INV-20

Phase contrast imaging and microtomography with coherent hard x-rays

Anatoly A. Snigirev, C. Raven, I. Snigireva, and V. Kohn
Experiments Dept., European Synchrotron Radiation Facility, BP 220, 38043 Grenoble, France

As shown recently, high spatial coherence of the beam from the third-generation sources, such as the ESRF, offer new possibilities in coherent imaging techniques like phase contrast imaging, holography, and interferometry (Snigirev et al., ESRF News Lett. **N24**, 23, 1995; Snigirev et al., Rev. Sci. Instr. **66**, 5486, 1995). In fact, these techniques are based on a Gabor (in-line) holography setup and, therefore, are particularly interesting since they do not require additional x-ray optics. We proposed and realized a new microtomography technique by combining phase contrast imaging using in-line holography geometry and a computed tomography reconstruction algorithm (Raven et al., Appl. Phys. Lett. 1996, to be published). Experiments on phase contrast imaging and microtomography for different organic and non-organic samples were performed on the Optics (bending magnet) and High Energy (wiggler) beamlines at the ESRF with x-ray energies between 10 and 60 keV. Going to higher energies offers a number of advantages, like the investigation of thicker samples, reduced absorbed dose, and larger object-to-detector distance, that allows the possibility of installing a different sample environment facility (high pressure cells or cryostats).