

RIKEN Beamlines

1. Introduction

RIKEN SPring-8 Center (RSC) is responsible for the R&D of SPring-8 beamline technologies and application systems and 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 are responsible for 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. In FY2022, the COVID-19 infection has been subsiding, and the user use of SPring-8 has almost recovered to pre-COVID-19 levels. However, in order to avoid the effects of COVID-19, the development and promotion of remote experiments on beamlines have been especially emphasized since FY2022, and the experimental format of the SPring-8 beamlines has changed significantly compared with that before COVID-19.

RIKEN beamlines are the objects of various R&D studies for the SPring-8-II project. At the R&D beamline (BL05XU), a pair distribution function (PDF) study was performed as a pilot

application using a high-energy pink beam with a double multilayer monochromator (DMM).

For digital transformation (DX) to advance the convenience of users and the use of analytical data of macromolecular crystallography (MX), we are building a database that integrates and makes available all experimental and analytical information related to High Data Rate MX, utilizing ZOO, a fully automated data acquisition pipeline for MX.

RIKEN beamlines also promote cutting-edge research by participating in national projects such as the AMED/BINDS project as a drug discovery research platform at the Structural Biology Beamline, the NEDO and Kyoto University RISING3 project as an innovative storage battery development at BL38B2, and the NEDO PEFC project for fuel cell development at BL36XU.

As a countermeasure for aging beamlines, a new insertion device, the Helical-8 undulator, for possible use at SPring-8 II has been designed, and the replacement of ID17 was completed in the summer of 2022.

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

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