

FIRST PHASE BEAMLINES AT MAX-IV

Y. Cerenious *

¹ MAX-laboratory, Lund University, Sweden

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*) e-mail: namer@zzz.edu.fr

The construction of the next Swedish synchrotron light source, the MAX IV, is scheduled to begin during 2010. MAX IV will be succeeding the present MAX I, II & III storage rings and it will consist of two state-of-the-art storage rings, one larger (528 m in circumference) operating at an energy of 3 GeV and one smaller (96 m in circumference) 1.5 GeV ring optimized primarily for lower photon energies. The first user activity is, however, expected to take place on the short pulse facility (SPF) which is situated on the extension of the linear accelerator. This linac is then providing both storage rings with electrons in topping up mode as well as serves as electron source for the SPF. At the SPF are the electron bunches from the linac utilized to produce short (femtoseconds) spontaneous X-ray pulses. It is expected that this facility will be in operation at a very early stage of the project. At a much later stage it also foreseen that the linac will be used as a source for a Free Electron Laser (FEL) in the UV and X-ray spectral range. Fully equipped, the new facility will be accommodating about 30 beamlines for research in a wide range of disciplines. The main radiation source of MAX IV, the 3 GeV ring [1], will be an ultra-low emittance ring for the generation of high brilliance soft- and hard X-rays. The storage ring is designed to meet the requirements of state-of-the-art insertion devices which will be installed on the nineteen available 5 m long dispersion-free straight sections. Several of the preliminary beamline studies have been based on 3.8 m long in-vacuum undulators with a peak field of 1.2 T. These will deliver an outstanding brilliance up to energies of about 30 keV.

At present (April 2010) funding is secured for a start version of MAX IV which includes the accelerators and a first beamline. In addition, a proposal has been submitted to the Knut and Alice Wallenberg (KAW) Foundation for

the financing of 5-6 additional beamlines. The beamline prioritization process has been ongoing since 2004 and first set of beamlines were proposed in the Conceptual Design Report [2] from 2006. For the KAW proposal this procedure culminated during the spring 2010 and resulted in a list of 5 beamline with the highest priority and second set of 5 beamline with only slightly lower priority. From this second group it is foreseen that one or two additional beamlines will be selected during the autumn. The prioritization process has been delicate due to the large number of considerations and the broad range of involved scientific areas. These first high profile beamlines have been selected since they among other things do take advantage of the unique performance of the MAX IV. However, they can only be considered to be a subset of the portfolio of the required beamlines for the mature MAX IV project and many important experimental techniques are missing. This includes also techniques that have a large and active user community on the existing MAX-lab and therefore should be granted the possibility for a continuation on MAX IV.

At the 10th ISSRNS meeting there will be a brief overview of the first selected high profile beamlines as well as an attempt to foresee the future process to identify the next generation of MAX IV beamlines.

References

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- [2] Detailed Design Report on the MAX IV Facility: http://www.maxlab.lu.se/local/maxiv_ddr/MXAIV_DDR_Master_Subs/DDR_pdf_documents_100406.html.