



December 21, 2022

Statement on Fusion Ignition at the National Ignition Facility, Lawrence Livermore National Laboratory

The Society for Science at User Research Facilities (SSURF) joins the global scientific community to celebrate the historic fusion ignition achievement at the National Ignition Facility (NIF) announced by the U.S. Department of Energy (DOE) and DOE's National Nuclear Security Administration (NNSA). Through this accomplishment, NIF, a U.S. national scientific user research facility at Lawrence Livermore National Laboratory (LLNL) and a member of SSURF, has demonstrated international leadership in fusion energy science and the tremendous value of federally funded research facilities, and the critical role they play in support of the nation's national security.

After decades of research, scientists at the NIF conducted the first controlled fusion experiment in history to reach this milestone, also known as scientific energy breakeven, meaning it produced more energy from fusion than the laser energy used to drive it. This landmark feat will provide unprecedented capability to support NNSA's Stockpile Stewardship Program and will offer invaluable insights surrounding the prospects of clean fusion energy. This is a profound example of the unique technologies the United States has invested in to ensure our global leadership in the pursuit of science. NIF's one-of-a-kind research capabilities are available for scientists from throughout the country to conduct innovative and transformative research.

"The pursuit of fusion ignition in the laboratory is one of the most significant scientific challenges ever tackled by humanity, and achieving it is a triumph of science, engineering, and most of all, people," said LLNL Director Dr. Kim Budil.

On Monday, December 5, 2022 at 1:03 am scientists at NIF focused 192 giant lasers at a tiny cylinder that contained the hydrogen fusion fuel encased in a diamond capsule. The laser beams entered at the top and bottom of the cylinder, compressing a BB-size fuel pellet of deuterium and tritium, the heavier forms of hydrogen. The experiment surpassed the fusion threshold by delivering 2.05 megajoules (MJ) of energy to the target, resulting in 3.15 MJ of fusion energy output, demonstrating for the first time a most fundamental science basis for inertial fusion energy (IFE).

“We are extremely grateful to the DOE and NNSA for their support of the facility. Without support and critical sustainment of the nation’s research facility infrastructure, transformational scientific breakthroughs like this won’t happen” said Kevin Fournier, the NIF’s User Office Director and SSURF Board of Directors member.

We applaud the profound commitment of the thousands of scientists and researchers and their decades of work on multiple teams with expertise across a spectrum of physics, engineering, and computer science. We emphasize what LLNL Director Budil said: “Their efforts—a continual process of learning, building, expanding knowledge and capability, and then finding ways to overcome the new challenges that emerged—these are the problems that the U.S. national laboratories were created to solve.”

The nation’s network of user facilities like NIF provide unique technologies, foster communities of brilliant scientists, and deliver innovative resources to address our national priorities and challenges, ensuring the most crucial discoveries manifest across society with benefits to all humanity. Maintaining and ensuring such facilities are updated with the latest equipment and staffing is fundamental to the United States national prosperity and security. We are proud to speak on behalf of the inspiring and vital missions of the laboratories across this network and to help share their successes, thus strengthening our country’s scientific enterprise.

[See more details at NIF’s website >>>](#)

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About SSURF:

The Society for Science at User Research Facilities is a 501(c)3 non-profit with a mission is to provide a consolidated voice and be a unique resource for best practices and support to those who are engaged in research at one or more of our nation’s federal research laboratory User Facilities. SSURF member research facilities are located throughout the U.S. and include laboratories of the Dept. of Energy, Dept. of Commerce and National Science Foundation-funded entities, with a combined network of more than 100,000 scientists & researchers (“users”).

SSURF’s primary efforts are:

- 1) Supporting federal User Facility communities and research networks by sharing best practices and facilitating professional development, and
- 2) Promoting public awareness about the benefits and significance of User Facility research.

See more about SSURF at www.ssurf.org

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