

# Beamline 6-ID / $\mu$ -CAT

**Scientific focus:** Materials science

**Scientific programs:** Magnetic scattering and spectroscopy, liquid surface studies, and surface scattering

## Optics & Optical Performance

- Kohzu double-crystal constant-offset monochromator  
29.5 m from source  
3.2–38 keV energy range Si(111)  
 $10^{-4}$  energy resolution ( $\Delta E/E$ ) at 10 keV  
25 mm vertical offset  
liquid-nitrogen cooling
- High-energy double-crystal constant offset monochromator  
30.5 m from source  
26.4–52.6 keV energy range Si(111)  
49.5–100.5 keV energy range Si(311)  
66.5–132.3 keV energy range Si(331)  
600 mm horizontal offset  
water cooling
- 3-stripe vertically focusing 70 cm ULE mirror  
60 cm active length (clear aperture)  
Al, Rh, Pt coating stripes  
12, 23, 31 keV high-energy cutoffs at 0.15°  
1:1 vertical focusing (variable) at 6-ID-B  
 $< 0.6$  arcsec meridional slope error  
 $< 5$  arcsec sagittal slope error  
 $\sim 3$  Å rms roughness
- Typical unfocused beam size at sample at 8 keV  
0.7 mm vert. x 1.5 mm hor. FWHM
- Est. flux at 8 keV:  $7.1 \times 10^{12}$  ph/sec @ 100mA

## Experiment Stations

### 6-ID-A

- white beam first optics enclosure
- Kohzu monochromator
- SESO (vert. focusing) high-energy monochromator mirror

### 6-ID-B

- monochromatic beam station
- 4-circle diffractometer
- liquid surface reflectometer

### 6-ID-C

- monochromatic beam station
- UHV surface science chamber

## 6-ID-D

- monochromatic beam station
- 6-circle diffractometer

## Detectors

- NaI detectors
- ionization chambers
- 3-element Si energy dispersive array detector
- photodiodes
- Mar345 imaging plate system

## Beamline Controls and Data Acquisition

- Sun UNIX running EPICS with VME
- SPEC control software

## Beamline Support Equipment/Facilities

- 6K Displex
- polarization modifier
- polarization analyzer
- high-temperature furnace for powder diffraction

## 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	$9.6 \times 10^{18}$ ph/sec/mrad <sup>2</sup> /mm <sup>2</sup> /0.1% bw
source size at 8.0 keV $\Sigma_x$	359 $\mu$ m
$\Sigma_y$	21 $\mu$ m
source divergence at 8.0 keV $\Sigma_{x'}$	24 $\mu$ rad
$\Sigma_{y'}$	6.9 $\mu$ rad