MICRO-XRF

Aperture Management System for M4 TORNADO

Sharper results with smart AMS technology

No compromise in spatial resolution

In micro-XRF analysis, precision matters – especially when working with samples that are not perfectly flat. Polycapillary optics deliver a powerful, focused X-ray beam, but natural beam divergence can lead to larger spot sizes and reduced resolution when analyzing samples with complex topographies.

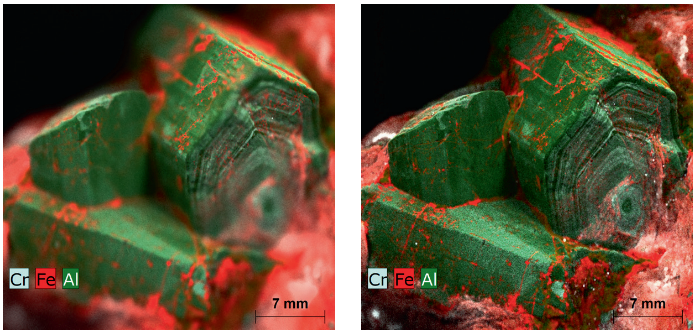
Depending on the lens design, this can result in spot sizes of up to 100 µm just 1 mm away from the focal point. For samples with pronounced surface variations, this divergence significantly reduces spatial resolution and compromises the accuracy of elemental mapping.

Bruker's patented Aperture Management System (AMS) provides an effective solution to this challenge. When needed, one of two AMS options (500 or 1000) can be seamlessly inserted into the beam path via software control.

This reduces beam divergence by a factor of three, maintaining a narrow and nearly constant spot size across varying sample depths, ensuring high-resolution analysis even on uneven surfaces.

AMS empowers your Bruker micro-XRF system to deliver high-resolution performance where it matters most. By combining advanced beam control with intuitive software integration, AMS delivers the flexibility and performance today's micro-XRF users need, without compromise.

Figure 1
Micro-XRF scan of an emerald sample with > 5 mm topography, measured without AMS and with AMS 500. The AMS 500 reduces beam diameter from ~ 300 µm to <150 µm, enabling clear visualization of Cr zonation bands.



Sharper focus, deeper insight

The Aperture Management System is a software-controlled feature designed to temporarily reduce beam divergence by reshaping the polycapillary output into a more focused, monocapillary-like beam profile.

This innovative approach allows users to take full advantage of the high intensity provided by polycapillary optics during standard operation, while seamlessly switching to a narrower beam geometry when higher spatial resolution is required – all within a single excitation setup.

AMS delivers flexibility without compromising performance, making it ideal for applications involving variable sample topographies. Significantly improved focal depth and sharpened diffraction peaks deliver enhanced clarity in both topographic and crystallographic analysis.

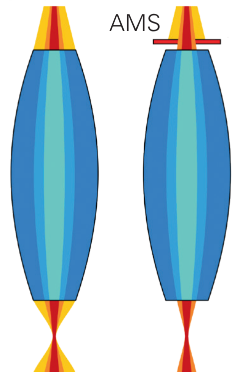


Figure 2
AMS working principle: Reshapes the polycapillary beam into a monocapillary-like profile – combining high intensity with narrow geometry in a single setup, without the need for a second optic. With AMS 500, the Mo Kα beam remains < 100 µm, even 4 mm from the focal plane.

Figure 3
Element distribution images of a dried seahorse sample, measure without AMS (left) and with AMS 500 (right). AMS improves the visibility of fine structural details.

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