

**PROGRAM ANNOUNCEMENT  
TO DOE NATIONAL LABORATORIES**



**U. S. Department of Energy  
Office of Science  
Office of High Energy Physics**

**FY2015 Research Opportunities in  
Accelerator Stewardship**

**DOE National Laboratory Announcement Number: LAB 14-1142  
Announcement Type: Initial**

<b>Issue Date:</b>	<b>June 13, 2014</b>
<b>Letter of Intent Due Date:</b>	<b>July 3, 2014, at 5 PM Eastern Time (A Letter of Intent is <b>required</b>)</b>
<b>Encourage/Discourage Response:</b>	<b>July 10, 2014, at 5 PM Eastern Time</b>
<b>Proposal Due Date:</b>	<b>September 4, 2014, at 11:59 PM Eastern Time</b>

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## **REGISTRATIONS**

### **A. DOE Office of Science Portfolio Analysis and Management System (PAMS)**

The DOE Office of Science performs many functions for DOE national laboratory proposals in the Portfolio Analysis and Management System (PAMS), which is available at <https://pamspublic.science.energy.gov>.

There are many activities that you can perform in PAMS, and more functionality will be added throughout the near future. DOE national laboratories will submit pre-proposals, letters of intent, and proposals directly into PAMS.

You must register in PAMS to submit a pre-proposal, letter of intent, or DOE national laboratory proposal.

To access PAMS, you may use the Internet Explorer, Firefox, Google Chrome, or Safari browsers.

Notifications sent from the PAMS system will come from the PAMS email address <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)>. Please make sure your email server/software allows delivery of emails from the PAMS email address to yours.

Registering to PAMS is a two-step process; once you create an individual account, you must associate yourself with (“register to”) your institution. Detailed steps are listed below.

#### **1. CREATE PAMS ACCOUNT:**

To register, click the “Create New PAMS Account” link on the website <https://pamspublic.science.energy.gov/>.

- Click the “No, I have never had an account” link and then the “Create Account” button.
- You will be prompted to enter your name and email address, create a username and password, and select a security question and answer. Once you have done this, click the “Save and Continue” button.
- On the next page, enter the required information (at least one phone number and your mailing address) and any optional information you wish to provide (e.g., FAX number, website, mailstop code, additional email addresses or phone numbers, Division/Department). Click the “Create Account” button.
- Read the user agreement and click the “Accept” button to indicate that you understand your responsibilities and agree to comply with the rules of behavior for PAMS.
- PAMS will take you the “Having Trouble Logging In?” page. (Note: If you reviewed for or were listed as PI on a prior submission to the Office of Science but have not previously created an account, you may already be linked to an institution in PAMS. If this is the case, PAMS will take you to the PAMS home page.)

## 2. REGISTER TO YOUR INSTITUTION:

- Click the link labeled “Option 2: I know my institution and I am here to register to the institution.” (Note: If you previously created a PAMS account but did not register to an institution at that time, you must click the Institutions tab and click the “Register to Institution” link.)
- PAMS will take you to the “Register to Institution” page.
- Type a word or phrase from your institution name in the field labeled, “Institution Name like,” choose the radio button next to the item that best describes your role in the system, and click the “Search” button. A “like” search in PAMS returns results that contain the word or phrase you enter; you need not enter the exact name of the institution, but you should enter a word or phrase contained within the institution name. (Hint: If your institution has an acronym, such as ANL for Argonne National Laboratory or UCLA for the Regents of the University of California, Los Angeles, you may search for the acronym under “Institution Name like.” Many institutions with acronyms are listed in PAMS with their acronyms in parentheses after their names.)
- Find your institution in the list that is returned by the search and click the “Actions” link in the Options column next to the institution name to obtain a dropdown list. Select “Add me to this institution” from the dropdown. PAMS will take you to the “Institutions – List” page.
- If you do not see your institution in the initial search results, you can search again by clicking the “Cancel” button, clicking the Option 2 link, and repeating the search.
- All DOE National Laboratories have established profiles in PAMS, so please keep searching until you find your laboratory.

For help with PAMS, click the “External User Guide” link on the PAMS website, <https://pamspublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this DOE National Laboratory Announcement should reference **LAB 14-1142**.

## **Section I – DOE NATIONAL LABORATORY OPPORTUNITY DESCRIPTION**

### **GENERAL INQUIRIES ABOUT THIS ANNOUNCEMENT SHOULD BE DIRECTED TO:**

#### **Administrative Contact:**

Questions about program rules should be sent to [SC.HEPFOA@science.doe.gov](mailto:SC.HEPFOA@science.doe.gov)

#### **Technical/Scientific Program Contact:**

Questions regarding the specific program areas/technical requirements should be directed to the technical contacts listed in Section I below for each program covered by the PA.

### **SUMMARY**

The Office of High Energy Physics at the U.S. Department of Energy, Office of Science hereby invites new proposals for support of research programs in Accelerator R&D Stewardship.

### **SUPPLEMENTARY INFORMATION**

The following program description is offered to provide more in-depth information on scientific and technical areas of interest to the Office of High Energy Physics Long-Term Accelerator R&D Stewardship program.

Please note that this DOE National Laboratory Program Announcement (PA) is only for opportunities advancing the Accelerator R&D Stewardship mission. This Accelerator Stewardship PA is for R&D activities that may impact High Energy Physics, but which predominantly impact other non-HEP applications.

**Program Website:** <http://science.energy.gov/hep/research/accelerator-rd-stewardship/>

The mission of the long-term accelerator R&D stewardship program is to support fundamental accelerator science and technology development of relevance to many fields beyond High Energy Physics, and to disseminate accelerator knowledge and training to the broad community of accelerator users and providers.

Central goals of Accelerator R&D Stewardship are to:

- Engage the expertise and facilities of the existing U. S. accelerator R&D ecosystem in a manner that enhances the ability of the DOE Office of Science specifically, and other federal agencies generally, to conduct their missions;
- Enhance the accelerator technology capabilities of U. S. industry;
- Drive a limited number of specific accelerator applications towards practical, testable prototypes in a 5-7 year timeframe;

- Foster collaboration between developers of accelerator technology and experts who apply accelerator technology;
- Provide the basic R&D foundation necessary for sustained innovation across a broad range of accelerator applications.

This call for proposals is for applied R&D that is focused on developing a prototype in response to a specific technical challenge.

Applications that are intended to meet specific BES or NP programmatic needs should be submitted in response to the FOAs issued by those Offices.

Proposals that are not in direct support of a topic below (e.g., conferences, experimental operations, specific project R&D or fabrication, etc.) must be submitted to the current annual Office of Science Funding Opportunity Announcement (DE-FOA-0000995 for Fiscal Year 2014).

### **Accelerator Stewardship Topical Areas**

**Technical Contact: is specific to the topic; see below.**

Accelerator Stewardship Topic Areas are focused R&D efforts aimed at solving a specific accelerator application problem in a specific area. The desired end goal after 3-6 years is a working prototype technology. Teams, comprising at a minimum an accelerator technology partner and an application partner, are expected to apply in this area, and develop a proposal that clearly defines the technology development pathway, teaming and management plan, IP allocation, and market opportunity (where applicable).

Applicants must provide a demonstration of the Stewardship customer's commitment to the proposed activity. This commitment may take the form of uncompensated effort; the provision of surplus materials, supplies, or equipment; the provision of access to facilities at no or reduced cost; voluntary cost sharing; mentoring, training, or coaching of personnel; or other methods of involving the Stewardship customer in the proposed activity.

There are three topic areas active in this PA:

- a) Particle Therapy Beam Delivery Improvements
- b) Ultrafast Laser Technology Program
- c) Energy Efficiency Improvements for Office of Science Accelerators

Proposals should address specific research goals in only **one** of these topical areas.

In addition to the standard merit criteria applied to all scientific proposals, proposals submitted will be specifically reviewed for (1) the strength and breadth of the collaborative team and (2) the quality of the technology R&D plan. See section V.A.2 for a detailed description of the Merit Review Criteria.

