

# 4 International Collaboration

## 4-1 Overview

Two beamlines are operated by foreign countries at the Photon Factory. One is the Australian National beamline BL-20B constructed by ANSTO. BL-20B has been operated since 1992, and resulted in the new Australian Synchrotron which started operation in 2007. The other is the Indian beamline BL-18B, which is leased by the Photon Factory to the Department of Science and Technology (DST) of the Government of India. This beamline started operation in 2009. In addition to these beamlines, the Photon Factory collaborates with synchrotron communities mainly in the Asian region, such as accepting PAL users during shutdown periods and the SESAME workshop.

## 4-2 Australian Beamline

As described above, BL-20B was constructed in 1992 by ANSTO and the Australian partner changed to the Australian Synchrotron (AS) in 2008. With the opening of the Australian Synchrotron, most diffraction-based experiments were shifted to AS while BL-20B is dedicated for EXAFS experiments. The most powerful tools are a 36-element Ge pixel array detector for fluorescent XAFS and a top-loading type cryostat. Samples can be changed without breaking the vacuum of the cryostat. In FY2010, 31 experiments were carried out at BL-20B. Most of them used the XAFS technique, especially fluorescent XAFS experiments on environmental and biological systems. Thirty one papers based on BL-20B experiments were published in 2010.

The multi-configuration vacuum diffractometer was derailed from its positioning rails due to the earthquake but was quickly restored.

## 4-3 Indian Beamline

The DST, Government of India and KEK agreed to set up an Indian beamline at the Photon Factory in 2008 with the Saha Institute of Nuclear Physics (SINP) as a nodal institute of India. Beamline 18B is leased to DST as is, and SINP is setting up two diffractometers and related detection systems. During the early days a diffractometer and related equipment were leased to DST by the Photon Factory in order to start the commissioning of the beamline and preliminary experiments earlier.

Commissioning of the beamline and end-station started in June 2009. During this period, it was found that the beam position was not stable enough. It was ascribed to an unstable mirror system and the problem was fixed, which made the beam sufficiently stable for

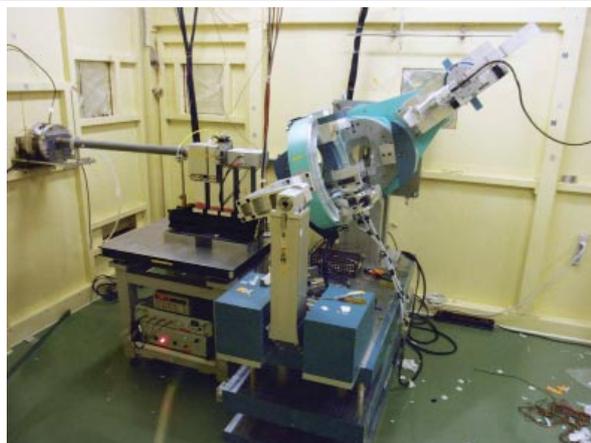


Figure 1  
The first diffractometer installed in BL-18B.



Figure 2  
Shri. Prithviraj Chavan, the Minister of State (independent charge) for Science and Technology and Earth Science (left) and Prof. M. K. Sanyal, the PI of the project.

the planned experiments. Some preliminary experiments were carried out. A new 5+2 circle diffractometer was installed in November and its commissioning started (Fig 1). It is being used for powder and single crystal diffraction, reflectivity measurements. A low-temperature cell (up to 10 K) has been set up and a high-pressure cell (up to 30 GPa) is being set up on this diffractometer.

This diffractometer is also used as the beam deflector for scattering experiments from liquid surfaces, which is a new research activity at the Photon Factory. This liquid surface spectrometer is to be installed soon and will be ready for experiments from October 2011.

Just before installation of the first diffractometer, Shri. Prithviraj Chavan, the Minister of State (independent charge) for Science and Technology and Earth Science visited the Indian beamline on October 6 (Fig. 2).

However, the first diffractometer was derailed due to



Figure 3  
The derailed diffractometer after the earthquake on March 11.

the earthquake on March 11 2011. Fortunately the diffractometer itself was sound but it took several months to repair and improve the slider parts (Fig. 3). The second diffractometer will be installed by autumn at the latest.

#### 4-4 Support for Korean Synchrotron Users during the Shutdown of PLS

Some 2800 synchrotron users have lost their research tool in Korea during the construction and commissioning phase of Pohang Light Source II (PLS II) between December 2010 and July 2012. Pohang Accelerator Laboratory (PAL) has asked synchrotron facilities in Asia/Oceania and other countries to provide some beam time for PLS users while they cannot use PLS.

Since the Photon Factory is one of the nearest synchrotron facilities and has many beamlines for similar research purposes, an MOU was signed by both directors in 2010. The Photon Factory provides beam time to PLS users and PAL sends some beamline scientists to support the experiments of PLS users with those in the Photon Factory. About 70 proposals had been approved by PF-PAC by March 2011 and many PLS users and beamline scientists have come to carry out experiments. Unfortunately, not many experiments could be done between April and July 2011 due to the earthquake.

#### 4-5 Cooperation to SESAME Project

The SESAME-JSPS-KEK Synchrotron Radiation Workshop was planned between March 17 and 21, 2011, in Amman, Jordan. The workshop was planned to be a platform for transferring knowledge to young scientists, engineers and students in SESAME member countries. The workshop consisted of seminars, lectures and practice sessions in materials science, structural biology, electronic structure, XAFS and X-ray fluorescence analysis, which meet the SESAME Phase-I beamlines. However, it was postponed due to the earthquake on March 11.

In addition to the above-described cooperation, the Photon Factory cooperates with many synchrotron facilities such as Synchrotron Light Research Institute (SLRI) in Thailand. The Photon Factory also co-organized the summer school "Cheiron School" held between October 9 and 18, 2010, at SPring-8.