CRYSTALLOGRAPHY

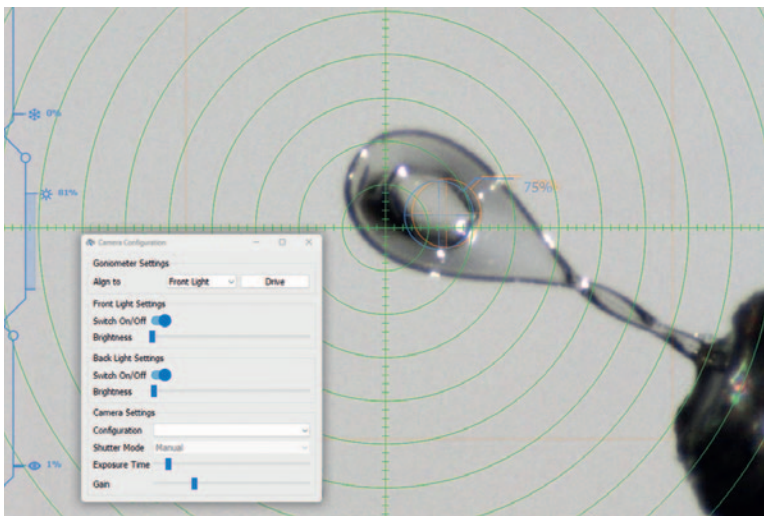
D8 VENTURE VX

The Most Versatile Platform for Advanced Facilities

Innovation with Integrity

Preferred Configuration

Dual X-ray sources
IμS DIAMOND II Cu
IμS DIAMOND II Ag
KAPPA goniometer
PHOTON IV detector

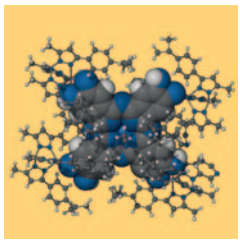


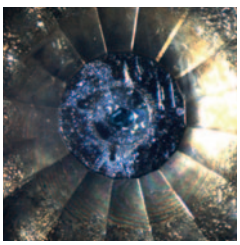
Discover the future with Crystal AI Centering

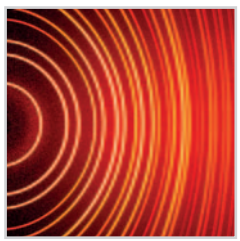
Bruker's Crystal AI Centering significantly boosts throughput by automating the centering process, reducing the time required for manual adjustments. This enables users to complete more experiments in less time, enhancing overall productivity. Additionally, the system's user-friendly interface and automated features make it accessible to less experienced users, enabling them to achieve precise results without extensive training. This combination of high throughput and ease of use ensures that both novice and expert users can benefit from the system's advanced capabilities.

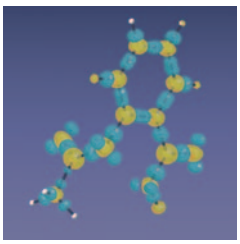
Maximize your instrument time and efficiently collect complete data with high multiplicity and unparalleled speed. The APEX suite guarantees optimal data parameters and enhanced instrument utilization. Trust in the automated strategy determination, which allows you to fine-tune parameters while maintaining full control.

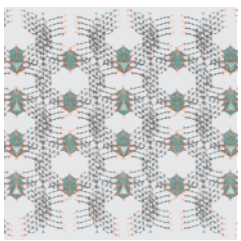
D8 VENTURE VX – The Most Versatile Solution for High-End Crystallography

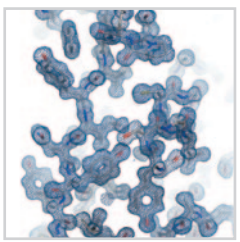

Coordination

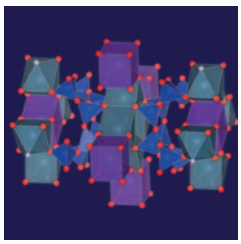

High pressure

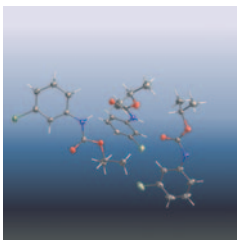

Powder


Charge density


MOF


Protein


Minerals


Organic

The unique benefits of a highly versatile diffraction system

The Bruker D8 VENTURE VX is the most versatile single crystal X-ray diffractometer on the market, designed to accommodate the broadest range of crystallographic experiments. This powerful, highly advanced instrument provides crucial insights into various materials' detailed structure, function, and reactivity.

