

**Office of Science
Financial Assistance
Funding Opportunity Announcement
DE-PS02-09ER09-24**

Topical Collaborations in Nuclear Theory

The Office of Nuclear Physics (NP), Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving proposals for Topical Collaborations in Nuclear Theory. Topical Collaborations are fixed-term, multi-institution collaborations established to investigate a specific topic in nuclear physics of special interest to the community, which is well aligned with programmatic NP goals. They also provide a mechanism for maintaining a robust community, by encouraging the creation of tenured university appointments and permanent laboratory positions in nuclear theory.

APPLICATION DUE DATE: September 1, 2009, 8:00 pm, Eastern Time

Formal applications submitted in response to this Announcement must be received by September 1, 2009, 8:00 p.m. Eastern time, to permit timely consideration of awards. **APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.**

ATTENTION - CHANGE IN SUBMISSION REQUIREMENT EFFECTIVE March 12, 2009:

The Office of Science is now requiring all financial assistance applications be submitted through the Department of Energy e-Center (IIPS) <http://doe-iips.pr.doe.gov/>. Applicants will still need to visit the Grants.gov website <http://www.grants.gov/> to download the required Application Package (forms), by clicking on "Apply for Grants" and searching for the Funding Opportunity Announcement.

For Instructions on the Use of IIPS visit this web page, IIPS Instructions.
<http://www.sc.doe.gov/grants/iips-Instructions.html>

Registration Requirements: There are several one-time actions you must complete in order to submit an application (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See <http://www.grants.gov/GetStarted>. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.doc> 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.

GENERAL INQUIRIES ABOUT THIS FOA SHOULD BE DIRECTED TO:

Scientific/Technical Program Contact:

Program Manager: George Fai
Phone: 301-903-8954
Fax: 301-903-3833
E-Mail: George.Fai@science.doe.gov

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>.

A Vision for Nuclear Theory, Report of the NSAC Subcommittee on Nuclear Theory (October 2003) <http://www.sc.doe.gov/np/nsac/nsac.html>.

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, the quarks and gluons, are familiar, but how they interact and combine to form nuclear matter remains a broad and open field of research. To address these issues, the NP program supports experimental and theoretical research and the development and operation of particle accelerators and advanced technologies. The NP Program is also responsible for the development and production of critical isotopes for the Nation.

The Nuclear Theory subprogram supports theoretical research at universities and DOE national laboratories with the goal of improving our fundamental understanding of nuclear physics, interpreting the results of experiments carried out in part under the auspices of the experimental nuclear physics program, and identifying and exploring important new areas of research. This subprogram addresses all three of the field's scientific frontiers, as described in the NSAC Long Range Plan. A major theme of this subprogram is an understanding of the mechanisms and effects of quark confinement and de-confinement; a quantitative description of these phenomena starting from the fundamental theory of quantum chromodynamics remains one of the Nuclear Theory subprogram's great intellectual challenges. New theoretical and computational tools are being developed to describe nuclear many-body phenomena, which may also have important applications in condensed matter physics and in other areas of the physical sciences. Another major research area is nuclear astrophysics, which includes efforts to understand the origins of the elements (as in supernovae) and the consequences that neutrino masses have for nuclear astrophysics and for the current theory of elementary particles and forces.

Many of the theoretical aspects of nuclear physics could benefit from additional long-term sustained efforts beyond the base program that bring together the resources of several institutions in a coordinated way to address a well defined problem or topical area. The Office of Nuclear Physics accordingly solicits applications for finite duration, multi-institutional Topical Collaborations, to be initiated through a peer review process. These applications must have a clear description of their relevance to the goals of the national nuclear science program, and contain a list of "deliverable" results anticipated during the award period. These collaborations will function as hubs of a network of scientists from the participating institutions, support sustained interaction and communication within the network, and provide a mechanism for placing new researchers in permanent positions in nuclear theory. These initiatives are intended to bring together, on a temporary basis, research groups of leading nuclear theorists, leverage the resources of small research groups, and provide expanded opportunities for the next generation of nuclear theorists. Areas of interest include but are not limited to:

- a. Effective field theory descriptions of nuclear forces
- b. Properties of nuclei far from stability
- c. Microscopic studies of nuclear input parameters for astrophysics
- d. Calculations of electroweak corrections to precision data
- e. Microscopic nuclear reaction theory
- f. Analysis of the spectrum of excited baryons and mesons
- g. Studies of the phases of strongly-interacting matter
- h. Phenomenology of hard probes of hot, dense matter
- i. Phenomenology of thermal probes of hot matter
- j. Simulations of core collapse supernovae
- k. Lattice simulations of hadron properties
- l. Lattice simulations of thermal quantum chromodynamics
- m. *Ab initio* many-body calculations
- n. Phenomenology of neutrino oscillations
- o. Dynamics of fission
- p. Calculations of double beta decay nuclear matrix elements
- q. Extensions of the Standard Model

Each application should address the scientific and technical merit of the effort, the appropriateness of the proposed method or approach, the background and expertise of the participants, the adequacy of the proposed resources, the reasonableness and appropriateness of the proposed budget, and any other factors relevant to the proposed project. Applications will be reviewed by experts in nuclear science.

Merit Review

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria listed in descending order of importance as codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project
2. Appropriateness of the Proposed Method or Approach

3. Competency of the Research Team and Adequacy of Available Resources
4. Reasonableness and Appropriateness of the Proposed Budget.

The evaluation 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. It should be noted that external peer reviewers are selected on the basis of their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers may be used, and submission of an application constitutes agreement that this review process is acceptable to the investigator(s) and the submitting institution.

In addition, each application should also address the following 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 specific goals of the collaboration, and a timeline, including milestones, for reaching those goals;
- The relevance and impact of this opportunity on experimental nuclear physics;
- The opportunities for training and placing permanent researchers in nuclear theory.

Additional Information:

The project narrative is limited to 20 pages.

Preapplications are not required. Cost sharing is not required, but any planned cost sharing, such as partial institutional funding of tenure-track positions, should be indicated. Since one purpose of this program is to increase staffing levels in nuclear theory, joint funding and bridging positions are anticipated, and will be considered favorably in the proposal review process.

It is estimated that selections of applications will be announced by November 16, 2009.

Collaboration:

Collaborative research projects with other institutions, such as universities, non-profit organizations, and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, are encouraged. Further information on preparation of collaborative applications may be accessed via the Internet at: <http://www.science.doe.gov/grants/Colab.html>.

PROGRAM FUNDING:

A total of up to approximately \$6,000,000 will be available for awards over a period of five years, starting in Fiscal Year 2010. It is anticipated that two to three Topical Collaborations will initially be established, for a period of no more than five years each. We expect that a Topical Collaboration will typically be supported at approximately \$300,000 to \$500,000 per year, although applications with smaller funding requirements will also be considered. The number and size of awards will depend on the number of applications 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 applications. DOE reserves the right to fund, in whole or in part, any, all, or none of the applications submitted.

A companion Program Announcement to DOE Laboratories (LAB 09-24) will be posted on the Office of Science Grants and Contracts web site at:

http://www.sc.doe.gov/grants/LAB09_24.html.

The Catalog of Federal Domestic Assistance (CFDA) number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

Posted on the Office of Science Grants and Contracts Web Site
June 29, 2009.