Analyzing atomic-scale structure and deformation using 4D-STEM

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With the introduction of high speed direct electron detectors, scanning transmission electron microscopy (STEM) can now record a full image of the diffracted electron probe scanned over the sample, producing a four-dimensional dataset we refer to as a 4D-STEM experiment. These diffraction patterns encode a large amount of information about the local atomic arrangements, and can be recorded over very long length scales. In this talk, I will show various materials science applications of 4D-STEM for measurement of local structure, orientation and strain of crystalline materials, and the degree of disorder and deformation in amorphous materials.