

Microdiffraction

In situ strain/stress measurement and phase identification at micro scale

X13B

In a typical experiment:

Create a small beam (1 μm x 2 μm)

- Mirrors (lower resolution, but tunable)
- Diagnostics

Of hard x-ray photons

- 11.3 KeV is peak brightness but $9 \text{ KeV} < E < 19 \text{ KeV}$
- Scan photon energy, not sample angles

Position beam on sample

- Precision encoded sample stages
- Goniometer
- Fluorescence markers

Detect photons

- Fluorescence detector (Amptek)
- CCD (calibrate position first)
- Transmission

Configuration key items:

- Micro-focusing optics: choice of KB mirrors and kinoform lens
- CCD area detector and fluorescence detector
- High precision positioning stages with 100 nm positioning accuracy
- Diffractometer

