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International and Domestic Collaboration

8-1 Overview

Since the user community of synchrotron radiation spreads across national boundaries, international discussion and collaboration are becoming more and more important. The Photon Factory has a history of collaborating internationally since the early 1980s, including the successful operation of Australian and Indian beamlines at the PF. The Australian National beamline BL-20B was constructed at the PF by the Australian Nuclear Science and Technology Organization (ANSTO) and was operated from 1992 to 2013. The major activity of the beamline at the PF has now been moved to the Australian Synchrotron in Melbourne, Australia. The Indian beamline BL-18B was leased from the Photon Factory to the Department of Science and Technology (DST), India, and has been operational since 2009. Part of the beamtime is open for domestic users as well. The PF is also collaborating with international synchrotron radiation communities through meetings, workshops, and schools. On the other hand, since KEK was originally established as the first inter-university research institute, collaboration with domestic universities and institutes is one of the major missions of KEK. Based on the supporting funding by KEK, mutual collaboration projects between the PF and domestic organizations are also ongoing.

8-2 Indian Beamline

The Indian beamline BL-18B is leased from the PF to DST, and has been operational since FY2009. This international collaboration between India and Japan has been strongly supported by the leaders of both countries. The Prime Minister of Japan, Mr. Shinzo Abe, and the Prime Minister of India, Dr. Manmohan Singh, signed a Letter of Intent on Scientific and Technological Cooperation between the DST and KEK as a part of the “Joint Statement on the Roadmap for New Dimensions to the Strategic and Global Partnership between Japan and India”, which was announced in New Delhi on August 22, 2007. Based on the Letter of Intent, the

DST 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.

After the Memorandum of Understanding on Scientific and Technological Cooperation was signed in October 2008, the Indian BL office was started at KEK in March 2010. The BL was opened for Indian general users in October 2011, and also opened for non-Indian users in April 2014. The beamline enables various synchrotron radiation measurements including powder diffraction at low and high temperatures, X-ray reflectivity, diffuse scattering from solid and liquid interfaces, and X-ray diffraction of on-line growth and structural characterization of thin films and nanostructures. The numbers of proposals and unique users are gradually increasing as shown in Table 1. Scientific outputs based on BL-18B experiments have been published in refereed journals.

8-3 Cooperation with the SESAME Project

There are over 60 synchrotron radiation facilities in the world, but none in the Middle East. SESAME, which is a major synchrotron radiation facility under construction near Amman (Jordan), will not only be the first light-source in the Middle East, but also the region's first true international center of excellence. Since the SESAME-JSPS Collaboration funding was terminated in FY2013, the commitment from KEK to SESAME was mainly attendance at the SESAME Council meeting in FY2014. The SESAME Council meeting was held in December 2014, and Executive Director of KEK attended the meeting. The Council approved renewed plans for the construction of SESAME which was lost in 2014, due to the collapse of the roof in December 2013 as a result of unusually heavy snowfall in Jordan. The revised plan foresees commissioning starting in mid-2016 with two of the radio frequency cavities and two of the ‘day-one’ beamlines; the other two cavities and the two other ‘day-one’ beam lines will be added in 2017 (three more Phase 1 beamlines will be added later).

Table 1: The numbers of proposals and unique users of Indian beamline (BL-18B).

Fiscal year		Number of proposals	Unique users
2009	Jan. 2010 - Mar. 2010	4	7
2010	Apr. 2010 - Mar. 2011	12	18
2011	Oct. 2011 - Mar. 2012	16	26
2012	Apr. 2012 - Mar. 2013	20	38
2013	Apr. 2013 - Feb. 2014	25	45
2014	Apr. 2014 - Dec. 2014	28	51
	total	105	185

8-4 Domestic Collaborations

KEK has a wide variety of collaborations with domestic organizations. Among them, two collaboration meetings related to the PF and domestic organizations were held in FY2014.

Firstly, the 6th collaboration symposium between KEK and Hokkaido University was held in Sapporo on January 28, 2015. The main topics of the symposium were materials science and quantum beams. Speakers from Hokkaido University gave talks on photocatalytic reactions of TiO_2 , and newly-designed fluorescence materials. Three speakers from the Institute of Materials Structure Science introduced techniques for materials science using quantum beams such as scanning transmission X-ray microscopy (STXM), neutron inelastic scattering, and muon spin resonance. Applications of novel quantum-beam techniques to brand-new materials developed at Hokkaido University were discussed in the symposium.

Secondly, a collaboration meeting among KEK, the University of Tokyo, and the National Institute of Advanced Industrial Science and Technology (AIST) was held at AIST West Campus in Tsukuba on February 20, 2015 (Fig. 1). The main topics of the meeting were enhancing the careers of young researchers especially in the nanotechnology field. Five young PhD students and postdoctoral fellows from the University of Tokyo and Photon Factory presented their research by talks and posters, and two senior researchers from AIST introduced new research programs at AIST. Young students and postdocs actively joined discussions with each other and with researchers at AIST. KEK and AIST are members of the Tsukuba Innovation Arena for nanotechnology (TIA-nano), seeking various types of collaborations in the field of nanotechnology in Tsukuba, and the secretary general of TIA-nano also briefly introduced the outline of the TIA-nano project.



Figure 1: Snapshot of the poster session in the collaboration meeting among KEK, University of Tokyo, and AIST.