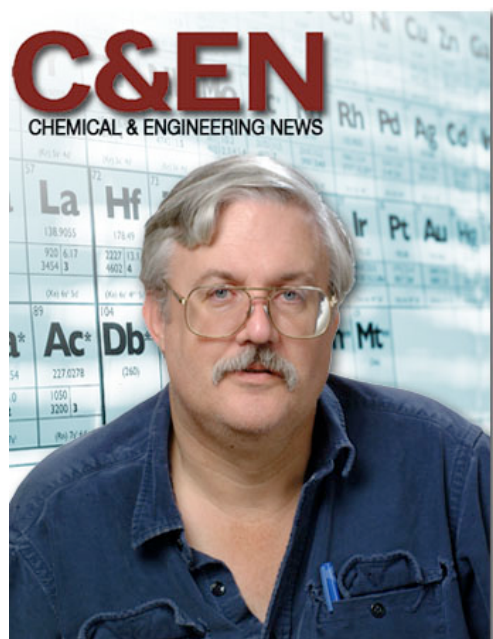


# LAWRENCE LIVERMORE REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: March 2-March 9, 2009.

## LLNL scientist earns Glenn T. Seaborg award



### Ken Moody

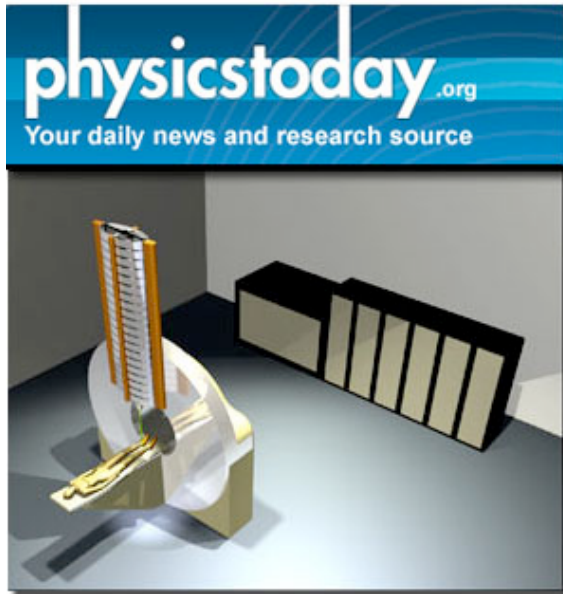
For the last 30-plus years, Lab chemist Ken Moody along with Russian collaborators has helped provide a glimpse of the "Island of Stability" that lies at the outer bounds of the periodic table, where super-heavy elements live for milliseconds, minutes or even years amid a sea of oddly short-lived nuclei.

He and his collaborators have single-handedly produced the first long-lived versions of each element between 113 and 118 (with the exception of 117).

His work hasn't gone unnoticed. The American Chemical Society's Division of Nuclear Chemistry and Technology has awarded him the 2009 Glenn T. Seaborg award for his work in heavy elements and nuclear forensics. He will receive his award at the national meeting March 22-26, in Salt Lake City, UT.

*Chemical and Engineering News* recently wrote about Moody's accomplishments. To read the article, go to [https://newsline.llnl.gov/\\_rev02/articles/2009/mar/CE\\_news.pdf](https://newsline.llnl.gov/_rev02/articles/2009/mar/CE_news.pdf)

## Proton therapy explored for cancer research



A recent article in *Physics Today* describes the movement to shrink the size of accelerators so they can be used to help treat cancer patients.

Smaller, cheaper accelerators promise to make proton radiation therapy available to more cancer patients. The Lab has developed a linac technology to accelerate protons to 100 MeV.

Originally developed for X-ray radiography to image explosives, the so-called dielectric wall accelerator generates a pulsed electric field that lasts a few nanoseconds.

