

D8 VENTURE D8 QUEST

- D8 Crystallography Solutions

Crystallography at the Forefront of Science

Twenty-five! This amazing number of Nobel Prizes has been awarded for work in the field of crystallography during the last four decades.

This is an impressive illustration of the crucial importance of crystallography in cutting-edge science. Another impressive statistic: over this same period, only 4% of all chemistry publications dealt with crystallography yet this subfield captured 19% of the available Nobel Prizes.

It is no wonder that influential chemistry journals publish a relatively high number of crystal structures, when ground-breaking research depends on crystallography for insight into structure, function, and reactivity. Therefore, crystal structure data is one of the most important resources for developing scientific knowledge.

Great science deserves great tools.

Crystallography provides accurate and precise measurements of molecular structure and dimensions in a way that no other analytical technique can begin to approach.

To get the maximum benefit out of this technique, scientists need the latest analytical tools. This was the driving vision of our development team for the D8 Crystallography Solutions: to provide your cutting-edge research with the superior tools it deserves!

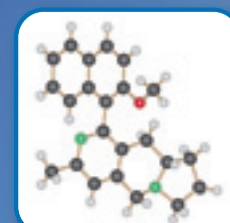
D8 QUEST and D8 VENTURE: designed with customers in mind.

The D8 Crystallography Solutions were designed to offer the highest standards of quality, performance, and reliability. With an exciting design – featuring groundbreaking low maintenance and all-air-cooled options – we manufacture instrumentation for tomorrow's research needs that will exceed all your expectations.

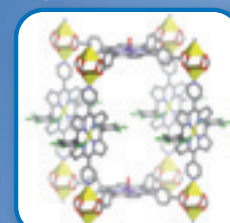
D8 Crystallography Solutions!



Absolute configuration ¹⁾



Supramolecular ²⁾



Organic ³⁾



Incommensurate ⁴⁾



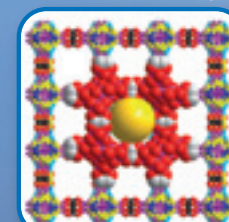
Phase transition ⁵⁾



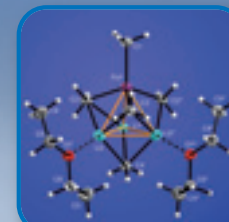
Twinning ⁶⁾



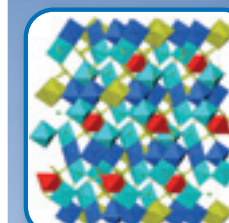
Service crystallography ⁷⁾



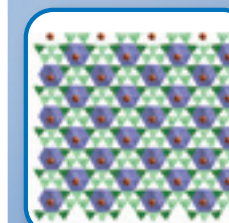
Coordination ⁸⁾



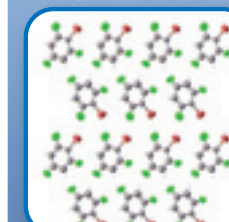
Minerals ⁹⁾



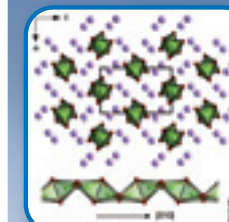
Strong absorbers ¹⁰⁾



High pressure ¹¹⁾



Solid state ¹²⁾



Inorganic ¹³⁾



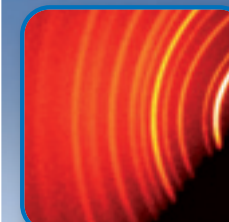
Charge density ¹⁴⁾



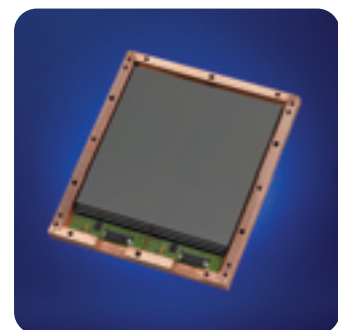
Proteins ¹⁵⁾



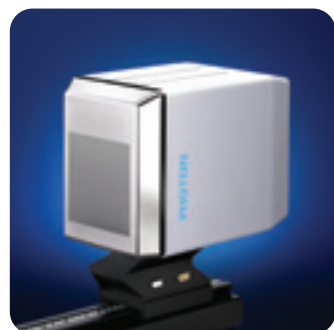
Powder ¹⁶⁾



- 1) Fischer, F.; Weding, N.; Ott, H.; Hapke, M.: Publication in preparation
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- 3) Bauer, R. E.; Enkelmann, V.; Wiesler, U. M.; Berresheim, A. J.; Müllen, K.: Chem - Eur. J. 2002, **8**, 3858
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CMOS sensor, 100 cm²



PHOTON 100 detector, air-cooled



Highly visible LED status lights



Compact IpS microfocus source



Optional low-temperature device



Wide doors for optimal access



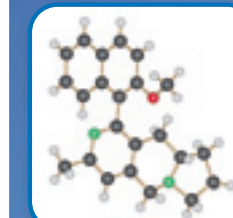
Stable and easy-to-align beam path



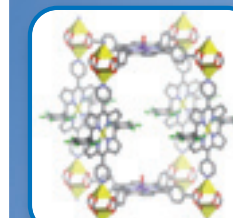
LED enclosure illumination



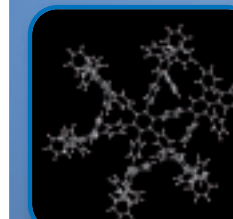
Absolute configuration ¹⁾



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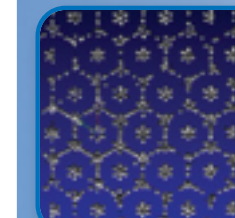
Incommensurate ⁴⁾



