

5-2. RIKEN Beamlines

1. Introduction

RIKEN SPring-8 Center is responsible for the R&D of SPring-8 beamline technologies and systems as well as the new SACLA technologies in various fields of Synchrotron Radiation (SR) science. The RIKEN Advanced Photon Technology Division explores the best use of the highly brilliant SR sources of SPring-8 and XFEL of SACLA in diverse scientific fields from life science to materials science.

2. Recent activities

From FY2019, two beamlines using an undulator and a bending magnet for light sources were redefined as R&D beamlines. R&D focuses on areas that are common to all beamlines for the future SPring-8-II project. As the first beamline scrap-and-swap program for the SPring-8-II project, the remodeling of former RIKEN beamline BL45XU to a high-throughput MX beamline was completed at the end of FY2018. BL45XU is operated as a public MX beamline, while the SAXS activity at the former BL45XU will be rearranged to RIKEN beamline BL38B1, which was converted from a public beamline, and BL05XU.

In addition, this division is responsible for the operation and user support of the 12 current RIKEN beamlines. RIKEN beamlines have been used to

develop and operate new measurement methods, as shown below. The high-throughput and automated protein crystallography at BL26s and BL32XU provided sample centering and data collection without human intervention. The high-spatial resolution scanning SX spectromicroscope at BL17SU is useful in microspectroscopic studies on various advanced materials. The X-ray optics for high-energy X-rays at BL19LXU can stably supply 100-KeV X-rays for more than a week, contributing to the stabilization of nano-focusing. The capability of BL43LXU for inelastic X-ray scattering research was improved with a new Kirkpatrick-Baez (KB) focusing mirror system and a cryomagnet system.

Technological developments and SR experiments are proceeding smoothly at four structural biology-related, five physical science-related, and two R&D beamlines. Each beamline has its own characteristics. Below, we report on the current status of the RIKEN beamlines in operation and under commission: BL05XU, BL17SU, BL19LXU, BL26B1, BL26B2, BL29XU, BL32XU, BL32B2, BL38B1, BL43LXU, and BL44B2.

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