

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT**



U.S. Department of Energy

**Office of Science
Office of Fusion Energy Sciences
Jointly with
The National Nuclear Security Administration, Defense Programs
Office of Stockpile Stewardship**

High Energy Density Laboratory Plasmas

Funding Opportunity Number: DE-FOA-0000583

Announcement Type: Initial

CFDA Number: 81.049

ISSUE DATE: September 8, 2011

LETTER OF INTENT DUE DATE: September 30, 2011
(Letters of Intent are strongly encouraged)

PREAPPLICATIONS: N/A

APPLICATION DUE DATE: November 3, 2011, 11:59 PM Eastern Time

NOTE: REQUIREMENTS FOR GRANTS.GOV

Where to Submit: Applications must be submitted through Grants.gov to be considered for award. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember you have to update your Central Contract Registry (CCR) registration annually. If you have any questions about your registration, you should contact the Grants.gov Helpdesk at 1-800-518-4726 to verify that you are still registered in Grants.gov.

Registration Requirements: There are several one-time actions you must complete in order to submit an application through Grants.gov (i.e., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the CCR, register with the credential provider, and register with Grants.gov). To register with Grants.gov go to “Get Registered” at http://grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.pdf> to guide you through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in the CCR registration process. Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible.

IMPORTANT NOTICE TO POTENTIAL APPLICANTS: When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

Questions: Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. Part VII of this Funding Opportunity Announcement (FOA) explains how to submit other questions to the Department of Energy (DOE).

Application Receipt Notices:

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of four e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. The titles of the four e-mails are:

Number 1 - Grants.gov Submission Receipt Number

Number 2 - Grants.gov Submission Validation Receipt for Application Number

Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number

Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

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PART I – FUNDING OPPORTUNITY DESCRIPTION

GENERAL INQUIRIES ABOUT THIS FUNDING OPPORTUNITY ANNOUNCEMENT SHOULD BE DIRECTED TO:

Technical/Scientific Program Contact:

Program Manager: Ms. Ann Satsangi, Fusion Energy Sciences
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ATTN: DE-FOA-0000583

STATUTORY AUTHORITY

Public Law 95-91, US Department of Energy Organization Act
Public Law 109-58, Energy Policy Act of 2005

APPLICABLE REGULATIONS

U.S. Department of Energy Financial Assistance Rules, codified at 10 CFR Part 600
U.S. Department of Energy, Office of Science Financial Assistance Program Rule, codified at 10 CFR Part 605

SUMMARY:

The Fusion Energy Sciences (FES) program of the Office of Science (SC) and the Office of Stockpile Stewardship of the Defense Programs (DP) of the National Nuclear Security Administration (NNSA), both of the U.S. Department of Energy (DOE), jointly announce their interests in receiving grant applications for new awards and grant renewals for research in the

SC-NNSA Joint Program in High-Energy-Density Laboratory Plasmas (HEDLP). All individuals or groups planning to submit applications for new or renewal funding in Fiscal Year 2012 should submit in response to this Funding Opportunity Announcement (FOA). A companion Program Announcement for DOE National Laboratories (LAB 11-583) will be posted on the Office of Science Grants and Contracts web site at: [Http://www.science.doe.gov/grants/pdf/LAB_11-583.pdf](http://www.science.doe.gov/grants/pdf/LAB_11-583.pdf).

The specific areas of interest are:

1. High-Energy-Density Hydrodynamics
2. Radiation-Dominated Dynamics and Material Properties
3. Magnetized High-Energy-Density Plasma Physics
4. Nonlinear Optics of Plasmas and Laser-Plasma Interactions
5. Relativistic High-Energy-Density Plasmas and Intense Beam Physics
6. Warm Dense Matter
7. Diagnostics for HEDLP
8. Community Development Activities

More specific information on each area of interest is outlined in the general and program specific supplementary information provided below.

A FOA for the NNSA Stewardship Science Academic Alliances (SSAA) program is planned to be published separately in the coming months. That FOA is solely published by NNSA. It will include a call for Cooperative Agreements for the SSAA Centers of Excellence in the fields of Materials Under Extreme Conditions, Low-Energy Nuclear Science, Radiochemistry, and High-Energy-Density Physics. That FOA will also include a call for research grants in the fields of Materials Under Extreme Conditions, Low-Energy Nuclear Science, and Radiochemistry, but will fund no research grants in High-Energy-Density Physics.

