



Sandia National Laboratories Pulsed Power Sciences

Call for Proposals Package for the Z Facilities Fundamental Science Experiments for the Period April 1, 2016 to December 31, 2017

Date Issued: June 15, 2015

Applications Due: September 15, 2015

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Part 1: Shot Opportunity Description

A Background

The Z facilities include a megajoule-class pulsed power accelerator at Sandia National Laboratories (SNL) that, after fifteen years, has grown into a multifaceted resource. This Z accelerator produces intense x-rays and magnetic fields for experiments in fundamental high-energy-density science. The Z-Petawatt and Z-Beamlet lasers are used for diagnosis and for stand-alone experiments. Approximately 10 to 15% of the operating time, up to 4 shot weeks or approximately 20 shots, will be available for fundamental science in Calendar Years 2016 and 2017. SNL researchers are available for scientific collaboration and for assistance with user experiments. Principal Investigators are strongly encouraged to collaborate with SNL staff

members; for each proposal utilizing the Z-accelerator a ‘SNL accelerator scientist’ will be nominated to assist experimental planning and execution.

This call for proposals offers opportunities for US University, Business, and National Laboratory Scientists to perform experiments in high-energy-density (HED) physics, including inertial confinement fusion (ICF), laboratory astrophysics, properties of materials under HED conditions, etc. For a broad review of HED physics, see the National Research Council report, “Frontiers in High Energy Density Physics: The X-Games of Contemporary Science” (copyright 2003, National Academy Press, Washington, DC. Many of the physics regimes outlined in this report are accessible using the Z Facilities.

For information about the Z facilities, the solicitation process, and Z-accelerator scientists who will assist in experimental planning and execution, please contact:

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B Solicitation Schedule

Event	Target Date
Call for proposals	June 15, 2015
Proposals due (via Word .doc or .rtf files)	September 15, 2015
Distribution of shots to projects	December 11, 2015
Experiments conducted	April 1, 2016 through December 31, 2017

The (unclassified) proposals must be received in full by close of business on September 15, 2015 at Sandia National Laboratories at the following address:

zproposals@sandia.gov

C Z Facilities Fundamental Science Program purpose and objectives

The primary purpose of the Z-Facilities Fundamental Science Program is to provide access to NNSA's Z accelerator for HED experiments. The specific objectives of the program are to provide access to the Z accelerator and its diagnostics to a broad community of academic, industrial and national laboratory research interests, for use:

- 1) as tools for conducting fundamental research in HED science, and
- 2) in providing research experience necessary to maintain and grow the HED community, especially through involvement of researchers in academia

D Technical Scope and research areas

The research tools and resources of the Z Facilities are available to scientists for state-of-the-art fundamental research in HED physics, which is taken to include, but is not limited to: hydrodynamics, properties of materials under extreme conditions, laboratory astrophysics, advanced ignition concepts, fundamental HED physics, biology, and chemistry.

Fundamental research is defined as research directed toward increasing knowledge in a particular field of science. The primary aim of fundamental research is a fuller knowledge or understanding of the subject matter under study, rather than an immediate application of that knowledge.

Part 2: Shot Allocation Information

A Type of Award Instrument

Sandia National Laboratories Z facilities will provide:

- Experimental time
- Basic power feed hardware
- Standard diagnostics
- Load assemblies and most targets

B Anticipated Experiment Size

We encourage experiments utilizing the Z accelerator in the 3 to 5 shots per calendar year range.

C Expected Number of Experiments

A total allotment of up to 4 Z accelerator shot weeks (~20 shots) will be scheduled in both CY2016 and CY2017, which we anticipate to include up to around 6 experimental proposals.

D Period of Performance

This proposal process is for Z facilities shot requests from April 1, 2016 to December 31, 2017.

Part 3: Eligibility Information

A Eligible Applicants

The objective of this announcement is to make experimental time available, on a competitive basis, to Principal Investigators (PIs) who are members of the teaching/research faculty of a US university or academic institution, employees of US-based companies, or members of one of the five principal US laboratories participating in the HED program (currently LLNL, LANL, SNL, NRL, and UR/LLE) for experimental use of the unique resources of the Z Facilities at SNL. SNL must be notified of any foreign nationals involved in the work, and there may be some restrictions on their participation..

Part 4: Application and Submission Information

A Content and Form of Application

1. Cover Page/Proposal Summary

The first page of the proposal shall be the completed Proposal Summary Form included in Appendix A. If the project requires extraordinary support beyond the normal support for a Z experiment, such requirements and the source of such support must be identified.

2. Project Narrative

The project narrative must not exceed 20 pages, including cover page, table of contents, 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).

EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed.

The project narrative must include:

1) Narrative Cover Page, which must indicate:

- (a) the name and type of organization;
- (b) the project title;
- (c) the technical points of contact for the applicant, denoting the names, titles, addresses, telephone and facsimile numbers, and electronic mail addresses; and

- (d) a statement that the document is an application, includes the Principal Investigator's name, telephone number, facsimile number, e-mail address, and academic institution.
2. Project Objectives: This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.
 3. Merit Review Criterion Discussion: This section should be formatted to address each of the merit review criterion and sub-criterion listed in Part 5A. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria.
 4. Relevance and Outcomes/Impacts: This section should explain the relevance of the effort to the objectives in the program announcement and the expected outcomes and/or impacts.
 5. Project Management Plan: This section should identify the activities/tasks to be performed, a time schedule for the accomplishment of the activities/tasks, and the expected dates for the release of outcomes. Applicants may use their own project management system to provide this information. This plan should identify any decision points and go/no-go decision criteria. Successful applicants must use this project timetable format to report progress variances. Please provide the Project Management Plan as an appendix to your Project Narrative. This appendix will not count in the Project Narrative page limitation.
 6. Bibliography and 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. 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 application. In order to reduce the number of files attached to your application, please provide the Bibliography and References Cited information as an appendix to your Project Narrative. This appendix will not count in the Project Narrative page limitation.
 7. Facilities and Other Resources: This information is used to assess the capability of the organizational resources, including sub-awardee resources, available to perform the effort proposed. Identify the facilities to be used (laboratory, office, laser, etc.) at each performance site listed. If appropriate, indicate their capacities—pertinent resources that are directly applicable to the proposed work. Describe other resources available to the project (such as machine shop, electronic shop) and the extent to which they would be available to the project. In order to reduce the number of files attached to your application, please provide the facility and other

resource information as an appendix to your Project Narrative; this appendix will not count in the Project Narrative page limitation.

