

**Program Announcement  
To DOE National Laboratories  
LAB 08-15**

***Development of Diagnostic Systems  
for Magnetic Fusion Energy Sciences Experiments***

**SUMMARY:** The Office of Fusion Energy Sciences (OFES) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals to conduct experimental research for the development of new measurement capabilities in magnetic fusion plasmas, leading to improved understanding of plasma behavior in fusion experiments relevant to the U.S. program in magnetic fusion energy sciences. All individuals or groups planning to submit proposals for new or renewal funding in Fiscal Year 2009 should submit to this Announcement.

**LETTER OF INTENT DUE DATE: April 4, 2008 (Required)**

A Letter of Intent (LOI) to submit a proposal is **REQUIRED** and should be submitted by April 4, 2008. Failure to submit a Letter of Intent by a principal investigator may preclude the full proposal from due consideration. The Letter of Intent should be submitted electronically by e-mail to: john.sauter@science.doe.gov and darlene.markevich@science.doe.gov. Please include "Letter of Intent for Announcement LAB 08-15" in the subject line.

The purpose of the Letter of Intent (LOI) is to facilitate the OFES in planning the peer review and the selection of potential reviewers for the proposal. For this purpose, the LOI must include a one-page abstract of the proposed research and list the names and institutional affiliations of Principal Investigators, any Co-Principal Investigators, key investigators, collaborators or consultants, so as to identify any potential conflict of interest in the selection of qualified reviewers for the proposal.

**DATES:** Proposals submitted in response to this Announcement must be submitted using the **Office of Science Field Work Proposal Instructions** provided in the **Notice to Users** section on the ePMA home page: <http://epma.energy.gov>, and must be received no later than **May 6, 2008**, 8:00 p.m., Eastern Time to be accepted for merit review and to permit timely consideration for award.

Please see the "Addresses" section below for further instructions on the method of submission for the proposal.

**ADDRESSES:** A complete formal FWP in a single Portable Document Format (PDF) document that has 'formatted text and graphics' (also known as "native" PDF) must be submitted using the **Office of Science Field Work Proposal Instructions** provided in the Notice to Users section on the ePMA home page: <http://epma.energy.gov>. (This submission process includes sending the FWP via CD using Federal Express).

**Send CD via Federal Express to:** Mr. John Sauter  
U.S. Department of Energy  
Office of Fusion Energy Sciences, SC-24.2/GTN  
19901 Germantown Road  
Germantown, MD 20874-1290  
ATTN: Program Announcement LAB 08-15

To identify that the FWP is responding to this Program Announcement, when sending your CD please identify the Program Announcement Title and Program Announcement number on the Federal Express package.

In addition to following the submission instructions on the <http://epma.energy.gov> web site, please submit via email, a single PDF file of the entire LAB proposal and FWP. This will assist in expediting the review process. Please send the email to: [john.sauter@science.doe.gov](mailto:john.sauter@science.doe.gov). Please include "Proposal for LAB 08-15" in the subject line of the email.

DOE National Laboratories should submit as instructed above. Researchers from other Federal agencies and Non-DOE Federally Funded Research and Development Centers (FFRDCs) should follow the format at [http://www.science.doe.gov/grants/fed\\_prop.html](http://www.science.doe.gov/grants/fed_prop.html) and also submit via email as stated above.

**FOR FURTHER INFORMATION CONTACT:**

**PROGRAM MANAGER:** Dr. Darlene Markevich, Office of Fusion Energy Sciences  
**PHONE:** (301) 903-4920  
**FAX:** (301) 903-4716  
**E-MAIL:** [darlene.markevich@science.doe.gov](mailto:darlene.markevich@science.doe.gov)

Communications related to the formal proposal should use "Program Announcement LAB 08-15" in the subject line.

**SUPPLEMENTARY INFORMATION:**

**Program Objective:**

The Fusion Energy Sciences Advisory Committee (FESAC) Report "Scientific Challenges, Opportunities and Priorities for the U.S. Fusion Energy Sciences Program," April 25, 2005 ([http://www.ofes.fusion.doe.gov/more\\_html/FESAC/ProgPrioritiesReport.pdf](http://www.ofes.fusion.doe.gov/more_html/FESAC/ProgPrioritiesReport.pdf)) states that "progress in plasma experiments has been closely linked to the development of improved diagnostic techniques, and that there has been impressive and steady progress in those techniques." In order to ensure continued progress in plasma experiments for the magnetic fusion energy sciences program, proposals are sought for new techniques to measure quantities not previously accessible or at a level of detail greater than previously possible. The fusion community and the OFES must recognize the measurement as necessary for advancing the magnetic fusion energy sciences program. Interest for this Announcement is in experimental programs for the development of hardware for the measurement of magnetic fusion plasma

parameters. However, it is recognized that part of a coordinated proposal may include a minimal amount of theory and/or modeling in support of the proposed experimental research. Stand-alone theory, modeling, computation, code development, and/or software development proposals will be declined. Proposal requests seeking funding for the application of proven diagnostic techniques to experimental facilities will not be considered under this Announcement. Such diagnostic applications are typically funded as part of experimental facilities, based on their own research program priorities.

