

Towards time-resolved soft X-ray ptychography imaging

Tuesday, 13 January 2026 11:30 (20 minutes)

The investigation of magnetization dynamics at the nanoscale is one of the key aspects for the technological applications of magnetic systems. Synchrotron-based microscopy techniques, in particular scanning transmission X-ray microscopy (STXM), have been highly successful in the imaging of such processes by combining time-resolved imaging with dichroic contrast mechanisms such as the XMCD and XLD effects. However, the current limitation of STXM lies in the achievable spatial resolution, limited by the optics used to focus the X-ray beam to about 10-20 nm. Coherent diffractive imaging techniques such as X-ray ptychography imaging would allow us to overcome these limitations in the spatial resolution, but require a different approach in acquiring the time-resolved images, as the bandwidth of the currently-available 2D detectors lies well below the several hundred MHz bunch repetition rates of synchrotron light sources.

In this presentation, we will show our current progress in the development of time-resolved soft X-ray ptychography and future outlooks upon the release of the next generation of 2D counting X-ray detectors.

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Session Classification: Applications - II

Track Classification: Soft X-ray Detectors: Applications