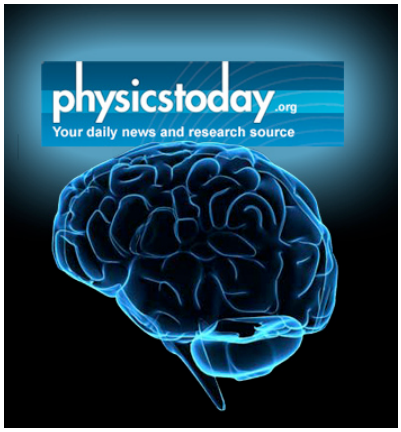
LAWRENCE LIVERMORE
REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Aug. 24-31, 2009.

Flexing skulls on the battlefield may damage brains



When a person's head strikes something, such as a car's windshield during an automobile accident, it accelerates. As it begins to decelerate, the brain slams into the skull, then bounces off and oscillates until the impact energy dissipates. The resulting shear and compressive strains can lead to brain damage.

But in battlefield explosions, just the blast waves alone can cause soldiers traumatic brain injuries to soldiers.

To better understand that process, LLNL's William Moss and Michael King and the University of Rochester's Eric Blackman compared numerical simulations of a head colliding with a wall to one being struck by an explosion's blast waves. Their findings could lead to improved military helmet design.

To read more, go to http://blogs.physicstoday.org/update/2009/08/skulls-flex-damage-brain-under.html

Quest takes on nuclear power

Diablo Canyon Nuclear Power Plant

Is there a nuclear power revival in California? Maybe, according to a Quest radio program that aired recently.

Recent polls suggest that Californians may finally be warming up to the idea and a new study suggests that a clean energy future may not happen without it.

California has had a legal moratorium on building new nuclear power plants since 1976.

But the Laboratory's National Ignition Facility might just change that. As opposed to creating energy through fission, as is done in San Onofre in Southern California and Diablo Canyon on the Central Coast, NIF would provide a path to creating safe, clean energy produced through fusion. Fusion experiments are scheduled to begin in 2010.

The Lab's Bill Halsey says: "It's not the lowest hanging fruit, but it is the juiciest."

For more, listen to http://www.kqed.org/quest/radio/new-nuclear

***NY Times* highlights Lab's fuel cell work**

Fuels for the direct C fuel cell: coal, pet-coke and biomass residues.

Direct carbon fuel cells efficiently produce electricity straight from the carbon source, which can be anything from coal to coconut shells.

The laboratory-scale technology has the potential of making electricity by using less than half the coal burned today and sharply reducing the costs of capturing carbon dioxide emissions from the fuel.

Even though fuel cells tend to be synonymous with hydrogen, direct carbon fuel cells have a history dating back to the mid-19th century. By the 1980s, labs including Lawrence Livermore National Laboratory had small research programs to delve into the chemistry of these cells.

To read more, go to http://www.nytimes.com/cwire/2009/08/26/26climatewire-is-there-some-light-at-the-end-of-coals-long-29519.html?scp=1&sq=Jessica%20Leber&st=cse

Nanowires exposed in *Computerworld*

Researchers are working on integrating nanotechnology with biological materials to create more powerful computers, medical tools and even prosthetics.

Scientists at the Laboratory have built a hybrid platform out of a mixture of biological and manmade materials. The platform is enabling them to build prototypes of what they're calling bio-nanoelectronic devices.

"Electronic circuits that use these complex biological components could become much more efficient," said Aleksandr Noy, a lead scientist on the project.

The platform is based on nanowires that are coated in lipids, which are essential structural components of living cells

For more information, go to http://www.computerworld.com.au/article/314901/nanotech_biological_hybrid_could_speed_computers

Livermore Lab Report to take a break

LAWRENCE LIVERMORE
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The *Livermore Lab Report* will take a break for the week of Aug. 31-Sept. 7. The report will return Sept. 14.

Latest _Newsline_ available

NEWSLINE

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

Photo of the week

Right on target: The National Ignition Facility's millimeter-sized targets must be designed and fabricated to meet precise specifications for density, concentricity and surface smoothness for NIF experiments. LLNL scientists and engineers like Richard Montesanti have developed the precision robotic assembly machine to manufacture the small and complex laser-driven fusion ignition targets.

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