Taiwan Contract Beamlines at SPring-8: Historical Prospect

The Taiwan government funded the construction of a national synchrotron facility in mid 1980 as its importance to the country's future science and technology development was realized. SRRC successfully constructed and commissioned a 1.5 GeV storage ring, the Taiwan Light Source, in April 1993. With the installations of three undulator sources and numerous advanced experimental stations, the TLS has already become one of the world-class synchrotron facility serving VUV and soft X-ray user community. The hard X-ray capability had been considered to be limited in the initial phase of the TLS project. Only a 23-pole wiggler was planned and its installation shortly after the commissioning of TLS. After the completion of three hard X-ray beamlines, the wiggler had quickly become the most demanded source serving a large research community in the studies of thin films, catalysts, environmental samples, and more recently, protein crystals.

At TLS, the wiggler raises the critical energy at 2.14 keV of the bending magnet to 2.8 keV. Even though, the source is still limited for many types of synchrotron X-ray studies. In 1995, SRRC launched a Five-year Plan in which the development of international collaborations with foreign high-energy synchrotron facilities was proposed. With the strong support of the National Science Council, the Memorandum of Understanding and Agreement for SPring-8 Contract Beamlines was signed between JASRI (Japan Synchrotron Radiation Research Institute) and APCST (Asia and Pacific Council for Science and Technology) on December 18, 1998. This marked the beginning of SRRC's Taiwan Beamline Project at SPring-8. Under this project, two beamlines namely the bending magnet line BL12B2 and the undulator line BL12XU will be completed in five years with a total budget of NTD 300M (about USD 10M). The Project has proceeded smoothly since then in close collaboration and with help of SPring-8. In operation, 80% of the beam time is given to SRRC users for both beamlines. These two high-brilliance sources at SPring-8 have added new capabilities critically needed by Taiwan X-ray users and a new chapter of synchrotron radiation research in Taiwan can be envisioned. A summary of all the hard X-ray sources available to SRRC users now is shown in Fig. 1.

To take charge of the operation of the Taiwan Beamlines at SPring-8, the Taiwan Beamline Office at SPring-8 was established in October 1999. At present, the Office stations six staff members, including scientists, engineers and office assistant. Major milestones accomplished so far and the project team members are listed in the following.

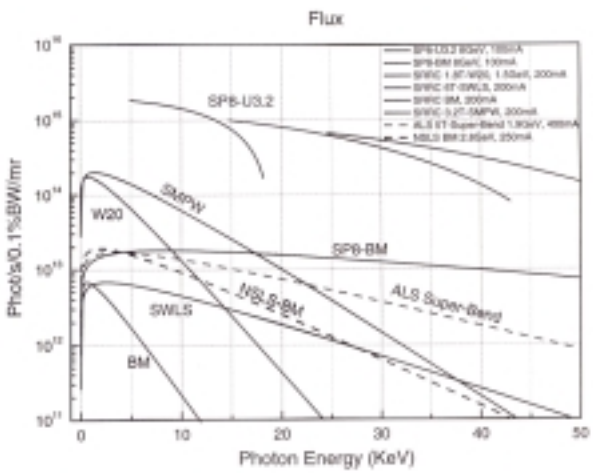

Fig. 1: Hard X-ray sources available to SRRC users.

Major Milestones

BL12B2

+ Aug. 1999	Installation of front end
+ June 2000	Hutch installation completed
+ Oct. 13, 2000	Beamline commissioning
+ Nov. 3, 2000	First EXAFS on Cd edge (26.7 keV) obtained
+ May 2001	Open for XAS and X-ray diffraction
+ Sep. 2002	Open for protein crystallography

BL12XU

+ Jan. 2000	Installation of undulator
+ Aug. 2000	Installation of front end
+ Dec. 17, 2001	Beamline commissioning
+ Apr. 2002	Installation of IXS spectrometer
+ June 9, 2002	First spectrum of inelastic X-ray scattering obtained

Project Team Members

Front Ends	: G. Y. Hsiung, T. F. Lin, K. M. Hsiao, and J. R. Chen
X-ray Undulator	: C. S. Hwang, C. H. Chang, and H. H. Chen
BL12B2 Beamline	: M. T. Tang, T. E. Dann, C. C. Chen, C. Y. Liu, K. L. Tsang, and K. S. Liang
BL12XU Beamline	: Y. C. Cai, P. C. Tseng, C. C. Chen, G. C. Yin, K. L. Tsang, and C. T. Chen
Radiation Safety	: J. P. Wang and J. Liu

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