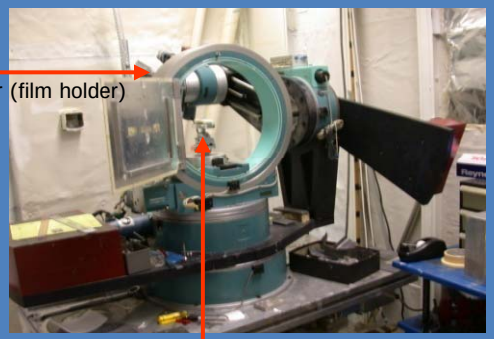
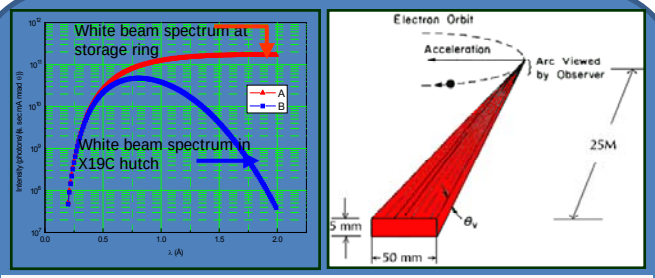
Synchrotron White Beam X-Ray Topography

X19C

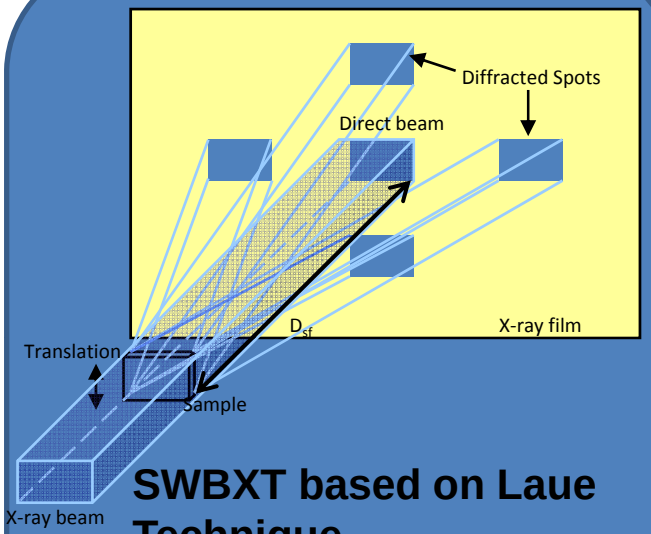


Huber 5-Circle Diffractometer



- Large area beam of low divergence & high intensity (50 mm×5 mm)
- Small source (300 μm×100 μm) & large source-specimen distance (25 m) ☞Good spatial resolution capability (~ 0.04 μm)
- Broad wavelength range (0.3 - 1.6 Å)

White Beam Characteristics



SWBXT based on Laue Technique

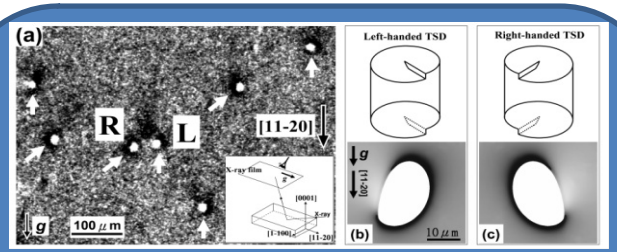
Diffraction pattern contains several large area diffraction spots, each one of which is a high-resolution X-ray toxograph

Summary of Capabilities

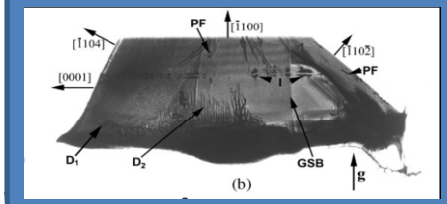
- Huber 5-circle goniometer with computer-controlled robotic detector arm for positioning x-ray detectors
- Sun Ultra 5, Solaris 7 using SPEC software package (fourc) for motor control
- Scanning stage for scanning large-size crystals (up to 12" long)
- Slit-defined white radiation; capability of introducing various absorbers into beam path to modify spectral distribution.
- Environmental chamber with beryllium exit and entrance windows; remote manipulators, furnace, deformation stage
- Fully equipped darkroom for processing (developing, washing and drying) of various types of x-ray films

Application

- Technique capable of providing information on the nature and distribution of structural defects such as dislocations, inclusions/precipitates, stacking faults, growth sector boundaries, twins and low-angle grain boundaries in single crystal materials.

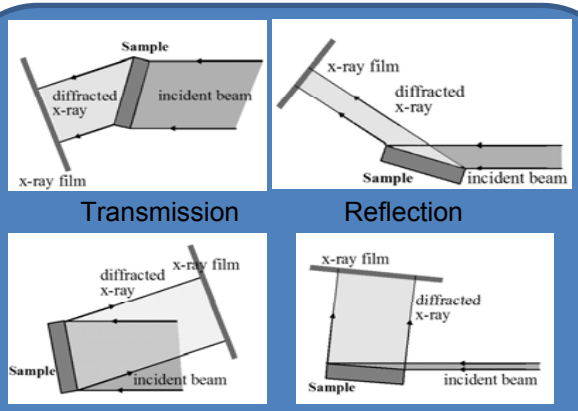


Direct determination of dislocation sense of 1c threading screw dislocations in SiC. The asymmetric contrast seen (b) and (c) provides an unambiguous way to discern their senses.



Spontaneously nucleated AlN crystals
Transmission X-ray topographs: inclusions (I), growth sector boundaries (GSB), growth bands (GB), growth dislocations (D1) and dislocation loops (D2). Pendellösung fringes (PF) indicate high crystalline perfection.

Examples



Transmission | Reflection

Back reflection | Grazing incidence

Recording Geometries