Program Announcement
to
DOE National Laboratories
LAB 11-450

Applications of Nuclear Science and Technology Initiative

SUMMARY:

The Office of Nuclear Physics (NP), Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for initiatives in Applications of Nuclear Science and Technology, aimed at nuclear science research and development being conducted to achieve Nuclear Physics mission goals and that are also relevant to applications important to the Nation. The knowledge, data, techniques, and methods of nuclear science are utilized in a broad portfolio of applications, including energy, nuclear medicine, commerce, medical physics, space exploration, finance, geology, environmental sciences, and national security.

DATES:

Full proposals submitted in response to this Announcement must be received no later than Monday, April 25, 2011, 11:59 pm ET, to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2011.

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

SUBMISSION INSTRUCTIONS:

Have your LAB administrator submit the entire LAB proposal and Field Work Proposal (FWP) via Searchable FWP (https://www.osti.gov/fwp). If you have questions about who your LAB administrator is or how to use Searchable FWP, please contact the Searchable FWP Support Center. All submissions and inquiries about this Program Announcement must reference Program Announcement LAB 11-450.

FOR FURTHER INFORMATION CONTACT:

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Office of Science
U. S. Department of Energy
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SUPPLEMENTARY INFORMATION:

Background:
Includes:

- *The Frontiers of Nuclear Science—a Long Range Plan*, DOE/NSF Nuclear Science Advisory Committee (December 2007) http://www.sc.doe.gov/np/.

- *Report to the Nuclear Science Advisory Committee,* Submitted by the Subcommittee on Performance Measures, August 2008, http://www.sc.doe.gov/np/nsac/docs/PerfMeasEvalFinal.pdf.

- *Report of the Nuclear Physics and Related Computational Science R&D for Advanced Fuel Cycles Workshop*, DOE Offices of Nuclear Physics and Advanced Scientific Computing Research (August 2006) http://www.sc.doe.gov/np/program/docs/AFC_Workshop_Report_Final.pdf.

- *Advancing Nuclear Medicine Through Innovation*, National Academy of Sciences (2007) http://www.sc.doe.gov/np/.

- *Report on the Workshop on the Role of the Nuclear Physics Research Community in Combating Terrorism*, DOE Office of Nuclear Physics (July 2002), http://www.sc.doe.gov/np/homeland/index.html.

- *Nuclear Forensics—Role, State of the Art, Program Needs*, American Physical Society and American Association for the Advancement of Science http://www.aps.org/policy/reports/upload/Nuclear-Forensics-Report-FINAL.pdf.

Program Objective:

The mission of the Nuclear Physics (NP) Program is to discover, explore, and understand all forms of nuclear matter. The fundamental particles that compose nuclear matter—quarks and gluons—are relatively well understood, but exactly how they fit together to create different types of matter in the universe is still largely a puzzle. To solve this mystery, the NP program supports experimental and theoretical research—along with the development and operation of particle accelerators and advanced technologies—to create, detect, and describe the different forms and complexities of nuclear matter that can exist in the universe, including those that are no longer naturally found.

Nuclear science basic research is inherently relevant to a broad suite of applications that are important to the Nation. The advancement of knowledge of nuclear matter and its properties is intertwined with nuclear power, nuclear medicine, national security, the environmental and geological sciences, and isotope production. The NP program develops advanced instrumentation, accelerator techniques, and analytical and computational approaches needed for nuclear science research, and which have broad societal and economic benefits. Equally important, the program trains the highly skilled workforce needed to develop and advance nuclear-related technologies in society, and that enter a variety of other fields that require training in advanced technology and computational and analytical backgrounds.

Under the Fiscal Year 2011 Appropriation, the Office of Nuclear Physics intends to sponsor initiatives in Applications of Nuclear Science and Technology. **The primary goal of these initiatives is to pursue forefront nuclear science research and development needed to achieve Nuclear Physics mission goals and that are also relevant to applications important to the Nation. Proposals that are solely based on pure research or pure applications will not be considered for funding.** Areas of interest include but are not limited to:

a. Identification and development of approaches to the measurement of nuclear data needed for the nuclear energy industry and other applications;

b. Measurement of neutron cross sections and other relevant nuclear data such as decay properties, delayed neutrons, fission yields, photon production, etc., required for advanced reactor fuel cycles and other applications.

c. Development and use of covariances and covariance matrices to support reactor and fuel cycle design and other applications, and to identify priorities for cross section measurements and improved modeling of nuclear reactions.

