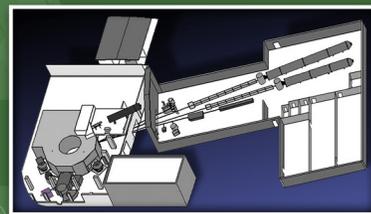


INSTRUMENT

HB-2C



WAND² – US/JAPAN WIDE-ANGLE NEUTRON DIFFRACTOMETER

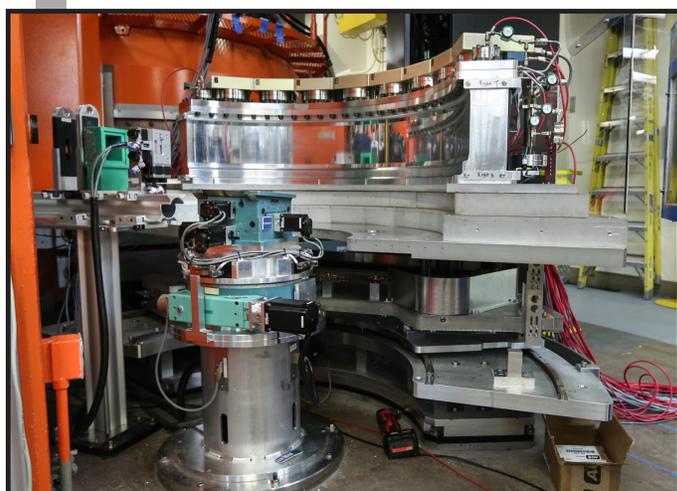
SPECIFICATIONS

Beam spectrum	Thermal
Monochromator	Vertically focused hot pressed Ge
Monochromator angle	$2\theta_M = 51.5^\circ$
Wavelength	$\lambda = 1.5 \text{ \AA}$ (Ge 113) 0.95 \AA (Ge 115)
Scattering angles	$0^\circ < 2\theta < 156^\circ$
Collimator	Oscillating collimator radial before the detector
Detector	2-dimensional ³ He curved PSD with $\sim 2e^6$ pixels; event mode capability
Resolution	0.4 mm spatial resolution (x and y)

Status: Available to users

The HFIR HB-2C WAND² instrument was designed to provide two specialized data-collection capabilities: (1) fast measurements of medium-resolution powder-diffraction patterns and (2) measurements of diffuse scattering in single crystals. For 2018, this instrument has been upgraded with a curved, two-dimensional ³He position-sensitive detector covering 120° of the scattering angle with the focal distance of 71 cm and +/- 7.5° vertical coverage. This enables measurements of single-crystal diffraction patterns in a short time over a wide range of the reciprocal space, making WAND² useful to search for fundamental magnetic propagation vectors or measurements of diffuse

scattering in single crystals. WAND² is also a medium resolution powder diffractometer where the high flux allows fast data sampling for studies of kinetics in phase transitions. Additionally, it can be used for time-resolved experiments for structural transformations having short time constants or in stroboscopic mode for reversible processes. The WAND² detector (BNL120) is a seamless two-dimensional position sensitive ³He gas counter with 8*480*512 pixels. This detector has 0.4 mm subwire resolution, which yields an angular resolution of 0.1°



Installation of 2-D detector without shielding..

WAND². The vertical focussing Ge monochromator provides high flux at the sample position which allows fast parametric measurements. The full range of HFIR's sample environment can be used, including cryofurnaces (4–800 K), furnaces (to 1800 K), cryostats (to 0.06 K), and cryomagnets (to 7 T). The high flux at the sample position also allows high pressure experiments with clamp cells up to 6 GPa.

APPLICATIONS

WAND² is ideal for the study of time-resolved phenomena and for the study of diffuse scattering in single crystals. Research performed at WAND² includes studies of the growth of ferroelectric ice-XI, hole and charge ordering in colossal magnetoresistance materials, and studies of magnetic structures and correlations in low-dimensional magnetic systems and other magnetic materials.

WAND² is operated in collaboration with the Japan Atomic Energy Research Institute under the US/Japan Cooperative Program on Neutron Scattering Research.

FOR MORE INFORMATION, CONTACT

Instrument Scientist: Matthias Frontzek, frontzekmd@ornl.gov, 865.574.2478

neutrons.ornl.gov/wand