

# NSF/DOE PARTNERSHIP IN BASIC PLASMA SCIENCE AND ENGINEERING

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## *Program Solicitation*

NSF 99-159

NSF

DIRECTORATE FOR ENGINEERING  
DIRECTORATE FOR GEOSCIENCES  
DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES

DOE

OFFICE OF FUSION ENERGY SCIENCES

**DEADLINE:**

*November 1, 1999 (Letter of Intent)*

*January 12, 2000 (Proposal, FastLane Submission)*



**NATIONAL SCIENCE FOUNDATION**



**DEPARTMENT OF ENERGY**

# PARTNERSHIP IN BASIC PLASMA SCIENCE AND ENGINEERING

## SUMMARY OF PROGRAM REQUIREMENTS

### GENERAL INFORMATION

**Program Name:** NSF/DoE Partnership in Basic Plasma Science and Engineering

**Short Description/Synopsis of Program:** The Directorates for Engineering, Geosciences, and Mathematics and Physical Sciences of the NSF and the Office of Science/Office of Fusion Energy Sciences of the Department of Energy are continuing in FY2000 the joint Partnership in Basic Plasma Science and Engineering begun in FY1997. As stated in the original solicitation (NSF 97-39), the goal of the initiative is to enhance plasma research and education in this broad, multidisciplinary field by coordinating efforts and combining resources of the two agencies. The initiative will address fundamental issues in plasma science and engineering that can have impact in other areas or disciplines in which improved basic understanding of the plasma state is needed.

#### **Cognizant Program Officers:**

Dr. Ronald McKnight, Office of Fusion Energy Sciences, DoE/SC, 301-903-4597,

Ronald.McKnight@science.doe.gov

Dr. Michael Crisp, Office of Fusion Energy Sciences, DoE/SC, 301-903-4883,

Michael.Crisp@science.doe.gov

Dr. Barry Schneider, Division of Physics, NSF/ MPS, 703-306-1808, bschneid@nsf.gov

Dr. Denise Caldwell, Division of Physics, NSF/ MPS, 703-306-1807, dcaldwel@nsf.gov

Dr. Michael Steuerwalt, Division of Mathematical Sciences, NSF/MPS, 703-306-1878,

msteuerw@nsf.gov

Dr. Lawrence Goldberg, Division of Electrical and Communications Systems, NSF/ENG, 703-306-1339, lgoldber@nsf.gov

Dr. Farley Fisher, Division of Chemical and Transport Systems, NSF/ENG, 703-306-1371,

ffisher@nsf.gov

Dr. Delcie Durham, Division of Design Manufacture and Industrial Innovation, NSF/ENG, 703-

306-1330, ddurham@nsf.gov

Dr. Kile Baker, Division of Atmospheric Sciences, NSF/GEO, 703-306-1519, kbaker@nsf.gov

Dr. Paul Evenson, Division of Atmospheric Sciences, NSF/GEO, 703-306-1530, pevenso@nsf.gov

**Applicable Catalog of Federal Domestic Assistance (CFDA) Nos.:** 47.041; 47.049; 47.050; 81.049

### ELIGIBILITY

**Limitation on the categories of organizations that are eligible to submit proposals:** Proposals may be submitted by individual investigators or small groups from universities and non-profit organizations.

**PI eligibility limitations:** An applicant may submit only one proposal as Principal or Co-Principal Investigator.

**Limitation on the number of proposals that may be submitted by an organization:** None

#### **AWARD INFORMATION**

**Type of award anticipated:** Continuing Grant

**Number of awards anticipated in FY 2000:** 25-30 awards

**Amount of funds available:** Approximately \$11 million over a three-year period will be available for this initiative

**Anticipated date of award:** July 2000

#### **PROPOSAL PREPARATION & SUBMISSION INSTRUCTIONS**

##### **Proposal Preparation Instructions**

**Letter of Intent requirements:** Requested, by November 1, 1999

**Preproposal requirements:** None

**Proposal preparation instructions:** Standard NSF Grant Proposal Guide (GPG) instructions

**Supplemental proposal preparation instructions:** None

**Deviations from standard (GPG) proposal preparation instructions :** None

##### **Budgetary Information**

**Cost sharing/matching requirements:** None

**Indirect cost (F&A) limitations:** None

**Other budgetary limitations:** Award amounts range from \$25,000 to \$200,000 per year with a duration of up to three years

##### **FastLane Requirements**

**FastLane proposal submission:** required

**FastLane point of contact:** Cheryl Albus, NSF/ENG, 703-306-1302, calbus@nsf.gov;  
FastLane user support services, 703-306-1142, fastlane@nsf.gov

**Proposal Deadline:** 5:00 PM local time, January 12, 2000 (FastLane)

## **PROPOSAL REVIEW INFORMATION**

**Merit Review Criteria:** Standard NSF criteria approved by the National Science Board

**Review Process:** Panel review or combination of mail and panel review, jointly administered by program officers from NSF and DoE.