(a) **Particle Therapy Beam Delivery Improvements**  
**Technical Contact: Michael Zisman, (301)-903-2718,**  
**Michael.Zisman@science.doe.gov**

Even with less than fully optimized treatment techniques, there have been reports of impressive local control rates using particle beam therapy for otherwise difficult-to-treat cancers. Although lower-cost proton beam options are starting to appear, today's proton beam facilities are costly to build and thus are not widely available. Based on their potential biological advantage, there is now increasing medical interest in exploring the use of other light ions for therapy; typically, beams up to carbon are considered.

While beam delivery ("gantry") systems for proton beams have been designed and constructed previously, they are typically large, massive, and costly. Accommodating heavier beams, up to carbon, with similar technology requires delivery systems that are even more massive.

Short dose deposition times, on the order of seconds, will require fast and efficient scanning in all three spatial dimensions. This will place new demands on the accelerator, beam line and detector systems to guide and verify dose placement.

Ion beam therapy also comes with unique challenges, requirements and opportunities for imaging. There is a big gap between imaging capabilities of today and imaging needs for future ion beam therapy facilities. This gap needs to be bridged in order to fully exploit the potential of ion beam therapy. For conventional photon therapy, it suffices (to first order) to know the tumor position at every moment in time, whereas proton and ion beam therapy additionally require dynamic knowledge of the surrounding anatomy, because those tissues affect the range of the beam. Ideally, the range of the beam will be directly observed with "range imaging" techniques. Ultimately, in order to capture the temporal-spatial (4D) dose distribution, it would be desirable to know the 4D distribution of stopping power of the tumor and normal tissues with great precision.

Proposals in this topical area should address ideas for providing one or more of the following:

1. less massive and more compact beam delivery systems capable of delivering ion beams from protons up to carbon that are suitable for patient therapy
2. technology that can provide for rapid (seconds) scanning of the beam over a tumor volume in three dimensions, that is both transversely and longitudinally
3. beam diagnostic technologies for ion beam therapy, with emphasis on increased readout speed and accuracy of position and dose

To meet the teaming requirement, proposals authors **are strongly encouraged to** include significant participation from each of the following: (1) an institution with technical leadership in a relevant accelerator technology, (2) a medical institution with clinical experience in imaging and treatment for external beam radiotherapy (EBRT), and (3) a domestic company currently marketing EBRT products. Proposals lacking significant participation from either a clinical or accelerator technology partner and/or lacking an industry partner may score poorly under merit review.

The Particle Therapy Beam Delivery Improvements program of this PA does **not** request designs for accelerators themselves, but covers only ancillary devices that work in conjunction with an accelerator. Proposals to design an accelerator or accelerator complex are outside the scope of this call, and such proposals will be declined without review. Designs that are independent of the proton or ion beam accelerator, such that they can work with more than one type of accelerator, are preferred.

PIs are strongly encouraged to review the report of the recent workshop on Ion Beam Therapy, held January 9-11, 2013. The report provides an overview of the technical issues and required R&D to develop accelerator technologies for ion beam treatment of cancer. The report is available online at [http://science.energy.gov/~media/hep/pdf/accelerator-rd-stewardship/Workshop\\_on\\_Ion\\_Beam\\_Therapy\\_Report\\_Final\\_R1.pdf](http://science.energy.gov/~media/hep/pdf/accelerator-rd-stewardship/Workshop_on_Ion_Beam_Therapy_Report_Final_R1.pdf).

**(b) Ultrafast Laser Technology Program**  
**Technical Contact: Eric Colby, 301-903-5475, Eric.Colby@science.doe.gov**

Lasers are used or proposed for use in many areas of accelerator applications: as drivers for novel accelerator concepts for future colliders; in the generation, manipulation, and x-ray seeding of electron beams; in the generation of electromagnetic radiation ranging from THz to gamma rays; and in the generation of neutron, proton, and light ion beams. In many cases, ultrafast lasers with pulse lengths well below a picosecond are required, with excellent stability, reliability, and beam quality. With applications demanding ever-higher fluxes of particles and radiation, the driving laser technology must also increase in repetition rate—and hence average power—to meet the demand.

These applications have some general technological requirements in common:

- Ultrafast pulses (<1 ps)
- High average powers (>1 kW up to 100 kW or more)
- Diffraction limited beams
- Good (ps) to excellent (fs) pulse timing
- Robust and reliable operation

Many important applications also require, or can benefit from:

- High pulse energy (>0.01 J up to 1 kJ)
- High pre-pulse power contrast (better than  $10^{-9}$ )
- High wall plug efficiency (>20% with a goal of 30% or higher)
- Longer laser wavelengths (>1.5  $\mu\text{m}$  out to 10  $\mu\text{m}$ )

The primary goals of the Ultrafast Laser Technology Program are to develop the enabling technologies that will ultimately lead to construction of demonstration prototypes for one or more of the principal types of ultrafast lasers needed for accelerator applications, and to enhance industry's capability to produce the necessary technologies. Ultrafast lasers for accelerator applications fall into four basic laser types, summarized in Table 1 below.

**Table 1. Target performance parameters for the four principal types of ultrafast lasers**

	<b>Type I</b>	<b>Type II</b>	<b>Type III</b>	<b>Type IV</b>
Wavelength ( $\mu\text{m}$ )	1.5-2.0	0.8-2.0	2.0-5.0	2.0-10.0
Pulse Energy	3 $\mu\text{J}$	3 J	0.03–1 J	300 J
Pulse Length (fs)	300	30–100	50	100–500
Repetition Rate	1–1000 MHz	1 kHz	100 kHz	100 Hz
Average Power (kW)	Up to 3	3	3 and up	30
Energy Stability	<1%	<0.1%	<1%	<1%
Beam Quality	$M^2 < 1.1$	Strehl > 0.95	$M^2 < 1.1$	$M^2 < 1.1$
Wall-plug Efficiency	>30%	>20%	>20%	>20%
Pre-Pulse Contrast	N/A	> $10^{-9}$	N/A	> $10^{-9}$
CEP-capable	Required	N/A	Required	N/A
Optical Phase Noise	< $5^\circ$	N/A	< $5^\circ$	N/A
Wavelength Tunability Range	0.1%	0.1%	10%	0.1%

- Type I laser systems, used both to directly power laser-driven accelerators-on-a-chip, and as subassemblies of coherently combined fiber arrays used to generate higher pulse energies.
- Type II laser systems, used to excite plasma waves for particle trapping and high gradient acceleration, and for the generation of x-rays through Compton backscattering.
- Type III laser systems, used for generating high repetition rate radiation pulses through nonlinear processes, particularly high-harmonic generation (HHG).
- Type IV laser systems, used for plasma-based sources of protons, light ions, and neutrons.

This initial phase of the Laser Technology Program will concentrate on basic research and engineering design studies to produce the breakthroughs in technology and design architecture necessary to make each of the four laser types practical. Proposals are sought in these five topical areas:

- (1) **Ultrafast gain materials capable of very high average power.** Development of materials suitable for fiber or bulk usage, supporting amplification of <100 fs pulses, with excellent thermal conductivity, low thermal lensing, low saturation fluence, high damage threshold and small quantum defect will be key to increasing average power capabilities of ultrafast lasers. Materials must be scalable to average powers in the kilowatt range and above while maintaining excellent beam quality.
- (2) **Increased robustness and reduction in size of optical components.** Each will reduce the cost of ultrafast laser systems. Development of ultrafast optical coatings and materials capable of supporting <100 fs laser pulses with significantly increased damage threshold, excellent thermal stability, and low loss and low scatter will permit more compact, higher

reliability ultrafast lasers to be developed.