V for Versatility is a key feature of the D8 VENTURE VX, capable of handling an extensive array of applications and sample types, from intermetallic materials and small molecules to large biological macromolecules. Key features contributing to its versatility include:

- **Multiple X-ray sources:** Equipped with the brightest Microfocus Ag and Cu DIAMOND II sources, the D8 VENTURE VX allows researchers to optimize diffraction experiments for the widest range of sample types.
- **Ag radiation:** Provides high-resolution structure determination, reduced extinction effects, larger penetration depth, reduced absorption effects, improved data quality, and efficient data collection. Ag radiation is particularly valuable for detailed structural studies of small molecules, metal complexes, solid-state, and intermetallic materials.
- **Cu radiation:** Offers the highest intensity when needed and strong anomalous signals for determining chirality. It is essential for studying biological macromolecules and determining the absolute structure of materials with light atoms.
- **Advanced PHOTON IV detector:** With the highest sensitivity for Cu and Ag, the PHOTON IV detector ensures precise and rapid data collection by counting X-ray photons.
- **Flexible KAPPA goniometer:** These components provide precise positioning and rotation of the crystal, accommodating complex experimental setups and enhancing data accuracy.
- **User-friendly APEX software:** Intuitive software interfaces streamline the process of designing and executing experiments, analyzing data, and interpreting results, making advanced crystallographic studies accessible to researchers.

These features make the Bruker D8 VENTURE VX an indispensable tool in fields such as chemistry, materials science, and structural biology, where detailed structural information is crucial for advancing research and development.

D8 VENTURE VX – Bruker's powerful system for modern X-ray service laboratories

Enhanced X-ray intensities: By optimizing the cathode, electron optics, and take-off angle, the IμS DIAMOND II achieves significantly higher X-ray intensities compared to conventional microfocus sealed tubes and traditional microfocus rotating anodes. This means faster measurement times and more efficient data collection, allowing users to complete their experiments more quickly and accurately.

Improved heat management: The innovative diamond hybrid anode design dramatically enhances heat management, delivering stable output performance over extended periods. This thermal stability minimizes fluctuations, ensuring consistent results and reducing the need for frequent recalibrations or manual adjustments. Best of all, it achieves this with a fully air-cooled system, eliminating the complexity and maintenance demands of traditional water-cooled setups.

Convenience and reliability: Unlike rotating anodes, which suffer from rapid output degradation due to repeated heating and cooling cycles, the IμS DIAMOND II maintains a constant heat load on its target. This results in a stable output and eliminates the hassle of regular maintenance, making the instrument more convenient and cost-effective to use.