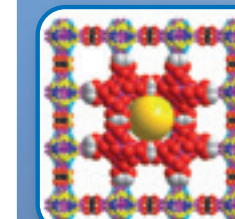
Phase transition ⁵⁾



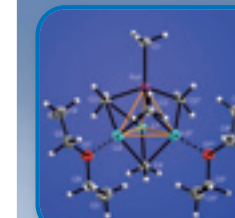
Twinning ⁶⁾



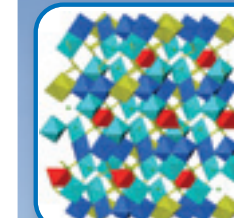
Service crystallography ⁷⁾



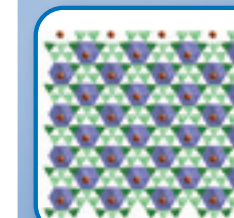
Coordination ⁸⁾



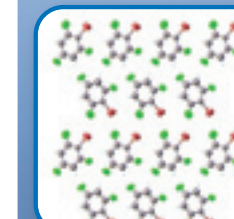
Minerals ⁹⁾



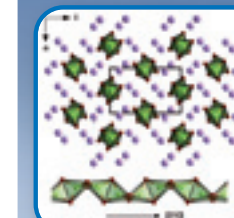
Strong absorbers ¹⁰⁾



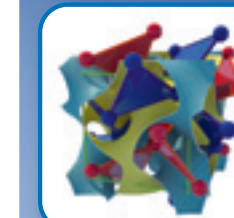
High pressure ¹¹⁾



Solid state ¹²⁾



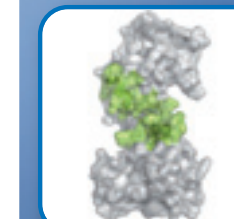
Inorganic ¹³⁾



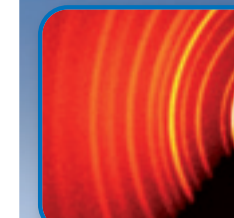
Charge density ¹⁴⁾



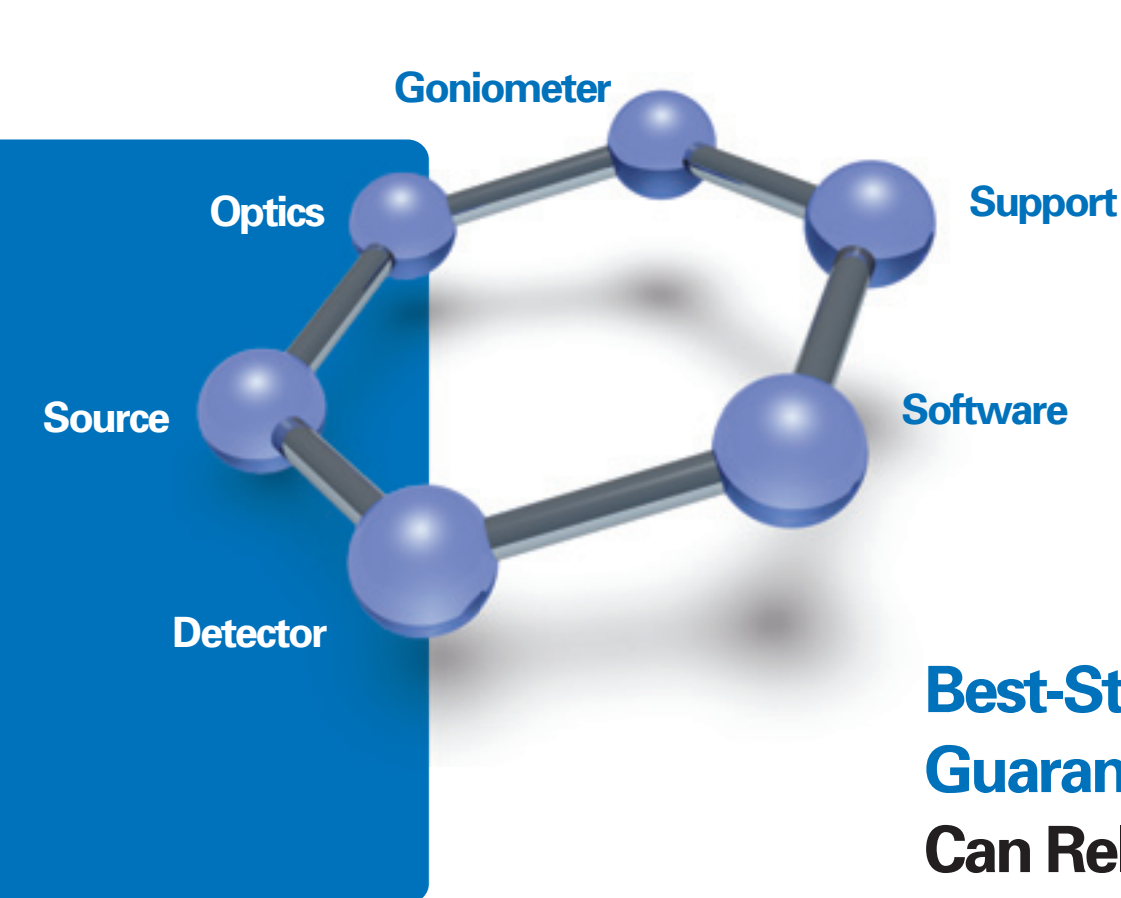
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Best-Structure Guarantee You Can Rely On 100%

For many years, the vast majority of published structures has been determined using Bruker equipment. There is a reason for this: From the X-ray source, through the goniometer and detector, to the analytical software, you always get the best-in-class solution for all of your applications.

X-Ray Sources and X-ray Optics

A successful diffraction experiment starts with an excellent X-ray source. Whether you choose a traditional standard sealed X-ray tube – optionally enhanced with the TRIUMPH monochromator – or you choose from one of the outstanding μ S microfocus sources, you always get the best performance.

Goniometer and Sample Stages

Ultimate precision, it's as simple as that. Our mechanism is so precise that the sphere of confusion is unsurpassed by any other goniometer – period. Even your tiniest microcrystal stays reliably in the center of the X-ray beam.

CMOS X-ray Detector

From the company that brought you the first CCD detector, Bruker once again spearheads X-ray detector development with the

revolutionary new PHOTON 100, the first CMOS (Complementary Metal Oxide Semiconductor) detector for X-ray crystallography. The PHOTON 100 employs a novel sensor with the largest active area available anywhere – 100 cm^2 – to deliver the sensitivity and performance you expect. In addition, our unique air-cooled design gives you the ultimate convenience and reliability, backed by our unmatched 3-year detector warranty.

Software

Our excellent hardware is complemented by the world's most advanced software for both instrument operation and data processing. Completely new and highly-efficient collision-avoidance software, based on the latest robotic trajectory-planning algorithms, allows you to make the most of our highly-flexible goniometers and also makes experiment planning easier and more efficient than ever. Data integration, scaling, structure solution, completion and refinement also have powerful software solutions – including the power and convenience of XPRESSO, the first completely automated data processing pipeline.

Our Best-Structure Guarantee – only from Bruker!

Good Diffraction Practice: Your Safety is our Top Priority

The D8 Crystallography Solutions are designed to the most stringent safety standards.

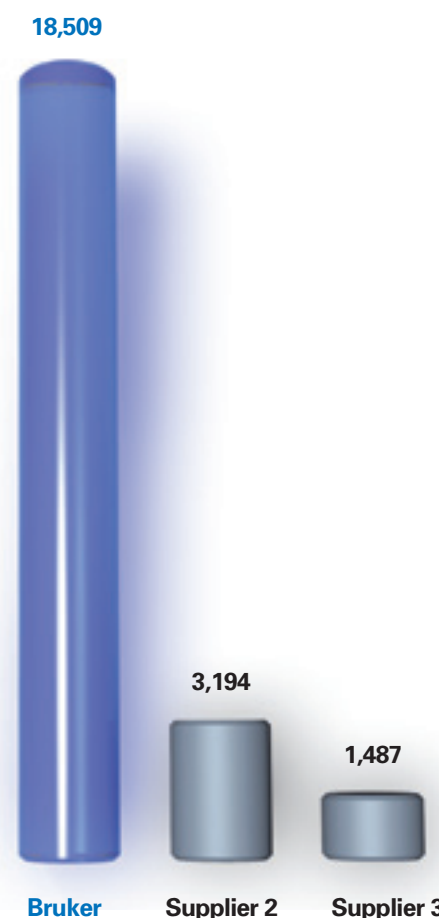
The typical radiation leakage outside the enclosure is more than an order of magnitude lower than EURATOM regulations!

Two independent fail-safe circuits monitor the safety of the system to prevent any accidental radiation exposure, in compliance with the strictest and most recent radiation and personnel safety regulations.

Furthermore, all warning and operating elements are ergonomically installed, clearly visible, and coordinated with one another in an elegant and state-of-the-art design.

Design, development, manufacturing, and installation of our systems fully comply with ISO 9001:2008. Finally, the D8 Crystallography Solutions are the first systems to allow easy sample and beam alignment with the enclosure doors closed, eliminating any potential danger from scattered X-rays during alignment.

Published Structures in Acta E 2004 – 2010 ¹⁾



Conforms to:

- 2006/42/EC
- 2006/95/EC
- 2004/108/EC
- 96/29/EURATOM
- RöV
- DIN EN 954-1 Cat. 3
- DIN EN 61010-1/-2
- CSA C22.2 No. 1010
- EN 61000-6-1/-2/-3/-4
- ... and more

Approved by:

- TÜV
- NEMKO

1) Supplier search results Acta Crystallographica Section E Search terms: Bruker OR Siemens OR Nonius NOT ("Bruker Nonius" OR "Bruker-Nonius")

Kuma OR "Oxford Diffraction" OR Varian Rigaku

X-ray wavelength suitability

X-ray wavelength [K_{α}]:	Ag [0.56089 Å]	Mo [0.71073 Å]	Cu [1.54178 Å]	
Minerals				Mo/Ag
High pressure				
Strong absorbers				
Solid state				
Inorganic				
Charge density				
Absolute configuration				Mo/Cu
Supramolecular				
Organic				
Incommensurate				
Phase transition				
Twinning				
Service crystallography				
Coordination				
Powder				
Proteins				

Best

Riding the Perfect Wave

Matching the right wavelength to your sample can significantly improve the quality of the experiment.

Molybdenum (Mo) radiation is most often the wavelength of choice for chemical crystallography and is most widely used for structure determination of a wide variety of samples. One of the reasons for Mo radiation's popularity is that even compact area detectors can cover reciprocal space to atomic resolution with just one detector setting for fast and convenient data acquisition.