- (3) **Innovations in laser architectures, cryogenics, other advanced thermal management techniques.** Direct diode pumping, coherent combination, hybrid fiber/bulk systems, and the use of advanced cryogenic systems will be needed to significantly increase the average power performance of ultrafast lasers.
- (4) **Wavelength extension further into the infrared.** The development of efficient, robust, cost-effective ultrafast laser systems out to 10 microns in wavelength will enable new applications such as solid-state seeding for ultrafast CO<sub>2</sub> lasers and driving HHG hard x-ray generators, as well as open new opportunities in plasma acceleration and high harmonic generation. Significant increases in repetition rate are needed to achieve high average power.
- (5) **Improvements in laser quality.** Advances in pulse contrast, optical phase noise, flexible pulse shaping (both transverse and longitudinal), and precision synchronization to external references will directly impact both the quality and capability of the laser-based sciences.

This Ultrafast Laser Technology Program of this PA includes initial R&D to identify promising technical avenues for developing ultrafast lasers of the four types discussed above. It does **not** include the engineering and construction of full-scale demonstration laser systems for any of the four types during this initial phase. Proposals to develop full-scale demonstration laser systems are out of the scope of this PA, and will be declined without review.

To meet the teaming requirement, proposals **are strongly encouraged to** include significant participation from each of the following: (1) an institution with technical leadership in a relevant laser technology, and (2) an institution with technical leadership in the application of laser technology to accelerators and/or a domestic company currently marketing related laser products. Proposals lacking significant participation from a laser technology or accelerator technology partner, or an industry partner, may score poorly under merit review.

PIs are strongly encouraged to review the report of the recent workshop on Laser Technology for Accelerators, held January 23–25, 2013. The report provides an overview of the technical issues and required R&D to develop ultrafast laser technology for accelerator applications. The report is available online at [http://science.energy.gov/~media/hep/pdf/accelerator-rd-stewardship/Lasers\\_for\\_Accelerators\\_Report\\_Final.pdf](http://science.energy.gov/~media/hep/pdf/accelerator-rd-stewardship/Lasers_for_Accelerators_Report_Final.pdf).

- (c) **Energy Efficiency Improvements compatible with Office of Science Accelerators**  
**Technical Contact: Eric Colby, (301)-903-5475, Eric.Colby@Science.doe.gov**

Executive Order 13514, together with DOE's 2010 Strategic Sustainability Performance Plan, mandate a 28% reduction in greenhouse gas emissions from DOE-owned facilities by 2020, when compared with the baseline year 2008. Current DOE Office of Science accelerators consume roughly ~1 TW-hr/yr of electricity.

Magnet and RF power sources consume a majority of the total power for large accelerators. Improving the power efficiency of these sources can yield significant operational savings over the lifetime of an accelerator.

Proposals are sought for R&D leading to new concepts in very high efficiency power conversion systems in two categories:

**1. *Plug-Compatible Concepts***

Developments in this area are targeted at upgrading existing power supplies, modulators and/or klystrons that are currently in service. Designs must be as close to plug-compatible as possible.

**2. *Revolutionary Concepts***

Developments in this area must offer revolutionary gains in efficiency. While plug-compatibility is not required, a cost/benefit analysis must be included in the proposal to support the claim that the differential cost of developing, deploying, and operating the new power system components will generate a positive return on investment over a 10-year time period.

Proposals in this area may propose the use of Office of Science facilities to test their approaches and concepts, but any technologies, techniques, concepts, or other products will remain the property of their inventors or the relevant applicant. Concepts proposed in this area must be of potential utility to any operators of large magnets or RF power sources.

To meet the teaming requirement, proposals in topic area **are strongly encouraged to** include significant participation from each of the following: (1) an institution with technical leadership in a relevant accelerator technology, and (2) a domestic company currently marketing related power conversion technology. Proposals lacking significant participation in either of these two areas will be declined without review.

## **PROPOSAL REQUIREMENTS**

All proposals submitted to this Program Announcement (PA) must address one of the research topic areas described in the previous section. Further, all proposals must conform to the format specified in Section IV of this PA; each proposal will be pre-screened for responsiveness to the research area descriptions and for compliance with the proposal requirements.

## **Section II – AWARD INFORMATION**

### **A. TYPE OF AWARD INSTRUMENT**

DOE anticipates awarding laboratory work authorizations under this DOE National Laboratory Program Announcement.

### **B. ESTIMATED FUNDING**

It is anticipated that approximately \$10,000,000 will be available for all Accelerator R&D Stewardship new, renewal and cooperative agreement awards in FY 2015, subject to the availability of appropriated FY 2015 funds. The number, duration and size of awards will depend on the number of proposals selected for award, and the actual amount of funds available in FY 2015.

DOE is under no obligation to pay for any costs associated with preparation or submission of a proposal. DOE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this PA.

### **C. MAXIMUM AND MINIMUM AWARD SIZE**

(See B. Estimated Funding Section above.)

### **D. EXPECTED NUMBER OF AWARDS**

(See B. Estimated Funding Section above.)

### **E. ANTICIPATED AWARD SIZE**

(See B. Estimated Funding Section above.)

### **F. PERIOD OF PERFORMANCE**

(See B. Estimated Funding section above.)

### **G. TYPE OF PROPOSAL**

DOE will accept new DOE National Laboratory Proposals under this DOE National Laboratory Program Announcement. Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. The Office of Science will request FWPs later from those selected for funding consideration under this Announcement.

## **Section III – ELIGIBILITY INFORMATION**

### **A. ELIGIBLE APPLICANTS AND TOPICS**

The intent of this program is to strengthen the capabilities of the U. S. in accelerator technology applications to discovery science, medicine, industry, energy & environment, and security applications.

This is a DOE Lab-only Announcement. FFRDCs from other Federal agencies are not eligible to submit in response to this Program Announcement. Other entities should consult the companion Funding Opportunity Announcement **DE-FOA-0001142**.

For official postings see the Office of Science Grants and Contracts web site, <http://www.science.energy.gov/grants>.

### **B. COST SHARING**

Cost sharing is not required, but a demonstration of institutional commitment to the proposed activity is strongly encouraged for all proposals. The institutional commitment may take the form of uncompensated effort; the provision of surplus materials, supplies, or equipment; the provision of access to facilities at no or reduced cost; voluntary cost sharing; mentoring, training, or coaching of personnel; or other methods of involving the applicant institution in the proposed activity.

Reviewers will be asked to evaluate the strength of the collaboration proposing the work; the demonstration of institutional commitment will be taken as evidence of the Stewardship customer's interest in the outcome. See section V.A.2.

### **C. ELIGIBLE INDIVIDUALS**

Eligible individuals with the skills, knowledge, and resources necessary to carry out the proposed research as a Principal Investigator are invited to work with their organizations to develop a proposal. Individuals from underrepresented groups as well as individuals with disabilities are always encouraged to apply.

## Section IV – PROPOSAL AND SUBMISSION INFORMATION

### A. ADDRESS TO REQUEST PROPOSAL PACKAGE

Proposal submission instructions are available in this Announcement on the DOE Office of Science Portfolio Analysis and Management System (PAMS). Screenshots showing the steps in DOE National Laboratory proposal submission are available in the PAMS External User Guide, accessible by navigating to <https://pamspublic.science.energy.gov> and clicking on the “PAMS External User Guide” link.

Proposals submitted outside of PAMS will not be accepted.

### B. LETTER OF INTENT AND PRE-PROPOSAL

#### 1. Letter of Intent

LETTER OF INTENT DUE DATE

**July 3, 2014, at 5 PM Eastern Time**

A Letter of Intent (LOI) is required and should be submitted by **July 3, 2014, at 5 PM Eastern Time**. Letters of Intent will not be accepted after this time. Proposals submitted by the proposal deadline of **September 4, 2014, at 11:59 PM Eastern Time** will be declined without review if no prior LOI was submitted.

