

Micro-focus X-ray source system



AXO micro-focus X-ray source with mirror housing.

X-ray source

Water cooled 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, beam shutter, temperature sensor and two sets of warning lights.

X-ray Control Unit

The X-ray Control Unit is built in a 19" rack-mounted housing. This single enclosure contains controller, high voltage generator and water cooler (optional).



AXO X-ray Control Unit

AXO micro-focus X-ray source system with high performance ASTIX optics

We provide a micro-focus X-ray source system equipped with high performance ASTIX X-ray optics for two-dimensional beam shaping. The system is made for upgrades of existing X-ray instruments and it can be applied for customized solutions.

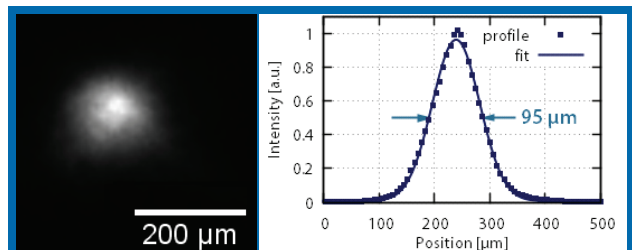
Applications

Main applications are **XRD, SAXS, WAXS** and **μ -XRF**. Benefits are an intense and symmetric beam of high spectral purity as well as low power consumption of the X-ray source. The properties of the beam can be matched to customers' requirements. For example, high-flux optics with a large convergence angle are designed for single crystal XRD, low-convergence optics with a sharp beam edge are of interest for SAXS, whereas small spot sizes are crucial for μ -XRF.

X-ray generator

The X-ray generator provides high voltage up to 65 kV for the X-ray source. The integrated interlock system ensures X-ray safety. The controller communicates via Ethernet with an open ASCII network protocol. This allows for an easy platform independent integration in custom environments.

A Windows software tool is included. It provides GUI, control and monitoring of all parameters. A SPEC integration is available on request.



Focal spot of an ASTIX-f optics for a 50 μ m source (Ag K α radiation) with a FWHM of 95 μ m.

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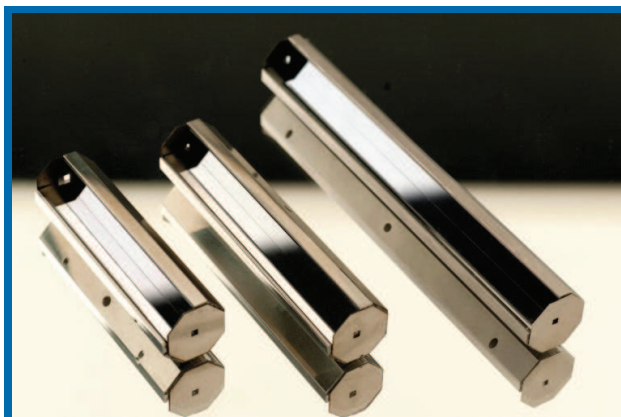
ASTIX X-ray optics

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 optics (ASTIX-h) are available upon request.

Two subsequent multilayer reflections select the desired photon energy, e.g. $K\alpha$ or $K\beta$ radiation, and suppress other radiation.

We offer standard optics with fixed parameters and tailored optics for customized solutions. Depending on the application, optics can be designed to achieve a high brilliance.

ASTIX⁺⁺ X-ray optics with extremely low slope errors are of interest for selected applications.



2-dimensionally beam-shaping ASTIX optics.

Optics installation and alignment

The AXO vacuum mirror housing is directly attached to the X-ray source housing. There are manual or motorized alignment methods available to adjust the optics with respect to the X-ray source and the resulting beam with respect to the experiment.

An external collimating system or a cross slit screen downstream the optics stop remaining direct X-rays and provide final shaping of the X-ray beam in terms of size or convergence.

Specifications

X-ray source

X-ray focus size	30 - 70 μm
Power	30 - 70 W
Max. voltage	65 kV
Anode materials	Cu, Mo, Ag, Cr, ...
Cooling	water-cooled
Shutter	rotary, tungsten
Mass incl. mirror housing	~9 kg

ASTIX X-ray optics (typical values)

Types	ASTIX-f (focusing) ASTIX-c (collimating) ASTIX-h (hybrid)
$K\beta$ suppression	$> 10^3$
Beam size	300 - 1500 μm (ASTIX-c)
Spot diameter	30 - 600 μm (ASTIX-f)
Focal length f_2	100 - 2000 mm (ASTIX-f) (from optics center to secondary focus)
Mirror length	40 - 150 mm

Vacuum mirror housing

Alignment	manual or motorized
Vacuum	yes
Beam shaping	cross slit screen or pinhole

X-ray Control Unit

Rack-mount	19", 3U (XCU-S) / 4U (XCU-C) (without/with integrated water-to-water cooler)
Voltage input	100 - 240 V (AC), 50/60 Hz
Max. output	70 W
Max. high voltage	65 kV, 0.1 kV steps
Max. emission current	1.4 mA, 0.01 mA steps
Communication	Ethernet, ASCII protocol
Control software	Windows, Linux
X-ray safety	door interlock, internal and external interlock input, external emergency stop button interlock
Shutter ext. triggering	current loop, TTL
Other features	XCU-C includes 1.5 l coolant tank