User Facility Summaries

Dynamic Integrated Compression Experimental Facility

The Dynamic Integrated Compression Experimental (DICE) facility at Sandia National Laboratories provides multiple platforms for materials property studies utilizing both gun-launched projectiles and pulsed power accelerators with pulse shaping abilities. Unique to DICE is the ability to perform not only shock, or isotropic, compression but also ramped, or isentropic, compression of materials. This allows direct comparison of sample response under different loading conditions. Primary diagnostics include laser-based velocimetry (PDV, VISAR) and high-speed videography. For more information visit https://www.sandia.gov/pulsed-power/research-facilities/dice/. Interested users may contact Scott Alexander (calexa@sandia.gov) for more information.

Dynamic Compression Sector

The DOE/NNSA-sponsored Dynamic Compression Sector (DCS) is a first-of-its-kind experimental capability dedicated to understanding the dynamic compression/deformation response of materials through real-time, multiscale measurements. Managed and operated by Washington State University and located at the Advanced Photon Source (APS) at Argonne National Laboratory, the DCS uniquely integrates state-of-the-art dynamic compression facilities and high energy, synchrotron X-ray capabilities to provide *in-situ* time-resolved, microscopic measurements under high stress impulsive loading. User experiments utilizing X-ray (diffraction, phase contrast imaging, absorption, and scattering) and continuum (laser interferometry) measurements are conducted in each of the experimental stations (Impact Facilities, Laser-Shock, and Special Purpose). Significant enhancements during the APS-Upgrade have resulted in a unique, world-leading experimental capability for the DCS to make measurements using X-ray energies to 70 plus keV. This ability to routinely obtain high energy X-ray measurements under dynamic compression will provide unprecedented opportunities for novel scientific studies. For more details, visit https://dcs-aps.wsu.edu or contact Dr. Paulo Rigg (dcs.admin@wsu.edu).

High Pressure Collaborative Access Team

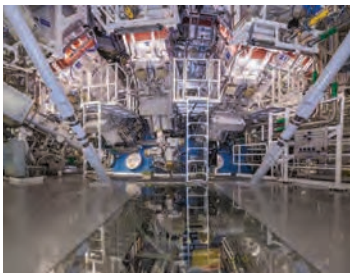
The NNSA-sponsored High Pressure Collaborative Access Team (HPCAT) at sector 16 of the Advanced Photon Source (APS), Argonne National Laboratory, is a synchrotron X-ray facility dedicated for experimental research on materials under extreme pressure-temperature (P-T) and strain rate conditions. The primary experimental focus at HPCAT is on research and development of synchrotron X-ray techniques and coupling these with diamond anvil cell and large volume press, P-T platforms. With four, simultaneously operational, experimental beamline stations, our users are provided X-ray experimental probes, covering an array of diffraction, imaging, and spectroscopy techniques. For more information, visit https://hpcat.aps.anl.gov/ or contact Nenad Velisavljevic (HPCAT-Director@anl.gov). The operational schedule at HPCAT, along with the host APS facility, is divided into three cycles per year – the calendar time-frame of each cycle and any updates can be found on the APS home website. For those interested in performing work at HPCAT the experimental time can be obtained via the General User Proposal (GUP) peer review system or internal partner time allocation request. If interested in GUP, additional information can be found at https://www.aps.anl.gov/Users-Information/About-Proposals/Proposal-Types/General-User-Proposals. For partners (including LLNL/ LANL/SNL and NNSA-SSAA PIs) please email HPCAT-Director@anl.gov to discuss dedicated beamtime allocation, experimental scope/requirements, etc.

Los Alamos Neutron Science Center

For more than 50 years, the Los Alamos Neutron Science Center (LANSCE) has provided the nuclear physics and materials science data needed to ensure the safety and surety of the nuclear stockpile. User time is available at the proton radiography (pRad) facility for dynamic radiography; the Lujan Center for neutron scattering, neutron radiography, and radiography nuclear physics; and the Weapons Neutron Research Facility for nuclear physics, neutron radiography, and electronics testing. In addition to national security research, LANSCE provides the scientific community with intense sources of neutrons and protons for experiments supporting the production of medical and research isotopes, neutron irradiation for industrial application, and research in fundamental physics.

Proposal call dates for the various LANSCE experimental areas vary, but they generally open in December/January and run through January/March. For more information, visit https://lansce.lanl.gov or contact lansce-user-office@lanl.gov.

