

# INSTRUMENT

BEAM LINE

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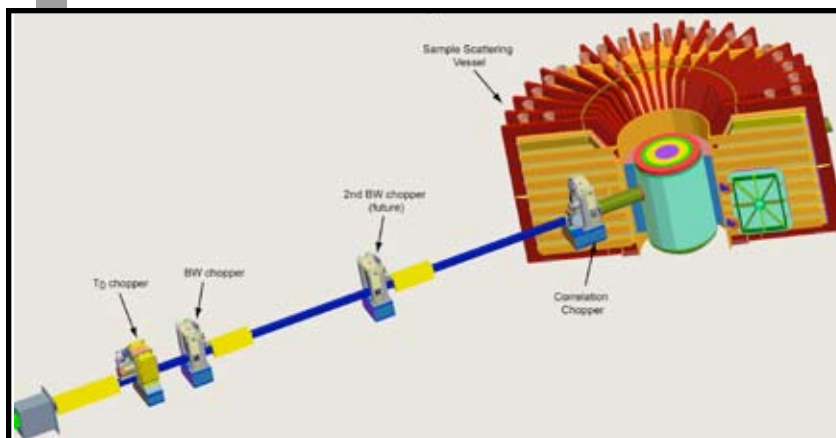
SPALLATION NEUTRON SOURCE

# Fact Sheet



## CORELLI – ELASTIC DIFFUSE SCATTERING SPECTROMETER

CORELLI is a statistical chopper spectrometer with energy discrimination. The momentum transfer ranges from 0.5 to 12  $\text{\AA}^{-1}$ , and the energy of incident neutrons ranges from 10 to 200 meV. This instrument combines the high efficiency of white-beam Laue diffraction with energy discrimination by modulating the beam with a statistical chopper.



A cross-correlation method is used to reconstruct the elastic signal from the modulated data. Accurate modeling of the short-range order associated with the diffuse scattering requires measurements over large volumes of three-dimensional

reciprocal space, with sufficient momentum resolution to distinguish the diffuse signal from the strong Bragg peaks.

### APPLICATIONS

CORELLI is designed and optimized to probe complex disorder in crystalline materials through diffuse scattering of single-crystal samples. Studies at this instrument encompass a wide range of novel materials.

- Diffuse scattering in material science, including colossal magnetoresistance materials, ferroelectric relaxors, and fast ion conductors.
- Diffuse scattering in condensed matter physics, including high-temperature superconductors, geometrically frustrated systems, and quantum critical phenomena.
- Diffuse scattering in molecular systems including molecular solids and microporous framework systems.

### SPECIFICATIONS

Moderator	Ambient H <sub>2</sub> O decoupled poisoned
Source-to-sample distance	20 m
Sample-to-detector distance	2.5 m
Anular coverage	-23° to +152° horizontally ±28.5° vertically
Energy resolution	1 meV at 10 $\text{\AA}^{-1}$
Momentum resolution	$\Delta Q/Q \sim 0.005$
Incident energy range	10–200 meV
Momentum transfer	0.5–12 $\text{\AA}^{-1}$
Beam size at sample position	~ 1 cm <sup>2</sup>

Status:  
To be commissioned in 2014

**FOR MORE INFORMATION, CONTACT**

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February 2009

09-G00161/arm