

September 13, 2002

Dr. Ray Orbach
Director, Office of Science
United States Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Dr. Orbach:

The Fusion Energy Sciences Advisory Committee (FESAC) endorses the conclusions of the Burning Plasma Strategy Panel. This endorsement is unanimous and enthusiastic.

On February 22, Acting Director James Decker charged FESAC “to establish a high-level panel ...to recommend a strategy for burning plasma experiments.” The panel, chaired by Professor Stewart Prager, met in Austin on August 6 – 8 and submitted its strategy recommendation to the FESAC on September 5. FESAC has now formally reviewed the panel’s report, “A Burning Plasma Program Strategy to Advance Fusion Energy,” and, with this letter, submits the panel’s report to you.

The report notes that “The world effort to develop fusion energy is at the threshold of a new state in its research: the investigation of burning plasmas. This investigation, at the frontier of the physics of complex systems, would be a huge step in establishing the potential of magnetic fusion energy to contribute to the world’s energy security.” It then outlines a consistent, aggressive strategy, taking advantage of US and international efforts, to develop the science and technology of plasmas heated primarily by thermonuclear reactions. The FESAC finds the outlined strategy to be sensible, coherent and convincing. We thank Professor Prager and the panel for their carefully reasoned plan.

Submission of this report is the latest step in a process that began in October of 2000, with the charge from Dr. Mildred Dresselhaus, for the FESAC to “address the scientific issues of burning plasma physics...” The panel responding to this charge, chaired by Professor Jeffrey Freidberg, issued its report in September of 2001, stating that “NOW is the time for the US Fusion Energy Sciences Program to take the steps leading to the expeditious construction of a burning plasma experiment,” and laying out a plan for finding the best burning-plasma strategy. The second step in the process, recommended by the Freidberg panel, occurred in July of 2002: a 2-week Summer Study of burning plasma physics, involving a large part of the fusion research community. The most important product of the Summer Study, aside from the community unanimity it revealed on the need for burning plasma research, was a uniform technical assessment of the three leading proposals for burning-plasma experimental devices. This assessment provided crucial input to the deliberations of the Prager panel, and hence to the attached report.

I will remark that both the Freidberg panel report (DOE/SC-0041) and the report of the Snowmass Summer Study contain a wealth of technical material that provide helpful background to the present report.

As you know, the need for a burning plasma experiment was recognized in fusion community planning long before the Dresselhaus charge. For example the report of the FESAC Panel on Priorities and Balance, issued in September of 1999, includes participation in a burning plasma experiment as part of one of its four key goals. However, the present report is more than a restatement of long-felt ambitions: it offers a proactive plan to realize those ambitions. For there has been a change in our community: a firmer confidence that burning plasma physics is well within our reach, and a reinforced conviction that studying the behavior of a burning plasma will bring truly enormous scientific and technical gains for fusion energy. This community sees itself on the threshold of a giant step forward.

Yours truly,

Richard Hazeltine
Chair, FESAC

RDH/lh

Enclosure

cc: N. A. Davies
Michael Roberts
John Willis