LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, May 13-17, 2013.

io9 **BEAM ME UP**

This scene from "Star Trek Into Darkness," was filmed at Lawrence Livermore's National Ignition Facility.

The new movie, "Star Trek Into Darkness," which opens this weekend, uses physical sets instead of green screen, as much as possible.

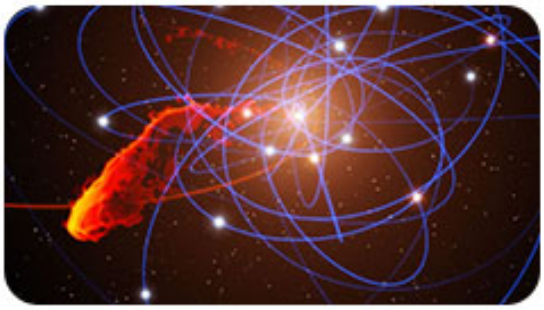
One of the huge sets was Lawrence Livermore's National Ignition Facility, where the building's laser bays and target chamber were key backgrounds for the movie.

Filming at NIF "was extraordinary," says Simon Pegg, who plays Scotty. "Also, aesthetically speaking, it formed a brilliant bridge between all the clean lines and that fantastically futuristic bridge, to the industrial metal of the engine room -- which is what J.J. Abrams always wanted to look like, the guts of the Titanic. But in the middle of this, you've got the warp core, which is this perfect mish-mash of the two. You've got all this steel, and yet it's very modern-looking."

Some NIF scientists served as extras in the film.

To read more, go to io9.

THE SUNDAY TIMES **GOBBLE GOBBLE**



Simulations of the dust and gas cloud G2 on its orbit around the Milky Way central black hole SgrA.

Photo courtesy of M. Schartmann and L. Calcada/ European Southern Observatory and Max-Planck-Institut fur Extraterrestrische Physik.

The black hole at the center of the Milky Way has quite a big appetite and could be about to start the cosmic fireworks display of the century after it gobbles up a giant cloud of gas and dust.

Sagittarius A, a supermassive black hole with about 4 million times the mass of our sun, has trapped a giant cloud of gas and dust, dubbed G2, in its huge gravitational field and is pulling it inward, at about 5 million miles an hour.

When the cloud reaches the black hole, expected in the next few months, large sections will be sucked into it -- generating blasts of powerful radiation as they are dragged to their doom.

A supercomputer simulation prepared by two Lawrence Livermore physicists and a former postdoc suggests that some of G2 will survive, although its surviving mass will be torn apart, leaving it with a different shape and questionable fate.

To read more, go to *The London Times*.

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ACTIVE TO THE CORE

East limb view of the Earth's moon as seen by Clementine. Image courtesy of NASA.

New evidence from ancient lunar rocks suggests that the moon's long-lived dynamo -- a molten, convecting core of liquid metal that generated a strong magnetic field -- lasted 160 million years longer than originally estimated and was continuously active until well after the final large impacts.

Lawrence Livermore scientist William Cassata and a group of international collaborators analyzed two rocks gathered during the Apollo 11 mission and found that they were magnetized in a stable and surprisingly intense magnetic field. The study of these slowly cooled, unshocked rocks demonstrates that the moon had a core dynamo as late as 3.55 billion years ago.

"The important implication of this discovery is that the moon possessed a magnetic field much later than would be expected for a body of its size," Cassata said.

Cassata said the study shows that the moon likely possessed a long-lived, core dynamo, much like the one that currently exists on Earth, but generated by a different mechanism.

To read more, go to *Lab Manager*.

THE DAILY TIMES FARMINGTON, NEW MEXICO
THE FOUR CORNERS INFORMATION LEADER
PROTECTING THE LAND

From left, Brad Esser, Gilbert Dayzie, Vic Madrid, Michael Taffet, Theresa Kayzar and Melvin Yazzie stand at the base of monitoring equipment to be installed on a waste cell on the Navajo Nation.

The Navajo Nation is working with Lawrence Livermore scientists on a new project to make sure that water is not reaching uranium-contaminated soil in northeast Arizona and northwestern New Mexico.

A team of Lab scientists visited Shiprock last month to help install an instrument that will determine whether water is reaching contaminated soil. The tribe activated the instrument -- a soil moisture monitoring system that looks like a 3-foot-tall triangular configuration of silver pipes -- this week.

The contaminated soil holds toxic levels of uranium, a radioactive material that was mined for several decades on the Navajo Nation. Some of the uranium contaminated the ground and water around the mines, according to the Environmental Protection Agency.

The mines are scattered across the Navajo Nation, most of them in northeastern Arizona. Lab scientists will be working with the Shiprock office of the Abandoned Mine Lands Reclamation Project to ensure that the cells are keeping all moisture from the contaminants.

To read more, go the *Daily Times*.

R&D HERE COMES THE SUN

The concentrator photovoltaic (CPV) system in the field. ***Photo courtesy of Cool Earth Inc.***

The California Energy Commission (CEC) has awarded $1.7 million to a partnership between Lawrence Livermore and Cool Earth Solar Inc. (CES) to conduct a community-scale renewable energy integration demonstration project at the Livermore Valley Open Campus.

CES is the prime awardee and is contributing an additional $1 million in matching funds to the CEC amount, while Lawrence Livermore will provide advanced R&D support for the effort.

This project will test and demonstrate a model for how communities can generate solar energy, forecasting that solar generation and developing energy management tools to adapt to that forecast. The net result will be a community that is able to reduce its total consumption and place more reliance on clean, locally available renewable resources.

Lawrence Livermore will contribute advanced solar forecasting and building energy management for improved efficiency and peak load shaving.

To read more, go *to R&D Magazine*.

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.