

New opportunity for the material characterization at SOLARIS

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The SOLARIS is a National Synchrotron Radiation Centre third generation light source constructed in Krakow, Poland. The storage ring is a replica of the 1.5 GeV storage ring installed at MAXIV Laboratory in Lund, Sweden. The storage ring lattice is composed of double bend achromat (DBA) cells with zero-dispersion straights and exhibits 12-fold symmetry. With the circumference of 96 m and energy of 1.5 GeV, its strong focusing and ultra-compact lattice enables to reach the natural emittance of 5.98 nmrad [1]. The Solaris facility has started a User operation in mid of 2018 with two beamlines fully operational (the PEEM/XAS and the UARPES beamline) as a CERIC partner [2]. Nowadays the daily basis operation is with current of 400 mA and the detailed performance and the actual storage ring parameters is described in [3,4].

At present Solaris offers several experimental opportunities at different end stations for sample characterization of the material properties in many research areas. We present actual status of available experimental stations and briefly discuss possibility of experiments of beamlines under construction. The results of few accomplished experiments will be presented, and among others the recently explained antiferromagnet (AFM) / ferromagnet (FM) magnetic moment structure in an exchange bias CoO/Fe(110) system [5]. It was proved that the FM layer with strong uniaxial magnetic anisotropy determines the interfacial spin orientations of the neighboring AFM layer and rotates its easy axis.

The near future development plan of the facility will be presented. The most important milestones for the future operation will be stressed.

References:

[1] MAX IV Detailed Design Report, <http://www.maxiv.lu.se/accelerators-beamlines/accelerators/accelerator-documentation/max-iv-ddr/>

[2] CERIC consortium, <https://www.ceric-eric.eu/>

[3] A. I. Wawrzyniak et al., in Proc. 8th Int. Particle Accelerator Conf. (IPAC'17), May 2017, pp. 2490-2494. doi:10.18429/JACoW-IPAC2017-WEOCA1

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[5] M. Słezak et al., Scientific Reports 9 889 (2019)