International fusion project will use Princeton physics lab

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Photo by file photo

U.S. Secretary of Energy Spencer Abraham announced last Thursday at the Princeton Plasma Physics Laboratory that President Bush has decided the United States will enter negotiations to determine its role in the International Thermonuclear Experimental Reactor (ITER) project.

The project aims to determine the viability of exploiting cold fusion as an energy source around the world. Much of the research for the impending project will take place in PPPL, where fusion research first began in the 1950s.

Most of the United States' role in the first phase of the ITER project would consist of producing the machinery necessary to conduct fusion experiments. The second phase of conducting experiments with these new machines would take place largely in small private labs, such as PPPL.

"Technically, we're ready, and now is an excellent time for us to get involved in burning plasma experiments," Rich Hawryluck, deputy director of PPPL, said. "If the U.S. were to rejoin ITER, now would be the time."

The United States was a member of ITER until it withdrew in 1998 because of some doubts that the expensive project would get off the ground at all, Hawryluck said.

According to Jim Kapsis, the communications director of Congressman Rush Holt's office, the program has been significantly streamlined, alleviating some of the Administration's concerns with ITER's organization. Canada, the European Union, Japan, the Russian Federation, India, Korea and China among others all currently participate in ITER.

Fusion energy

Fusion is the nuclear process by which two hydrogen nuclei unite, usually under conditions of extreme heat and pressure, to create a single helium nucleus, releasing enormous amounts of energy. Scientists have hoped for decades for a way to harness this energy.

The main hurdle preventing fusion from being a feasible source of alternative energy is that all current fusion technologies require more energy than they produce. Until this can be remedied, fusion energy will not be cost efficient.

The potential benefits of fusion energy include managable radioactive waste, unlike that produced by fission energy, and an alternative to fossil fuels, which release ozone-depleting carbon emissions, Hawryluck said. Also, while fossil fuels are limited by supply and geography, the ingredients for fusion — water and lithium — are infinitely abundant, he said.

The machines to be built by ITER aim to improve a number of aspects of the fusion process, including keeping the plasma clean and containing the plasma in one place. Self-heating plasma is a necessity to the process, as the amount of energy obtained from it would ideally be much larger than the amount put in.

Initial funding

Fusion research is not new to the University. In 1952, astrophysicist Lyman Spitzer recognized the potential of fusion as an energy source and was the first to obtain government funding to conduct fusion experiments at PPPL.

Both government and science officials alike caution that fusion energy sources are still a long way on the horizon. Hawryluck estimated it will be at least 35 years before even a demonstration power plant could be constructed to test the viability of commercial production of fusion energy.

Hawryluck, who has worked in PPPL for 28 years, said he has never seen such a strong commitment from the White House to exploring fusion as a viable source of energy.

"We are very, very pleased that the President and his Secretary of Energy have made this long term commitment to fusion energy research."