

Beamline 10-ID / MR-CAT

Scientific focus: Materials science and environmental science

Scientific programs: Spectroscopy of dilute environmental systems, combined techniques for *in situ* characterization of materials, and microfocusing spectroscopy and imaging

Optics & Optical Performance

- Daresbury/Fisons monochromator
 - 30 m from source
 - 4.8–32 keV energy range Si(111)
 - 15–90 keV energy range Si(333)
 - 1st crystal, IIT-design, cryo cooling w/
pseudo-fixed offset crystal cage
 - 2nd crystal, 240 mm with Bragg normal
motion
 - 10^{-4} energy resolution ($\Delta E/E$) at 10 keV
 - 35 mm offset
 - liquid-nitrogen cooling
- harmonic rejection mirror
- Ge bent Laue “beam cleaner”
- KB mirror focusing

Experiment Stations

10-ID-A

- white beam first optics enclosure
- monochromator

10-ID-B

- monochromatic beam station
- all experiments 4 m x 12 m

Detectors

- Bruker 1k x 1k CCD
- Canberra Si energy-dispersive detector
- Daresbury/Lesker spectroscopy ionization chambers
- Lytle detectors
- 13-element Canberra/XIA Ge detector system
- NaI scintillation detectors
- bent Laue analyzer

Beamline Controls and Data Acquisition

- Debian Linux running “MX”
- SPEC
- EPICS

Beamline Support Equipment/Facilities

- large Huber 8-circle goniometer with positioning
- X95 rail system for experiment alignment
- Displex refrigerator
- water purifier
- once-through glove box

Insertion Device Source Characteristics (nominal)

source	Undulator A
period	3.30 cm
length	2.47 m
effective K_{\max} (at minimum gap = 10.5 mm)	2.78
energy range 1st harmonic	2.9 - 13.0 keV
energy range 1st - 5th harmonics	2.9 - 45.0 keV
on-axis peak brilliance at 6.5 keV	9.6×10^{18} ph/sec/mrad ² /mm ² /0.1% bw
source size at 8.0 keV Σ_x Σ_y	359 μ m 21 μ m
source divergence at 8.0 keV Σ_x' Σ_y'	24 μ rad 6.9 μ rad