SUPPLEMENTARY INFORMATION:

Descriptions of the Research Programs and the Applications Solicited under this FOA

High-energy-density laboratory plasma (HEDLP) physics is the study of ionized matter at extremely high density and temperature, specifically when matter is heated and compressed to a point that the stored energy in the matter reaches approximately 100 billion Joules per cubic meter (the energy density of a hydrogen molecule). This corresponds to a pressure of approximately 1 million atmospheres or 1 Mbar. Systems in which free electrons play a significant role in the dynamics and for which the underlying assumptions and methods of traditional ideal-plasma theory and standard condensed matter theory do not apply (e.g., Warm Dense Matter (WDM) at temperatures of a few eV) can have pressures as low as 0.1 Mbar and are also considered high-energy-density plasmas [R. P. Drake, Phys. Plasmas 16, 055501 (2009)].

Grant applications on high-energy-density science are sought by this FOA that address the recommendations of the 2003 report *Frontiers in High Energy Density Physics The X Games of Contemporary Science*, the intentions of the 2007 *Report of the Interagency Task Force on high-energy-density physics*, and the research needs identified by the 2009 Research Needs Workshop (ReNeW) on high-energy-density laboratory physics. Proposed research efforts can include experimental, theoretical, and/or computational science. Applications integrating experiments, theory, and simulation are encouraged. Specifically, grant applications are sought in the following subfields and cross-cutting areas of HEDLP, as described in the Report of the ReNeW in HEDLP, with additional scope indicated specifically below:

1. High-Energy-Density Hydrodynamics

Specific areas of interest include, but are not limited to, turbulent mixing, probing properties of high-energy-density (HED) matter through hydrodynamics, solid-state hydrodynamics at high pressures, new hydrodynamic instabilities, and hydrodynamic scaling.

2. Radiation-Dominated Dynamics and Material Properties

Specific areas of interest include, but are not limited to, radiative shocks, radiation waves and radiation transport, radiative cooling, opacities and equation of state, radiative instabilities, and radiation pressure.

3. Magnetized High-Energy-Density Plasma Physics

Specific areas of interest include, but are not limited to, basic properties of magnetized HED plasmas, coupled dynamics and atomic kinetics, phase transitions in the presence of high magnetic fields and current densities, ultra high magnetic fields and their measurements, radiation-dominated HED dynamo, and radiation-dominated reconnection.

4. Nonlinear Optics of Plasmas and Laser-Plasma Interactions

Specific areas of interest include, but are not limited to, the interplay between coherent radiation and nonlinear states in HED plasmas, nonlinear-wave-particle interactions, multiple coexisting instabilities, broadband radiation in plasma, and quantum phenomena in plasmas.

5. Relativistic HED Plasmas and Intense Beam Physics

Specific areas of interest include, but are not limited to, relativistic laser and beam propagation, relativistic laser-solid interaction, ultrahigh energy density plasmas at the quantum electrodynamic (QED) limit, relativistic thermal plasmas, and relativistic shocks.

6. Warm Dense Matter

Specific areas of interest include, but are not limited to, phase transitions in and around the WDM regime, comprehensive theory connecting different WDM regimes, equation of state dependence on formation history, transport properties of warm dense matter, and quark-gluon plasma similarities to warm dense matter.

7. Diagnostics for HEDLP

Grant applications will be considered for the development of advanced diagnostic instruments, methods and experimental techniques, as discussed in the ReNeW report, to be developed at the home institution or on intermediate scale HED facilities, and that would, if

the research is fruitful, have potential applications on large scale facilities e.g. the National Ignition Facility (NIF), the Z-machine at the Sandia National Laboratories, the Matter under Extreme Conditions Instrument (MECI) at the Stanford Linear Accelerator Center.

8. Community Development Activities

Applications will be accepted for community-development activities, especially in the areas associated with the LINAC Coherent Light Source Materials under Extreme Conditions Instrument experimental end station at the Stanford Linear Accelerator Center (LCLS-MECI), the Neutralized Drift Compression Experiment upgrade (NDCX-II) at the Lawrence Berkeley National Laboratory, and the National Ignition Facility at the Lawrence Livermore National Laboratory. Examples of community-development activities may include partial support for coordinating a series of workshops, a multi-institutional, broad-impact research effort in HEDLP science, a community-accessible platform for data sharing, and user-oriented support.

