

LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: March 16-March 23, 2009.

'NewsHour' focuses on NIF



The "NewsHour with Jim Lehrer" recently featured a story on the National Ignition Facility.

Reporter Spencer Michaels visited the Laboratory earlier this year. He interviewed NIF and Photon Sciences Principal Associate Director Ed Moses who discussed the possibility of creating fusion in the Laboratory. Moses said there is an infinite amount of fuel that could be produced with no carbon waste.

To story aired on PBS on March 17. To see the news clip, go to https://newslive.llnl.gov/_rev02/articles/2009/mar/images/NewsHour-NIF.mov

Sweeping the sky clean



KTVU recently aired a story about space debris and the danger it poses to the Space Station. But what can be done about this trash in the sky?

Reporter John Fowler interviewed Lab scientist Georg Albrecht, who says the situation will only get worse before it gets better. Albrecht suggested shining a laser on the object to create a recoil that can slow it down and in turn, de-orbit the debris.

To see the news story, go to <http://www.ktvu.com/video/18920779/index.html>

Fastest supercomputers just outside of Silicon Valley



The Lab's Hyperion testbed.

Last week, the *New York Times* featured an article about LLNL's supercomputers and compared LLNL to the computing equivalent of Mount Rushmore.

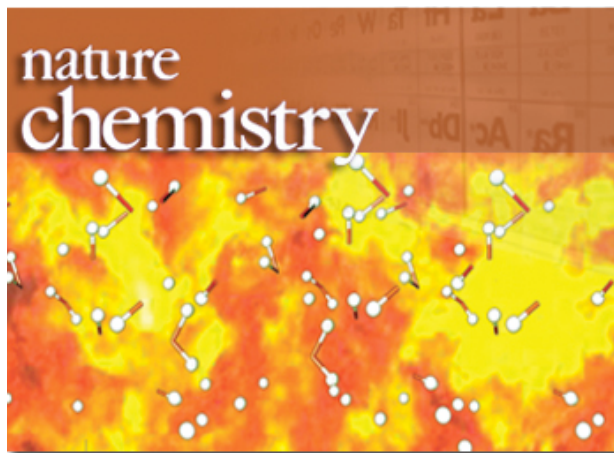
The Lab houses a number of the fastest supercomputers on the planet. One building alone at Lawrence Livermore has 45 megawatts of power coursing through it to fuel thousands of computers -- one of which could end up as the fastest machine in the world. To put that power number in perspective, the 300,000-person area in which the Lab resides has peak power usage of about 90 megawatts each year.

Making sure that all these machines hum along has turned into a priority for the researchers at the Laboratory. And they've managed to strike up a unique partnership with some of the largest technology companies to help them.

Intel, Dell, Cisco Systems, Sun Microsystems and others have worked with Lawrence Livermore to create something called the Hyperion testbed.

To read more, go to <http://bits.blogs.nytimes.com/2009/03/13/national-labs-monument-to-open-source-code-is-alive/?scp=1&sq=Nehalem&st=cse>

Water goes to extremes in explosives



Simulations of the detonation of a high explosive show that 'extreme' water can act as a chemical catalyst.

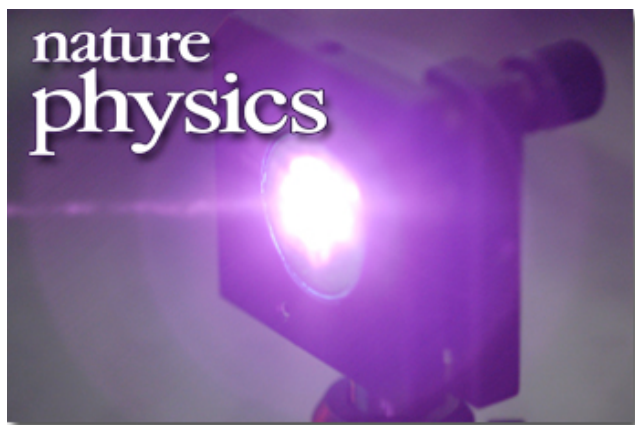
The most abundant material on Earth exhibits some unusual chemical properties when placed under extreme conditions.

Laboratory scientists have shown that water, in hot dense environments, plays an unexpected role in catalyzing complex explosive reactions. A catalyst is a compound that speeds chemical reactions without being consumed. Platinum and enzymes are common catalysts. But water rarely, if ever, acts as a chemical catalyst under ordinary conditions.

Detonations of high explosives made up of oxygen and hydrogen produce water at thousands of degrees Kelvin and up to 100,000 atmospheres of pressure, similar to conditions in the interiors of giant planets.

To read more, go to <http://www.nature.com/nchem/journal/v1/n1/full/nchem.130.html>

Shifting sound to light may lead to better computer chips



A plasma is generated by a laser pulse similar to how sound is converted to light.

By reversing a process that converts electrical signals into sounds heard out of a cell phone, researchers may have a new tool to enhance the way computer chips, LEDs and transistors are built.

Laboratory scientists have for the first time converted the highest frequency sounds into light by reversing a process that converts electrical signals to sound. Commonly used piezo-electric speakers, such as those found in a cell phone, operate at low frequencies that human ears can hear.

But by reversing that process, lead researchers Michael Armstrong, Evan Reed and Mike Howard, and collaborators from Los Alamos National Laboratory and Nitronex Corp., used a very high frequency sound wave -- about 100 million times higher frequency than what humans can hear -- to generate light.

To read more, go to
<http://www.nature.com/nphys/journal/vaop/ncurrent/full/nphys1219.html>

Latest *Newsline* available



Newsline provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov/rev02/index.php>

Photo of the week



Spring is in the air: Lab volunteers prepare to distribute daffodils to raise money for cancer research through the American Cancer Society's Daffodil Days Campaign. The daffodil is the first flower of spring and a symbol of hope.

LLNL is managed by Lawrence Livermore National Security, LLC, for the U.S. Department of Energy's National Nuclear Security Administration.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the Livermore Lab Report, send e-mail <mailto:labreport@llnl.gov>.

The Livermore Lab Report archive is available at:
https://publicaffairs.llnl.gov/news/lab_report/2009index.html