

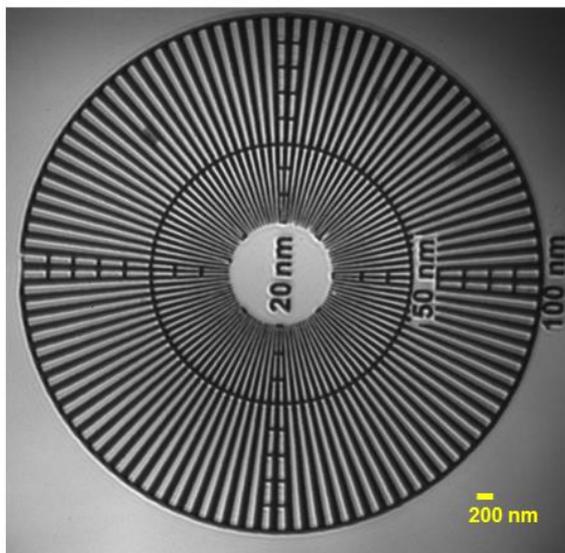
## The HZB-TXM is back in operation at the brand-new U41-PGM-beamline

It is our pleasure to announce that the X-ray microscope (HZB-TXM) is back in operation at the brand-new U41-L06-PGM1-XM beamline which was designed to extend the available photon energy range to the tender X-ray regime by exchanging the undulator U41 with the planned undulator UE32. First user-friendly experiments together with the group of E. Zschech at the Fraunhofer Institute IKTS in Dresden are already conducted by investigating Cu/low-k interconnects structures of advanced backend-of-line (BEoL) stacks of microchips. The high interest of users for this world-class instrument is emphasized by an overbooking for the beamtime allocation period 2017-II.

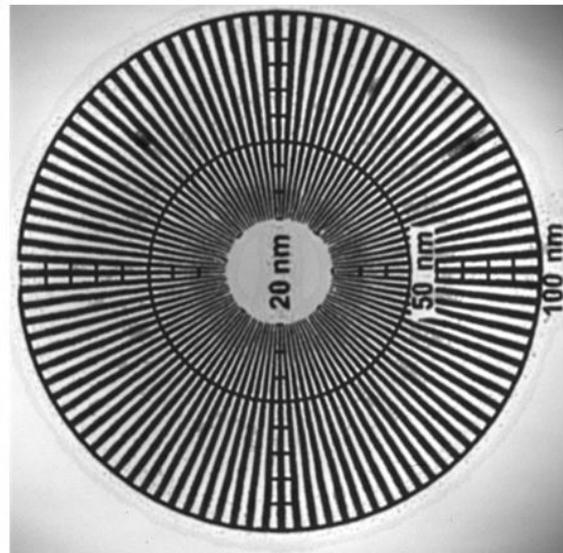
Together with the user-friendly beamtime results gathered so far, the comparison of the same test object between the old and the new XM-beamline underlines the high performance and benefits of this new beamline setup (Fig.1). The quality and high spatial resolution of this new beamline set-up is demonstrated by using the X-ray objective in the third order imaging mode (Fig.2 and Fig.3).

The beamline design was developed in cooperation with Rolf Follath (now PSI, Switzerland). The set-up of the beamline itself was supported by the Institute for Nanometer Optics and Technology (mainly by Matthias Mast and Jan-Simon Schmidt). During the shutdown time of the TXM the control software of the TXM and partly of the beamline was updated to run under the latest Linux (Debian) OS, EPICS and QT versions on a new workstation. This was realized together with the implementation of a more sensitive camera for the incorporated fluorescence light microscope in the framework of the bachelor and master thesis (both supervised at the HTW, Berlin) by Catharina Häbel.

