

Multi-functional XRD/XRR system



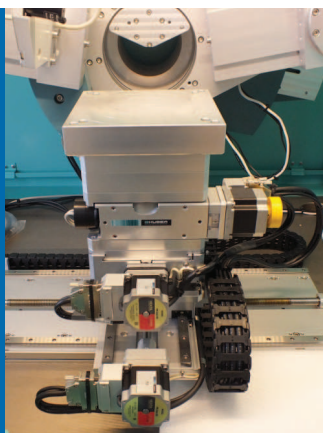
AXO multi-functional XRD/XRR system in radiation protection housing.

AXO multi-functional XRD/XRR system

We provide a versatile customer-specific XRD/XRR system in θ/θ -geometry for multiple applications with the following components:

- Microfocus X-ray tube with multilayer optics
- Automatic filter changer
- θ/θ -goniometer with tube and detector arm
- Motorized sample stage
- Scintillation detector
- Radiation protection housing
- Controller for motors, tube and detector
- Optional: Air-water cooler
- Optional: Spec software and macro package

Computer-controlled motorized sample stage system, located in the rotational center of two 1-circle goniometers, with Huber x-, y- and z-stage. The sample stage is designed for small and large samples (more than 50 cm length possible) and thin and thick (up to several cm) substrates.



X-ray source

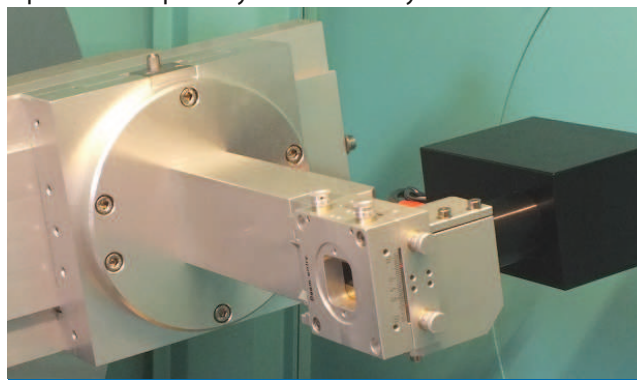
Sealed micro-focus X-ray sources are available with all typical anode materials such as Cu, Mo, Ag or Cr. The source is mounted in a compact housing which includes: radiation shielding, heat exchanger, two beam shutters (safety shutter connected to the interlock, fast shutter for easy synchronizing with CCD detectors), temperature sensor and a set of warning lights. Cooling water can be provided by an external water-to-water or water-to-air chiller. Thus, no connection to lab water is necessary.



AXO micro-focus X-ray source system with optics in vacuum mirror housing and cross slit screen.

Detector system

The system comprises a scintillation detector with movable huber slits or secondary 1-dimensional parallel beam optics for better angle resolution. A twin mirror arrangement (TMA) can be used with parallel beam optics on the primary and secondary side.



Scintillation detector (secondary optics optional).

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ASTIX X-ray optics

This type of compact X-ray optics takes advantage of a side-by-side geometry to achieve a symmetric two-dimensionally focused (ASTIX-f) or collimated beam (ASTIX-c). Hybrid mirrors (ASTIX-h) are available upon request.

X-ray generator and controller

X-ray generator, controller and (optional) cooler are 19" rack-mount. The X-ray generator provides high voltage up to 65 kV for the X-ray source.

Reflectometry (XRR) and diffraction (crystal orientation, XRD) can even be carried out on very long samples. *The sample shown here is a 620 mm long toroidal ZEISS synchrotron mirror.*

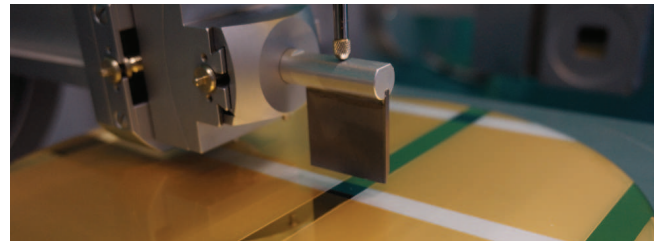


Sample stage and goniometers

The sample table provides indentation marks for easy positioning of 4", 6" and 8" wafers (larger samples possible) and can be moved in x/y/z direction via high precision Huber translation stages. X-ray source and detector are mounted on Huber 1-circle goniometers aligned to the rotational center of the system.

Controller and software

Tube, shutters, filters, alignment motors and sample stages can be computer controlled with a SPEC based software or using customer software via control libraries. Special macros for common tasks such as sample alignment, peak search or angular scans (XRR) are available on request.



X-ray source and housing

X-ray focus size	30 μm – 50 μm
Power	30 W – 50 W
Anode materials	Cu, Mo, Ag, Cr, ...
Cooling	water cooled, via chiller
Shutter	safety shutter and fast shutter

ASTIX X-ray optics (typical values)

Types	ASTIX-f/c/h (focusing/collimating/hybrid)
K β suppression	> 10 ³
Beam size	300 μm – 1500 μm (ASTIX-c)
Spot diameter	30 μm – 600 μm (ASTIX-f)

X-ray generator and controller

Rack-mount	19" 2U per device
Voltage input	100 V – 240 V (AC), 50/60 Hz
Max. output	65 W
High voltage	10 kV – 65 kV, 0.1 kV steps
Emission current	0 mA – 1 mA (0.01 mA steps)
Communication	Ethernet, open ASCII protocol
Control software	yes (Windows-based, SPEC optional)
X-ray safety	safety interlock circuit with control of safety shutter

Other features X-ray tube temperature protection
chiller interlock, option for two X-ray sources

