



System Upgrades

- Stay Ahead with Forward Compatibility



Stay Ahead with Forward Compatibility

Bruker appreciates the significant investment you have made in your equipment. All our systems are designed to allow and facilitate upgrades for a fraction of the cost of a new system. Typically, all our upgrades can be installed by our field service engineers.

Install the latest software, the newest X-ray source, or detector and become more productive than ever before. Upgrade your instrumentation today for tomorrow's research needs.

Best of all, most of these upgrades are fully transferable in case you decide to replace the unaltered part of your current system. For example, if you upgrade a X8 PROSPECTOR or X8 PROTEUM with a new state-of-the-art PHOTON III detector, that new detector could be transferred to a new D8 QUEST or D8 VENTURE in a couple of years. Many of our users are taking advantage of this forward compatibility to upgrade their laboratory in steps.

Protect the value of your system while enjoying the power and ease of use of the latest state-of-the-art technology.

PHOTON III: Synchrotron-format Detector for the Home-lab

PHOTON III – Large format, mixed-mode detector for the most accurate data

The new PHOTON III is the largest pixel array detector offered for the home laboratory. The large active area of $208 \times 139 \text{ mm}^2$ allows faster, more efficient data collection and thus better data. This is especially crucial when working with small, radiation sensitive samples.

The PHOTON III also brings another advanced feature of the latest beamline detectors into the home lab for the first time: mixed-mode detection. Mixed-mode detection seamlessly combines simultaneous photon counting and integration to offer both the highest sensitivity and the best linearity of any laboratory detector for the best possible data quality.



Overview of Features and Benefits

Operation mode	Simultaneous photon counting and integrating (mixed mode)
Active area (mm)	208 × 139
Sensor format (pixels)	1,536 × 1,024
Pixel size (microns)	135
Total dead area (%)	0 (no gaps)
Percentage of active area with charge sharing losses (%)	0 (no charge sharing)
Count rate nonlinearity (% at 10^6 X-rays per pixel-sec)	0 (no count rate saturation)
Maximum parallax error (pixels)	<1
Sensor dynamic range	>200,000
Sensor frame rate (Hz)	70
Readout dead time between frames (msec)	0
Operating energy range (keV)	5-12
Cooling	Air-cooled

Available for: X8 PROSPECTOR, X8 PROTEUM, D8 QUEST and D8 VENTURE.

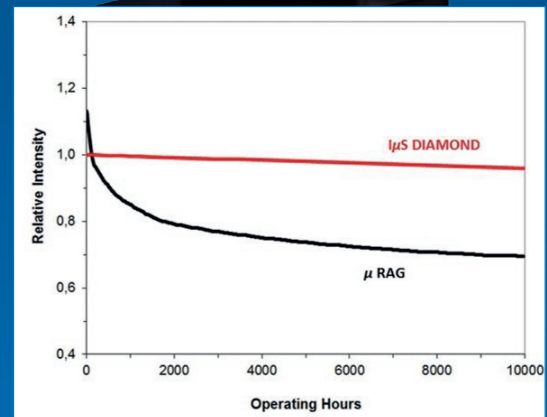
1 μ S DIAMOND: Enhanced X-ray Intensity Zero Maintenance

Rotating anode intensity from the diamond hybrid microfocus source

The new 1 μ S DIAMOND delivers higher X-ray intensities than microfocus rotating anode generators. Diamond conducts heat five times more efficiently than any other known material, making it perfect to remove the intense heat loads in a modern microfocus source.

In contrast to rotating anode generators the 1 μ S DIAMOND is fully air-cooled, has extraordinarily long up-times and does not require any routine maintenance. Performance better than a rotating anode – without downtime and hassles: no filament changes, no anode refurbishments, no ferro seal or water seal replacements...

Extreme intensity when you need it – all day every day.



Overview of Features and Benefits

Uptime	$\geq 99\%$	High reliability, X-rays when you need them, where you need them
Intensity compared to microfocus rotating anodes	$> 20\%$ higher average intensity	Best-in-class performance
Beam stability compared to microfocus rotating anodes	10 times more stable	
Power consumption	< 150 W, single phase power	Environmentally friendly
Cooling	No cooling water, air-cooled	
No routine maintenance	No moving parts under vacuum	Low costs of ownership

Available for: D8 QUEST and D8 VENTURE.

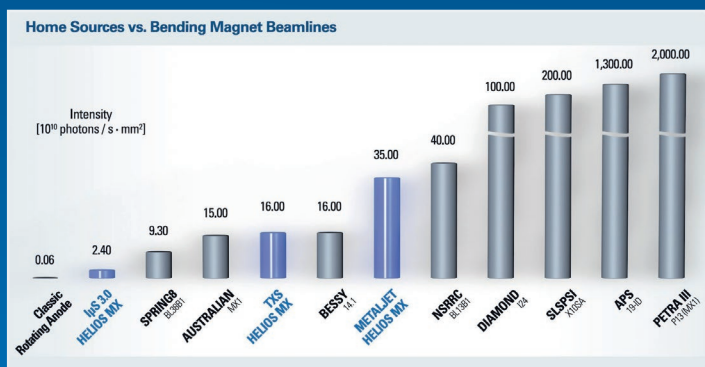
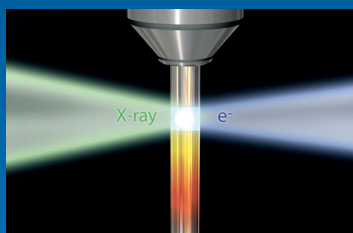
METALJET: An X-Ray Revolution Without Rotation

Beamline intensities in your home lab

In the METALJET, the solid anode of conventional generators is replaced by a high-speed jet of liquid gallium that can accept a much higher power load. The result is an X-ray beam an order of magnitude brighter than currently achieved with other home sources.

Transmitting the extreme source brightness to the sample requires an optic of highest quality. Based on more than a decade of experience in the field of synchrotron mirrors we have developed the HELIOS MX for the METALJET – synchrotron quality mirrors in-house.

Maintenance of the METALJET is straightforward and comparable to that of modern microfocus X-ray sources. Long intervals between servicing the instrument result in extended instrument up-time.



Technical Specifications

Cathode	High-brightness LaB ₆
Target material ¹⁾	Gallium alloy
Target type	Liquid jet
Energy, wavelength	K α = 9.243 KeV, 1.3414 Å
Voltage	70 kV
Power	200 W

Available for: D8 VENTURE.

