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Fast-scanning X-ray Diffraction Microscopy (SXDM) at the XFM beamline

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Scanning X-ray Diffraction Microscopy (SXDM, aka ptychography) produces phase and absorption contrast images at high spatial resolution, well below the incident beam size(1). The experimental conditions for SXDM are close enough to X-ray Fluorescence Microscopy (XFM) that they are readily combined into a single simultaneous measurement(2-5). However, SXDM has additional coherence and positioning precision requirements compared to XFM and therefore has tended to slow down the whole data collection process(3). Here we present recent advances in fast “flyscan” SXDM data collection, and processing strategies implemented at the XFM beamline that reduce the time taken to collect the data, and produce artefact-free images. These advances provide a pathway to nanoscale imaging of millimetre-sized samples, in the gigapixels per hour regime.

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