Beamline practice at BL02B1 (Single crystal analysis)

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1. Introduction

The bending magnet beamline, BL02B1 is used for various applications of single crystal analysis over a wide energy range from 5 to 115 keV. In the practical training course, we will plan to show how to measure single crystal data for a precise structure analysis, which including the alignment of experiment stage of large cylindrical IP camera.

2. Plan of practice

9:00- Introduction of BL02B1, alignment of optics, the measurement system and the plan of practice experiment

10:00- Alignment of the experiment stage of large cylindrical IP camera.

12:30 - ------- Lunch ----------

13:30- Introduction of sample preparation of single crystal (silicon or cytidine)

14:30- Measurement of single crystal data of standard sample.

15:30- Discussion on some technical and scientific subject.

17:00 Close.

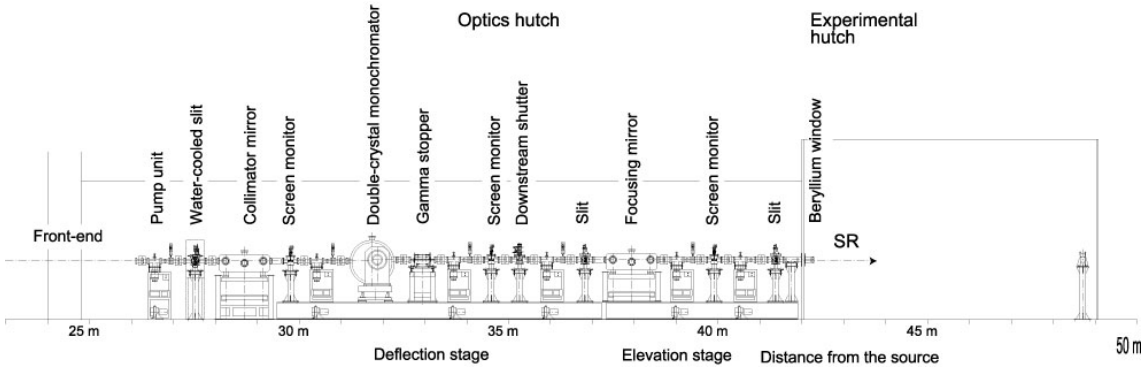

Fig. 1 Schematic layout of BL02B1

3. Large cylindrical IP camera

For the orbital resolution single crystal diffractometory, the detector is required installing the large dynamic range for high statistic data. We selected the IP as the detector, because the IP cannot only collect the reliable data but also observe the wide area with high angle 2θ by one scan. On the other hand, the diffractometer for the accurate structure analysis in the charge density level must be designed to collect the complete data with high redundancy and high resolution. The specification of

large cylindrical IP camera is shown in Table 1. The large radius of cylindrical camera (191.3 mm) isn't only realized to collect the high resolution data using high energy X-ray source but also there is the free space of the equipment for the external field response experiment. In the conceptual design, two goniometers were combined with the large cylindrical IP camera (Fig. 2).

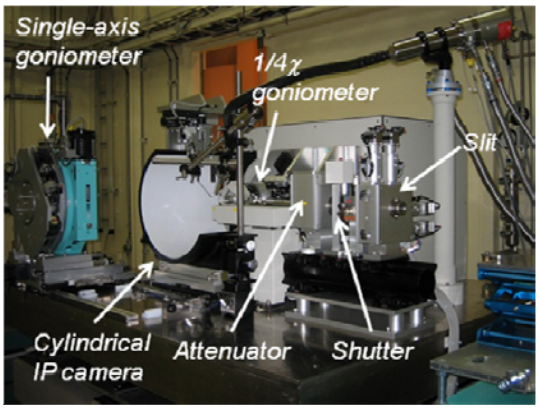

Fig. 2 Large cylindrical IP camera installed to BL02B1.

The 1/4χ-axis goniometer can collect the complete data with high angle 2θ and the single-axis goniometer can install the large and/or heavy equipment to adopt the various experiment conditions such as the low- and high temperature cryostat, the humidity controller chamber, the gas absorption control system and so on. In the commissioning, user community members were collaborated with us. The data collection and reduction software was prepared for the external user, which is almost same as the interface of conventional instrument. Basically, it is easy to understand the procedure of the data collection and reduction for the large cylindrical IP camera.

TABLE 1. The specification of large cylindrical IP camera

Detector size	350(V) x 683(H) mm
Pixel size	100 x 100 μm, 200 x 100 μm
2θ resolution	0.03 °/pixel
2θ coverage (Horizontal)	-60° to +145°
(Vertical)	-42.5° to +42.5°
Goniometer (1/4χ) ω-axis	-130° to +220°
(1/4χ) χ-axis	-5° to +60°
(1/4χ) ϕ-axis	-180° to +180°
(single) ϕ-axis	-177° to +177°