THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

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Request for Information on Topical Areas in Inertial Fusion Energy

Issued by the Committee on the Prospects for Inertial Confinement Fusion Energy Systems

Background

In the development of the 1999 FESAC report, "Opportunities in the Fusion Energy Sciences Program," researchers were asked to provide a two-page description of each of the main topical areas of fusion energy in which they worked. The description provided the status and prospects for each area in the near-term, midterm, and long-term, and discusses both opportunities and issues. These 2-pagers are published as Appendix C of the aforementioned report, which can be found at URL http://www.ofes.fusion.doe.gov/more_html/FESAC/FES_all.pdf.

In the same vein, the NRC Committee on Prospects for Inertial Confinement Fusion Energy Systems requests the community's input on the topical areas in inertial fusion energy which are identified below. This request is meant to help the committee get a sense of the current research landscape for IFE.

Guidelines for the Preparation of Two-Pagers

In not more than two pages (not including figures), and in single-spaced type with 12-point Times New Roman font, please provide information on the below categories (see page 2) for your topical area of expertise/interest.

The initial points of contact for each topic (identified in the parentheses) should make every effort to collect input and information broadly from the IFE community in preparing the two-pagers. Indeed, it may be appropriate that the individual(s) ultimately responsible for coordinating the preparation of a two-pager be different or from a different institution than that identified in parentheses below. A list of authors and contributors may be provided in an appendix which will not count against the page limit.

Please notify the NRC staff by email at IFECommittee@nas.edu *once a primary author(s) is identified by the community for a topical area(s).*

We kindly request that you submit your two-pagers to IFECommittee@nas.edu *by* ***March 1, 2011***. *Any questions can be sent to the same email address*.

Please note that everything you submit to the committee must be made publicly available per FACA Section 15.

The committee thanks the community in advance for its help.

Topical Areas in Inertial Fusion Energy

- Direct-Drive Inertial Fusion Energy (Rochester, NRL)
- Fast Ignition Inertial Fusion Energy (LLNL, Rochester)
- National Ignition Facility (LLNL)
- Indirect-Drive Inertial Fusion Energy (LLNL)
- Heavy Ion Inertial Fusion Energy (LBNL)
- Pulsed Power Inertial Fusion Energy (Sandia)
- High-Repetition-Rate Krypton Fluoride Laser Drivers (NRL)
- High-Repetition-Rate Solid-State Laser Drivers (LLNL)
- Heavy Ion Accelerator Drivers (LBNL)
- Pulsed Power Drivers (Sandia)
- Laser-Plasma Interactions (LLNL)
- Beam-Plasma Interactions (LBNL)
- Inertial Fusion Energy Target Designs (John Perkins)
- Target Fabrication (Dan Goodin)
- Target , Injection and Tracking, Diagnostics and Control (GA, LLNL, NRL)
- Final Optics—Laser-Driven (LLNL)
- Final Optics—Heavy Ion Beams (LBNL)
- *Liquid-Wall Chambers (including material on blanket and tritium systems, high-heat-flux components, radiation-materials and International Fusion Materials Irradiation Facility, etc., shield, remote maintenance, and safety and environment) (Wayne Meier)
- *Dry-Wall Chambers (including material on magnetic divertors, blanket and shield, radiation-materials and International Fusion Materials Irradiation Facility, etc., shield, remote maintenance, and safety and environment) (John Sethian)

*Several subtopics have been identified for liquid-wall chambers and dry-wall chambers: each subtopic should receive up to one page of coverage.

Outline for Descriptions of the Above Topical Areas in Inertial Fusion Energy

You are welcome to make additional comments beyond this outline as long as the submission does not exceed the page limit.

1. **Title**
2. **Description**
3. **Status**
4. **Current R&D**
   - R&D Goals and Challenges
   - Related R&D Activities
   - Recent Successes
5. **Metrics**
   - Anticipated contributions
   - Near-term < 5 years
   - Midterm ~ 10 years
   - Long-term > 20 years
6. **Principle steps to a DEMO plant**
7. **Proponents' Claims—**Why should research and development in this area receive high priority?
8. **Critics' Claims**—If you were a critic, what would you say is the weakness of this area?