

Office of Science
Notice DE-FG01-03ER03-23

*Research and Development
for the Rare Isotope Accelerator*

Department of Energy

Office of Science Financial Assistance Program Notice DE-FG01-03ER03-23; Research and Development for the Rare Isotope Accelerator

AGENCY: U.S. Department of Energy

ACTION: Notice inviting grant applications.

SUMMARY: The Office of Nuclear Physics (NP), 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., Wednesday, October 15, 2003, to be accepted for merit review and to permit timely consideration for award in early Fiscal Year 2004.

ADDRESSES: Formal applications in response to this solicitation are to be electronically submitted by an authorized institutional business official 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 Internet. In order to submit applications through IIPS your business official will need to register at the IIPS website. The Office of Science will include attachments as part of this notice that provide the appropriate forms in PDF fillable format that are to be submitted through IIPS. **IIPS offers the option of submitting multiple files—please limit submissions to only one file within the volume if possible, with a maximum of no more than four files. Color images should be submitted in IIPS as a separate file in PDF format and identified as such. These images should be kept to a minimum due to the limitations of reproducing them. They should be numbered and referred to in the body of the technical scientific application as Color image 1, Color image 2, etc.** Questions regarding the operation of IIPS may be e-mailed to the IIPS Help Desk at: HelpDesk@pr.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>.

FOR FURTHER INFORMATION CONTACT: Dr. Eugene A. Henry, Office Nuclear Physics, SC-23/Germantown, Office of Science, U.S. Department of Energy, 1000 Independence

Avenue, SW, Washington, DC 20585-1290; telephone: (301) 903-6093; facsimile: (301) 903-3833; e-mail: gene.henry@science.doe.gov. The full text of Program Notice DE-FG01-03ER03-23 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 available at the following website address: <http://www.sc.doe.gov/production/henp/np/nsac/nsac.html>.

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/nsac/nsac.html>.

Updated opportunities for RIA R&D can be found at the following website after September 15, 2003: <http://www.sc.doe.gov/henp/np/program/riard.htm>.

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 2004, 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 should 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. Please note that 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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