

NOTICE OF VACANCY

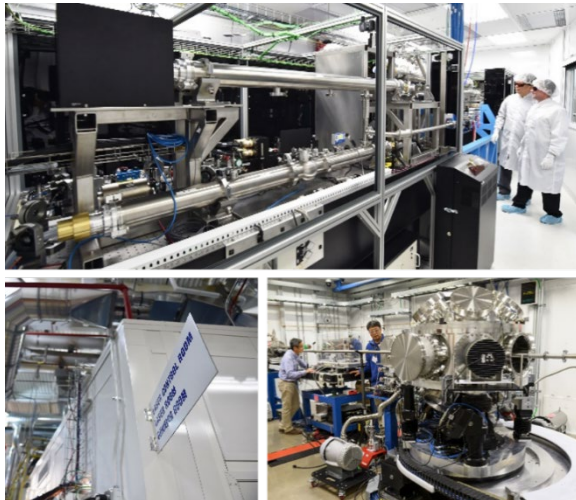
Laser/Optical Physicist for the Dynamic Compression Sector at the Advanced Photon Source, Lemont, Illinois



Washington State University (WSU) is seeking a strongly self-motivated, talented experimentalist to work with scientists and engineers at a first-of-a-kind experimental user facility: The Dynamic Compression Sector (DCS) at the Advanced Photon Source (APS). The DCS constitutes a new paradigm for understanding the dynamic compression and deformation response of materials subjected to extreme conditions on short timescales. Real-time, atomistic-scale investigations of condensed matter phenomena are undertaken in single event experiments through time-resolved, in-situ measurements utilizing the tunable, high energy X-ray capabilities at the APS.



The ideal Laser/Optical Physicist should enjoy hands-on work and problem solving in a fast-paced, research environment. The location for this WSU position is Argonne National Laboratory (ANL) in Lemont, IL. As such, DCS staff are considered “resident users” and must adhere to ANL policies and procedures, including the completion of required training courses.



The Laser-Shock capabilities at the DCS include a state-of-the-art 100J laser and a custom-built target chamber system to perform well-characterized, high stress (up to ~500 GPa), short duration (5–15 ns) experiments involving x-ray and optical measurements. The optimal performance of the laser system for a broad range of research objectives is a key element of the DCS scientific mission. The flexibility of laser-driven dynamic compression experiments presents unique and exciting challenges and opportunities. The successful candidate will work on a team of physicists responsible for the operation and maintenance of the 100J laser system to ensure optimal performance and to develop new capabilities to conduct state-of-the-art scientific experiments. Further information about the DCS Laser-Shock Station may be found within this journal article: X.

Wang, et al., “The Laser Shock Station in the Dynamic Compression Sector,” *Review of Scientific Instruments*, 90(5): 053901(2019).

Many of the experiments performed at the DCS utilize a wide variety of lasers that are integral to characterizing/understanding the shock compressed state of materials (e.g., pulsed high energy DPSS lasers, CW DPSS frequency doubled lasers, pulsed and CW high power IR and visible fiber lasers, short pulse low energy lasers, and pulsed and CW laser diodes). A wide array of optical detection and analysis approaches are also utilized, including fast photodetectors, image intensifiers, ICCD’s, streak cameras, and other state-of-the-art electro-optic instrumentation. While the primary responsibility of this position will be for the 100J laser, the successful candidate, after appropriate training,

will also be expected to operate and maintain these systems, as needed for a broad range of user experiments.

Responsibilities for this position include, but are not limited to:

1. Participate in the operation of the 100-Joule laser for laser-shock research activities, contribute to the design and conduct of laser-shock experiments, and work with scientific users. This also includes quantifying and archiving the laser performance for each shot.
2. Working with other laser experts, document and maintain safe operating procedures related to the laser and its control areas at the DCS.
3. Participate in the design, development, and use of optical equipment and systems, for laser-interferometry measurements and other laser-based diagnostics.
4. Work with the DCS users to prepare for experiments in advance. This includes providing guidelines for experimental design, personnel safety, and equipment operating procedures.
5. Contribute effectively to all aspects of research projects including assistance to DCS users; optimal and safe operations of the experimental facilities; ensure availability of experimental components, equipment, and supplies; enhancement of experimental capabilities; and working effectively in a team setting to advance the DCS research mission.
6. Independently define and complete experimental projects and tasks; conduct and analyze research experiments and prepare reports and publications as appropriate.

Qualifications

A background in dynamic compression research is not required for this position. However, a strong, hands-on experimental background and skills relevant to the position responsibilities are essential. The required professional qualifications and personal attributes are:

- A Ph.D. degree in Physics or a related field with a strong background in lasers and optics.
- Demonstrated technical expertise and hands-on ability with the design, fabrication, and optimization of nonlinear optical systems, instruments, and associated diagnostic equipment.
- Strong interest in being involved in all aspects of DCS user experiments.
- Considerable skill and knowledge of hardware and software required to support user experiments on a large-scale laser.
- Good computer skills, including experience with programs for instrument control and analysis, such as LabView and Matlab. Experience with optical design software is useful but not required (e.g., Zemax).
- Excellent communication skills, both oral and written.
- Ability to effectively work independently and in a team environment, as needed.
- Personal attributes should include critical thinking, good judgment, clear sense of purpose, attention to detail, 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 apply by submitting a letter of application addressing the required qualifications for this position and date of availability; detailed curriculum vitae; and the contact information for three professional references to dcs.admin@wsu.edu, attention of Dr. Paulo Rigg.

Due to the large volume of applications, we will contact only those selected for next steps.

Additional information about the Institute for Shock Physics and Washington State University follows:

The Institute has ongoing research activities at the following three locations:

- *Institute for Shock Physics - Pullman, WA*: Combining research innovations and rigorous education (shock.wsu.edu)
- *Dynamic Compression Sector - Lemont, IL*: Frontier of dynamic compression science (first-of-a-kind worldwide user facility) located at the Advanced Photon Source, Argonne National Laboratory (dcs-aps.wsu.edu)
- *Applied Sciences Laboratory - Spokane, WA*: Transforming science into practical solutions (asl.wsu.edu)

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, the Tri-Cities, and Everett. Due to its strong emphasis on excellence in research and education, the Carnegie Classification™ has designated WSU as R1/Tier 1: Doctoral University – Highest Research Activity. Current enrollment is approximately 31,600 undergraduate, graduate, and professional students. The University offers 98 majors, 86 minors, and 100+ in-major specializations for undergraduates, 78 master's degree programs, 65 doctoral degree programs, and 3 professional degree programs. Academically, the University is organized into 11 colleges (Agriculture, Human, and Natural Resource Sciences; Arts and Sciences; Business; Communication; Education; Engineering and Architecture; Honors; Medicine; Nursing; Pharmacy and Pharmaceutical Sciences; and Veterinary Medicine) and a Graduate School. For more information, please visit www.wsu.edu.



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