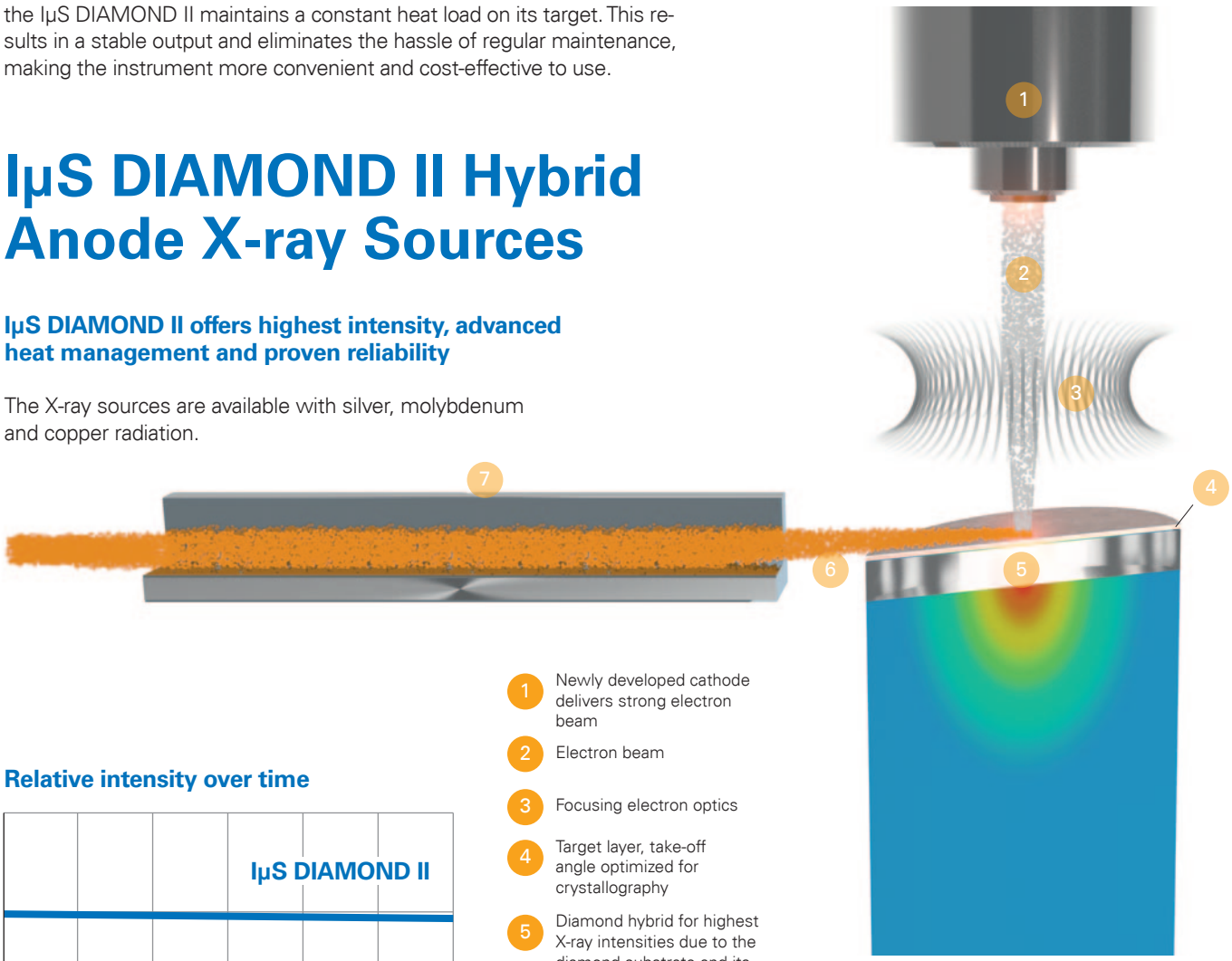
High performance: The IμS DIAMOND II combines the performance of a rotating anode with the convenience of a sealed tube. Users benefit from high X-ray intensities without the high operational costs and maintenance requirements associated with rotating anodes.

Better experiments: Overall, these innovations allow users to achieve superior X-ray intensities, stable performance, and reliable results, enhancing their research capabilities and efficiency.

IμS DIAMOND II Hybrid Anode X-ray Sources

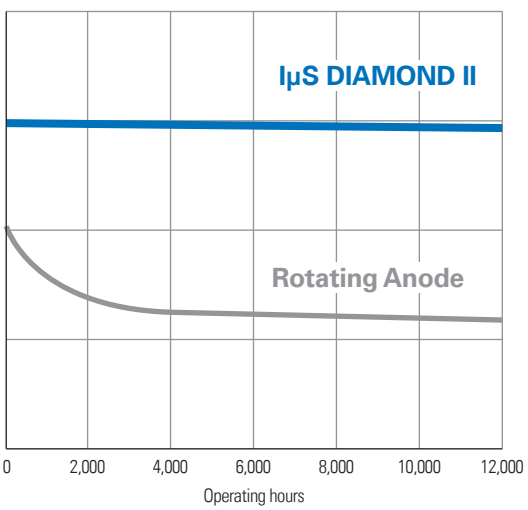
IμS DIAMOND II offers highest intensity, advanced heat management and proven reliability

The X-ray sources are available with silver, molybdenum and copper radiation.



1. Newly developed cathode delivers strong electron beam
2. Electron beam
3. Focusing electron optics
4. Target layer, take-off angle optimized for crystallography
5. Diamond hybrid for highest X-ray intensities due to the diamond substrate and its most efficient thermal conductivity
6. X-ray beam
7. HELIOS optics

Relative intensity over time



Brilliance without compromise

Bruker's IμS DIAMOND II microfocus X-ray source delivers up to twice the intensity of rotating anodes. It enables near-instant wavelength switching, 99% uptime, and maintenance-free operation. With exceptional beam stability and long tube life, it redefines SC-XRD performance, offering high brilliance and reliability without the complexity of rotating anode systems.

