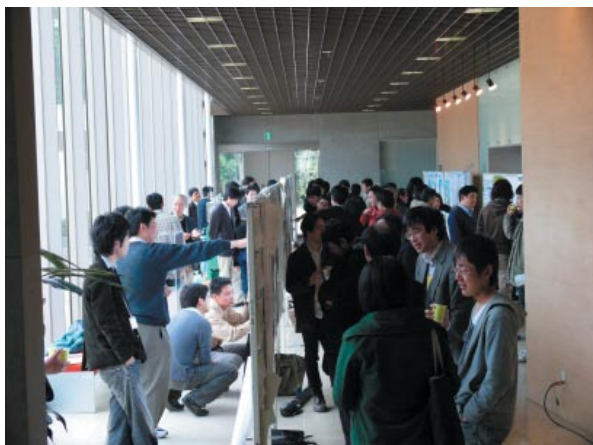


# 3 Workshops and Seminars

## 3-1 PF Symposium

The 25th PF Symposium, the annual users' meeting, was held on March 18-19, 2008 at the Tsukuba Campus of KEK. More than 200 users and PF staff participated in the Symposium. The main purpose of the PF Symposium is to discuss the present status and future projects of the PF. In addition, users and the PF staff promote mutual friendship through scientific presentations and discussion. In the first part of the symposium, PF staff reported on the status and recent progress of the facility. We invited six speakers for special lectures: four from outside and two from inside the PF. Two oral sessions were held on two important topics: the Energy Recovery Linac Project and the improvement of PF and PF-AR. There were 93 user poster presentations, with results presented from 17 S-type proposals. There were 26 presentations from the staff of the Accelerator Laboratory of KEK, Neutron Science Division of IMSS and the PF staff, resulting in a total of 136 poster presentations.



## 3-2 PF Workshops

Five PF workshops were held in FY2007 with the approval of the PF Program Advisory Committee (PF-PAC). Anyone can propose such a workshop. Free discussion is made upon a specific scientific topic in synchrotron-radiation research and its related application fields. The proceedings of the workshops are found in the KEK proceedings, which are available at the Library KEK.

(1) "New Development of Research on Function Organic and Biological Thin Films using High Brilliant Synchrotron Radiation in Ultraviolet and Soft X-ray Regions" held on May 8-9, 2007 at the PF, KEK Proceedings 2007-11 (in Japanese).

Soft-matter solid-state thin film made of organic or

biological molecules have been attracting increasing interest in recent years. Due to their many advantageous qualities, including their pliability, high quality, and potential for diverse molecular layouts, organic and biological thin films are being highlighted as candidates for next-generation devices, are already being used as organic EL devices, and are being developed for use in organic FETs, DNA sensors, DNA chips, and other diverse applications. However there remain many properties of these devices which need to be studied to aid in device design, including the electronic structure of the organo-metallic interface, and the mechanisms of thin-film growth, orientation, and surface diffusion.

In the area of soft X-ray / vacuum ultraviolet (SX-VUV) synchrotron radiation studies, advances are being made in forefront analytical techniques, including high-resolution photoelectron spectroscopy, X-ray standing wave, coincidence spectroscopy, energy-dispersive XAFS, and the photoemission electron microscope. It can be expected that these techniques should be useful for studying the structure and functions of organic and biological thin films, but there are very few SX-VUV beamlines in Japan which specialize in these studies.

This workshop therefore aims at discussing the current state of SX-VUV functional organic/biological thin-films research, and also how these studies can best be advanced in the future using high brilliance VUV-SX synchrotron radiation.

(2) "Workshop on Cellular Response against Low Dose Radiation using Microbeam Cell Irradiation System" held on August 27-28, 2007 at the PF. KEK Proceedings 2007-13 (in Japanese).

The use of a micro-beam cell irradiation system to select individual cells and irradiate their nuclei or cytoplasm with a predetermined dose of radiation is a prominent technique for studying the biological effects of low-dose radiation. To date studies using particle microbeam irradiation systems installed outside Japan have been successful in revealing phenomena such as bystander effects (radiation induced effects in un-irradiated cells located nearby an irradiated cell). From the reasons that exposure to photon radiation such as gamma rays (and the corresponding secondary electrons) is more likely than heavy particle irradiation in normal environments, and that synchrotron radiation X-rays are highly directional and ideal for forming a microbeam, four years ago we began development of synchrotron X-ray microbeam cell irradiation system. Using this system, it has been shown that the cellular response to low-dose radiation is determined not only by the repair of DNA damages, but also by the intracellular signaling network. This has also led to new developments

of "radiation biology" tying up with the other biological research fields such as cell biology.

