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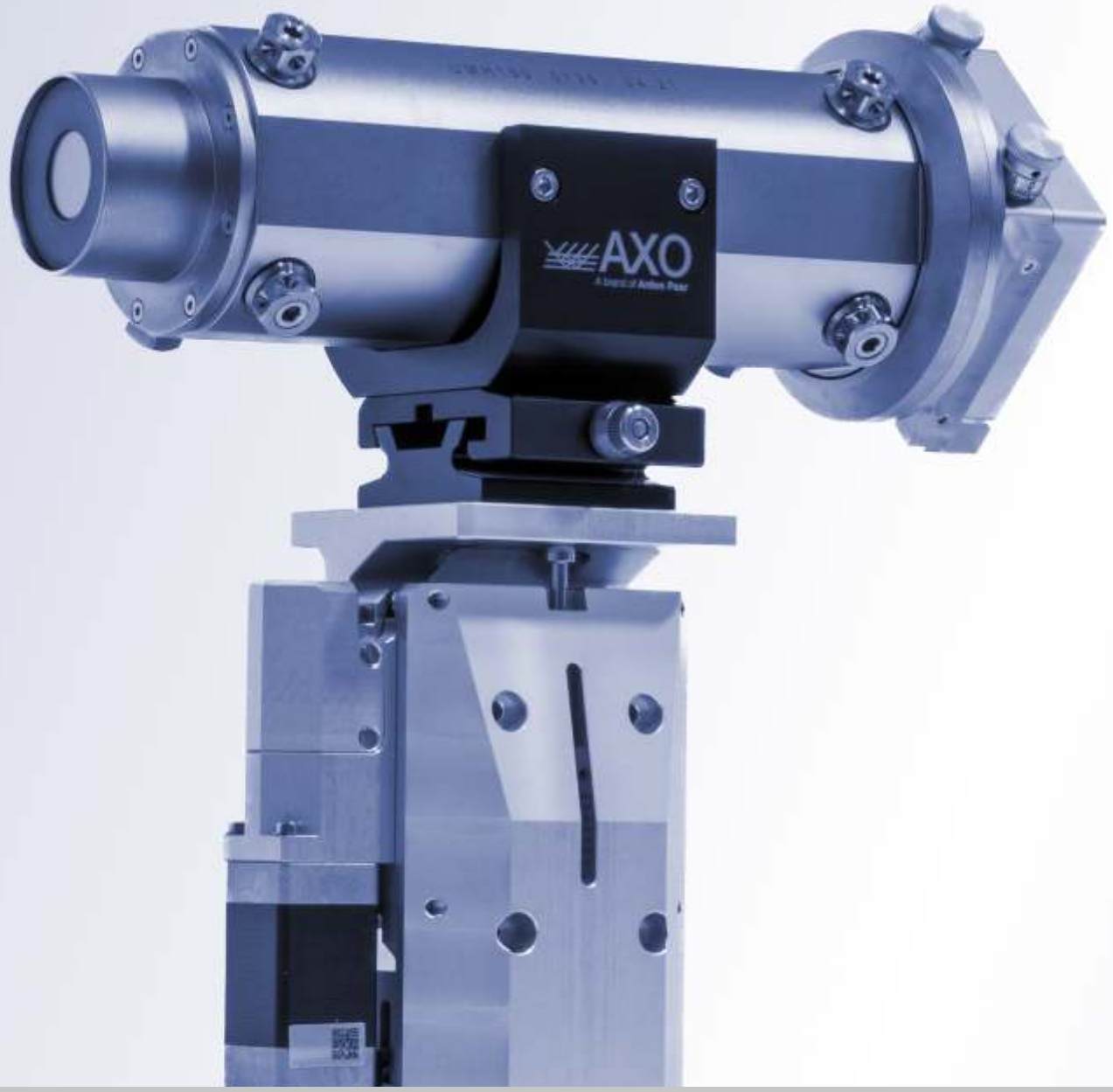
Multilayer
X-ray Optics



Multilayer X-ray Optics

Flat and curved multilayer X-ray optics are used as monochromators, collimators or focussing optics in X-ray diffraction, reflectometry, scattering methods (SAXS, WAXS), X-ray fluorescence analysis, synchrotron applications and many other fields of X-ray analytical solutions.
Tailored multilayer X-ray optics can be designed and optimized depending on the user‘s application, providing higher photon flux, necessary monochromaticity, better resolution and optimzed beam shape and profile.
AXO optics are avaible with alignment housing and can be offered with motorization, vacuum capability and cooling on demand.

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X-ray optics can be used in many applications. Beam shaping properties (such as focussing or collimating) are defined by the mirror geometry. Multilayer coatings are responsible for the spectral response of a mirror, i.e. which photon energies are reflected. Typically, the coating is optimized for one specific energy, e.g. Cu Kα radiation in laboratory X-ray tubes, or a certain bandwidth, e.g. high resolution or broadband mirrors for synchtrotron sources. In addition to this, it is necessary to adapt the multilayer coating on each position on a beam shaping mirror to the local reflection angle and photon energy. Based on our flexible design and fabrication techniques we can provide optimal tailored solutions for all demands.
Typical applications for parallel and focussing beam mirrors are XRD and XRF. Some XRD setups require flat (plane) mirrors with a so-called lateral thickness gradient along the mirror length. Other geometries such as spherical, toroidal and cylindrical can be coated with customer-specific multilayers: periodic (constant layer thickness in depth), aperiodic (depth-gradient) or lateral gradients in one or two dimensions.

Typical (multi)layer coatings
- Total reflection coatings relect a large range of low to medium energy photons.
- High resolution multilayers are applied for e.g. selection of one characteristic emission line (e.g. Cu Kα).
- Adding channel-cut crystals to the set-up can increase the resolution even more to split e.g. Cu $K\alpha_1$ from Cu $K\alpha_2$.
- High flux coatings provide the highest number of photons for a specific application.

Optics specifications

Typical sizes	40-150 mm length 10-20 mm width (others on request)
Types	focusing, collimating, hybrid, flat
Photon energy	all common source types: Cr, Cu, Ga, Mo, Rh, Ag, In (many others possible)
Beam size	30-600 µm (focussing) 300-2000 µm (collimating) (typical values, others on request)
Focal length f_2 mirror center to focus	100-3000 mm (typical values, others on request)

Mirror housings MH, VMH & UMH

Alignment	high-precision screws manual or motorized
Gas purging	possible in all housings
Vacuum	possible in VMH & UMH

Accessories (optional)

Beam shaping	pinhole (0D) slit screen (1D) soller slits (1D) crossed-slit screen (2D)
Cooling	cooling system available for UMH
Adaptors	radiation tight adapters for all common sources (customer-specific solution possible)

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