

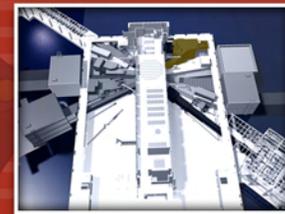
# INSTRUMENT

BEAM LINE

# 17

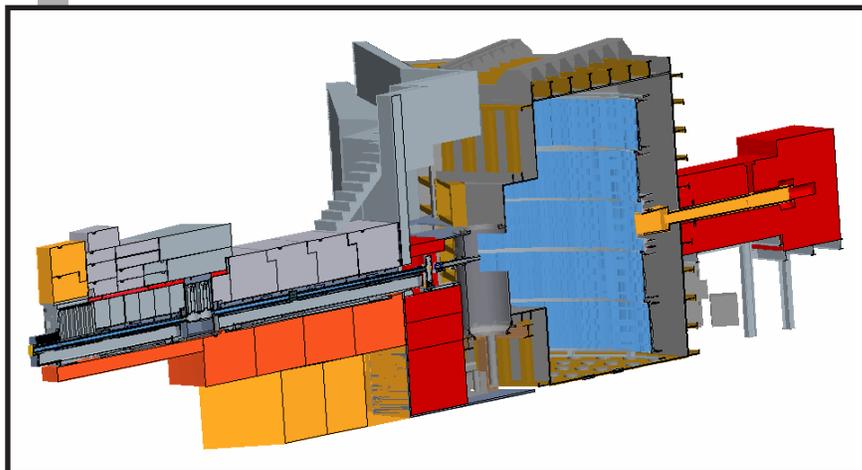
SPALLATION NEUTRON SOURCE

# Fact Sheet



## SEQUOIA – FINE-RESOLUTION FERMI CHOPPER SPECTROMETER

SEQUOIA is a fine-resolution Fermi chopper spectrometer optimized to provide a high neutron flux at the sample and fine energy resolution. The spectrometer is capable of selecting 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 is being developed not only to block the prompt radiation from the source but also to eliminate unwanted neutrons from the incident beam line. SEQUOIA can help scientists understand excitations in many materials,



for example, magnetic materials, novel oxides, and high-temperature superconductors. 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       | $\sim 30$ – $30^\circ$         |
| Horizontal detector coverage     | $\sim 30$ – $60^\circ$         |
| Minimum detector angle           | $3^\circ$                      |

Status:

To be commissioned in 2008

### 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, 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/hracs.shtml](http://neutrons.ornl.gov/instrument_systems/hracs.shtml)



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