

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT**



U.S. Department of Energy

**Office of Science
Office of High Energy Physics**

Second Generation Dark Matter Experiments

Funding Opportunity Number: DE-FOA-0000597

Announcement Type: Initial

CFDA Number: 81.049

ISSUE DATE: March 7, 2012

Letter of Intent Due Date: May 4, 2012
(Requested/Not Required)

Application Due Date: July 6, 2012

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
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PART I – FUNDING OPPORTUNITY DESCRIPTION

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Technical/Scientific Program Contact:

Dr. Michael Salamon, Office of High Energy Physics, SC-25
PHONE: (301) 903-5106
E-MAIL: michael.salamon@science.doe.gov

Dr. Kathy Turner, Office of High Energy Physics, SC-25
PHONE: (301) 903-1759
E-MAIL: kathy.turner@science.doe.gov

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 Office of High Energy Physics (OHEP) at the U. S. Department of Energy's Office of Science, hereby announce their interest in receiving new grant applications for support of experiments dedicated to the direct detection of dark matter. Only those experiments qualifying as "second-generation" experiments will be considered, i.e., those with the capability to improve by at least an order of magnitude our current knowledge of physical dark matter parameters. Applications selected in response to this Funding Opportunity Announcement (FOA) will be funded in FY13 for one year of research and development (R&D) and pre-conceptual design.

A companion Program Announcement to DOE National Laboratories (LAB 12-597) will be posted on the Office of Science Grants and Contracts web site at:
<http://www.science.doe.gov/grants>

SUPPLEMENTARY INFORMATION:

Background: Astrophysical and cosmological observations have established that atomic matter constitutes only ~5% of the mass-energy in our Universe. In the Standard Model of cosmology the remaining 95% is composed of two mysterious components: dark matter (23%) and dark energy (72%). The Standard Model of particle physics does not include a particle species with properties that can account for dark matter. One non-Standard Model candidate for dark matter is a weakly-interacting massive particle (WIMP) whose cosmic abundance today is a relic of the Big Bang. Other dark matter candidates include the axion, originally hypothesized as a solution to the strong-CP problem.

Searches for WIMPs, axions and other dark matter particle candidates directly address the HEP mission of understanding the origin and unification of particles and forces and the mysterious forms of unseen energy and matter. These studies fall within HEP's Cosmic Frontier program, whose focus is on non-accelerator-based measurements of naturally occurring phenomena to learn about the nature of dark matter, dark energy, and other fundamental properties of matter and energy.

Investigation Requirements: There are three complementary methods for searching for dark matter: (1) accelerator searches for dark matter particle production, (2) indirect detection of dark matter annihilation within the Galaxy, and (3) the direct detection of Galactic dark matter particles that pass through terrestrial detectors. This FOA solicits applications for support of future second-generation experiments of the third type only, those that conduct direct-detection searches for dark matter particles.

For the purposes of this FOA, a second-generation experiment is one that, in the absence of detection, improves our current knowledge of a relevant dark matter particle parameter by roughly one order of magnitude or more. For WIMPs, this parameter could be (but is not restricted to) the WIMP-nucleon cross section limit. In the case of axions, the parameter could be (but is not restricted to) a limit on the photon-axion coupling constant.

Applications are not limited to searches for WIMPs or axions; any viable dark matter species may be the object of an investigation. The strength of theoretical arguments for the existence of a given species will be a factor in the selection process.

Award Description: This FOA solicits applications for one year of support for R&D leading to second-generation dark matter experiments. Those investigations selected will be provided with funding that shall be used for R&D, including pre-conceptual experiment design and work that reduces scientific, technical or cost risks associated with the experiment. Funding is expected to commence early in FY2013. The total amount of DOE funds is anticipated to be approximately \$6M, subject to availability of funds, to be divided among the successful investigations selected under this FOA and the companion DOE laboratory program announcement noted above. No experiments will enter project phase during this year of funding. This funding shall not be used for fabrication of the experiment **except as noted below**.

Funding for the project phase of second-generation dark matter experiments is not supported under this FOA. A future selection process (“down-selection”), described in “Future Project Awards” below, will select a subset of the investigations for project funding during the period FY2014 to FY2016. The intent of this FOA is to provide support for R&D, including pre-conceptual design and risk reduction prior to the future competition for entry into project phase and subsequent fabrication and commissioning of the experiment.

