

# PREFACE

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

SPring-8 (Super Photon ring 8 GeV), one of the world's largest synchrotron facilities, welcomed its 200,000th user in April 2016, just eighteen and a half years after it was opened to users in October 1997. SPring-8 has helped users from various scientific and industrial disciplines to realize numerous outstanding achievements. 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 2.5% for the papers published in 2014.

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. SACLA produces femtosecond X-ray pulses with nearly full spatial coherence and offers research opportunities to users from various fields, including structural biology, nonlinear X-ray optics, ultrafast physics and chemistry, and high-energy-density science. In 2016, SACLA users published over 60 research papers, and the ratio of papers in the top 1% of the citation index was as high as 7.0% for all papers published by users.

A number of SPring-8 and SACLA users were awarded prizes in 2016 and 2017 for their achievements in science and technology. Prof. Yoshihiro Kawamura (Kumamoto University) was awarded the Medal with Purple Ribbon in 2017 for the research and development of amorphous metal alloys. In 2017, 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 nine young users were awarded Young Scientists Prizes by the Minister.

In this volume, two comprehensive reviews are reported by Prof. Toshiyuki Shimizu (The University of Tokyo) and Prof. Akira Sekiyama (Osaka University). Active users of SPring-8 have also contributed the essence of their results as review articles in this volume. In addition, eight excellent 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.



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