

# I. Introduction

## Topics of SPring-8 in 2008 and Efforts toward the Next Decade

It was the last year that the SPring-8 celebrated its 10th anniversary since its start of operation in 1997. The year 2008 is, hence, positioned as the first year for the SPring-8 to initiate new efforts toward the next decade. The major milestones that the SPring-8 has so far reached in its history are shown in the Table I.

Following the SPring-8 Advisory Council (SAC) in March 2000 and JASRI International Advisory Council (JIAC) in July 2006, RIKEN and JASRI jointly established an international review committee called the "SPring-8 Academic Review Committee (SPARC)" this year. The missions given to this committee was (1) to measure and evaluate the scientific performance of academic research carried out at the SPring-8, (2) to help the public become better informed of the scientific values of research at

the SPring-8, and (3) to advise on the future plans proposed. To accomplish these missions, SPARC meetings were held at the SPring-8 campus, from November 17 to 19, 2008. As shown in Table II, the review committee selected twelve research activities as the outstanding achievements from academic viewpoint among a wide range of scientific and technological activities carried out at the SPring-8, covering life science, chemical science, materials science, earth and planetary science, environmental science, and industrial application. Also closely examined were the future plans and prospects for each activity, which were rated highly by the SPARC board panel. For details of the review results, please refer to the following URL:

[http://www.spring8.or.jp/en/about\\_us/committees/reports/sparc\\_report](http://www.spring8.or.jp/en/about_us/committees/reports/sparc_report)

Since RIKEN and JASRI have collaboratively started formulating the upgrade program of the SPring-8 by setting 2019 as the target year, the presentations and recommendations from the SPARC should be of great help for both research organizations to further develop and improve not only the SPring-8 accelerator complex and its beamlines, but its effective utilization. To promote scientific and technological achievements at the SPring-8 as during the last decade, it is essential for the SPring-8 to upgrade its accelerator complex as well as its beamlines at an appropriate timing in the near future, thus enabling itself to compete and collaborate with other world-leading synchrotron radiation facilities. To successfully evolve the SPring-8 in the right direction, the SPring-8 upgrade committee has proposed a large-scale upgrade plan over the next

Table I. Major milestones

Jul. 1987	Recommendations for the "Promotion of Comprehensive R&D on Advancement of Light Science and Technology" (Inquiry No. 11) was submitted by MEXT.
Oct. 1988	Japan Atomic Energy Research Institute and RIKEN established a collaborative team for the synchrotron radiation facility research and development.
Jun. 1989	Harima Science Garden City in Hyogo Prefecture was chosen as the construction site.
Dec. 1990	Japan Synchrotron Radiation Research Institute was founded.
Nov. 1991	SPring-8 construction started.
Oct. 1994	"Law regarding Promotion of Common Use of the Synchrotron Radiation Facility" was enforced and Japan Synchrotron Radiation Research Institute was assigned as the "Organization for promoting synchrotron radiation research."
Mar. 1996	Recommendations for the "Effective Utilization and Management of Large-Scale Synchrotron Radiation Facility (SPring-8)" (Inquiry No. 20) was submitted by MEXT.
Mar. 1997	The generation of synchrotron radiation was confirmed.
Oct. 1997	Start of SPring-8 Operation.
Jan. 2000	Start of NewSUBARU Operation.
Mar. 2000	SPring-8 Advisory Council (SAC).
Apr. 2000	Drafting of the XFEL development concept (compact and low-cost).
Sep. 2002	Report on the First Interim Review of SPring-8 by MEXT.
Oct. 2003	RIKEN was reorganized as an Independent Administrative Institution.
Jun. 2004	The "top-up" operation began.
Apr. 2005	Construction of a 250 MeV test apparatus SCSS began.
Oct. 2005	Japan Atomic Energy Research Institute withdrew from the management of SPring-8 and the management by two bodies, JASRI and RIKEN, began.
Mar. 2006	XFEL was certified as Key Technology of National Importance in Third-Stage Basic Plan for Science and Technology.
Apr. 2006	RIKEN and JASRI established joint project office for the XFEL project.
Jun. 2006	Laser oscillation of 49 nm UV rays was achieved in the test apparatus SCSS.
Jul. 2006	"Law regarding Promotion of Common Use of the Synchrotron Radiation Facility" was revised.
Jul. 2006	JASRI International Advisory Council (JIAC).
Mar. 2007	JASRI was approved as a Registered Institution for Promoting Synchrotron Radiation Research.
Jul. 2007	Report on the Second Interim Review of SPring-8 by MEXT.
Oct. 2007	SPring-8 10th Anniversary Ceremony and Symposium.
Nov. 2008	SPring-8 Academic Review Committee (SPARC).

Table II. Outstanding achievements

In-vacuum Undulator Sources.
Advanced Beamline Technology.
Structural Studies on Membrane Proteins.
Structural Studies on Macromolecular Assemblies.
Real-time SAXS Analysis of Periodosome.
Motion of Potassium Channel Revealed by Single Molecule Tracking.
Rational Design of Nanoporous Materials with Chemical Functionality.
Probing Bulk States of Correlated Electron Systems by High-Resolution Resonance Photoemission.
Phase Change Mechanism of Rewritable Optical Media.
Post-perovskite Phase of MgSiO <sub>3</sub> at 120 GPa: Nature of the Mantle-core Boundary.
Advancing the Understanding of Automobile Exhaust Gas Catalysts.
Interfacial Magnetism between FM/AFM Bilayers in Magnetic Sensor Heads.