



The next generation of materials research

SNS site including support facilities and the Center for Nanophase Materials Sciences.

Purpose: Provide intense neutron beams for research on the structure and dynamics of materials in fields such as physics, chemistry, materials science, and biology.

Sponsor: U.S. Department of Energy, Office of Basic Energy Sciences

Features:

- 1.4-MW beam power at 60 Hz
- 20 instruments in operation or under design and construction phases

Users: Scientists and engineers from universities, industries, and government laboratories

Complementary ORNL Facilities:

- High Flux Isotope Reactor
- Center for Nanophase Materials Sciences
- National Center for Computational Sciences
- High Temperature Materials Laboratory

Other North American Neutron Facilities:

- Intense Pulsed Neutron Source
- Los Alamos Neutron Science Center
- National Institute of Standards and Technology Center for Neutron Research
- Canadian Neutron Beam Centre

Spallation Neutron Source

SNS is an accelerator-based neutron source that will provide the most intense pulsed neutron beams in the world for scientific research and industrial development. When ramped up to its full beam power of 1.4 MW, SNS will be eight times more powerful than today's best facility. This versatile scientific tool will give researchers more detailed snapshots of the smallest samples of physical and biological materials than ever before possible. The diverse applications of neutron-scattering research will provide opportunities for experts in practically every scientific and technical field.

Capabilities

With the eventual SNS suite of up to 24 best-in-class instruments, scientists will be able to count scattered neutrons, measure their energies and the angles at which they scatter, and map their final positions. In many cases, these instruments represent improvements in the state of the art. As a result, SNS will allow measurements of greater sensitivity, higher speed, higher resolution, or in more complex sample environments than have been possible at existing neutron facilities.

Additional Nearby Facilities

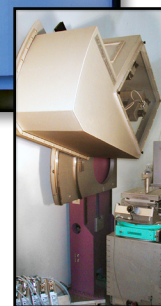
- The Center for Nanophase Materials Sciences is a collaborative nanoscience user research facility for the synthesis, characterization, theory/modeling/simulation, and design of nanoscale materials.
- The Joint Institute for Neutron Sciences, to be built at ORNL in conjunction with The University of Tennessee, will be an intellectual center for neutron users.
- The ORNL User Facility will accommodate overnight visits for users.

Neutron Scattering Science User Program

The intent of the ORNL Neutron Scattering Science User Program is to provide a system that operates seamlessly for users, whether they want to conduct research at SNS, HFIR, or both. This program also accommodates users at the Center for Nanophase Materials Sciences and the Shared Research Equipment Program. The combined proposal system for these facilities allows users to easily submit multiple and combined-facility proposals.

Proposals are peer-reviewed by external panels, with recommendations based on scientific and technological impact and the experience of the research team. Experiments are also reviewed by a safety committee and are approved by the director of the Neutron Scattering Science Division.

Meeting the needs of users is paramount at all of these facilities. To find out more or to provide input on the Neutron Scattering Science User Program, contact neutronusers@ornl.gov or visit our web site at neutrons.ornl.gov.



Installation and commissioning of SNS instruments.



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HFIR site including support facilities.

Purpose: Provide intense neutron beams for research on the structure and dynamics of materials in fields such as physics, chemistry, materials science, and biology.

Sponsor: U.S. Department of Energy, Office of Basic Energy Sciences

Features:

- 85-MW steady-state source
- Peak thermal flux of 2.6×10^{15} neutrons per cm^2/s
- 15 instruments planned or in operation

Users: Scientists and engineers from universities, industries, and government laboratories

Complementary ORNL Facilities:

- Spallation Neutron Source
- Center for Nanophase Materials Sciences
- National Center for Computational Sciences
- High Temperature Materials Laboratory

Other North American Neutron Facilities:

- Intense Pulsed Neutron Source
- Los Alamos Neutron Science Center
- National Institute of Standards and Technology Center for Neutron Research
- Canadian Neutron Beam Centre

High Flux Isotope Reactor

HFIR is the highest flux reactor-based source of neutrons for condensed matter research in the United States. Thermal and cold neutrons produced by HFIR are used for studies in a variety of scientific fields. The neutron scattering capabilities of this facility provide knowledge about the molecular and magnetic structures and behavior of materials, including high-temperature superconductors, polymers, metals, and biological samples.

Capabilities

In recent years, HFIR has undergone the most dramatic transformation in its 40-year life. Improvements include an overhaul of the reactor structure for reliable, sustained operation; installation of a liquid hydrogen cold source; a new neutron guide hall that houses seven new cold-neutron instruments; and significant upgrading of the eight thermal-neutron spectrometers in the beam room.

Additional Nearby Facilities

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New HFIR instruments being installed and commissioned.

