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Workshops and Seminars

3-1 PF Symposium

The 22nd PF Symposium, the annual users' meeting, was held from March 17-18, 2005 at the KEK campus. There were over 130 participants including users and PF staff. The main purpose of the PF Symposium is to discuss the present status and future projects of the PF. As well as this, users and the PF staff promote mutual friendship through scientific presentations and discussions. As the first part of the symposium, seven members of the PF staff reported on the status and progress of the facility. We invited six speakers for special lectures; five from outside and one from inside PF. Two oral sessions were held on two important themes, the straight-sections upgrade project and the future plan. There were 45 poster presentations from users, staff of the accelerators division of KEK and the PF staff.



3-2 PF Workshops

There were four PF workshops held in FY2004 which were approved by the PF Program Advisory Committee (PF-PAC). Anyone can propose such a workshop, in which discussion takes place upon a specific scientific topic in synchrotron radiation and its related fields. The proceedings of the workshops can be found in the KEK proceedings, which are available at the Information Resource Division of KEK.

(1) "X-ray and neutron reflectometry: Towards nano-sciences and technologies" held on July 20-21, 2004 at the PF. KEK proceedings 2004-5 (in Japanese).

The workshop focused on topics related to the characterization of surfaces and interfaces of thin films and multilayers by X-rays and neutrons with a special emphasis on unsolved problems and potential future research topics in nano-sciences and technologies. It is significant to bring together those people who are currently working with X-ray and neutron reflectivity methods or those who are simply interested in these subjects, because so far in Japan there have been very few meetings to discuss scientific problems despite growing demand. There also exists a strong mission to plan and build beamlines dedicated to reflectivity and related methods at synchrotron radiation and neutron facilities. In the workshop, a variety of materials, i.e., semiconductors, metals, ceramics, polymers, magnetic materials, and multilayers, need to be discussed in detail. We think it is of key importance to recognize that materials research realistically involves finding solutions for difficult problems, because sometimes characterization tends to be devoted only to quite simple tasks. In addition, we think it also necessary to discuss certain theoretical and software-related problems, although involvement is limited purely to scientists at the moment.

(2) "The 3rd Symposium on Powder Diffraction Method; New Aspects Achieved by Powder Method" held on December 1-2, 2004 at the PF.

Powder diffraction is well renowned as a long-standing generic technique for structural analysis, and is applied in a broad range of fields from basic science through to materials science. Along with recent developments in experiments using synchrotron radiation and neutron beams, the advances in analysis methods using for example the Rietveld and maximum-entropy methods have dramatically increased the variety of information which can be obtained using the technique.

In December 1997 and May 2001 the 1st and 2nd Symposia on Powder Diffraction Methods were held as PF workshops. After the passing of 3 years since the 2nd

workshop there were several strong requests for a new workshop to be held. The 3rd symposium was proposed by the leader of the PF Powder Diffraction User Group to discuss recent developments in the analysis of diffraction data from synchrotron radiation and neutron source experiments.

(3) "Workshop on Biological Effects of Low Dose Radiation using Microbeam Cell Irradiation System" held on December 20-21, 2004 at the PF.

Cell irradiation system utilizing synchrotron X-ray microbeam has been developed in the Photon Factory, in order to study radiobiological effects in low dose region. This type of system, in which each cell can be recognized and irradiated individually with X-ray microbeam, is essential to study "bystander effects of radiation" and other effects specific in low dose region, and similar systems with particle microbeams has been developed at JAERI-TAKASAKI or being constructed at National Institute of Radiological Sciences. This workshop was held in order to enhance the mutual communication and collaboration in future between radiobiologists interested in the microbeam irradiation system.

(4) "Possibilities of dynamic structure analysis using a hard X-ray" held on December 24-25 5, 2004 at the PF. KEK proceedings 2004-16 (in Japanese).

PF-AR has become a 6.5 GeV stable storage ring with its critical energy nearly 26 keV to afford a synchrotron radiation after the improvement in 2001.

Many elements such as Zr, Nb, Mo, Ru, Rh, Ag, Cd, Te, I have their K absorption edges above 20 keV. These elements are important for material science and technol-

ogy and there are big demands for high energy K-edge EXAFS and AXS experiments for these elements since the first PF operation in 1982. However, PF has a critical energy around 4 keV and cannot provide high energy X-rays. Many efforts using a wiggler beam line at BL-14A and 3 GeV operations have been done to extend the energy range. Since the SPring-8 was started in Nishi-Harima in 1997, most activities in these high energy region were shifted to the new 8 GeV facility. But those who were working on the in-situ EXAFS of catalysts systems in PF still desired to carry out their experiments for high K-edge energy in the Photon Factory site because SPring-8 has put too much severe restrictions for the gas handling and chemicals. Therefore, they intended to construct a new beam line in the PF-AR and proposed a plan for the EXAFS station suitable for in-situ experiments and quick XAFS. The high-energy X-ray has advantage in anomalous scattering experiments to extend the measuring elements. In addition to availability in high energy regions, it can be operated in a full-time single bunch mode which is suitable for dynamic spectroscopic study. Consequently, PF-AR will expand the ability and possibility of PF in the material structure science and technology. In this PF workshop, we have discussed possibilities of this new light source for a high energy XAFS and AXS, and a dynamic XAFS in order to open a new horizon in a hard X-ray region. In the workshop, we have 18 papers, including 4 key note lectures.

3-3 PF Seminars

There were 32 PF seminars held in FY2004 which were given by the PF staff and visitors. The list is summarized in Table 1.

