

# R&D III (BL38B1)

## 1. Introduction

This beamline is allocated to the third 'R&D beamline' which is to serve R&D's for the optics of the standard bending magnet, the various applications of XAFS, monochromatic data collection for routine macromolecular crystallography with software development, and technical R&D's for novel experimental equipment.

## 2. Optics

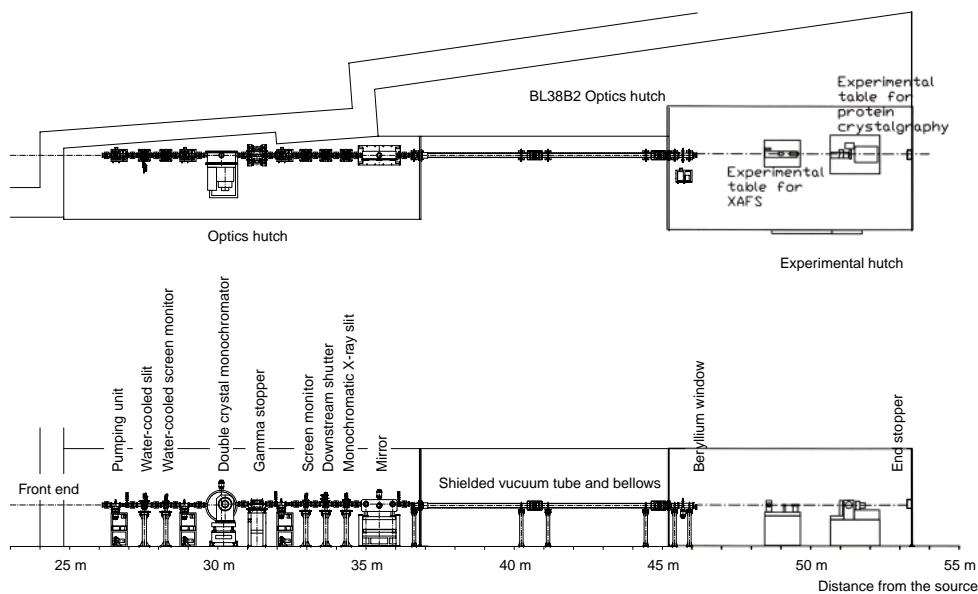
The optics consists of standard bending magnet components such as BL40B2. The designed glancing angle of the vertically bent cylinder mirror is from 0 to 5 mrad in a downward direction. The Rh-coated 1m mirror focuses the beam at the experimental hutch with the glancing angle from 3 to 4 mrad, while the cut off energies in the angles are from 22 to 17 keV. The calculated horizontally acceptances of the beamline

and that of the mirror are about 1.5 mrad and from 0.7 to 0.8 mrad, respectively.

A fin-cooling system has been adopted for the first crystal in the monochromator. However a newly designed direct cooling system for the first crystal and a sagittal focusing system for the second crystal are also being tested.

## 3. Experimental Station

Standard XAFS measurement like BL01B1 and X-ray diffraction measurement for protein crystals like BL40B2 are available. The detectors for XAFS measurement are ionization chambers, a fluorescence detector (so-called Lytle detector), an electron-yield cell and a multi-element SSD. For X-ray diffraction measurement there are a CCD camera from ADSC Corporation and an imaging plate (R-AXIS from RIGKU Corporation). A new technique for the XAFS method and a new conventional procedure from the measurement to the analysis for X-ray diffraction method of protein crystals are being developed.



Light Source	
Type	Bending magnet
Critical energy	28.9 keV
Source size $\sigma_x$	0.182 mm
$\sigma_y$	0.058 mm
$\sigma_v$	0.065 mrad (@ 10 keV)
Horizontal beam divergence	1.5 mrad

X-rays at Sample	
Energy range	3.8~117 keV
Energy resolution	$\Delta E/E = 3 \times 10^{-5} \sim 2 \times 10^{-4}$
Photon flux	$10^9 \sim 10^{11}$ ph/s

Facilities in Experimental Station	
· Gas-flow type ionization chamber	
· CCD camera (188 × 188 mm <sup>2</sup> )	
· Si PIN photodiode	
· Automated slit and sample stage	
· Horizontal axis goniometer	
· Continuous He flow cryostat	
· Cryostream cooler	
· Automated crystal centering and axis-set	
· Microscope	
· Incubator	
· PC for control and data collection	
· Workstation for analysis	
· PC for data analysis	