d. Existing or new instrumentation and accelerator design and development, and analytical and computational methods that can be applied to nuclear forensics, handling of nuclear wastes, nuclear energy, national defense, medicine, environmental, space exploration, finance, commerce, radiation health physics, etc;

Disciplines and areas that could benefit from this initiative include but are not limited to: National Security, where advances in accelerator and instrumentation technology are relevant to defense and homeland security; Nuclear Energy, where new approaches such as advanced fuel cycles, new fuels, and driven systems are of interest, and where minimization or disposal of nuclear waste and protection of fissile and radioactive material from diversion are important; Nuclear Medicine, in which instrumentation and accelerator developments can be of relevance to diagnostic and therapeutic approaches; Radiation Health Physics, where new instrumentation can lead to cost effectiveness, enhanced performance and safer environments for the public; and Nuclear Forensics, which benefits from a trained nuclear science workforce, instrumentation advances and new analytical and computational approaches. A skilled nuclear science workforce is the underpinning of the applied science workforce.

Proposals will be reviewed by experts in nuclear science and in the applications of nuclear science and technology. Awards will be based on how well the proposals address the review criteria and program policy factors.

Collaboration

Collaborative research projects with other institutions, such as universities, industry, non-profit organizations, and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, are encouraged under this Announcement. Proposals submitted from different institutions, which are directed at a single research activity, should clearly indicate they are part of a proposed collaboration and contain a brief description of the overall research project. However, each proposal must have a distinct scope of work and a qualified principal

investigator who is responsible for the research effort being performed at his or her institution. If a university is part of a proposed collaboration, the university must submit a separate application that meets all the essentials stated above. It is highly recommended to include on the first page of the proposal narrative a simple table listing every collaborating institution/PI and the amount of funding requested by each. Further information on preparation of collaborative proposals may be accessed via the Internet at: http://www.sc.doe.gov/grants/colab.asp.

PROGRAM FUNDING:

It is anticipated that up to $3,500,000 will be available for awards to be made in Fiscal Year 2011, and maintained in outyears, contingent on the availability of appropriated funds. Proposals may request project support for one year only but may present projected outyear budget requests. The number and size of awards will depend on the number of proposals received and selected for award and the availability of appropriated funds.

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

The instructions and format described should be followed. You must reference Program Announcement LAB 11-450 on all submissions and inquiries about this program.

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

Proposals from National Laboratories submitted to the Office of Science (SC) as a result of this Program Announcement will follow the Department of Energy Field Work Proposal process with additional information requested to allow for scientific/technical merit review. The following guidelines for content and format are intended to facilitate an understanding of the requirements necessary for SC to conduct a merit review of a proposal. Please follow the guidelines carefully, as deviations could be cause for declination of a proposal without merit review.

1. Evaluation Criteria

After an initial screening for eligibility and responsiveness to this Announcement, proposals will be subjected to a formal scientific merit review (peer review). The proposals will be evaluated against the following criteria, which are listed in descending order of importance:

Each proposal should address the following **review criteria**:

1. Scientific and/or technical merit of the proposed project – both the nuclear physics research and the application of that research;
2. The Appropriateness of the proposed method or approach;
3. The Competency of the applicant's personnel;
4. The adequacy of the proposed resources, and the reasonableness and appropriateness of the proposed budget; and
5. Any other factors relevant to the proposed project.

In addition, each proposal should also address these **program policy factors**:

a. The particular outstanding scientific opportunity in nuclear physics research afforded by the proposed research and its relevance to the NSAC Performance Measures and/or opportunities identified in the NSAC 2007 Long Range Plan;
b. The relevance and impact of this opportunity on applications and applied sciences; and
c. The opportunity for training personnel in key disciplines of nuclear science that are in short supply, such as nuclear chemistry and closely related disciplines, nuclear forensics, nuclear engineering, and radiation health science.

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the Announcement and the agency's programmatic needs. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of a proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

2. Summary of Proposal Contents

- Field Work Proposal (FWP) Format (Reference DOE Order 412.1A) (DOE ONLY)
- Proposal Cover Page
- Table of Contents
- Budget (DOE Form 4620.1) and Budget Explanation
- Abstract (one page)
- Narrative (main technical portion of the proposal, including background/introduction, proposed research and methods, timetable of activities, and responsibilities of key project personnel - 12-page limit)
- Literature Cited
- Biographical Sketch(es)
- Description of Facilities and Resources
- Other Support of Investigator(s)
- Appendix (optional)

2.1 Submission Instructions

Have your LAB administrator submit the entire LAB proposal and FWP via Searchable FWP (https://www.osti.gov/fwp). All submissions and inquiries about this Program Announcement must reference Program Announcement LAB 11-450. If you have questions about who your LAB administrator is or how to use Searchable FWP, please contact the Searchable FWP Support Center.

