Editor's Note

SPring-8 Research Frontiers 2011 covers advances achieved during the last two consecutive research periods, the second half of 2010 (2010B) and the first half of 2011 (2011A). Extraordinary scientific achievements at SPring-8 in various fields of basic and applied science, including industrial applications, are described, as well as the development of accelerators, beamlines and experimental apparatus, and the present status of the SPring-8 facility. In addition, the activities using NewSUBARU, which forms an integral part of the research complex, are introduced.

SACLA (the SPring-8 Angstrom Compact free electron Laser) was built jointly by RIKEN and JASRI as one of the Key Technologies of National Importance designated in 2006. Electron beam commissioning began in February 2011 and we accomplished "lasing" with SACLA on June 7, 2011. The SACLA facility opened to both domestic and international public users on March 7, 2012.

Two papers using SPring-8 facilities were included in the top ten groundbreaking scientific achievements from 2011 by the journal *Science*. These two papers concerned research led by Japanese researchers. In both cases, analyses at SPring-8 contributed greatly to breakthroughs. One paper was on the Hayabusa Mission led by Prof. Akira Tuchiyama (Kyoto Univ.). The analyses of dust particles from the Itokawa asteroid revealed that dust from Itokawa matched the composition of the most abundant type of meteorite, ordinary chondrites. The other paper reported the detection of a photosynthetic protein. The Structure of Oxygen-Evolving Photosystem II (PS II) has been revealed by a research group led by Prof. Sian-Ren Shen (Okayama Univ.) and Prof. Nobuo Kamiya (Osaka City Univ.). The research advanced another step in the bid to understand the natural catalyst for splitting water into oxygen and hydrogen using solar energy and progressed toward the realization of artificial photosynthesis, which could be a key to solving clean energy environmental and food issues.

In the layout of Research Frontiers, photographs of flowers grown at the SPring-8 campus and the Harima Science Garden City have been inserted. Photographs taken by Mr. M. Sugiura, Mr. M. Kida, Ms. T. Masaki, and Mr. T. Ozaki, are greatly appreciated.

Copies of SPring-8 Research Frontiers will be sent on request. The full text is also available on the SPring-8 website (http://www.spring8.or.jp/). For the list of publications produced by SPring-8 users and staff, please visit the publication database at http://www.spring8.or.jp/en/science/publication_database/.

We extend our appreciation to those who have recommended excellent research results suitable for publication in SPring-8 Research Frontiers. We would also like to express our sincere gratitude to the users and staff of SPring-8 for contributing their reports to this issue.

Editorial Board