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Making the most of the Ptychographic data set

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Ptychography is an incredibly exciting and rapidly advancing area of research. In only seven years it has gone from fuzzy proof-of-principle to an accepted X-ray imaging technique, now being implemented at synchrotron facilities around the world. Its success is thanks to the enormously information-rich ptychographic dataset. In the first instance, this provides robustness to the iterative image reconstruction process, avoiding a traditional weakness of conventional phase retrieval. But as research progresses and as the ptychographic dataset is further explored, additional contrast mechanisms are being realised from this same ptychographic data. Coherent modes can now be extracted; missing data, lost behind a beamstop or beyond the extent of the detector, can be recovered; sampling constraints can be relaxed and, as I will detail in this talk, truly three-dimensional images can be realised directly from the ptychographic dataset, without resorting to sample rotation.