

SUPPORT FUSION ENERGY SCIENCES IN FY 2013
HELP THE UNITED STATES REMAIN A WORLD LEADER IN FUSION RESEARCH
RESTORE FUNDING FOR THE DOMESTIC FUSION PROGRAM
AND MAINTAIN OUR COMMITMENT TO ITER

It is imperative that both the domestic research program and the U.S. contributions to ITER be funded to achieve the goals of the U.S. fusion program. To realize the promise of participation in ITER, cultivate future fusion researchers, and prepare for the commercialization of fusion energy, the U.S. must have its own internationally competitive fusion research programs and facilities and meet the expectations of the ITER partners. America has always led the fusion field – playing a key role in its origination, conducting many of the milestone experiments, nurturing a cadre of students for the next generation, and collaborating internationally to advance fusion science. As we approach the steps that will ultimately take us to fusion power generation, it is critical that the U.S. maintain its leadership so that fusion can be developed for the U.S.

FY 2013 BUDGET REQUEST FOR THE OFFICE OF FUSION ENERGY SCIENCES (OFES)

The FY 2013 budget requests \$398.3 million for OFES. While the budget's \$150M for the U.S. Contributions to ITER is a \$45M increase from the FY 2012 level, it is \$50M below the U.S. ITER Project's plan, making U.S. achievement of the international ITER schedule extremely difficult. The budget only includes approximately \$248M for domestic fusion research, a \$49M **decrease** from the current funding level. This cut would have a devastating impact on the U.S. fusion program, most pointedly by shutting down one of the three facilities critical to continued U.S. leadership in fusion. After years of operating on minimal budgets and essentially level funding, the domestic fusion program cannot absorb the proposed reductions without significant negative impacts to the program and our scientific and engineering contributions. The FY 2013 Budget Request would result in:

- The shutdown of Alcator C-Mod at MIT, one of three major U.S. fusion research facilities;
- Cutbacks in operations, reduced productivity, and delayed upgrades at the remaining fusion facilities;
- Substantial layoffs of scientists, engineers, and support personnel throughout the country;
- Significant cutbacks in fusion theory, computation, and simulation;
- A severely weakened ability to contribute to and, importantly, benefit from the advances made by ITER;
- Increasing cutbacks in university research, the loss of numerous students and professors from the U.S. fusion program, and the related impact of discouraging future fusion researchers from entering the field;
- Contraction in plasma research and a jeopardized ability to design and build future fusion systems in this country;
- The U.S. ceding further advantage to our ITER partners, which together expend considerably more effort and resources toward fusion than the U.S.

RECOMMENDED ACTION

Increase the Fusion Energy Sciences budget request by \$49 million to a total of \$447 million in FY 2013. This will allow funding for the Domestic Fusion Program to remain at the FY 2012 level, prevent a serious weakening of U.S. fusion research, and ensure that the U.S. will remain a world leader in fusion research and a first-tier contributor to ITER with the researchers and program elements in place to fully benefit from ITER when it is complete.

BACKGROUND ON THE U.S. FUSION PROGRAM

Fusion energy is the power source of our sun and the stars. Its characteristics as an energy source for the future are unrivaled: capable of providing large-scale energy supply using domestically available, virtually unlimited fuel; no greenhouse gas or acidic emissions; inherently safe operation (no Fukushima-like accidents are possible); and no need for long-term waste disposal. Fusion energy is created routinely in laboratories around the world; the remaining challenge is to complete its development into a practical energy source, which only recently has come within our reach.

There are two components of the U.S. Fusion Program, run by the DOE Office of Fusion Energy Sciences (OFES):

- **The Domestic Research Program:** The domestic fusion program operates three U.S. magnetic fusion research facilities (DIII-D at General Atomics in California; C-MOD at MIT in Massachusetts; and NSTX at the Princeton Plasma Physics Laboratory in New Jersey). Each of these facilities is unique and complementary in parameter space that will enable us to optimize fusion performance in the future. The domestic fusion budget also supports numerous university research programs, experimental work in high energy density laboratory plasmas, fusion theory and modeling, enabling R&D, and general plasma science. Together, these elements are key to developing the scientific basis for fusion, establishing the foundation for the next steps in the U.S. fusion program, and providing scientific advances for the international ITER project. These facilities and programs provide valuable research and training for hundreds of scientists and engineers and support research by U.S. teams on facilities abroad for studies that complement the work of U.S. based facilities.
- **The U.S. Contributions to ITER Project:** The creation, control and study of a self-heated “burning plasma” is a major next step for fusion. ITER is a large facility that will demonstrate the feasibility of fusion power and contribute to its commercialization. The components are designed and fabricated by seven international partners (the European Union, China, India, Japan, Russia, South Korea, and the U.S.) and is now under construction. Over 80 percent of the U.S. funds for this project are spent within the U.S. for research, design, and fabrication of components by U.S. industry that will ultimately be shipped to the ITER site for assembly and research operation. Another ten percent funds U.S. personnel working at the ITER site and common expenses. The U.S. will have access to all ITER-developed technology and scientific data while bearing only nine percent of its construction cost. There is no other U.S. government-funded R&D program with such high leverage for the U.S.