An initial review will check that the application is responsive to the objectives of the FOA and not duplicative of programmatic work, in addition to checking for eligibility, completeness and mandatory requirements. Applications which satisfy the initial review criteria will be subjected to formal merit review (see Part V – Application Review Information)

References

Frontiers in High Energy Density Physics: The X Games of Contemporary Science, 2003
(http://www.nap.edu/catalog.php?record_id=10544)

Office of Science and Technology Policy (OSTP), *Report of the Interagency Task Force on High Energy Density Physics* (Chairs: C. Keane, D. Kovar), National Science and Technology Council, Committee on Science, Interagency Working Group on the Physics of the Universe.
(http://www.whitehouse.gov/sites/default/files/microsites/ostp/report_of_the_interagency_task_force_on_high_energy_density_physics.pdf).

Report of the 2009 Workshop on Basic Research Needs for High-Energy-Density Laboratory Physics, Chairs: Robert Rosner and David Hammer.
(http://science.energy.gov/~media/fes/pdf/workshop-reports/Hedlp_brn_workshop_report_oct_2010.pdf)

Collaboration

Collaborative research projects that require more than one institution are welcome *if the added value is absolutely clear and compelling*. Grant applications involving a multi-institution collaborative team will be scrutinized. Those without an obvious collaborative imperative or clear benefit from the collaboration are discouraged and will be declined. Listing collaborators external to the principal investigator's institution that are not absolutely essential will be regarded as a negative factor. Listing co-investigators and collaborators who do not draw salary and support from the proposed budget is discouraged.

Each collaborating institution submitting an application must use the same title in Block 11 of the SF 424 (R&R) form, clearly indicate they are part of a proposed collaboration, contain a common description of the overall research project, contain scientific or technological justification for treating the grant application as part of a collaboration, include Letters of Coordination from the collaborative partners, and identify a lead principal investigator for the entire collaboration. Each application, participating in collaboration, must have a distinct scope of work, budget for their institution, and a qualified principal investigator, who is responsible for the research effort being performed at his or her institution. Multi-institutional collaborative applications will be reviewed as a single project and subsequently awarded or declined as a single project.

Additional Information

In selecting applications for funding, priority will be given to applications that can produce experimental results within three years after grant initiation. Theoretical research will be accepted for consideration under this FOA, especially if it is related to, or supports, a laboratory experiment or nature observations. Preferred applications in this category would typically have a performance period of three years.

PART II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT.

DOE anticipates awarding new and renewal grants under this FOA.

B. ESTIMATED FUNDING.

Research Grant Awards (typically single-investigator projects) are expected to be made for a period of two or three years at a funding level appropriate for the proposed scope, with out-year support contingent on the availability of appropriated funds and satisfactory progress. Total funding up to \$14,000,000 annually is expected to be available to support the non-DOE laboratory and DOE National Laboratory portions of this FOA subject to appropriation of funds by Congress. DOE is under no obligation to pay for any costs associated with the preparation or submission of an application. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this FOA.

The Joint Program reserves the right to make no awards, or fewer awards than would be possible at the \$14,000,000 grand-total level, if an insufficient number of applications are judged to be of suitable scientific quality or of sufficient relevance to the programs described in Part I. The cost effectiveness of the application will be considered when comparing applications with differing funding requirements. A single award or multiple awards may be made depending on the number and quality of the applications that are received and favorably reviewed. If multiple awards are made, it is anticipated that award sizes may range from \$50,000 per year to \$1,000,000 per year, typically less than \$300,000 per year. Grant applications for greater than \$500,000 per year need to justify a budget that is much larger than the average award. Programmatic relevance is a factor in evaluating all grant applications.

C. MAXIMUM AND MINIMUM AWARD SIZE.

Minimum award size is \$50,000 per year and applications for greater than \$500,000 per year need to justify a budget that is much larger than the average award. Grant applications for larger than \$2,000,000 per year are unlikely to be successful.

D. EXPECTED NUMBER OF AWARDS.

Approximately 30 to 40 non-laboratory awards are expected, with a median award size between \$200,000 per year and \$250,000 per year.

E. ANTICIPATED AWARD SIZE.

It is anticipated that award sizes may range from \$50,000 per year to \$1,000,000 per year, typically less than \$300,000 per year.

F. PERIOD OF PERFORMANCE.

Research Grant Awards are expected to be made for a period of two or three years. A nonstandard performance period requires additional justification.

