Program Announcement
To DOE National Laboratories
LAB 09-13

THIS IS A RECOVERY ACT ANNOUNCEMENT

RECOVERY ACT (ARRA)
APPLICATIONS OF NUCLEAR SCIENCE AND TECHNOLOGY

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 research and development activities in nuclear science that are 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.

PROPOSAL DUE DATE: Formal proposals submitted in response to this Announcement must be received by May 6, 2009, 8:00 p.m. Eastern time, to permit timely consideration of awards. **You are encouraged to transmit your proposal well before the deadline. PROPOSALS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

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

ADDRESSES:

Please have your lab administrator submit the entire lab proposal and 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.

Also, to assist in expediting the review process, please submit via federal express, a single PDF file of the entire LAB proposal and FWP on a CD along with two hard copies to the address below.

Please send the CD and 2 hard copies via Federal Express to:

Chris Izzo
Office of Nuclear Physics, SC-26

Office of Science
19901 Germantown Road
Germantown, MD 20874-1290
ATTN: Program Announcement LAB 09-13

FOR FURTHER INFORMATION CONTACT:

Technical/Scientific Program Contact for this program is:

Program Manager: Manouchehr Farkhondeh
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SUPPLEMENTARY INFORMATION:

Projects under this Announcement will be funded, in whole or in part, with funds appropriated by the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, (Recovery Act or Act). The Recovery Act's purposes are to stimulate the economy and to create and retain jobs. Accordingly, special consideration will be given to projects that promote and enhance the objectives of the Act, especially job creation, preservation and economic recovery, in an expeditious manner.

Be advised that special terms and conditions may apply to projects funded by the Act relating to:

- Reporting, tracking and segregation of incurred costs;
- Reporting on job creation and preservation;
- Publication of information on the Internet;
- Access to records by Inspectors General and the Government Accountability Office;
- Prohibition on use of funds for gambling establishments, aquariums, zoos, golf courses or swimming pools;
- Ensuring that iron, steel and manufactured goods are produced in the United States;
- Ensuring wage rates are comparable to those prevailing on projects of a similar character;
- Protecting whistleblowers and requiring prompt referral of evidence of a false claim to an appropriate inspector general; and
- Certification and Registration.

These special terms and conditions will be based on provisions included in Titles XV and XVI of the Act. The exact terms and conditions will be provided as soon as available.

The Office of Management and Budget (OMB) has issued Initial Implementing Guidance for the Recovery Act. See M-09-10, Initial Implementing Guidance for the American Recovery and Reinvestment Act of 2009. OMB will be issuing additional guidance concerning the Act in the near future. Applicants should consult the DOE website, http://www.energy.gov, the OMB website http://www.whitehouse.gov/omb/, and the Recovery website, http://www.recovery.gov regularly to keep abreast of guidance and information as it evolves.

Recipients of funding appropriated by the Act shall comply with requirements of applicable Federal, State, and local laws, regulations, DOE policy and guidance, and instructions in this Announcement, unless relief has been granted by DOE. Recipients shall flow down the requirements of applicable Federal, State and local laws, regulations DOE policy and guidance, and instructions in this Announcement to subrecipients at any tier to the extent necessary to ensure the recipient's compliance with the requirements.

Be advised that Recovery Act funds can be used in conjunction with other funding as necessary to complete projects, but tracking and reporting must be separate to meet the reporting requirements of the Recovery Act and related OMB Guidance. Applicants for projects funded by sources other than the Recovery Act should plan to keep separate records for Recovery Act funds and to ensure those records comply with the requirements of the Act. Funding provided through the Recovery Act that is supplemental to an existing grant is one-time funding.

Applicants should begin planning activities for their first tier subawardees, including obtaining a DUNS number (or updating the existing DUNS record), and registering with the Central Contractor Registration (CCR). The extent to which subawardees will be required to register in the CCR will be determined by OMB at a later date.

ADDITIONAL SUPPLEMENTARY INFORMATION:

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 American Recovery and Reinvestment Act (ARRA) of 2009 and the Fiscal Year 2009 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 important to the NP mission and that is also relevant to applications. The Office of Nuclear Physics solicits innovative research and development proposals that are relevant to basic nuclear science research goals, while simultaneously being relevant to existing or next-generation applications of nuclear science. 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 of new approaches to the handling of nuclear wastes;
d. Development of new and improved instrumentation, techniques and methods that can be applied to nuclear forensics, nuclear energy, national defense, medicine, environmental, space exploration, finance, commerce, radiation health physics, etc;
e. 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.

