

MS2-P3 **BioMAX, a multipurpose high-throughput crystallography beamline at MAX IV** Marjolein Thunnissen¹, Johan Unge², Ana Labrador², Derek T. Logan¹ and Thomas Ursby². ¹*Dept. of Biochemistry and Structural Biology, Lund University, P.O.Box 124, SE-221 00 Lund, Sweden,* ²*MAXIV Laboratory, Lund University, P.O.Box 118, SE-221 00 Lund, Sweden*
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MAX IV will be the next generation synchrotron radiation facility in Sweden. It will replace the existing laboratory consisting of the MAX I, II and III storage rings. Two new storage rings (1.5 GeV and 3 GeV) with exceptionally low emittance are being constructed for the production of soft and hard x-rays, which will lead to an unprecedented brilliance for a synchrotron source. The macromolecular crystallography beamline BioMAX on the 3 GeV ring will be one of the first seven beamlines at the MAX IV facility.

BioMAX will be a multipurpose high-throughput beamline for X-ray diffraction data collection and phasing dedicated to the needs of the macromolecular crystallography community. It will offer high brilliance, tuneable (0.5–2.5 Å wavelength), monochromatic X-rays with state-of-the-art performance in terms of low beam-divergence (0.1 mrad), high X-ray flux (~10¹³ photons/sec) and variable beam size (from 10–50 mm), allowing work with both small crystals and large biomolecular complexes with concomitantly large unit cells. The uniquely low emittance properties of MAX IV are utilized in the design of this beamline in order to offer small diffraction focal spot and a low divergence beam. Thus BioMAX is designed to be very flexible and serve a very broad range of needs for the life science community.

This high-performance X-ray beam will be complemented by a high level of user support, including rapid automated sample changing facilities, crystal alignment software, a large state-of-the-art area detector, cryo-cooling, on-the-fly data analysis and remote data-collection options. A fully equipped crystallization laboratory will be situated in very close proximity. Our vision is that the proposed beamline will be outstanding in terms of reliability and stability, and that it will become the X-ray diffraction data collection beamline of choice for the majority of structural biology projects within the Nordic Countries and Baltic region.

The detailed design of the beamline started in January 2012 and it is planned that users can use the facility in late 2016.

Keywords: synchrotron, new sources, crystallography beamlines

MS2-P4 **The Cassiopeia suite of beamlines at the MAX IV Laboratory** Marjolein Thunnissen¹, Roberto Appio², Johan Unge², Folmer Fredslund², Tomás Plivelic², Sylvio Haas², Derek T. Logan¹, Thomas Ursby² and Ana Labrador²
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Cassiopeia (I911) is a suite of beamlines dedicated to structural biology at the MAX II storage ring within the MAX IV Laboratory in Lund, Sweden. The beamline suite has a superconducting wiggler as its X-ray source. The central tuneable macromolecular crystallography station (I911-3) uses a collimating mirror, a double-crystal monochromator and a focusing mirror as the main optical elements. There are four fixed-wavelength side-stations, all using optics of similar design consisting of small monochromator crystals followed by multilayer mirrors. The side-stations are used for macromolecular crystallography (I911-2 and I911-5), small angle x-ray scattering (I911-4) and for various other scattering experiments such as grazing incidence and reflectivity measurements (I911-1). The beamline became available for users in 2005 with stations I911-2, 3 and 5, and it has been operational since then. I911-4, a dedicated beamline for scattering studies had its first users in 2011 and is used for SAXS studies on both proteins and lipids.

In order to be able to fully automate the I911-3 station it was decided to redesign and refurbish the experimental hutch in 2010, and a new state-of-the-art goniostat, an automated sample changer that can handle crystallization plates as well as mounted crystals and a device for crystal dehydration were all installed.

The Cassiopeia beam line suit is presented in its current set-up, with an emphasis on the refurbished station I911-3. Some recent results are also presented.

Keywords: synchrotron, crystallography beamlines