Table 1 A list of PF seminars held in FY2004

Control of Lattice Dynamics by Femtosecond Coherent Anti-Stokes Raman Scattering TAKAHASHI Jun-ichi (JSR CREST) Apr. 9, 2004
Molecular Analysis of Lysosomal Multienzyme Complex and its Deficiency Diseases ITOU Kouji (Tokushima Univ.) May 18, 2004
Calculation of Coherent Synchrotron Radiation using Mesh AGOH Tomonori (KEK Accelerator) May 20, 2004
BSRF: The Status, the Upgrading and the Research in the Structure of Proteins DONG Yuhui (BSRF, China) Jun. 4, 2004
Dynein and Kinesin Share an Overlapping Microtubule Binding Site MIZUNO Naoko (Univ. of Texas Southwestern Medical Center, USA) Jul. 21, 2004
Solar Battery Produced by Plants: Construction of Molecules, Functions, and Coherent Control in Photosynthetic Systems HASHIMOTO Hideki (Osaka City Univ.) Jul. 23, 2004
Watching Proteins Function with 150-picosecond Time-resolved X-ray Crystallography ANFINRUD Philip (Lab. Chemical Physics/NIDDK, National Inst. Health, USA) Sep. 6, 2004

Figure 8 Undulator

TANAKA Takashi (RIKEN/SPring-8) Sep. 22, 2004

Construction of Beam Line BL27SU at SPring-8 Dedicated for Soft X-ray Photochemistry

OHASHI Haruhiko (JASRI/SPring-8) Sep. 22, 2004

Molecular-Orbital Tomography—Dynamical Imaging of Gas-phase Molecules Using High-intensity, Ultra-Short Pulsed Lasers—

ITATANI Jiro (JST) Sep. 27, 2004

Effect of Light Irradiation on Ferromagnetism and Photoinduced Spin Dynamics in III-V-based Ferromagnetic Semiconductors

OIWA Akira (JST) Oct. 22, 2004

Novel Techniques for Structural Analysis

SAKATA Makoto (Nagoya Univ.) Oct. 29, 2004

Diffraction Physics with Polarized X-rays: Recent Developments and Current Challenges

DETLEFS Carsten (ESRF, France) Nov. 4, 2004

A Study of Natural Circular Dichroism in Biomolecules in the VUV and Soft X-ray Regions by Helicity Switching of Circularly Polarized Light

NAKAGAWA Kazumichi (Kobe Univ.) Nov. 15, 2004

Femto-Second Studies of the Metal-Insulator Transition

CAVALLERI Andrea (LBL, USA) Nov. 22, 2004

A Novel Ubiquitin Binding Protein Involved in Disuse Muscle Atrophy

WATANABE Ken (National Center for Geriatrics and Gerontology) Nov. 26, 2004

X-Ray Magnetic Circular Dichroism Measurements with Helicity Switching of Circularly Polarized Light

MURO Takayuki (JASRI/SPring-8) Nov. 30, 2004

Determination of Crystal Structures Based on Powder Diffraction Data

ASLANOV Leonid Alexandrovich (Moscow State Univ.) Dec. 9, 2004

Soft X-ray Magnetic Circular Dichroism in Magnetic Semiconductors

FUJIMORI Atsushi (Univ. of Tokyo) Dec. 17, 2004

Observation of Fragile-to-Strong Liquid-Liquid Transition in Deeply Supercooled Confined Water by Quasielastic Neutron Scattering

CHEN Sow-Hsin (MIT) Dec. 21, 2004

Enhancement of Magnetic Fluctuations due to Element Substitution in a Multi-Band, Spin-triplet Superconductor Sr_2RuO_4

KIKUKAWA Naoki (Univ. of St. Andrews, Scotland) Dec. 27, 2004

The Electronic States and Structure of Water –A Soft X-ray Spectroscopic Study–

OGASAWARA Hiroto (SSRL) Jan. 5, 2005

Kinetic Study of Catalysis Reaction by Means of Time-Resolved XAFS Method

INADA Yasuhiro (KEK-PF) Jan. 11, 2005

Present status and future prospects of Linac Coherent Light Source

HODGSON Keith (SSRL) Jan. 24, 2005

A Study of Surface and Interface Magnetism using Photoelectron Emission Microscope Combined with Circularly and Linearly Polarized Light
KINOSHITA Toyohiko (ISSP, Univ. of Tokyo) Feb. 22, 2005

Vibrationally Resolved Photoelectron Angular Distribution for K-shells of CO and N₂ Molecules
CHEREPKOV Nikolai (Tohoku Univ.) Feb. 28, 2005

The Impacts of Synchrotron Radiation and Neutrons on Nano-materials
Van de Voorde (Max Planck Inst.) Feb. 28, 2005

Present Status of Development of Pixel-type Detectors at SLS•SPring-8
TOYOKAWA Hidenori (JASRI/SPring-8) Mar. 4, 2005

Development and Applications of a Universal X-ray Ellipsometer
UEJI Yoshinori (Univ. of Tokyo) Mar. 4, 2005

First-Principles Calculations of On-site Effective Coulomb Interaction: Applications to 3d Transition Metals
NAKAMURA Kazuma (Univ. of Tokyo) Mar. 11, 2005

First-Principles Study of Materials with Many-body Wave Functions
TSUNEYUKI Shinji (Univ. of Tokyo) Mar. 11, 2005

A Space- and Time-resolved Study of Magnetism in Ultrathin Films
AMEMIYA Kenta (Univ. of Tokyo) Mar. 30, 2005