The LOI must include the following:

- A cover sheet with the following information:
  - i. Program Announcement (PA) Number: **LAB 14-1142**
  - ii. Title of the planned research proposal
  - iii. Name of Lead Principal Investigator and Job Title
  - iv. Name and mailing address of the sponsoring institution
  - v. E-mail address and telephone number of the Principal Investigator
  - vi. Additional Senior Investigator(s) and Senior/Key personnel expected to be involved in the planned proposal
  - vii. Administrative Point of Contact, Telephone number, and E-mail address
  - viii. Indicate type of proposal planned: New or Renewal
  - ix. Indicate # year(s) for proposal project period for the planned proposal (typically 3 years)
  - x. Topical area for the planned proposal, as specified in Section I of this PA
  - xi. Relevant DOE Technical Contact name(s) as listed in Section I of this PA
- An overview of the research plan limited to two pages. This overview should include:
  - i. Background information: Why is the proposed work important? What experience does the group have working in this area?
  - ii. Proposed Research: What will be accomplished? What methods will be used? Why is the approach superior to existing approaches?
  - iii. Statement of Work: At a high level, what are the main tasks to be accomplished?

- iv. Description of results, products: What scientific and/or technical advances will result? How will the results be a significant advance over existing knowledge or techniques? How will the results be captured? (scientific papers, prototypes, patents, software packages, etc.)?
- v. Teaming and Management Plan: With whom will you plan to team? What unique advantages does your group or team have? How do the group/team participants reflect the range of skills needed to complete the proposed research? How will the effort be managed?
- vi. Cost, Schedule, Milestones: Provide a high-level description of the cost, schedule, and major milestones of the proposed work.

Only those applicants that submit a LOI by the due date are eligible to submit a full proposal under this PA.

Letters of Intent will be reviewed for responsiveness of the proposed work to the research topics identified in this PA. DOE will send a response by email to each applicant encouraging or discouraging the submission of full proposals by **July 10, 2014, at 5 PM Eastern Time**. Applicants who have not received a response regarding the status of their LOI review by this date are responsible for contacting the program to confirm this status. **Only those proposals that receive notification from DOE encouraging a full proposal may submit full proposals.** No other full proposals will be considered.

The LOI must be submitted electronically through the DOE Office of Science Portfolio Analysis and Management System (PAMS) website <https://pamspublic.science.energy.gov/>. It is important that the LOI be a single file with extension .pdf, .docx, or .doc. The Principal Investigator (PI) and anyone submitting on behalf of the PI must register for an account in PAMS before it will be possible to submit a letter of intent. **All PIs and those submitting LOIs on behalf of PIs are encouraged to establish PAMS accounts as soon as possible to avoid submission delays or missed deadlines.**

To access PAMS, you may use the Internet Explorer, Firefox, Google Chrome, or Safari browsers.

## **2. Pre-application: Pre-applications are not required.**

### **C. CONTENT AND PROPOSAL FORMS**

PROPOSAL DUE DATE

**September 4, 2014, at 11:59 PM Eastern Time**

LETTERS

Letters of support are not required.

#### **1. Information about PAMS**

SUBMISSION INSTRUCTIONS

Full proposals must be submitted into the DOE Office of Science Portfolio Analysis and Management System (PAMS). For help with PAMS, click the “External User Guide” link on the PAMS website, <https://pamspublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9:00 AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free number) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submissions and inquiries about this Program Announcement should reference **LAB 14-1142**. Full proposals submitted in response to this Program Announcement must be submitted to PAMS no later than May 23, 2014 at 5:00 PM Eastern Time.

All PIs and those submitting on behalf of PIs are encouraged to establish PAMS accounts as soon as possible to ensure timely submissions. To register, click “Create New PAMS Account” on the website <https://pamspublic.science.energy.gov/> and follow the instructions for creating an account.

The following information is provided to help with proposal submission. Detailed instructions and screen shots can be found in the user guide. To find the user guide, click the “External User Guide” link on the PAMS home page. Onscreen instructions are available within PAMS.

- Log into PAMS. From the proposals tab, click the “View DOE National Laboratory Announcements” link and find the current announcement in the list. Click the “Actions/Views” link in the Options column next to this Announcement to obtain a dropdown menu. Select “Submit Proposal” from the dropdown.
- Note that you must select one and only one Principal Investigator (PI) per proposal; to do so, click the “Select PI” button on the far right side of the screen. Find the appropriate PI from the list of all registered users from your institution returned by PAMS. (Hint: You may have to sort, filter, or search through the list if it has multiple pages.) Click the “Actions” link in the Options column next to the appropriate PI to obtain a dropdown menu. From the dropdown, choose “Select PI.”
- If the PI for whom you are submitting does not appear on the list, it means he or she has not yet registered in PAMS. For your convenience, you may have PAMS send an email invitation to the PI to register in PAMS. To do so, click the “Invite PI” link at the top left of the “Select PI” screen. You can enter an optional personal message to the PI in the “Comments” box, and it will be included in the email sent by PAMS to the PI. You must wait until the PI registers before you can submit the proposal. Save the proposal for later work by selecting “Save” from the dropdown at the bottom of the screen and then clicking the “Go” button. It will be stored in “My Proposals” for later editing. As a minimum, you must complete all the required fields on the PAMS cover page before you can save the proposal for the first time.
- The cover page, budget, and attachments sections of the lab proposal are required by PAMS before it can be submitted to DOE.
- Complete the sections in PAMS one at a time, starting with the cover page and following the instructions for each section.

- Click the “+View More” link at the top of each section to expand the onscreen instructions. On the budget section, click the “Budget Tab Instructions” link to obtain detailed guidance on completing the budget form.
- Save each section by selecting either “Save” (to stay in the same section) or “Save... and Continue to the Next Section” (to move to the next section) from the dropdown menu at the bottom of the screen, followed by clicking the “Go” button.
- If you save the proposal and navigate away from it, you may return later to edit the proposal by clicking the “View My Existing Proposals” or “My Proposals” links within PAMS.
- You must enter a budget for each annual budget period.
- You must also enter a budget for each proposed sub-award. The sub-award section can be completed using the same steps used for the budget section.
- In the attachments section of the lab proposal, the abstract, the budget justification, and the proposal narrative are required and must be submitted as separate files.
- You must bundle everything other than the budget, abstract, and budget justification into one single PDF file to be attached under “Proposal Attachment.”
- Do not attach anything under “Other Attachments.”
- To upload a file into PAMS, click the “Attach File” button at the far right side of the screen. Click the “Browse” (or “Choose File” depending on your browser) button to search for your file. You may enter an optional description of the file you are attaching. Click the “Upload” button to upload the file.
- Once you have saved all of the sections, the “Submit to DOE” option will appear in the dropdown menu at the bottom of the screen.
- To submit the proposal, select “Submit to DOE” from the dropdown menu and then click the “Go” button.
- Upon submission, the PI will receive an email from the PAMS system <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)> acknowledging receipt of the proposal.
- The proposal will also appear under My Proposals with a Proposal Status of “Submitted to DOE.”

Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. The Office of Science will request FWPs later from those selected for funding consideration under this Announcement.

For help with PAMS, click the “External User Guide” link on the PAMS website, <https://pamspublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9:00 AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free number) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submissions and inquiries about this Program Announcement should reference **LAB 14-1142**.

## 2. Detailed Contents of the Proposal

### BUDGET AND BUDGET EXPLANATION

The budget must be submitted into PAMS using the PAMS budget form. Research proposed under this Announcement may only have one annual budget period.

PAMS will calculate the cumulative budget totals for you.

A written justification of each budget item is to follow the budget pages. The budget justification should be placed in a separate, single pdf document and attached on the appropriate screen in PAMS. Further instructions regarding the budget and justification are given below and in the PAMS software.

#### PROJECT SUMMARY/ABSTRACT (NO MORE THAN ONE PAGE)

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s) (PD/PI), the project title, the site(s) where research will be conducted (for experimental-based proposals), the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). A sample is provided below:

<p>A Really Great Idea</p> <p>A. Smith, Lead Institution (Principal Investigator) A. Brown, Institution 2 (Co-Investigator) A. Jones, Institution 3 (Co-Investigator)</p> <p>Text of abstract</p>
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The project summary must not exceed 1 page when printed using standard 8.5” by 11” paper with 1” margins (top, bottom, left and right) with font not smaller than 11 point. To attach a Project Summary/Abstract, click “Add Attachment.”

