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Nanoscale X-ray Diffraction Microscopy at the Nanoprobe Beamline MARTIN HOLT, ROBERT WINARSKI, JORG MASER, X-ray Imaging Group, Center for Nanoscale Materials, Argonne National Laboratory — The near-term completion of the Nanoprobe Beamline at the Advanced Photon Source as part of the Center for Nanoscale Materials Project will provide a dedicated facility for hard X-ray microscopy at a landmark 30nm spatial resolution. Integrating a high-flux synchrotron X-ray beamline with an advanced optomechanical experimental platform at an energy range of 3-30keV will make possible nanoscale studies of functional and biological materials with a high degree of precision and efficiency. The unique capabilities of hard X-ray microscopy techniques such as large penetration depths, experimental sensitivity to elemental composition, crystallographic phase, and strain when applied at this length scale offer unique opportunities for many fields of sciences. The challenges and scientific impact of extending X-ray microscopy techniques such as scanning probe X-ray fluorescence, scanning probe microdiffraction, spectroscopy, tomography, and full-field imaging to the nanoscale will be discussed.

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