Copper (Cu) radiation's stronger interaction with the sample leads to stronger diffracted intensities, but data collection is more challenging because large diffraction angles are necessary to collect data to atomic resolution. Bruker pioneered sophisticated data collection strategy software and thus initiated the renaissance of Cu radiation for weakly diffracting organic molecules and absolute-configuration experiments.

Silver (Ag) radiation, even shorter in wavelength than Mo radiation, has minimal absorption and extinction effects and allows data collection to higher resolution. Diffracted intensities from traditional sealed tubes are very weak, and only with Bruker's introduction of high-intensity Ag microfocus sources has the application of Ag radiation become practical again.

Moly is everybody's darling!

The sealed tube/flat monochromator combination delivers a large top-hat-shaped beam with moderate intensity and is ideal for larger samples.

The TRIUMPH monochromator increases the incident intensity compared to a flat monochromator by a factor of three and is the best choice for facilities that investigate crystals with a wide range of sizes.

The μ S microfocus source is perfectly matched with high-performance multilayer optics and provides a small, high-intensity X-ray beam that is ideally suited for the smallest and most weakly diffracting crystals.

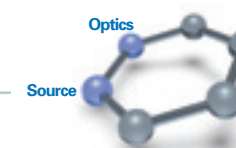
Copper intensity is king!

The sealed tube/flat monochromator combination delivers a large top-hat-shaped beam with good intensity. Combined with monocapillary optics, the intensity can be doubled. This setup is ideal for larger organic samples.

The μ S microfocus source with high-performance multilayer optics guarantees outstanding intensity in a small X-ray beam that is ideally suited for the smallest crystals.

The silver bullet!

Advanced deposition techniques have finally brought us high-performance Ag multilayer optics that are perfectly matched to μ S microfocus sources. Ag μ S systems produce a small high-performance beam, and are exclusively available from Bruker. They provide extensive benefits for solid-state compounds and charge-density experiments to the highest resolution.



Sealed tube with Mo or Cu radiation



μ S X-ray source with Mo, Cu or Ag radiation



Detector

PHOTON 100: Answer Tomorrow's Questions Today



PHOTON 100 detector, air-cooled



CMOS sensor, 100 cm²

Detectors for crystallographic applications require a unique combination of sensitivity, speed, dynamic range, resolution, and detector size.

Welcome CMOS, thank you CCD, and bye-bye taper!

CMOS (Complementary Metal Oxide Semiconductor) technology has undergone an impressive wave of advancement, and is now the perfect solution for high-performance crystallography. CMOS technology pioneers the implementation of very large sensors, unachievable with CCD manufacturing processes. Because large CCD sensors are not possible, other detector manufacturers have resorted to optical demagnification, using fiber optics to create a larger active area.

CMOS overcomes the disadvantages associated with CCD glass taper technology.

1. Size: The CMOS sensor is four times larger than the CCD chips typically used for crystallography.
2. Signal loss: 1:1 detection without the taper demagnification that causes about a 80% loss of signal in taper-CCD detectors.
3. Spatial resolution: CMOS does not suffer from the smearing and distortion introduced by glass tapers.

Conclusion: Glass fiber taper magnification is a bad compromise and a flawed way to compensate for the small size of CCD sensors.

CMOS sensors also overcome intrinsic electronic problems of CCD chips.

1. CMOS does not suffer from blooming or streaking. With CCDs, a strong reflection can saturate a pixel and cause a vertical streak. There is no electronic way to ever recover this lost data. In CMOS sensors, the blooming effect does not occur. Therefore, CMOS sensors handle strong reflections significantly better and, in particular, improve the low-resolution data quality.
2. Low power consumption of CMOS compared to CCD significantly improves sensor reliability and detector lifetime. The CMOS is a low-maintenance sensor that allows air cooling and does not require vacuum insulation, thus there is no need to periodically re-pump the detector as in most CCDs.
3. Larger pixels have a greater volume and provide a greater full well (i.e., electron capacity) for a high dynamic range. Matching the pixel size to the scintillator screen's point spread produces superior signal quality.

Conclusion: CMOS makes the electronic problems inherent to CCD chips a thing of the past.

PHOTON 100 with CMOS – welcome to the future!

Superior PHOTON 100 detector

CMOS Chip: 10.0 cm * 10.0 cm = 100.0 cm² chip size



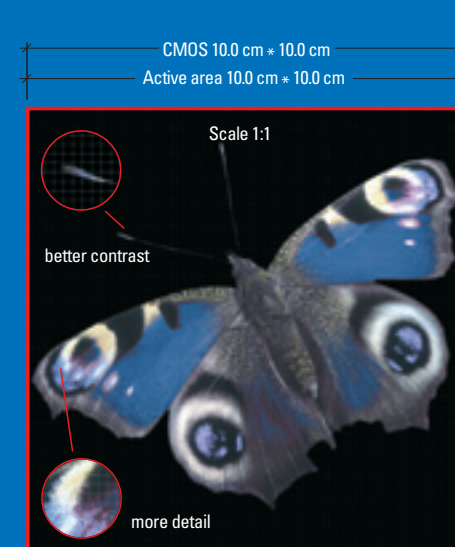
Scale: 1:1



No Blooming



High Transmission



- Large 100-cm² sensor for fast and efficient data collection
- Low-power-consumption sensor for high reliability: backed by our unique three-year detector warranty
- Air-cooled for low maintenance
- No glass fiber taper for superior spatial accuracy and high sensitivity
- Optimized pixel size and point-spread function for superior signal
- Large pixel volumes for best light conversion
- Fast readout for fast data collection
- No frame correlation needed
- No blooming or streaking
- Perfect match of the pixel size and the point spread of the high-resolution scintillator screens

Conventional Taper detector

CCD Chip: 5.0 cm * 5.0 cm = 25.0 cm² chip size



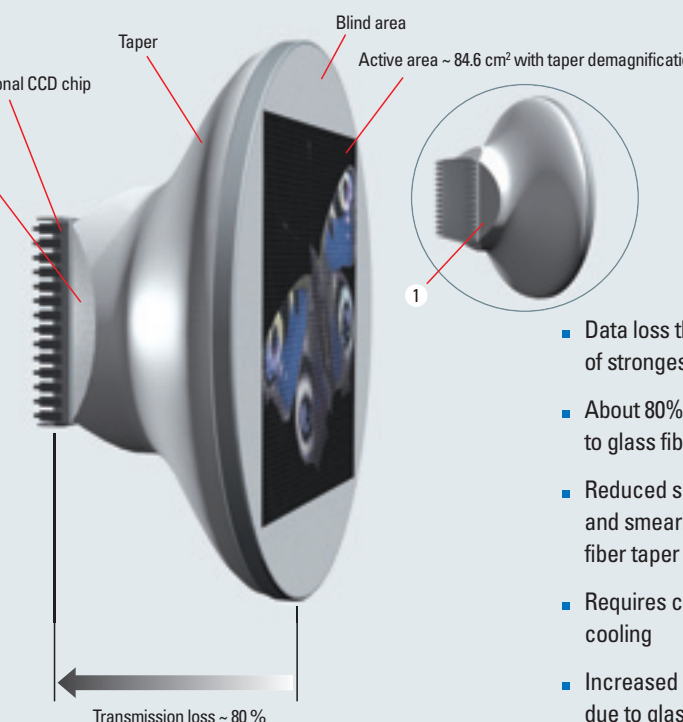
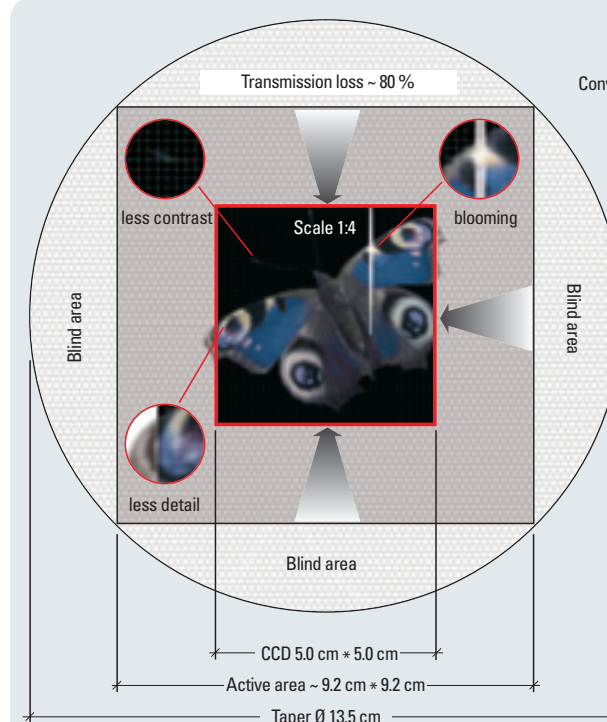
Scale: 1:4