G. TYPE OF APPLICATION.

DOE will accept new and renewal applications under this FOA. Researchers seeking renewals of their grants which expire in FY 2012 should apply to this FOA. Renewal applications will compete with all other applications. In preparing a renewal application, applicants should assume that reviewers will not have access to previous applications. The application should be developed as fully as though the applicant were applying for the first time. The application must include all the information required for a new project. In addition, the project narrative section should discuss the results from prior work.

PART III – ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS.

All types of applicants are eligible to apply, except Federally Funded Research and Development Center (FFRDC) contractors (i.e. National DOE Laboratories) and nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995.

A companion Program Announcement for DOE National Laboratories, LAB 11-583, will be posted on the Office of Science Grants and Contracts web site at:
http://www.science.doe.gov/grants/LAB_11-583.pdf.

B. COST SHARING.

Cost sharing is not required.

C. OTHER ELIGIBILITY REQUIREMENTS.

N/A

PART IV – APPLICATION AND SUBMISSION INFORMATION

A. ADDRESS TO REQUEST APPLICATION PACKAGE.

Application forms and instructions are available at Grants.gov. To access these materials, go to <http://www.grants.gov>, select "**Apply for Grants**", and then select "**Download a Grant Application Package**." Enter the CFDA number and/or the funding opportunity number shown on the cover of this FOA and then follow the prompts to download the application package.

B. LETTER OF INTENT AND PREAPPLICATION.

1. Letter of Intent (LOI).

LOI DUE DATE: September 30, 2011

A LOI is STRONGLY ENCOURAGED and should be submitted by September 30, 2011. It is important that the submission be in a single PDF file. The LOI should clearly indicate the research area or areas identified in Part I to which the application is responding. The LOI should be submitted electronically by E-mail to John.Sauter@science.doe.gov, with a copy to Ann.Satsangi@science.doe.gov, Sean.Finnegan@science.doe.gov, Keith.LeChien@nnsa.doe.gov and Kirk.Levedahl@nnsa.doe.gov. Please include "**Letter of Intent for DE-FOA-0000583**" in the subject line.

The purpose of the LOI is to help in planning the review and the selection of potential reviewers for the application. For this purpose, the LOI must include: (1) identification of relevant research areas of interest from among those identified in this FOA, (2) one-page abstract of the proposed research; (3) list of names and institutional affiliations of all Principal Investigators, key investigators, collaborators, or consultants; (4) for each funded PI, a list of collaborative co-investigators including co-authors of past 48 months, co-editors of past 24 months, graduate and postdoctoral advisors/advisees, and close associations. For publications or collaborations with more than 10 authors or participants, only list those individuals in the core group with whom the Principal Investigator interacted on a regular basis while the research was being done. For proposed investigations requiring access to experimental user facilities, confirmation of communication with the facility's point-of-contact should be indicated in the LOI. Collaborations should submit a single LOI clearly indicating the collaboration and all PI's and institutions involved, and list a primary point of contact/Lead PI for the research activity.

2. Preapplication.

N/A.

C. CONTENT AND FORM OF APPLICATION – SF 424 (R&R).

You must complete the mandatory forms and any applicable optional forms (e.g., SF-LLL-Disclosure of Lobbying Activities) in accordance with the instructions on the forms and the additional instructions below. **Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this FOA.**

1. SF 424 (R&R)

Complete this form first to populate data in other forms. The list of certifications and assurances referenced in Field 17 can be found on the DOE Financial Assistance Forms page at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>, under Certifications and Assurances.

2. RESEARCH AND RELATED Other Project Information.

Complete questions 1 through 6 and attach files. The files must comply with the following instructions:

Project Summary/Abstract (Field 7 on the Form)

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s) (PD/PI), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as the Department may make it available to the public. The project summary must not exceed 1 page when printed using standard 8.5” by 11” paper with 1” margins (top, bottom, left and right) with font not smaller than 11 point. To attach a Project Summary/Abstract, click “Add Attachment.”

Project Narrative (Field 8 on the form)

The project narrative **must not exceed 25 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right). **EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE.** The font must not be smaller than 11 point. Letters of endorsement from unfunded collaborators should also be included, if applicable. Please do not submit general letters of support as these are not used in making funding decisions and can interfere with the selection of peer reviewers.

Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed. See Part VIII.D for instructions on how to mark proprietary application information. To attach a Project Narrative, click “Add Attachment.”

The application narrative should begin with a cover page that includes: the project title, the Lead PI’s name and complete contact information.

