



Research in Jeopardy: Plasma lab may face cuts, layoffs

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Proposed congressional cuts to research funding could result in layoffs of a third of the staff and researchers at the Princeton Plasma Physics Laboratory, threatening the country's leadership in the development of fusion energy, the lab's top officials said in interviews.

While HR 1, the only long-term budget to pass in the House of Representatives this year, failed in the Senate, similar cuts are still under consideration as a shutdown of the federal government looms.

"Any cuts are going to have a severe consequence to an already vulnerable situation," said Stewart Prager, the lab's director. "It would strike at the core of the integrity of PPPL as a national laboratory."

If Congress does not pass a new budget or short-term funding measure by tomorrow night, the federal government will shut down. The lab, however, would still remain open as long as it can rely on existing funding, lab spokeswoman Kitta MacPherson said on Wednesday afternoon.

The lab is a leader in the international effort to create a new source of safe, clean fusion energy from plasma, a fourth state of matter. Roughly 98 percent of the lab's \$90.7 million of funding comes from the federal government.

If funding levels similar to HR 1 are applied proportionally across the Department of Energy's Office of Science, between 135 and 150 of the lab's 457 employees will be laid off, Prager said. The remaining staff and researchers will then be furloughed for three weeks, according to Joyce Rechtschaffen '75, the University's director of government affairs.

HR 1 would also have implemented an 18 percent spending cut at the lab. Because half of the fiscal year has already passed, however, this would effectively result in a 36 percent cut for remaining operations in fiscal year 2011.

House Republicans contend that cuts to a host of programs are crucial to combating a growing deficit that may have serious consequences for America's long-term fiscal stability.

"At a time when the federal government borrows nearly 40 cents of each dollar that it spends and averages trillion-dollar deficits each year, House Republicans are firmly committed to cutting spending and tightening the belt just like business people and families around the country are doing," House majority leader Rep. Eric Cantor, R-Va., said in a statement this week. "Americans deserve nothing less," he added.

However, Rep. Rush Holt, D-N.J. — the former assistant director of the lab whose district includes Princeton — said in an interview with *The Daily Princetonian* last week that the cuts would significantly hurt the country's investment in science.

"The fight is between two very different views," Holt explained. "One is that ... spending is bad, and there is no such thing as 'investment.' And the other view as raised by the president in his State of the Union

[address] is America's future depends on our ability to out-innovate, out-educate and out-build the rest of the world.”

Indeed, officials emphasized that funding cuts at the lab could have global implications.

“This would knock the U.S. fusion program off of the world stage and it would consign us to a sort of third-world country in fusion,” Prager said. “It would be devastating.”

The funding cuts would be a substantial change of fortune for the lab. Two years ago, it was the recipient of \$19.4 million in funding from the America Recovery and Reinvestment Act. The funding, distributed in 2009-10, paid for important upgrades to the lab's equipment.

But just two years later, cuts could derail or delay those very projects.

Energy of the future?

The lab, about a 10 minute drive south east of central campus, is a major U.S. research center that studies plasma fusion, a technology that researchers say is the energy source of the future.

Fusion energy imitates processes in the sun and stars by heating atoms to temperatures of more than 100 million degrees Celsius. Scientists use high-powered magnets, some that are 8,000 times as strong as earth's magnetic field, to control the plasma reaction. Using fusion energy, one gallon of water — which contains the hydrogen isotope deuterium — has the energy content of 300 gallons of gasoline.

“It delivers an energy source that is ideal in its properties,” Prager

said, adding that fusion energy is inexhaustible, does not release greenhouse gases and is “extremely safe.” In contrast to nuclear power plants, there is no risk of meltdown with fusion energy, Prager said.

Despite these benefits, researchers said that harnessing fusion energy is difficult, likening it to “taking Jello and holding it with rubber bands,” said John DeLooper, the head of best practices and outreach at the lab.

However, any cuts could significantly restrict operations of the lab’s flagship device, called the National Spherical Torus Experiment, Prager added.

Using Recovery Act money, the lab upgraded diagnostic equipment and increased operational time for the device — a maze of cables, tubes, wires, magnets and cameras surrounding a vacuum-sealed chamber. But the NSTX’s run schedule is at the mercy of the current congressional talks. The device will be prepared to run experiments at the end of April, barring funding cuts.

“It’s part of working for the government,” DeLooper said as he navigated the tunnels near the NSTX control center, a room fit with nearly 90 computer monitors, projectors and panels of switches and gauges.

Countering cuts

As Congress debates spending cuts, the University and lab have tried to convince lawmakers of the benefits of a future powered by fusion energy.

The University’s Office of Government Affairs — the school’s lobbying

wing in Washington — recently hosted a “fusion advocacy day,” where scientists demonstrated to members of Congress new developments in fusion technology.

Historically, advocacy for fusion energy is a consistent focus of the office, according to a ‘Prince’ analysis of lobbying disclosure reports. Indeed, University and lab officials indicated that funding fusion energy should be the government’s role.

“The facilities needed to do that are very expensive,” said University Vice President and Secretary Bob Durkee ’69. The long-term nature of the technology and cost puts fusion research beyond the short-term profit objectives of most companies, he said.

Therefore, Durkee said, “it’s appropriate for the public to fund it, because at the end of the day, it is the public that benefits.”

The impact of stalled funding is highlighted in a project known as the National Compact Stellarator Experiment — which currently seems like an \$86 million jigsaw puzzle.

If fully completed, the experiment mechanism would be full of twists and turns and spiraled with magnets. It is so precisely engineered that more than a millimeter of error is unacceptable. “If the plasma were to design its own path, this is what it’d look like, we think,” said Adam Cohen, the lab’s deputy director of operations.

Still, the project — which was halted due to cost overruns in 2008 — requires another \$73 million for completion. Cohen said that its implementation would yield invaluable knowledge about the characteristics of plasma.

“When you have all the ashes, the phoenix rises out of the ashes,”

Cohen said as he stood near the structure's 18 parts, many of which were still covered in translucent plastic sheets.

Still, he said, "it's going to be a tough road."

Senior writer Rachel Jackson and staff writer Anastasya Lloyd-Damnjanovic contributed reporting to this article.

This article is the second in a [three-part series](#) about how federal funding affects University science. Check back tomorrow to see how the University lobbies for research dollars. For feedback or tips, please email investigations@dailyprincetonian.com.