Instrumentation & Methodology

Radiation from SPring-8 features the most powerful characteristic of having the world's highest brilliance. The low emittance operation that was back last year after an interval of three years has further increased brilliance three times higher than the former operation, and thus it has brought about new scientific opportunities not only in basic researches but also in technological developments, being combined with sophisticated top-up operation. In this issue, eight reports have been selected as outstanding results in the field of Instrumentation and Methodology.

Cavity resonance fringes have been successfully observed and Fabry-Perot resonators have been realized for the first time in the hard X-ray region using minute monolithic silicon crystal cavities. Commercially available nearly perfect large-area quartz wafers have been investigated and it has been confirmed that they have a great potential for inelastic X-ray scattering analyzers. A new algorithm using the maximum entropy method has been proposed for single-energy photoelectron holography and its effectiveness has been clearly demonstrated using a two-dimensional display type analyzer. Phase tomography by Talbot interferometry has been realized with thick gold gratings fabricated by X-ray lithography and gold electroplating using the LIGA beamline of NewSUBARU. A multilayer supermirror composed of platinum-carbon combination, which is for astronomical hard X-ray telescope, has been characterized by highly brilliant SR. High-energy X-ray PEEM has been able to achieve a probe depth ten times deeper than that using conventional soft X-ray PEEM. The phase modulation of the nuclear resonant synchrotron radiation for ^{181}Ta nucleus has been clearly shown. Ultrafine monochromatized X-ray beam for nuclear resonant scattering experiments has been generated by high-quality iron borate crystal heated at near Néel temperature.

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