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A Next-Generation Hard X-ray Microscope for Sub-10 nm Imaging: 2D MLL optics for Rapid Nano-Tomography

Wednesday 28 August 2024 12:15 (15 minutes)

We have developed a next-generation scanning X-ray microscope RASMI (RApid Scanning Microscopy Instrument) for high-throughput tomographic imaging. RASMI is installed at the Hard X-ray Nanoprobe (HXN) beamline at NSLS-II, and is capable of housing 1D multilayer Laue lenses (MLLs) and 2D optics (both zone plates and monolithically assembled 2D MLLs). The sample scanning stage utilizes line-focusing interferometry as an encoder while performing fly-scanning data acquisition. During the presentation, technical details of the system, including fly-scanning architecture and implementation, will be discussed. In addition, a brief introduction and review of the developed 2D MLL structures will be provided along with the details of design, assembly, and characterization of MEMS-based 2D MLLs. Lastly, we will demonstrate a successful collection of a nano-tomography dataset, where a microelectronics sample of 2 ⬛m diameter and 3⬛⬛m height has been imaged within 1 hour with sub-10 nm pixel size and data acquisition rate of 625 Hz. RAMSMI can be adopted for in-vacuum applications and will become a foundation for the next-generation microscopy systems to be developed and commissioned at NSLS-II.

I plan to submit also conference proceedings

Yes

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