RIKEN Structural Biology I (BL45XU)

1. Protein Crystallography Station

Protein crystallography is one of the most active research fields for third-generation synchrotrons. Utilizing the third generation synchrotron radiation with the maximized advantage of the multiple-wavelength anomalous diffraction (MAD) method, BL45XU is designed to contribute to structural biology studies. Anomalous diffraction contributes minimally, so that the accuracy of the intensity data collection is technically the most important issue. To realize such an experimental environment for MAD, the "trichromatic concept" has been introduced by developing high quality diamond crystals. This concept is based on the fact that MAD data sets at three different wavelengths are easily taken for the same protein crystal without changing any beamline setting by a tandem vertical undulator and trichromator. The trichromatic undulator beams have been utilized for MAD data collection since 1998. In 1999, we replaced the goniometer of the cylindrical bent mirror. An imaging plate detector (RIGAKU R-AXIS IV) was installed and is used for MAD data collection. We collected MAD data sets including many anomalous compounds (zinc, mercury, selenium, platinum, lead etc.), and successfully obtained straight structure determination by MAD. This result shows the advantage of coupling of the trichromator and the imaging plate detector.

2. SAXS Station

The small angle X-ray scattering (SAXS) station at BL45XU is designed to perform solution X-ray scattering and fiber diffraction of biological systems. In 1999, we improved the beamline setting for the good signal to noise ratio of the SAXS data. SAXS station accepted public users within 20 % of total beam time. The beam time for each proposal ranged from three to six shifts. Since the beam-time is rather tight, public users who want to be this station are requested to contact Dr. T. Fujisawa before submitting a proposal.

Light Source	
ID Type	In-Vaccum Tandem Vertical Undulator
ID Spec.	37 mm × 37 periods × 2
Energy of 1st harmonics	6.7 - 14 keV

X-rays at Sample	
PX-station	
Energy	7.5 - 14 keV
Flux	1×10^{11} /0.15 × 0.15 mm^2
SAXS-station	
Energy	6.7 - 14 keV
Flux	2×10^{12} /0.8 × 0.4 mm^2

Facilities in Experimental Station
PX-station
Diffractometer
Cryogenic cooler for sample crystal
Imaging plate detector
SAXS-station
Small-angle X-ray camera
XZ sample stage
X-ray II + CCD detector
Imaging plate detector