Apart from the development at the PF, particle microbeam irradiation systems are also in operation or under construction at JAEA's Takasaki Establishment and at NIRS (National Institute for Radiological Sciences, Chiba). The users of these facilities share a common interest in the study of the biological effects of low-dose radiation, and this workshop has been planned to facilitate the exchange of knowledge and knowhow, and to promote discussion on future developments through presentations on research results to date. It also provided an opportunity to plan a training course for new users.

The workshop was jointly organised with Microbeam Biology Research Union of Japan.

(3) "Recent Development of the Experimental Techniques in High-pressure Research on Synchrotron Radiation Sources" held on November 8-9, 2007 at the PF. KEK Proceedings 2007-7 (in Japanese).

Experiments under high-pressure using synchrotron radiation X-rays and the multi-anvil press were first developed in the 1980s by a collaboration of Japanese scientists, and the technique has left its mark on various fields including earth sciences, materials science, and the physics of fluids. Developments have since been made in the many related technologies, including pressure generation, sample structure, and X-ray detection. The multi-anvil press is installed at many synchrotron radiation facilities around the world, and is used in much active research. Japanese high-pressure research groups also lead the world in introducing the imaging plate for research using the diamond-anvil cell, leading to many new results. From pressure generation to X-ray detection techniques, experimental technology is at the heart of high-pressure research. This workshop focuses on new technological developments such as the diamond capsule and new gasket materials, promoting their use to synchrotron radiation users. It also provided a forum for discussing the new developments in high-pressure science that will be made possible.

(4) "Recent Trends and Prospects of the Time-Resolved XAFS Researches" held on March 1-2, 2008 at the PF. KEK Proceedings 2008-5 (in Japanese).

The purpose of the workshop was to discuss the current status and the near-future prospects of time-resolved XAFS research in Japan. Time-resolved applications are regarded to be the most important activity for many XAFS users, and are going to play a crucial role in the intrinsic interpretation of reaction mechanisms, the clarification of the local structure and electronic state of short-lived species, and so on. Recent developments in pulsed X-ray detection techniques have led to improvements in time resolution to the order of sub ns for XAFS experiments, much shorter than the previously

available ms order. At the PF, time-resolved dispersive XAFS (DXAFS) instrumentation has been developed at the NW2A station, and sub-ns time-resolved XAFS experiments can be performed using a pulsed-laser pump, X-ray probe technique. The DXAFS instrument is also useful for the mechanistic investigations of many heterogeneous catalysts with a measurement time scale on the ms ~ s order. In addition, a quick-scanning XAFS (QXAFS) system has been constructed at some of the XAFS stations at the PF and PF-AR, and is now widely accepted as a daily tool for conventional measurements.

(5) "Future Prospects in X-ray Phase Measurement" held on January 17-18, 2008 at the PF. KEK Proceedings 2007-18 (in Japanese).

This workshop was the third in a series of workshops. The previous workshops were held at the PF in 2002 and 2005.

The purpose of the workshop was to share information about the current status of X-ray phase-related measurements including the topics of next-generation synchrotron radiation (XFEL and ERL), X-ray coherent optics, X-ray coherent diffraction microscopy, X-ray phase-contrast microscopy and radiography, soft X-ray Fourier-transform holography, X-ray fluorescent holography and next-generation X-ray area detector. Future plans and scientific prospects for each topic were shown in oral presentations, which were followed by active discussions. The total number of participants was 70.

### 3-3 PF Seminars

Thirty-one PF seminars were held in FY2007. They were given either by PF staff members or by visitors, and a list is given in Table 1. The topics of the seminars covered a wide range of science, mainly related to synchrotron-radiation research. Topics included the electronic structure and atomic structure of condensed matters and their surfaces, X-ray diffraction analyses of solids and bio-molecules, ultrafast time-resolved dynamics, high-resolution real-space imaging, new interesting materials, structural analyses of matters under extreme conditions, new light sources and insertion devices, electron-beam stabilization, and electron- and light-beam monitoring.

Table 1 A list of PF seminars held in FY2007.

