NSF/DOE Partnership in Basic Plasma Science and Engineering

PROGRAM SOLICITATION
NSF 16-564

REPLACES DOCUMENT(S):
NSF 15-601, NSF 13-596

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Physics
Division of Astronomical Sciences

Directorate for Engineering
Division of Chemical, Bioengineering, Environmental, and Transport Systems
Division of Electrical, Communications and Cyber Systems

Directorate for Geosciences
Division of Atmospheric and Geospace Sciences

U.S. Dept. of Energy

Full Proposal Target Date(s):

October 21, 2016

Third Friday in October, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

The solicitation follows most of the requirements in the Grant Proposal Guide, but has additional requirements listed below. These relate primarily to proposers who anticipate having multiple sources of support, proposals involving significant instrumentation development, and proposals with letters of collaboration. These requirements may supplement proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

Unless specifically advised otherwise, proposals received after the target date will only be considered in next year's funding cycle.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 16-1), which is effective for proposals submitted, or due, on or after January 25, 2016.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF/DOE Partnership in Basic Plasma Science and Engineering

Synopsis of Program:

Plasma Physics is a study of matter and physical systems whose intrinsic properties are governed by collective interactions of large ensembles of free charged particles. 99.9% of the visible Universe is thought to consist of plasmas. The underlying physics of the collective behavior in plasmas has applications to space physics and astrophysics, materials science, applied mathematics, fusion science, accelerator science, and many branches of engineering.

The National Science Foundation (NSF), with participation of the Directorates for Engineering, Geosciences, and Mathematical and Physical Sciences, and the Department of Energy, Office of Science, Fusion Energy Sciences are continuing the joint Partnership in Basic Plasma Science and Engineering begun in FY1997 and renewed several times since. As stated in the original solicitation (NSF 97-39), which is superseded by the present solicitation, the goal of the initiative is to enhance basic plasma research and education in this broad, multidisciplinary field by coordinating efforts and combining resources of the two agencies. The current solicitation also encourages submission of proposals to perform basic plasma experiments at NSF and DOE supported user facilities, such as the Basic Plasma Science Facility at the University of California, Los Angeles and facilities located at DOE national laboratories, designed to serve the needs of the broader plasma community.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Vyacheslav (Slava) Lukin, Division of Physics, NSF, 1015 N, telephone: (703) 292-7382, email: vlukin@nsf.gov
- John Gillaspy, Program Director, Division of Physics, NSF, 1015 N, telephone: (703) 292-7173, email: jgillasp@nsf.gov
- Bogdan Mihaila, Program Director, Division of Physics, NSF, 1015 N, telephone: (703) 292-8235, email: bmihaila@nsf.gov
- Nigel A. Sharp, Program Director, Division of Astronomical Sciences, NSF, 1045 S, telephone: (703) 292-4905, email: nsharp@nsf.gov
- Janet U. Kozyra, Program Director, Division of Atmospheric and Geospace Sciences, NSF, 775 S, telephone: (703) 292-8519, email: jkozyra@nsf.gov
- Ilia I. Roussev, Program Director, Division of Atmospheric and Geospace Sciences, NSF, 775 S, telephone: (703) 292-8519, email: iroussev@nsf.gov
- Triantafillos (Lakis) Mountziaris, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, NSF, 565 S, telephone: (703) 292-8320, email: tmountzi@nsf.gov
- Jenshan Lin, Program Director, Division of Communications, Circuits, and Sensing Systems, NSF, 525 N, telephone: (703) 292-7950, email: jenlin@nsf.gov
- Sean Finnegan, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-4920, email: sean.finnegan@science.doe.gov
- Nirmol Podder, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-9536, email: nirmol.podder@science.doe.gov
- Curt Bolton, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-4914, email: curt.bolton@science.doe.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 81.049 --- Office of Science Financial Assistance Program

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 15 to 20

Anticipated Funding Amount: $3,500,000

Subject to availability of funds and receipt of sufficient quality proposals; the anticipated annual funding amount includes joint funding from NSF and DOE.

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI:

None. However, note that as per GPG Chapter I.G, "If the proposer envisions review by multiple programs, more than one program may be designated on the Cover Sheet. The submission of duplicate or substantially similar proposals concurrently for review by more than one program without prior NSF approval will result in the return of the redundant proposals."

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**

- Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
- Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

  Not Applicable

- **Other Budgetary Limitations:**

  Not Applicable

C. Due Dates

- **Full Proposal Target Date(s)**:

  October 21, 2016

  Third Friday in October, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

Plasma Physics is a study of matter and physical systems whose intrinsic properties are governed by collective interactions of large ensembles of free charged particles. 99.9% of the visible Universe is thought to consist of plasmas. The underlying physics of the collective behavior in plasmas has applications to space physics and astrophysics, materials science, applied mathematics, fusion science, accelerator science, and many branches of engineering.

