

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

Because of the COVID-19 pandemic since the beginning of 2020, SPring-8 and SACLA suspended user operation in April and May. With the relaxation of the activity restriction level in June, operations were gradually resumed at each RIKEN beamline while paying attention to measures for the prevention of COVID-19 infection.

The most significant change in the RIKEN beamline was the addition of BL36XU as a new RIKEN beamline named "RIKEN Materials Science II". BL36XU was constructed as a beamline featuring time-resolved QXAFS measurements in 2008 and has been dedicated to the New Energy and Industrial Technology Development Organization (NEDO) program for the development of polyelectrolyte fuel cells (PEFCs).

The R&D of SPring-8 beamline technologies and systems has been carried out using all RIKEN beamlines for future SPring-8-II projects. This year, we focused on a remote beamline experiment

system that can be operated without visiting the facility in response to the activity restrictions imposed as a result of the COVID-19 pandemic.

BL05XU as an R&D beamline advanced the R&D of the dual multilayer monochromator (DMM) and its application program to further enhance the utilization of high-energy X-rays, which is a feature of SPring-8.

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

High-throughput and automated macromolecular crystallography on BL26s and BL32XU continued with mail-in and automated data collection without visiting the SPring-8 site, even under the activity restrictions. These automatic measurement technologies have been contributing to the structural analysis of the SARS-Cov2 protein from an early stage.

Since the resumption of beamline operations in June, technological development and SR experiments have been proceeding steadily with four structural biology-related, six physical science-related, and two R&D beamlines.

From the next section, we report on the current status of the RIKEN beamlines in operation and under commission.

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