BL32B2
R&D-BM

1. Introduction

BL32B2 is allocated to the R&D beamline for facility-related problems and challenges, which are relevant to a bending-magnet beamline. This beamline was rebuilt and restarted along with two experimental hutches (EH1 and EH2) in FY2018. Thereafter, BL32B2 has undergone the following updates: the replacement of the counter/timer module and the pulse motor–driving system (FY2019), the installation of the flight tube-retracting mechanism in EH1 to facilitate the handling of a huge tube (FY2019), the introduction of SPEC software for instrument control and data acquisition (FY2020), and the update of the beamline interlock system (FY2021).

The optics is composed of transport-channel slits, a double-crystal monochromator, and a pair of total-reflection mirrors. To provide high-energy X-rays, a net plane of a silicon-crystal pair can be switched from Si(111) to Si(311). The type of mirror coating can be selected from platinum and rhodium in accordance with the situation. A mirror-bending mechanism is available for vertical focusing, and the cylindrical shunt on the second mirror is used for horizontal focusing. EH1 is dedicated to R&D studies and has the dimensions of 5.0 m (W) × 3.0 m (D) × 3.3 m (H). An optical bench is placed inside this hutch. It accommodates two XY carriers and five Y carriers that can load user test benches. An 8-channel counter/timer module (CT08-01F) can count at rates up to 300 MHz for FAST NIM and 100 MHz for TTL. Ionization chambers, high-speed transimpedance amplifiers, voltage-to-frequency converters, and high-voltage power supplies are also provided to users. A 16-channel pulse motor controller (PM16C-16HW2) can run all subordinate motors simultaneously. The default setting is 16 Type-II pulse motor driver units. Four Type-I pulse motor driver units can be used if necessary. Motor cables are wired into the hutch and have a TRIM TRIO connector (8P socket plug type) on the motor side. A GPIB instrument control device (GPIB-ENET/1000) intermediates between the SPEC and legacy instrument components. EH2 is now devoted to the RISING3 Project of NEDO and Kyoto University. The beam path in EH1 should be bridged by a wide-bore vacuum flight tube during experiments at EH2, which means that the long-term installation of any equipment in EH1 is prohibited.

2. Recent activities

In 2022, a monochromator stabilization (MOSTAB) system was installed. The MOSTAB system attempts to hold an outgoing monochromatic beam unchanged by using a feedback control mechanism.

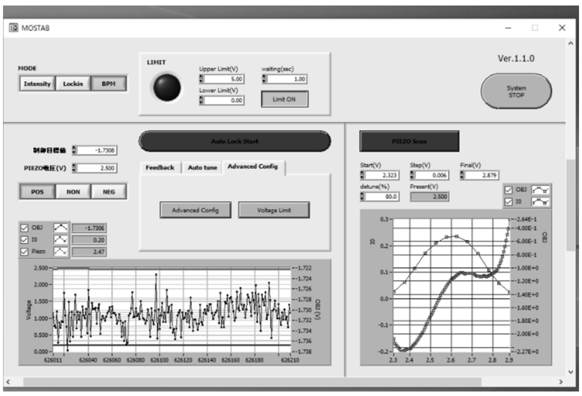

Fig. 1. Appearance of a graphical user interface for monochromator stabilization.

Depending on the kind of experiments, a user can choose either intensity or position as an incident beam property that is maintained for long periods of time. A stationary beam incidence contributes to reducing signal distortions due to normalization between nonlinear detector signals.

Cables running across the floor were relocated to a new cable ladder bridge between EH1 and operation console desks. The elimination of floor cable covers facilitates easy movement of loaded carts or mobile user equipment. In addition, KVM extenders were laid between the operation console desk and the optical bench. The KVM extenders provide easy remote access to a computer that is put inside EH1 and contribute to saving the time required for setting up the mobile user equipment.

Fig. 2. Appearance of a cable ladder bridge between EH1 and operation console desks.

Several R&D studies were carried out at EH1 for the performance improvement of the MOSTAB system and an attitude control mechanism for monochromator crystals. Alternatively, various user experiments were conducted at EH2 for investigations on battery science by NEDO and Kyoto University.

Ohsumi Hiroyuki

SR Imaging Instrumentation Team, Physics and Chemical Research Infrastructure Group, Advanced Photon Technology Division, RIKEN SPring-8 Center