Blooming



Low Transmission



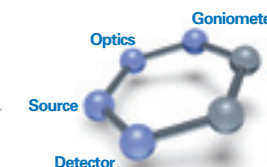
- Data loss through blooming of strongest reflections
- About 80% signal loss due to glass fiber taper
- Reduced spatial resolution and smearing due to glass fiber taper
- Requires chiller for detector cooling
- Increased size and weight due to glass fiber taper



PHOTON 100 CMOS detector:
air-cooled, single-phase power



IμS X-ray source:
air-cooled, single-phase power



Da Vinci in Mind – D8 Crystallography Solutions

“Leonardo da Vinci is revered for his technological ingenuity and his extraordinary powers of invention. Leonardo developed a unique new attitude towards machines. He reasoned that by understanding how each separate machine part worked, he could modify them and combine them in different ways to improve existing machines. Leonardo set out to write the first systematic explanations of how machines work and how the elements of machines can be combined.”

“Wisdom is the daughter of experience.”

“Never be satisfied...” – this philosophy has always driven our development engineers, whenever designing a new diffraction system. Furthermore, decades of experience have taught us the most important principles: incorporate users’ feedback, and address their needs! So today, this allows us to offer our customers the most advanced D8 Crystallography Solutions ever – ready for the structures to come.

“Poor is the pupil, not surpassing his master.”

With a number of major breakthroughs in technology, the time is ripe for the next generation of X-ray instruments. Our new D8 Crystallographic Solutions are the next “big thing” and the future-proof platform for X-ray diffraction! Structure determination will benefit from the new features and capabilities of our D8 QUEST and D8 VENTURE. Both open the doors to best structures, best performance, and more possibilities in the world of crystallography.

“Simplicity is the ultimate sophistication.”

Our D8 Crystallography Solutions offer more and need less. More flexibility, better ease of use, and better safety – paired with less energy consumption, less need for service, and no water supply.

**To keep it simple, we call it:
DAVINCI design with DAVINCI.BLUE.**



DAVINCI.BLUE

We have designed the IμS microfocus source and the PHOTON 100 detector with the principles of Da Vinci in mind. Both feature low energy consumption and do not need water cooling. These benefits significantly reduce the cost of ownership and also improve reliability.

These cost savings come with no compromises. DAVINCI.BLUE configurations also feature the very highest performance.

Low energy
+ **no water supply**
+ **Da Vinci in mind**
= **DAVINCI.BLUE!**

saves
26 t of CO₂
per year*



No Water Supply

- Air-cooled PHOTON 100
- Air-cooled IμS microfocus source
- No external chillers required

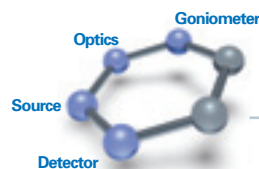
saves
1,700 m³
cooling water
per year*



Single-phase Power

- Ultra-low power consumption of the PHOTON 100
- IμS delivers beam intensities that easily outperform traditional 5-KW rotating-anode generators
- IμS uses 99% less energy than conventional rotating anodes
- Single-phase power, standard circuit breaker available for the first time in high-end research instrumentation for single-crystal diffraction

saves
43,000 kWh
electrical energy
per year*



D8 QUEST and D8 VENTURE: Systems as Individual as Your Research

We are proud to present the new D8 Crystallographic Solutions, with an abundance of unparalleled innovations.

With our D8 Crystallographic Solutions with DAVINCI design, we are introducing a pioneering diffractometer concept with flexibility and modularity. The D8 QUEST and the D8 VENTURE can be perfectly configured for the demands of any imaginable application in single-crystal X-ray diffraction.

Just follow three simple steps:

1. Choose your preferred wavelength from a wide variety of X-ray sources and optics.
2. Combine it with the goniometer and enclosure of your choice.
3. Add the extra-large, state-of-the-art PHOTON 100 CMOS detector.

Now you are ready to run the most sophisticated analytical experiments. Do you need two wavelengths at your fingertips? OK, these configurations are also readily available with our D8 Crystallographic Solutions and, in addition, a single-source instrument is upgradable at any time.

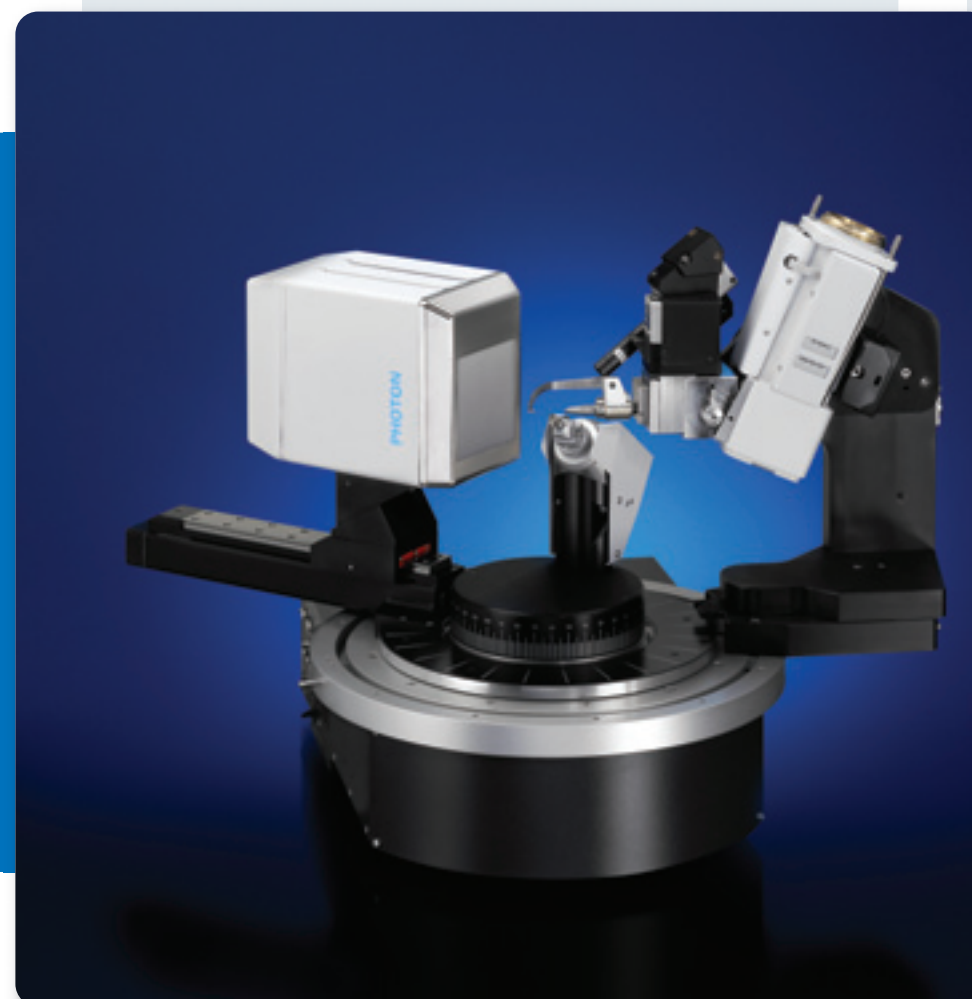
DAVINCI.MODE provides the real-time status of the configuration and components, carefully logged and safely stored with all other experiment information, ready to use for automated report generation and publications.