In addition, the proposed measurement must be of benefit to the research program of the fusion facility on which the diagnostic system will be installed and tested. A letter of support is required from the requisite person at the facility, explaining this benefit.

Additional information about measurement needs in the magnetic fusion energy sciences can be found in the following:

1. Proceedings of the 16th Topical Conference on High-Temperature Plasma Diagnostics, Williamsburg, VA, 2006, *Review of Scientific Instruments*, Vol. 77, No. 10, Part II, October 2006.
2. Proceedings of the 15th Topical Conference on High-Temperature Plasma Diagnostics, San Diego, CA, 2004, *Review of Scientific Instruments*, Vol. 75, No. 10, Part II, October 2004
3. "Scientific Challenges, Opportunities and Priorities for the U.S. Fusion Energy Sciences Program," April 2005. (Report No. DOE/SC-0092) (URL: [http://www.ofes.fusion.doe.gov/more\\_html/FESAC/PP\\_Rpt\\_Apr05R.pdf](http://www.ofes.fusion.doe.gov/more_html/FESAC/PP_Rpt_Apr05R.pdf))
4. General Atomics, "Fusion Group DIII-D Program Diagnostic Needs" (URL: <https://fusion.gat.com/global/DIII-DDiagnostics>)
5. Massachusetts Institute of Technology, "Alcator C-Mod Program Diagnostic Needs" (URL: [http://www.psf.mit.edu/research/alcator/program/diagnostic\\_needs.html](http://www.psf.mit.edu/research/alcator/program/diagnostic_needs.html))
6. Princeton Plasma Physics Laboratory, "National Spherical Torus Experiment (NSTX) Diagnostic Needs" (URL: [http://nstx.pppl.gov/Pages\\_folder/program\\_folder/NSTX\\_Diag\\_Needs.pdf](http://nstx.pppl.gov/Pages_folder/program_folder/NSTX_Diag_Needs.pdf))
7. Princeton Plasma Physics Laboratory, "National Compact Stellarator Experiment (NCSX) Diagnostic Needs" (URL: <http://ncsx.pppl.gov/Diagnostics/Diagnostics.html>); for additional information on NCSX, see <http://ncsx.pppl.gov/>.

### **Program Funding:**

It is anticipated that up to a **total** of about \$485,000 of Fiscal Year 2009 funding will be available to fund new work, or renewals of existing work, from proposals received in response to this Announcement. Multi-year funding of awards is expected, generally for three years, with funding provided on an annual basis. You are encouraged to submit proposals with three-year

project periods, unless the nature of your research requires a project period of less than three years.

Because future year funding is not anticipated to increase, proposals should plan for constant effort in future years (allowing for inflation). Future year funding will depend upon suitable progress and the availability of funds. The cost-effectiveness of the proposal will be considered when comparing proposals with different funding requirements. In cases where the proposed work assumes the availability of a facility, experimental apparatus, or base group to perform the work, the funding source(s) for these additional needs must be identified in the proposal.

DOE is under no obligation to pay for any costs associated with the preparation or submission of proposals. DOE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted.

### **Formal Proposals:**

DOE will accept new and renewal proposals under this Announcement. Renewal proposals compete with all other proposals. In preparing a renewal proposal, principal investigators should assume that reviewers will not have access to previous proposals. The proposal should be developed as fully as though the principal investigator were applying for the first time. The proposal must include all the information required for a new project, plus the project narrative section should discuss the results from prior work.

Funding under this Announcement is limited to supporting research activities based in the U.S. It is recognized that a diagnostic system may need to be installed/tested on a facility outside the U.S. This will be allowed with appropriate justification. Proposals from non- U.S. institutions will be declined.

The research project description must be **20 pages** or less, exclusive of attachments and appendices and must contain an abstract or summary of the proposed research. All collaborators should be listed with the abstract or summary. Attachments include literature cited, biographical sketches, description of facilities and resources, letters of endorsement, and a listing of all current and pending federal support. Biographical sketches should be limited to no more than two pages per individual.

