Notice of Vacancy

Research Engineer (High Intensity Laser)
for the Dynamic Compression Sector (DCS)
at the Advanced Photon Source

Washington State University (WSU) is seeking to hire a strongly self-motivated, talented Research Engineer (with strong laser expertise) to develop and support laser-shock experiments at a first-of-a-kind experimental user facility: The Dynamic Compression Sector (DCS) at the Advanced Photon Source (APS), Argonne National Laboratory. The DCS is dedicated to time-resolved X-ray measurements under dynamic compression. We are looking to hire a Research Engineer who enjoys hands-on experimental work and problem solving in a fast-paced, research environment. The DCS research activities involve state-of-the-art, dynamic compression experiments, including experiments that utilize a pulsed 100-Joule high energy laser system to dynamically compress materials to millions of atmospheres of pressure.

Advanced Photon Source

The location for this WSU position is the Advanced Photon Source, Argonne National Laboratory, Argonne, IL. It is expected that the DCS laser development and other responsibilities associated with laser-shock experiments will constitute the primary focus for this position until the DCS laser is installed and becomes operational.

Responsibilities include, but are not limited to:

1. Participate in all aspects of the development and installation of the 100J laser system from the design phase, including building and qualifying the laser, through commissioning experiments.
2. Once the laser system is installed at the DCS, take the lead for operations and use of the laser for laser-shock research activities.
3. Quantify and archiving the laser performance for each shot.
4. Establish and carefully document safe operating procedures related to laser control areas at the DCS.
5. Work with the DCS users, including providing guidelines for experimental design, reviewing safety and equipment operating procedures, and preparing for experiments in advance.
6. Contribute effectively to all aspects of the various research projects including optimal and safe operations of the experimental facilities; availability of experimental components, equipment and supplies; and working effectively in a team setting to advance the DCS research activities.
7. Independently define and complete experimental projects and tasks; conduct and analyze research experiments, and prepare reports and publications as appropriate.
8. Guide other staff members, as needed.

The 100J laser at the DCS is a state-of-the-art laser being built to routinely perform well-characterized, high pressure experiments involving X-ray measurements. The optimal performance of the laser system is a key element of the DCS research objectives. The flexibility of laser-driven dynamic compression experiment means unique and exciting challenges will be presented with each new experiment performed using the laser system.

Qualifications

Only applicants who are currently in the U.S. and meet the following minimum qualifications will be considered for the position:

Background in dynamic compression research is not required for this position. However, a strong, hands-on experimental background and skills related to laser experiments are essential. The required professional qualifications and personal attributes are:

- A Ph.D. degree in Physics or a related field with a strong experimental background in lasers and optics. (Candidates with M.S. degrees and appropriate post-graduate experience will also be considered)
- Strong hands-on ability with design and fabrication of instruments and experimental components related to the position responsibilities.
- Strong interest in being involved in all aspects of laser-shock experiments.
- Good familiarity with hardware and software required to support user experiments on a large scale laser.
- Good computer skills, including experience with technical/design programs, such as LabView and SolidWorks.
- Excellent communication skills, both oral and written.
- Personal attributes should include critical thinking, good judgment, clear sense of purpose, attention to detail, ability to work effectively in a team, and accountability.
- Must be able to obtain a badge at U.S. Department of Energy National Laboratories to gain access to restricted areas

The salary structure is both attractive and nationally competitive. Other benefits include health/dental insurance, vacation/sick leave, and retirement plans.

Applications

Applicants should submit a letter of application explicitly addressing the qualifications for this position and date of availability; detailed curriculum vitae; and the names, email, and addresses of three professional references via email (preferred) to: dcs.info@wsu.edu or via mail to:

Ms. Kristin Ahrens
The Dynamic Compression Sector
9700 S. Cass Ave, 438F Room F001
Lemont, IL 60439

To ensure consideration, please specify the position (DCS Research Engineer – High Intensity Laser) for which you are applying. We will begin reviewing submissions immediately and will continue to do so until the position is filled.

Additional information about the Dynamic Compression Sector, the Institute for Shock Physics and Washington State University follows:

Dynamic Compression Sector (DCS) Background

The National Nuclear Security Administration (NNSA) of the Department of Energy (DOE) is sponsoring the development of this first-of-a-kind user facility. Washington State University is partnering with the APS and collaborating with the DOE/NNSA National Laboratories (Los Alamos, Lawrence Livermore, and Sandia), Department of Defense Laboratories including the Army Research Laboratory and Naval Research Laboratory, and academic institutions in developing and building the DCS infrastructure and instrumentation at Sector 35 on the APS experiment hall floor.

