

mar μ **X**^{2G}

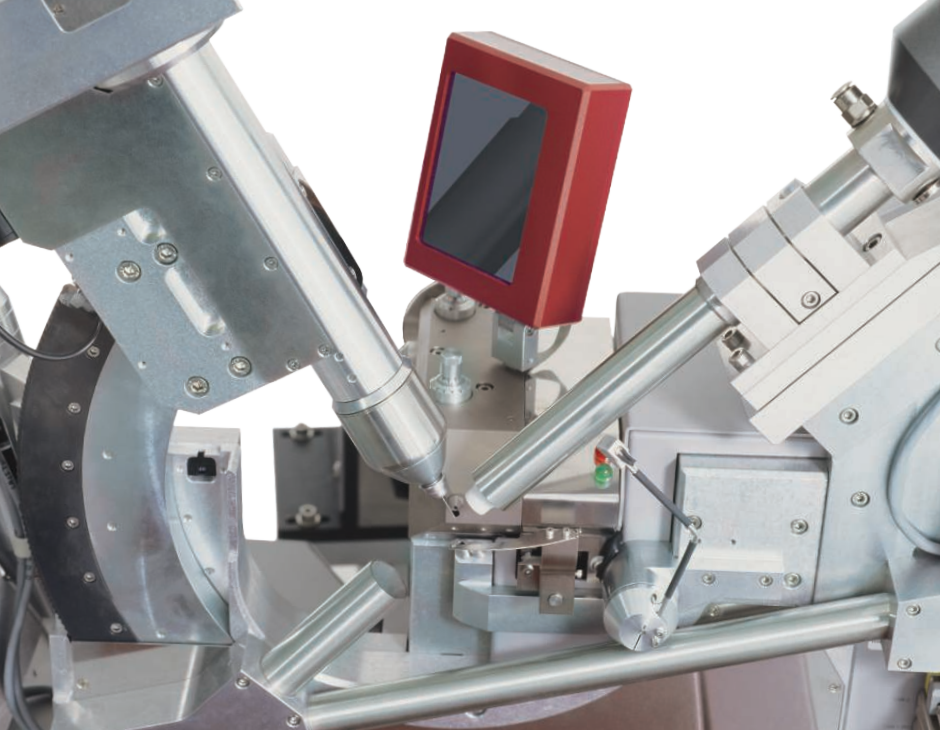
Next generation
turn-key system
for X-ray crystallography





marµX^{2G} is the second generation of our complete turn-key system for X-ray crystallography. It delivers twice as many usable X-ray photons as compared to the previous generation and narrows the gap to modern rotating anodes. **marµX^{2G}** consists of the **marµS** micro-beam X-ray generator operating at 30 Watts without water cooling. It is equipped with a state-of-the-art multi-layer optic producing a spot size at the sample of appr. 250 µm x 250 µm. Further, it features the new fast **mar345S** image-plate detector, the well known **mar dtb** goniostat and an Oxford Cryostream low temperature unit with an automatic refill system. The full system is integrated in a functional and stable table with plenty of space for all electronics and attachments.

marµX^{2G} is modular built and can easily be expanded to include the enhanced goniostat **easymount** or the **marcsc** sample changer. Optionally, a table top radiation enclosure is available.



IMPRESSIVE PERFORMANCE

It has been shown that the **marμX^{2G}** system operated at only 30 Watts produces data comparable to high-powered rotating anode systems operated at 1200 Watts or more. This is possible thanks to a thorough optimization of all involved components. In a test using lysozyme crystals it was possible to collect data of good enough quality for sulfur-SAD-phasing¹ using only 90° of data.

A direct comparison between the **marμX^{2G}** system and a rotating anode generator using the same experimental conditions (same crystals, exposure times, detector, etc.) revealed that small crystals produce superior data with the **marμX^{2G}** system while the results for larger crystals are virtually identical².



EFFICIENT SAMPLE SCREENING

Typical usage of home laboratory equipment is crystal screening for synchrotron use. The superb brilliance of the beam of the **marμS** source in combination with the extremely low noise read-out of the fast **mar345S** image-plate detector allows for fast screening of diffraction power of your samples - even if they are getting very small.

MULTI-PURPOSE INSTRUMENT

The **marμX^{2G}** system can be used for a wide variety of X-ray applications; among others:

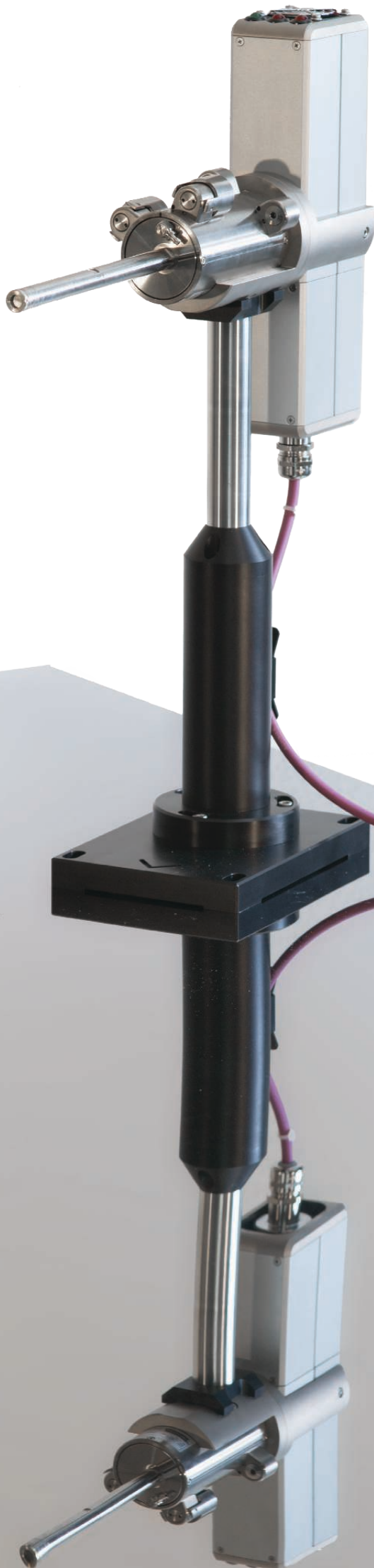
- single crystal macromolecular crystallography
- single crystal small molecule crystallography
- powder diffraction
- textures
- diffuse scattering
- high-pressure crystallography

Depending on its primary usage, the X-ray source can be equipped with Cu-, Mo- or Ag-anode.

Available for download at www.marxperts.com:

1) Application Note AN260107

2) Application Note AN070207



LOW RUNNING COSTS

Since the utilized power of the X-ray source is very low (30W) there is no need for cooling water. The necessary cooling of the anode is accomplished through a highly efficient fan - like the CPU in a PC.

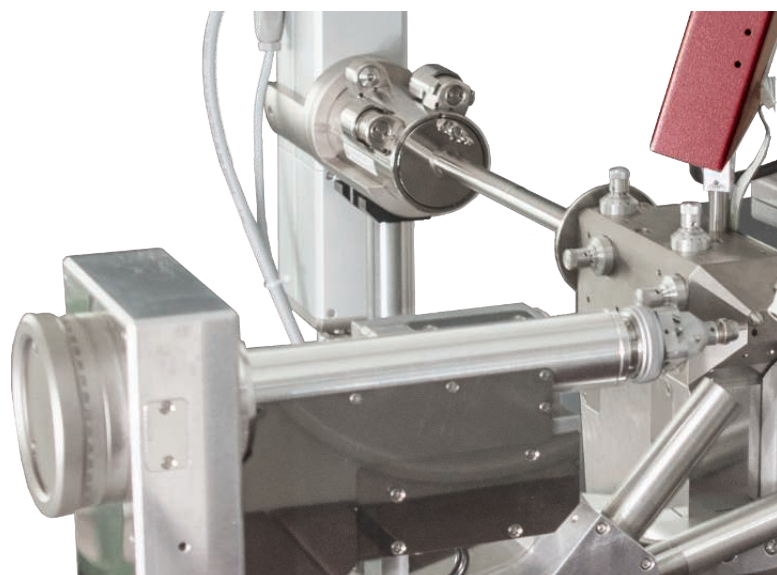
Electrical power requirements are also extremely low. The complete system can be run from a standard single-phase 220/110 V wall socket with a 16A fuse.

No need for costly water and electrical installations in the X-ray lab.

Both the source and the detector are Ethernet controlled. This ensures flexibility in the placement of the computer. Only one single Ethernet cable between the PC and the **mar μ X^{2G}** is necessary.

SPECIFICATIONS

X-ray source:	marμS micro-beam 50 kV / 0.60 mA
Optics:	Incoatec multi-layer optic
Beam size at sample	< 250 μ m x 250 μ m
Beam divergence	< 5.1 mrad
Anode cooling	Air cooled, no water cooling required
Mirror protection	Diaphragm vacuum pump with interlock to shutter
Detector:	mar345S fast image plate detector
Read-out times	9 to 68 seconds (depending on diameter and scan mode)
Dynamic range	1 : 128000
Sensitivity	1.5 X-ray photons equivalents
Goniometer:	mardtb multi-purpose goniometer with automatic X-ray beam alignment and continuous monitoring of the primary beam intensity
Options	Built-in motorized goniometer head, easymount or marcsc
Cryo-cooler:	Oxford Cryostream 800 liquid nitrogen system with weight based auto-refill system or Oxford Cobra system with liquid nitrogen generator
Experimental table:	Stainless steel magntic table top and aluminum table frame 1700 mm x 1000 mm x 800 (w:d:h)
Options:	Radiation enclosure with sliding doors and shutter interlock system Rayonix CCD-detector instead of image plate detector



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