SNS
SPALLATION NEUTRON SOURCE

SNS at a Glance

Location Oak Ridge National Laboratory
Oak Ridge, Tennessee
USA

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

Design and construction cost $1.4 billion

Research and support staff 600

Visiting scientists 2000 annually when all instruments are online

Scientific instruments 25

Scientific purpose Provide information about the structure and properties of materials that cannot be obtained from x-rays, electron microscopes, or steady-state neutron sources

neutrons.ornl.gov

OAK RIDGE National Laboratory

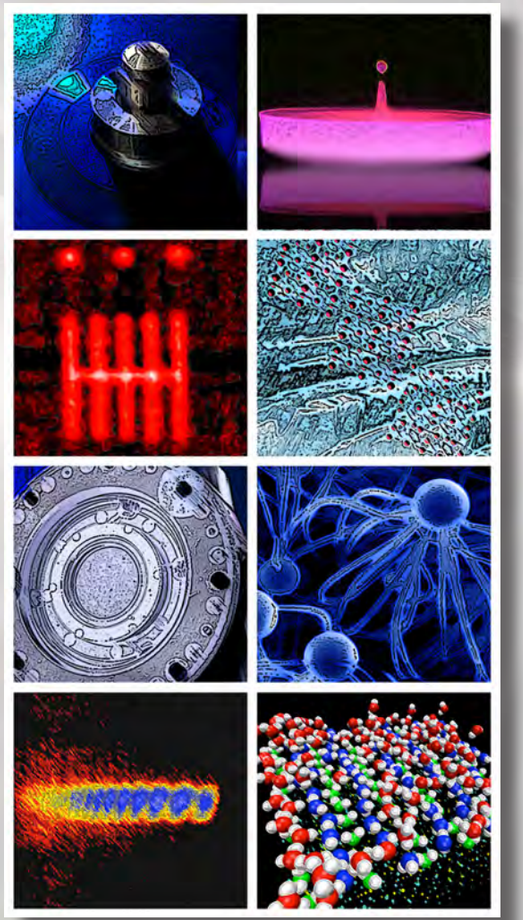
U.S. DEPARTMENT OF ENERGY
Office of Science

09-G0046/gjm

SNS

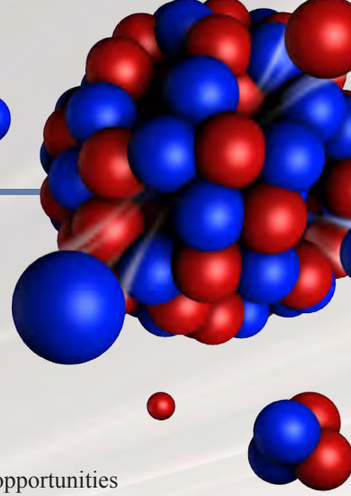
Spallation Neutron Source

The next generation of materials research



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

The potential to change our lives



Oak Ridge National Laboratory operates the Spallation Neutron Source, one of the world's foremost facilities for the study of materials. Built and funded by the U.S. Department of Energy Office of Basic Energy Sciences, SNS provides the most intense pulsed neutron beams in the world for scientific and industrial research and development.

Experts in practically every scientific and technical field can take advantage of the opportunities provided by SNS. Its advanced instrument suite—25 will eventually be available—gives researchers more detailed snapshots of smaller samples of physical and biological materials than ever before possible.

The capabilities of SNS will enable scientific breakthroughs that will enrich our lives in ways we haven't yet imagined.

Neutron scattering was pioneered at ORNL by Clifford G. Shull, who later received a Nobel Prize for his work. Today, ORNL attracts neutron scattering researchers from all over the world.

A brighter future

Neutron scattering research is leading to the improvement of many products and technologies that are part of everyday life. Scientific and technological discoveries at SNS will provide lasting benefits to the scientific, business, and industrial communities.

Among the discoveries neutron scattering could make possible:

- Medical implants that last indefinitely, reducing the need for additional surgeries
- Drug delivery systems that release a medicine precisely when and where needed by the body
- Lightweight fuel cells that power emission-free vehicles
- Efficient, nonpolluting industrial plants
- Economical energy from abundant sources such as the sun and water

Transportation

Lighter, more efficient motors for powering hybrid and electric vehicles

High-speed (over 300 mph) trains powered by electromagnetism rather than petroleum

Energy

Superconducting materials for power lines and electrical components that conduct electricity without resistance, making it cheaper and service more reliable

Efficient, cost-effective methods for breaking down naturally occurring plant material to produce fuels from renewable sources

Medicine

Advanced treatments for the protein abnormalities that cause diseases such as Alzheimer's and Parkinson's

Synthetic biomaterials for more effective drugs and methods for diagnosing disease

Engineering

Safer designs and more durable materials for machinery, bridges, and nuclear power plants

Stronger materials and improved techniques that reduce stresses in welded equipment and structures

Electronics

Better optical fibers for telecommunication equipment

Techniques for developing smaller, more durable devices for computers and other electronics

Environment

Environmentally friendly processes for manufacturing plastics that produce less toxic waste

Chemical production processes that create less greenhouse gases

Manufacturing

Improved thin films for use in batteries, electronic semiconductors, and packaging materials

Better understanding of the health and environmental effects of "engineered" materials used in manufacturing

Polymers

Coatings that continually kill germs that land on surfaces such as doorknobs and counters

"Self-repairing" materials for use in critical structures such as aircraft frames