



'PERFECT POWER'? Laser Test Results Raise Hope for Fusion Power

<http://www.foxnews.mobi/quickPage.html?page=22995&content=96572741&pageNum=-1>

It's one small step for energy -- and one giant blast for lasers.

Lawrence Livermore's National Ignition Facility announced Tuesday a successful test of its ultrapowerful laser system, which melds 192 laser beams into a single incredible burst of energy. On Aug. 13, the facility was activated for 14 billionths of a second and aimed at a tiny capsule of fuel. The result: approximately 350 trillion watts of power -- hundreds of times more than the entire United States consumes at any given instant.

"We're working in a place where no human has ever gone before," Ed Moses, principle associate director for NIF and Photon Science, told FoxNews.com. "We're working on the bleeding edge of fusion physics."

Fusion is similar to fission, where atoms are split releasing massive amounts of energy. But instead of being torn apart, atoms are welded together in fusion. It's the same ongoing energy process in the sun and other stars, a "perfect power" because more energy is released than used. Fusion could solve the world's energy problems -- if it's possible at all.

In the NIF, beams of light converge on pellets of hydrogen isotopes to create a controlled micro-explosion. As the beams move through a series of amplifiers, their energy increases. From beginning to end, the total energy grows from one-billionth of a joule to a potential high of 4 million joules, NIF says - a factor of more than a quadrillion. The current test reached 1.7 million joules (or megajoules), though a test last year hit a record high of 1.85.

Last year's test yielded unexpected results, however. In this test, NIF dialed down the laser beam's power and tweaked it, for tremendous results.

"We lowered the energy a tiny bit -- about 5 percent -- but more important, we changed the shape of the energy pulse. We moved energy from the back of the pulse to the front. We got three times the energy out," Moses told FoxNews.com.

"Our goal is to get fusion burn -- more energy out than we put in."

Because the laser is on for the merest fraction of a second, it costs little to operate -- between \$5 and \$20 per blast. Still, the cost of the facility has raised temperatures in Washington. The gigantic laser lab was built in California for \$3.5 billion in 2008, and ran up approximately \$1.5 billion more in operating costs over the past five years.

Despite the latest success, ignition hasn't happened, and NIF's managers admitted to Congress in December that they can't guarantee that it will ever succeed.

"At present, it is too early to assess whether or not ignition can be achieved at the National Ignition Facility," wrote Thomas P. D'Agostino, administrator of the National Nuclear Security Administration (NNSA) in a report requested by Congress last year.

Congress had given the facility until the end of 2012 to achieve its goal of ignition. The NNSA report proposed instead a three-year program to better understand why the actual implosion does not agree with scientific models. And three years may not be enough. "The three-year plan culminates in a comprehensive review at the end of FY 2015. At that time, NNSA will have an assessment of the likelihood and schedule for achieving ignition," the report said.

Moses told FoxNews.com funding is lower than hoped for, but still sufficient to operate.

"We're coming into the beginning of the fiscal year and we think we have a pretty good picture of where the funding is," he said. That the latest laser blast more effectively matches models helps the facility to meet its other key goal: nuclear weapon stewardship. Moses said the test informs basic understanding of nuclear energy, weapons science and efficacy, and basic understanding of how the cosmos works.

"This represents an important advance in establishing a self-sustaining burning target, the next critical step on the path to fusion ignition on NIF."