PHOTON IV Detector

In a nutshell: large area, photon-counting, unmatched versatility

The integration of the high-intensity IμS DIAMOND II Ag and Cu sources with the scintillator-optimized PHOTON IV detector creates the most versatile system available. This combination offers an extensive range of applications while ensuring exceptional experimental quality. The IμS DIAMOND II sources provide unparalleled X-ray intensities, and when paired with the PHOTON IV detector, they deliver precise and rapid data collection. This system is designed to meet the diverse needs of researchers, offering both high performance and reliability.

The PHOTON IV features a customized rare-earth X-ray scintillator, achieving optimized Detective Quantum Efficiency (DQE) for X-rays across a wide range of energies. Its large, monolithic sensors have no insensitive regions, ensuring the efficient collection of highly accurate data to very high resolution. This design makes it the most versatile home lab detector, providing fast and accurate data with high multiplicity.

Additionally, the PHOTON IV leverages massively parallel readout, high pixel density, and extended dynamic range. This enables precise photon counting and real-time off-pixel processing, ensuring no information is lost and every photon is accurately counted. This technology also supports intelligent photon counting with inter-pixel communication, providing sub-pixel resolution for best data accuracy.

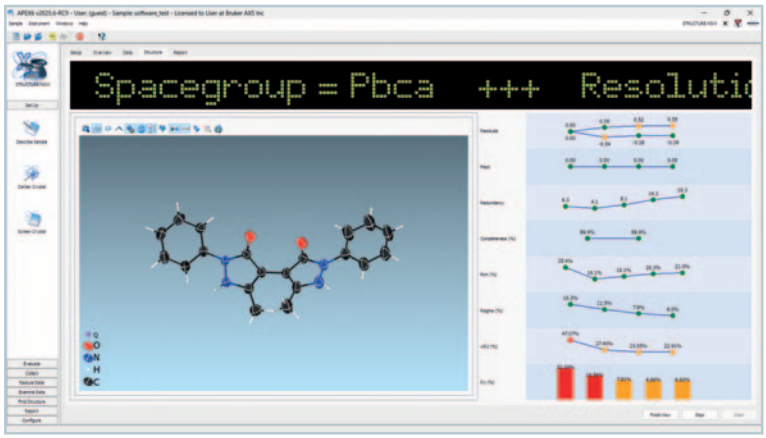
X-ray wavelength [K_α]	**Ag**	**Mo**	**Cu**
Charge density			
High pressure			
Strong absorbers			
Solid state / intermetallic			
PDF			
Inorganic compounds			
Minerals			
Coordination			
Powder			
Supramolecular / MOF			
Organic			
Light Atom Absolute configuration			
Proteins			
			Best

Data collection made simple

Achieve the full potential of your instrumentation with smart strategy planning. The APEX suite empowers users to efficiently collect complete datasets, featuring high multiplicity and optimized experiment time, ensuring every minute of instrument time is maximized. With intelligent, automated strategy determination, you can fine-tune acquisition parameters while retaining full control over experimental outcomes. Optimal results, minimal effort.

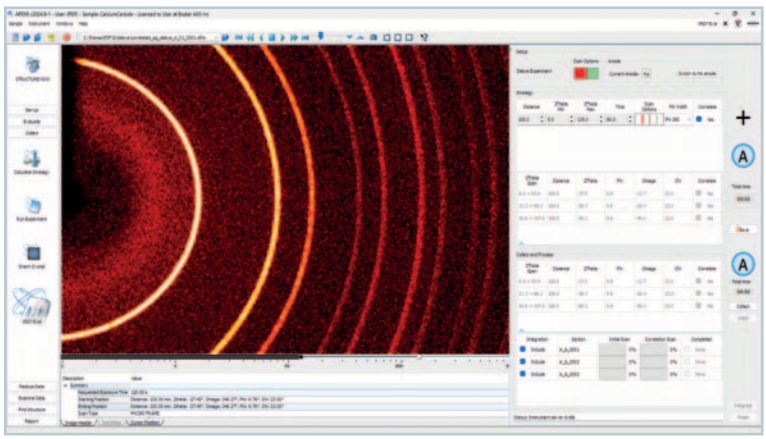
A one-stop plugin for automated structures

STRUCTURE NOW automates structure determination, refinement, visualization, and reporting. The software learns to optimize data collection and processing, improving results over time. With options for full automation or manual control, this makes it ideal for novice and expert users alike.



