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# MicroMAX –Time-resolved crystallography at MAX IV

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The new 4th generation storage ring sources, such as the MAX IV Laboratory 3 GeV ring, gives new possibilities to study dynamics using crystallography. The MicroMAX beamline that recently started its user operation is designed to be flexible both in terms of X-ray beam and experiment setup. The focus is on serial and time-resolved crystallography but with state-of-the-art functionality also for high-throughput single crystal data collections.

MicroMAX is equipped with a diffractometer for rotational crystallography as well as serial crystallography using fixed target supports and flow injectors (high viscosity extrusion, capillary, microfluidics). The diffractometer is supported by an in-house designed sample table with a breadboard controlled and constrained by six legs with micrometer precision. A beam conditioning unit upstream of the sample table includes an X-ray chopper providing different combinations of pulse length (down to 10 microseconds), repetition rate (up to 2.2 kHz) and duty cycle (0.8 –70%). The inhouse designed detector table supports two detectors, an Eiger2 X 9M CdTe photon counting hybrid pixel detector and a Jungfrau 9M Si integrating hybrid pixel detector (on-loan from PSI). The end station is also equipped with an automatic sample changer (ISARA2) that can be used in cryogenic conditions housing up to 29 unipucks but can also exchange crystallisation plates and room-temperature spine-based sample holders. Experiments are controlled by MXCuBE with ISPyB managing sample information, metadata and analysis results.

The beamline has a second experiment hutch that can be used for other activities while the first hutch is in X-ray operation. Initially the second hutch is used as laser and off-line UV/vis spectroscopy laboratory. It has a nano-second pump laser system covering the wavelength range of 210 –2600 nm that can be used either for the spectroscopy setup or brought to the first hutch X-ray setup using an optical fibre.

The beamline has two monochromators, a crystal monochromator giving a narrow bandwidth beam with up to 10^13 photons/s and a multilayer monochromator giving a wider bandwidth (up to 1%) with more than 10^14 photons/s. The X-ray beam is initially focused by beryllium X-ray lenses down to around 10 micrometers but a mirror system will be added giving a beam size down to one micrometer. This system is quite flexible in terms of changing beam size at the sample.

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## I plan to submit also conference proceedings

No

**Primary author:** URSBY, Thomas (MAX IV Laboratory, Lund University)

**Co-authors:** AURELIUS, Oskar (MAX IV Laboratory); Dr MILAS, Mirko (MAX IV Laboratory); Dr CHENCHILIYAN, Manoop (MAX IV Laboratory); Dr CASADEI, Cecilia M (MAX IV Laboratory); BJELCIC, Monika (MAX IV Laboratory); NAN, Jie (MAX IV Laboratory); GORGISYAN, Ishkhan (MAX IV Laboratory); Dr AGGARWAL, Swati (MAX IV Laboratory); FINKE, Aaron (European Spallation Source); Mr JAGUDIN, Elmir (MAX IV

Laboratory); EGUIRAUN, Mikel (Max IV Laboratory); Mr NARDELLA, Alberto (MAX IV Laboratory); Mr BENEDICTSSON, Staffan (MAX IV Laboratory); Mr ROSLUND, Linus (MAX IV Laboratory); LEONARSKI, Filip (Paul Scherrer Institute); Dr KEPA, Michal (PSI); GONZALEZ, Ana (MAX IV)

**Presenter:** URSBY, Thomas (MAX IV Laboratory, Lund University)

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