Technical data sheet N° TDS-G10

Beam delivery system
GeniX 3D Cr Micro Spot

July 2010

Fig. 1: Beam delivery system head and control unit

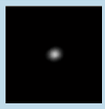
Microdiffraction and some microfluorescence applications require a highly focused monochromatic X-ray beam for high spatial resolution measurements with sufficient flux to maintain data quality. This is a clear challenge for use of standard X-ray generators due to the large source focus size and low brilliance. This challenge is even more important for chromium radiation due to high absorption in air or sample.

The GeniX 3D Cr Micro Spot combines a high brilliance microfocus tube with FOX3D aspheric optics in a demagnifying configuration providing a focal spot size of reduced dimensions compared to X-ray source focus size. The system is minimizing intensity losses with a totally evacuated beampath between source and optic and the integration of a single window in addition to source exit window.

The use of high efficiency and high precision FOX3D optics results in an intense monochromatic beam with a very small spot size (focusing gain is approximately 4000 compared to a pinhole place at 38 cm from the source). The increased focusing distance compared to other total reflection optics warranties sufficient sample clearance and enables wide diffracted angle detection.

The high stability and reliability of the GeniX 3D, makes it a powerful, cost-effective, and low maintenance solution, ideal for cutting edge applications with high reliability. More over the low level of maintenance makes it ideal for industrial applications.

Fig. 2: High resolution CCD pattern of beam at focus position. Box size is 0.25 x 0.25 mm². FWHM = 21 µm.



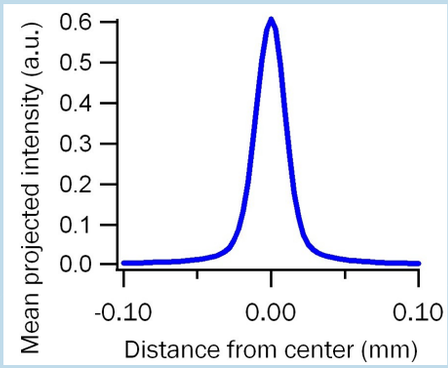


Fig. 3: X-ray horizontal beam profile of the spot (fig.2).

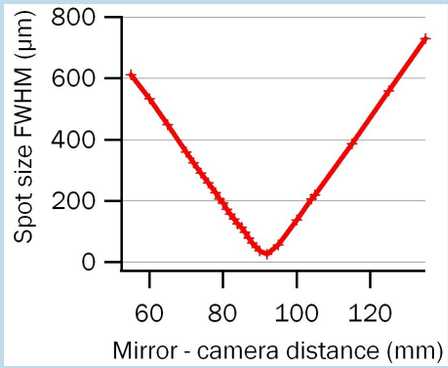


Fig. 4: Focusing curve (FWHM).

Applications
- *microdiffraction*
- *stress analysis*
- *micro-XRF*

Benefits
- *very high flux density*
- *excellent beam focusing*
- *extremely stable beam*
- *compact system, easy to integrate*
- *low power and low maintenance source*
- *smart source power management*
- *intuitive interface*

Options
- *configurable collimator system*
- *software utility for remote operation*

Accessories
- *alignment camera*
- *beamstop*
- *collimator*
- *pindiode detector*
- *dry vacuum pump*
- *water to air chiller*

Preliminary Technical Data

Subject to technical changes without notice

Beam features	
• Wavelength	2.29Å / 5.4 keV (Cr Kα)
• Integrated flux (vacuum, 14W-35KV-0.4mA source)	> 12 x10^6 photons/sec
• Divergence (on a 40µm source)	~ 17mrad FW20%M in both planes
• Spot size at focus (14W/40µm FWHM source)	< 30 µm FWHM
• System output to focus	~ 50 mm (add-on collimator capability)
Electronic	
• Dimensions	3U — 19" — 600mm in depth
• Total weight	13.6kg
• Power	110/220 V (AC)
Head	
• Dimensions (LxWxH)	45 x 12 x 37 cm^3
• Total weight	Maximum 14.5Kg
Integration	
• System power consumption	150 Watts
• Remote control features	Ethernet port & Software
• System shutter	Safety shutter
• Cooling flow rate (closed loop)	>1.0l/min (set point 25°C)
• Dry vacuum pump	Working pressure: 3mbar Pump speed: 0.6m3/hr

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