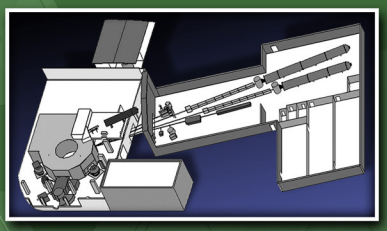
High Flux Isotope Reactor

Instrument

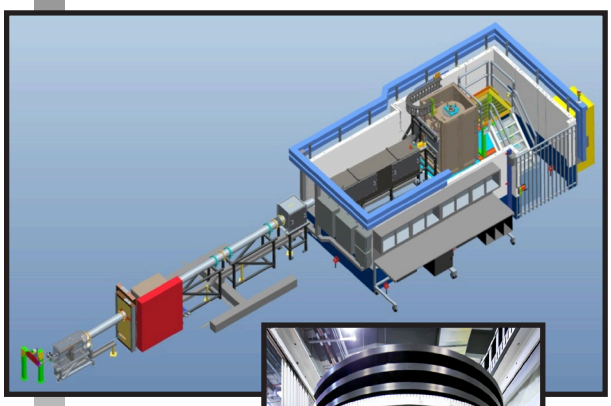
BEAM LINE

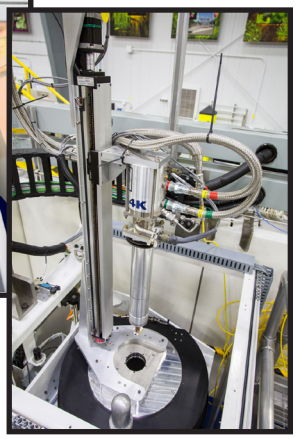
CG-4D



IMAGINE – Quasi-Laue Single-Crystal Diffractometer

IMAGINE is a state-of-the-art beam line for neutron diffraction analysis of advanced materials and macromolecules. IMAGINE has broad scientific application for the analysis of light atom positions in materials of interest across the diverse fields of structural biology, chemistry, condensed matter physics, and geological sciences. Neutron structures can be determined to near-atomic resolutions (1.5 Å) from crystals with unit cell edges up to ~ 100 Å. IMAGINE is suited to pinpoint individual hydrogen atoms in small molecules and protein structures.





IMAGINE optics are tunable and use an automated system of interchangeable flat mirrors and filters to select incident quasi-Laue wavelength and band pass characteristics that are best matched to the sample (λ min = 2.0, 2.8, and 3.3 Å; λ max = 3.5, 4.0, and 4.5 Å). Elliptical mirrors are used to deliver a highly focused and intense beam at the sample. The diffractometer uses neutron image plates mounted on a cylindrical detector drum, which allows hundreds of stimulated reflections to be simultaneously recorded.

Closed Cycle Refrigerator: The CCR provides a constant sample temperature in the range of 4 to 450 K. The CCR can be used for macromolecular, supramolecular, and materials science experiments.

Applications

Protein Structure-Function
- Hydrogen atoms in proteins
- Enzymology
- Ligand complexes
- Drug design

Supramolecular Crystallography
- Single-molecule magnets
- Metal-organic frameworks
- Polyoxometalates

Materials Chemistry
- Small molecules
- Minerals
- Pharmaceuticals

Specifications

Flux	~10^7 n/s/cm^2
Cross section	2.0 x 3.5 mm
Wavelengths minimum	2.0, 2.8, 3.3 Å
Wavelengths maximum	3.0, 4.0, 4.5 Å
Detector	Neutron image plate
Detector size	1200 x 450 mm
Pixel size	125, 250, 500 μm
Sample-to-detector distance	200 mm
Goniometer	Kappa and phi rotation axes

Status: Available to users

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