learn about their new teammate, the ATLAS robot. The teams will see if their simulation-honed algorithms can run a real machine in real environments. The teams will be further refining their algorithms, using both simulation and experimentation.

Tags: Autonomous systems & robotics, Government S&T

Designer has DIY kit for turning objects into UAVs

PhysOrg.com, 10JUL2013

A Dutch designer has come up with a DIY kit with parts that turn objects into machines that can fly. Unpack, assemble, attach. As the demo video shows, you can fly your book, keyboard, bicycle wheel, or any other suitably lightweight object. [INSTRUCTIONS](#)

Tags: Autonomous systems & robotics

Making robots more trustworthy

PhysOrg.com, 03JUL2013

A project sponsored by the UK will explore how robots can participate in sophisticated interactions with humans in an increasingly safe and trustworthy manner. It will address issues concerning the barriers between robots and humans that have hampered the development of human-robot interactions.

Tags: Autonomous systems & robotics, S&T UK

BIG DATA**Stunning Maps of 3 Billion Tweets Reveal iPhone vs. Android Neighborhoods**

Wired, 15JUL2013

The visualizations were created by engineers at MapBox, an enterprise mapping outfit. The project yielded three interactive maps. One shows where tourists tend to congregate in cities around the world. Another map tweets by the language in which they were written. The third colors in cities by the types of mobile devices used in them.

Tags: Big data

BIOTECHNOLOGY**Lab-on-a-chip technology gets a flexible upgrade**

Nanowerk, 12JUL2013

In a development that promises to make lab-on-a-chip devices more portable and economic to construct, researchers in Japan have produced a new type of microfluidic control valve that takes up significantly less space on a microchip than existing approaches. [TECHNICAL ARTICLE](#)

Tags: Biotechnology, S&T Japan

Breakthrough Could Lead to ‘Artificial Skin’ That Senses Touch, Humidity and Temperature

Science Daily, 08JUL2013

Using tiny gold particles and a kind of resin, a team of scientists in Israel has discovered how to make a new kind of flexible sensor that one day could be integrated into electronic skin, or e-skin. If scientists learn how to attach e-skin to prosthetic limbs, people with amputations might once again be able to feel changes in their environments.

[TECHNICAL ARTICLE](#)

Tags: Biotechnology, Sensors

“It is the tension between creativity and skepticism that has produced the stunning and unexpected findings of science.” CARL SAGAN

BREAKTHROUGH TECHNOLOGY

British engineers report successful test of space penetrator

PhysOrg.com, 15JUL2013

The space penetrator is a bullet shaped projectile with electronics inside. Its purpose is to hard-land on another planet or moon, penetrating the surface by up to ten feet, then radio back sensor information.

Tags: Breakthrough technology, S&T UK, Space technology

COMMUNICATIONS TECHNOLOGY

Build Your Own Internet with Mobile Mesh Networking

MIT Technology Review, 09JUL2013

A project developed by researchers in Australia called Serval offers an app that allows nearby phones to link up using their Wi-Fi connections, as long as they have been modified to disable the usual security restrictions. Voice calls, text messages, file transfers, and more can take place between devices with the Serval app installed.

Tags: Communications Technology

ENERGY

Nano-Tool for Designing the Next Big Battery: Eavesdropping On Lithium Ions

Science Daily, 08JUL2013

The important action in a battery occurs at the atomic level, and it's been virtually impossible to find out exactly what's happening at such a scale. Now, researchers at Michigan Technological University have developed a device that allows researchers to eavesdrop on individual lithium ions—and potentially develop the next generation of batteries. TECHNICAL ARTICLE

Tags: Energy, Battery

ENVIRONMENTAL SCIENCE

Japanese team sees gamma-ray pulse before lightning flash

Physics World, 12JUL2013

Researchers in Japan have observed for the first time emissions that ended abruptly, less than a second before the exact moment the flash occurs. The finding provides important information about the relationship between the mysterious atmospheric accelerators that produce the gamma rays and the lightning that we see in the sky. TECHNICAL ARTICLE

Tags: Environmental science, Climatology, S&T Japan

Researchers set out path for global warming reversal

e! Science News, 11JUL2013

Researchers in Sweden show that if BECCS (Bioenergy with carbon capture and storage) is implemented on a large-scale along with other renewable energy sources, temperature increases can be as low as 1.5°C by 2150.

