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REPORT



High-Resolution Imaging by Fourier Transform X-ray Holography

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Abstract

Fourier transform x-ray holography has been used to image gold test objects with submicrometer structure, resolving features as small as 60 nanometers. The hologram-recording instrument uses coherent 3.4-nanometer radiation from the soft x-ray undulator beamline X1A at the National Synchrotron Light Source. The specimen to be imaged is placed near the first-order focal spot produced by a Fresnel zone plate; the other order is directed chiefly to the zeroth, illuminate the specimen. The wave scattered by the specimen interferes with the spherical reference wave from the focal spot, forming a hologram with fringes of low spatial frequency. The hologram is recorded in digital form by a large-area-coupled device camera, and the specimen image is obtained by numerical reconstruction.

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