The instructions and format described below should be followed. You must reference Program Announcement LAB 08-15 on all submissions and inquiries about this program.

## **OFFICE OF SCIENCE GUIDE FOR PREPARATION OF SCIENTIFIC/TECHNICAL PROPOSALS TO BE SUBMITTED BY NATIONAL LABORATORIES**

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this Program Announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following guidelines for content and format are intended to facilitate an understanding of the requirements

necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

## **1. Evaluation Criteria**

After an initial screening for eligibility and responsiveness to the solicitation, proposals will be subjected to scientific merit review (peer review). The proposals will be evaluated against the following criteria, which are listed in descending order of importance as set forth in 10 CFR Part 605.10 (d). Included with each criterion are the detailed questions that are typically asked of the reviewers:

### **1. Scientific and/or technical merit of the project**

- What important problem(s) in plasma or fusion science does this proposal address?
- How does the proposed research compare with other research in its field, both in terms of scientific and/or technical merit and originality?
- What is the likelihood that it will lead to new or fundamental advances in its field?

### **2. Appropriateness of the proposed method or approach**

- Are the conceptual framework, methods, and analyses adequately developed and likely to lead to scientifically valid conclusions?
- Does the proposed research employ innovative concepts or methods?
- Does the principal investigator recognize significant potential problems and consider alternative strategies?
- If appropriate, does the principal investigator plan to compare experimental results against theoretical predictions?

### **3. Competency of the principal investigator's personnel and adequacy of the proposed resources**

- How well qualified are the principal investigator's personnel to carry out the proposed research? (If appropriate, please comment on the scientific reputation and quality of recent research by the principal investigator and other key personnel.)
- Please comment on the principal investigator's research environment and resources.
- Does the proposed work take advantage of unique facilities and capabilities and/or make good use of collaborative arrangements?

### **4. Performance under existing award (for renewal proposals)**

- Assess the progress the principal investigator made toward the research goals during the most recent performance period and the impact of the research on the fusion program.
- Has the principal investigator disseminated the results of the research through publications in peer-reviewed journals, meeting and conference presentations, workshops, or other appropriate means?
- If appropriate, has the principal investigator attempted to compare experimental results against theoretical predictions?

## **5. Reasonableness and appropriateness of the proposed budget**

- Are the proposed budget and staffing levels adequate to carry out the proposed research?

The reviewers are also asked to comment **on other appropriate factors:**

- Responsiveness to Program Announcement: How does the proposed research fit the criteria for developmental, as defined by "new technique to measure quantities not previously accessible or at a level of detail greater than previously possible," as opposed to "application of proven diagnostic techniques," which is not considered developmental and therefore not responsive to this Announcement?
- What are the overall strengths and weaknesses of the proposal?
- Could the proposed research make a significant contribution to another field?
- If applicable, please comment on the educational benefits of the proposed activity.

The OFES will also consider, as part of the evaluation, other available advice or information as well as program policy factors, such as ensuring an appropriate balance within the program and quality of previous performance. The selected projects will be required to acknowledge support by DOE in all public communication of the research results.

External peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of a proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

## **2. Summary of Proposal Contents**

- Field Work Proposal (FWP) Format (Reference DOE Order 412.1A) (DOE ONLY)
- Proposal Cover Page
- Table of Contents
- Budget (DOE Form 4620.1) and Budget Explanation
- Abstract (no more than two pages)
- Narrative (main technical portion of the proposal, including background/introduction, recent accomplishments, proposed research and methods, timetable of activities, and responsibilities of key project personnel)
- Literature Cited
- Biographical Sketch(es)

- Description of Facilities and Resources
- Other Support of Investigator(s)
- Appendix (optional)

## **2.1 Number of Copies to Submit**

A complete formal FWP in a single Portable Document Format (PDF) document that has 'formatted text and graphics' (also known as "native" PDF) must be submitted using the **Office of Science Field Work Proposal Instructions** provided in the Notice to Users section on the ePMA home page: <http://epma.energy.gov>. (This submission process includes sending the FWP via CD using Federal Express).

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## **3. Detailed Contents of the Proposal**

Adherence to type size and line spacing requirements is necessary for several reasons. No researcher should have the advantage, by using small type, of providing more text in their proposals. Small type may also make it difficult for reviewers to read the proposal. Proposals must have 1-inch margins at the top, bottom, and on each side. Type sizes must be at least 11 point. Line spacing is at the discretion of the researcher, but there must be no more than 6 lines per vertical inch of text. Pages should be standard 8 1/2" x 11" (or metric A4, i.e., 210 mm x 297 mm).

