4 Workshops and Seminars

The 20th PF symposium as the annual users' meeting, was held on March 18-19, 2003 at the KEK campus. There were 131 participants including users and PF staff. The main purpose of the PF symposium is to discuss present status and future projects, along with several invited talks on excellent scientific results obtained at the PF. In the last session, there was a serious discussion on the choice of future direction. The improvement of the 2.5-GeV PF ring with the extension of straight sections, the up-grade of the PF-AR, the ERL (energy recovery linear accelerator)-based light source project, and other possibilities were all discussed.

There were five PF workshops held in FY2002 which were approved by the PF Program Advisory Committee (PF-PAC). Anyone can propose such a workshop, in which discussion of a specific scientific topic on the future development of beamlines and experimental apparatuses can be discussed. Four workshops were concerned with the future development of experimental facilities, and three of these were related to a new ERL-based light source.

1) "Forefront of Atomic and Molecular Science and Solid State Physics Using SR in the VUV Region" held on May 1, 2002 at the PF.

The aim of this workshop was to present insight into the scientific forefront of solid-state physics and atomic and molecular science utilizing synchrotron radiation in the vacuum ultraviolet region. It was found that a high-flux and high-resolution spectroscopic facility ($E/\Delta E \approx 10^4$ with 10^{12} photons/s) consisting of a normal incidence monochromator (NIM) and an undulator similar to those in ALS at Berkeley and Super ACO at Orsay is a necessity in order to develop scientific activity in the VUV region. The participants agreed that an undulator-based NIM beamline should be constructed either in the proposed VUV-SX 3rd generation ring or at the PF in order to promote solid-state physics, atomic and molecular science, and related fields.

2) "Development of a Femto-Second Pulse Synchrotron Light Source and Prospects of New Science (first workshop of PF Future Plan)" held on October 3-4, 2002 at the PF.

The PF has a future plan based on an ERL, which has the potential to produce synchrotron radiation with an ultrashort pulse width (100~1000 fs), high coherence, and/or nanodiameter (~10 nm). To discuss the new scientific fields which will be opened by this plan, a series of PF workshop was held. This workshop was the first, and focused on recent results and promising new research directions in the area of femtosecond X-ray, soft X-ray and VUV science. Achievements and problems in the generation of ultrashort pulse radiation and measurements of ultrafast phenomena were also discussed.

3) "Recent Developments in X-Ray Measurement Using Phase Information (second workshop of PF Future Plan)" held on October 31 and November 1, 2002 at the PF.

The upcoming linac-based synchrotron light sources, such as energy recovery linacs (ERLs) and X-ray free electron lasers (XFELs), will generate very brilliant coherent X-ray beams. The target of this workshop was to review the latest X-ray research utilizing coherence and/or phase information, and to discuss future applications at ERL and XFEL sources. The following topics, for example, were covered: (i) X-ray intensity interferometry, (ii) X-ray phase-contrast imaging with interferometers, (iii) X-ray holography, (iv) X-ray fluorescent holography, (v) X-ray oversampling

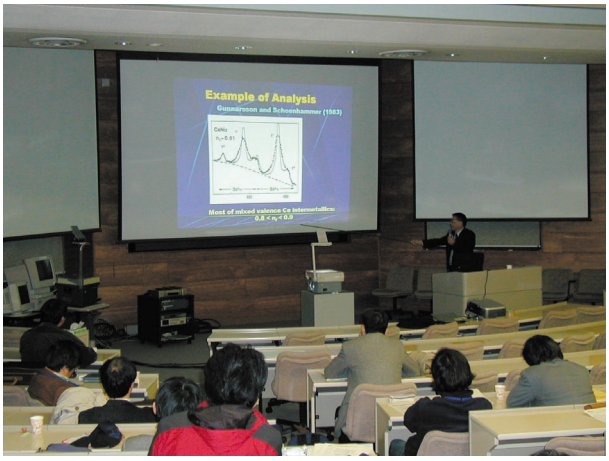
phasing method, (vi) Zernike-type phase-contrast microscopy and (vii) X-ray refraction-contrast imaging. Recent developments in neutron interferometry were also reviewed.

4) "Prospect of Synchrotron Micro-beam and its Applications (third workshop of PF Future Plan)" held on November 14-15, 2002 at the PF.

X-ray micro-beams have become a new and indispensable probe for materials research and biological and biomedical applications owing to advances in the synchrotron radiation sources. An ERL, a future synchrotron light source now proposed at the PF and also at various other SR facilities, is an ultra low-emittance (0.01 nmrad) source and provides a round beam. With an ERL, a "nano-beam" of around 10 nm in diameter is expected to be realized. The workshop was planned in order to discuss the future direction of nano-beam applications and related new scientific opportunities, including the state-of-the-art technologies of X-ray micro-beam and its applications, X-ray imaging techniques and nano-structure analysis.

5) "Progress and Future Prospects of Core-Level Spectroscopy" held on December 20-21, 2002 at the PF.

