

MS40-02 | OPPORTUNITIES WITH COHERENT X-RAY NANOBEAMS: A SHORT PERSPECTIVE FROM A BEAMLINER

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Coherence has become the crucial property of X-ray beams at new generation sources. The main drive for the science developed at diffraction limited storage rings sources is the exploitation of the coherence of X-rays for imaging smaller and smaller structures and accessing dynamics of materials at small time-scales [1]. The interference patterns created by the scattering of coherent waves from a material, both in the near and far field, contain a wealth of information that can be exploited for a wide range of applications, ranging from the disclosure of subtle details of complex materials [2,3] to the investigation of the dynamics of complex systems [4].

Nanobeams of coherent X-rays are used as local probe as well as for scanning microscopy approaches when access to laterally resolved structural and chemical information is demanded, as in complex or inhomogeneous systems (e.g. heterostructures, device-like structures, etc.) [5].

In this talk I will show a selection of different uses of coherent X-ray nanobeams, with a special focus on the possibilities for coherent x-rays approaches at new generation synchrotron sources.

[1] M. Eriksson et al. (2014) *J. Synchrotron Rad* **21**837

[2] F. Mastropietro et al. (2017) *Nature Materials* **16**946

[3] V. L. R. Jacques et al. (2013). *Phys. Rev. Lett.* **111**, 065503.

[4] A. Madsen et al (2015). "Structural Dynamics of Materials Probed by X-Ray Photon Correlation Spectroscopy". Springer International Publishing. DOI: 10.1007/978-3-319-04507-8_29-1.

[5] J. Stangl *et al.* (2013). "Nanobeam X-Ray Scattering: Probing Matter at the Nanoscale" Wiley-VCH Verlag GmbH & Co ISBN: 978-3-527-41077-4.