### **3.1 Field Work Proposal Format** (Reference DOE Order 412.1A) (DOE ONLY)

The Field Work Proposal (FWP) is to be prepared and submitted consistent with policies of the investigator's laboratory and the local DOE Operations Office. Additional information is also requested to allow for scientific/technical merit review.

Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

### **3.2 Proposal Cover Page**

The following proposal cover page information may be placed on plain paper. No form is required.

Title of proposed project  
SC Program announcement title  
Name of laboratory  
Name of principal investigator (PI)  
Position title of PI  
Mailing address of PI  
Telephone of PI  
Fax number of PI  
Electronic mail address of PI  
Name of official signing for laboratory\*  
Title of official  
Fax number of official  
Telephone of official  
Electronic mail address of official  
Requested funding for each year; total request  
Use of human subjects in proposed project:  
    If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.  
Use of vertebrate animals in proposed project:  
    If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.  
Signature of PI, date of signature  
Signature of official, date of signature\*

\*The signature certifies that personnel and facilities are available as stated in the proposal, if the project is funded.

### **3.3 Table of Contents**

Provide the initial page number for each of the sections of the proposal. Number pages consecutively at the bottom of each page throughout the proposal. Start each major section at the top of a new page. Do not use unnumbered pages and do not use suffices, such as 5a, 5b.

### **3.4 Budget and Budget Explanation**

A detailed budget is required for the entire project period and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information\*. Modifications

of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

A written justification of each budget item is to follow the budget pages. For personnel this should take the form of a one-sentence statement of the role of the person in the project. Provide a detailed justification of the need for each item of permanent equipment. Explain each of the other direct costs in sufficient detail for reviewers to be able to judge the appropriateness of the amount requested.

Further instructions regarding the budget are given in section 4 of this guide.

\* Form 4620.1 is available at web site: <http://www.science.doe.gov/grants/budgetform.pdf>

### **3.5 Abstract**

Summarize the proposal in no more than two pages. Give the project objectives (in broad scientific terms), the approach to be used, and what the research is intended to accomplish. State the hypotheses to be tested (if any). At the top of the abstract give the project title, names of all the investigators and their institutions, and contact information for the principal investigator, including e-mail address.

**3.6 Narrative** (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel).

The narrative comprises the research plan for the project and is **limited to 20 pages** (maximum), including text and figures, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) and font not smaller than 11 point. It should contain enough background material in the Introduction, including review of the relevant literature, to demonstrate sufficient knowledge of the state of the science. The major part of the narrative should be devoted to a description and justification of the proposed project, including details of the methods to be used. It should also include a timeline for the major activities of the proposed project, and should indicate which project personnel will be responsible for which activities. In addition to the technical description of the proposed work and tasks, include a discussion of the following: plans for comparison with theoretical predictions and/or experimental measurements where appropriate; plans for verification and validation of computer codes where appropriate; impact of the proposed research on other fields of science, if appropriate; project schedules, milestones, and deliverables.

It is important that the 20-page technical information section provide a complete description of the proposed work, because reviewers are not obliged to read the Appendices. Proposals exceeding these page limits may be rejected without review.

If any portion of the project is to be done in **collaboration** with another institution (or institutions), provide information on the institution(s) and what part(s) of the project it will carry out. Further information on any such arrangements is to be given in the sections "Budget and

Budget Explanation," "Biographical Sketches," and "Description of Facilities and Resources." Please note that collaborative research projects with institutions that receive grants, such as universities, industry, and non-profit organizations, are **not allowed** under this Announcement, unless there is no request for funds from these institutions. Subcontracts to these institutions are allowed under this Announcement.

### **3.7 Literature Cited**

Give full bibliographic entries for each publication cited in the narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Principal investigators should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal.

### **3.8 Biographical Sketches**

This information is required for senior personnel at the institution submitting the proposal and at all subcontracting institutions (if any). The biographical sketch is limited to a maximum of two pages for each investigator and must include:

*Education and Training.* Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.

*Research and Professional Experience.* Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

*Publications.* Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

*Synergistic Activities.* List no more than 5 professional and scholarly activities related to the effort proposed.

To assist in the identification of potential conflicts of interest or bias in the selection of reviewers, the following information must also be provided in each biographical sketch.