D8 QUEST and D8 VENTURE are both built for excellent sample access and sample visibility. Their absolutely open design protects your investment with maximum flexibility for future extensions.

Make your choice and get the best possible structure from your sample – guaranteed!

D8 QUEST

- Small foot print without sacrificing experimental flexibility
- Accommodates single-source configurations
- Exterior dimensions: 187 cm (h) · 130 cm (w) · 114 cm (d)

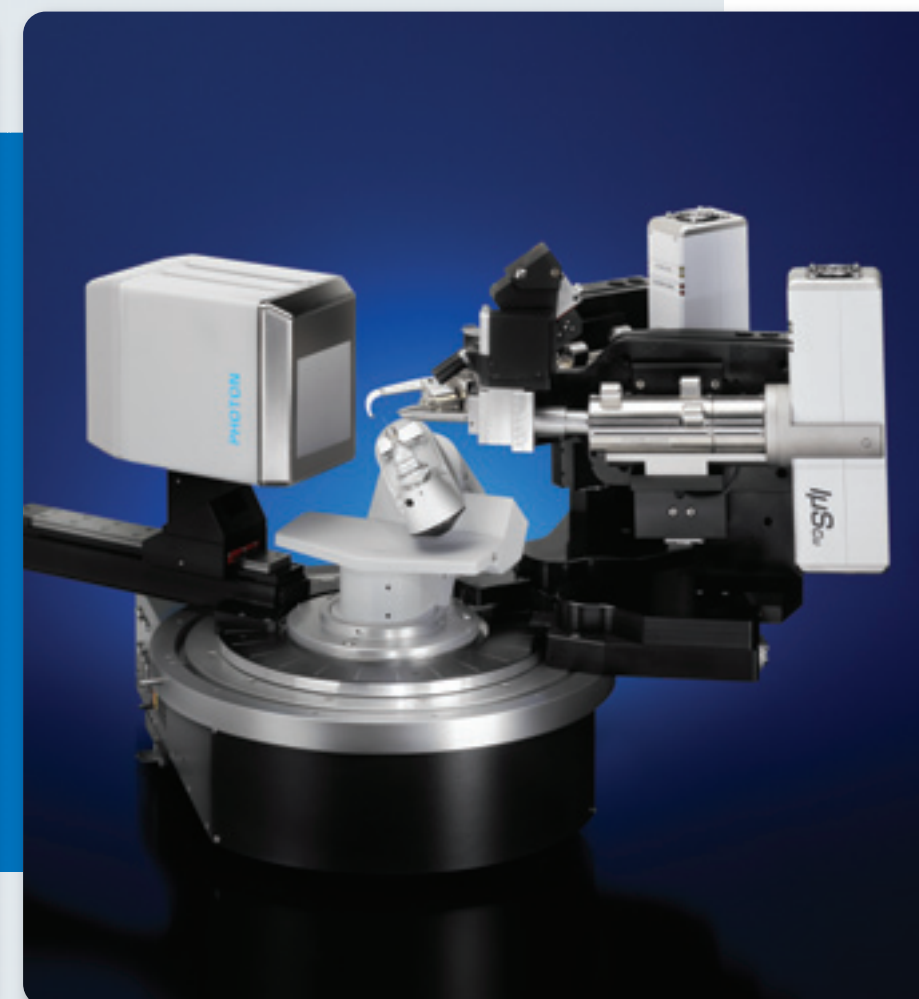


D8 QUEST single source configuration with Mo sealed source, FIXED-CHI and PHOTON 100

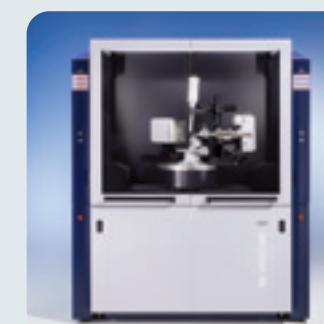


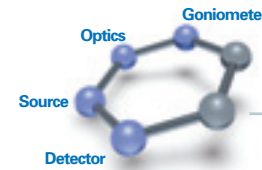
D8 VENTURE

- More room for dual-wavelength setups
- Accommodates single- and dual-source configurations
- Exterior dimensions: 202 cm (h) · 168 cm (w) · 129 cm (d)

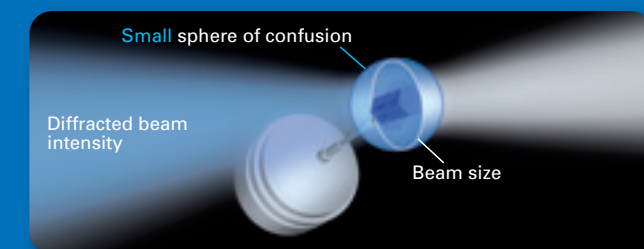


D8 VENTURE dual source configuration with Mo μ S, Cu μ S, KAPPA and PHOTON 100





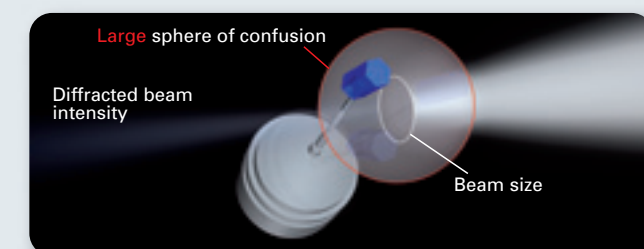
FIXED-CHI or KAPPA goniometer



Our D8 goniometer is designed for the highest accuracy and precision, superb alignment, and long-term reliability. Our goniometer has the smallest error in intersection of the instrument axes, provides the

best sphere of confusion, and is unsurpassed by any other goniometer. Even the tiniest microcrystal stays reliably centered during the entire data acquisition, guaranteeing the best possible structure.

Standard Goniometer

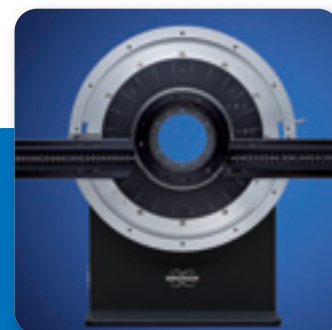


A large sphere of confusion is a serious problem for large crystals because the scattering volume significantly fluctuates. Tiny crystals may even move out of the beam completely.

The smaller the beam, the more pronounced this problem becomes. This inhibits proper scaling and absorption correction, and results in systematically poor structures.

Collision Protection

- Revolutionary collision-protection software using optimized algorithms for goniometer control.
- Software uses a 3-D model of the current hardware configuration for real-time collision avoidance.
- Extension with custom 3-D models is possible.



FIXED-CHI or KAPPA goniometer

- Sphere of confusion (SOC) < 7 micrometers
- Best scaling for highly absorbing samples
- Constant sample scattering volume in the beam
- Highest intensity from microcrystals

KRYOFLEX II with Auto-Refill

Crystal cooling to low temperatures allows data collection on sensitive samples and significantly improves data quality.

- Full system integration
- Temperatures range from 80 K to 400 K
- Temperature stability of better than 0.1 K
- Low nitrogen consumption



Best Beam Conditioning

Beam collimation is a fast and simple way to tailor the beam size and divergence to the demands of the sample.