Near the end of the one-year funding period, each Principal Investigator (PI) is to submit a report to DOE that documents the work done under the award, including any improvements in the experiment concept and any reductions of scientific, technical or cost risks associated with the experiment.

Experiments whose costs fall below the two thresholds given below are not subject to the DOE requirements that are placed on projects and major items of equipment. For such experiments, funding provided under this FOA may be used for equipment and fabrication costs in addition to R&D, pre-conceptual design and risk reduction costs. The two cost thresholds are:

- 1) \$2,000,000 for the total capital equipment cost to DOE. Contributions from other agencies are not included in this total.
- 2) \$5,000,000 for the total experiment cost to DOE. “Experiment cost” is defined to include the cost of design, engineering, equipment, fabrication, technical support, and management; but does not include operations or the costs of scientific personnel. Contributions from other agencies are not included in this total.

Final determination of which proposed experiments fall below the DOE budget and project threshold(s) will be made by DOE program managers.

Future Project Awards: This section briefly describes the anticipated process by which second-generation dark matter experiments will be selected to enter into project status and does not affect the award process for this FOA. The actual process used to down-select and implement experiments may differ from that described here.

Each future second-generation dark matter project will be managed by a DOE Laboratory. The PI, with DOE coordination, will choose a DOE Laboratory to fulfill project-phase management responsibilities. The chosen DOE Laboratory may also join the scientific collaboration subject to the membership rules of the collaboration. Near the end of the R&D awards made under this FOA, the PI and the affiliated DOE Laboratory will be invited to prepare a Field Work Proposal (FWP) for submission through the Laboratory to DOE for the design, fabrication, and commissioning of the proposed project.

Following review of the FWP’s, a down-selection will be made by the DOE Selection Official (the Associate Director of the Office of High Energy Physics) in which a subset of the investigations selected by this FOA will be chosen to become new DOE projects within the Second-Generation Dark Matter Experiment Program. **Only investigations that have been selected under this FOA will be eligible for continued funding into project phase.** Those investigations not chosen to continue as projects will not receive additional funding beyond the

one year of support provided by this FOA. Contingent upon availability of funds, those investigations selected to become projects are expected to receive project funding over the three-year period of FY2014 to FY2016. The amount of DOE funds for all experiments during the FY2014-2016 period is anticipated to total up to \$29M.

DOE Laboratory management or collaboration will not be required for experiments whose total DOE costs fall below the thresholds specified in “Award Description.” For such an experiment, rather than submitting an FWP, the PI will submit a grant renewal application to the *Continuation of Solicitation for the Office of Science Financial Assistance Program* for continued funding if desired. Applications received under this solicitation will be reviewed following standard merit review criteria.

APPLICATION REQUIREMENTS:

Selections will be based in part on the scientific merit of the proposed experiment itself. Therefore in addition to requiring a description of the research activities to be conducted during the R&D funding period, a substantial fraction of the application’s science section should be devoted to a description of the experiment, including its science goals, design, technology, and estimated cost and schedule.

The following elements are to be included in the body of the application:

- a. A statement of the science goals and the theoretical context for the chosen experiment, along with justification for qualifying this experiment as a second-generation dark matter experiment.
- b. Description of and advocacy for the chosen experimental method, including the experiment performance requirements needed to achieve the science goals.
- c. A technical description of the experiment that documents how it will meet its performance requirements.
- d. An estimate (not a budget), including basis of estimate, of the total costs of the experiment up to but not including operations or data analysis, broken into each of the following categories:
 - o Design, engineering and technical support costs
 - o Equipment costs
 - o Fabrication costs
 - o Management costs
 - o (Support for science personnel is not to be included)
- e. A schedule estimate of the experiment development.
- f. A list of current technical risks, should any exist, along with a plan for their minimization. Less mature detection methods are expected to have larger numbers of technical risks than more mature methods.
- g. A detailed description of the proposed research and concept development work, including scientific, technical and cost risk reduction, which will be conducted during the year of

support provided under this FOA. A formal budget for this period is required, along with a budget explanation.

Documentation of the investigators' experience in dark matter research or related areas is to be provided in the application along with the curriculum vitae of the investigators.

MULTIPLE AGENCY SUBMISSION:

For those proposers who are applying to both NSF and DOE for support of a second-generation dark matter experiment, it is requested that the applications to DOE include a copy of the NSF budget tables and budget justification pages in a separate appendix. This will facilitate coordination between the two agencies' dark matter programs.

