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SNS
SPALLATION NEUTRON SOURCE

Spallation Neutron Source

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE U.S. DEPARTMENT OF ENERGY

SNS

SNS at a Glance

Location	Oak Ridge National Laboratory Oak Ridge, Tennessee USA
Sponsor	U.S. Department of Energy Office of Science
Design and construction cost	$1.4 billion, the world's largest facility for the study of materials
Construction time	Seven years
Research and support staff	450
Visiting scientists	2000 annually
Scientific instruments	24
Scientific purpose	The world's most powerful pulsed-neutron source can provide information about the structure and properties of materials that cannot be obtained from X-rays, electron microscopes, or steady-state neutron sources. SNS is about ten times more powerful than existing neutron sources in Europe and Asia.

OAK RIDGE National Laboratory

Office of Science
U.S. DEPARTMENT OF ENERGY

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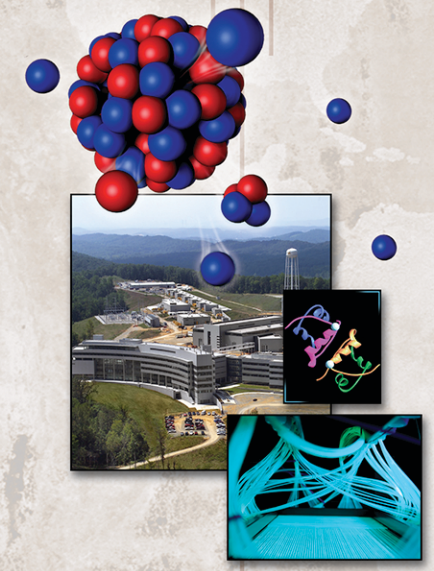
The next generation of materials research



OAK RIDGE NATIONAL LABORATORY

SNS

The potential to change our lives is extraordinary

The U.S. Department of Energy, in cooperation with Oak Ridge National Laboratory, is opening the Spallation Neutron Source, the world's foremost facility for the study of materials. Six Department of Energy laboratories were involved in designing this powerful scientific tool that will produce neutron pulses every 17 milliseconds. Just as we prefer a bright light to a dim one to read the fine print in a book, SNS gives researchers more detailed snapshots of even the smallest samples of physical and biological materials.

For many research problems, having neutrons available in a series of pulses is better than having a continuous neutron source. SNS produces pulses that contain a neutron intensity 20 to 100 times higher than that obtainable from the best continuous sources. Using a highly sophisticated suite of 24 instruments, scientists can count scattered neutrons, measure their energies and the angles at which they scatter, and map their final positions. In an almost limitless variety of areas, these "movies" of molecules in motion could lead to discoveries with the potential to change our lives.

SNS was designed and built as a partnership among six Department of Energy laboratories: Argonne in Illinois, Brookhaven in New York, Jefferson in Virginia, Lawrence Berkeley in California, Los Alamos in New Mexico, and Oak Ridge in Tennessee.

The stuff of dreams

Technological discoveries at SNS will provide lasting benefits to America's scientific, business, and industrial sectors. Among the discoveries neutron scattering could make possible:

- Drug delivery systems that release a medicine precisely when needed by the body to relieve pain
- Lubricants that enable a car engine to generate more power with less emissions
- Superconducting wires that carry more power and reduce electricity costs
- Manufacturing processes for plastics that do not harm the environment
- Lightweight fuel cells that power emission-free vehicles
- Cures for diseases through better understanding of how proteins work in the human body

Magnetism and Superconductivity

High-speed trains could be levitated by superconducting magnets, traveling faster than the TGV in France.

Complex Fluids

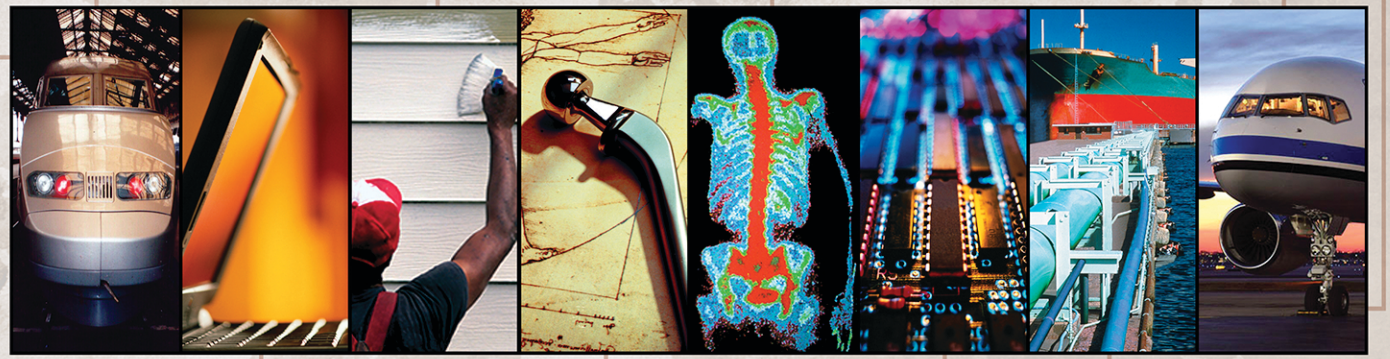
Protective coatings, such as paint, are complex fluids that could be made more durable by altering their molecular structure.

Biomaterials

Advanced medicines could identify and provide remedies for diseases such as osteoporosis.

Polymers

Lightweight plastics could lead to stronger, safer, and more energy-efficient aircraft.



Crystalline Materials

Better thin films could increase nonvolatile memory, greatly extending the life of laptop computer batteries.

Disordered Materials

Wear- and corrosion-resistant alloys could provide better surfaces for materials such as hip implants.

Semiconductors

Smaller, faster electronic chips could lower the cost of computing and make possible more convenient devices.

Engineering

Stronger welding materials could reduce stress, preventing cracks and oil leaks in piping.