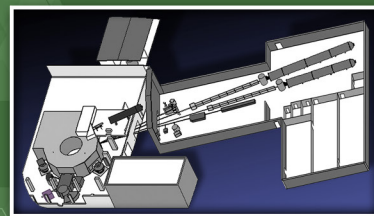


HIGH FLUX ISOTOPE REACTOR

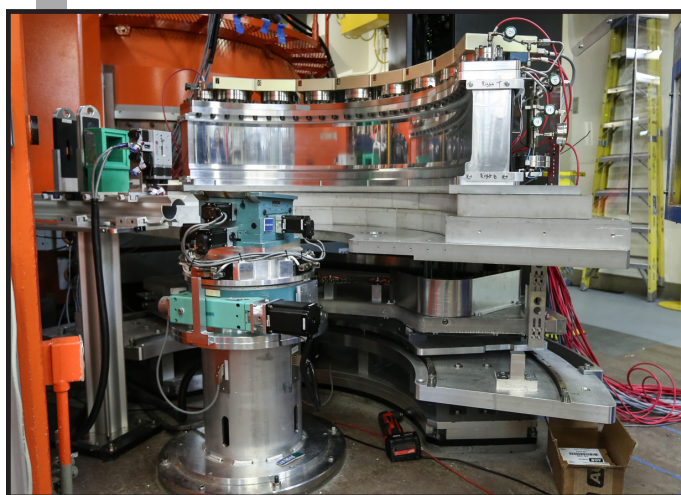
# INSTRUMENT BEAM LINE HB-2C



## WAND<sup>2</sup> – US/JAPAN WIDE-ANGLE NEUTRON DIFFRACTOMETER

The HFIR HB-2C WAND<sup>2</sup> 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 <sup>3</sup>He 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 WAND<sup>2</sup> useful to search for fundamental magnetic propagation vectors or measurements of diffuse

scattering in single crystals. WAND<sup>2</sup> 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 WAND<sup>2</sup> detector (BNL120) is a seamless two-dimensional position sensitive <sup>3</sup>He 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..

WAND<sup>2</sup>. 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

WAND<sup>2</sup> is ideal for the study of time-resolved phenomena and for the study of diffuse scattering in single crystals. Research performed at WAND<sup>2</sup> 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.

WAND<sup>2</sup> is operated in collaboration with the Japan Atomic Energy Research Institute under the US/Japan Cooperative Program on Neutron Scattering Research.

### 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) $0.95 \text{ \AA}$ (Ge 115)
Scattering angles	$0^\circ < 2\theta < 156^\circ$
Collimator	Oscillating collimator radial before the detector
Detector	2-dimensional <sup>3</sup> He curved PSD with ~2e <sup>6</sup> pixels; event mode capability
Resolution	0.4 mm spatial resolution (x and y)

Status: Available to users

### FOR MORE INFORMATION, CONTACT

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