SELECTION CRITERIA:

Applications will be competitively peer-reviewed and evaluated in part using the standard selection criteria of the DOE Office of Science, these being:

1. Scientific and/or technical merit of the project;
2. Appropriateness of the proposed method of research;
3. Competency of applicant's personnel and adequacy of proposed resources;
4. Reasonableness and appropriateness of the proposed budget.

The second-generation dark matter experiment must be described in sufficient detail so as to enable an evaluation of proposals using the following additional selection criteria:

- a. Importance of the investigation's experiment within the context of current national and international dark matter research efforts.
- b. Completeness of flow-down from science goals to experiment performance requirements.
- c. Capability of the experiment to meet its performance requirements along with the potential scientific power of the experimental method.
- d. Completeness of the identification of current technical risks; feasibility of the plan for technical risk reduction. The increased risk associated with methods incorporating less mature technologies may be offset by the promise of potentially superior science capabilities.

An external, competitive, anonymous peer review will be held in which all compliant applications will be evaluated according to the above criteria. Selection(s) will be made by the DOE Selection Official based on these evaluations, coordination with the NSF, and other programmatic factors.

PART II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT.

DOE anticipates awarding Grants under this FOA.

B. ESTIMATED FUNDING.

It is anticipated that up to \$6,000,000 total will be available for multiple awards to be made in FY2013, contingent on the availability of appropriated funds. Submitted budgets may request one year of support. The year of support (FY2013) is limited to research and experiment concept development work only, not to fabrication of the experiment. The budget explanation page for the year of support must reflect this restriction.

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.

C. MAXIMUM AND MINIMUM AWARD SIZE.

The award size will depend on the number of meritorious applications and the availability of appropriated funds.

D. EXPECTED NUMBER OF AWARDS.

The exact number of awards will depend on the number of meritorious applications and the availability of appropriated funds.

E. ANTICIPATED AWARD SIZE.

The award size will depend on the number of meritorious applications and the availability of appropriated funds.

F. PERIOD OF PERFORMANCE.

A maximum of one year will be considered for support in FY2013.

G. TYPE OF APPLICATION.

DOE will accept new applications under this FOA.

PART III - ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS.

All types of domestic entities are eligible to apply, except other Federal agencies, Federally Funded Research and Development Center (FFRDC) Contractors, 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.

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 and/or the funding opportunity number located on the cover of this FOA and then follow the prompts to download the application package.

B. LETTER OF INTENT AND PRE-APPLICATION.

1. Letter of Intent.

(Requested/Not Required)

A **Letter of Intent (LoI)** that lists the collaboration members and their institutional affiliations is requested, although not required. The LoI should be submitted electronically by E-mail to Michael.Salamon@science.doe.gov and Kathy.Turner@science.doe.gov. By identifying collaboration members these LoI's will help DOE select a review panel that has no conflicts of interest. Submission of LoI's by May 4, 2012 is requested.

2. Pre-Application.

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. Complete all the required fields in accordance with the pop-up instructions on the form. 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.

By submitting an application in response to this FOA the Applicant certifies that:

- It is **not** a corporation that has been convicted (or had an officer or agent of such corporation acting on behalf of the corporation convicted) of a felony criminal violation under any Federal law within the preceding 24 months,

- It is **not** a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability,
- If the Applicant's financial assistance application is chosen for award and the award is in excess of \$1,000,000, the applicant will, by the end of the fiscal year, upgrade the efficiency of their facilities by replacing any lighting that does not meet or exceed the energy efficiency standard for incandescent light bulbs set forth in Section 325 of the Energy Policy and Conservation Act (42 U.S.C. 6295).

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 1-2 pages 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 30 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1.0 inch margins (top, bottom, left, and right). **EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE.** The font in Times New Roman 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 cover page must also 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 Announcement Number: DE-FOA-0000597

DOE/Office of Science Program Office: Office of High Energy Physics

DOE/Office of Science Program Office Technical Contact: Drs. Michael Salamon and Kathy Turner

DOE Grant Number (if Renewal or Supplemental Application):

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.