To read more, go to [http://scitation.aip.org/journals/doc/PHTOAD-ft/vol\\_62/iss\\_3/22\\_1.shtml](http://scitation.aip.org/journals/doc/PHTOAD-ft/vol_62/iss_3/22_1.shtml)

## BBC's "Horizon" on NIF



### **Brian Cox**

British physicist Brian Cox hosts the most recent edition of the BBC's "Horizon: Can We Build a Star on Earth?" which delves into the possibility of creating energy (fusion) like that which forms in stars on earth.

Cox explores different strategies now being pursued to make nuclear fusion a reality, including the Lab's National Ignition Facility, that aims to create inertial fusion. NIF blasts tiny pellets of deuterium-tritium fuel with a single 500-trillion-watt laser beam -- more than 500 times the U.S. peak generating power.

This giant short-lived laser pulse causes the fuel pellet to collapse and detonate, producing a mini-star for a fraction of a second.

To read more about the BBC program, go to <http://news.bbc.co.uk/2/hi/science/nature/7891787.stm>

### **New insight into nature of Earth's core**



**Prior to melting and under sufficient shear, a metal flows like a Bingham plastic such as hot tar (center section).**

At one point, the metals in Earth's interior may have had the consistency of raw pizza dough before they solidified to become the core.

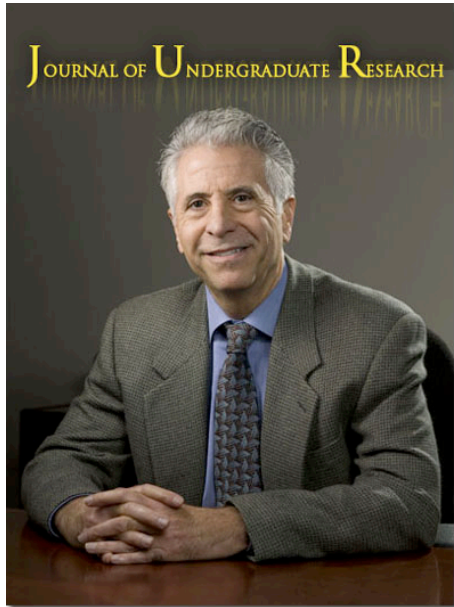
Livermore researchers recently discovered a novel gooey tantalum structure that occurs before it melts under stress at high pressures. The research suggests that the same finding could apply to other metals such as iron, which is found in Earth's interior.

Unlike previous research that assumed solid metals immediately turn into a liquid upon exposure to high pressures and temperatures, Christine Wu and colleagues found instead that the metal tantalum underwent a viscous plastic flow transition under heating and shear (the deformation of a material in which parallel internal surfaces slide past one another) before it melted into a liquid.

"There wasn't true melting," Wu said. "It was a viscous plastic flow much like hot tar. It had liquid-like behavior to a certain extent, but the material flowed as a group instead of as individual atoms as a liquid would."

The research appears in the journal, *Nature Materials*. To read more, go to <http://www.nature.com/nmat/journal/v8/n3/full/nmat2375.html>

## LLNL scientist writes article for *Journal of Undergraduate Research*



**Don Correll**

LLNL scientist Don Correll was asked by the DOE's Office of Workforce Development for Teachers and Students to write the guest editorial for the 2008 *Journal of Undergraduate Research (JUR)*. In addition to Correll's guest editorial "The Education-Research Continuum," the 2008 *JUR* issue has an introduction by former DOE Undersecretary for Science Ray Orbach.

Since its inception in 2001, the *JUR* has been publishing 'peer reviewed' papers by undergraduate college students who have completed summer internships at the various DOE national labs.

To read more about the journal, go to

[http://www.scied.science.doe.gov/scied/JUR\\_v8/default.htm](http://www.scied.science.doe.gov/scied/JUR_v8/default.htm)

**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



**Keep your eye on the birdie:** A National Ignition Facility technician inspects a damage inspection instrument that is used to assess the optics in the target chamber.

---

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](https://publicaffairs.llnl.gov/news/lab_report/2009index.html)

