Office of Science
Financial Assistance
Funding Opportunity Announcement
DE-PS02-06ER06-23

Annual Notice
for Continuation of Availability of Grants and Cooperative Agreements for Nuclear Physics

The Office of Nuclear Physics (NP), within the Office of Science (SC) of the Department of Energy (DOE), hereby announces its continuing interest in receiving **NEW** applications for support of research in Nuclear Physics.

On September 3, 1992, DOE published in the Federal Register the Office of Energy Research Financial Assistance Program (now called the Office of Science Financial Assistance Program), 10 CFR Part 605, Final Rule, which contained a solicitation for this program. The purpose of this solicitation is to request that all NEW applications for the Office of Nuclear Physics be submitted in response to this notice instead of the "Annual Notice - Continuing Solicitation for all Office of Science Programs". This does not change the process for renewal and supplemental applications. All renewal and supplemental applications should still be submitted in response to the "Annual Notice - Submission of Renewal and Supplemental Applications for Office of Science Grants". Information about submission of applications, eligibility, limitations, evaluation and selection processes and other policies and procedures are specified in 10 CFR Part 605 which can be accessed at: http://www.science.doe.gov/grants/. Additional requirements for applicants to the Office of Nuclear Physics can be found at http://www.sc.doe.gov/np/grants/grants.html. See SUPPLEMENTARY INFORMATION section for more in-depth information on scientific and technical areas of interest to the Office of Science.

LETTER OF INTENT: October 1, 2006, 4:30 PM Eastern Time

A Letter of Intent, consisting of information on collaborators and a brief summary of proposed research (one paragraph), is encouraged (but not required) and should be submitted by October 1, 2006, by e-mail directly to the Office of Nuclear Physics at one of the addresses listed below. Please include the phrase "New Application Letter of Intent" in the subject line of the e-mail.

APPLICATION DUE DATE: November 1, 2006, 8:00 PM Eastern Time

Applications must be submitted using Grants.gov, the Funding Opportunity Announcement can be found using the CFDA Number, 81.049 or the Funding Opportunity Announcement number, DE-PS02-06ER06-23. Applicants must follow the instructions and use the forms provided on Grants.gov.

Formal applications **must be submitted by November 1** of the Fiscal Year for which funding is requested to permit timely consideration for award in that Fiscal Year. If this deadline is not met, the application will probably not be considered for funding until the next Fiscal Year. Any new applications not able to meet this deadline may be submitted in response to the "Annual Notice - Continuing Solicitation for all Office of Science Programs" mentioned above for consideration in the subsequent Fiscal Year.

PROGRAM MANAGER: Dr. Eugene A. Henry, Office of Nuclear Physics, SC-26

Dr. Eugene A. Henry (Low Energy Nuclear Physics)
PHONE: 301-903-6093
E-MAIL: Gene.Henry@science.doe.gov

ADDITIONAL PROGRAM CONTACTS:

Dr. W. Bradford Tippens (Medium Energy Nuclear Physics)
PHONE: 301-903-3904
E-MAIL: Brad.Tippens@science.doe.gov

Dr. Gulshan Rai (Heavy Ion Nuclear Physics)
PHONE: 301-903-4702
E-MAIL: Gulshan.Rai@science.doe.gov

Dr. Sidney A. Coon (Nuclear Theory and Nuclear Data)
PHONE: 301-903-7878
E-MAIL: Sidney.A.Coon@science.doe.gov

SUPPLEMENTARY INFORMATION: The following program descriptions are offered to provide more in-depth information on scientific and technical areas of interest to the Office of Science.

