Experimental Facilities
-General-

1. Introduction

Activities of the Experimental Facilities Division, the Beamline Division and the Experimental Research Division broadly cover the areas of beamline commissioning, initiating public use, continuation of public beamline construction, consultation on contract beamline construction, utilization of beamlines, support of the Beamline Committee and the Proposal Review Committee (PRC), and international workshops and symposia. The beamlines, including the JAERI and RIKEN beamlines, were available for public use after completion. Following by the first public use of eight public beamlines in October 1997, we can count sixteen public beamlines and several more to follow which are now under construction.

2. Beamline Commissioning and Operation of Beamlines

After two months of summer shutdown for the maintenance of the accelerators and installation of additional beamlines, the commissioning of the beamlines was started in September, 1999. The new beamlines are the so-called "B2-series" from the downstream bending magnet source, i.e., BL02B2, BL04B2, BL20B2, BL28B2 and BL40B2. As a result, we have now sixteen public beamlines for public use. In addition, we have the JAERI/RIKEN beamlines and contract beamlines, some of which are being used exclusively.

In addition to the beamline construction, the operation point of the storage ring was changed to new parameters so that the storage ring is operated in horizontal high- and vertical low-beta mode instead of the hybrid mode in the first stage of operation. As a result, we have a high-beta source in odd numbered cells in the storage ring.

3. Beamline Construction: Public Beamlines

At SPring-8, each beamline consists of a bending magnet source/insertion device, a front-end channel, a transport channel including optics, experimental station equipment including additional optics, diffractometer, detector and data acquisition system, shielding hutches and interlock/beamline control systems. The table shows the construction status for all of the beamlines as of the end of 1999. At SPring-8, 61 beamlines were initially planned from the X-ray sources of the storage ring. However, the SPring-8 team decided to build an additional beamline, drawn out from a crotch of the storage ring, for infrared studies. We thus were able to finish five beamlines for public use in the second and third periods of utilization:

BL01B1	XAFS
BL02B1	Crystal Structure Analysis
BL02B2*	Powder Diffraction
BL04B1	High-temperature Research
BL04B2*	High-energy Scattering/Diffraction
BL08W	High-energy Inelastic Scattering
BL09XU	Nuclear Resonant Scattering
BL10XU	Extremely-dense-state Research
BL20B2*	Medical/imaging application
BL25SU	Soft X-ray Spectroscopy of Solids
BL27SU	Soft X-ray Photochemistry
BL28B2*	White Radiation Topography
BL39XU	Physicochemical Analysis
BL40B2*	Structural Biology II
BL41XU	Structural Biology I
BL47XU	R&D(1) mainly in imaging

Beamlines with asterisks (*) are the new public beamlines in 1999.

A Biomedical Imaging beamline, BL20B2, extends over 200 meters from the X-ray source point, and its experimental station was situated outside of the experimental hall of the storage ring.

In 1999, there were several public beamlines under construction:

BL20XU	Medical Use
BL35XU	High-energy-resolution Inelastic Scattering
BL38B1	R&D(3), Structural Biology and XAFS
BL40XU	High-flux Undulator
BL43IR	Infrared Studies
BL46XU	R&D(2),high-energy undulator Materials Science

4. Beamline Construction: JAERI/RIKEN and Contract Beamlines

JAERI/RIKEN scientists have constructed seven beamlines for their exclusive use:

BL11XU	Materials Science (JAERI)
BL14B1	Materials Science (JAERI)
BL19LXU	SR Physics(RIKEN)
BL23SU	Actinide Studies (JAERI)
BL29XUL	Coherent X-ray Studies (1km beamline) (RIKEN)
BL44B2	Structural Biology (RIKEN)
BL45XU	Structural Biology (RIKEN).

Out of these, the BL29XUL SPring-8 standard undulator beamline has a experimental hutch in the experimental hall of the storage ring and will be extended out of the experimental hall to the second experimental station placed 1km from the source. RIKEN also started construction of a 30m-long straight section beamline, BL19LXU, from FY1998

and will complete it in FY2000. Five undulator segments of 5 m are connected in vacuum to generate coherent hard X-rays. It will give a super high brilliant X-rays of 10^{21} photons. In addition to JAERI/RIKEN beamlines, several institutions/consortia have their beamlines.

BL12XU+	Materials Science (APCST, Chinese Taipei)
BL12B2+	Materials Science (APSCT, Chinese Taipei)
BL15XU+	Materials Science (Nat'l Inst. Res. Inorg. Mat.)
BL16XU	Materials Science (Industrial Consortium)
BL16B2	Materials Science (Industrial Consortium)
BL24XU	Multi-purpose (Hyogo Pref.)
BL33LEP+	Laser Electron Photon Studies (Osaka University)
BL44XU	Macromolecular Assemblies (Osaka University)

Beamlines with plus (+) are those that are under construction in 1999.