For further information contact:

Program Manager: Dr. Manouchehr Farkhondeh
Office of Nuclear Physics
Office of Science
U. S. Department of Energy
Phone: 301-903-4398

E-Mail: Manouchehr.Farkhondeh@science.doe.gov

3. Detailed Contents of the Proposal

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

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

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

3.2 Proposal Cover Page

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

Title of proposed project
SC Program announcement title and number: **Applications of Nuclear Science and Technology Initiative (LAB 11-450)**
Name of laboratory
Name of principal investigator (PI)
Position title of PI
Mailing address of PI
Telephone of PI
Fax number of PI
Electronic mail address of PI
Name of official signing for laboratory*
Title of official
Fax number of official
Telephone of official
Electronic mail address of official
Requested funding for each year; total request
Use of human subjects in proposed project:
    If activities involving human subjects are not planned at any time during the proposed project period, state "No"; otherwise state "Yes", provide the IRB Approval date and Assurance of Compliance Number and include all necessary information with the proposal should human subjects be involved.
Use of vertebrate animals in proposed project:
    If activities involving vertebrate animals are not planned at any time during this project, state "No"; otherwise state "Yes" and provide the IACUC Approval date

and Animal Welfare Assurance number from NIH and include all necessary information with the proposal.

Signature of PI, date of signature
Signature of official, date of signature*

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

3.3 Table of Contents

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

3.4 Budget and Budget Explanation

A detailed budget is required for the entire project period and for each fiscal year. It is preferred that DOE's budget page, Form 4620.1 be used for providing budget information*. Modifications of categories are permissible to comply with institutional practices, for example with regard to overhead costs.

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

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

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

3.5 Abstract

Summarize the proposal in one page. Give the project objectives (in broad scientific terms), the approach to be used, and what the research is intended to accomplish. State the hypotheses to be tested (if any). At the top of the abstract give the lead DOE national Laboratory, project title, names of all the investigators and their institutions, and contact information for the principal investigator, including e-mail address.

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

The narrative comprises the research plan for the project and is limited to **maximum of 12 pages**. It should contain enough background material in the Introduction, including review of the relevant literature, to demonstrate sufficient knowledge of the state of the science. The major part of the narrative should be devoted to a description and justification of the proposed project, including details of the methods to be used. It should also include a timeline for the major

activities of the proposed project, and should indicate which project personnel will be responsible for which activities. It is important that the 12-page technical information section provide a complete description of the proposed work, because reviewers are not obliged to read the Appendices. Proposals exceeding these page limits may be rejected without review or the first 12 pages may be reviewed without regard to the remainder.

All proposals submitted in response to this LAB Announcement must explicitly state how the proposed project will support the accomplishment of the program goals and the NP mission, including the project's impact on applications of interest to the Office of Science.

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

3.7 Literature Cited

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

3.8 Biographical Sketches

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

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

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

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

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

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

Collaborators and Co-editors: A list of all persons in alphabetical order (including their current organizational affiliations) who are currently, or who have been, collaborators or co-authors with the investigator on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of the proposal. Also, include those individuals who are currently or have been co-editors of a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of the proposal. Finally, list any individuals who are not listed in the previous categories with whom you are discussing future collaborations. If there are no collaborators or co-editors to report, this should be so indicated.

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

3.9 Description of Facilities and Resources

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

3.10 Other Support of Investigators

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

3.11 Appendix

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

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

4. Detailed Instructions for the Budget

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

4.1 Salaries and Wages

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

4.2 Equipment

DOE defines equipment as "an item of tangible personal property that has a useful life of more than two years and an acquisition cost of $50,000 or more." Special purpose equipment means equipment which is used only for research, scientific or other technical activities. Items of needed equipment should be individually listed by description and estimated cost, including tax, and adequately justified. Allowable items ordinarily will be limited to scientific equipment that is not already available for the conduct of the work. General purpose office equipment normally will not be considered eligible for support.

4.3 Domestic Travel

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

4.4 Foreign Travel

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

4.5 Other Direct Costs

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

a. Materials and Supplies

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

b. Publication Costs/Page Charges

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

c. Consultant Services

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

d. Computer Services

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

e. Subcontracts

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

4.6 Indirect Costs

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