White Beam Topography of 300 mm Si - Wafers

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The beamline is now upgraded to handle 300 mm or even larger wafers (fig.1). A new vacuum slit system allows brilliant section topographs (width: 15 µm, length 1 mm). In addition there is now a digital X-ray camera [1] available to image single reflections with excellent resolution and increased dynamic range. Every single reflection is collected via a $CdWO_4$ scintillating single-crystal (40 µm thick, polished on both sides and glued to a YAG substrate). Its luminescence image is projected and magnified onto a CCD camera (PCO4000, 11 MPixel, 13bit) via a microscope optic. Using this system, the achieved lateral resolution is approximately 5 µm.

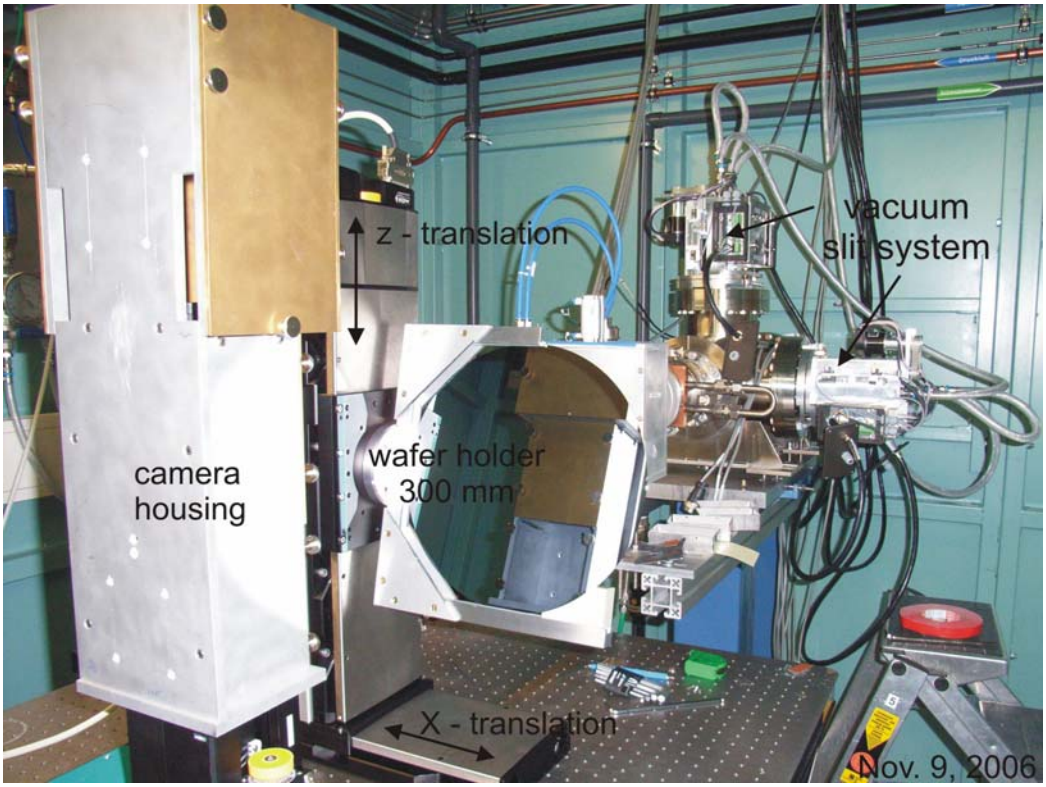
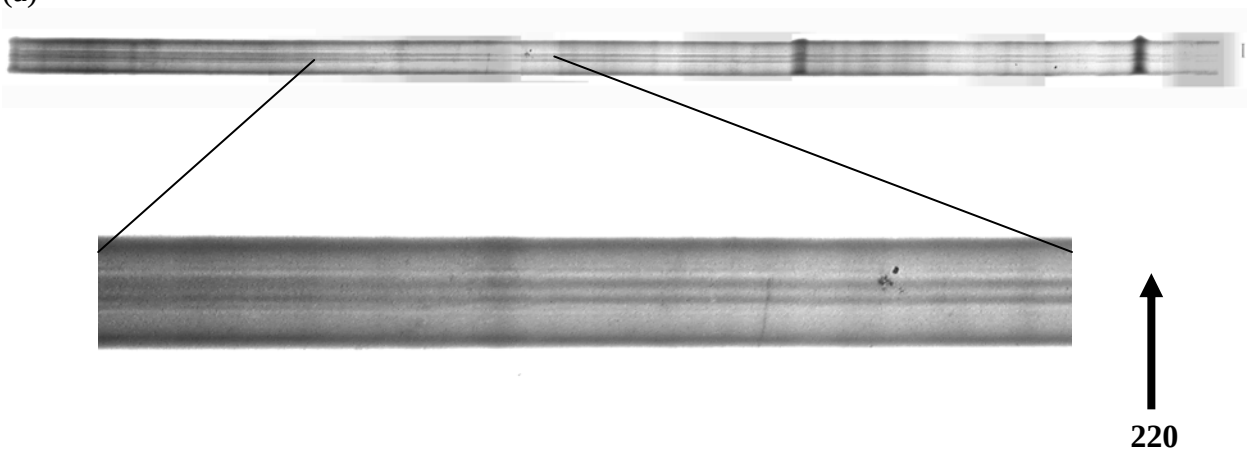


