

A Magnet for the World's Top Nuclear Scientists & Students

In addition to providing world-class facilities and instrumentation to aid in R&D, the INL ATR NSUF is committed to:

- Fostering collaboration among researchers on high-quality experiments
- Supporting nuclear programs at universities that lack a dedicated research reactor through research awards
- Providing nuclear technology internships that focus on the underpinnings of reactor operations
- Offering short courses where industry researchers, university faculty, postdoctoral researchers and graduate students can gain specific high-level knowledge and network within the nuclear research community
- Sponsoring ATR NSUF Users Week, an annual education and outreach program for ATR NSUF users where participants learn about ATR NSUF research and capabilities

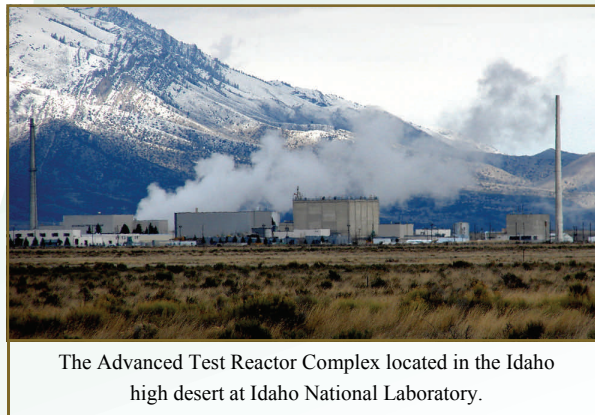
**Advanced Test Reactor
National Scientific User Facility**

Idaho National Laboratory's Advanced Test Reactor (ATR) National Scientific User Facility (NSUF) offers scientists and engineers an opportunity to perform novel research in the only U.S. research reactor capable of providing large-volume, high-flux neutron irradiations in a prototypic reactor environment. Once irradiated, a variety of post-irradiation examination capabilities are offered for characterization of research.

Advancing the State of the Art in Nuclear Technology

Testing in a controlled neutron environment allows for advances in fuels and materials performance, instrumentation and detection capability, neutronics benchmarks and thermal performance. Reactor testing can prove the performance of advanced technologies as well as provide critical data to validate modern computational techniques. These advances all must ultimately be proven in the extremely complex environment of an actual reactor.

Thus the ATR NSUF provides a rich field for scientific investigation. Through access to the world-class capabilities offered by the Advanced Test Reactor and post-irradiation examination facilities at Idaho National Laboratory, and the variety of reactors, beamlines and instruments at the partner facilities, researchers can build on current knowledge and advance the state of the art.



The Advanced Test Reactor Complex located in the Idaho high desert at Idaho National Laboratory.

ATR NSUF Capabilities

	IIT	INL	MIT	NCSU	U of MI	UNLV	U of WI
Reactor		X	X				
PIE		X		X	X	X	X
Beamline	X			X	X		X



ATR
National Scientific User Facility

ATR NSUF
Partner Facilities

ILLINOIS INSTITUTE
OF TECHNOLOGY

MIT Massachusetts
Institute of
Technology

NC STATE UNIVERSITY

M
UNIVERSITY OF
MICHIGAN

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

W
THE UNIVERSITY
of
WISCONSIN
MADISON

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For more information, visit our
website at <http://atrnusuf.inl.gov/>

Idaho National Laboratory Facilities

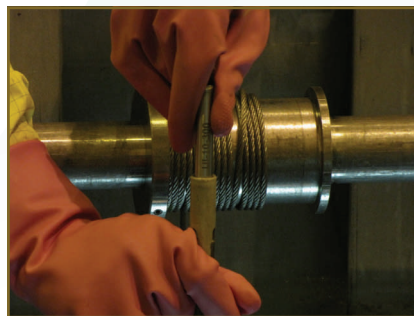
- **Advanced Test Reactor (ATR)** – large-volume, high-flux neutron irradiations in a prototypic reactor environment
- **Advanced Test Reactor-C (ATR-C)** – low power prototype ATR environment for neutronics benchmarks and detector studies
- **Hot Fuel Examination Facility (HFEF)** – heavily shielded, alpha-gamma hot cell facility designed for remote examination of highly irradiated fuel and structural materials
- **Analytical Laboratory** – analysis of irradiated and radioactive materials
- **Electron Microscopy Laboratory** – radiological facility containing optical, scanning and analytical electron microscopes



Engineers use robotic manipulators to perform Post-Irradiation Examination in hot cells at the Hot Fuel Examination Facility (HFEF) at INL.

Partner Facility Capabilities

- **Illinois Institute of Technology** – synchrotron radiation at the Materials Research Collaborative Access Team (MRCAT) beamline located in the Advanced Photon Source offers X-ray diffraction, X-ray absorption, X-ray fluorescence and 5µm spot size fluorescence microscopy.
- **Massachusetts Institute of Technology** – 5 MW research reactor offering a variety of experimental positions including in-core, beam ports, pneumatic tubes, graphite-reflector irradiation positions and shielded medical rooms.
- **North Carolina State University** – PULSTAR reactor offers neutron powder diffraction, neutron imaging, intense positron source, ultra-cold neutron source, neutron activation analysis, isotope production and reactor irradiations.



A University of Illinois Capsule is loaded into the INL Advanced Test Reactor.

- **University of Michigan** – Michigan Ion Beam Laboratory (MIBL) offers use of accelerators to study radiation effects by emulating neutron damage in nuclear reactor materials; and the Irradiated Materials Complex (IMC), composed of the Irradiated Materials Laboratory (IML) and the hot cells, provides the capability to conduct high-temperature mechanical properties, and corrosion and stress corrosion cracking experiments on neutron irradiated materials in an aqueous environment.
- **University of Nevada, Las Vegas** – Radiochemistry Laboratories offer Metallographic microscopy, X-ray powder diffraction, Rietveld analysis, scanning electron microscopy, electron probe microanalysis, analytical transmission electron microscopy and X-ray fluorescence (XRF) spectrometry.
- **University of Wisconsin** – Characterization Laboratory for Irradiated Materials (CLIM) is capable of examining neutron-irradiated transmission electron microscopy specimens, and the Tandem Accelerator Ion Beam can produce high-energy ion beams.