Structural Plasticity in the Colinesterases SILMAN Israel (Weizmann Inst. of Sci.) Apr. 10, 2007
A Terahertz Coherent Synchrotron Radiation from the Compact ERL HARADA Kentaro (KEK-PF) Apr. 25, 2007
Present situation of THz-SR and outlook of the intense THz-CSR from compact ERL KIMURA Shinichi (IMS) Apr. 25, 2007
Production of Hard X-ray Nanobeams YAMAUCHI Kazuto (Osaka Univ.) May 21, 2007
Surface Gradient Integrated Profiler for X-ray and EUV Optics HIGASHI Yasuo (KEK-MEC) May 21, 2007
Present Status of Hard X-ray Focusing and Imaging Optical Elements at SPring-8 SUZUKI Yoshio (JASRI) May 25, 2007
Development of X-ray Optical Elements at NTT-AT TAKENAKA Hisataka (NTT-AT) May 25, 2007
The Basic Concept and Preliminary Estimation of Inverse Compton Scattering KOBAYAKAWA Hisashi (KEK) May 29, 2007
The Inverse Compton Scattering as an X-ray Source for Femtosecond Time-Resolved X-ray Studies ADACHI Shinichi (KEK-PF) May 29, 2007
The Inverse Compton Scattering as an X-ray Source for Medical Imaging HYODO Kazuyuki (KEK-PF) May 29, 2007
Abnormal Quantum Hall Effect in Graphene HATSUGAI Yasuhiro (Univ. of Tsukuba) Jun. 15, 2007
Weak Interactions and Electronic Structure of Organic Semiconductor Thin Films: Expectations for Study using Synchrotron Radiation KERA Satoshi (Chiba Univ.) Jun. 25, 2007
Energy Band Structure of Well-ordered Organic Thin Films and Related Interfaces YAMANE Hiroyuki (Nagoya Univ.) Jul. 11, 2007
Records and Observations of Space- and Time-continuous Video of Propagation of Light using a Ultrafast Pulse Laser AWATSUJI Yasuhiro (Kyoto Inst. of Tech.) Jul. 12, 2007
Immune Escape Mechanism of Herpes Simplex Virus SUZUTANI Tatsuo (Fukushima Medical Univ.) Jul. 12, 2007
Ordering of Gold Nanoparticles on Solid Surface and Liquid Interfaces SANYAL K. Milan (SINP, INDIA) Jul. 24, 2007
Ultrafast Laser Technology as an Essential Part of the ERL ITATANI Jiro (JST-ERATO) Jul. 25, 2007
Elucidation of Electronic Structure of Optoelectronic Functional Organic Materials and Material Design KANAI Kaname (Nagoya Univ.) Jul. 26, 2007

Doping to Organic Monolayer on a Si(100) Surface  
YOSHINOBU Jun (The Univ. of Tokyo) Sep.13, 2007

Upgrade Plans for the Advanced Photon Source(APS)  
J. Murray Gibson (APS) Oct. 17, 2007

Epitaxial Growth and Electronic Structure of Organic Semiconductors  
SHIMADA Toshihiro (The Univ. of Tokyo) Oct. 26, 2007

Crystal Structures of Outer Membrane Region of a Receptor Tyrosine Kinase, KIT, before and after the Stimulation by a Stem Cell Factor  
YUZAWA Satoru (Yale Univ.,USA) Oct. 29, 2007

NSRL XAFS Station and its Applications to the Studies of Dilute Magnetic Semiconductors and Quantum Dots  
PAN Zhiyun (USTC, China) Nov. 12, 2007

Recent Development and Future Prospect of Synchrotron Characterization of Electrochemical Energy Conversion Materials  
UCHIMOTO Yoshiharu (Kyoto Univ.) Nov. 27, 2007

Australian Synchrotron Research & the Australian Synchrotron  
GARRETT Richard (ANSTO) Jan. 15, 2008

NSLS and NSLS-II Update  
KAO Chi-Chang (NSLS) Jan. 15, 2008

Tracking Photoswitching Dynamics of Molecules in Materials  
CAILLEAU Herve (CNRS) Jan. 28, 2008

Catalyst Development for the Conversion of Methane and Biomass-derived Chemicals: Catalytic Performance and Structural Analysis of Active Sites by EXAFS  
TOMISHIGE Keiichi (Univ. of Tsukuba) Feb. 15, 2008

Status Report of Macromolecular Crystallography Beamline at SSRF  
WANG Qisheng and DU Guahao (SSRF) Feb. 19, 2008

Current Status and Future Perspective of Therapeutic Medicine for Alzheimer Disease  
SUGIMOTO Hachiro (Kyoto Univ.) Feb. 20, 2008

Current Status and Progress of SSRF Project  
TAI Renzhong (SSRF) Mar. 11, 2008