- SNAP-LOCK mount for simple exchange and excellent precision
- Component recognition
- Set of optimized collimators included

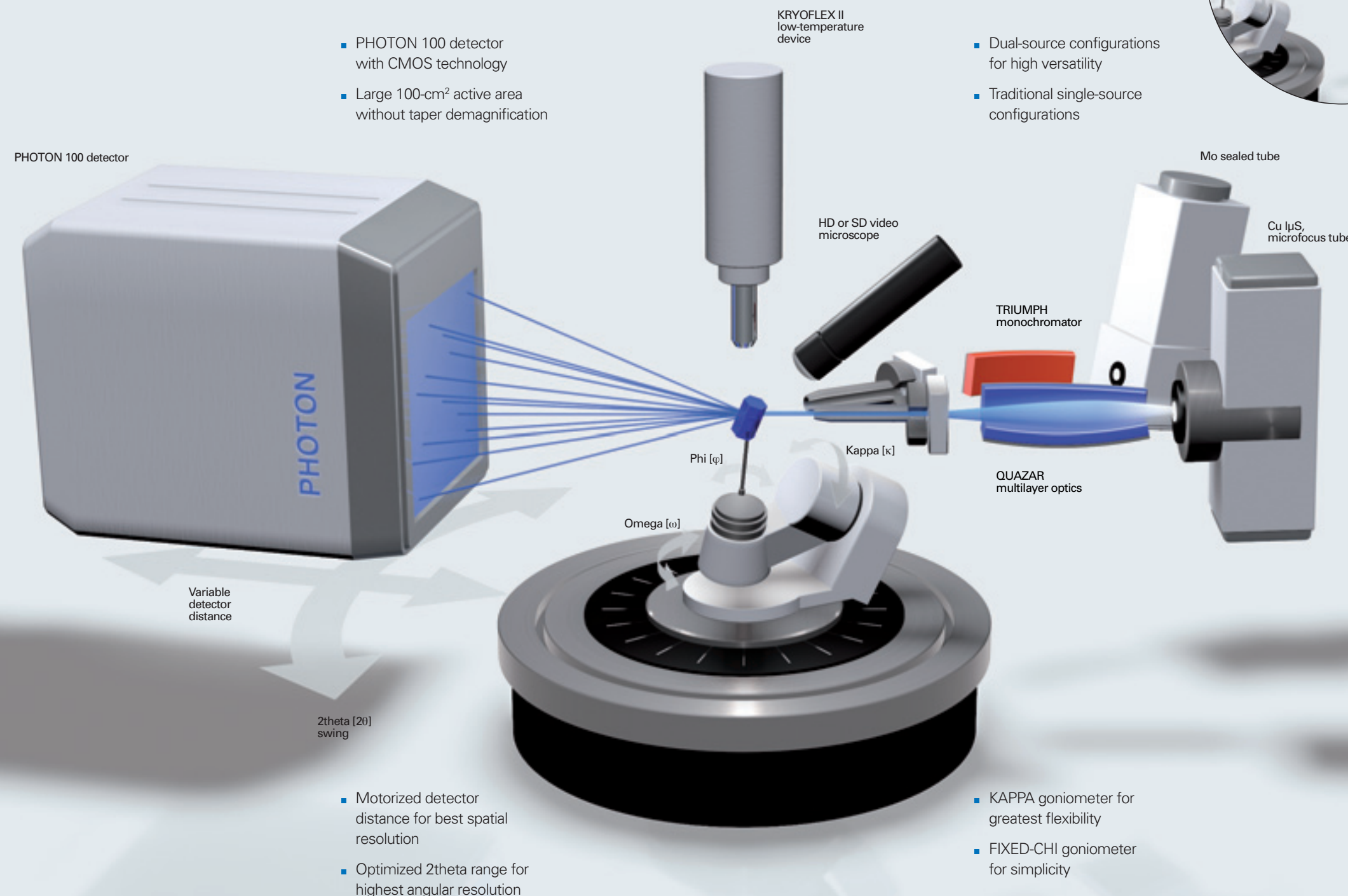
Love FIXED-CHI? Prefer KAPPA? We Invented Them Both!

Whatever your goniometer of choice – three-axis FIXED-CHI or four-axis KAPPA – optical encoders ensure extremely high angular precision and fast goniometer positioning enhances productivity, no matter what the focus of your applications. What would a high-precision goniometer be without easy crystal mounting and constant sample monitoring? The new D8 Crystallographic Solutions make sample alignment a real pleasure: large doors give you excellent access to the goniometer. Polarized lenses and dimmable LED sample illumination greatly enhance the crystal image quality. The crystal image is captured by a high-resolution video microscope that can be viewed remotely during the entire experiment.

The new beam path was designed for easy downstream alignment and maximizes the accessible 2theta range for high-resolution work. This is an important asset for your charge-density studies or data sets with copper radiation that require high-2theta data.

In addition to the tube's safety shutter, a precisely synchronized experiment shutter ensures the most accurate exposure timing and attenuation of the X-ray beam when necessary. The robust goniometer allows secure attachment of components for crystal conditioning.

Diffractometer geometry



TRIUMPH Monochromator

The curved TRIUMPH monochromator for Mo K_α sealed-tube systems provides a threefold intensity gain compared to conventional monochromators.

- Small- to large-sized crystals benefit equally – ideal for service crystallography
- Homogeneous, top-hat-shaped beam profile



FIXED-CHI Goniometer

The 3-circle FIXED-CHI sample stage provides an ingenious solution with only a small number of moving parts. The open geometry has minimal obstruction and allows easy mounting of additional crystal-conditioning devices.

- Supports a 360° phi drive at the magic angle of 54.7°
- Highly efficient data collection using precise omega scans
- Easy-to-use geometry

IμS for Cu, Mo and Ag Radiation

The IμS microfocus source excels with low maintenance and high reliability.

- Up to 60% higher intensity due to improved heat management
- Third-generation optics with superb accuracy, excellent reflectivity and precision
- Best spectral purity and a close-to-zero X-ray background
- Ag radiation – exclusively from Bruker
- Three-year source warranty



KAPPA Goniometer

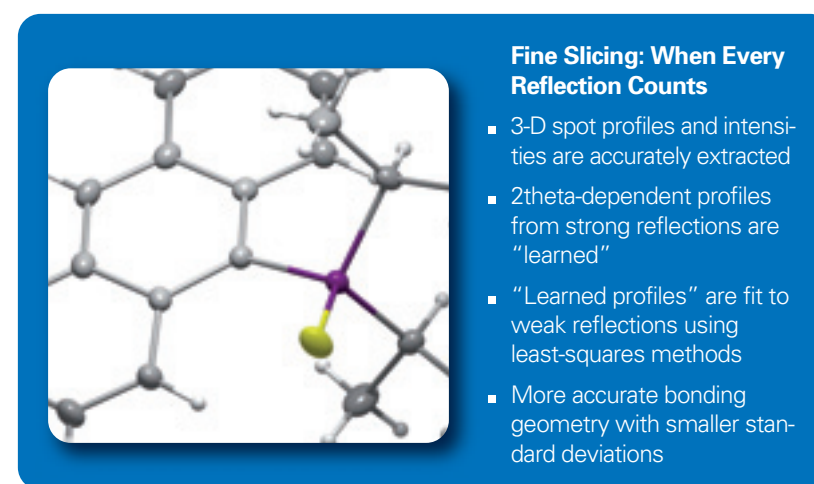
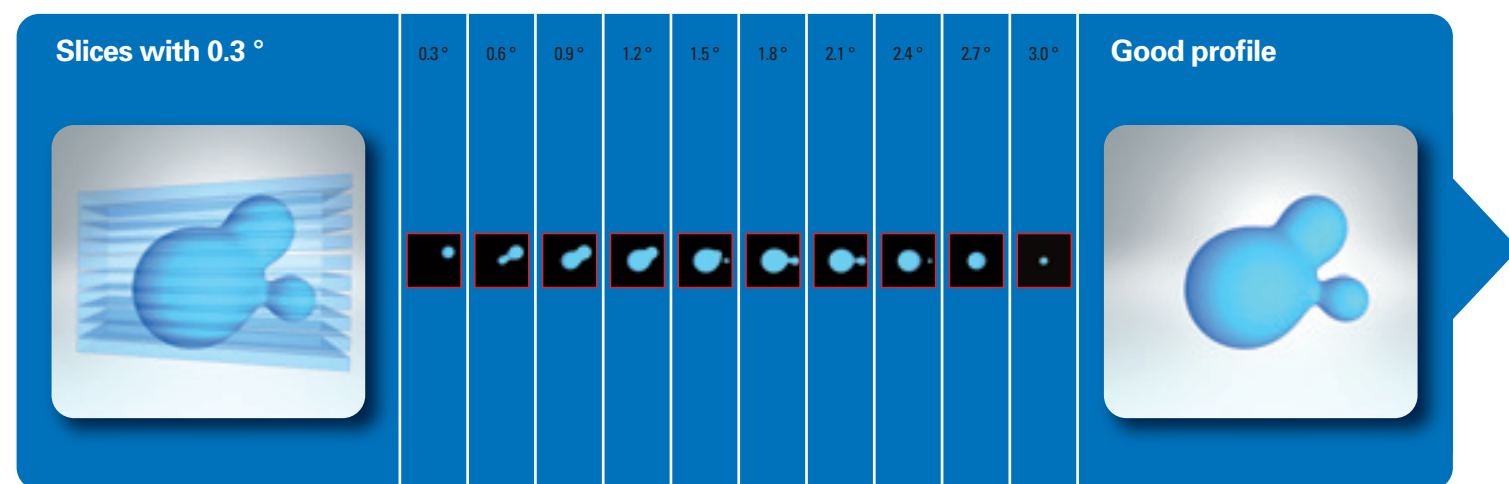
The open geometry of the KAPPA four-circle goniometer offers ultimate sample-positioning freedom for the collection of a nearly infinite number of independent observations. The motorized detector track is automatically adjusted to the optimal detector-to-sample distance based on unit cell dimension and crystal quality.

