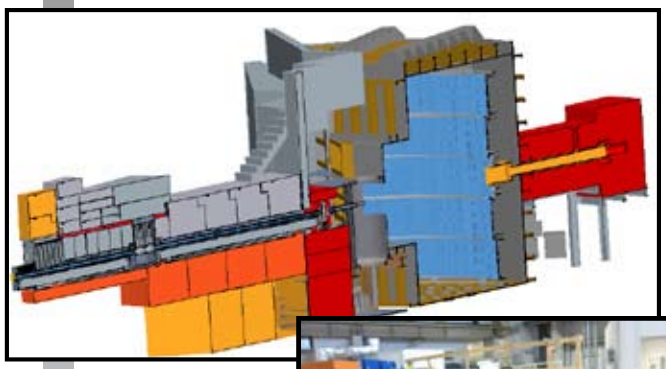
INSTRUMENT Fact Sheet

BEAM LINE 17

SPALLATION NEUTRON SOURCE

SEQUOIA – FINE-RESOLUTION FERMI CHOPPER SPECTROMETER

SEQUOIA is optimized to provide a high neutron flux at the sample and fine energy resolution. The spectrometer can select neutrons with incident energies from a few hundredths of an electron volt to a couple of electron volts and thus can study excitations over this wide energy scale. An elliptically shaped supermirror guide in the incident flight path boosts the performance at the lower end of this range. The sample and detector vacuum chambers provide a window-free final flight path and incorporate a large gate valve to allow rapid sample changeout. A new T_0 neutron chopper will not only block the prompt radiation from the source but also eliminate unwanted neutrons from the incident beam line. SEQUOIA is a collaboration between Oak Ridge National Laboratory and the Canadian Institute for Neutron Scattering.



SPECIFICATIONS

Moderator	Decoupled ambient water
Source-to-Fermi chopper distance	18 m
Chopper-to-sample distance	2.0 m
Sample-to-detector distance	5.5–6.3 m cylindrical geometry
Incident energy range	10–2000 meV
Resolution (elastic)	1–5% E_i
Vertical detector coverage	-30–30°
Horizontal detector coverage	-30–60°
Minimum detector angle	3°

Status: In commissioning

APPLICATIONS

With its capability to acquire data quickly and relate them to three-dimensional momentum transfers, SEQUOIA allows new studies of single crystals and novel systems such as the following:

- High-temperature superconductivity: spin dynamics in superconductors and precursor compounds and incommensurate spin fluctuations at varying doping levels
- Model magnetic systems, such as one-dimensional spin chains and spin ladders, and crossover effects from one- to three-dimensional magnetism
- Excitations in quantum fluids, quantum critical phenomena, and non-Fermi liquid systems
- High-resolution crystal field spectroscopy reaching into the 1-eV range
- Coupling of electronic and spin systems in correlated-electron materials
- Colossal magnetoresistive materials

FOR MORE INFORMATION, CONTACT

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http://neutrons.ornl.gov/instrument_systems/hrcs.shtml

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