## **AWARD ADMINISTRATION INFORMATION**

**Awarding Agency:** Either NSF, DoE, or jointly

**Grant Award Conditions:** NSF awards GC-1 or FDP III; DoE awards 10 CFR Part 605

**Special grant conditions anticipated:** None

**Special reporting requirements anticipated:** None

# **PROGRAM SOLICITATION**

NSF 99-159

## **DEADLINE:**

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**NATIONAL SCIENCE FOUNDATION**



**DEPARTMENT OF ENERGY**

## **PARTNERSHIP IN BASIC PLASMA SCIENCE AND ENGINEERING**

### **INTRODUCTION**

The Directorates for Engineering (Divisions of Electrical and Communications Systems, Chemical and Transport Systems, and Design Manufacture and Industrial Innovation), Geosciences (Division of Atmospheric Sciences) and Mathematics and Physical Sciences (Divisions of Mathematical Sciences and Physics) of the National Science Foundation (NSF) and the Office of Science/Office of Fusion Energy Sciences (SC/OFES) of the Department of Energy (DoE) are continuing in FY2000 the joint Partnership in Basic Plasma Science and Engineering begun in FY1997. As stated in the original solicitation (NSF 97-39), which is superseded by the present solicitation, the goal of the initiative is to enhance plasma research and education in this broad, multidisciplinary field by coordinating efforts and combining resources of the two agencies.

### **PROGRAM DESCRIPTION**

Dynamic growth in new research areas, fostered by the development of new investigative techniques and tools, presents an unusual window of opportunity for fundamental studies in basic plasma science and engineering. At the same time, economic forces are driving the need for more fundamental knowledge as underpinning for the many applications of plasmas in modern technology. This initiative is a response to these emerging needs and opportunities.

The focus of this initiative is to address fundamental issues in plasma science and engineering that can have impact in other areas or disciplines in which improved basic understanding of the plasma state is needed. Proposals should discuss effective ways in which education is integrated within the research programs. Proposals directly related to fusion energy studies are not eligible. Some of the general research areas which are included are:

- Chaos, Turbulence and Structure in Plasmas
- Strongly Coupled Coulomb Systems in Plasmas
- Plasmas in Magnetic Fields
- Intense Field Matter Interactions in Plasmas
- Advanced Methods for Plasma Modeling and Simulation
- Control of Plasma Processes
- Chemistry of Plasmas
- Plasma Transport and Surface Interactions
- Plasma Modification, Synthesis and Processing of Materials
- Plasmas in Environmental Science and Technology
- Solar, Interplanetary and Planetary Magnetospheric Plasmas

Although the above list is intended to be illustrative, it directly reflects the interests and responsibilities of the NSF Divisions participating in the initiative and the goals of the SC/OFES.

## **ELIGIBILITY**

Proposals may be submitted by individual investigators or small groups from universities and non-profit organizations. Synergistic collaborations among researchers and collaborations or partnerships with industry or government are encouraged when appropriate, though no funds will be provided to these organizations. The support of collaborations between university and industrial researchers can also utilize the mechanism of the GOALI Program (NSF 98-142) <http://www.nsf.gov/cgi-bin/getpub?nsf98142>. Due to the limited availability of funds, prospective applicants are strongly urged to discuss prospective proposals with one of the program directors listed at the end of this document. An applicant may submit only one proposal as Principal or Co-Principal Investigator.

Proposals in plasma science and engineering submitted to the disciplinary programs before the deadline are eligible for consideration under this program solicitation. The Division of Atmospheric Science requires that any proposal requesting funding on topics covered by this program solicitation must be submitted to this competition and comply with all the deadlines and other stated requirements. We strongly urge all prospective applicants to contact the relevant Program Officer.

