'Cold linac' commissioning major step for ORNL's Spallation Neutron Source

August 19 2005

The Spallation Neutron Source at the Department of Energy's Oak Ridge National Laboratory has met a crucial milestone on its way to completion in June 2006 -- operation of the superconducting section of its linear accelerator.

The SNS linac has two sections: a room-temperature, or warm, section, which completed its commissioning last January, and a superconducting, or cold, section, which operates at temperatures hundreds of degrees below zero. The cold linac provides the bulk of the power that drives the linac, and has already achieved an energy level of 865 MeV, which is about 75 percent of the speed of light. The SNS linac is the world's first high energy, high power linac to apply superconducting technology to the acceleration of protons. "The successful operation of the cold linac is a major step toward the 2006 completion of the SNS and demonstrates the success of the collaboration of national labs in keeping the project on time, on budget and on scope. It represents, technically, one of the most complex systems of the SNS facility," said Thom Mason, ORNL's Associate Director for the SNS. "This successful test is just another indicator of the outstanding team of men and women that ORNL has brought together to build and operate the SNS facility. They can be justifiably proud of this accomplishment," said Les Price, DOE's project director for the SNS. The Thomas Jefferson National Accelerator Facility in Virginia, part of the team of six DOE national laboratories collaborating on the DOE Office of Science project, was responsible for the superconducting linac and its refrigeration system. Los Alamos National Laboratory in New Mexico provided the radio-frequency

systems that drive the linac. The other DOE national laboratories supporting ORNL in the SNS collaboration are Argonne, Lawrence Berkeley, and Brookhaven. "Jefferson Lab congratulates the Oak Ridge SNS team on this major milestone," said Claus Rode, SNS project manager for Jefferson Lab. "The SNS project was a challenging five-year effort that used all of Jefferson Lab's expertise in superconducting radiofrequency technology."

SNS will produce neutrons by accelerating a pulsed beam of high-energy protons down the 1,000-foot linac, compressing each pulse to high intensity, and delivering them to a liquid mercury target where neutrons are produced in a process called "spallation."

SNS will increase the intensity of pulsed neutrons available to researchers nearly tenfold, providing higher quality images molecular structures and motion. Together, ORNL's High Flux Isotope Reactor and SNS will represent the world's foremost facilities for neutron scattering, a technique pioneered at ORNL shortly after World War II.

When completed next year, SNS will become the world's leading research facility for study of the structure and dynamics of materials using neutrons. It will operate as a user facility that will enable researchers from the United States and abroad to study the science of materials that forms the basis for new technologies in telecommunications, manufacturing, transportation, information technology, biotechnology and health.

Source: Oak Ridge National Laboratory

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