This workshop was held in commemoration of the 20th anniversary of the first photon beam from the PF storage ring and of the scheduled retirement of Prof. A. Kotani of ISSP, University of Tokyo. In his plenary talk, he made a detailed review of the theoretical progress in core-level spectroscopy, such as XPS, XAS, XES, and resonant XES in d and f electron systems, over the past 30 years. There were many talks on theoretical and experimental studies, including element-selective, polarization-dependent XES studies of various compounds, resonant X-ray scattering (RXS) studies



in particular in relation to orbital ordering and lattice distortions, angle- and spin-resolved XPS and UPS studies of highly correlated electron systems, XMCD (X-ray magnetic circular dichroism) and XLD (X-ray linear dichrosim) studies of nanoscale magnets and ferro- and antiferro-magnetic substances, and XMCD and XNLD (X-ray natural linear dichroism) microscope observations using polarized soft and hard X-rays.

The proceedings of the five PF Workshops can be found in the following KEK Proceedings, which are available at the Information Resource Division of KEK.

1) KEK Proceedings 2002-9 (in Japanese)
2) KEK Proceedings 2002-19 (in Japanese)
3) KEK Proceedings 2002-22 (in Japanese)
4) KEK Proceedings 2002-23 (in Japanese)
5) KEK Proceedings 2003-1 (in Japanese)

There were a number of seminars given by the PF staff and visitors held at the PF in FY2002, which are summarized in Table 4.

Table 4 A list of PF seminars held in FY2002.

Granuphilin, a novel Rab27a effector protein, is involved in the exocytosis of dense-core granules IZUMI Tetsuo (Gunma Univ.) Apr. 2, 2002
Arginine kinase structure; Revisiting classical questions in enzymology YOUSEF Mohammad (Florida State University, USA) Apr. 17, 2002
Autophgy is an intracellular process for bulk degradation of cytoplasmic components YOSHIMORI Tamotsu (National Institute of Genetics) Apr. 26, 2002
Photoionization of N_2 molecule calculated in the random phase approximation CHEREPKOV Nikolai A. (KEK-PF, State Academy of Aerospace Instrumentation, Russia) Apr. 26, 2002
Coordinate measuring machine using parallel mechanism HIRAKI Masahiko (KEK-PF) May 17, 2002
Complete spectra in double photoionization: a new technique and early results ELAND John H.D. (Oxford University, UK) June 25, 2002
Future synchrotron radiation projects in the world IWAZUMI Toshiaki (KEK-PF) Aug. 28, 2002

A molecular mechanism of dynein, which is a microtube motor protein
TOYOSHIMA Yoko (Univ. of Tokyo) Aug. 29, 2002

Synchrotron light sources and X-ray optical elements for next generation
HIRANO Keiichi (KEK-PF) Sep. 13, 2002

Non-linearity and macroscopic oscillatory phenomena in photoinduced structural phase transition of low dimensional electron-lattice systems
IWANO Kaoru (KEK-PF) Sep. 18, 2002

Study on precise structural materials with powder diffraction
TAKATA Masaki (Nagoya Univ.) Sep. 24, 2002

Production and application of hard X-ray nanometer beams
LAGOMARSINO Stefanno (CNR, Italy) Oct. 21, 2002

Present status of magnetic scattering group at ESRF
PAOLASINI Paolasini (ESRF, France) Nov. 8, 2002

In-situ photoemission and PEEM studies of magnetic materials
ONO Kanta (KEK-PF) Nov. 13, 2002

Coherence of ERL and FEL: difference between effective and non-effective “coherence” and its application
MIYAHARA Tuneaki (Tokyo Metropolitan Univ.) Nov. 22, 2002

Some aspects of the SR investigations for industry, biology and medicine in the Kurchatov synchrotron
STANKEVICH Vladimir G. (Kurchatov Institute, Russia) Dec. 3, 2002

Time-resolved structural analysis of unstable states
OHASHI Yuji (Tokyo Institute of Tech.) Dec. 4, 2002

Theoretical approach for ultrafast and non-linear X-ray spectroscopy
TANAKA Satoshi (Osaka Pref. Univ.) Dec. 13, 2002

Ultra-fast photo-induced phase transformation in TTF-CA by time-resolved X-ray diffraction
LEMEE-CAILLEAU Marie-Helene (University of Rennes, France) Dec. 16, 2002

Scattering experiments by plasma induced X-ray laser: Speckle and parametric scattering etc.
NAMIKAWA Kazumichi (Tokyo Gakugei Univ.) Dec. 19, 2002

Relationship between sialidases and signal transduction in cells
MIYAGI Taeko (Miyagi Prefectural Cancer Center) Feb. 5, 2003

Time-resolved X-ray diffraction study and its future development
HIRONAKA Yoichiro (Tokyo Institute of Tech.) Feb. 19, 2003

Production of sub-nanosecond X-ray pulses and time-resolved X-ray diffraction experiments
ADACHI Shin-ichi (RIKEN Harima Institute) Feb. 26, 2003

Present status of the Shanghai Synchrotron Radiation Facility (SSRF)
XIA Xhaojian (SSRF, Shanghai, China) Mar. 24, 2003