Tags: Environmental science, Climatology

IMAGING TECHNOLOGY

100-megapixel camera developed

PhysOrg.com, 11JUL2013

Researchers in China have successfully developed a camera featuring a 100-megapixel CCD chip. Its high sensitivity and high dynamic range (HDR) features mean it will be useful in high-resolution imaging in the fields of aerial mapping, city planning, disaster monitoring and intelligent transportation systems.

Tags: Imaging technology, S&T China

Human Motion Will Power the Internet of Things, Say Energy Harvesting Engineers

MIT Technology Review, 11JUL2013

Most people generate enough power to continuously transmit data at a rate of 1 Kb/s, say researchers at Columbia University who have audited the harvestable energy from human motion. TECHNICAL ARTICLE

Tags: Imaging technology, Energy

INFORMATION TECHNOLOGY

Five Dimensions Store More Data Than Three

IEEE Spectrum, 15JUL2013

Researchers in the UK have demonstrated that when their data-recording laser marks the glass, it doesn't just make a pit: it changes two parameters of the birefringence of the glass. The researchers set these parameters, called slow axis orientation and strength of retardance, by controlling the polarization and intensity of their laser beam. Add the two optical dimensions to three spatial coordinates and the result is 5D data storage. TECHNICAL ARTICLE

Tags: Information Technology, S&T UK

MATERIALS SCIENCE

Researchers Discover a New Form of Liquid

Science Daily, 11JUL2013

Researchers at the University of Arkansas have identified that water, when chilled to a very low temperature, transforms into a new form of liquid. The properties of supercooled water are important for understanding

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basic processes during cryoprotection of tissue or cells.

TECHNICAL ARTICLE

Tags: Materials science, Advanced materials

Scientists investigate how electric current flows in multilayer 2-D materials

PhysOrg.com, 11JUL2013

In a new study, researchers at Purdue University have investigated exactly how a current flows through multilayer 2-D materials, and found that current flow in these materials is very different than current flow in 3-D materials and cannot be explained with conventional models. This understanding could guide researchers in designing future nanoelectronics devices. TECHNICAL ARTICLE

Tags: Materials science

NEUROSCIENCE

Inner Speech Speaks Volumes About the Brain

Science Daily, 16JUL2013

The internal speech—the monologue you “hear” inside your head—is a ubiquitous but largely unexamined phenomenon. A new study by researchers at Columbia University looks at a possible brain mechanism that could explain how we hear this inner voice in the absence of actual sound. TECHNICAL ARTICLE

Tags: Neuroscience

Computer as Smart as a 4-Year-Old? Researchers IQ Test New Artificial Intelligence System

Science Daily, 15JUL2013

Researchers at the University of Illinois, Chicago put ConceptNet 4, an artificial intelligence system developed at M.I.T., through the verbal portions of the Weschsler Preschool and Primary Scale of Intelligence Test, a standard IQ assessment for young children. They found ConceptNet 4 has the average IQ of a young child. But unlike most children, the machine’s scores were very uneven across different portions of the test.

Tags: Neuroscience, Information technology

FEATURED RESOURCE

IEEE Spectrum magazine

Flagship publication of the IEEE is a monthly magazine for technology innovators, business leaders, and the intellectually curious. Spectrum explores future technology trends and the impact of those trends on society and business. [RSS](#)

Daydreaming Simulated by Computer Model

Science Newsline, 12JUL2013

Researchers at Washington University created a computer model based on the dynamics of brain cells and the many connections those cells make with their neighbors and with cells in other brain regions. They hope the model will help them understand why certain portions of the brain work together when a person daydreams or is mentally idle.

Tags: Neuroscience

Brain Regions Associated With the Successful Spread of Ideas Identified

Science Daily, 08JUL2013

How do ideas spread? What messages will go viral on social media, and can this be predicted? UCLA psychologists have taken a significant step toward answering these questions, identifying for the first time the brain regions associated with the successful spread of ideas, often called “buzz.” The research could lead to more effective public health campaigns, more persuasive advertisements and better ways for teachers to communicate with students.

