

Soft X-ray Spectroscopy of Solid Beamline, BL25SU

BL25SU is designed for research on electronic structures, magnetic states and surface structures of solids with high energy-resolution circularly-polarized soft x-rays.

Left- and right-handed circularly polarized radiation is obtained along the same optical axis by twin helical undulators. The helicity of the circularly polarized radiation can be periodically switched at 0.1, 1 or 10 Hz by using kicker magnets distributed around the two undulators.

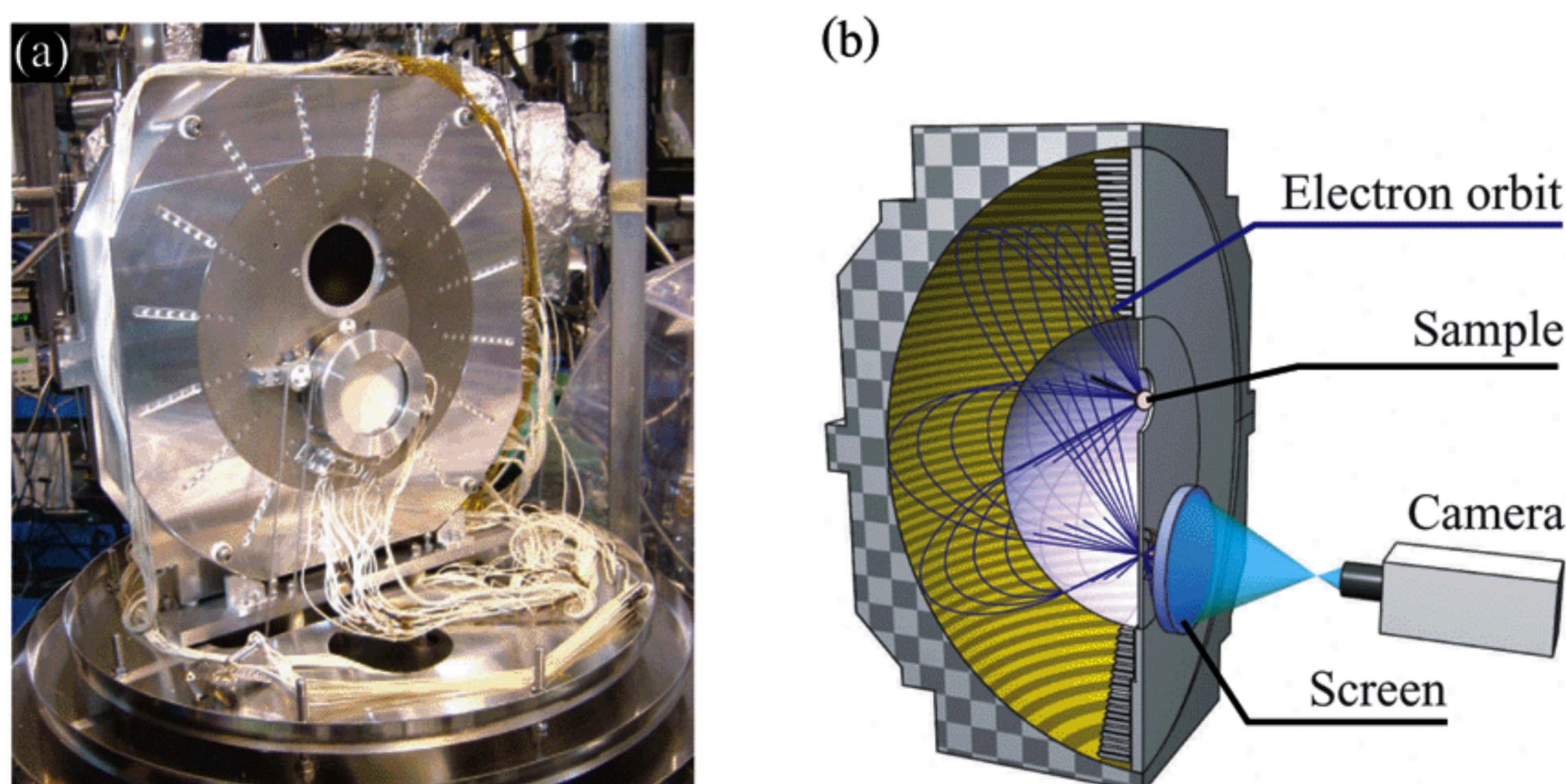


Fig. 1
 (a) Photograph of the two-dimensional display-type electron analyzer (DIANA).
 (b) Schematic view of the DIANA.