Each proposal should address the scientific and technical merit of the effort, the appropriateness of the proposed method or approach, the competency of the applicant's personnel, the adequacy of the proposed resources, the reasonableness and appropriateness of the proposed budget, and any other factors relevant to the proposed project. Proposals will be reviewed by experts in nuclear science and in the applications of nuclear science and technology.

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

- The particular outstanding scientific opportunity in nuclear physics research afforded by the proposed research and its relevance to the NSAC Performance Measures and opportunities identified in the NSAC long range plan;
- The relevance and impact of this opportunity on applications and applied sciences; and
- 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 Announcement invites experts from across the National Laboratory complex, Universities and commercial enterprises to plan, design, carry out, and report on the results of the studies and investigations, and assist in the transfer of these results to practice. Collaborative efforts including multi-institutional, multi-investigator efforts are encouraged to foster the measurement of essential data, the development of knowledge, and the exchange of scientific ideas, and to extend interdisciplinary research. Basic research will be performed to provide the fundamental understanding and the basic data needed to advance future technologies. Researchers will design and fabricate state-of-the-art prototype accelerators, instrumentation, and other equipment, and develop advanced methods and techniques for new applications. A modeling and simulation component may foster interdisciplinary methodologies to surmount existing barriers for technology development. An important element of the initiative is to foster training of students and early career scientists and engineers in nuclear sciences.

Disciplines and areas that are likely to 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 may be of interest; Minimization or disposal of nuclear waste and protection of fissile and radioactive material from diversion are important questions; Nuclear medicine applications, in which diagnostics and therapy is a major benefit to the health of the public; Radiation health physics developing new instrumentation leading to safer environments for the public; Development of equipment, methods and techniques that, at lower cost, provide higher performance and improve safety; Nuclear forensics, which has become an increasingly important element to our Nation's security. A skilled nuclear physics and chemistry workforce is essential to apply fundamental nuclear science in the field. Our society needs and continues to develop new applications of nuclear methods and techniques, and could benefit from focused efforts to improve processes, safety, and other characteristics related to the use of radionuclides and radiation. Other nuclear science areas exist from which advances could be identified and developed in future technologies.

ESTIMATED FUNDING

It is anticipated that a total of up to approximately $7,000,000 will be available for awards in the first year starting as early as Fiscal Year 2009. Over the estimated five year span of these initiatives, the total funding may be approximately $30,000,000. The number and size of awards will depend on the number of proposals selected for award, and the availability of appropriated funds.

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

SUBMISSION INFORMATION

The instructions and format described below must be followed. You must reference Program Announcement LAB 09-13 on all submissions and inquiries about this Program Announcement.

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 the solicitation, proposals will be subjected to scientific merit review (peer review). The proposals will be evaluated against the following criteria, which are listed in descending order of importance. Included with each criteria are the detailed questions that will be asked of the reviewers.

1. Scientific and/or Technical Merit of the Proposed Research
2. Appropriateness of the Proposed Method or Approach
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources
4. Reasonableness and Appropriateness of the Proposed Budget
5. Other Appropriate Factors

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the Announcement and the Department's programmatic needs. External peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. 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)
- Literature Cited
- Biographical Sketch(es)
- Description of Facilities and Resources
- Other Support of Investigator(s)
- Appendix (optional)

2.1 Number of Copies to Submit

Please have your lab administrator submit the entire lab proposal and 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.

Also, to assist in expediting the review process, please submit via federal express, a single PDF file of the entire LAB proposal and FWP on a CD along with two hard copies to the address below.

Please send the CD and 2 hard copies via Federal Express to:

Chris Izzo
Office of Nuclear Physics, SC-26
Office of Science
19901 Germantown Road
Germantown, MD 20874-1290
ATTN: Program Announcement LAB 09-13

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, by using small type, of providing more text in their proposals. 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. Laboratories may submit proposals directly to the SC Program office listed above. A copy should also be provided to the appropriate DOE operations office.

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
- 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 no more than two pages. 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 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. 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.

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(s) 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." Collaborative research projects with institutions that receive grants, such as universities, industry, and non-profit organizations, are allowed under this Announcement. See the section on Collaboration. Further information on collaboration may be accessed at http://www.science.doe.gov/grants/Colab.html.

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 5 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. 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.