## **AWARD INFORMATION**

Funding for this initiative is derived from a coordination of existing resources of the participating NSF Divisions, complemented by resources in the SC/OFES at DoE. Award sizes are anticipated to range from \$25,000 to \$200,000 per year with a duration of up to three years, depending upon the nature of the research activity. Subject to the availability of funds, the two agencies have designated approximately \$11 million over a three year period to support a total of 25-30 awards in this competition. Prospective applicants funded in the 1997 NSF/DoE Partnership in Basic Plasma Science and engineering desiring renewed support should submit to this solicitation.

## PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A brief letter of intent to submit a proposal should be sent by electronic mail to [pselett@nsf.gov](mailto:pselett@nsf.gov) no later than November 1, 1999. The letter should clearly state that it is in response to this solicitation and, if known, indicate the NSF Program Officer most closely associated with the proposed activity (see Inquiries section below). The letter should contain the name and electronic mail addresses of the PI and any Co-PI's, their institutions, and a few sentences description of what would be proposed. Please send the letter in clear text, with no attachments. It is our intent to provide guidance to prospective proposers on the appropriateness of the subject matter for the planned submission prior to the proposal deadline of January 12, 2000.

Proposals should be prepared following the general guidelines contained in the Grant Proposal Guide (NSF 00-2), at <http://www.nsf.gov/cgi-bin/getpub?gpg>. Page limitation guidelines will be strictly adhered to. **All proposals responding to this program solicitation must be submitted electronically via the FastLane system, at <http://www.fastlane.nsf.gov>.** Instructions in the use of FastLane may be accessed directly at <http://www.fastlane.nsf.gov/a1/newstan.htm>. On the FastLane proposal Cover Sheet (Form 1207), please enter the designation NSF 99-159 in the field labeled Program Announcement. For further information, you may contact FastLane user support services (703-306-1142; [fastlane@nsf.gov](mailto:fastlane@nsf.gov)).

Collaborative projects involving more than one academic institution require simultaneous submission via FastLane of proposals by each of the participating institutions. For these proposals, the project title must begin with the words "Collaborative Research: ...". The lead organization submission will include a cover sheet, project summary, project description, references cited, biographical sketches, budgets and budget justification, current and pending support, and facilities, equipment and other resources for their organization. Non-lead organization submissions will include all of the above for their organization except the project summary, project description, and references cited which are the same for all collaborating organizations. In its submission, the lead organization should discuss the benefits of the multi-institutional collaboration, tasks and responsibilities for each institution, resources available, and project management plan. It should also include in its budget justification a cumulative budget for all collaborating organizations showing the total amount requested for the project. The proposal submissions will be combined for printing or electronic viewing by FastLane.

To submit the collaborative proposal, the following two step process must be completed:

- (i) Before the lead organization submits their proposal, each non-lead organization must provide to the lead organization the temporary proposal ID generated by FastLane when the non-lead proposal is being created. The lead organization must then enter each non-lead organization(s) temporary proposal ID into the FastLane lead proposal by using the "Link Collaborative Proposals" option found on the FastLane "Form Preparation" screen. This provides an electronic link to all of the non-lead proposals for printing.
- (ii) To facilitate the lead organization's role in submitting the proposal, each non-lead organization must also provide their proposal number (assigned on proposal submission), to the lead organization. The lead organization should then include a list of these collaborative proposal numbers with its signed Cover Sheet (NSF Form 1207).

## **PROPOSAL DUE DATE**

Proposals must be submitted to NSF via FastLane no later than 5:00 PM local time on **January 12, 2000**.

The signed proposal Cover Sheet (Form 1207) must be forwarded to the following address and received at NSF by January 19, 2000:

National Science Foundation  
DIS-FastLane Cover Sheet: NSF 99-159  
4201 Wilson Blvd.  
Arlington, VA 22230

A proposal may not be processed until the complete proposal, including signed Cover Sheet, has been received by NSF.

## **PROPOSAL REVIEW**

All proposals are subject to the guidelines and merit review criteria of the National Science Foundation (see Appendix I). Proposal review will be managed jointly by a working group of program directors from NSF and DoE offices participating in the initiative. The review process may involve a combination of mail and panel review, to determine both the specific intellectual merit and broad impact of the proposed research.

