

# PREFACE

Today, the SPring-8 campus operates two world-leading accelerator based light sources of SPring-8 and SACLA and offers a unique environment where the two facilities can be used synergistically.

SPring-8 (Super Photon ring 8 GeV), one of the world's largest synchrotron facilities, welcomed over 17,000 users in 2017. In 2017, 10,720 users conducted 1,575 experiments at the public beamlines, and 6,887 users performed 681 experiments at the contract beamlines. The operation time of the storage ring in 2017 was 5,282 h and the user time was 4,479 h. Currently, SPring-8 users are publishing over 1,000 research papers per year, and the ratio of papers in the top 1% of the citation index was as high as 1.9% for the papers published in 2016.



SACLA (SPring-8 Angstrom Compact free electron LAsEr) is the second operating hard X-ray Free Electron Laser (XFEL) in the world and the first compact XFEL, which was opened to users in March 2012. In 2017, 1,219 users conducted 94 experiments at 3 beamlines, and SACLA users published over 80 research papers. The ratio of papers in the top 1% of the citation index was as high as 4.1% for the papers published by SACLA users in 2016.

A number of SPring-8 and SACLA users were awarded prizes in 2017 and 2018 for their achievements in science and technology. Prof. Chikashi Toyoshima (The University of Tokyo) was awarded the Imperial Prize and Japan Academy Prize in 2018 for his achievement in the elucidation of the molecular mechanism of the ATP-driven ion-transport across the membranes. Prof. Takeshi Aida (RIKEN) was awarded the Japan Academy Prize in 2018 for his achievement in studies on precision hierarchical design on innovative soft materials. Prof. Yuuichi Komizo (JASRI) and Prof. Maki Kawai (Institute of Molecular Science) were respectively awarded the Medal with Purple Ribbon in Fall 2017. Prof. Osamu Nureki (The University of Tokyo) and Prof. Yukihiro Ozaki (Kwansei Gakuin University) were awarded respectively the Medal with Purple Ribbon in Spring 2018. In 2018, eight active users from academia and industry were awarded Prizes for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, and twelve young users were awarded Young Scientists Prizes by the Minister.

In this volume, two comprehensive reviews are reported by Prof. Jian-Ren Shen (Okayama University) and Prof. Makoto Seto (Kyoto University). Active users of SPring-8 have also contributed the essence of their results as review articles in this volume. In addition, four articles are provided by active users of SACLA.

I am very grateful to the many authors and experts who contributed their papers to this volume. Special thanks are due to Dr. Naoto Yagi and the members of the editorial board for their continuous efforts.

土肥 義治

Yoshiharu Doi  
President

Japan Synchrotron Radiation Research Institute (JASRI)