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Electron and photon beam parameters for SOLARIS synchrotron light source

A.I. Wawrzyniak[1,2*], C.J. Bocchetta[1], R. Nietubyć[1,3], M.J. Stankiewicz[1,2] and M. Zając[1]

[1]*National Synchrotron Radiation Centre SOLARIS, Jagiellonian University, Kraków, 98, Czerwone Maki, 30387 Kraków, Poland*
[2]*Institute of Physics, Jagiellonian University, Kraków, 4, Reymonta,30059 Kraków, Poland*
[3]*National Centre for Nuclear Studies, Świerk, 7, Andrzej Sołtan, 05400 Otwock, Poland*

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*e-mail: adriana.wawrzyniak@uj.edu.pl

The Solaris synchrotron light source is composed of a 60 m long 600 MeV linear accelerator with a thermionic electron RF gun and a vertical transfer line as well as the 1.5 GeV storage ring with a circumference of 96 m, which is a replica of the MAXIV 1.5 GeV storage ring [1-3]. Since the injection energy is 600 MeV, an energy ramp in the storage ring to the final operating energy is required [4]. This compact 3rd generation light source has been designed to have an emittance of 6 nmrad and to operate with 500 mA stored current for IR, VUV and soft X-ray production. The compact magnet design allows twelve 3.5 m long straight sections. Three of these sections are occupied by injection components, diagnostics and RF cavities, whereas the rest are available for long insertion devices. The electron beam parameters are presented in Table 1.

Table 1. The electron beam parameters in Solaris storage ring

Electron energy	0.6 - 1.5 GeV
Design current	500 mA
Bunch charge	5 nC
Number of circulating bunches	32
Natural bunch length σ_z	14.2 mm
Natural bunch length with Landau Cavity	60 mm
Natural emittance (bare lattice @1.5GeV)	5.982 nmrad
Coupling constant	0.01
Energy spread (bare lattice @1.5 GeV)	0.000745
Beam size in the straight section center (h/v)	184/13 μm

For X-ray production up to 2 superconducting wigglers can be installed, while undulators will be used for variable polarised light production [5, 6].

Up to now two beamlines have been funded. The Photoemission Electron Microscope (PEEM) beamline utilizes light from a bending magnet in the energy range from 200 up to 2000 eV [7] whereas the Ultra Angle Resolved Photoelectron Spectroscopy (UARPES) beamline will use an elliptical polarized undulator (EPU) with 120 mm period length as a light source [8]. The synchrotron radiation spectrum from the bending magnet is presented in Fig. 1. The critical energy of photon spectrum is 1959.88 eV, whereas the total synchrotron radiation power is 58.62 kW. Within this presentation the photon beam parameters for various insertion devices will be given.

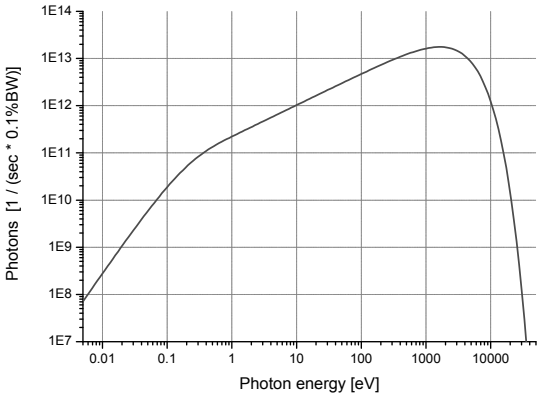

Fig. 1 The photon spectrum from the Solaris storage ring bending magnet centre

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