

Beamline 7-ID / MHATT-CAT

Scientific focus: Real-time x-ray studies

Scientific programs: Real-time x-ray studies, x-ray microcharacterization, and x-ray photon correlation spectroscopy

Optics & Optical Performance

- BESSRC-type double-crystal fixed-exit HHL monochromator
 - 30 m from source
 - 5–50 keV energy range
 - 10^{-4} energy resolution ($\Delta E/E$) at 10 keV
 - 35 mm offset
 - liquid-nitrogen cooling
- pink-beam mirror filter
 - 30 m from source (centered on HHL mono)
 - 6–10 keV energy range
 - 0.03 energy resolution ($\Delta E/E$)

Experiment Stations

7-ID-A

- white beam first optics enclosure
- HHL monochromator
- pink-beam mirror filter

7-ID-B

- white beam station
- 5 m x 7 m
- microfocus facility

7-ID-C

- monochromatic and pink beam station
- 5 m x 7 m
- diffraction
- small-angle scattering

7-ID-D

- monochromatic and pink beam station
- 5 m x 6 m
- femtosecond laser facility

Detectors

- NaI scintillation
- ionization chambers
- various CCD detectors
- Amptek Si detector
- picosecond streak camera

Beamline Controls and Data Acquisition

- EPICS
- SPEC
- k-Space Associates real-time CCD data acquisition
- LabView environment

Beamline Support Equipment

- Newport/Micro-Control 6-circle Kappa goniometer (7-ID-C)
- Huber 4-circle goniometer (7-ID-B)
- two xyz optical tables (4 ft x 6 ft)
- refractive x-ray optics

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 \sum_x \sum_y	359 μm 21 μm
source divergence at 8.0 keV $\sum_{x'}$ $\sum_{y'}$	24 μrad 6.9 μrad