Preface

We are delighted to deliver the SPring-8/SACLA Annual Report FY2019. Beginning in 1994, we published our first six annual reports in English. From 2000 to 2017, we changed the language to Japanese. In 2018, we returned to using English, making it easier to share information with our overseas colleagues.

SPring-8's first launched user operations in 1997. In the twenty-two years since then, we have welcomed more than 260,000 users. This volume of users is by far the largest among Japan's shared user facilities. Our users have included many researchers from industry as well as many more from academia.

SPring-8 is one of the three earliest third-generation hard-X-ray synchrotron radiation facilities in the world. Its performance has long ranked among the best in the world. When SPring-8 was designed, its low-emittance storage ring with a DBA (Double-Bend Achromat) lattice was the most advanced and reliable technology. Two other facilities built around the same time, , European Synchrotron Radiation Facility (ESRF) and Advanced Photon Source (APS), also used this technology. However, with the advent of new Multi-Bend-Achromat (MBA) lattice technology, many facilities have developed upgrade plans to exploit the advantages this technology offers.

MAX-IV in Sweden was the first facility to deploy MBA technology. ESRF soon followed, incorporating it in large-scale synchrotron radiation facilities and evolving into EBS (Extreme Bright Source). APS also received funds for an MBA lattice technology upgrade project. SPring-8, of course, has plans to include MBA lattice technology in the SPring-8-II upgrade initiative. We published the conceptual design report back in 2014. However, SPring-8 is the sole third-generation facility in Japan. Since both industry and academia depend heavily on SPring-8, there has been a great deal of resistance to shutting down the facility for the one-year period that the upgrade will require.

To address this problem, the Japanese community decided to build a new 3GeV MBA facility in Sendai under the leadership of the National Institutes for Quantum and Radiological Science and Technology (QST). The construction project commenced earlier in this fiscal year with technical help from RIKEN and JASRI. The SPring-8 accelerator team considers the QST facility a proof-of-concept for SPring-8-II.

We decided to change the SPring-8 injector from the original linac-booster synchrotron system to a full-energy injection configuration using the SACLA linac. This change will eliminate the need for one of our

three high-voltage power receiving facilities. We expect to save a lot of money on maintenance for the aging facility. However, retiring the old system entails eliminating losing the injector system for the NewSUBARU facility. Therefore, we plan to build a new 1 GeV linac as a prototype of the new QST facility's injector and , eventually, to serve as the injector for the NewSUBARU facility.

Earlier in this current fiscal year, we launched a beamline renovation project. The renovation started with converting the RIKEN macromolecular crystallography beamline (BL45XU) to become a public beamline. In exchange, we converted one public beamline (BL38B1) to become a RIKEN beamline. The renovation of the remaining public and RIKEN beamlines will continue. We hope that the contract beamlines will undertake similar renovations.

At the end of this fiscal year, we faced the COVID-19 pandemic. The impact in FY 2019 was not great because the overlap of pandemic restrictions with user operations was limited. However, as I write this preface, the impacts of the pandemic have become much greater. We sincerely hope everyone stays healthy!

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