

Beamline 12-BM / BESSRC-CAT

Scientific focus: Spectroscopy, x-ray scattering, and diffraction

Scientific programs: Materials science (x-ray scattering, diffraction, spectroscopy), geoscience (mineral-liquid interface characterization by x-ray scattering and spectroscopy), chemistry (EXAFS and XANES spectroscopy of actinides and lanthanides), and atomic physics

Optics & Optical Performance

- BESSRC standard monochromator
 - 2.4–22 keV energy range Si(111) focused
 - 7.5–100 keV energy range Si(333)
 - 35 mm offset
 - water cooling
 - UHV vacuum compatibility
- Mirrors (removable double-mirror system)
 - down deflection, flat figure, Pd coating
 - up deflection, toroidal figure, Rh coating
 - 22 keV energy cutoff

Experiment Stations

12-BM-A

- white beam first optics enclosure
- white beam slits
- monochromator and mirror system

12-BM-B

- monochromatic beam station
- x-ray scattering
- diffraction
- spectroscopy (EXAFS and XANES)

Detectors

- ionization chambers
- Bicron
- Lytle detector
- solid-state detectors
- single-element Si and Ge
- Canberra 9-element Ge

Beamline Controls and Data Acquisition

- Linus workstation running EPICS with VME and SPEC software
- Windows NT running EPICS applications
- Macintosh with MacOS software running EPICS applications

Beamline Support Equipment/Facilities

12-BM-B

- spectroscopy table
- 6-circle Huber goniometer

Bending Magnet Source Characteristics (nominal)

source	APS bending magnet
critical energy	19.51 keV
on-axis peak brilliance at 16.3 keV	2.9×10^{15} ph/sec/mrad ² /mm ² /0.1%bw
on-axis peak angular flux at 16.3 keV	9.6×10^{13} ph/sec/mrad/0.1%bw
on-axis peak horizontal angular flux at 5.6 keV	1.6×10^{13} ph/sec/mradh/0.1%bw
source size at critical energy \sum_x \sum_y	145 μm 36 μm
source divergence at critical energy $\sum_{x'}$ $\sum_{y'}$	6 mrad 47 μrad