Coherent Imaging at MAX IV

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The MAX IV Laboratory operates the first of the diffraction-limited storage rings (DLSR:s) that are now being built or designed worldwide. The high-brilliance source is particularly well suited for coherence applications such as ptychography and coherent diffraction imaging. The hard X-ray nanoprobe NanoMAX is currently taking full advantage of the coherent beam available at the synchrotron. The soft X-ray beamline SoftiMAX will begin operations by the end of this year, and also provide new coherent imaging opportunities.

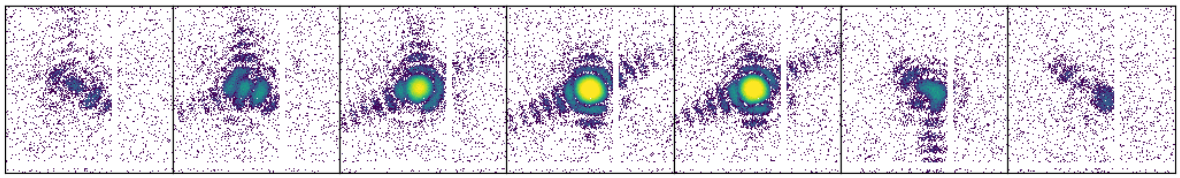

Figure 1: Coherent Bragg diffraction from a single nanoparticle encodes its 3D shape and strain state.

The first user operation campaigns at NanoMAX has seen user experiments in two main categories. First, many users have applied the coherent beam condensed matter physics problems with emphasis on semiconductors and strain characterization. Secondly, scientists from diverse parts of biology and geology have used the nanofocused beam for fluorescence mapping. Since the KB-mirror endstation provides a relatively high flexibility, users are increasingly providing sample environments for measurements under specific electrical, magnetic, thermal, pressure, or chemical conditions.