The first page of your narrative must include the following information (this page will not count in the project narrative page limitation):

Applicant/Institution:

Street Address/City/State/Zip:

Principal Investigator:

Postal Address:

Telephone Number:

Email:

Funding Opportunity FOA Number: DE-FOA-0000583

DOE/Office of Science Program Office: Office of Fusion Energy Sciences

DOE/Office of Science Program Office Technical Contact: Ms. Ann Satsangi

DOE Grant Number (if Renewal Application)

Research area or areas (as identified in Part I)

Is this a Collaboration? If yes, please list ALL Collaborating Institutions/Pis* and indicate which ones will also be submitting applications. Also indicate the PI who will be the point of contact and coordinator for the combined research activity.

* Note that collaborating applications must be submitted separately.

Project Objectives:

This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.

The Project Narrative comprises the research plan for the project; 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 method 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.

Appendix 1: Biographical Sketch.

Provide a biographical sketch for the project director/principal investigator (PD/PI) and each senior/key person listed in Section A on the R&R Budget form. **Provide the Biographical Sketch information as an Appendix to your project narrative. Do not attach a separate file. The Biographical Sketch Appendix will not count in the project narrative page limitation.** The biographical information (curriculum

vitae) for each person must not exceed 2 pages when printed on 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point 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.

Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers. Provide the following information in this section:

Collaborators and Co-editors: List in alphabetical order all persons, including their current organizational affiliation, who are, or who have been, collaborators or co-authors with you on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of this application. For publications or collaborations with more than 10 authors or participants, only list those individuals in the core group with whom the Principal Investigator interacted on a regular basis while the research was being done. Also, list any individuals who are currently, or have been, co-editors with you on a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of this application. If there are no collaborators or co-editors to report, state “None.”

Graduate and Postdoctoral Advisors and Advisees: List the names and current organizational affiliations of your graduate advisor(s) and principal postdoctoral sponsor(s) during the last 5 years. Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates during the past 5 years.

Appendix 2: Current and Pending Support.

Provide a list of all current and pending support (both Federal and non-Federal) for the Project Director/Principal Investigator(s) (PD/PI) and senior/key persons, including subawardees, for ongoing projects and pending applications. For each organization providing support, show the total award amount for the entire award period (including indirect costs) and the number of person-months per year to be

devoted to the project by the senior/key person. **Provide the Current and Pending Support as an Appendix to your project narrative. Do not attach a separate file. The Current and Pending Support Appendix will not count in the project narrative page limitation.** Concurrent submission of an application to other organizations for simultaneous consideration will not prejudice its review.

Appendix 3: Bibliography & References Cited.

Provide a bibliography of any references cited in the Project 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. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application. **Provide the Bibliography and References Cited information as an Appendix to your project narrative. Do not attach a separate file. The Bibliography and References Cited Appendix will not count in the project narrative page limitation.**

Appendix 4: Facilities and Other Resources.

This information is used to assess the capability of the organizational resources, including subawardee resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. **Please provide the Facilities and Other Resources information as an Appendix to your project narrative. Do not attach a separate file. The Facilities and Other Resources Appendix will not count in the project narrative page limitation.**

Appendix 5: Equipment.

List major items of equipment already available for this project and, if appropriate identify location and pertinent capabilities. **Provide the Equipment information as an Appendix to your project narrative. Do not attach a separate file. The Equipment Appendix will not count in the project narrative page limitation.**

Appendix 6: Other Attachment.

If you need to elaborate on your responses to questions 1-6 on the “Other Project Information” document, **please provide the Other Attachment information as an Appendix to your project narrative. Do not attach a separate file. The Other Attachment Appendix will not count in the project narrative page limitation.**

Do not attach any of the requested appendices described above as files for fields 9, 10, 11, and 12. Instead follow the above instructions to include the information

as appendices to the project narrative file (these appendices will not count in the project narrative page limitation).

3. RESEARCH AND RELATED BUDGET.

Complete the Research and Related Budget form in accordance with the instructions on the form (Activate Help Mode to see instructions) and the following instructions. You must complete a separate budget for each year of support requested. The form will generate a cumulative budget for the total project period. You must complete all the mandatory information on the form before the NEXT PERIOD button is activated. You may request funds under any of the categories listed as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this FOA (See PART IV, G).

Budget Justification (Field K on the form).

