INSTRUMENTATION &

"Kobushi" - Magnolia

"Fuji" - Wisteria

METHODOLOGY

Although the 10th anniversary of the SPring-8 inauguration was celebrated in October 2007, the development of new instrumentation and methodology are still continuing. Ten years of operation has accumulated a wide variety of instrumentation, yet some new instrumentation would be required to devise because of and (i) possible transplantation of new devices developed in other fields than the synchrotron radiation science, (ii) possible combination of existing instrumentation for more advanced and/or efficient data acquisition, and (iii) continuing improvement of the light source performance which includes the reduction of the horizontal emittance of the electron beam as well as the increase of the time-averaged intensity with the top-up operation. In addition, as reported in this volume, the construction of a new X-ray free electron laser (XFEL) facility started in 2006 to complete in 2010. Some new instrumentations and methodologies for XFEL are being developed using SPring-8 beams.

We have selected six excellent articles among many candidates for the Instrumentation & Methodology chapter of this volume.

Five articles describe new instrumentation/methodology which combines two or more techniques to make a new unique technique. Dr. Hiroyasu Masunaga and coauthors presented a WAXD/SAXS simultaneous measurement system applied to polymer samples. Dr. Takaya Mitsui presented a Mössbauer spectroscopy under ultrahigh-pressure by combining the ultrahigh-pressure technique with nuclear Bragg diffraction with synchrotron radiation. Dr. Tomoya Uruga and coauthors combined fast oscillation mechanism with a crystal monochromator to realize quick EXAFS using a pink beam from an undulator. Dr. Akira Saito and coauthors has been trying to devise an element-sensitive STM by combining STM with hard X-ray excitation with a micerobeam. Dr. Yoshiki Kohmura presented the combination of X-ray in-line holography with shearing interferometry which can give the complete information of the complex transmissivity of samples.

The approaching coherent X-rays from the coming X-ray free electron laser urged to open up a new methodology of X-ray non-linear optics. Dr. Kenji Tamasaku and coauthors presented a new finding in parametric down-conversion of X-rays.

We hope some of the instrumentation introduced in this volume will be used by wider scientific communities in the near future.

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