Beamline 33-ID / UNI-CAT

Scientific focus: Materials science and condensed matter physics

Scientific programs: Materials science, ceramic science, phase transitions, surface science, thin-films structure and growth, and materials physics

Optics & Optical Performance

- focused beam size 280 μm hor. x 100 μm vert.

- PSL double-crystal monochromator
  - 45 m from source
  - 4.0–40.0 keV energy range Si(111)
  - 10^{-4} energy resolution (ΔE/E)
  - 20–35 mm beam offset
  - liquid-nitrogen cooling
  - variable sagittal focus

- vertical focusing mirror
  - 2.0–5.0 mrad angle of incidence
  - Pt, Rh coating stripes
  - variable vertical focus

- harmonic rejection mirror
  - 2.0–5.0 mrad angle of incidence
  - Pt, Rh coating stripes

Experiment Stations

33-ID-D

- general purpose scattering
- USAXS station

33-ID-E

- surface and interface scattering station

Detectors

- NaI scintillation counters
- ionization chambers
- gas-filled proportional counters (Xe, Ar)

Beamline Controls and Data Acquisition

- Sun UNIX/Linux running EPICS with VME, SPEC

Beamline Support Equipment/Facilities

33-ID-D

- Bruker single-crystal diffractometer
- Newport 6-circle goniometer w/ kappa geometry
- USAXS station

33-ID-E

- UHV surface/interface scattering chamber

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/mrad²/mm²/0.1% bw
source size at 8.0 keV Σ_x Σ_y	 359 μm 21 μm
source divergence at 8.0 keV $\Sigma_{x'}$ $\Sigma_{y'}$	 24 μrad 6.9 μrad