

# Overview of the SPring-8 Project

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## 1. Introduction

The project has been carried out jointly by Japan Atomic Energy Research Institute (JAERI) and the Institute of Physical and Chemical Research (RIKEN) and construction of the facility started in 1991. Commissioning of the injector linac was started in August 1996 and 8GeV electron beam was injected into the storage ring in March 1997. The first synchrotron radiation from a bending magnet was observed at the front end of the beamline on March 25 and radiation from an undulator was observed on April 23, 1997. On-beam test of seven beamlines, four of them are from in-vacuum undulators and three from bending magnets, was started in July. The dedication of the SPring-8 was held on December 6, 1997 and the initiation of public use of the public beamlines was started in October, 1997.

## 2. Accelerators

### *Injector linac*

The installation of the linac was started on April 1995 and completed in December 1995. Testing of various kinds of power supplies were started early in 1996. The beam commissioning was started on August 1, 1996 and the acceleration of the beam to the final energy of 1GeV was succeeded on August 8. The linac was steadily operated over 10,000 hours for two years from the first operation in early 1996 until March 31, 1998.

### *Booster Synchrotron*

The construction of the synchrotron was started in 1993 and all components were installed at the end of March 1996. After alignment of lattice magnets, the conditioning of the RF cavities was started at June 1996. The beam commissioning was started December 10, 1996 and energy ramping of the electron beam in the synchrotron from 1GeV of the injection energy to 8GeV of the extraction energy was succeeded on December 16, 1996.

The single bunch mode was realized in the synchrotron using RF-knockout system and

the single bunch beam was begun to supply for users on November 21, 1997.

### *Storage ring*

All systems of the storage ring, such as magnets, vacuum system, power supplies and control system were completed and the beam commissioning was started in middle of March 1996. The first synchrotron radiation from a bending magnet was observed at the front end of the beamline on March 25 and radiation from an undulator was observed on April 23, 1997. The user time operation was started since October, 1997 with the stored beam current 20mA.

Past one year operation experience of the Spring-8 storage ring shows the high performance of magnets and alignment, RF system, vacuum system, beam diagnostics and control system. The activities of the beam dynamics group has also important role for the successful commissioning of the storage ring.

## 3. Beamlines

The beamlines are divided into four groups to the source types and source points, beamlines from IDs installed at low beta sections, those from IDs at high beta sections, those from IDs at the long straight sections and beamlines from bending magnets.

The beamlines are also classified into four groups; public beamlines, contract beamlines, JAERI/RIKEN beamlines, and beamlines from R&D and machine study.

Eight public beamlines were completed for public use by the time public use started in October, 1997. These are bio-crystallography (BL41XU), high energy inelastic scattering (BL08W), nuclear resonant scattering (BL09XU), extremely dense state (BL10XU), physico-chemical analysis (BL39XU), crystal structure analysis (BL02B1), high temperature research (BL04B1), and XAFS (BL01B1). Two public beamlines, soft X-ray spectroscopy of solid (BL25SU) and soft X-ray photochemistry (BL27SU) have been arranged for public use by the end of March, 1998. Biomedical imaging research beamline (BL20B2; 200m long) have also started for construction.

R&D beamline (BL47XU) was completed and subjected partly for public use mainly in

the field of imaging.

Out of six beamlines of JAERI (BL11XU, BL14B1, BL23SU) and RIKEN (BL29XU, BL44B2, BL45XU), the RIKEN structural biology beamline 1 (BL45XU) was completed. Some of the other JAERI/RIKEN beamlines were nearly completed to be commissioned by March, 1998.

For contract beamline, five proposals were accepted for construction and two of them, multi-purpose beamline (Hyogo Prefecture; BL25XU) and supramolecular crystallography beamline (Osaka University; BL44XU) have been under construction and are to complete during the FY1998. Three additional contract beamlines, advanced materials research (National Institute for Research in Inorganic Materials, BL15IN), materials researches 1 and 2 (Industrial Consortium; BL16XU and BL16BM), are in construction status.

Laser electron photon beamline (The Research Center of Nuclear Physics, Osaka University) is also in construction status.

#### **4. Conventional facilities**

The followings were completed in 1997, main building (June), experimental facility for medical imaging (June), biomedical imaging R&D facility (June), guest houses B, C (September), guest house office (September), machine laboratory (September), and accelerator and beamline R&D facility (September). Guest house D is under construction.

#### **5. Administrations**

The present SPring-8 organizational structure, established 1995, enables both the SPring-8 Project Team and JASRI staff to make direct contribution to the project organization. At the end of March 1998, the SPring-8 Project had a total staff of 309, 94 of whom belonged to the SPring-8 Project Team, while the remaining 236 were the members of JASRI.

The dedication of SPring-8 was held on December 6, 1997. More than 700 guests including Mr. S. Tanigaki, Minister of State for Science and Technology, Dr. Y. Petroff, Director General of ESRF, Dr. D. Moncton, Director General of APS were attended the dedication.

#### **6. JASRI users programs**

198 scientific subjects were proposed to Proposal Review Committee for the first period of utilization of SPring-8 beamlines. 130 subjects were accepted during October, 1997 and March, 1998.

The beamline committee selected six public beamlines following to the constructed or construction eleven public beamlines. These are medical beamlines, high flux beamline, high resolution beamline, crystal structure analysis 2 beamline, surface and interface structure research beamline and infrared spectroscopy beamline.

#### **7. SPring-8 users society**

SPring-8 user's society was formally established in 1993. More than 1180 members (68% from universities, 16% from national laboratories and 16% from industry) with 35 groups, are joining for promoting scientific program including the detailed design of public beamlines.

#### **8. Symposium and workshops**

The 6th International Conference on Synchrotron radiation Instrumentation (SRI'97) was held in Himeji City, Hyogo Prefecture, from August 4 to August 8, 1997. The program consists of 52 invited, 67 oral presentations, 341 poster presentations, and 24 facility reports. The participants are more than 600 including 230 overseas participants.

Along with the Conference, there are several satellite meetings in addition to the "SPring-8 International Workshop on Long Straight Sections of SPring-8 Storage Ring".