

SPring-8

I. Introduction

SPring-8 was stably operated throughout FY2018 with the total operation time of the accelerator complex and the total user beam time of 5316.7 h and 4559.6 h, respectively, and a total downtime of 43.1 h. SPring-8 completed all its operations by the middle of February 2019.

Regarding its research proposal system, SPring-8 designated Industrial Application Using Advanced Technology as a field of the priority research program on 19 September 2018. Concerning the contract beamlines, there were five interim reviews conducted for JAEA Actinide Science (BL22XU), JAEA Actinide Science II (BL23SU), QST Quantum Dynamics I (BL11XU), QST Quantum Dynamics II (BL14B1), and Catalytic Reaction Dynamics for Fuel Cells (BL36XU, The University of Electro-Communications), and all projects were authorized to continue.

At present, the number of SPring-8 users is as many as 15,000, all of whom are members of the SPring-8 User Community (SPRUC). It is important for SPring-8 to jointly organize scientific events

with SPRUC, such as the SPring-8 Symposium, to facilitate dialogue between users and the facility staff. In 2018, the SPring-8 Symposium was held at Himeji City Civic Center on August 25–26, with 345 participants. SPring-8 also promotes communication between users and industry. The Joint Conference on Industrial Applications of SPring-8 was held in Kobe on September 6–7, 2018, with 240 participants. As part of its continuous effort towards fostering of human resources in synchrotron sciences, SPring-8 organized the 18th SPring-8 Summer School with 60 students of graduate schools nationwide, in cooperation with Hyogo University, Kwansai Gakuin University, The University of Tokyo, Okayama University, Osaka University, Japan Atomic Energy Agency, National Institutes for Quantum and Radiological Science and Technology, and RIKEN. Furthermore, SPring-8 and SPRUC organized the 2nd SPring-8 Autumn School with 45 participants, which included 3rd year university students and researchers from companies.

II. Machine Operation

The operation statistics for the last five fiscal years are shown in Fig. 1. In FY2018, the total operation time of the accelerator complex was 5329.8 h. The operation time of the storage ring was 5316.7 h, 85.8% of which (4559.6 h) was for SR experiments. This excellent figure for the user time represents a storage ring availability of 98.9%. The downtime resulting from failure accounted for 43.1 h (0.95% of the total user time), which was 50% greater than the figure for last year owing to problems with the magnet system. The intensity of the light source, i.e., the stored current, was kept extremely stable within 0.1% owing to the top-up operation, in which the current is filled up at any time on demand. For 99.9% of the user time in FY2018, the stored current was kept at 100 mA by the top-up operation.

The variety of operation modes for SR experiments is one of the characteristics of SPring-8. The operation modes are grouped into several-bunch and hybrid filling modes. The several-bunch mode consists of equally spaced bunches or bunch trains, i.e., 203 bunches, or 29 trains of 11 bunches, and the hybrid filling mode is composed of a long bunch train and isolated single bunches as shown in Table 1, where the share of each operation mode is also shown. The isolated bunch impurity is routinely maintained better than 10^{-8} in the top-up operation by bunch cleaning in the booster. The bunch current is also kept constant within 1% by the top-up operation. Table 2 summarizes the beam parameters of the storage ring.