## **AWARD ADMINISTRATION**

The final award recommendations will be a joint decision of the working group. Grants may be funded totally by either agency or jointly between the two agencies. Grants will be administered by an agency determined by the working group and will be in accordance with the individual policies of the awarding agency. NSF grants (see Appendix II) will be administered in accordance with the terms and conditions of NSF GC-1, "Grant General Conditions," or FDP-III, "Federal Demonstration Project General Terms and Conditions," depending on the grantee organization. More comprehensive information on the administration of NSF grants is contained in the Grant Policy Manual (NSF 95-26), available at <http://www.nsf.gov/cgi-bin/getpub?nsf9526>. DoE grants will be administered in accordance with the policies and procedures contained in the Application Guide for the Office of Energy Research Financial Assistance Program and 10 CFR Part 605.

## **INQUIRIES**

Questions concerning this joint program should be addressed, preferably via email, to the following NSF or DoE program staff:

Dr. Ronald McKnight, Office of Fusion Energy Sciences, DoE/SC, 301-903-4597,  
[Ronald.McKnight@science.doe.gov](mailto:Ronald.McKnight@science.doe.gov)



Dr. Michael Crisp, Office of Fusion Energy Sciences, DoE/SC, 301-903-4883,  
Michael.Crisp@science.doe.gov

Dr. Barry Schneider, Division of Physics, NSF/ MPS, 703-306-1808, bschneid@nsf.gov

Dr. Denise Caldwell, Division of Physics, NSF/ MPS, 703-306-1807, dcaldwel@nsf.gov

Dr. Michael Steuerwalt, Division of Mathematical Sciences, NSF/MPS, 703-306-1878,  
msteuerw@nsf.gov

Dr. Lawrence Goldberg, Division of Electrical and Communications Systems, NSF/ENG, 703-306-1339, lgoldber@nsf.gov

Dr. Farley Fisher, Division of Chemical and Transport Systems, NSF/ENG, 703-306-1371,  
ffisher@nsf.gov

Dr. Delcie Durham, Division of Design Manufacture and Industrial Innovation, NSF/ENG, 703-306-1330, ddurham@nsf.gov

Dr. Kile Baker, Division of Atmospheric Sciences, NSF/GEO, 703-306-1519, kbaker@nsf.gov

Dr. Paul Evenson, Division of Atmospheric Sciences, NSF/GEO, 703-306-1530, pevenso@nsf.gov

## **APPENDIX I: MERIT REVIEW CRITERIA**

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority serving institutions, adjacent disciplines to that principally addressed in the proposal, etc.

Proposals will be reviewed against the two general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

### **Criterion 1: What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

**Criterion 2: What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

PIs should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to the above-described NSF merit review criteria. NSF staff will give these elements careful consideration in making funding decisions.

**Integration of Research and Education**

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students, and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

**Integrating Diversity into NSF Programs, Projects, and Activities**

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- are essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

**APPENDIX II: NSF AWARD ADMINISTRATION INFORMATION****Notification of the Award.**

Notification of the award is made to the submitting organization by a Grants Officer in the Division of Grants and Agreements (DGA). Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator.

**Grant Award Conditions.**

An NSF grant consists of: (1) the award letter, which includes any special provisions applicable to the grant and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; and (4) the applicable grant conditions, such as Grant General Conditions (NSF GC-1) or Federal Demonstration Partnership Phase III (FDP) Terms and Conditions. Electronic mail

notification is the preferred way to transmit NSF grants to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

### **Reporting Requirements.**

For all multi-year grants (including both standard and continuing grants), the PI must submit via FastLane an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after expiration of a grant, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented a new electronic project reporting system, available through FastLane, which permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and, other specific products and contributions. Reports will continue to be required annually and after the expiration of the grant, but PIs will not need to re-enter information previously provided, either with the proposal or in earlier updates using the electronic system.

### **ABOUT THE NATIONAL SCIENCE FOUNDATION**

The National Science Foundation funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at 703-306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment, or general information. TDD may be accessed at 703-306-0090 or through FIRS on 1-800-877-8339.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student

research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at 703-306-1636.

#### **PRIVACY ACT AND PUBLIC BURDEN STATEMENTS:**

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne H. Plimpton, Reports Clearance Officer; Division of Administrative Services; National Science Foundation; Arlington, VA 22230.

#### **YEAR 2000 REMINDER**

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at [plainlanguage@nsf.gov](mailto:plainlanguage@nsf.gov).

Catalog of Federal Domestic Assistance (CFDA) No.:

47.041 - Engineering

47.049 - Mathematical and Physical Sciences

47.050 - Geosciences

81.049 - Basic Energy Sciences-University and Science Education

OMB No.: 3145-0058

NSF 99-159 (*Electronic Dissemination Only*)