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**Coherent X-ray diffraction to image Silver Nanocrystals** MENGNING LIANG, YUGANG SUN, ROSS HARDER, IAN ROBINSON, University of Illinois Urbana Champaign, YOUNAN XIA, University of Washington — Coherent x-ray diffraction is a method of imaging a crystalline object embedded inside a medium in a non-invasive way. When a coherent source is incident upon a crystal, the resulting diffraction pattern is the intensity of the 3D Fourier transform of the object. Were the phase information also known, an inverse Fourier transform could be performed to get an image of the original structure. It has been shown theoretically that the phase information can be recovered by oversampling the diffraction pattern and applying iterative algorithms. Silver nanocubes approximately 170nm in size were chemically synthesized and deposited on silica and silicon substrates using a variety of methods. Diffraction from a monochromatic, coherent x-ray beam was imaged on a CCD camera at the Advanced Photon Source at Argonne National Lab. The resultant diffraction pattern is a 2D slice through the 3D Fourier transform of a cube. Using various inversion algorithms, slices through the center are inverted into real 2D projections of the object while off center slices are shown to add a phase factor to the projection.

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