DCS X-Ray Optics

The DCS, with a focus on time-resolved X-ray diffraction and imaging measurements in materials subjected to dynamic compression, provides in-situ, time-resolved, measurements at microscopic length scales to achieve a fundamental understanding of the mechanisms governing a broad range of time-dependent, condensed matter phenomena (structural transformations, inelastic deformation and fracture, and chemical reactions) under dynamic loading. Such measurements are also essential for validating multi-scale modeling of the key materials phenomena under shock wave and shockless compression.

DCS Impact Facilities

The energies (hard X-rays) and the time-structure (ns-separated pulses) of the APS X-rays are uniquely suited to examine time-dependent changes in materials subjected to a broad range of peak stresses (~ 1 GPa to over 200 GPa) and time-durations (~10 ns to microseconds). The DCS, with its emphasis on condensed matter and materials science activities using a variety of dynamic compression platforms, is an excellent complement to other national user facilities that emphasize static pressure materials response, warm dense matter response, and dense plasma response.

The DCS is an exciting and visionary scientific undertaking that integrates scientific/technical expertise across the DOE (NNSA and the Office of Science) to address both scientific and programmatic challenges. Further information about DCS may be found at www.dcs-aps.wsu.edu.

THE INSTITUTE FOR SHOCK PHYSICS

A multidisciplinary research organization within the College of Arts and Sciences, the ISP undertakes a broad range of fundamental scientific activities related to understanding condensed matter response under dynamic and static compression. Washington State University has a long and distinguished history of conducting research in dynamic compression science. In 1997, the Institute was established with support from the DOE (Defense Programs) to ensure a strong, long-term academic base for the DOE's national security mission, and is currently funded through NNSA's Stockpile Stewardship Academic Alliance (SSAA) program, WSU funds, and other extra-mural support.

The Institute for Shock Physics

Continuum-to-Atomic level understanding is the pervading scientific theme of the research activities that emphasize integration of innovative experiments with theoretical and computational advances. Multidisciplinary efforts that combine expertise in Physics, Materials Science, Chemistry, and Mechanical Engineering are underway to address several exciting and challenging scientific problems. In addition to the faculty within the Institute, students and faculty from several departments within the College of Arts and Sciences and the College Engineering participate in the Institute's research projects. Excellent research interactions are in place with the NNSA National Laboratories: Lawrence Livermore, Los Alamos, and Sandia.

A brief summary of the Institute's activities follows. Experimental work, under dynamic compression, typically involves fast, time-resolved measurements in single event, impact experiments. Research projects currently underway include: time-resolved x-ray diffraction studies; pressure induced structural phase transitions; understanding of inelastic deformation and failure under dynamic loading; effect of material microstructure on dynamic deformation; chemical decomposition in energetic materials; development of fast optical methods to probe shock induced changes; effect of deformation on semiconductor properties; high pressure equation of state studies; and chemical and physical changes under static high pressures. Since Professor C. S. Yoo's appointment in 2007, a strong static high pressure research program has complemented the shock wave effort.

ISP Impact Laboratory Facility

State-of-the-art experimental and computational facilities are housed in the Shock Physics Building. Inaugurated in 2003, the building was designed specifically for shock wave research and represents a unique facility among academic institutions. The major experimental research facilities available for studying physical and chemical phenomena over a large range of length and time scales include the Impact Laboratory, Laser Shock Laboratory, Static High Pressure Laboratory, and the Compact Pulsed Power Facility. Among the Institute's research capabilities is a Computational Facility designed to complement the experimental effort. Further details may be seen at www.shock.wsu.edu.

WASHINGTON STATE UNIVERSITY

Washington State University

Washington State University, one of the two research universities in the state, was founded in 1890 as the state's land-grant institution and is located in Pullman with regional campuses in Spokane, Vancouver and the Tri-Cities. It is a Carnegie Doctoral/Research Extensive University with a strong emphasis on excellence in research and education. Current enrollment is approximately 26,300 undergraduate, graduate, and professional students. The University offers more than 200 fields of study, with 95 majors for undergraduates, 64 master's degree programs, 44 doctoral degree programs, and 2 professional degree programs. Academically, the University is organized into 10 colleges (Agriculture, Human, and Natural Resource Sciences; Arts and Sciences; Business; Communication; Education; Engineering and Architecture; Honors; Nursing; Pharmacy; Veterinary Medicine) and a Graduate School.

WSU is an EO/AA Educator and Employer.