Spallation Neutron Source

SNS provides the world’s most intense pulsed neutron beams for research on structure and dynamics of materials in fields such as physics, chemistry, materials science, and biology.

Scientific Accomplishments

Greener Manufacturing Processes
Better production processes are needed for manufacturing practices that can harm the environment, such as in the plastics industry. Neutron studies at SNS have revealed the dynamics of water molecules at the nanoscale. This discovery is helping scientists develop catalysts that will allow more economical, environmentally friendly energy production and the reduction of greenhouse gases.

Advanced Biotechnological Materials
Neutrons are ideal for studying the various properties of polymers made up of both natural and synthetic materials. Such materials are highly versatile because they possess the desired properties of both types of polymers. Researchers at SNS are studying the dynamics of such mixtures that hold promise for applications from biocompatible films for human implants to semiconductors to durable, self-repairing materials for aircraft.

Abundant New Energy Sources
Neutron studies with materials under high pressure, as well as other extreme environments, are leading to discoveries of potential new energy sources. At SNS, such studies have revealed the never-before-seen structure of gas molecules that could produce energy, as well as capture toxic carbon dioxide. This research promises great advancements in energy production and reduction of global warming from use of common materials.

Targeted Drug Delivery Systems
A pervasive problem in the medical industry is use of drugs that destroy invasive agents, such as cancer, but that are toxic to other areas of the body. At SNS, researchers are studying the unique structure and behavior of synthetic molecules in solutions that simulate those in the body. Understanding how these molecules function in different situations is helping in the development of drugs that can target diseased areas of the body without harming healthy tissue.

SNS is an accelerator-based neutron source that provides the world’s most intense pulsed neutron beams for scientific research and development. These intense beams are delivered to an advanced suite of up to 25 instruments, providing researchers with more detailed information about smaller samples of physical and biological materials than ever before possible. Research at SNS is leading to discoveries that will provide lasting benefits to the scientific, business, and industrial communities.

Double the Output
SNS is designed to be upgraded to more than twice its original power to accommodate a second target station. An optimized instrument suite on this target station will complement the capabilities available at the first target station, providing more than an order-of-magnitude performance improvement for broad areas of forefront science and totally new areas of scientific exploration with neutrons. When most of its instruments are operational, the second target station will double the scientific output of SNS.

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