The National Science Foundation (NSF), with participation of the Directorates for Engineering, Geosciences, and Mathematical and Physical Sciences, and the Department of Energy, Office of Science, Fusion Energy Sciences are continuing the joint Partnership in Basic Plasma Science and Engineering begun in FY1997 and renewed several times since. As stated in the original solicitation (NSF 97-39), which is superseded by the present solicitation, the goal of the initiative is to enhance basic plasma research and education in this broad, multidisciplinary field by coordinating efforts and combining resources of the two agencies. The current solicitation also encourages submission of proposals to perform basic plasma experiments at NSF and DOE supported user facilities, such as the Basic Plasma Science Facility at the University of California, Los Angeles and facilities located at DOE national laboratories, designed to serve the needs of the broader plasma community.

II. PROGRAM DESCRIPTION

Dynamic growth in new research areas, fostered by the development of new investigative techniques and tools, continues to present 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, a continuation of the successful NSF/DOE Partnership in Basic Plasma Science and Engineering begun in FY1997, is a response to these fundamental research opportunities in plasma science and engineering. The foci of the initiative are to generate an understanding of the fundamental physics principles governing the collective interactions of large ensembles of free charged particles, as well as to improve the basic understanding of the plasma state as needed for other areas or disciplines of science and engineering. Proposals should discuss effective ways in which education and outreach are 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 Self-Organization in Plasmas
- Strongly Coupled Coulomb Systems in Plasmas
- Dusty Plasmas
- Non-neutral Plasmas
- Flows and Magnetic Fields in Plasmas, their Interaction and Interpenetration
- Intense Field Matter Interactions in Plasmas
- Advanced Methods for Plasma Modeling and Simulation
- Plasma Diagnostics
- Control of Plasma Processes
- Study of Plasma Reactors for Chemical Production
- Plasma Surface Interactions, Plasma Modification, Synthesis and Processing of Materials
- Atmospheric Pressure Plasmas, Microplasmas, and Plasmas in Environmental Science and Technology
- Astrophysical and Solar Plasmas, Plasmas in Interplanetary Space, Earth and Other Planetary Magnetospheres and Atmospheres

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 DOE SC/FES.

III. AWARD INFORMATION

Funding for this program is derived from a coordination of existing resources of the participating NSF Divisions, complemented by resources in the SC/FES at DOE. Award sizes are anticipated to range from $25,000 to $250,000 per year with a duration of up to three years, depending upon the nature of the research activity. Subject to the availability of funds and receipt of sufficient quality proposals, the two agencies have designated approximately $3.5 million for the annual support of a total of 15-20 awards per year in this competition. Prospective PIs funded in the prior NSF/DOE Partnership in Basic Plasma Science and Engineering desiring renewed support should submit to this solicitation. Estimated program budget, number of awards and average award size/duration are subject to the availability of funds and receipt of sufficient quality proposals.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI:

None. However, note that as per GPG Chapter I.G, "If the proposer envisions review by multiple programs, more than one program may be designated on the Cover Sheet. The submission of duplicate or substantially similar proposals concurrently for review by more than one program without prior NSF approval will result in the return of the redundant proposals."

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.5 of the Grant Proposal Guide provides additional information on collaborative proposals.

See Chapter II.C.2 of the GPG for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions.

Additional Information

PIs are encouraged to explore the suitability of their proposal to any of the programs within NSF that have a more specific focus on the area of application of the particular plasma science and engineering research project being proposed.

For PIs who anticipate having other concurrent sources of support (including but not limited to grants from other agencies or private foundations, and laboratory appointments), proposals should clearly explain how the proposed work is distinct from other funded activities. The proposal should also articulate the nature of commitments (such as deliverables, specific projects) associated with other sources of support. These commitments should be presented in the Current/Pending Support section. [Note that a separate file upload for each individual who is required to provide the Current/Pending Support information will be needed.] The proposal review process will include an assessment of the proposers' ability to carry out the proposed research in light of these commitments. PIs who have applied to more than one agency with substantively similar proposals will be expected to withdraw all other applications should one of these proposals be funded.

Letters of Support/Endorsement are not permitted.

Letters of Collaboration limited to stating the intent to collaborate and not containing endorsements or evaluation of the proposed project are allowed. Letters of collaboration should follow the single-sentence format:

"If the proposal submitted by Dr. [insert the full name of the Principal Investigator] entitled [insert the proposal title] is selected for funding by the NSF, it is my intent to collaborate and/or commit resources as detailed in the Project Description."

Departure from this format may result in the proposal being returned without review. The Project Description should document the need for and nature of collaborations, such as intellectual contributions to the project, permission to access a site, an instrument, or a facility, offer of samples and materials for research, logistical support to the research and education program, or mentoring of U.S. students at a foreign site.

