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Nano-tomo-ptychography 3D-imaging on the Swing Beamline

Tuesday 16 September 2025 17:00 (1 hour)

In 2018, a new Nanoprobe system was installed and validated on the SWING beamline (Synchrotron SOLEIL) for 2D-nano-ptychography with an expected imaging resolution of 40 nm. The setup had been designed to be portable and capable of handling multiscale sample-sizes (from micrometer to hundreds of a micrometer). This system was then successively upgraded to allow for 2D-imaging resolutions of 20 nm, and 3D-nano-tomo-ptychography imaging with spatial resolutions of 50 nm. The end-station is composed of: a sample stage (5DOF), an optical stage comprised of a central stop and a Fresnel zone plate optical (3DOF), an order sorting aperture stage (3DOF). All positioning stages comprise piezo-driven actuators, of which synchronized control (with kinematic modelling) is done using the SOLEIL Delta Tau platform. In addition, fiber interferometry feedback was used for image reconstruction purposes. After the last improvements in 2023, imaging results show that the system can resolve 3D-images with a spatial resolution of 31 nm using a teeth sample (18h of acquisition). This contribution will present an overview of the mechanical design concepts and solutions adopted for the Nanoprobe project.

Footnotes

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