- Oriented images
- Friedel pairs on the same frame
- Long-unit-cell samples with the shortest detector-to-sample distance

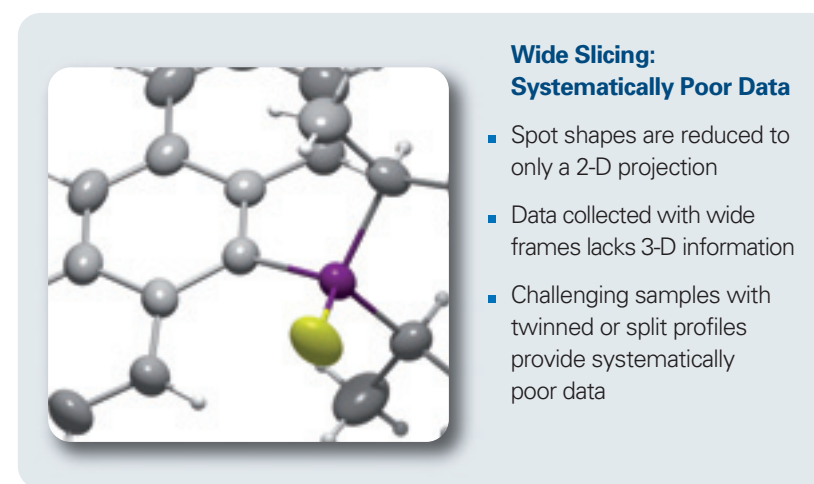
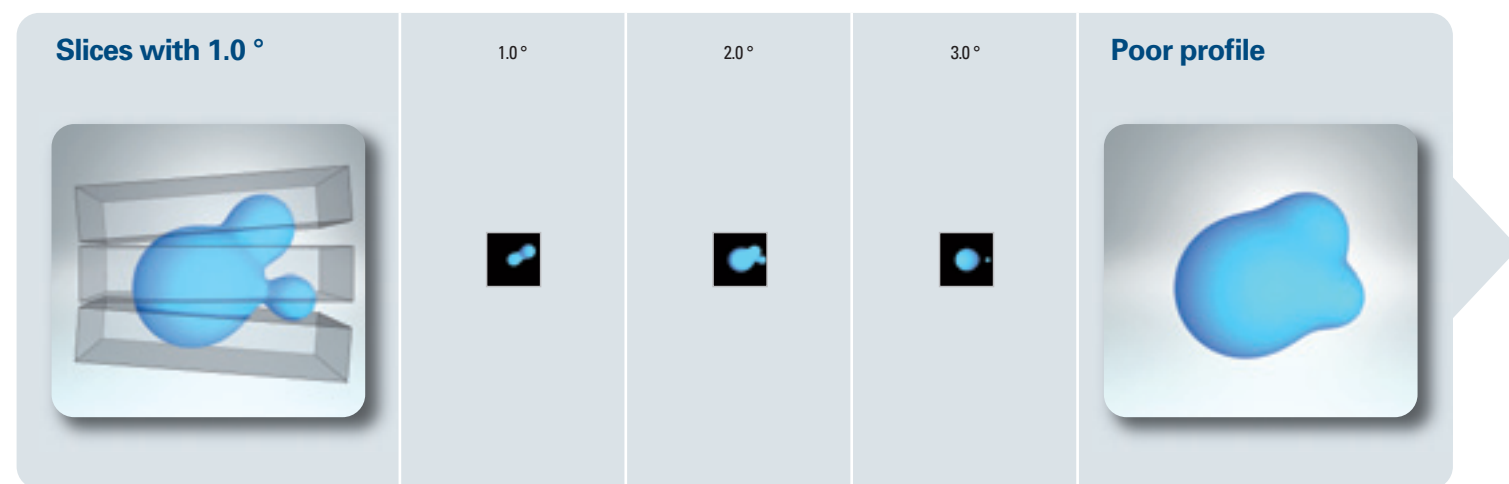
- Reflections have a three-dimensional shape and an intensity profile
- Images acquired in fine slicing mode best preserve three-dimensional information
- APEX2 software is best for integration of even weak reflection intensities
- Intuitive graphical user interface
- Expert tools for advanced crystallography
- Fully-automated structure determination module
- Easy instrument access via client/server using TCP/IP protocols
- Database storage of all relevant experiment information
- Report generation based on templates for easy CIF publication
- HTML reports with interactive molecule display
- Windows and Linux support
- Hardware protection via reliable real-time anti-collision software



Best Hardware + Best Software = Best Structure



Our APEX2 software guides you through the complete experiment with minimal input and maximum graphical feedback, and allows you to focus on the structure determination at hand. Use APEX2 to launch data collection or integration modules with a mouse click. The GUI keeps you informed about the progress and quality of the structure determination process. Underlying engines for data acquisition, unit cell determination, data integration, and scaling utilize the world's best algorithms to generate superior data. Benefit from built-in expert knowledge about instrument geometry and data collection strategies.



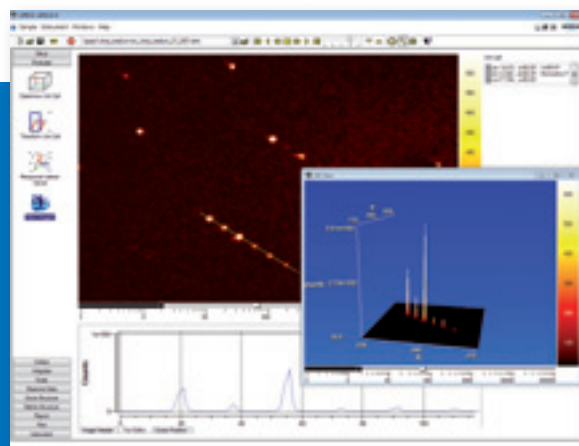
From diffraction spots to accurate intensities.

Reflections have a three-dimensional intensity distribution. Our software is dedicated to preserving this information by acquiring diffraction images in fine slices – a few tenths of a degree apiece. Data collected with wide frames lack 3-D information because spot shapes are reduced to their 2-D projections. Our integration software extracts the 3-D spot profiles and their intensity distribution, and learns 2theta-dependent profiles from strong, well-defined reflections in your data set. The software fits the “learned profiles” to weak reflections using least-squares methods. This provides the best possible extraction of weak reflection intensities. Particularly for challenging samples – where every reflection counts – this approach makes a big difference, and our data quality always prevails. Our software is the only package that applies profile information for twinned, split, or modulated crystal data.

Image Analysis

The intuitive APEX2 graphical interface provides all the tools for image analysis, including:

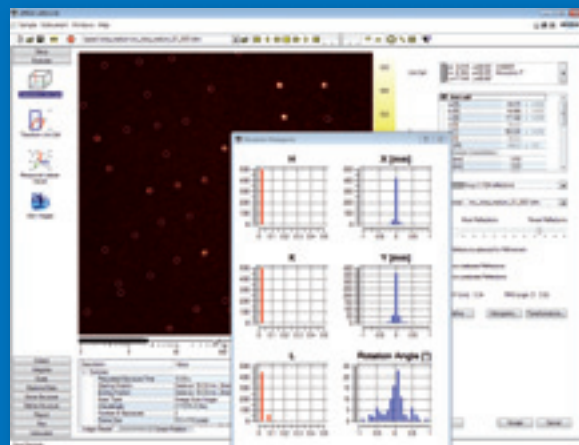
- zoom and panning,
- 3-D views,
- line graphs,
- rocking curves,
- resolution rings,
- and many more...



