Program Announcement
To DOE National Laboratories
LAB 09-24

Topical Collaborations in Nuclear Theory

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 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.

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

Formal proposals 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. **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:

Christine Izzo, SC-26
Office of Nuclear Physics
Office of Science
19901 Germantown Road
Germantown, MD 20874-1290
ATTN: Program Announcement LAB 09-24

GENERAL INQUIRIES ABOUT THIS ANNOUNCEMENT 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
Communications related to the formal proposal should use "Program Announcement LAB09-24" in the subject line.

SUPPLEMENTARY INFORMATION:

Program Objective:

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 proposals for finite duration, multi-institutional Topical Collaborations, to be initiated through a peer review process. These proposals 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 proposal 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. Proposals will be reviewed by experts in nuclear science.

Additional Information:

The project narrative is limited to 20 pages.

Preproposals 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 proposals 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 proposals 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 proposals with smaller funding requirements will also be considered. 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.

The instructions and format described below should be followed. You must reference Program Announcement LAB09-24 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 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.

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 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 proposal constitutes agreement that this review process is acceptable to the investigator(s) and the submitting institution.

In addition, each proposal 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.

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, recent accomplishments, 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)

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.

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 and is **limited to 20 pages** (maximum), including text and figures, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) and font not smaller than 11 point. 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 20-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.

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

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 general 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 $25,000 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.