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Workshops and Seminars

3-1 PF Symposium

The 24th PF Symposium, the annual users' meeting, was held on March 14-15, 2006 at the Tsukuba Campus of KEK. More than 170 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, eight members of the PF staff reported on the status and recent progress of the facility. We invited six speakers for special lectures: five from outside and one from inside the PF. Two oral sessions were held on two important topics: the extension and improvement of insertion devices and beamlines following the completion of the Straight-Section Upgrade Project, and the Energy Recovery Linac Project. There were 86 user poster presentations, with results presented from 13 S-type proposals. There were 28 presentations from the staff of the Accelerator Laboratory of KEK, Neutron Science Division of IMSS and the PF staff, resulting in a total of 114 poster presentations.



3-2 PF Workshops

Two PF workshops were held in FY2006 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 Research Cooperation Division of KEK.

(1) "New Prospects for Soft X-Ray Spectroscopic Studies with Rapidly-Reversible and Variably-Polarized Undulator Radiation" held on May 1-2, 2006 at the PF, KEK Proceedings 2006-18 (in Japanese).

The potential capabilities of the 2.5-GeV PF storage ring have increased following the program to refurbish the storage ring, with the creation of new short straight sections and the elongation of the existing long ones. The longest straight section, B15-B16, is ≈ 9 m in length, and the betatron oscillation in this section is extremely small, providing an ideal situation for producing a high-flux soft X-ray beam using first-order undulator radiation. Over the last decade, we have studied the feasibility of constructing a fast polarization-switching soft X-ray spectroscopic facility at beamline BL-16 using twin helical undulators installed in the longest straight section, B15-B16. The main scientific targets of the new facility would be to investigate nano-scale magnets, strongly correlated electron systems, and critical phenomena near phase-transition regions using soft X-ray magnetic circular/linear dichroism (XMCD/XMLD) as well as studies of chiral molecules and biomolecules using soft X-ray natural circular dichroism (XNCD).

The first session of the Workshop consisted of a discussion of the feasibility study performed over the past several years for the necessary hardware for the new spectroscopic facility. The following design requirements for the facility were confirmed; i) the production of right/left-circularly and horizontal/vertical linearly polarized light using two undulators in tandem, ii) the realization of fast polarization-switching using a kicker magnet system, iii) the adoption of variable deviation-angle optics with varied-line-spacing gratings, and iv) satisfying the condition that beam size and intensity should be the same from both undulators, to allow precise XMCD and XNCD signals to be obtained.

Scientific proposals for the new facility have been previously presented on various occasions, such as PF Workshops and PF seminars. The scientific proposals presented during this Workshop can be categorized into (1) dichroism studies with very weak signals, where fast polarization-switching is essential, and (2) variable po-

larization spectroscopy, where fast polarization switching is not necessarily required.

In the second session of the Workshop, scientific proposals in category (1) beside the above mentioned XMCD/XMLD and XNCD studies were discussed, including proposals for investigations of dilute semiconductors with high sensitivity XMCD/XMLD, and magnetic non-ordering systems with temperature dependent XMCD.

The third session concentrated on proposals in category (2), including studies of surface magnetic dynamics using time resolved XMCD, nano-structures and electronic states using soft X-ray resonant scattering, real-space observations of small magnetic domains using PEEM, surface/interface magnetism using spin-resolved photoelectron spectroscopy, electronic structures using soft X-ray emission spectroscopy, and CD/LD in photoionization and photodissociation dynamics of isolated systems.

In summary, a wide range of scientific proposals which would make the best use of the new BL-16 were presented at the workshop by many potential users. The proposals can be expected to promote the development of soft X-ray polarization spectroscopy, an area in which the new BL-16 spectroscopic facility will certainly play an important role. The detailed technical design studies of hardware presented during the Workshop showed that we were nearly ready to begin construction of the new facility. The total number of participants was 69. The organizers of the Workshop are grateful to all the speakers and participants, and hope to see them again at the new BL-16.

(2) "Medical Application of Synchrotron Radiation II" held on January 27th, 2007 at Tokyo University of Science. This workshop was the third in a series of workshops. The first was held at Tsukuba Gakuin University

in 2004, and the second was held at Tsukuba Gakuin University in 2005.

The purpose of the workshop was to share information about the current status of various imaging techniques, including the X-ray phase-contrast imaging methods, intravenous coronary angiography (IVCAG), micro-angiography, monochromatic X-ray Computed Tomography (CT), fluorescent X-ray CT and conventional X-ray imaging methods in the medical field. Future plans and scientific prospects for each imaging method, especially from the point of the clinical applications, were proposed in oral presentations, which were followed by active discussions. The topics of the workshop also included up-to-date information about related stations, BL-14C1, AR-NE1A2 and AR-NE5A. Discussions were made on possible improvements and renovation of each station.