Dynamic nanoscale measurement using electron holography

Dr. T. Matsushita (JASRI/SPring-8) and his team have developed a new theory (SPEA-MEM) that enables the reconstruction of a three-dimensional atomic arrangement from an electron hologram. To verify the theory, a two-dimensional display-type electron analyzer was developed at SPring-8's BL25SU (Fig. 1), and an Auger electron hologram of a Cu crystal was measured (Fig. 2). They have succeeded in reconstructing the atomic arrangement of 102 atoms from the measured hologram (Fig. 2). Moreover, the hologram can be measured within 0.1 sec using the developed electron analyzer; the measurement time is shortened to 1/1,000,000 that for previous similar devices. As a result, it is thought that this technique enables us to visualize the movement of atoms in a catalysis reaction, and that it is useful for realizing, for example, the performance gain of a catalyst and the quality improvement of a semiconductor.

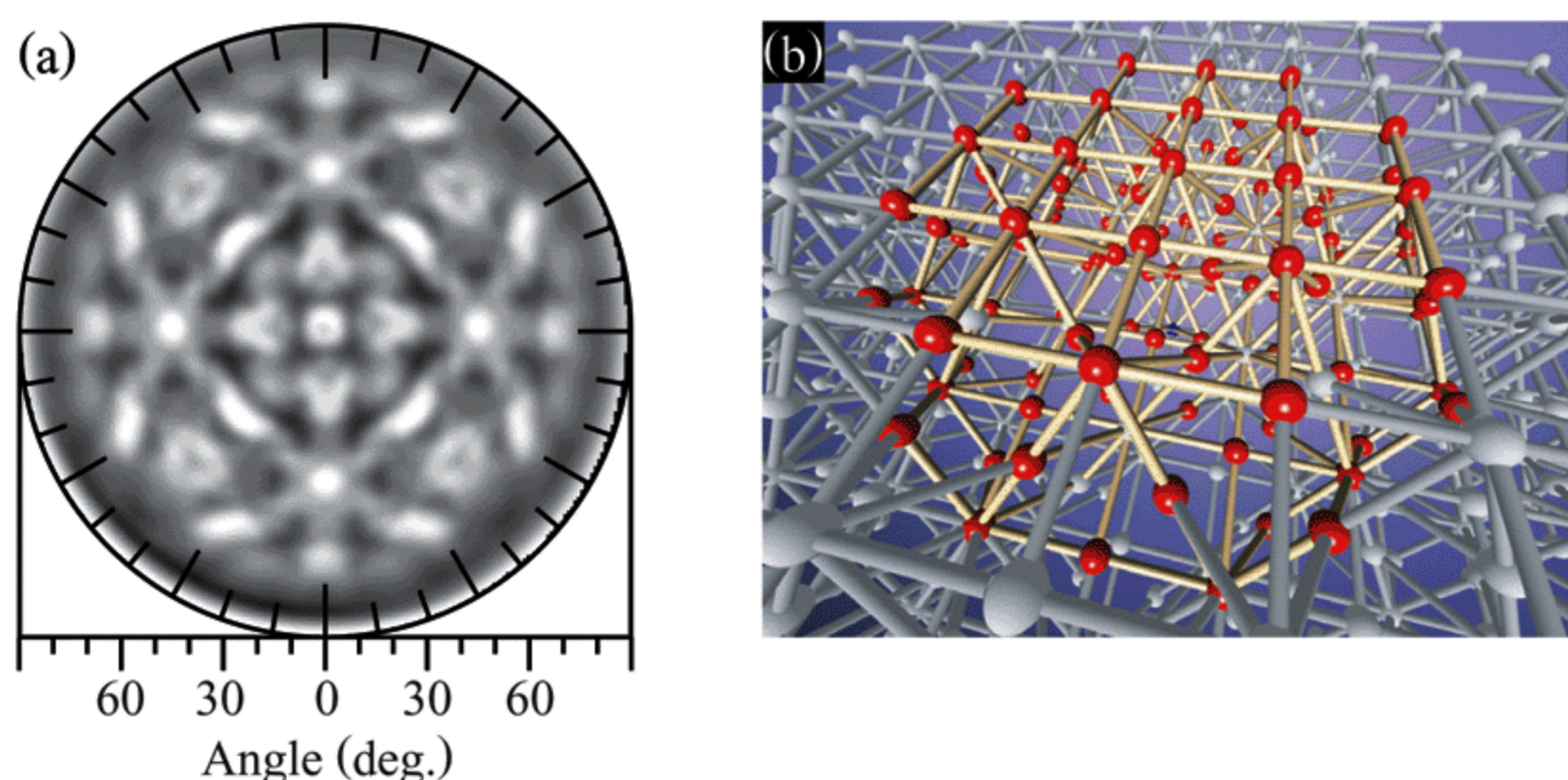


Fig. 2
 (a) The measured Auger electron hologram of Cu crystal.
 (b) The image of reconstructed atoms by using the SPEA-MEM. 102 atoms marked by red balls were reconstructed.