Research at Undergraduate Institutions (RUI) proposals that are otherwise suitable for this solicitation should be submitted by the deadline in this solicitation. RUI proposals should also follow the Additional Information requirements specified above.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- **Full Proposal Target Date(s)**:

  October 21, 2016

  Third Friday in October, Annually Thereafter

D. FastLane / Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

For PIs who anticipate having other concurrent sources of support (including but not limited to grants from other agencies or private foundations, and laboratory appointments), the proposal review process will include an assessment of the proposers' ability to carry out the proposed research in light of commitments associated with these other sources of support.

For proposals involving development or construction of complex instrumentation (typically at or above the million dollar level), the applicant's ability to successfully deliver the instrumentation within the proposed budget will be considered as part of the proposal evaluation.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad Hoc and Panel reviewers.

NSF and DOE program officers will jointly oversee the entire process beginning with the selection of reviewers. After the review process is complete, the proposals will be evaluated jointly by program officers from both agencies for award decisions and funding profiles. Specific awards will be made and monitored either by NSF or DOE or in combination, as deemed appropriate.

DOE Process:

For those proposals identified to be considered for DOE funding, the principal investigator will be asked to withdraw their proposal from NSF and to submit the same core proposal to the DOE Office of Science open solicitation, along with a revised budget at the amount communicated by DOE program managers and a corresponding revised statement of work. The proposal will then be processed in the DOE system, based upon review results of the joint NSF/DOE process and reviews obtained. Verbatim copies of reviews, excluding the names of the reviewers, will be sent to the Principal Investigator by the NSF Program Officer.

Submission of proposals in the DOE system requires registration in the System for Award Management (SAM), Grants.gov, and the Portfolio Analysis And Management System (PAMS). Registering in advance would help to expedite the award process. This can be done at: http://www.sam.gov/, http://www.grants.gov/web/grants/applicants.html and https://pamspublic.science.energy.gov/.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the DOE Chicago Contracting Office for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of DOE or authorize the expenditure of funds. No commitment on the part of DOE should be inferred from technical or budgetary discussions with a DOE Program Manager. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the DOE Grants and Agreements Officer does so at their own risk.

NSF Process:

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. 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. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process).

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award 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 notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from

nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

DOE Reporting Requirements:

For all grants sponsored by the DOE, the Principal Investigator is required to submit an annual project report to the cognizant Program Manager at least 90 days prior to the end of the current budget period, as well as a final report within 90 days of completion of the project. Review and processing of any future funding increments is contingent upon receipt of the annual report. DOE Office of Science reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. The checklist is available at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms under Award Forms.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Vyacheslav (Slava) Lukin, Division of Physics, NSF, 1015 N, telephone: (703) 292-7382, email: vlukin@nsf.gov
- John Gillaspy, Program Director, Division of Physics, NSF, 1015 N, telephone: (703) 292-7173, email: jgillasp@nsf.gov
- Bogdan Mihaila, Program Director, Division of Physics, NSF, 1015 N, telephone: (703) 292-8235, email: bmihaila@nsf.gov
- Nigel A. Sharp, Program Director, Division of Astronomical Sciences, NSF, 1045 S, telephone: (703) 292-4905, email: nsharp@nsf.gov
- Janet U. Kozyra, Program Director, Division of Atmospheric and Geospace Sciences, NSF, 775 S, telephone: (703) 292-8519, email: jkozyra@nsf.gov
- Ilia I. Roussev, Program Director, Division of Atmospheric and Geospace Sciences, NSF, 775 S, telephone: (703) 292-8519, email: iroussev@nsf.gov
- Triantafillos (Lakis) Mountziaris, Program Director, Division of Chemical, Bioengineering, Environmental, and Transport Systems, NSF, 565 S, telephone: (703) 292-8320, email: tmountzi@nsf.gov
- Jenshan Lin, Program Director, Division of Communications, Circuits, and Sensing Systems, NSF, 525 N, telephone: (703) 292-7950, email: jenlin@nsf.gov
- Sean Finnegan, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-4920, email: sean.finnegan@science.doe.gov
- Nirmol Podder, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-9536, email: nirmol.podder@science.doe.gov
- Curt Bolton, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-4914, email: curt.bolton@science.doe.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Ramona Winkelbauer, IT Specialist, Division of Physics, 1013 N, telephone: (703) 292-7390, fax: (703) 292-9078, email: rwinkelb@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

Department of Energy Contacts:

Sean Finnegan, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-4920, email: sean.finnegan@science.doe.gov

Nirmol Podder, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-9536, email: nirmol.podder@science.doe.gov

Curt Bolton, Program Manager, Fusion Energy Sciences, DOE/SC, telephone: (301) 903-4914, email: curt.bolton@science.doe.gov

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

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NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

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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 about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

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; and 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 proposal review process; to proposer 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 or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; 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," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. 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 the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

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Reports Clearance Officer
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