- Do not include any proprietary or sensitive business information.
- DOE may use the abstract may to prepare public reports about supported research.

#### DOE COVER PAGE

(PART OF PROJECT NARRATIVE)

The proposal narrative should begin with a cover page that will not count toward the project narrative page limitation. The cover page must include the following items:

- The Project Title:
- Applicant/Institution:
- Street Address/City/State/Zip:
- Postal Address:
- Lead PI name, Telephone number, Email:
- Administrative Point of Contact name, Telephone number, Email:
- Program Announcement (PA) Number: **LAB 14-1142**

- DOE/Office of Science Program Office: **Office of High Energy Physics**
- DOE/Office of Science Program Office Technical Contact: [SC.HEPFOA@science.doe.gov](mailto:SC.HEPFOA@science.doe.gov) **or the appropriate Technical Contact listed in Section I under the Supplementary Information subsection in this PA.**
- PAMS Letter of Intent or Pre-proposal tracking number (if applicable):
- Topical Area as identified in Section I of this PA :

COVER PAGE SUPPLEMENT FOR COLLABORATIONS  
(PART OF PROJECT NARRATIVE ATTACHED TO FIELD 8 ON THE FORM)

Collaborative proposals submitted from different institutions must clearly indicate they are part of a collaborative project/group. **Proposal authors are strongly encouraged to include collaborating institutions.** Every partner institution must submit a proposal through its own sponsored research office. Each collaborative group can have only one lead institution. Each proposal within the collaborative group, including the narrative and all required appendices and attachments, must be identical with the following exceptions:

- Each proposal must contain a correct SF-424 (R&R) cover page for the submitting institution only.
- Each proposal must contain a unique budget corresponding to the expenditures for that proposal's submitting institution only.
- Each proposal must contain a unique budget justification corresponding to the expenditures for that proposal's submitting institution only.

Collaborations that include other institutions that are not DOE National Laboratories should note that separate proposals should be submitted in response to the companion Funding Opportunity Announcement (DE-FOA-0001142).

Each proposal belonging to a collaborative group should have the same title in Block 11 of the SF 424 (R&R) form.

The Office of Science will use the multiple applications associated with a collaborative group to create one consolidated document for merit review that consists of the common, identical application materials combined with a set of detailed budgets from the partner institutions. It is very important that every application in the collaborative group be identical (including the title) with the exception of the budget and budget justification pages.

If the project is a collaboration, provide the following information on a separate page as a supplement to the cover page.

- List all collaborating institutions by name with each institution's principal investigator on the same line.
- Indicate the lead PI who will be the point of contact and coordinator for the combined research activity.
- Provide a statement explaining the leadership structure of the collaboration.
- Include a description of each collaborating institution's facilities, equipment, and resources that will be made available to the collaborative group.

- If applicable, explain how students and junior researchers will be trained and mentored by the collaborators.

Include a table modeled on the following chart providing summary budget information from all collaborating institutions. Provide the total costs of the budget request in each year for each institution and totals for all rows and columns. If necessary, modify the table below for the correct number of years.

<b>Name and Yearly Budget for Proposals with Multiple Collaborating Institutions</b>						
	<b>Name</b>	<b>Institution</b>	<b>Year 1 Budget</b>	<b>Year 2 Budget</b>	<b>Year 3 Budget</b>	<b>Total Budget</b>
Lead PI						
Co-PI						
Co-PI						
Co-PI						

**PROJECT NARRATIVE (FIELD 8 ON THE FORM)**

The project narrative **must not exceed a total of 16 pages** of technical information, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right). The font must not be smaller than 11 point.

- For each senior investigator, clearly indicate the fraction of total research time during the year that will be spent on the proposed research.
- References needed to cite the research described in the 16 pages of narrative can be listed in the Appendix material described below.

Merit reviewers will only consider the number of pages specified in the above requirement. Proposals exceeding the 16-page limit will not be reviewed and, therefore, won’t be considered for funding.

Do not include any Internet addresses (URLs) that provide supplementary or additional information that constitutes a part of the proposal. Using Internet sites in an attempt to avoid page limits will fail: the content of those sites will not be reviewed. References posted to an Internet-based archive or publication are permitted in a list of references. See Part VIII.D for instructions on how to mark proprietary application information. To attach a Project Narrative, click “Add Attachment.”

**Narrative Format for Accelerator Stewardship Topical Areas**

The proposal narrative must include the following sections, with a recommended page length for each section indicated in braces:

**A. {1 page} Background/Introduction.** Explanation of the importance and relevance of the proposed work as well as a review of the relevant literature. A brief description of research activities conducted by the primary team members and their R&D groups, including

accomplishments and impacts made during the recent past (typically the past three years), is also encouraged.

**B. {6 pages} Proposed Research, Innovative Claims, Technical Rationale, and Approach.** If appropriate, identify the hypotheses to be tested and details of the methods to be used. This section should describe the scientific and technical challenges, unique approach(es), and potential anticipated technical solutions in the topical area that will be addressed. Proposals should clearly explain the technical approach(es) that will be employed and provide ample justification for their feasibility. This section should demonstrate that the proposer has a clear understanding of the state-of-the-art, and it should provide sufficient technical details to permit complete evaluation of the feasibility of the approach. Additionally, comparison with other ongoing research efforts should be provided indicating advantages and disadvantages of the proposed effort.

**C. {2 pages} Program Plan & Risk Assessment.** A narrative explaining the explicit timelines, milestone achievements, and quantitative metrics by which progress toward the goals can be evaluated. The proposed period of performance of the overall program, and each program phase, should be clearly stated. The narrative should include a specific plan detailing how all program metrics will be accurately assessed. This section should also identify major technical risk elements specific to the proposed approach, estimate the risk magnitude for each such element, and describe specific plans to mitigate risk.

**D. {1 page} Statement of Work.** Clearly and concisely define the technical work to be performed on a task-by-task basis, listing the durations and the dependencies among the tasks. The statement of work **must** include a table defining the program metrics to be applied.

For each task, provide:

- A general description of its objective;
- A detailed description of the approach to be taken to accomplish it;
- Identification of the primary organization responsible for task execution (prime, sub, team member, by name, etc.);
- The completion criteria for each task/activity – a product, event, or milestone that defines its completion.

**E. {2 pages} Description of the results, products, transferable technology, and expected technology transfer path.** Summary of objectives associated with the proposed research and, where appropriate, the plans and capability to accomplish technology transfer and commercialization. If this application has a commercial product as the end goal, clearly describe the market opportunity. If intellectual property rights will be reserved and assigned, describe the expected assignment of such rights, the measures to be used to protect proprietary information, and include relevant agreements in Appendix 7: Other Attachments  
. See also Section VIII. “Intellectual Property” for instructions on marking proprietary information in the proposal.

**F. {2 pages} Teaming and Management Plan.** A clearly defined organization chart for the program team that includes, as applicable: (1) the programmatic relationship of the primary team

member; (2) the unique capabilities of the primary team members; (3) the task responsibilities of the primary team members; (4) the teaming strategy among the team members; and (5) the key personnel along with the amount of effort to be expended by each person during each year.

Please include in Appendix 7: Other Attachments

any formal teaming agreements that are required to execute this plan.

**G. {2 pages} Cost, schedule, and measurable milestones for the proposed research,** including estimates of cost for each task in each year of the effort, broken down by the primes and major subcontractors, total cost, and any cost sharing. (Note: Measurable milestones should capture key development points in tasks and should be clearly articulated and defined in time relative to start of effort.) Where the effort consists of multiple portions which could reasonably be partitioned for purposes of funding, these should be identified as options with separate cost estimates for each.

