

INSTRUMENT

BEAM LINE

9

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 Å⁻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 ₂ 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 Å ⁻¹
Momentum resolution	ΔQ/Q~0.005
Incident energy range	10–200 meV
Momentum transfer	0.5–12 Å ⁻¹
Beam size at sample position	~ 1 cm ²

Status: Under construction

FOR MORE INFORMATION, CONTACT

Instrument Scientist: Feng Ye, yef1@ornl.gov, 865.576.0931



February 2012

09-G00161B/gjm