Provide the required supporting information for the following costs (See R&R Budget instructions): equipment; domestic and foreign travel; participant/trainees; materials and supplies; publication; consultant services; ADP/computer services; subaward/consortium/contractual; equipment or facility rental/user fees; alterations and renovations; and indirect cost type. Provide any other information you wish to submit to justify your budget request. **Attach a single budget justification file for the entire project period in field K.** The file automatically carries over to each budget year.

4. R&R SUBAWARD BUDGET ATTACHMENT(S) FORM.

Budgets for Subawardees, other than DOE FFRDC Contractors. You must provide a separate cumulative R&R budget for each subawardee that is expected to perform work estimated to be more than \$100,000 or 50 percent of the total work effort (whichever is less). If you are selected for award, you must submit a multi-year budget for each of these subawardees (See Section IV.D for submission of Subawardees' multi-year budgets). Download the R&R Budget Attachment from the R&R SUBAWARD BUDGET ATTACHMENT(S) FORM and E-mail it to each subawardee that is required to submit a separate budget. After the Subawardee has E-mailed its completed budget back to you, attach it to one of the blocks provided on the form. Use up to 10 letters of the subawardee's name (plus.xfd) as the file name (e.g., ucla.xfd or energyres.xfd).

5. PROJECT/PERFORMANCE SITE LOCATION(s).

Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided.

Note that the Project/Performance Site Congressional District is entered in the format of the two-digit state code followed by a dash and a three-digit Congressional district code, for example VA-001. Hover over this field for additional instructions.

Use the Next Site button to expand the form to add additional Project/Performance Site Locations.

- 6. SF-LLL Disclosure of Lobbying Activities** If applicable, complete SF-LLL.
 Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, you must complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying."

Summary of Required Forms/Files

Your application must include the following documents:

Name of Document	Format	Attach to
SF 424 (R&R)	Form	N/A
RESEARCH AND RELATED Other Project Information	Form	N/A
Project Summary/Abstract	PDF	Field 7
Project Narrative, including required appendices	PDF	Field 8
RESEARCH & RELATED BUDGET	Form	N/A
Budget Justification	PDF	Field K
PROJECT/PERFORMANCE SITE LOCATION(S)	Form	N/A
SF-LLL Disclosure of Lobbying Activities, if applicable	Form	N/A

D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS.

If selected for award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information
- Other budget information
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Commitment Letter from Third Parties Contributing to Cost Sharing, if applicable

E. SUBMISSION DATES AND TIMES.

1. Letter of Intent (LOI).

LOI DUE DATE: September 30, 2011

A LOI is STRONGLY ENCOURAGED and should be submitted by September 30, 2011. It is important that the submission be in a single PDF file. The LOI should clearly indicate the research area or areas identified in Part I to which the application is responding. The LOI should be submitted electronically by E-mail to John.Sauter@science.doe.gov, with a copy to Ann.Satsangi@science.doe.gov, Sean.Finnegan@science.doe.gov, Keith.LeChien@nnsa.doe.gov, and Kirk.Levedahl@nnsa.doe.gov. Please include “**Letter of Intent for DE-FOA-0000583**” in the subject line.

2. Preapplication.

N/A.

3. Formal Applications.

Formal applications submitted in response to this FOA must be received by **November 3, 2011, 11:59 PM Eastern Time. You are encouraged to transmit your application well before the deadline. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

F. GOVERNMENTAL REVIEW.

This program is not subject to Executive Order 12372 Intergovernmental Review of Federal Programs.

G. FUNDING RESTRICTIONS.

Cost Principles. Costs must be allowable, allocable and reasonable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. The cost principles for commercial organization are in FAR Part 31.

Pre-award Costs. Recipients may charge to an award resulting from this FOA pre-award costs that were incurred within the ninety (90) calendar-day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600 and 2 CFR 215. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90-day calendar period.

Pre-award costs are incurred at the applicant’s risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

H. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS.

1. Where to Submit.

APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV TO BE CONSIDERED FOR AWARD.

Submit electronic applications through the “Apply for Grants” function at www.Grants.gov. If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 or send an email to support@grants.gov.

2. Registration Process.

You must COMPLETE the one-time registration process (all steps) before you can submit your first application through Grants.gov. We recommend that you start this process at least three weeks before the application due date. It may take 21 days or more to complete the entire process. To register with Grants.gov go to “Get Registered” at http://grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.pdf> to guide you through the process. **IMPORTANT:** During the CCR registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner Identification Number" (MPIN). When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e., Grants.gov registration).