*Collaborators and Co-editors:* A list of all persons in alphabetical order (including their current organizational affiliations) who are currently, or who have been, collaborators or co-authors with the investigator on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of the proposal. Also, include those individuals who are currently or have been co-editors of a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the

submission of the proposal. If there are no collaborators or co-editors to report, this should be so indicated.

*Graduate and Postdoctoral Advisors and Advisees:* A list of the names of the individual's own graduate advisor(s) and principal postdoctoral sponsor(s), and their current organizational affiliations. A list of the names of the individual's graduate students and postdoctoral associates during the past five years, and their current organizational affiliations.

### **3.9 Description of Facilities and Resources**

Facilities to be used for the conduct of the proposed research should be briefly described. Indicate the pertinent capabilities of the institution, including support facilities (such as machine shops), that will be used during the project. List the most important equipment items already available for the project and their pertinent capabilities. Include this information for each subcontracting institution (if any).

### **3.10 Other Support of Investigators**

Other support is defined as all financial resources, whether Federal, non-Federal, commercial, or institutional, available in direct support of an individual's research endeavors. Information on active and pending other support is required for all senior personnel, including investigators at collaborating institutions to be funded by a subcontract. For each item of other support, give the organization or agency, inclusive dates of the project or proposed project, annual funding, and level of effort (months per year or percentage of the year) devoted to the project.

### **3.11 Appendix**

Information not easily accessible to a reviewer may be included in an appendix, but do not use the appendix to circumvent the page limitations of the proposal. Reviewers are not required to consider information in an appendix, and reviewers may not have time to read extensive appendix materials with the same care they would use with the proposal proper.

The appendix may contain the following items: up to five publications, manuscripts accepted for publication, abstracts, patents, or other printed materials directly relevant to this project, but not generally available to the scientific community; and letters from investigators at other institutions stating their agreement to participate in the project (do not include letters of endorsement of the project).

## **4. Detailed Instructions for the Budget**

(DOE Form 4620.1 "Budget Page" may be used).

### **4.1 Salaries and Wages**

List the names of the principal investigator and other key personnel and the estimated number of person-months for which DOE funding is requested. Proposers should list the number of

postdoctoral associates and other professional positions included in the proposal and indicate the number of full-time-equivalent (FTE) person-months and rate of pay (hourly, monthly or annually). For graduate and undergraduate students and all other personnel categories such as secretarial, clerical, technical, etc., show the total number of people needed in each job title and total salaries needed. Salaries requested must be consistent with the institution's regular practices. The budget explanation should define concisely the role of each position in the overall project.

## **4.2 Equipment**

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of \$25,000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

## **4.3 Domestic Travel**

The type and extent of travel and its relation to the research should be specified. Funds may be requested for attendance at meetings and conferences, other travel associated with the work and subsistence. In order to qualify for support, attendance at meetings or conferences must enhance the investigator's capability to perform the research, plan extensions of it, or disseminate its results. Consultant's travel costs also may be requested.

## **4.4 Foreign Travel**

Foreign travel is any travel outside Canada and the United States and its territories and possessions. Foreign travel may be approved only if it is directly related to project objectives.

## **4.5 Other Direct Costs**

The budget should itemize other anticipated direct costs not included under the headings above, including materials and supplies, publication costs, computer services, and consultant services (which are discussed below). Other examples are: aircraft rental, space rental at research establishments away from the institution, minor building alterations, service charges, and fabrication of equipment or systems not available off-the-shelf. Reference books and periodicals may be charged to the project only if they are specifically related to the research.

### **a. Materials and Supplies**

The budget should indicate in general terms the type of required expendable materials and supplies with their estimated costs. The breakdown should be more detailed when the cost is substantial.

### **b. Publication Costs/Page Charges**

The budget may request funds for the costs of preparing and publishing the results of research, including costs of reports, reprints page charges, or other journal costs (except costs for prior or early publication), and necessary illustrations.

### **c. Consultant Services**

Anticipated consultant services should be justified and information furnished on each individual's expertise, primary organizational affiliation, daily compensation rate and number of days expected service. Consultant's travel costs should be listed separately under travel in the budget.

### **d. Computer Services**

The cost of computer services, including computer-based retrieval of scientific and technical information, may be requested. A justification based on the established computer service rates should be included.

### **e. Subcontracts**

Subcontracts should be listed so that they can be properly evaluated. There should be an anticipated cost and an explanation of that cost for each subcontract. The total amount of each subcontract should also appear as a budget item.

## **4.6 Indirect Costs**

Explain the basis for each overhead and indirect cost. Include the current rates.