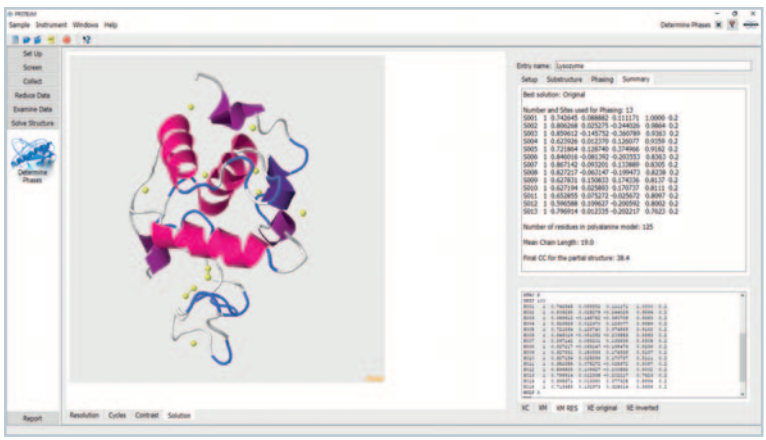
Powder diffraction

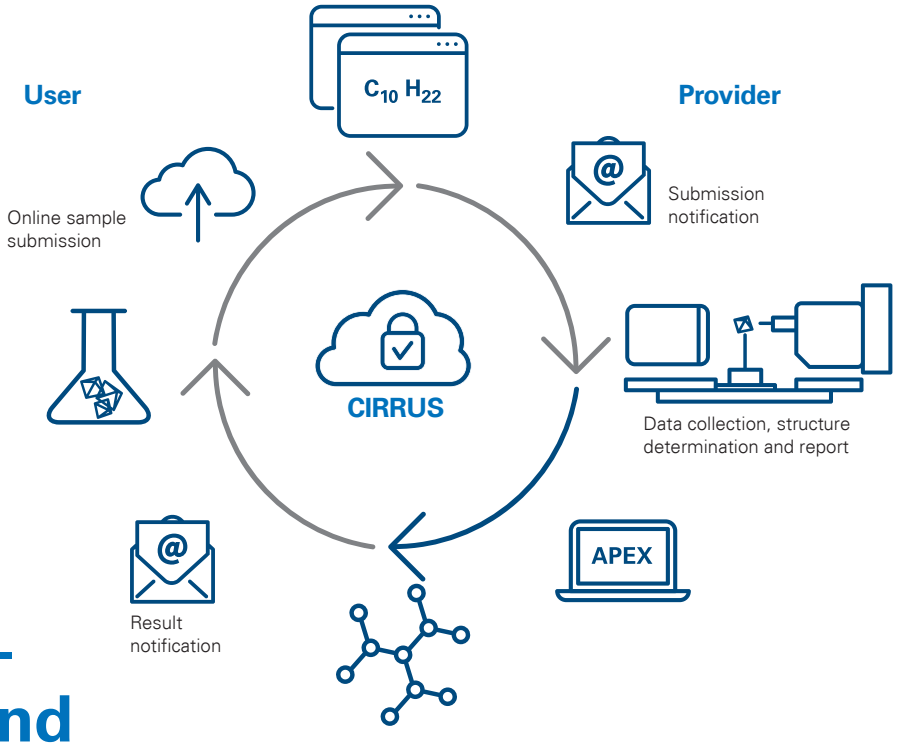
Your single-crystal diffraction system is not limited to single crystals alone. It's perfectly suited for collecting and processing high-quality powder diffraction data as well. The plug-in effectively handles diffraction from polymers, fibers, and textured powders, and seamlessly integrates with the full suite of Bruker XRD software for comprehensive analysis. Automated data strategy planning, collection, and processing are now standard features, ensuring streamlined and efficient workflows.



Protein structure solution

An intuitive and versatile interface streamlines the entire SAD phasing workflow using the powerful SHELX software suite. From data preparation through phase generation to model building, each step is seamlessly integrated. Informative metrics are displayed throughout the process, helping users assess progress and determine success with confidence.





APEX Software – Fast, Powerful, and User-Friendly!

APEX is celebrated for its speed, power, and user-friendliness. The software has been redesigned to emphasize ease of use, education, and automation, while still offering advanced functionality for expert users.

