

SOLARIS National Synchrotron Radiation Centre: infrastructure for research

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The SOLARIS synchrotron in Krakow is a third-generation synchrotron radiation source operating within the medium electron energy range [1]. Since the first observation of synchrotron light in 2016 and the commencement of User experiments in 2018, SOLARIS has been continuously expanding its activities. This includes the development of experimental beamlines and complementary infrastructure, such as cryo-electron microscopes. As the only synchrotron in Central-Eastern Europe, SOLARIS offers unique research opportunities in both fundamental and applied sciences. Currently the scientific research can be conducted at seven beamlines and two cryomicroscopes. At the PIRX beamline, Users can utilize X-ray absorption spectroscopy (XANES region, X-ray absorption near edge structure) and magnetic dichroism. The primary technique at the URANOS beamline is angle-resolved photoelectron spectroscopy (ARPES). The PHELIX beamline employs two methods: ARPES and X-ray absorption spectroscopy (XANES). The DEMETER beamline offers two end-stations: scanning transmission X-ray microscopy (STXM) and photoemission electron microscopy (PEEM). The ASTRA beamline, which utilizes a bending magnet, is dedicated to X-ray absorption spectroscopy (XAS). The POLYX beamline is well suited for X-ray microimaging and X-ray microspectroscopy in the energy range of 4-15 keV. The CIRI beamline constitutes a specialized research infrastructure that employs infrared light to facilitate imaging at micro- and nanometric spatial resolutions. In addition to the experimental beamlines utilizing synchrotron radiation, SOLARIS also provides access to two high-end cryo-electron microscopes dedicated to determining the structures of biomacromolecules.

Further infrastructure development plans include the construction of the ARYA, SMAUG and NANO-X beamlines. The ARYA and SMAUG beamlines will operate in the hard X-rays range and will be dedicated to structural studies of macromolecules. The NANO-X beamline will enable comprehensive investigations into chemical composition and atomic structure through the application of an X-ray nanobeam. In addition, the SOLARIS infrastructure will be extended by the NAP-XPS experimental station on the PHELIX beamline and the OPERANDO station for the hard X-rays regime.

In this presentation, I will introduce the SOLARIS synchrotron project, its available research infrastructures and those under constructions and showcase examples of research results obtained by the Users at the SOLARIS Centre.

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References

1. J. Szlachetko et. al, Eur. Phys. J. Plus 138 (2023) 10.