ISX Stage: *in situ* Crystallography Made Easy

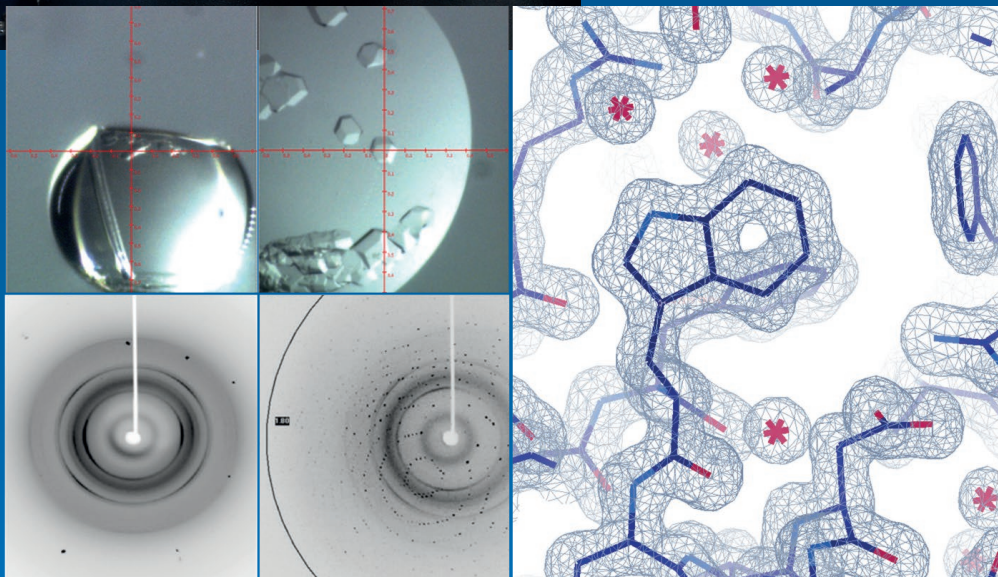


From automated *in situ* crystal screening to structure solution

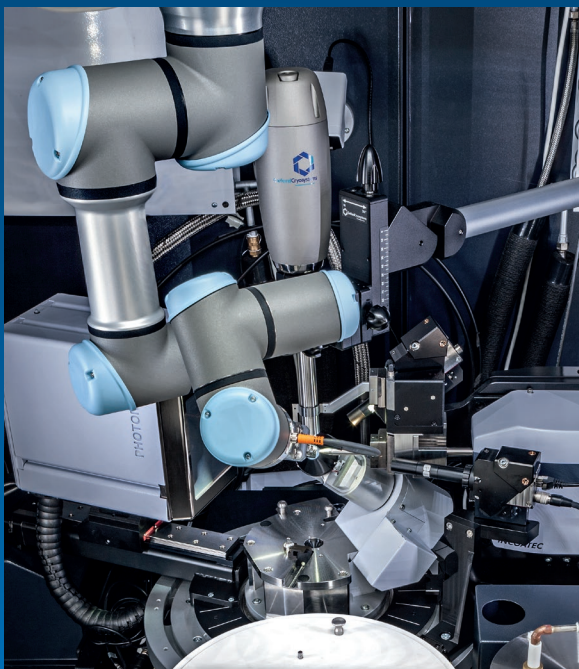
The ISX stage is a powerful tool, both for screening crystals and for conveniently collecting room-temperature data using the latest serial crystallography techniques – recently pioneered at synchrotron beamlines.

The ISX is fully motorized. It mounts easily onto the KAPPA goniometer using a kinematic mount, so it can be installed within minutes and then simply removed after use for cryo-crystallography.

- Compatible with all SBS format multi-well plates
- Job queuing for unattended, overnight full plate screening and full data collection of multiple samples



SCOUT: Automated Cryo-Cooled Crystal Handling



Reliable high-throughput system for highest productivity

The new SCOUT sample changing system automates the crucial process of screening cryo-frozen protein samples to determine their diffraction quality. SCOUT reduces the time to screen samples and also reduces the chances of sample damage during mounting and retrieval. SCOUT helps prepare for synchrotron trips and ensures more successful use of beam time.

SCOUT features the latest robotic and cryogenic technologies in a unique, compact configuration.

SCOUT's impressive hardware integration goes hand in hand with cutting-edge software for instrument control and bioinformatics.

This combination of state-of-the-art hardware and software makes SCOUT the ideal choice for crystal screening and data collection.

Overview of Features and Benefits

Low nitrogen consumption	1.2 l/h	Long continuous unattended automatic operation for more than a week
Large sample dewar	Safely stores up to 48 samples in 3 UNIPUCKS	
Twin Dewar with a separate Dewar for nitrogen inlet and level sensors	Zero turbulence in sample dewar	Safe sample handling
Fast sample loading and unloading	14 s	
Automated Goniometer Head (AGH)	Motorized XYZ goniometer head for precise sample alignment	Convenient automated sample centering
Standardized puck	UNIPUCK, 48 SPINE or ALS pins	Compatibility with first class synchrotrons worldwide
Fast optical and X-ray crystal centering	45 s per iteration, typically performs 2 iterations	Best sample alignment even for the tiniest, nearly invisible samples
Intelligent sensors and system diagnostics	Sensors to detect: sample loaded on system, Dewar lid position, liquid nitrogen level	
Compact, high precision robot	Six-axis with position accuracy: ± 0.02 mm	Best system reliability
Robust error handling for software and hardware	Implemented in SCOUT software	
Bio-informatics with sample based review, interactive workflow environment	License for SCOUT software package included	Optimized efficiency and best system usage
Meets latest safety regulations	Machinery Safety Directive 2006/42/EC, Pressure Equipment Directive 97/23/EC, Collaborative Robot Safety ISO/TS 15066:2016.	Safe and risk-free operation

Available for: **D8 VENTURE.**

Automated XYZ Goniometer Head (AGH): Motorized Sample Centering

Make your sample get to the point

A perfectly-centered sample is paramount to successful structure determination and a high-quality final structure model. This novel Automated Goniometer Head (AGH) simplifies the optical centering of small crystals tremendously. Manual goniometer heads that are still in use today were developed for the much larger crystals at the time. They suffer from backlash and make the centering of micrometer sized crystals very tedious.

Centering with the AGH is as easy as clicking on the center of the crystal in the video image or letting the system center the sample automatically – fast and reliable.



Upgrade Matrix

	Detector	Source		Automation		
	PHOTON III	I μ S DIAMOND	METALJET	ISX Stage	SCOUT	AGH
X8 PROTEUM	X	X ¹⁾				
X8 PROSPECTOR	X	X ¹⁾				
D8 QUEST	X	X				X
D8 VENTURE	X	X	X	X	X	X

¹⁾ installation by INCOATEC

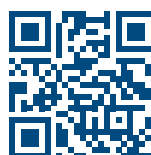
Bruker AXS GmbH

info.baxs@bruker.com

www.bruker.com

Worldwide offices

bruker.com/baxs-offices



Online information

bruker.com/sc-xrd

