

Higher Dimensional Ptychography at the ALS

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Soft X-ray ptychography is a unique imaging tool to study specimen at the nanoscale with spectroscopic sensitivity. Beamline 5.3.2.1 at the Advanced Light Source has show-cased its applicability to various questions in material science [1,2] where battery science has emerged as a promising application [3].

Using computed tomography, a latest highlight [4] demonstrated the extension to 3d-microscopy in the soft X-ray regime. In view of the roll-out of the new COSMIC beamline and microscope endstation which offers higher fluxes, 3d microscopy will become an essential technique frequently requested by users.

The pursuit for 3D in soft X-rays at highest resolution withholds some unique challenges ranging from handling large amounts of data [5,6] to the absence of commercial photon counting detectors, focal depth limitations and to carbon deposition on the sample.

In this conference contribution, we present latest results for 3D soft X-ray ptychography and discuss challenges and opportunities of higher dimensional ptychography at the ALS.

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