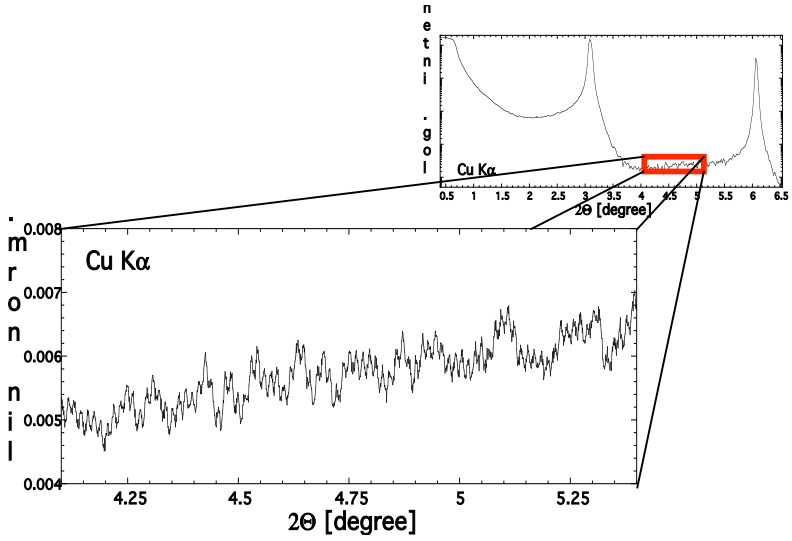
Multilayer X-ray Optics and High Precision Deposition

R. Dietsch, Th. Holz
AXO DRESDEN GmbH, Siegfried-Raedel-Str. 31, 01809 Heidenau, Germany;
contact@axo-dresden.de

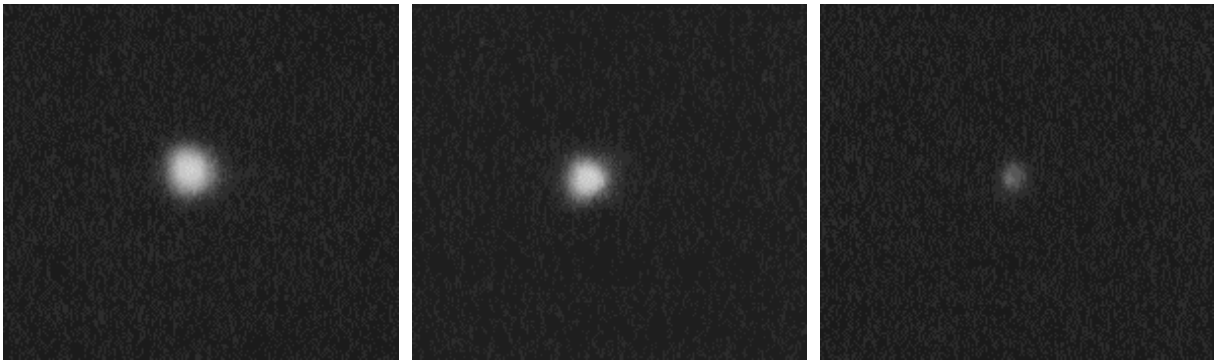
1- and 2- dim. X-ray optics are developed and fabricated to provide high brilliance monochromatic X-ray beams for application in XRD/XRR.

The α-Twin Mirror Arrangement (α-Twins) was developed to increase the resolution of multilayer mirror systems in X-ray reflectometry.
The optimized combination of low divergence multilayer optics and reflectometry X-ray tube yields to a divergence of less than 50 arcseconds in the parallel beam.
So it is possible to measure total thin film thicknesses up to 600nm without channel cut monochromators in the beam path.
α -Twins combine first the high intensity of a multilayer mirror system with a high resolution comparable to channel cut systems. Beam characteristics of this upgrade option and measurements will be presented.



α-Twin reflectometry

Based on a modified Montel geometry ASTIX- optics were developed for application at Cu Kα and Mo Kα wavelength.
A higher symmetry of spot profile and a reduced background level were estimated from ray-tracing calculations and will be demonstrated from measurements.
In combination with low power X-ray sources spot diameters from 100µm to more than 300µm can be observed.
Conventional arrangements will be compared with µ-source + ASTIX-f optics combination.
It can be shown that the flux density can be twice within 300µm spot for Mo Kα radiation.



MARCAM images of ASTIX-f focal spots (CuKα) with diameters between <100µm (right) and 250µm (left)