LowDosePES: an end-station for low-dose, angular-resolved and time-resolved photoelectron spectroscopy at BESSY II.

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Angle-resolved time-of-flight (ArTOF) electron spectrometers allow photoemission studies to be performed with high energy resolution, high angular resolution, wide cone acceptance, high transmission, and high temporal resolution [1].

The third-generation synchrotron BESSY II – by combining a suitable storage ring filling pattern with various pulse picking techniques (such as MHz choppers) – offers an exceptionally suitable pulsed source for ArTOF experiments.

At the LowDosePES end-station of the dipole beamline PM4, we want to take advantage of the high information rate of the ArTOF to investigate, at a reduced photon flux, radiation-sensitive functional materials, the access to whose native electronic properties would otherwise be hindered due to either damage or too long acquisition times [2].

Among such class of samples, we find many emergent materials - like layered transition-metal chalcogenides, perovskites, or organic crystals - which are considered great candidates for a new generation of opto-electronic and electro-chemical devices.

Thanks to the availability of an optical excitation source and suitable time-resolution capabilities, LowDosePES also offers the opportunity to address light-induced charge carriers dynamics directly in the time domain, with down to $\sim$ 100 ps resolution.

In this contribution, I will describe the LowDosePES end-station and propose a selection of exemplary results to illustrate its key features, namely: low-dose, angular-resolution and time-resolution capabilities.

References

[1] R. Ovsyannikov *et al.* Jour. of El. Spec. Rel. Phen. 191, 92-103 (2013)

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