It is important that the project narrative section provide a complete description of the proposed work, because reviewers are not obliged to read the last Appendix in any detail. Proposals exceeding the page limits will be declined without review. The page count of 16 pages does not include the Cover Page and Budget Pages, the Title Page, the biographical material and publication information, or any Appendices.

Do not include in any section or any appendix of the proposal any sensitive personally identifiable information (PII) such as a Social Security Number, date of birth, or city of birth. Do not include information that a merit reviewer should not make use of. Proposals containing PII will be declined without review.

**Note for Collaborative Proposals:** Each collaborating institution must submit an identical common narrative. The common narrative must identify which tasks and activities will be performed by which of the collaborating institutions in every budget period of the proposed project. The budget and the budget justification—which are unique to each collaborating institution—may refer to parts of the common narrative to further identify each collaborating institution’s activities in the joint project. There should be no ambiguity about each institution’s role and participation in the collaborative group.

The Office of Science will use the multiple applications associated with a collaborative group to create one consolidated document for merit review that consists of the common, identical application materials combined with a set of detailed budgets from the partner institutions. It is very important that every application in the collaborative group be identical (including the title) with the exception of the budget and budget justification pages.

#### APPENDIX 1: BIOGRAPHICAL SKETCH – PROJECT DIRECTOR / PRINCIPAL INVESTIGATOR AND SENIOR / KEY PERSONNEL

Provide a biographical sketch for the project director/principal investigator (PD/PI) and each

senior/key person listed in Section A on the R&R Budget form.

- Provide the biographical sketch information as an appendix to your project narrative.
- Do not attach a separate file.
- The biographical sketch appendix will not count in the project narrative page limitation.
- The biographical information (curriculum vitae) for each person must not exceed 2 pages when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point 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. You may use an abbreviated style such as the *Physical Review Letters* convention for citations (list only the first author). You may also use this convention in the proposal bibliography. 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.

**Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers:** Provide the following information in this section:

- **Collaborators and Co-editors:** List in alphabetical order all persons, including their current organizational affiliation, who are, or who have been, collaborators or co-authors with you on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of this proposal. For publications or collaborations with more than 10 authors or participants, only list those individuals in the core group with whom the Principal Investigator interacted on a regular basis while the research was being done. Also, list any individuals who are currently, or have been, co-editors with you on a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of this proposal. If there are no collaborators or co-editors to report, state "None."
- **Graduate and Postdoctoral Advisors and Advisees:** List the names and current organizational affiliations of your graduate advisor(s) and principal postdoctoral sponsor(s) during the last 5 years. Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates during the past 5 years.
- **Advisory Committees:** List all advisory committees on which the senior investigator serves, including the name of the institution and department (if applicable).

**Personally Identifiable Information (PII):** Do not include sensitive personally identifiable information such as a Social Security Number, date of birth, or city of birth. Do not include information that a merit reviewer should not make use of. Proposals containing PII will be

declined without review.

#### APPENDIX 2: CURRENT AND PENDING SUPPORT

Provide a list of all current and pending support (both Federal and non-Federal) for the Project Director/Principal Investigator(s) (PD/PI) and senior/key persons, including subawardees, for ongoing projects and pending proposals. For each organization providing support, show the total award amount for the entire award period (including indirect costs) and the number of person-months per year to be devoted to the project by the senior/key person. Do not list simply the title of the current and/or pending grant; provide the “Project Abstract,” which includes brief details on the scope of research. A level of detail sufficient to identify similarities and differences with the work presented in the proposal being submitted is required. Provide the Current and Pending Support as an appendix to your project narrative. Concurrent submission of an proposal to other organizations for simultaneous consideration will not prejudice its review.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 3: BIBLIOGRAPHY & REFERENCES CITED

Provide a bibliography of any references cited in the Project 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. For research areas where there are routinely more than ten coauthors of archival publications, you may use an abbreviated style such as the *Physical Review Letters* (PRL) convention for citations (listing only the first author). For example, your paper may be listed as, “A Really Important New Result,” A. Aardvark *et al.* [MONGO Collaboration], PRL 999 (2011). You may also use this convention in the proposal bibliography. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal. Provide the Bibliography and References Cited information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 4: FACILITIES & OTHER RESOURCES

This information is used to assess the capability of the organizational resources, including subawardee resources, available to perform the effort proposed. Identify the facilities to be used (Laboratory, Animal, Computer, Office, Clinical and Other). If appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Describe other resources available to the project (e.g., machine shop, electronic shop) and the extent to which they would be available to the project. For proposed investigations requiring access to experimental user facilities maintained by institutions other than the applicant, please provide a document from the facility manager confirming that the researchers will have access to the facility. Please provide the Facility and Other Resource information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 5: EQUIPMENT

List major items of equipment already available for this project and, if appropriate identify location and pertinent capabilities. Provide the Equipment information as an appendix to your project narrative.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 6: ENCOURAGE RESPONSE FROM DOE

Full proposals will only be considered for funding if (1) a Letter of Intent meeting the requirements of section IV.B.1 is submitted by the deadline and (2) the applicant receives an “encourage” response from the DOE. Include in this appendix the “encourage” response received from the DOE.

- Do not attach a separate file.
- This appendix will not count in the project narrative page limitation.

#### APPENDIX 7: OTHER ATTACHMENTS

If you need to elaborate on your responses to questions 1-6 on the “Other Project Information” document, please provide the Other Attachment information as an appendix to your project narrative. Information not easily accessible to a reviewer may be included in this appendix, but do not use this appendix to circumvent the page limitations of the proposal.

Include in this appendix documents which support the teaming arrangements, intellectual property sharing arrangements, and so on. Examples include letters from subcontractors/consultants indicating availability and expected charges to work on the project, teaming agreements, non-disclosure agreements, IP sharing agreements, etc.

Reviewers may not have time to read extensive appendix materials with the same care they would use with the proposal proper.

- Do not include copies of previously presented and/or published research papers, technical notes, and/or reports written for respective experiments or collaborations. Further, do not include presentations made at any meetings or conferences
  - Do not attach a separate file.
  - This appendix will not count in the project narrative page limitation.
- **Do not attach any of the requested appendices described above as files for fields 9, 10, 11, and 12. Instead, follow the above instructions to include the information as appendices to the project narrative file.**
  - **These appendices will not count toward the project narrative’s page limitation.**

### **3. Detailed Instructions for the Budget**

Budgets are required for the entire project period. A budget form should be completed for each budget period of the award, and a cumulative budget form for the entire project period will be populated by PAMS. A detailed budget justification narrative should be included after the budget pages. The justification should cover labor, domestic travel, equipment, materials and supplies, and anything else that will be covered with project funds.

To edit a section on the budget, click the edit icon (  ) for each section on the page. Remember to save all budget periods before moving on to the next section. You can save the budget periods by selecting “Save All Budget Periods” from the dropdown on the lower right corner of the PAMS budget entry screen and then clicking the “Go” button. You can also save any data entry page in PAMS using the blue diskette icon (  ) in the floating toolbar on the bottom of the screen.

#### **Section A. Senior/Key Person (Required)**

For each Senior/Key Person, enter the appropriate information. List personnel, salary funds, and the number of months that person will be allocated to the project. Also include a written narrative in the budget justification that fully justifies the need for requested personnel.

#### **Section B. Other Personnel**

List personnel, salary funds, and the number of months that person will be allocated to the project. Also include a written narrative in the budget justification that fully justifies the need for requested personnel.

#### **Section C. Equipment Description**

For the purpose of this budget, equipment is designated as an item of property that has an acquisition cost of \$5,000 or more and an expected service life of more than one year. (Note that this designation applies for proposal budgeting only and differs from the DOE definition of capital equipment.) List each item of equipment separately and justify each in the budget justification section. Allowable items ordinarily will be limited to research equipment and apparatus not already available for the conduct of the work. General-purpose office equipment, such as a personal computer, is not eligible for support unless primarily or exclusively used in the actual conduct of scientific research.

