Support the President's FY07 Budget Level for DOE Science and Fusion

Fusion is the process that powers the sun and the stars. A decades-long scientific effort has brought profoundly improved understanding of this process and has led to a new international agreement to construct ITER, a project that will demonstrate the scientific and technological feasibility of fusion energy by producing near-industrial levels of fusion power for pulses of up to an hour. The President's budget, through the American Competitiveness Initiative, provides full funding for the U.S. share of the ITER construction project and somewhat reduced funding for domestic fusion activities that enable the U.S. to support and to benefit from ITER.

The international recognition of fusion as a safe, environmentally attractive large-scale energy option is demonstrated by how other nations are leveraging strongly on the ITER project. Major new plasma confinement facilities, more expensive than anything constructed in the U.S. in decades, are being built in China, South Korea, Europe and India, as well as in Japan through a European–Japanese collaboration. This collaboration is also undertaking the engineering design and validation for a Fusion Materials Irradiation Facility, and will construct a next-generation supercomputer – for fusion – as a follow-on to the Japanese Earth Simulator. Accompanying such expanding programs, a new generation of young scientists is now being trained abroad; China alone plans to bring 1000 graduate students into fusion energy science. Fusion R&D is a clear example of the international competitive trends identified by the National Academy of Science in its recent "Rising above the Gathering Storm" report.

In addition to full funding for ITER construction, the President's budget provides increased funding for a number of very important domestic activities within the Fusion Energy Sciences program:

A $4.2M increase in funding for the three major experimental facilities, C-Mod, DIII-D and NSTX. These facilities provide critical research results for ITER and beyond, and train researchers for the U.S. role in ITER. This budget reverses a trend of decreasing operating time and makes possible utilization of these facilities at slightly above 50% of optimal.

A $2.7M increase for the Scientific Discovery through Advanced Computing program, which effectively links computer scientists, applied mathematicians and plasma physicists to perform advanced computations in support of ITER, taking advantage of the most powerful computers and networks.

A $0.65M increase to enhance the capabilities of the mid-sized MST experiment, which explores a promising innovative confinement configuration and addresses key questions of basic plasma science.

However important areas of domestic fusion science and technology are significantly reduced. Lasting cuts in these areas will significantly constrict pathways of innovation, workforce training and technology development essential to the multi-decadal program to produce competitive fusion power systems.

A $3.65M reduction in funding for fusion materials and key enabling technologies, following a $4.2M cut last year. Development of materials and plasma technologies, such as radio frequency and microwave heating and current drive and superconducting magnets, supports experiments, enables the U.S. to exploit ITER as a fusion technology test bed, allows transfer of technologies to industry and provides university training for fusion engineers.

A $2.9M reduction in funding for High Energy Density Physics research, which has been endorsed by the National Academy of Science for its broad importance to plasma science, including and beyond fusion energy. Research in heavy ion acceleration has yielded much greater progress in recent years than anticipated.

A $2.8M reduction of research in smaller-scale innovative confinement configurations and analytic theory. The planned cuts to these seminal programs, which provide the majority of support for University programs, will erode the creative base of U.S. fusion research and significantly curtail the training of fusion scientists. 8% of funding for the smaller experiments and 3– 4 University theory groups will be eliminated. The future competitiveness of the U.S. fusion enterprise depends crucially on trained professionals who will be in mid-career as the nation exploits the results from ITER and from domestic research to design practical fusion power plants.

A $1.1M reduction in the FY2007 construction budget for NCSX, pushing back the time when this important experiment to test a new approach to continuous high-gain operation will become available for research.

The fusion research community strongly supports the proposed budget increases for the DOE Office of Science and for the Fusion Energy Sciences program. We applaud the leadership of DOE Secretary Bodman and DOE Office of Science Director Orbach in bringing them about. These budget increases, along with the planned 10-year doubling of physical sciences research budgets, are critical for maintaining America's long-term competitiveness. The fusion research community looks forward to working with DOE and Congress to craft plans to participate fully in ITER, to address the issues discussed above, and to position the nation to be competitive in the international development and deployment of fusion power.