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Photon efficient detector solution for full field XRM

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The nanotomography station at the imaging beamline IBL/P05 at PETRAIII is offering full field X-ray microscopy (XRM) at an energy range of 11-14keV using Fresnel Zone Plates (FZPs) [1,2]. A sample-to-detector distance of 18 –22 m can be realised by placing the detector in the microtomography hutch. Making use of this distance in the XRM mode no light optical magnification is needed, thus resulting in higher photon efficiency. This setup configuration leads to an effective pixel size of 13 –20 nm and scan times of below 1 hour for a full tomographic scan (1200 projections). Recently scan times of 15min and below have been realised in flight scan mode for XRM as well as Zernike Phase contrast mode. Thanks to the high flexibility of the nanotomography setup other imaging modes e.g. cone beam experiments can be instrumented and are currently under commissioning.

[1]L Larsson, D Gürsoy, F De Carlo, E Lilleodden, M Storm, F Wilde, K Hu, M Müller and I Greving; Nanoporous gold: A hierarchical and multiscale 3D test pattern for characterizing X-ray nano-tomography systems. Journal of Synchr. Rad., in Press, 2018

[2]I Greving, M Ogurreck, F Marschall, A Last, F Wilde, T Dose, H Burmester, L Lottermoser, M Müller, C David, F Beckmann; Nanotomography endstation at the P05 beamline: Status and perspectives. Journal of Physics: Conference Series, vol. 849 (012056) pp. 1-5, 2017

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