

## Preface

The Synchrotron Radiation Laboratory (SRL) of the Institute for Solid State Physics (ISSP) has been cooperating with the Synchrotron Radiation Research Organization of the University of Tokyo to operate the BL07LSU soft X-ray beamline and its experimental end stations at SPring-8 since 2006. The beamline has a 27-m-long polarization-controlled undulator and monochromator covering the photon energy range from 250 eV to 2 keV with an average photon flux of  $10^{12}$  photons/sec. In 2009, SRL opened the beamline to the public as one of the core facilities for the development of unique spectroscopy and advanced materials science in the soft X-ray region. Since then, the SRL staff members have been playing an essential role in promoting joint research by domestic and international users. The three end stations, i.e. ambient pressure X-ray photoemission spectroscopy, three dimensional nanoESCA, and the high-resolution soft X-ray emission spectroscopy stations, have excellent high pressure ( $\sim 20$  mbar), spatial resolution ( $\sim 70$  nm), and energy resolution ( $E/\Delta E \approx 10,000$ ), respectively. In FY2020, the COVID-19 problem significantly restricted the user access, which to some extent affected our research activities. Nevertheless, we continued our activities and developments without major delays by conducting analyses that contribute to the social community, e.g. development of medical devices that can be used to save coronavirus infectants.

The Japanese government has decided to construct a next-generation synchrotron radiation facility dedicated to the soft X-ray and tender X-ray regions in Sendai in 2018. SRL has decided to make a significant commitment to the new facility. SRL will terminate the ISSP joint research program at SPring-8 in the first half of 2022, and transfer many of the instrumentations to the new facility. In addition, SRL is planning to develop novel high-performance focusing mirrors to enhance imaging technology that can most effectively make use of the new facility.

In addition to the cutting-edge activities using synchrotron radiation, SRL joined the Laser and Synchrotron Research (LASOR) Center as a member in 2012. Since then, SRL has promoted the scientific use of laser-based high-harmonic generation in the vacuum ultraviolet and soft X-ray regions at the Kashiwa campus. Since 2015, SRL has opened the joint use of the high-resolution laser spin- and angle-resolved photoelectron spectroscopy (SARPES) system that is designed to provide high-energy (1.7 meV) and -angular resolutions with high-efficiency spin detectors for various types of solids, such as spin-orbit coupled materials and ferromagnetic materials.

Our goal is to provide users with a platform that uses both synchrotron radiation and high-harmonic generation by lasers by strong collaboration with other LASOR group members.

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