You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember you have to update your CCR registration annually.

3. Application Receipt Notices

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of four e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. The titles of the four e-mails are:

Number 1 - Grants.gov Submission Receipt Number

Number 2 - Grants.gov Submission Validation Receipt for Application Number

Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number

Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

PART V - APPLICATION REVIEW INFORMATION

A. CRITERIA.

1. Initial Review Criteria.

Prior to a comprehensive merit evaluation, DOE will perform an initial review in accordance with 10 CFR 605.10(b) to determine that (1) the applicant is eligible for the award; (2) the information required by the FOA has been submitted; (3) all mandatory requirements are satisfied; (4) the proposed project is responsive to the objectives of the Funding Opportunity Announcement, and (5) the proposed project is not duplicative of programmatic work. Applications that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

2. Merit Review Criteria.

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria, which are listed in descending order of importance as found in 10 CFR Part 605.10 (d). Included with each criterion are the detailed questions that will be asked of the reviewers.

1. Scientific and/or Technical Merit of the Project

- Discuss and assess the likelihood that the research being proposed will be deemed important in the relevant field of science (one or more of the preferred research areas identified in Part I). Comment on the potential impact of the expected findings outside its primary field.
- Does the application articulate the scientific objectives and/or the scientific issues of the proposed research in terms of an achievable plan? Comment on the competence of the investigators, the institutionally available infrastructure, and proposed resources in terms of achieving this plan.
- What is the likelihood that the specific project will lead to fundamental advances or discovery in its field within the proposed project period? Compare the anticipated scientific benefit of the proposed research for the proposed project period to that associated with past projects of the investigators or of peer investigators.

2. Appropriateness of the Proposed Method or Approach

- Is the proposed research approach sound and innovative?
- To what extent does the applicant recognize significant potential problems and consider alternative strategies?
- Comment on the effectiveness of the proposed research effort in addressing the scientific issues and/or objectives of the proposed research.

3. **Competency of Applicant's Personnel and Adequacy of Proposed Resources**

- How well qualified are the applicant's personnel to carry out the proposed research? (If appropriate, please comment on the scientific reputation and quality of recent research by the principal investigators and other key personnel.)
- Please comment on the applicant'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. **Reasonableness and Appropriateness of the Proposed Budget**

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

For renewal applications, the reviewers will also be asked to answer the following question:

Performance under the Existing Award

- Assess the progress the applicants made toward the research goals during the most recent performance period (last funding cycle) and the impact of the research in the relevant area of science.
- To the extent possible within his or her available means, has the applicant disseminated the results of his or her research through publications in peer-reviewed journals, meeting and conference presentations, workshops, or other appropriate means?
- If appropriate, has the applicant attempted to compare experimental results against theoretical predictions?

Other Appropriate Factors

- Could the proposed research make a significant contribution to another field?
- Is there potential for spin-offs?
- If applicable, please comment on the educational benefits of the proposed activity.
- What are the overall strengths and weaknesses of the application?

SC and NNSA will also consider, as part of the evaluation, other available advice or information as well as program policy factors such as ensuring a programmatically appropriate balance within the program areas, coupling to theory and computational efforts, and quality of previous performance. Selection of applications for award will be based upon the findings of the technical evaluations, the importance and relevance of the proposed research to the SC and NNSA's missions in high energy density laboratory plasmas, and funding availability. Funding under this FOA is limited to supporting research activities based in the U.S., though subcontracts with an international dimension are welcome. Limited funding for collaborators outside the U.S. may be allowed with appropriate justification.

B. REVIEW AND SELECTION PROCESS.

1. Merit Review.

Applications that pass the initial review will be subjected to a formal merit review and will be evaluated based on the criteria codified at 10 CFR Part 605.10(d) in accordance with the guidance provided in the “Office of Science Merit Review System for Financial Assistance.” This Merit Review System is available at: <http://www.sc.doe.gov/grants/merit.asp>.

2. Selection.

The Selection Official will consider the merit review recommendation, program policy factors, and the amount of funds available.

3. Governmental Discussions and Award.

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600 and 605; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES.

It is anticipated that the award selection will be completed by April 1, 2012. It is expected that awards will be made in Fiscal Year 2012.

Part VI - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES.

1. Notice of Selection.

Selected Applicants Notification: DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance. (See Part IV.G with respect to the allowance of pre-award costs.)