TECHNICAL ARTICLE

Tags: Neuroscience

PHOTONICS

How to make a compact frequency comb in minutes (w/video)

Nanowerk, 11JUL2013

Physicists at NIST can now make the core of a miniature frequency comb in one minute. Conventional microfabrication techniques, by contrast, may require hours, days or even weeks. TECHNICAL ARTICLE

Tags: Photonics, Government S&T

A New Way to Trap Light: Phenomenon Could Lead to New Types of Lasers and Sensors

Science Daily, 10JUL2013

Researchers at MIT have discovered a new method to trap light that could find a wide variety of applications. Light of a particular wavelength is blocked by destructive interference from other waves that are precisely out of phase.

TECHNICAL ARTICLE

Tags: Photonics

Light Transistor: Efficient Transistor for Light Could Lead to Optical Computers

Science Daily, 08JUL2013

Using terahertz radiation, researchers in Austria have changed the polarization direction of light without a large part of it being lost. An electrical field applied to an ultra-thin layer of material can turn the polarisation of the beam as required. This produces an efficient transistor for light that can be miniaturised and used to build optical computers. TECHNICAL ARTICLE

Tags: Photonics, S&T Australia

continued...

QUANTUM SCIENCE

Uncertainty over the Uncertainty Principle

IEEE Spectrum, 15JUL2013

Eighty-six years after Werner Heisenberg first described his eponymous uncertainty principle, experts are still arguing over what, exactly, the infamous inequality really means. Does it mean that the act of measuring position changes the momentum, and vice-versa—the observer effect? Or does it mean that the particle simply doesn't have precisely defined momentum and position to measure?

Tags: *Quantum science*

Link Between Quantum Physics and Game Theory Found

Science Daily, 12JUL2013

A deep link between two seemingly unconnected areas of modern science has been discovered by researchers from the Universities of Bristol and Geneva. Such new links have potential to trigger significant progress and open entirely new avenues for research. TECHNICAL ARTICLE

Tags: *Quantum science*

Physicists build quantum refrigerator based on four quantum dots

PhysOrg.com, 10JUL2013

The quadridot, proposed by researchers in Italy, consists of four quantum dots that are weakly coupled to four thermal reservoirs. Scientists have theoretically shown that the quadridot can pump energy from the hot and cold reservoirs to the two room temperature reservoirs, thus cooling the quantum dot coupled to the cold reservoir to make it even colder than before. TECHNICAL ARTICLE

Tags: *Quantum science, S&T Italy*

S&T POLICY

China will double down on investing in solar power while Germany winds down government support for solar

Next Big Future, 15JUL2013

China's State Council said that the installed capacity for solar electricity would reach more than 35 gigawatts by 2015 and grow by about 10 gigawatts a year between now and then. China's previous target was 21 gigawatts, and its installed capacity in 2012 was about 7 gigawatts.

Tags: *S&T policy, S&T China*

New Innovation and Knowledge Centre to drive UK's synthetic biology progress

EurekAlert, 11JUL2013

A new £10 million Innovation and Knowledge Centre (IKC), that will boost the UK's ability to translate the emerging field of synthetic biology into application and provide a bridge between academia and industry was announced today. The Centre will be a national resource and involve researchers from 17 universities and academic institutions across the UK, as well as 13 industrial partners, including the research arms of Microsoft, Shell and Glaxo Smith Kline.

Tags: *S&T policy, S&T UK*

Russians to deploy floating nuclear power plant

PhysOrg.com, 10JUL2013

The general director of one of Russia's largest shipbuilders, Aleksandr Voznesensky, has announced to reporters that a floating nuclear power plant is currently under construction at one of Russia's ship yards. He added that it will likely be ready for use by 2016. The Russians are calling it a "floating power" station, abbreviated to PEB. The vessel has been given the name Akademik Lomonosov.

Tags: *S&T policy, S&T Russia* ■

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