Digital White Beam X – Ray Topography at ANKA

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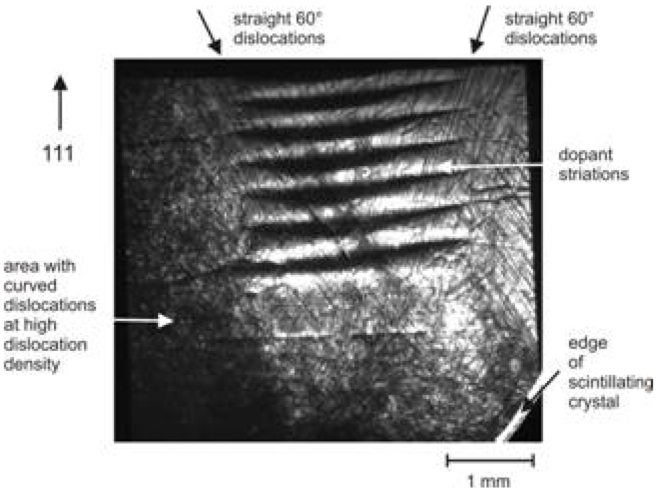
White beam synchrotron topography (SXRT) is based on recording a Laue-pattern of reflections where each reflection contains a topograph from the same investigated crystal position. Up to now the patterns are collected on normal or high resolution X-ray films (Agfa D3sc, Slavich VRP-M). The details about the TOPO-beamline and the experimental station at ANKA are given in ref. [1]. In addition there is now a digital X-ray camera [2] available to image single reflections with excellent resolution and increased dynamic range. The reflections are collected via a $CdWO_4$ scintillating single-crystal (40 µm thick, polished on both sides and glued on a YAG substrate). Its luminescence image is projected and magnified onto a CCD camera (PCO4000, 11 MPixel, 13bit) via a microscope optic. The achieved lateral resolution here is approx. 5 µm.

The figure shows the digital topograph taken from highly sulphur doped InP (sample AMF13). The (111) – reflection was selected and adjusted to illuminate the camera's field of view. The resolving power is the same as on a high resolution film but here combined with a much higher dynamic. All the details are visible: strong dopant inhomogeneities in the center of the crystal as a result of the (111) facet and straight V-shaped straight lines which are 60° dislocations of the type **b** = 1/2a [110]. Even single curved dislocations at the border of the crystal with very high dislocation density (about 10^5 cm^{-2}) are resolved.



[1] A. N. Danilewsky, R. Simon, A. Fauler, M. Fiederle and K. W. Benz (2003) Nuclear Instruments and Methods in Physics B 199(1), 7174.

[2] Weidemann G., Goebbels J., Wolk Th., Riesemeier, H.: First Computed Tomography Experiments at BAMline, BESSY Annual Report 2001, 249-250 (2001).