Beamline Ancillary Equipment

Summary information on the ancillary equipment is given below. The ancillary equipment listed here can be used with any of the neutron instruments. For information on equipment available to only a subset of instruments, see the pages specific to that instrument.

Applying Mechanical Loads

Servohydraulic load frame

- ±100 kN axial tensile/compressive loading, with fatigue capability
- Alignment fixture
- Extensometers for static loading
- Ability to read strain gauges
- Biaxial loading on tubular specimens using combined axial loading and internal pressurization
- In-situ heating available, up to ~900 C depending on sample geometry

Tilting axial/torsional load frame

- ±50 kN axial tensile/compressive loading, with fatigue capability
- ± 100 Nm torsional loading with fatigue capability
- Extensometers for static loading
- Ability to read strain gauges
- Load frame can be tilted ±90 deg.

Controlling the Temperature

Furnaces

- TLF, Top Loading Furnace, Room Temperature to 1600 K
- I/R Furnace, Room temperature to 1000 K

Cryostats

- Closed Cycle Heliox, 0.3 K to Room temperature
- Lemon Cryostat, 1.5K to 800K, 60mm sample diameter max
- H10 wet cryostat, 2K to Room Temperature (Heliox insert available for 0.3K operation)
- D1, closed cycle (Displex), 10 to 300 K
- D3, closed cycle (CTI), 12 to 300 K
- D4, 4K to Room Temperature, 40mm sample diameter max
- D5, 4K to 500K, 40mm sample diameter max
- D6, 4K to Room Temperature, 100mm sample diameter max
- M5, vertical field (9 T), 0.3 to 300 K (described further below)
- Cryostat for biological studies (manipulation of both humidity and temperature)

M5 Magnet Cryostat

Magnetic field

Vertical magnetic field with two modes of operation: symmetric mode (same current in both coils) for experiments with unpolarized neutrons and asymmetric mode (higher current in one coil to shift the null point) for experiments with polarized neutrons. For

fields above 6 T for the asymmetric and 7.5 T for the symmetric mode a l-plate is used to cool down the liquid He near the coils from 4.2 to 2.2 K. With the l-plate up to 7.2 T for polarized neutrons and up to 9 T for unpolarized neutrons is achievable.

Temperature: From 300 K down to 0.3 K. For temperatures below 1.5 K a special sample stick (Heliox) is needed

Dark angle 21 degrees

Sample size:

- Diameter < 25 mm for the Heliox insert (T < 1.5 K)
- Diameter < 30 mm for the standard sample stick (T > 1.5 K)

Time constants

- 35 minutes to ramp the field up to asymmetric 6 T
- 100 minutes to ramp the field up to symmetric 9 T
- 12 hours to cool from 300 K down to 1.5 K, another hour down to 0.3 K

Hold time: Liquid helium: 3 days without l-plate, 40 hours with l-plate temperature below 1.5 K: 1 day (1 hour is needed to again get below 1.5 K)

Controlling the Beam

Monochromators

A wide selection of monochromators is available to match the monoenergetic characteristics of the scattered beam to the experiment (e.g. Ge, Si, Pg, Cu).

Filters

- Cold beryllium or sapphire (77 K), before the monochromator
- Cold beryllium (77 K), cryostat can be placed between monochromator and specimen or specimen and analyzer
- Pyrolytic graphite can be placed between monochromator and specimen or specimen and analyzer

Other devices

- Precision collimating devices to study volumes as small as 0.3 mm × 0.3 mm × 0.3 mm

Positioning the Sample

Mechanical Devices

- XYZ translation tables
- Kappa Goniometer
- C Cradle
- Eulerian Cradle

Feel out of your depth?

Don't worry. Just talk to us (http://cins.ca/get-beam-time/expert-resources/). We'll help you design a feasible experiment.

Technical Support

The CNBC has a strong group of technical support staff who can assist with the experiment set up. Some experiments may demand several areas of expertise simultaneously, such as cryogenics and computer control, and a number of technicians can be working in parallel to ensure that your experiment gets underway promptly.