

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: April 12-19, 2010

Element 117: It's all in a name



Illustration of the newly created element 117

In Latin, it's called ununseptium. In English, it's called element 117 and Lawrence Livermore researchers were instrumental in the discovery of the newest superheavy element to be added to the periodic table.

The team produced six atoms of the element by smashing together isotopes of calcium and a radioactive element called berkelium in a particle accelerator in Dubna, Russia.

For each atom, the team observed the decay from element 117 to 115 to 113 and so on until the nucleus fissioned, splitting into two lighter elements. In total, 11 new "neutron-rich" isotopes were produced, bringing researchers closer to the presumed "island of stability" of superheavy elements.

This discovery brings the total to six new elements discovered by the Dubna-Livermore team (113, 114, 115, 116, 117 and 118, the heaviest element to date).

For more, go to <http://www.time.com/time/magazine/article/0,9171,1982306,00.html>

As far as the eye can see



The Lab's artificial retina team

Laboratory researchers are developing an implantable system for a third-generation artificial retina as part of a U.S. Department of Energy project to produce a "retinal prosthesis" that could restore vision to millions of people suffering from eye diseases.

An artificial retina or "retinal prosthesis" has the potential to restore vision to people suffering from eye diseases such as *retinitis pigmentosa*, macular degeneration or those who are legally blind due to the loss of photoreceptor function.

Researchers at the Lab are using advanced polymer-based micro-fabrication methods to further develop a biocompatible microelectrode array for the artificial retina device.

"This device has to be very soft, very sensitive to the retina and has to put very minimal pressure," said LLNL lead researcher Sat Pannu.

To see more on the research, go to

https://publicaffairs.llnl.gov/news/lab_report/movies/kgotv_artificial-retina_15apr2010.mov

Lab's Poyneer inducted into Women's Hall of Fame



Lisa Poyneer

You could say that Lisa Poyneer is working to help astronomers see the stars 100 times better than ever before.

Her work in adaptive optics and the development of the Gemini Planet Imager (GPI), which will be the world's most powerful astronomical adaptive optics instrument, has earned her induction into the Alameda County Women's Hall of Fame in the science category. She received her award Saturday.

Poyneer is one of the most promising researchers at the Laboratory. A signal processing and adaptive optics engineer, Poyneer was instrumental in the development of GPI, which will be completed in early 2011.

Adaptive optics clears the blurring effects of turbulence in the Earth's atmosphere when viewing stars. It corrects the wavefronts of light so that stars, galaxies and other celestial objects gain resolution and contrast.

To read more, go to https://newsline.llnl.gov/_rev02/articles/2010/apr/04.16.10-hof.php

Seeing through the rays



The GeMini gamma-ray spectrometer fits in the palm of your hand.

The ability to detect gamma rays is a vital tool for many areas of research. Gamma-ray detectors allow scientists to study celestial phenomena and diagnose medical diseases, and they have been used to determine the yield in an underground nuclear test.

But these detectors also are an important tool for homeland security, helping the nation confront new security challenges. The Lab has developed GeMini, a portable detection device that significantly advances the field of gamma-ray spectroscopy.

The device design depends on the element germanium (hence the "Ge" in GeMini) for accurately detecting and identifying nuclear materials. Compared with other instruments, GeMini identifies nuclear materials with a higher level of certainty and at a considerable cost savings.

To hear a report on the detector, go to <http://www.ucop.edu/sciencetoday/article/23177>



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Photo of the week



Clean n' shine: At the SCHOTT North America, Inc facility in Pennsylvania, one of the many optics for the National Ignition Facility gets a close inspection. NIF's total optical surface area is three-quarters of an acre -- 40 times the surface area of the giant Keck telescope in Hawaii.

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/2010index.html