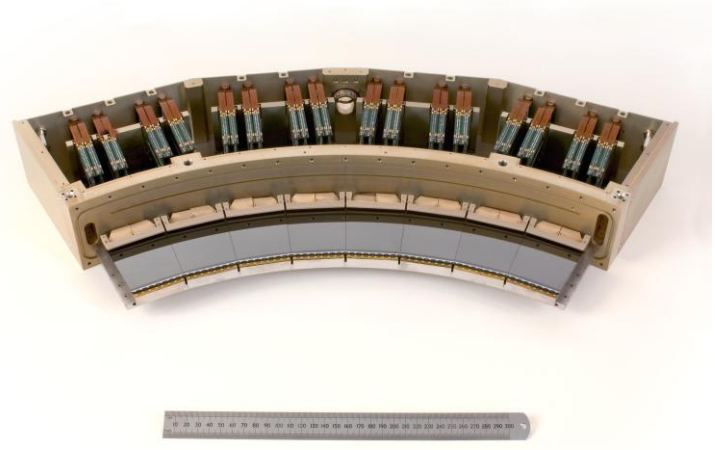
HOTWAXS

The intense beams of X-rays generated by synchrotron sources such as the Diamond Lightsource, put severe demands on the associated detector technologies used to instrument the beamlines, requiring detectors which are capable of very high counting rates. For X-ray crystallographic studies involving scattering and/or diffraction in the wide angular range (5-65°), further requirements of good spatial (i.e. angular) resolution and parallax free detection compound the issue further. A detector to match these criteria was deesigned and built, based on the microstrip gas counter technology, which we call the HOTWAXS detector (High Overall Throughput Wide Angle X-ray Scattering detector)

Until recently no detector options were available to measure 1-D WAXS at fast rate. Microstrip gas counter technology has made this feasible and can offer high count rate capabilities >0.5GHz globally, excellent dynamic range and very fast time framing <10µs. This is far in excess of anything possible with the latest CCD technology.[i]



Benefits

High count rate performance
High spatial resolution
Parallax free

Specification

Angular range	60° (from 5° to 65° with direct beam at 0°)
Angular resolution	less than or equal to 0.16° (FWHM)
Local count rate (each instrumented channel)	1×10^6 counts per second
Global count rate	500×10^6 counts per second
Uniformity	X-ray response over the detector aperture of <5% RMS
Channels of preamplifier, discriminator and scalar	512 individually instrumented

[i] **The non-crystalline Diffraction beamline for Diamond** – An Update, Fibre Diffraction Review 12, 9-14, 2004 , (DOI) 10.1382/s20041209 , N.J. Terrill, A.F. Grant, A.R. Marshall, A.D. Smith, K.J. Sawhney

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