

5-2. RIKEN Beamlines

1. Introduction

RIKEN SPring-8 Center (RSC) is responsible for the R&D of SPring-8 beamline technologies and application 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, mainly based on the RIKEN beamlines.

2. Recent activities

We continued to operate the RIKEN beamlines in FY2021 while taking care to prevent COVID-19 infection, as the COVID-19 pandemic that began in early 2020 continues. We are in charge of the operation and user support of the RIKEN beamlines in operation, and technical development and SR experiments are progressing smoothly at four Structural Biology beamlines, six Physical and Chemical Research beamlines, and two R&D beamlines.

The research and development of SPring-8 beamline technologies and utilization systems are carried out using all RIKEN beamlines for the future SPring-8-II project. As an R&D beamline, BL05XU has promoted R&D and application programs for high-energy and high-flux optics to further enhance the use of high-energy X-rays, which are SPring-8's strong points. BL29XU is contributing to the research and development program of the integrating X-ray detector "CITIUS",

which is being developed by the detector group at RIKEN as a next-generation detector in the SPring-8-II project.

As part of the Digital Transformation (DX) program for beamline utilizations, R&D for various remote experiment systems that enable beamline experiments without visiting the facility continue to cope with the mobility restrictions caused by the COVID-19 pandemic. The automated data collection system "ZOO" played an important role in the structural biology beamlines such as BL32XU, and automated data collection by mail has come to account for the majority of beamline use. These automated measurement techniques have also contributed to the structural analysis of the various SARS-Cov2 proteins.

As a countermeasure for aging beamlines, a new insertion device, the Helical-8 undulator, which will replace the multi-polarization-mode undulator, has been designed and manufactured at BL17SU, and the installation of the new insertion device is scheduled for FY2022. From BL19LXU, the aging experimental station counting system at SPring-8 was upgraded and brought online.

In the next section, we report on the current status of the RIKEN beamlines.

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