5. Beamline Committee

5.1 Beamline Committee

The Beamline Committee of SPring-8 reported their master plan for the public beamline construction in the second phase of the project, i.e., public beamlines from 11th to 20th. In 1999, the Committee called for Letters of Intent of beamline construction. These beamlines were partly selected by considering beamline specifications in various scientific fields: they are, BL02B2, BL04B2, BL13XU, BL20XU, BL20B2, BL28B2, BL35XU, BL40XU, BL40B2 and BL43IR. Of these, BL02B2, BL04B2, BL20B2, BL28B2 and BL40B2 are subjected for public use in October, 1999, and BL40XU and BL43IR will be completed for public use in April, 2000. BL13XU, BL20XU and BL35XU are under construction to finish in FY2000. In the first half of FY1999, the Committee called for the Letters of Intent for the 21st to 30th public beamlines. There have been 27 proposals submitted, ten out of which have been selected for asking to submit detailed plans for their beamline proposals (four Letters were merged in two in the Committee):

- Spectromicroscopy Beamline
- Earth and Planetary Science Beamline
- Ultra-high Brilliant Soft X-ray Beamline
- Horizontal Tandem Undulator Beamline with Triple Macromolecular Crystallographic Stations
- X-ray Emission Spectroscopy Beamline
- High-Brilliance High-Energy X-ray Beamline
- Bending Magnet Beamline for R&D
- Bending Magnet Beamline for Engineering Science Research

BL19B2 for engineering science research and BL13XU for surface science are on the budget and will be completed in March, 2001.

5.2 Contract Beamline Committee

Contract beamline plans were not submitted in 1999. The contract beamlines constructed are listed in the previous paragraph. The beamlines of SRRC in Chinese Taipei BL12B2 and BL12XU will be constructed in 2000 and 2001.

6. Proposal Review Committee

After the first period of public use, starting in October, 1997 (Period 1997B), two periods of public use followed in 1999:

Third period (Period 1999A)
November 1998 to June 1999
Number of shifts: 247
Number of proposals accepted/submitted: 258/392 (65.8%)

Fourth period (Period 1999B)
September 1999 to December 1999
Number of shifts: 139
Number of proposals accepted/submitted: 246/431 (57.1%)

These numbers do not include urgent proposals and various others. The details are shown elsewhere in this Annual Report.

7. Symposia and Workshops

Various symposia and workshops were held in 1999:

- The SPring-8 Workshop on Utilization of SPring-8, March 4-5
- The SPring-8 Workshop on High-energy Resolution Compton Scattering, September 17
- The SPring-8 Workshop on magnetism, October 13
- The Third SPring-8 Symposium, October 14-15
- Harima International Forum (Membrane Proteins), November 3-6

The meetings, unless otherwise stated, were all held at the SPring-8 Site in Harima.

Beamlines at SPring-8

-- Completed/under construction by the end of 1999 --

Beamline	Source*	Subject	Category**	Status***
BL01B1	BM	XAFS	Public	C
BL02B1	BM	Crystal Structure Analysis	Public	C
BL02B2	BM	Powder Diffraction	Public	C
BL04B1	BM	High Temperature Research	Public	C
BL04B2	BM	High Energy X-ray Diffraction	Public	C
BL08W	W	High Energy Inelastic Scattering	Public	C
BL09XU	U	Nuclear Resonant Scattering Surface Science	Public	C
BL10XU	U	Extremely Dense State Research High Brilliance XAFS	Public	C
BL11XU	U	Materials Science II	JAERI	C
BL12IN	U	APCST ID	Taiwan	UC
BL12B2	BM	APCST BM	Taiwan	UC
BL13XU	U	Surface/interface Science	Public	UC
BL14B1	BM	Materials Science I	JAERI	C
BL15XU	U	WEBRAM	NIRIM	UC
BL16XU	U	Industrial Consortium ID	Industry	C
BL16B2	BM	Industrial Consortium BM	Industry	C
BL19LXU	U	SR Physics Coherent X-ray Studies	RIKEN	UC
BL19B2	BM	Engineering Science Research	Public	UC
BL20XU	U	Medical and Imaging II	Public	UC
BL20B2	BM	Medical and Imaging I	Public	C
BL23SU	U	Actinide Science	JAERI	C
BL24XU	U	Hyogo	Hyogo	C
BL25SU	U	Soft X-ray Spectroscopy of Solid	Public	C
BL27SU	U	Soft X-ray Photochemistry	Public	C
BL28B2	BM	White Beam X-ray Diffraction	Public	C
BL29XU	U	Coherent X-ray Optics	RIKEN	UC
BL33LEP	BM	Laser-electron Photon	OU	UC
BL35XU	U	High Resolution Inelastic Scattering	Public	UC
BL39XU	U	Physicochemical Analysis	Public	C
BL40XU	U	High Flux	Public	UC
BL40B2	BM	Structural Biology II	Public	C
BL41XU	U	Structural Biology I	Public	C
BL44XU	U	Macromolecular Assemblies	OU	C
BL44B2	BM	Structural Biology II	RIKEN	C
BL45XU	U	Structural Biology I	RIKEN	C
BL46XU	U	R&D (2)	JASRI	UC
BL47XU	U	R&D (1)	JASRI	C

* Source: BM, bending magnet; W, wiggler; U, undulator.

** Category: Hyogo, contract beamline by Hyogo Prefecture; OU, contract beamline by Osaka University.

*** Status: C, completed and used for public use; UC, under construction.

The arrangement of the beamlines in the experimental hall of storage ring is shown elsewhere in this annual report.