#### **Section D. Travel**

In the budget justification, list each trip’s destination, dates, estimated costs including transportation and subsistence, number of staff traveling, the purpose of the travel, and how it relates to the project. Indicate whether travel cost estimates are based upon quotes from travel agencies; upon past experience of similar number of trips to similar travel destinations; or something else (describe). 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.

#### **Section E. Participant/Trainee Support Costs:**

If applicable, submit training support costs. Educational projects that intend to support trainees (precollege, college, graduate and post graduate) must list each trainee cost that includes stipend

levels and amounts, cost of tuition for each trainee, cost of any travel (provide the same information as needed under the regular travel category), and costs for any related training expenses. Participant costs are those costs associated with conferences, workshops, symposia or institutes and breakout items should indicate the number of participants, cost for each participant, purpose of the conference, dates and places of meetings and any related administrative expenses. In the budget justification, indicate whether trainee cost estimates are based upon past experience of support of similar number of trainees on similar projects; past experience of support of similar number of participants attending similar conferences/workshops/symposia; or something else (describe).

#### **Section F. Other Direct Costs:**

Enter Other Direct Costs information for each item listed.

- **Materials and Supplies:** Enter total funds requested for materials and supplies in the appropriate fields. In the budget justification, indicate general categories such as glassware, and chemicals, including an amount for each category (items not identified under "Equipment"). Categories less than \$1,000 are not required to be itemized. In the budget justification, indicate whether cost estimates are based upon past experience of purchase of similar or like items; quotes/catalog prices of similar or like items; or something else (describe).
- **Publication Costs:** Enter the total publication funds requested. The proposal budget may request funds for the costs of documenting, preparing, publishing or otherwise making available to others the findings and products of the work conducted under the award. In the budget justification, include supporting information. In the budget justification, indicate whether cost estimates are based upon past experience of purchase of similar or like items; vendor quotes of similar publication services; or something else (describe).
- **Consultant Services:** Enter total funds requested for all consultant services. In the budget justification, identify each consultant, the services he/she will perform, total number of days, travel costs, and total estimated costs. In the budget justification, indicate whether consultant cost estimate is based upon previous experience/quotes for similar or like services; or something else (describe).
- **ADP/Computer Services:** Enter total funds requested for ADP/Computer Services. The cost of computer services, including computer-based retrieval of scientific, technical and education information may be requested. In the budget justification, include the established computer service rates at the proposing organization if applicable. In the budget justification, indicate whether cost estimates are based upon quotes/past experience of purchase of similar computer services; established computer service rates at the proposing institution; or something else (describe).
- **Subawards/Consortium/Contractual Costs:** Enter total costs for all subawards/consortium organizations and other contractual costs proposed for the project. In the budget justification, justify the details.
- **Equipment or Facility Rental/User Fees:** Enter total funds requested for Equipment or Facility Rental/User Fees. In the budget justification, identify each rental/user fee and justify. In the budget justification, indicate whether cost estimates are based upon past experience with similar or like items; vendor quotes of similar items; or something else (describe).
- **Alterations and Renovations:** Enter total funds requested for Alterations and Renovations.

- **In the budget justification**, itemize by category and justify the costs of alterations and renovations, including repairs, painting, removal or installation of partitions, shielding, or air conditioning. Where applicable, provide the square footage and costs.
- **Other:** Add text to describe any other Direct Costs not requested above. Enter costs associated with “Other” item(s). Use the budget justification to further itemize and justify.

**Section G. Direct Costs**

This represents Total Direct Costs (Sections A thru F) and will be calculated by PAMS.

**Section H. Other Indirect Costs**

Enter the Indirect Cost information for each field. Only four general categories of indirect costs are allowed/requested on this form, so please consolidate if needed.

**Section I. Total Direct and Indirect Costs**

This amount will be calculated by PAMS (Sections G + H)

**D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS**

If selected for award, DOE reserves the right to request additional or clarifying information.

**E. SUBMISSION DATES AND TIMES**

**1. Letter of Intent Due Date**

**July 3, 2014, at 5 PM Eastern Time**

**2. Pre-proposal Due Date**

None.

**3. Proposal Due Date**

**September 4, 2014, at 11:59 PM Eastern Time**

You are encouraged to transmit your proposal well before the deadline.

Modifications to the proposal are not allowed after the proposal due date.

**4. Late Submissions**

Delays in submitting letters of intent, pre-applications, and proposals may be unavoidable. DOE has accepted late submissions when applicants have been unable to make timely submissions because of technological disruptions or significant natural disasters. Other circumstances do not justify late submissions. Unacceptable justifications include the following:

- Failure to begin submission process early enough.
- Failure to provide sufficient time to complete the process.

- Failure to understand the submission process.
- Failure to understand the deadlines for submissions.
- Failure to satisfy prerequisite registrations.
- Unavailability of administrative personnel.

Applicants must contact the Program Office/Manager listed in this Program Announcement to discuss the option of a late submission.

DOE notes that not all requests for late submission will be approved.

## **F. FUNDING RESTRICTIONS**

Funding for all awards and future budget periods are contingent upon the availability of funds appropriated by Congress and the availability of future-year budget authority.

## **G. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS**

### **1. Where to Submit**

Proposals must be submitted through PAMS to be considered for award.

Please only submit a PAMS lab technical proposal in response to this Announcement; do not submit a DOE Field Work Proposal (FWP) at this time. The Office of Science will request FWPs via the Searchable FWP system later from those selected for funding consideration under this Announcement.

### **2. Registration Process**

#### **ONE-TIME REGISTRATION PROCESS**

You must complete the one-time registration process (all steps) before you can submit your first proposal through PAMS. Registration instructions appear in the front matter of this Announcement.

For help with PAMS, click the “External User Guide” link on the PAMS website, <https://pamspublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this DOE National Laboratory Program Announcement should reference **LAB 14-1142**.

### **3. Proposal Receipt Notices**

Upon submission, the PI will receive an email from the PAMS system <[PAMS.Autoreply@science.doe.gov](mailto:PAMS.Autoreply@science.doe.gov)> acknowledging receipt of the proposal.

#### **4. Viewing Submitted Proposals**

Upon submission, the proposal will appear under My Proposals for the PI and the Submitter with a Proposal Status of “Submitted to DOE.”

## Section V - PROPOSAL REVIEW INFORMATION

### A. CRITERIA

#### 1. Initial Review Criteria

Full proposals that are submitted without a Letter of Intent having been previously submitted by the LOI deadline of **July 3, 2014, at 5 PM Eastern Time** will be declined without review.

Full proposals that do not receive an “encourage” response from the DOE will be declined without review.

Full proposals submitted after the full proposal deadline of **September 4, 2014, at 11:59 PM Eastern Time** will be declined without review.

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for the award; (2) the information required by the DOE National Laboratory Announcement has been submitted; (3) all mandatory requirements are satisfied; (4) the proposed project is responsive to the objectives of the DOE National Laboratory Announcement, and (5) the proposed project is not duplicative of programmatic work. Proposals that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

#### 2. Merit Review Criteria

Proposals will be subjected to scientific merit review (peer review) and will be evaluated against the following criteria, listed in descending order of importance.

- Scientific and/or Technical Merit of the Project;
- Appropriateness of the Proposed Method or Approach;
- Competency of Applicant’s Personnel and Adequacy of Proposed Resources; and
- Reasonableness and Appropriateness of the Proposed Budget.

Merit reviewers will be asked to evaluate stewardship proposals based on an additional criterion:

- Quality of the Accelerator R&D Stewardship Opportunity.