- **CIRRUS cloud-based service:** Includes sample submission and results dissemination services, ideal for institutional analytical services, allowing direct import and export of data into and from APEX.
- **One-click installer:** Simplifies the installation process by automatically checking for previous versions and updating them if necessary. APEX offers enhanced functionality, free upgrades, and demo licenses.
- **Micro powder X-ray diffraction:** Provides automated data collection and processing, with export options to various formats.
- **AI centering:** Uses deep learning to automatically center crystals in real-time, regardless of the crystal type, instrument configuration, or lighting conditions.
- **StructureNow:** A fully automated system for data collection and structure determination, requiring no user intervention. Perfect for routine work and novice users.
- **Auto twin-indexing:** Offers advanced twin handling with the "Domains" concept, providing fully automatic and reliable indexing of non-merohedral twin domains.
- **Scientific databases interface:** Interfaces with local and online scientific structure databases, offering automatic search and additional filters for ease of use.
- **Robust reporting feature:** Automatically generates complete CIFs and structured reports, incorporating experimental details from the instrument, software and processing details from the database, and user input.

This comprehensive suite of features makes APEX software a robust tool for crystallographers, suited for both novice and expert users.

Empower your crystallography workflow with CIRRUS

CIRRUS revolutionizes crystallography service by streamlining sample management and enhancing user satisfaction. With intuitive digital submission forms and seamless APEX integration, users can submit complete, standardized data effortlessly, minimizing errors and delays. Real-time notifications keep users informed throughout the process, whether they're across the hall or the globe. CIRRUS ensures secure, GDPR-compliant data handling and provides users with instant access to their submission history and results. By eliminating paperwork and centralizing communication, CIRRUS reduces administrative burden and accelerates turnaround times. The result? A more efficient, transparent, and user-centric experience that fosters trust, boosts productivity, and drives scientific success.

Features and Benefits

	Main characteristics		
D8 VENTURE VX System	The D8 VENTURE VX is a versatile crystallography system enabling the widest range of experiments, supporting studies from small molecules to macromolecules. It features the brightest Ag and Cu IμS DIAMOND II sources, the photon-counting PHOTON IV detector, and a flexible KAPPA goniometer for precise crystal alignment. It equips researchers to meet the challenges of managing advanced crystallographic facilities with high throughput, precision, flexibility, and maximum uptime.		
	Feature		Benefit
PHOTON IV Detector	Photon-counting pixel-array detector	4th generation pixel-array detector technology	Higher speed and sensitivity, best data quality
	Small pixel size [μm²]	100 × 100	Higher resolution
	Large active area [mm²]	111 × 72, ~8,000 111 × 145, ~16,000	Faster data collection
	Readout frequency [Hz]	112	
	Count rate [counts·pixel⁻¹·sec⁻¹]	Up to 4 × 10⁶	
	Dead time [sec]	0	
	No dead areas	Single, monolithic silicon sensor	Improved data quality
	No charge-sharing noise	0 electrons charge-sharing noise	
	Parallax [pixel]	< 1	
	Count-rate nonlinearity, before correction [%]	< 1	
	Detector absorption efficiency	Ag 87%, Mo 96%, Cu 100%	High Detective Quantum Efficiency (DQE)
	No operating gas or cooling water	Completely sealed design, air cooled	No maintenance, high uptime
	High reliability	3-year warranty	
IμS DIAMOND II Source	Very high intensity beam, completely air-cooled, revolutionary e-beam and cooling technology	Ag, Mo and Cu radiation	Dual-wavelength configuration with instantaneous wavelength switch for advanced data collection. Shorter measurement times and better data from difficult samples.
D8 Goniometer	Sphere of confusion [μm]	< 7	Best data quality
	High speed [deg/min]	Up to 3,000	Faster data collection
	Kappa geometry [deg]	-183 … +183	Highest experimental flexibility
APEX Software	The most comprehensive software package for single crystal X-ray diffraction (SC-XRD), utilizing well-tested, first-class algorithms. It offers a user-selectable level of automation, catering to both novices and providing complete control for experienced crystallographers. With state-of-the-art responsiveness, it incorporates user feedback from hundreds of installations. The software features unparalleled twin handling, boasting the most powerful reciprocal lattice viewer to address all crystallographic challenges. Additionally, it includes first-class interactive model-building and refinement tools.		

Bruker AXS
info.baxs@bruker.com

Worldwide offices
bruker.com/baxs-offices

Online information
bruker.com/d8venture

bruker.com

aim 03189