Overview of the SPring-8 Project

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The Japanese government has approved spending plans to complete construction of the first phase of the SPring-8 facility one year earlier than previously planned. According to the revised construction schedule, commissioning of the storage ring and beamlines will begin in February 1997. This will enable experimental researches using public beamlines to start in Autumn 1997.

1.Accelerators

1.1 *Injector linac*

The installation of the linac was started on April 1995. The beam focusing magnets were installed at first and the precise alignment of these magnets was carried out using the laser system. Whole components of the linac were installed until the end of December 1995. Power test was started on January 1996. Test of the control system is under way. RF aging of the waveguide and accelerator column was just started on April 1996. The commissioning of linac will begin in August 1996.

1.2 *Booster Synchrotron*

The construction of the synchrotron was started in 1993 and all components have been manufactured successfully. All magnets have been aligned precisely and the vacuum system, vacuum chamber and pumping units, is under construction. The RF power system is also under construction. The commissioning of booster synchrotron will begin in October 1996.

1.3 *Storage Ring*

Contracts of accelerator components are almost finished and fabrication of the components are in progress on schedule. Fabrication of main magnets was completed and installation of these magnets has been started in April 1995 and finished in March 1996 except the steering magnets. Final alignment is being scheduled in January 1997. All the power supplies of main magnets were completed.

Calibration of the beam position monitors (BPMs), installation of the distributed non-evaporable getter (NEG) pump, and the pre-bakeout of the vacuum chambers started in February 1995, while installation of the vacuum system in the storage ring tunnel began in July 1995. All vacuum components except for injection section were completed and all vacuum systems were installed in the storage ring tunnel. Baking of chamber was finished about 60% of total systems.

One RF station was completed and remaining two station are under construction. Control system is also under construction. Commissioning of the storage ring is scheduled in February 1997.

2.Beamlines

SPring-8's beamline committee has approved funding for the following ten public beamlines including earlier selected four beamlines, bio-crystallography, soft X-ray spectroscopy of solid, high energy inelastic scattering, nuclear resonant scattering, extremely dense state, physicochemical analysis, soft X-ray photochemistry, crystal structure analysis, high temperature research, and XAFS. These represent the first phase of SPring-8's public beamline construction program, which is scheduled for completion by the end of 1997. A few of JAERI and RIKEN beamlines are also under construction and some contract beamlines are proposed.

2.1 *Insertion Devices*

15 insertion devices(IDs) including IDs collaborated with other facilities are under constructing. The pilot device, an in-vacuum undulator, was completed and will be installed in the storage ring by September 1997.

2.2 *Front Ends*

Vertually all front-end components are being fabricated except for X-ray beam position monitors (XBPMs), and the construction of 11 front-ends is scheduled to start at July 1996. A whole of the undulator beamline front-end is being constructed as pilot front-end to find out the way of aligning

the front-end components and to examine the performance of the front-end. The components of pilot front-end have been aligned within an error of 0.25mm for both horizontal and vertical directions.

2.3 *Transport Channel and Optics*

The design of the each component standardly used in every transport channel were finalized as standard component kits. These are downstream shutters, 4-jaw slits for monochromatic X-rays, 4-jaw slits for white X-rays, fixed masks, view ports, bellows, beryllium windows, gamma-ray stoppers, helium chambers, end stoppers, exhaustion units, and vacuum gauge units. The standard double crystal monochromator designed in 1994FY as well as the standard mirror supports finalized in 1995FY are also included in standard component kits. Using these kits, standard X-ray undulator and bending magnet beamline were designed. For the high heat load optics, several R&D's were made for the water-cooled Si with pin-post structure. Diffraction properties of rotated-inclined geometry were studied both theoretically and experimentally. The results show that it will work as the standard monochromator for X-ray undulator beamline. The collaboration with Sumitomo Electric Industries enable us to get big size diamond crystal with X-ray monochromator quality, which will also be used in the undulator beamlines. Several type of focusing optical elements including Bragg-Fresnel devices as well as bent supermirrors were developed for the focusing of the higher energy X-rays. An inclined-analyzer interferometer was developed for the measurement of the spatial coherence length in the X-ray region.

2.4 *Detectors*

6 detector projects have been progressed; multiple CCD X-ray detector, microstrip gaseous detector, 1D CdTe detector, imaging plate detector, X-ray TV detector and proportional scintillation X-ray imaging chamber.

2.5 *Experimental Stations*

Each beamline has several experimental stations. Design and construction of experimental stations of the public beamline are progressed with the collaboration with user's group.

3. Buildings and Utilities

The injector building was fully completed on May 1995. It includes a two-story linac building, a synchrotron tunnel and several peripheral rooms located on top of the synchrotron tunnel. Storage ring building equipment and interior decoration are under construction and will be fully completed at the end of 1996. A cafeteria, a central building for research and administration, guest houses for visitors and construction collaborators, two experimental machine buildings and a research building for medical application are under construction.

4. User's Society

SPring-8 user's society was formally established in 1993. More than 1050 members with 34 groups are joining for promoting scientific program including the detailed design of public beamlines.