INSTRUMENTATION & METHODOLOGY

The development of new science is strongly related to the development of new experimental techniques or new instrumentation. High-quality synchrotron radiation from SPring-8 has opened new scientific fields. In this section, new instrumentation and methodology are introduced.

SPring-8 has succeeded in solving the high heat-load problem to beamline components, optical elements ,and X-rays and vacuum ultraviolet radiation is provided for a various experiments. Now the energy region is extended to the soft X-ray regime. Using a helical undulator and YB_{66} double-crystal monochromator, the 1 – 3 keV region has been covered at BL15XU. On the other hand, the development of detectors suited for higher energy regions continues. A free air ionization chamber is found to be a useful absolute intensity monitor even above 50 keV by employing the linear polarization of synchrotron radiation. An area detector for high energy X-rays, the YAP imager, which has 128×128 pixels has been developed and successfully applied to a temperature-dependent diffraction experiment.

In addition to the above-described new instruments, new experimental methods have developed by fully utilizing the high performance of SPring-8. A new high-throughput experimental method made non-resonant magnetic scattering as a practical tool to study the magnetic structure. High-resolution X-ray microdiffraction using zone plate clarified the special non-uniformity of the strain and the period in a multi-quantum well. X-ray microtomography has been successfully applied to the observation of micropores, which evidenced the unidirectional solidification of the Al-In alloy and the formation of porous Al by electrochemical etching. The last is the development of a Talbot interferometer for phase imaging, which showed air bubbles in a plastic sphere clearly.

Masaharu Nomura