The evaluation process will include program policy factors such as the relevance of the proposed research to the terms of the PA and the agency’s programmatic needs. Note that external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Both Federal and non-Federal reviewers may be used, and submission of an proposal constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

The questions below are provided to the merit reviewers to elaborate the criteria established by regulation:

#### SCIENTIFIC AND/OR TECHNICAL MERIT OF THE PROPOSED RESEARCH

- What is the scientific and/or technical innovation of the proposed effort?
- How does the proposed work compare with other efforts in its field, both in terms of scientific and/or technical merit and originality?
- How might the results of the proposed work impact the direction, progress, and thinking in relevant fields of research?
- What is the likelihood of achieving influential results?
- Does the proposed work have the potential to significantly impact the Stewardship use described by the PI?
- Does the proposed work have synergy with the HEP mission?

#### APPROPRIATENESS OF THE PROPOSED METHOD OR APPROACH

- Does the plan clearly describe the current technology state, and the technical gaps that must be addressed, to realize the application?
- Does the proposal clearly describe specific technical milestones that can be used to evaluate the progress of the R&D?
- Does the Program Plan and Risk Assessment correctly identify the primary risks, and appropriate mitigations for each?
- If intellectual property protection is required, has a clear plan been spelled out?
- If the application will result in a commercial product, has the market opportunity been clearly assessed and described? How good is the market opportunity?

#### COMPETENCY OF APPLICANT'S PERSONNEL AND ADEQUACY OF PROPOSED RESOURCES

- Does the proposed work take advantage of unique facilities and capabilities?
- What is the past performance of the leading members of the collaboration?
- Are any proposed plans for recruiting any additional scientific and/or technical personnel including new senior staff, students and postdocs reasonable, justified, and appropriate?
- Are the environment and facilities adequate for performing the proposed effort?
- Are the senior investigator(s) or any members of the research group that are being reviewed leaders within the proposed effort(s) and/or potential future leaders in the field?
- Does the Teaming and Management Plan clearly define the roles and responsibilities of all key participants?
- Does the collaborative team have an appropriate balance of accelerator-technology-side experts and application-side experts?
- If the application will result in a commercial product, does the team include an appropriate industrial partner?

#### REASONABLENESS AND APPROPRIATENESS OF THE PROPOSED BUDGET

- Are the proposed budget and staffing levels adequate to carry out the proposed work?
- Are all travel, student costs, and other ancillary expenses adequately estimated and justified?

- Is the budget reasonable and appropriate for the scope?

AS INDICATED ABOVE, THE FOLLOWING QUESTIONS ARE ALSO PROVIDED TO MERIT REVIEWERS WHEN EVALUATING THE ADDITIONAL CRITERION:

#### QUALITY OF THE ACCELERATOR R&D STEWARDSHIP OPPORTUNITY

In the questions that follow, the term “Stewardship customer” is used broadly to refer to the entity (other than HEP) whose mission or research objectives encompass the proposed work. The Stewardship customer can be another Office of Science (e.g., BES, NP, FES), another DOE program office (e.g., NNSA, EERE, ARPA-E) another federal agency (e.g., NIH, DoD), or industries that use accelerator technology.

- Does the proposed work require significant scientific or technical advances in accelerators or accelerator-related technology? (Accelerator-related technology includes such things as: superconducting magnets and RF cavities, RF and magnet power systems, specialized laser systems, specialized diagnostics and controls, and so on.)
- Will the proposed work result in substantial impact on the Stewardship customer’s needs **and** result in some synergy with the HEP mission? (synergies might include: developing additional expertise or facilities relevant to present or future HEP-supported work).
- For the primary participating institution(s), is the activity reasonably consistent with the institution’s primary mission? (e.g., if a National Laboratory is involved, is the activity consistent with that Laboratory’s primary mission?)
- Is the PI/collaboration arguably the best performer/provider for the Stewardship activity? Are other entities capable of providing a substantially similar (or superior) capability?
- What evidence is there that the Stewardship customer endorses the goal? Does this proposal address issues that have been identified in writing (e.g., advisory committee reports, workshop reports, white papers, roadmaps) by the Stewardship customer? Does the Stewardship customer participate substantially and materially in this effort (e.g., by co-funding, cost-sharing, in-kind donation or equipment, donation of effort)?

## **B. REVIEW AND SELECTION PROCESS**

### **1. Merit Review**

Proposals that pass the initial review will be subjected to a formal merit review and will be evaluated based on the criteria above.

### **2. Selection**

The Selection Officials will consider merit review recommendations as well as program policy factors, such as ensuring a programmatically appropriate balance within the program areas, and quality of previous performance. The selection process will include contacting cognizant program officials at other federal agencies to request input on the value of proposed Stewardship activities. Selection of applications for award will be based upon the findings of the technical

evaluations, the importance and relevance of the proposed research to the SC mission and/or other federal agencies, and funding availability.

### **3. Discussions and Award**

The Government may enter into discussions with a selected applicant for any reason deemed necessary. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

### **C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES**

It is anticipated that the award selection will be completed by September 2014. It is expected that awards will be made in Fiscal Years 2015 and 2016 if a sufficient number of quality proposals are submitted to this call.

DOE is interested in seeing projects supported under this Announcement begin work not than January 2015 for awardees selected for FY 2015 funding. Projects funded for FY2016 would be anticipated to begin October 1, 2015.

## **Section VI - AWARD ADMINISTRATION INFORMATION**

### **A. AWARD NOTICES**

#### **1. Notice of Selection**

**Selected Applicants Notification:** DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance.

**Non-selected Notification:** Organizations whose proposals have not been selected will be advised as promptly as possible. This notice will explain why the proposal was not selected.

#### **2. Notice of Award**

A work authorization/contract modification issued by the contracting officer is the authorizing award document.

### **B. REPORTING**

Annual progress reports from the award investigator will be required and will be due 90 days before the end of each budget year.

## Section VII - QUESTIONS/AGENCY CONTACTS

### A. QUESTIONS

For help with PAMS, click the “External User Guide” link on the PAMS website, <https://pamspublic.science.energy.gov/>. You may also contact the PAMS Help Desk, which can be reached Monday through Friday, 9AM – 5:30 PM Eastern Time. Telephone: (855) 818-1846 (toll free) or (301) 903-9610, Email: [sc.pams-helpdesk@science.doe.gov](mailto:sc.pams-helpdesk@science.doe.gov). All submission and inquiries about this DOE National Laboratory Program Announcement should reference **LAB 14-1142**.

Please contact the PAMS help desk for technological issues with the PAMS system.

Questions regarding the specific program areas and technical requirements may be directed to the technical contacts listed for each program within the DOE National Laboratory Program Announcement or below.

Please contact the program staff with all questions not directly related to the PAMS system.

### B. AGENCY CONTACTS

PAMS Customer Support	855-818-1846 (toll-free) 301-903-9610 <a href="mailto:sc.pams-helpdesk@science.doe.gov">sc.pams-helpdesk@science.doe.gov</a>
Administrative Contact	For questions about program rules, please contact <a href="mailto:sc.hepfoa@science.doe.gov">sc.hepfoa@science.doe.gov</a> .
Program Manager Scientific/Technical Contact	For questions about specific program areas and technical requirements, please contact the DOE personnel listed in Section I of this FOA.

## **Section VIII - OTHER INFORMATION**

### **A. MODIFICATIONS**

Notices of any modifications to this DOE National Laboratory Announcement will be posted on the Grants and Contracts website (<http://science.energy.gov/grants/>).

### **B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE**

DOE reserves the right, without qualification, to reject any or all proposals received in response to this DOE National Laboratory Announcement and to select any proposal, in whole or in part, as a basis for negotiation and/or award.

### **C. COMMITMENT OF PUBLIC FUNDS**

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

### **D. PROPRIETARY PROPOSAL INFORMATION**

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in a proposal only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the proposal which are to be restricted:

“The data contained in pages \_\_\_\_\_ of this proposal have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes.”

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

“The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation.”

### **E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL**

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its proposal, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing a proposal. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

## **F. AVAILABILITY OF FUNDS**

Funds are not presently available for this award. The Government's obligation under this award is contingent upon the availability of appropriated funds from which payment for award purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the Contracting Officer for this award and until the awardee receives notice of such availability, to be confirmed in writing by the Contracting Officer.