8. Experimental Requirements: This section should contain information on the technical requirements necessary to complete a successful experiment. Please provide the Z facilities detailed information as an appendix to your Project Narrative. This appendix (Appendix A of this document) will not count in the Project Narrative page limitation.
 - (a) Diagnostics requirements, including both standard and new diagnostics.
 - (b) Machine configuration, including: Marx charge voltage, desired current, pulse length, prepulse suppression, and estimated pulse shape.
 - (c) Load & Target hardware requirements (include diagram of target concepts/PowerPoint or scanned hand-drawn sketch is acceptable.)
 - (d) Environment, Safety, and Health Hazards such as beryllium, lithium, heavy metals, gases, explosives, *etc.* Safety is of utmost importance at the Z facility; please describe any material or process that can pose a hazard to the operations staff or the facility.

9. Roles of Collaborators/Participants: Information on collaboration with scientists at SNL or other institutions who are required for the conduct of the proposed work, including official institutional confirmation of the acceptance of such collaborations. For multi-organizational or multi-investigator projects, describe the roles and the work to be performed by each participant/investigator, business agreements between the applicant and participants, and how the various efforts will be integrated and managed. Please provide the Roles of Collaborators/Participants information as an appendix to your Project Narrative. This appendix will not count in the Project Narrative page limitation.

10. Evaluation Phase: This section must include a plan and metrics to be used to assess the success of the project. Please provide the Evaluation Phase information as an appendix to your Project Narrative. This appendix will not count in the Project Narrative page limitation.

Other attachments

Biographical Sketch Appendix:

Provide a biographical sketch for the project director/principal investigator (PD/PI) and each senior/key person listed. Provide the biographical sketch information as an appendix to your project narrative. The biographical sketch appendix will not count in the project narrative page limitation. The biographical information 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.

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.

B Submission Dates and Times

Applications must be received in full by close of business on **September 15, 2015**. Applications received after the deadline may not be reviewed or considered for an experimental series during this period. Applications must be submitted via e-mail in **Word .doc or .rtf** at the following address:

zproposals@sandia.gov

Confirmation of receipt will be provided.

Part 5: Application Review Information

A Criteria

1. Initial Review Criteria

Prior to a comprehensive merit evaluation, an initial review will be held to determine that (1) the applicant is eligible; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the shot-time opportunity announcement.

2. Merit Review Criteria

Applications will be technically evaluated based on the four general scientific/technical criteria listed:

1. Scientific and technical soundness and quality of the proposed method/approach, and the feasibility/likelihood of accomplishment of the stated objective;
2. The overall scientific/technical merit of the project and its relevance and prospective contribution to its field of research;
3. The competence, experience, and past performance of the applicant, principal investigator and/or key personnel; and
4. The demands of the project in terms of resource requirements (equipment, beam time, etc.) and/or other requirements (facility hardware modifications, component development, etc.) vis-à-vis competing demands.

B Review and Selection Process

An independent, non-conflicted peer review panel of knowledgeable scientists will undertake the technical review.

The Z Facility Director in consultation with the Pulsed Power Center Director, and the Z Facility Science Advisory Committee, will determine the final Z schedule with the goal of maximizing the overall quality of work and impact within the bounds of available resources.

C Anticipated Notice of Selection and Award Dates

We expect that the Principal Investigators of successful proposals will be notified by December 11, 2015 for experiments to be conducted starting April 1, 2016.

Part 6: Z Facility Contacts

For information about the Z facilities, the solicitation process and the Z-accelerator scientists who will assist in experimental execution, please contact:

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Appendix A

**Sandia National Laboratories Z Facilities
Fundamental Science Experiment Proposal Package Template
for the period
April 1, 2016 – December 31, 2017**

Fundamental Science Experiments January 1, 2016 to December 31, 2017

Title of experimental proposal:	
Principal Investigator & Co-PI: (Name, Phone, Email, Institution)	
Sandia accelerator scientist	
Experimental type:	(Ex. hydrodynamics, properties of materials under extreme conditions, laboratory astrophysics, advanced ignition concepts, fundamental HED physics...)
Summary of experimental objectives:	
Experimental approach:	
Experimental weeks and expected shots/week:	Total experimental weeks: Expected shots/week: If more than one experimental series, weeks by quarter: CY2016 Q2: Q3: Q4: CY2017 Q1: Q2: Q3: Q4
Pulsed power parameters required (e.g., Marx charge voltage, desired current, pulse length, prepulse suppression, pulse shape type, <i>etc.</i>)	
Special considerations (ES&H, security):	Highlight use of beryllium, heavy metals, gases, explosives, ride-along experiments on Z, STAR, or DICE:
Sandia-supplied diagnostics required:	
Type and number of targets/samples including spares and a <u>diagram of each type in project narrative:</u>	
Specific user-supplied equipment required (targets, diagnostics, samples, <i>etc.</i>):	

THIS BOX IS FOR Z PROPOSAL COMMITTEE USE ONLY

PID #:

Expected Shot Rate: