



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Magnetically levitating graphite can be moved with laser](#)

[PhysOrg.com](#), 31DEC2012

Researchers in Japan have used a laser to control the motion of a magnetically levitating graphite disk. By changing the disk's temperature, the laser can change the disk's levitation height and move it in a controlled direction, which has the potential to be scaled up and used as a light-driven human transportation system. Laser light or sunlight can also cause the levitating disk to rotate at over 200 rpm, which could lead to a new type of light energy conversion system. **TECHNICAL ARTICLE**

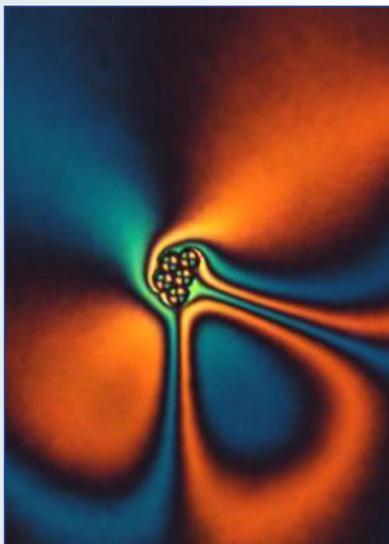
Tags: Materials science, S&T Japan, Featured Article

[Physicists create 'recipe book' for building new materials](#)

[Science Daily](#), 30DEC2012

By showing that tiny particles injected into a liquid crystal medium adhere to existing mathematical theorems, physicists at the University of Colorado have opened the door for the creation of a host of new materials with properties that do not exist in nature. **TECHNICAL ARTICLE**

Tags: Breakthrough technology, Featured Article



This image shows polarized light interacting with a particle injected into a liquid crystal medium. (Credit: Photo by CU-Boulder scientists Bohdan Senyuk and Ivan Smalyukh)

[Proposed Device Would Shape Magnetic Fields](#)

[American Physical Society Spotlight](#), 30DEC2012

Just as a light beam bends when it hits water, magnetic field lines become distorted when they penetrate an object with magnetic properties. A team of theorists in Spain have proposed a cylindrical device that could sculpt a magnetic field, concentrating its energy in a given region of space. The device could increase the sensitivity of a detector or transfer magnetic energy with increased efficiency from one place to another.

TECHNICAL ARTICLE

Tags: Advanced materials, Materials science, Featured Article

S&T NEWS ARTICLES

ADVANCED MATERIALS

[Synthetic and biological nanoparticles combined to produce new metamaterials](#)

[Science Daily](#), 20DEC2012

Scientists in Finland have succeeded in organizing virus particles, protein cages and nanoparticles into crystalline materials. These nanomaterials are important for applications in sensing, optics, electronics and drug delivery.

TECHNICAL ARTICLE

Tags: Advanced materials, Biotechnology

BIOTECHNOLOGY

[Strange behavior: New study exposes living cells to synthetic protein](#)

[Science Daily](#), 30DEC2012

Scientists at the University of Arizona have fabricated an artificial protein in the laboratory and examined the

surprising ways living cells respond to it. This unexplored area represents a new domain for synthetic biology and may ultimately lead to the development of novel therapeutic agents. [TECHNICAL ARTICLE](#)

Tags: Biotechnology, Biology

BREAKTHROUGH TECHNOLOGY

[The Numbers Behind Some of 2012's Biggest Technology Stories](#)

[MIT Technology Review](#), 30DEC2012

A few of the top technology stories of 2012 stand out for the big numbers they generated. Here are some of the events and trends that were especially dramatic in scale.

Tags: Breakthrough technology

COMMUNICATIONS TECHNOLOGY

[Best of 2012: Chinese Physicists Smash Distance Record For Teleportation](#)

[MIT Technology Review](#), 30DEC2012

In May, a Chinese team teleported photons through 100 kilometres of free space, opening the way for satellite-based quantum communications. The most important advance they have made is to develop a steering mechanism using a guide laser that keeps the beam precisely on target. As a result, they were able to teleport more than 1100 photons in 4 hours over a distance of 97 kilometres. [TECHNICAL ARTICLE](#)

Tags: Communications Technology

FORECASTING

[View from...Frontiers in Optics 2012: Fast-paced photonics](#)

[Nature Photonics](#), 31DEC2012

Attosecond photonics has contributed to a wide range of important scientific and technological breakthroughs. The challenges now are to realize high-energy attosecond sources and to simplify attosecond technologies for widespread use. [TECHNICAL ARTICLE](#)

Tags: Forecasting, Emerging technology

[Five Technologies to Watch in 2013](#)

[MIT Technology Review](#), 30DEC2012

In particular, here are five technologies that stand out because the rest of their stories remain unwritten - Wireless charging; 3D printing; the Stylus; Leap 3d, the Nook.