National Ignition Facility



The National Ignition Facility (NIF) is the world's most energetic laser and is available for user experiments investigating the properties of high energy density matter. The NIF provides up to 2.05 MJ of laser energy to targets, with pulse durations that range from sub-ns to 10s of ns. The NIF main laser can be used in conjunction with the kJ-class, ps-pulse ARC laser. The NIF's 10-meter-diameter target chamber has multiple lines of sight for optical, X-ray, gamma and neutron, and charged-particle diagnostics. Proposals for user experiments are solicited several times each year. A call for proposals for Discovery Science users is issued annually. For details, visit https://lasers.llnl.gov/for-users/call-for-proposals and https://lasers.llnl.gov or contact Kevin Fournier, NIF User Office Director, nifuseroffice@llnl.gov.

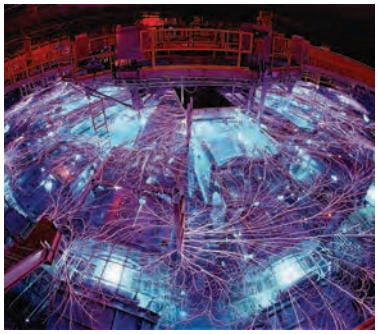
Omega Laser Facility

The Omega Laser Facility at the University of Rochester's Laboratory for Laser Energetics (LLE) includes the 60-beam OMEGA and the 4-beam high-energy, high-intensity OMEGA EP Laser Systems. The OMEGA EP short pulse beam (up to 2) or the tunable-wavelength long-pulse beam can also be transported to the OMEGA chamber for joint operations. The two lasers share over 100 facility-supported diagnostics and perform approximately 1800 highly diagnosed experiments annually. LLE staff work closely with the User Community via the Omega Laser Facility Users Group (OLUG) to improve and add new capabilities every year. Nearly one-third of the experiments at the Omega Laser Facility support basic high energy density science. Three programs provide general user access with beam time granted through a peer-reviewed proposal process (National Laser Users' Facility and Laboratory Basic Science (NBS) funded by NNSA, and LaserNetUS funded by DOE's Office of Fusion Energy Sciences). Application details are available on the LLE website for the NLUF and LBS programs, on the LaserNetUS website for additional beamtime on OMEGA EP. For more information, visit https://www.lle.rochester.edu/ or contact Dr. Mingsheng Wei, NLUF Manager, mingsheng@lle.rochester.edu

Shock Thermodynamic Applied Research

The Shock Thermodynamics Applied Research (STAR) Facility at Sandia National Laboratories is specifically designed, staffed, and used by professionals in the technical disciplines of High Temperature/High Pressure Condensed Matter Physics, Shock Physics, and Dynamic Material Properties. STAR houses a collection of five laboratory test launchers (guns) used for dynamic material property and ballistic impact studies. It is unique in the world in that the collection of launchers can achieve a wide range of sample pressure (bars to multi-Mbar) for material property study. The facility is also equipped to perform ballistics studies with a diverse range of projectile shapes, sizes, and materials. Primary diagnostics include laser-based velocimetry (PDV, VISAR), high-speed videography, and flash X-radiography. For more information visit https://www.sandia.gov/pulsed-power/research-facilities/star/. Interested users may contact Scott Alexander (calexa@sandia.gov) for more information.

Z Pulsed Power Facility



The Z Pulsed Power Facility (Z) is a megajoule-class pulsed power accelerator and multifaceted experimental resource at Sandia National Laboratories that produces intense X-rays and magnetic fields useful for experiments in fundamental high energy density (HED) science. Approximately 10% of the Z shots allocated—around 14 shots/year— are designated for the Z Fundamental Science Program. These shots are competitively-awarded to academic, industrial, and national laboratory research interests through a yearly proposal process for state-of-the-art fundamental research in HED physics, including hydrodynamics, properties of materials under extreme conditions, laboratory astrophysics, advanced ignition concepts, fundamental HED physics, biology, and chemistry. The Call for Proposals is typically issued in mid-June and closes in mid-September. The Z Fundamental Science Workshop is held in early August. Award notifications are provided in mid-December for a two-year award period that begins the following July. For more information, visit https://www.sandia.gov/pulsed-power/ or contact Marcus Knudson, mdknuds@sandia.gov.