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X-ray tomographic microscopy at TOMCAT: an overview

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During its first five years of life, the TOMCAT beamline at the Swiss Light Source has established itself as a cutting edge hard X-ray tomographic microscopy endstation for experiments on a large variety of samples. We present an overview of the hardware and techniques available to the user community. Absorption and phase contrast imaging with an isotropic voxel size ranging from 0.37 up to 14.8 microns is routinely performed. Phase contrast is obtained either with simple edge-enhancement, propagation based techniques or grating interferometry. Typical acquisition times are in the order of few minutes. An automatic sample exchanger is available for high throughput studies.

In addition, new cutting edge experiments are now possible thanks to the latest efforts towards improving spatial and temporal resolution. Nanostructures (100 nm) in micrometer size samples can be imaged using a full-field hard X-ray microscope. Dynamic processes can be followed in 3D for the first time thanks to the new ultrafast tomographic endstation offering sub-second temporal resolution. A laser-heated furnace, a cryo-chamber and a compression-tensile device are available for in-situ experiments.

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