3-3 PF Seminars

Twenty-eight PF seminars were held in FY2006. 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 states and 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.

The final part of each seminar is exclusively devoted to questions from participants, and the speaker's responses, often resulting in hot discussion. Participants are also allowed to ask questions at any time during the seminar

Table 1 A list of PF seminars held in FY2006.

Drosophila Functional Glycomics: Analyses of Glycan Functions by Drosophila Model System NISHIHARA Shoko (Soka Univ.) Apr. 12, 2006
Structural Tales of Cockmaches, Tails and Blue Fish RAMASWAMY Subramanian (Univ. of Iowa) Apr. 14, 2006
Theory of Photoelectron Ejection Following Inner-Shell Excitation of Fixed-in-Space Molecules ARAI Reiko (Chiba Univ.) May. 22, 2006
The PETRA-3 Project and the Planned EMBL Facilities in Hamburg for Structural Biology HERMES Christoph and FIEDIER Stefan (EMBL Hamburg Oustation) May. 23, 2006
Frontier of Electron Spectroscopic Study of Organic Films UENO Nobuo (Chiba Univ.) May 23, 2006
Photoionization and Excitation of Molecular Clusters in the Inner-Shell Regime BRADEANU Ioana (IMS) Jun.23, 2006

X-ray Filming of Reaction Intermediates in Solution Phase
HYOTCHERL Ihee (Department of Chemistry and School of Molecular Science (BK21)) Jun. 30, 2006

Time-Resolved Crystallography - A Technique Coming of Age?
REINHARD Pahl (The Univ. of Chicago USA) Jul. 3, 2006

Allosteric Action and Protein Structural Relaxation Studied by Time-resolved X-ray Crystallography
VUKICA Srajer (The Univ. of Chicago USA) Jul. 3, 2006

Life Sciences at the ESRF, Past, Present and Future Developments
SINE Larsen(ESRF) Jul. 6, 2006

Future Directions for the Advanced Photon Source
GIBSON Murray (ANL) Jul. 7, 2006

Role and Oxidation of Cys111 on the Stability of Human Cu/Zn-Superoxide Dismutase
FUJIWARA Noriko (Hyogo College of Medicine) Jul. 27, 2006

Quantum Simulation of Multi-Electron Dynamics in a Strong Laser Field
YABANA Kouichi (Univ. of Tsukuba) Jul. 28, 2006

Development of High Energy Resolution Inverse Photoemission Spectroscopy
ASAKURA Daisuke (KEK-PF) Aug. 11, 2006

Bulk Band Structure of Nickel: A Soft X-Ray Angle-Resolved Photoemission Study
KAMAKURA Nozomu (KEK-PF) Aug. 11, 2006

XAS Study of Lithium Battery Materials
Guy OUVRARD (IJean Rouxel Nantes, France) Sep. 8, 2006

Stabilization of Synchrotron Radiation X-Ray Beam by MOSTAB
KUDOH Tougo (JASRI) Oct.16, 2006

Theory of Recoil Effects in Photoemission; an Overlooked Elementary Process
KAYANUMA Yousuke (Osaka Prefecture Univ.) Dec. 1, 2006

Observation of Recoil Effects
TAKADA Yasutaka (RIKEN) Dec. 1, 2006

Applications of Synchrotron Radiation at SSLS in Singapore
CHOIEWA Marian (SSLS) Dec. 5, 2006

X-ray Lenses Fabricated by LIGA Technology
VLADIMIR Nazmov (IMT) Dec. 6, 2006

Time Resolved X-ray Diffraction on Solutions of Small Organic Molecules
KONG Qingyu (ESRF) Dec. 18, 2006

Ultra-Fast Dynamics of Photoinduced Insulator-Metal Phase Transitions in Organic Semi-Conductors
IWAI Shinichiro (Tohoku Univ.) Dec. 19, 2006

Theory of Recoil Effects Seen in the Spectra of High-Energy Electron Scattering and Photoemission
FUJIKAWA Takashi (China Univ.) Dec. 26, 2006

Observation of Recoil Effects in Solid-State Photoemission
SEKIYAMA Akira (Osaka Univ.) Dec. 26, 2006

Crystallographic Studies of the Purple Bacterial Photosynthetic Unit
ALEKSANDER W. Roszak (Univ. of Glasgow, UK) Feb. 1, 2007

Transformation of Soft X-Ray Radiation in the ω -t Space and Shortening
of the Pulse Length
MIYAHARA Tsuneaki (Tokyo Metro. Univ.) Feb. 6, 2007

TINE : The Control System and its Uses at DESY, Zeuthen, and EMBL
DUVAL Philip (DESY) Feb. 22, 2007