SOLARIS — NATIONAL SYNCHROTRON RADIATION CENTRE, PROJECT PROGRESS, MAY 2012

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The current status and plans for the future development of the recently granted National Synchrotron Radiation Centre — Solaris will be presented. The layout and basic design parameters of the accelerator will be shown and described.

The project is run by Jagiellonian University. The Centre will be situated within the Campus of the 600th Anniversary of the Jagiellonian University Revival area, the new location for the Science Faculties and the site of the Jagiellonian Centre of Innovation. The building was designed and is being built by the ALPINE Construction Polska Sp. z o. o. / Łęgprzem Sp. z o. o. Consortium with whom the contract was signed on the 24th of March 2011.

The synchrotron radiation facility will consist of:

- An electron injection system including thermionic RF gun, 550 MeV S-band linear accelerator and transfer line.
- A low emittance 1.5 GeV storage ring with a circumference of 96 m and 500 mA circulating current. The storage ring will have 12 double bend achromats (DBA) separated by 3.5 m long straight sections [1].
- One bending magnet based experimental beamline with Photoelectron Emission Microscope (PEEM) with band-pass filtering.

The main parameters of the machine are shown in Table 1 and the layout is visualized in Fig. 1.

Novel concepts have been applied to the system design which is based on the integrated magnets technology developed by Mikael Eriksson's team at MAX-lab in Lund University, Sweden with whom in December 2010 Jagiellonian University signed a relevant Cooperation Agreement [2]. The innovative design of the device allows the realization of a powerful scientific instrument at a very competitive price and the participation of experts from MAX-lab is essential to the project.

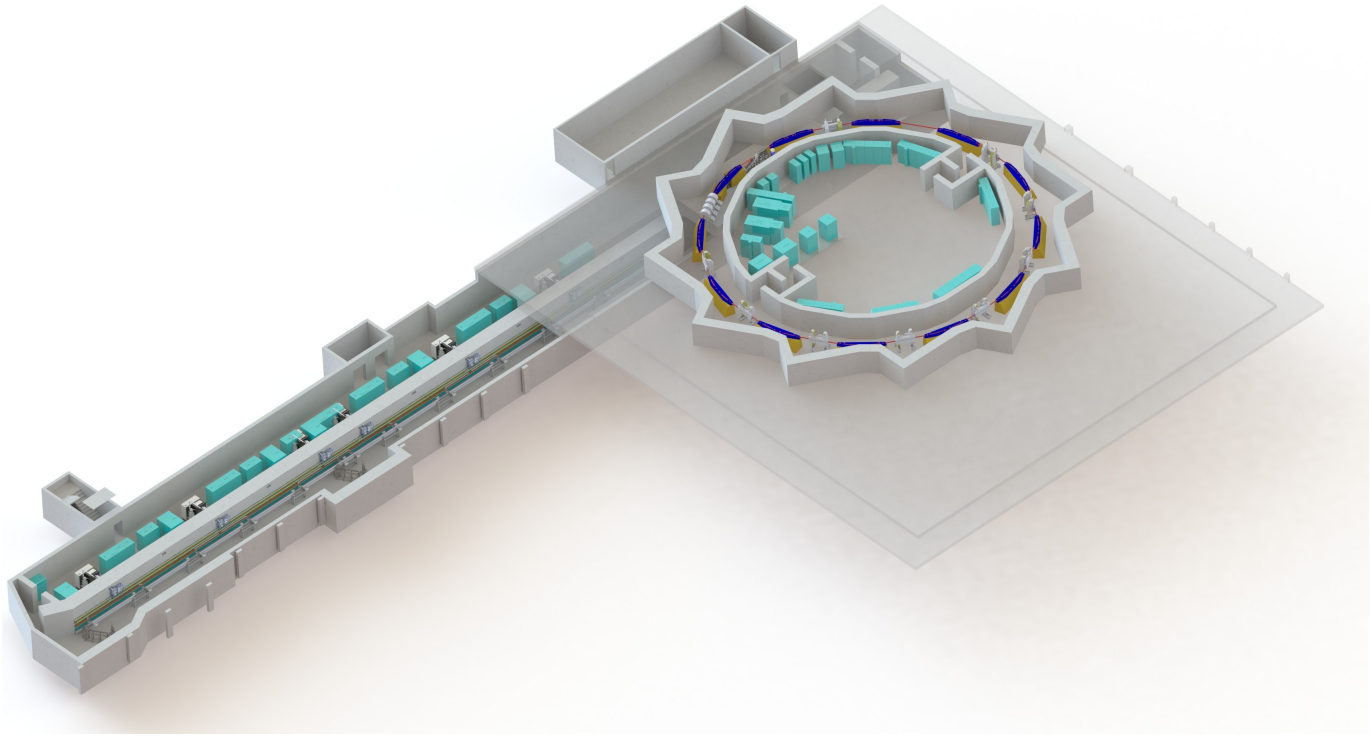

Figure 1: Layout of the Solaris synchrotron.

Table 1. Storage ring main parameters.

Horizontal tune ν_x	11.22
Vertical tune ν_y	3.15
Natural horizontal chromaticity ξ_x	-22.964
Natural vertical chromaticity ξ_y	-17.154
Momentum compaction (linear) α_C	$3.055 * 10^{-3}$
Horizontal damping partition J_x	1.464
Bare lattice emittance ε_0	5.982 nm rad

The funded project includes one experimental beamline and the search for funds for the full range of beamlines and endstations has started. Radiation sources for future beamlines can be from bending magnets and undulators, which may include a superconducting wiggler, mounted on one of ten free straight sections. The first beamline will be based on bending magnet radiation. Due to experimental interest (Soft x-ray absorption spectroscopy) and existing instrumentation (PEEM) the planned beamline will be designed for the soft X-ray photon energy range. The spectroscopy chamber and the PEEM microscope will be exchangeable. Already two external applications for funding additional experimental liners have been submitted. They include Ultra Resolution Angle Resolved Photoemission Spectroscopy (UARPES) and X-ray photoemission spectroscopy (XPS) bemalines, both based on undulators.

References

[1] C.J. Bocchetta *et al*, *Project status of the Polish Synchrotron Radiation facility Solaris* (Proceedings of IPAC2011, San Sebastián, Spain).

[2] M. Eriksson, *The MAX IV synchrotron light source* (Proceedings of IPAC2011, San Sebastián, Spain).