

Office of Science
Notice 02-27

*Research and Development
for the Rare Isotope Accelerator*

Department of Energy

Office of Science Financial Assistance Program Notice 02-27; Research and Development
for the Rare Isotope Accelerator

AGENCY: U.S. Department of Energy

ACTION: Notice inviting grant applications.

SUMMARY: The Nuclear Physics Division (NP), Office of High Energy and Nuclear Physics (HENP), Office of Science (SC), U.S. Department of Energy (DOE), hereby announces interest in receiving applications for Research and Development (R&D) projects directed at the proposed Rare Isotope Accelerator (RIA). RIA is proposed as a new accelerator facility to address emerging research opportunities in low energy nuclear physics, and DOE is sponsoring pre-conceptual R&D activities on the facility.

DATES: The deadline for receipt of formal applications is 4:30 p.m., E.D.T., October 2, 2002, to be accepted for merit review and to permit timely consideration for award in early Fiscal Year 2003.

ADDRESSES: We encourage you to submit formal applications in response to this solicitation electronically through DOE's Industry Interactive Procurement System (IIPS) at: <http://e-center.doe.gov/>. IIPS provides for the posting of solicitations and receipt of applications in a paperless environment via the World Wide Web. Applications must be submitted through IIPS in PDF format by an authorized institutional business official. Questions regarding the operation of IIPS may be e-mailed to the IIPS Help Desk at: HelpDesk@e-center.doe.gov or you may call the help desk at (800) 683-0751. Further information on the use of IIPS by the Office of Science is available at: <http://www.sc.doe.gov/production/grants/grants.html>.

If you are unable to submit the application through IIPS, formal applications referencing Program Notice 02-27, should be sent to: **The address as published in the Federal Register on August 8, 2002 was incorrect and a revision will be published within the next two weeks. The correct addresses follow:** U.S. Department of Energy, Office of Science, Grants and Contracts Division, SC-64/Germantown Building, 1000 Independence Avenue, SW, Washington, D.C. 20585-1290, ATTN: Program Notice 02-27.

When Submitting applications by U.S. Postal Service Express Mail, any commercial mail delivery service, or when hand carried by the applicant, the following address must be used: U.S.

Department of Energy, Office of Science, Grants and Contracts Division, SC-64, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 02-27.

FOR FURTHER INFORMATION CONTACT: Dr. Eugene A. Henry, Nuclear Physics Division, Office of High Energy and Nuclear Physics, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290; telephone: (301) 903-6093; facsimile: (301) 903-3833; e-mail: gene.henry@science.doe.gov. The full text of Program Notice 02-27 is available via the World Wide Web using the following web site address: <http://www.sc.doe.gov/production/grants/grants.html>.

SUPPLEMENTARY INFORMATION: The nuclear science community has proposed the Rare Isotope Accelerator as a new accelerator facility to address emerging research opportunities in nuclear structure, nuclear astrophysics, and fundamental interactions and symmetries. [See the DOE/NSF Nuclear Science Advisory Committee's 2002 Long Range Plan.]

The Department of Energy is sponsoring pre-conceptual research and development for the Rare Isotope Accelerator. Community sponsored studies and workshops have identified a number of areas where focused R&D and prototyping could enhance performance, reduce costs, and impact the engineering and construction schedule. Among these areas are:

- Gas stopper for fast fragments. A key feature of the RIA concept is the use of intense high-energy heavy-ion beams with projectile fragmentation as the production mechanism. The gas stopper will slow the projectile fragments and deliver them for subsequent re-acceleration.
- Fragment momentum compression preceding the gas stopper. To stop fragments efficiently in a finite gas stopper volume, there must be compensation of the large fragment momentum spread.
- Fragment separators that handle beam spray and allow beam sharing. Development work on the front end of the fragment separator is required to minimize radiation damage to the magnetic elements.
- Electron cyclotron resonance (ECR) ion sources producing high intensity, high-charge-state uranium, and the low energy beam transport (LEBT). The driver linear accelerator requires ECR ion source performance for uranium greater than the current state of the art by a factor of 2 to 8.
- Driver technologies, especially superconducting radio-frequency (SRF) structures. The driver linear accelerator will require a number of distinct radio-frequency (RF) structures, likely superconducting, but possibly room temperature. Among the issues to be addressed are beam loss, SRF structure cavity cleanliness, and overall cost.
- Beam stripping. The high power of the heavy ion beams requires innovative solutions to beam strippers such as liquid lithium films, or rotating carbon foil strippers that do not degrade beam emittance.
- High-power targets including liquid lithium for fragmentation and isotope separator on-line (ISOL-type) sources with good diffusion and effusion properties. The development of ISOL-type targets with long lifetimes and fast extraction times at high beam powers are essential for the success of RIA. For in-flight fragmentation and fission, development

of a liquid-lithium target, or other new high power fragmentation target concepts, is imperative.

- Other RIA accelerator and experimental facility components will also require focused effort. These include post-acceleration including radio frequency quadrupoles (RFQs) and very low velocity accelerating structures, charge-multiplying ECRs, radiation hardened magnetic equipment, innovative detector instrumentation, beam diagnostics optimized for a broad range of beam intensities, beam dumps, radio-frequency equipment, and controls.

The concept, elements and R&D issues of RIA are outlined in the Nuclear Science Advisory Committee (NSAC) ISOL Taskforce Report that can be found at:

<http://www.sc.doe.gov/production/henp/np/>. Select the NSAC button.

Applications requesting support for research and development in the areas outlined above should indicate a separate task for each area. Applications may include more than one task. For each task the application should address the goal of the effort; the method or approach to be taken; the cost and schedule of the effort; the deliverable result of the work; and the performance, cost, or schedule benefit for RIA. Institutional contributions to the effort should be clearly indicated.

Program Funding

It is anticipated that up to \$3,500,000 will be available for multiple awards to be made in early Fiscal Year 2003, in the areas described above, contingent on the availability of appropriated funds. Applications should be for one year, with a continuation of up to two additional years for those tasks requiring a multi-year effort. For continuation of multi-year effort, out-year support is contingent on the availability of funds, progress of the research and programmatic needs. For multi-year tasks, intermediate milestones should be indicated.

Collaboration

Applicants are encouraged to collaborate with researchers in other institutions, such as: universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, where appropriate, and to include cost sharing and/or consortia wherever feasible. Additional information on collaboration is available in the Application Guide for the Office of Science Financial Assistance Program that is available via the World Wide Web at:

<http://www.sc.doe.gov/production/grants/Colab.html>.

Formal Applications

Information about the development and submission of applications, eligibility, limitations, evaluation, selection process, and other policies and procedures are contained in 10 CFR Part 605, and in the Application Guide for the Office of Science Financial Assistance Program. Electronic access to the latest version of the Office of Science's Financial Assistance Guide and required forms is made available via the World Wide Web at:

<http://www.sc.doe.gov/production/grants/grants.html>. DOE is under no obligation to pay for any costs associated with the preparation or submission of applications if an award is not made.

The research project description must be five pages per task or less, exclusive of attachments and must contain an abstract or summary of the proposed research. Projects reporting results or progress on work conducted with DOE funding under the previous RIA R&D program may include two additional pages per task. All collaborators should be listed with the abstract or summary. On the grant face page, form DOE F 4650.2, in block 15, also provide the Principal Investigator's phone number, fax number, and E-mail address. Attachments include curriculum vitae, a listing of all current and pending federal support and letters of intent when collaborations are part of the proposed research. Curriculum vitae should be limited to no more than two pages per individual.

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 Part 605.10(d):

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,
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 agency's programmatic needs. Note, 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 an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

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

John Rodney Clark
Associate Director of Science
for Resource Management

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