Nuclear Physics

The Nuclear Physics program supports basic research, technical developments and world- class accelerator facilities to expand our fundamental understanding of the interactions and structures of atomic nuclei and nuclear matter, and an understanding of the forces of nature as manifested in nuclear matter. Today, the reach of nuclear physics extends from the quarks and gluons that form the substructure of the once-elementary protons and neutrons, to the most dramatic of cosmic events-supernovae. These and many other diverse activities are driven by five broad questions articulated in 2002 by the Nuclear Science Advisory Committee (NSAC) in the *Opportunities in Nuclear Science: A Long- Range Plan for the Next Decade*. The four subprogram areas and their objectives are organized around answering these five key questions. Research activities supported by the Office of Nuclear Physics are aligned with and contribute to the overall progress of the following long term performance measures:

- Make precision measurements of fundamental properties of the proton, neutron and simple nuclei for comparison with theoretical calculations to provide a quantitative understanding of their quark substructure.
- Recreate brief, tiny samples of hot, dense nuclear matter to search for the quark-gluon plasma and characterize its properties.
- Investigate new regions of nuclear structure, study interactions in nuclear matter like those occurring in neutron stars, and determine the reactions that created the nuclei of atomic elements inside stars and supernovae.
- Measure fundamental properties of neutrinos and test fundamental symmetries of nature that are relevant to the field of nuclear physics or that use the atomic nucleus as a laboratory.
- Contribute to the theoretical understanding of any of the above.

The program is organized into the following four subprograms:

(a) Medium Energy Nuclear Physics
This subprogram supports experimental research primarily at the Thomas Jefferson National Accelerator Facility and with the polarized proton collision program at the Relativistic Heavy Ion Collider (RHIC-Spin), directed at answering the first key question: *What is the structure of the nucleon?* Detailed investigations of the structure of the nucleon are aimed at understanding how these basic building blocks of matter are constructed from the elementary quarks and gluons of Quantum Chromo-Dynamics (QCD) and how complex interactions among them generate all the properties of the nucleon, including its electromagnetic and spin properties. New knowledge in this area would also allow the nuclear binding force to be described in terms of QCD, thus providing a path for understanding the structure of atomic nuclei from first principles.
Program Contact: (301) 903-3904

(b) Heavy Ion Nuclear Physics
This subprogram supports experimental research primarily at the Relativistic Heavy Ion Collider (RHIC) directed at answering the second question: *What are the properties of hot nuclear matter?* At extremely high temperatures, such as those that existed in the early universe immediately after the "Big Bang," normal nuclear matter is believed to revert to its primeval state called the quark-gluon plasma. This research program aims to recreate extremely small and brief samples of this high energy density phase of matter in the laboratory by colliding heavy nuclei at relativistic energies. At much lower temperatures, nuclear matter passes through another phase transition from a Fermi liquid to a Fermi gas of free roaming nucleons; understanding this phase transition is also a goal of the subprogram.
Program Contact: (301) 903-4702

(c) Low Energy Nuclear Physics
This subprogram supports experimental research directed at understanding the remaining three questions: *What is the structure of nucleonic matter?* Forefront nuclear structure research lies in studies of nuclei at the limits of excitation energy, deformation, angular momentum, and isotopic stability. The properties of nuclei at these extremes are not known and such knowledge is needed to test and drive improvement in nuclear models and theories about the nuclear many-body system. *What is the nuclear microphysics of the universe?* Knowledge of the detailed nuclear

structure, nuclear reaction rates, half- lives of specific nuclei, and the limits of nuclear existence at both the proton and neutron drip lines is crucial for understanding the nuclear astrophysics processes responsible for the production of the chemical elements in the universe, and the explosive dynamics of supernovae. *Is there new physics beyond the Standard Model?* Studies of fundamental interactions and symmetries, including those of neutrino oscillations, are indicating that our current "Standard Model" theory which explains what the universe is and what holds it together is incomplete, opening up possibilities for new discoveries by precision experiments.
Program Contact: (301) 903-6093

(d) Nuclear Theory (including the Nuclear Data subprogram)
Progress in nuclear physics, as in any science, depends critically on improvements in the theoretical techniques and on new insights that will lead to new models and theories that can be applied to interpret experimental data and predict new behavior. The Nuclear Theory program supports theoretical research directed at understanding all five of the central questions identified in the NSAC 2002 Long Range Plan.

Included in the theory program are the activities that are aimed at providing information services on critical nuclear data and have as a goal the compilation and dissemination of an accurate and complete nuclear data information base that is readily accessible and user oriented.
Program Contact: (301) 903-7878

Posted on the Office of Science Grants and Contracts Web Site
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