Simultaneous and sequential X-ray ptychography and fluorescence microscopy at the Australian Synchrotron

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Abstract

X-ray ptychography have seen many recent advances including sample delivery [1], data collection and analysis [2, 3], and data interpretation [4, 5]. Some of these advances have allowed water-window ptychography to be applied to hydrated specimens [1, 6] allow biological specimens to be imaged with high contrast in close to their natural environment. Other advances, such as on-the-fly scanning and rapid data processing offer improvements in the efficiency of ptychography that make simultaneous application of other scanning microscopy methods such as X-ray fluorescence microscopy experimentally viable [7]. For some specimens, the experimental requirements of these two methods overlap, and the measurements are best taken simultaneously [8]. However, for many cellular applications, the ideal conditions for each method are very different, requiring a sequential set of optimized measurements for ideal results [9]. In this presentation, we outline the case for each type of measurement and discuss recent applications of these two methods at the X-ray Fluorescence Microscopy and Soft X-ray Imaging beamlines at the Australian Synchrotron.

References

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