Fig.1: Expeimental station of the digital white beam topography with commercial 300 mm Si - wafer

The topographs collected on high resolution film and by digital camera show a comparable high resolution [3]. Fig 2 compares section topographs (slit 15 µ x 10 mm) from nearly perfect Si showing sharp Pendellösung fringes. The advantages of the digital topography are the increase of image spatial and dynamical resolutions as well as the reduction of exposure time.

(a)



(b)

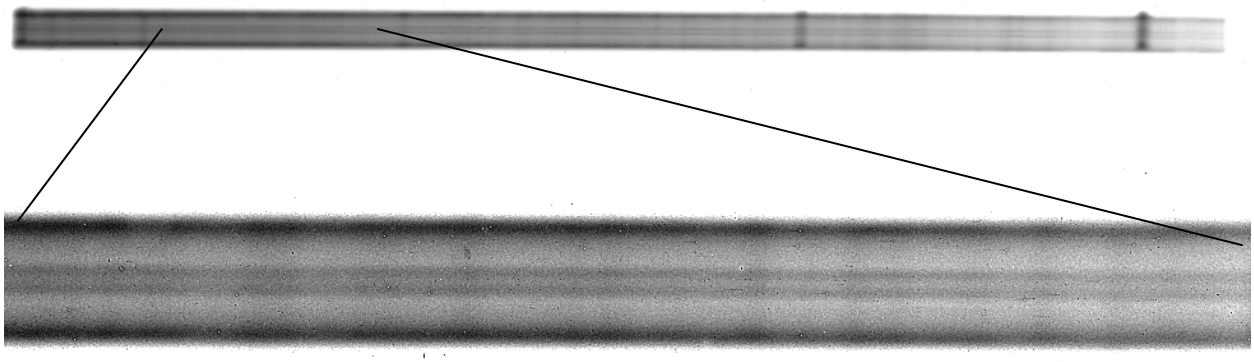


Fig. 2: Pendellösung fringes in perfect Si, 220 - reflection
(a) High resolution film SXRT22, distance 9 cm, 31 min (image processed)
(b) High resolution camera, distance 19 cm, 20 min (dark corrected, image processed)

[1] Weidemann G., Goebbels J., Wolk Th., Riesemeier, H.: First Computed Tomography Experiments at BAMline, *BESSY Annual Report 2001*, 249-250.
[2] A. N. Danilewsky, J. Wittge, A. Rack, T. Weitkamp, R. Simon, *Z. Krist. Suppl*. **25** (2007*)* .