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Coherent Diffraction Imaging of Device Nanostructures EDWIN FOHTUNG, JONG WOO, Physics Department University of California, San Diego USA, MARTIN HOLT, Center for Nanoscale Materials, Advanced Photon Source, Argonne, USA, STEPHAN HRUSZKEWYCZ, Materials Science Division, Advanced Photon Source, Argonne, USA, NA LEI, DAFINE RAVELOSONA, Institut d' Electronique Fondamentale, UMR CNRS, and Universite Paris-Sud, 91405 Orsay, France, ROSS HARDER, Advanced Photon Source, Argonne, Illinois 60439, USA, ERIC FULLERTON, Center for Magnetic Recording Research, University of California-San Diego, USA, IAN MCNULTY, Center for Nanoscale Materials, Advanced Photon Source, Argonne, USA, OLEG SHPYRKO, Physics Department University of California, San Diego USA — We employ x-ray coherent diffraction imaging to map the lattice strain distribution, elastic properties and device responses to external stimuli such as magnetic and electric field in a host of device nanostructures. For the case isolated Ni (001) nanowire grown vertically on an amorphous SiO2 /Si substrate we utilize the retrieved projection of lattice distortion to predict the Young's Modulus of the wire based on the elasticity theory [1]. We also image for the first time, the evolution of magnetostriction in these wires in the presence of an external magnetic field. For extended ferroelectric thin films, we utilized the recently developed Bragg Ptychography [2] to image the evolution of ferroelectricity [3].

[1] E. Fohtung et al., Appl. Phys. Lett. 101, 033107 (2012).
[2] S. O. Hruszkewycz et al., Nano Lett. 12, 5148 (2012).
[3] E. Fohtung et al., in preparation (2012).

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