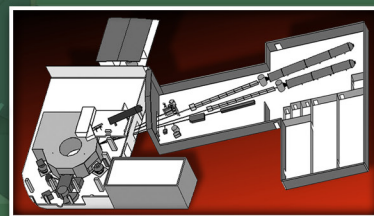


INSTRUMENT

CG-4D

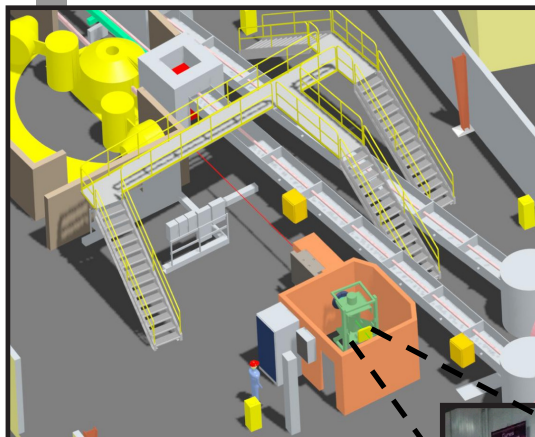
BEAM LINE

HIGH FLUX ISOTOPE REACTOR



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 at or near atomic resolutions (1.5 Å) from crystals with volume < 1 mm³ and with a unit cell edge of < 100 Å. IMAGINE is especially suited to pinpoint individual hydrogen atoms in protein structures. It is also designed to accommodate a range of additional sample environment equipment (furnaces, cryostats, and pressure cells) for analysis of materials under extreme environments.



Cold neutron guide hall.



MAATEL

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 ($\lambda_{\min} = 2.0, 2.8, \text{ and } 3.8 \text{ \AA}$, $\lambda_{\max} = 3.5, 4.0, \text{ and } 4.5 \text{ \AA}$). 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.

SPECIFICATIONS

Flux	$\sim 10^8 \text{ n/s/cm}^2$
Cross section	2.0 x 3.0 mm
Wavelengths minimum	2.0, 2.8, 3.8 Å
Wavelengths maximum	3.5, 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	Single Phi rotation axis

Status: Under construction

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

FOR MORE INFORMATION, CONTACT

Instrument Scientist: Flora Meilleur, meilleurf@ornl.gov, 865.242.5747

neutrons.ornl.gov/cg4d



The acquisition and installation of IMAGINE is supported by a National Science Foundation consortium award to MTSU, NCSU, and HWI (NSF Award No. 0922719).



May 2012