Comparison:            old   –   new            HZB - XM-beamline



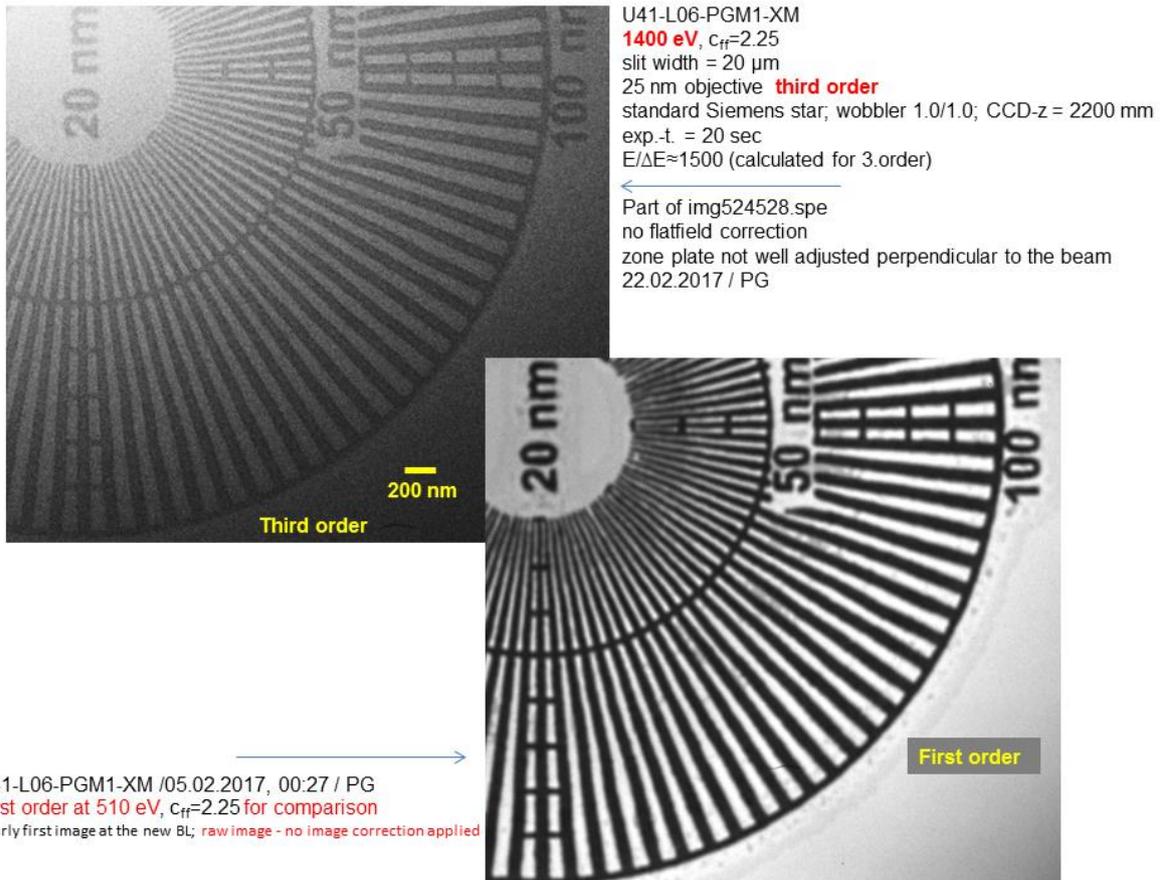
U41-L12-FSGM-XM / 14.06.2010  
published in Journal of Structural Biology 177 (2012) 212–223;  
one of the best images; *raw image - no image correction applied*



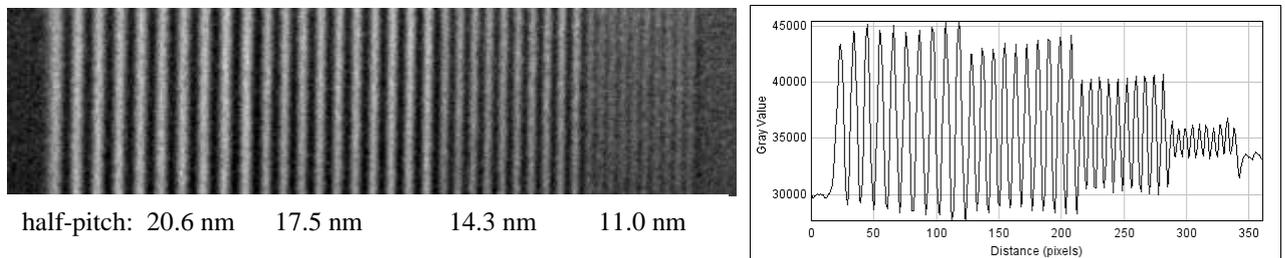
U41-L06-PGM1-XM /05.02.2017, 00:27 / PG  
nearly first image at the new BL; *raw image - no image correction applied*

Same specimen used with an X-ray objective (zone plate) having 25 nm outermost zone width

**Figure 1:** Comparison old – new X-ray microscopy beamline



**Figure 2:** Imaging with the 25 nm zone plate objective in first and third order of diffraction



**Figure 3:** Cr/B<sub>4</sub>C multilayer lamella imaged in third order of diffraction with the 25 nm zone plate objective at 950 eV; 8 sec exposure time; 1 pixel = 4.02 nm



**Figure 4:** The new beamline U41-L06-PGM1-XM and the TXM