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X-ray holography at third-generation storage rings*

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High brilliance sources at third-generation synchrotron storage rings produce, for the first time, sufficient coherent flux for x-ray holography experiments at a spatial resolution of 50 nm in the 1-8 keV energy region. Holographic x-ray microscopy is promising for high resolution study of complex biological, microelectronics, and materials science specimens in their natural state. By tuning the x-ray energy to spectra associated with specific elemental or chemical states, the imaging contrast can be optimized for features of interest within the specimen. In addition to three-dimensional imaging via holographic tomography, x-ray holography offers both absorption and phase contrast, and is well suited to electronic detectors and numerical reconstruction techniques for rapid image acquisition and analysis. This paper discusses the current status of the field, including recent work at the Advanced Photon Source.

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