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

The next generation of materials research

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:

- Eventual 1.4-MW beam power at 60 Hz
- 25 instruments in operation, under design or construction, or planned

Users: Scientists and engineers from universities, industries, and government laboratories around the world

Other North American Neutron Facilities:

- 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. This one-of-a-kind facility provides the most intense pulsed neutron beams in the world. When ramped up to its full beam power of 1.4 MW, SNS will be eight times more powerful than today's best facility. It will give researchers more detailed snapshots of the smallest samples of physical and biological materials than ever before possible.

Capabilities

With the eventual SNS suite of up to 25 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. SNS will allow measurements of greater sensitivity, higher speed, higher resolution, and in more complex sample environments than have been possible at existing neutron facilities.

Neutron Scattering Science User Program

Each year the User Office issues two calls for proposals. Submissions 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 SNS. 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.

Additional Nearby Facilities

Research capabilities at HFIR and SNS are enhanced by the proximity of other ORNL user facilities, most with the same access and training requirements. One of our major goals is to improve integration between the facilities, making it easier for users to access the support they need. Major user facilities at ORNL include the following:

- Center for Structural Molecular Biology
- Bio-Deuteration Laboratory
- Center for Nanophase Materials Sciences
- National Center for Computational Sciences
- Shared Research Equipment User Facility
- High Temperature Materials Laboratory

Two additional facilities that will benefit users are under construction:

- The Joint Institute for Neutron Sciences, being built at ORNL in conjunction with The University of Tennessee, will be an intellectual center for neutron users.
- The ORNL User Housing Facility will accommodate overnight visits for users.

Valeria Lauter and Hailemariam Ambaye at the SNS Magnetism Reflectometer.

Candice Halbert, Scientific Associate for the SNS Liquids Reflectometer.

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HFIR site including support facilities.

The next generation of materials research

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 in operation or planned

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

Other North American Neutron Facilities:

- 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 can house seven new cold-neutron instruments; and significant upgrading of the eight thermal-neutron spectrometers and diffractometers.

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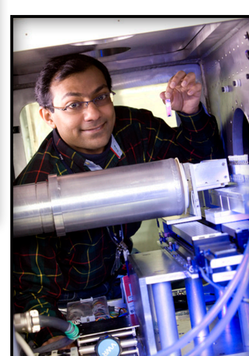
Mark Lumsden (left) and Andy Christianson at HFIR's HB-3 Triple-Axis Spectrometer.



Sui Venkatesh Pingol at the HFIR Bio-SANS instrument.

HFIR

SNS

Oak Ridge National Laboratory

U.S. DEPARTMENT OF ENERGY Office of Science

neutrons.ornl.gov

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