Collaborative applications submitted from different institutions should clearly indicate they are part of a collaborative project/group. Every partner institution must submit an application through its own sponsored research office. Each application within the collaborative group, including the narrative and all required appendices and attachments, should be identical with one exception: The exception is that each application should contain unique budget and budget justification documents corresponding to the expenditures for that application's submitting institution only. Each collaborative group can have only one lead institution, which should be identified in the common narrative. The common narrative should also contain a summary table describing the budget breakdown by institution for all participants.

Each application belonging to a collaborative group should have the same title in Block 11 of the SF 424 (R&R) form.

Our intent is to create from the various applications associated with a collaborative group one document for merit review that consists of the common, identical required appendices and attachments combined with a set of detailed budgets from the partner institutions. Thus, it is very important that every application in the collaborative group be exactly identical (including the title) with the exception of the budget and budget justification pages.

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 and 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. This 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. **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 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: equipment; domestic and foreign travel; participant/trainees; material 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. 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 2 digit state code followed by a dash and a 3 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, 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 Part 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.

A **Letter of Intent (LoI)** that lists the collaboration members and their institutional affiliations is requested, although not required. The LoI should be submitted electronically by E-mail to Michael.Salamon@science.doe.gov and Kathy.Turner@science.doe.gov. By identifying collaboration members these LoI's will help DOE select a review panel that has no conflicts of interest. Submission of LoI's by May 4, 2012 is requested.

2. Formal Applications.

APPLICATION DUE DATE: July 6, 2012, 11:59 PM Eastern Time

Formal applications submitted in response to this FOA must be received by Friday, July 6, 2012, 11:59 PM Eastern Time, to permit timely consideration of awards in Fiscal Year 2013. **You are encouraged to submit your application well before the deadline. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

F. INTERGOVERNMENTAL REVIEW.

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

G. FUNDING RESTRICTIONS.

Cost Principles. Costs must be allowable 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. 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 Part 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; and (4) the proposed project is responsive to the objectives of the funding opportunity announcement. 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 codified at 10 CFR Part 605.10(d):

1. Scientific and/or technical merit of the project
2. Appropriateness of the proposed method or approach
3. Competency of applicant's personnel and adequacy of proposed resources; and
4. Reasonableness and appropriateness of the proposed budget.

The second-generation dark matter experiment should be described in sufficient detail so as to enable application evaluation using the following additional selection criteria:

- a. Importance of the investigation's experiment within the context of the current and projected future national program of dark matter research.
- b. Adequacy of flow-down from science goals to experiment performance requirements.
- c. Capability of the experiment to meet its performance requirements.
- d. Completeness of the identification of current technical risks; feasibility of the plan for technical risk reduction. The increased risk associated with methods incorporating less mature technologies may be offset by the promise of potentially superior science capabilities.

Approximately two month after the deadline for submission of applications, an external, competitive review will be held in which all compliant applications will be evaluated according to the above criteria. Selections will be made based on these evaluations, coordination with the NSF, and other programmatic factors.

Near the end of the year of funding in FY2013, a down-selection of the investigations will be made by the agency in which only a subset of the investigations will be selected to enter into design, fabrication and commissioning phases as new projects. There will not be a new FOA issued for this purpose; only investigations which have been selected under this FOA can

become candidates for support as a three-year project. The down-selection evaluation process is expected to include:

- An internal agency review of remaining technical and cost risks that might threaten experiment success.
- External assessment of the updated science potential of the dark matter experiment and the potential impact of remaining risks.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES.

It is anticipated that selections will be completed by August 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 allowability 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; 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.

For grants and cooperative agreements made to universities, non-profits and other entities subject to OMB Circular 2 CFR, the Award also includes the Research Terms and Conditions located at <http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp>

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS.

1. Administrative Requirements.

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR Part 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>.

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>.

Statement of Substantial Involvement.

Either a grant or cooperative agreement may be awarded under this FOA. If the award is a cooperative agreement, the DOE Contract Specialist and DOE Project Officer will negotiate a Statement of Substantial Involvement prior to award.

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>.

PART VII - QUESTIONS/AGENCY CONTACTS

A. QUESTIONS.

Questions regarding the content of the FOA 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.

Technical/Scientific Program Contacts:

Dr. Michael Salamon, Office of High Energy Physics, SC-25

PHONE: (301) 903-5106

E-MAIL: michael.salamon@science.doe.gov

Dr. Kathy Turner, Office of High Energy Physics, SC-25

PHONE: (301) 903-1759

E-MAIL: kathy.turner@science.doe.gov

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.

N/A

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.