Tags: Forecasting, Emerging technology

FOREIGN S&T

[China's GPS alternative opens for commercial use](#)

[Wired UK](#), 30DEC2012

The Beidou system, which functions in a similar way to GPS, can supposedly identify a user's location to 10 metres, their velocity to within 20 centimetres per second, and synchronise clocks to within 50 nanoseconds. However, the receiver chips cost considerably more than GPS chips.

Tags: Foreign S&T, Military technology, S&T China

GOVERNMENT S&T

[Top 10 Most Popular DARPA Features of 2012](#)

[DARPA News](#), 30DEC2012

The DARPA website receives millions of visits each year. In 2012, we shared information about new efforts and announced milestones reached in our existing programs.

[FULL STORY](#)

Tags: Government S&T, DARPA

INFORMATION TECHNOLOGY

[Computers: It's Time to Start Over](#)

[IEEE Spectrum](#), 30DEC2012

Computer scientist Robert Watson, putting security first, wants to design with a "clean slate." The role of operating system security has shifted from protecting multiple users from each other toward protecting a single user from untrustworthy applications. Embedded devices, mobile phones, and tablets are a point of confluence: The interests of many different parties must be mediated with the help of operating systems that were designed for another place and time.

Tags: Information Technology

MATERIALS SCIENCE

[Graphene on nickel: Electrons behave like light](#)

[Nanowerk](#), 30DEC2012

Scientists investigated the electronic properties of nickel coated with graphene and achieved an astonishing result. They could show that the conduction electrons of the graphene behave as light rather than as particles.

[TECHNICAL ARTICLE](#)

Tags: Materials science, S&T Germany

“Extraordinary claims require extraordinary evidence.”

CARL SAGAN

Researchers discover unexpected charge properties of single dopants

Nanowerk, 30DEC2012

Researchers in England found that the precise location of the donor atom in the surface determined whether a positive or negative charge was induced in the surface, which was contrary to expectation because donors in bulk silicon are either neutral or positively charged, depending on sample temperature. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

'Molecular Levers' May Make Materials Better

Science Newslne, 24DEC2012

In a forced game of molecular tug-of-war, some strings of atoms can act like a lever, accelerating reactions 1000 times faster than other molecules. The discovery suggests that scientists could use these molecular levers to drive chemical and mechanical reactivity among atoms and ultimately engineer more efficient materials.

Tags: *Materials science*

FEATURED RESOURCE

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MEDICAL SCIENCES

Invisible 'knife' focuses sound waves to slice

Futurity.org, 31DEC2012

A team of researchers in the US was able to concentrate high-amplitude sound waves to a speck just 75 by 400 micrometers. Their beam can blast and cut with pressure, rather than heat. Scientists speculate that it might be possible to operate painlessly because its beam is so finely focused it could avoid nerve fibers. [TECHNICAL ARTICLE](#)

Tags: *Medical Sciences, Materials science*

S&T POLICY

Military projects and nanotechnology push boundaries of flexible electronics in imaging technologies

Nanowerk, 30DEC2012

With \$750,000 in support from the Air Force Office of Scientific Research, researchers have developed curved

night-vision goggles using germanium nanomembranes. Through some key breakthroughs in flexible semiconductors, electrical and computer engineering researchers at the University of Wisconsin have created two imaging technologies that have potential applications beyond the 21st century battlefield.

Tags: *S&T policy, Military technology, R&D Funding*

SCIENCE WITHOUT BORDERS

Measurements hint why the universe is dominated by matter, not anti-matter

Science Daily, 30DEC2012

Physicists have made a precise measurement of elusive, nearly massless particles, and obtained a crucial hint as to why the universe is dominated by matter, not by its close relative, anti-matter.

Tags: *Science without borders*

Searching for defects in space

PhysOrg.com, 30DEC2012

Topological defects in space may have developed fractions of a second after the Big Bang. Simulations of these wormlike entities and a comparison of the simulations with cosmic background radiation measurements by the Planck satellite should confirm their existence.

Tags: *Science without borders*

SENSORS

A Glove That Lets You Write in the Air

MIT Technology Review, 30DEC2012

A prototype glove developed by researchers in Germany recognizes pen strokes formed in thin air and turns them into text. The developers of the glove have set up the system to pay particular attention to alphabet-like patterns among the arm movements it is continuously tracking. The system is designed to recognize more than 8,000 words, and in tests was able to recognize word patterns with an average error rate of 11 percent.

Tags: *Sensors, Information technology, S&T Germany*

STEM

Russia launches S&T university

Physics Today, 31DEC2012

The top-down initiative aims to be interdisciplinary and international and to breed entrepreneurship. [TECHNICAL ARTICLE](#)

Tags: *STEM, S&T Russia*

continued...

Who Can Hold 2 Billion Transistors in His Head at Once?

IEEE Spectrum, 30DEC2012

It's impossible to do engineering anymore without using mostly other people's knowledge. After a few years out of school, much of the knowledge an engineer applies will have been learned on the job, through continuous education and just-in-time knowledge acquisition. His or her university education will have provided the fundamentals and core principles of engineering—whatever they are.

Tags: *STEM* ■

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