Non-selected Notification: Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

2. Notice of Award.

An Assistance Agreement issued by the contracting officer is the authorizing award document. It normally includes, either as an attachment or by reference: 1. Special Terms and Conditions; 2. Applicable program regulations, if any; 3. Application as approved by DOE/NNSA; 4. DOE assistance regulations at 10 CFR Part 600; 5. National Policy Assurances to Be Incorporated As Award Terms; 6. Budget Summary; and 7. Federal Assistance Reporting Checklist, which identifies the reporting requirements.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS.

1. Administrative Requirements.

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR 600 and 10 CFR Part 605 (See: <http://ecfr.gpoaccess.gov>). Grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR are subject to the Research Terms and Conditions located on the National Science Foundation web site at <http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp>.

DUNS and CCR Requirements

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR, Part 25 (See: <http://ecfr.gpoaccess.gov>). Prime awardees must keep their data at CCR current. Subawardees at all tiers must obtain DUNS numbers and provide the DUNS to the prime awardee before the subaward can be issued.

Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR, Part 170. (See: <http://ecfr.gpoaccess.gov>). Prime awardees must

register with the new FSRS database and report the required data on their first tier subawardees. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the CCR.

2. Special Terms and Conditions and National Policy Requirements.

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at: <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>, under Award Terms.

The National Policy Assurances to Be Incorporated As Award Terms are located at <http://www.nsf.gov/bfa/dias/policy/rtc/appc.pdf>.

Intellectual Property Provisions.

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at: <http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards>.

C. REPORTING.

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F4600.2, attached to the award agreement. For a sample checklist, see <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>, under Awards Forms.

PART VII - QUESTIONS/AGENCY CONTACTS

A. QUESTIONS.

Questions regarding the content of the announcement must be submitted through the FedConnect portal. You must register with FedConnect to respond as an interested party to submit questions, and to view responses to questions. It is recommended that you register as soon after release of the FOA as possible to have the benefit of all responses. More information is available at

https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf.

DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Applications submitted through FedConnect will not be accepted.

Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. DOE cannot answer these questions.

B. AGENCY CONTACTS.

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Technical/Scientific Program Contact:

Program Manager: Ms. Ann Satsangi, Fusion Energy Sciences

Phone: (301) 903- 9707

Fax: (301) 903-1225

E-mail: Ann.Satsangi@Science.Doe.Gov

ATTN: DE-FOA-0000583

Program Manager: Dr. Sean M. Finnegan, Fusion Energy Sciences

Phone: (301) 903- 4920

Fax: (301) 903-1225

E-mail: Sean.Finnegan@Science.Doe.Gov

ATTN: DE-FOA-0000583

Program Manager: Dr. Keith LeChien, National Nuclear Security Administration

Phone: (202) 586-1922

E-mail: Keith.LeChien@NNSA.Doe.Gov

ATTN: DE-FOA-0000583

Program Manager: Dr. Kirk Levedahl, National Nuclear Security Administration

Phone: (202) 586-1276

E-mail: Kirk.Levedahl@NNSA.Doe.Gov

ATTN: DE-FOA-0000583

PART VIII - OTHER INFORMATION

A. MODIFICATIONS.

Notices of any modifications to this FOA will be posted on Grants.gov and the FedConnect portal. You can receive an email when a modification or an FOA message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon after release of the FOA as possible to ensure you receive timely notice of any modifications or other FOAs. More information is available at <http://www.fedconnect.net>.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE.

DOE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

C. COMMITMENT OF PUBLIC FUNDS.

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

D. PROPRIETARY APPLICATION INFORMATION.

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

“The data contained in pages _____ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government’s right to use or disclose data obtained without restriction from any source, including the applicant.”

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

“The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation.”

E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL.

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

F. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM.

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See “Notice of Right to Request Patent Waiver” in paragraph G below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE’s own needs or to insure the commercialization of technology developed under a DOE agreement.

G. NOTICE OF RIGHT TO REQUEST PATENT WAIVER.

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this FOA, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.12, http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title10/10cfr784_main_02.tpl.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

H. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES.

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

I. AVAILABILITY OF FUNDS.

Funds are not presently available for this award. The Government's obligation under this award is contingent upon the availability of appropriated funds from which payment for award purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this award and until the awardee receives notice of such availability, to be confirmed in writing by the Contracting Officer.