Unit Cell Determination

A novel combination of Fast Fourier and Difference Vector techniques indexes the most difficult data reliably.

Full non-linear least-squares cell refinement with graphical feedback, overlay of spots, Bravais lattice determination, and tools for matrix manipulation complete this module.

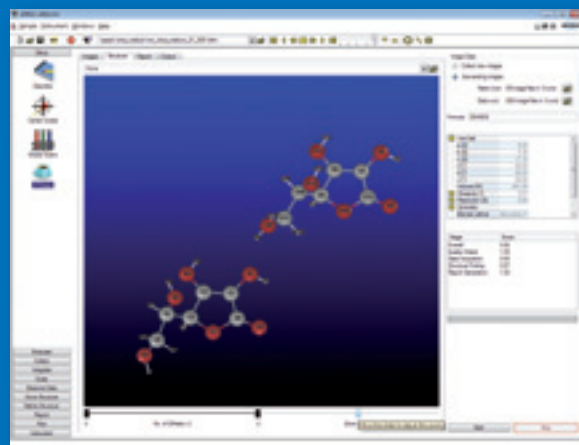


Automated Structure Determination

Just specify the formula, and let XPRESSO do the rest.

The module will automatically determine data quality of your sample and plan the best data collection strategy, process all data, and solve and refine the structure.

The module provides molecular graphics and a complete HTML report with all tables and information necessary for publication.

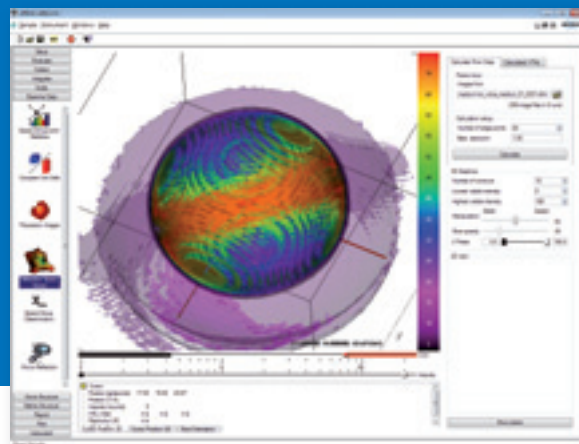


Diffraction Space Viewer

Display the complete reciprocal space as a volume, reconstructed from diffraction images.

The module allows investigation of textured samples, fibers and non-Bragg diffraction.

The GUI provides free rotation, zoom, and display of slices.

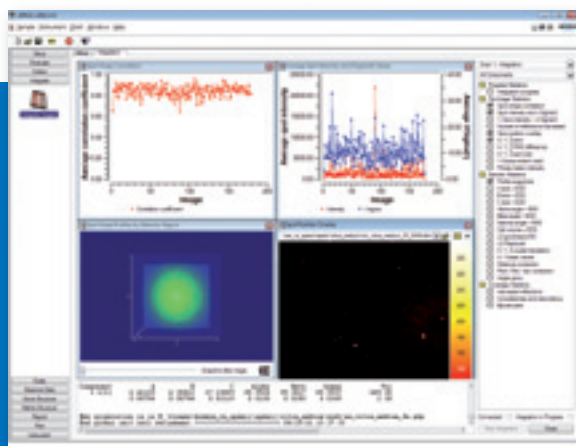


Data Integration

True 3-D integration with algorithms optimized for narrow and wide scans.

The best and fastest integration software for standard structures and more challenging data like twins and incommensurates.

On-the-fly integration with intensive feedback including integration progress and quality, 3-D reflection profiles, multiple component spot overlays, and many more...

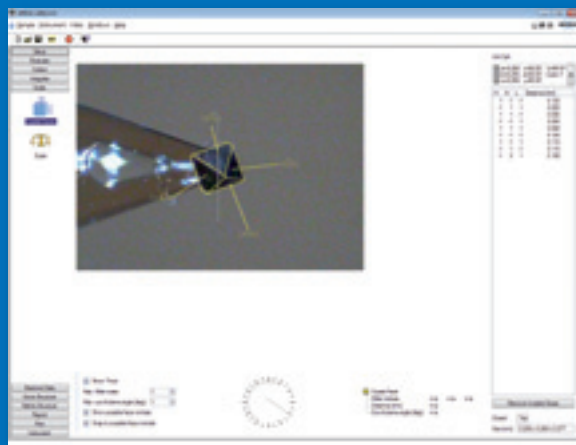


Face Indexing

Built to dimension!

Crystal description for numerical absorption correction is only a few mouse clicks away.

Determine the crystal shape from a pre-recorded movie with easy-to-use tools and intelligent helpers.



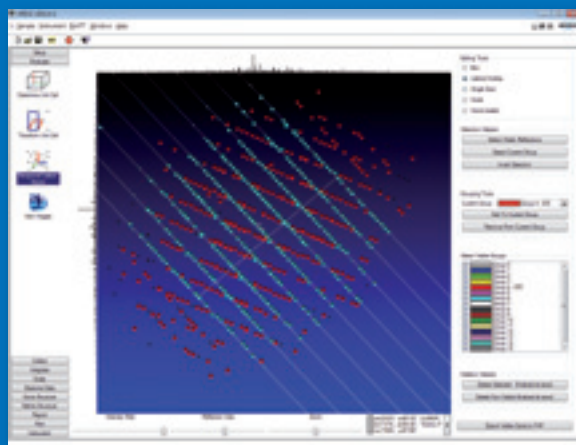
Reciprocal Lattice Viewer

Display and interactively modify a reflection array.

Remove artifacts from strong amorphous scatterers.

Visually separate twin components and determine q-vectors of incommensurates.

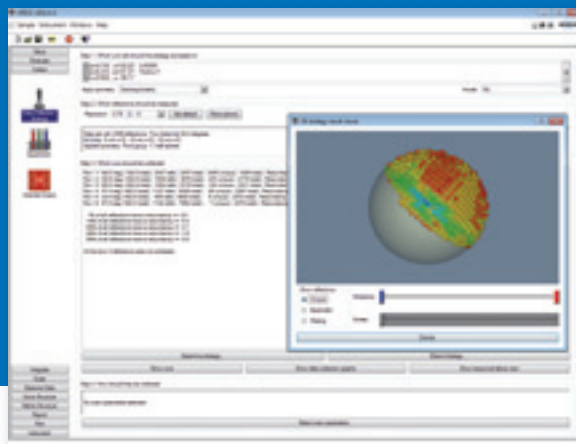
A powerful tool for tackling the most challenging problems, as well as a great teaching tool.



Data Collection Strategy Planning

Specify multiplicity and the time you want your experiment finished, and the strategy planner will make sure that you get complete data fast!

Data collection of this triclinic sample will be complete in less than two hours with the specified redundancy.



APEX2 Software Suite – the Must-Have Solution for Crystallography

SADABS and TWINABS – the champions for fast scaling.

During data collection, the X-ray beam takes different pathways through the crystal resulting in “true multiplicity.” True multiplicity is important for data scaling and multi-scan absorption correction and, in addition, allows a proper error analysis for accurate standard deviations of reflection intensities. State-of-the-art analytical absorption correction using indexed crystal faces can be directly applied here. SADABS and TWINABS – the tool for twinned sample data – have set standards with respect to accuracy and speed.

SHELXTL™ – the standard for reliable structure solution and refinement.

SHELXTL – the extended, proprietary version of SHELX – is the heart of the APEX2 software suite. XPREP has all tools built in for unambiguous space group assignment, statistical analysis, display of calculated Patterson sections, de-twinning of merohedral crystals, and much more. XS and XM form the core of the structure solution package. XL is the most popular refinement program, extensively tested on many thousands of structures. XP and XSHELL provide atomic and molecular graphics for interactive structure refinement and structure display.

AUTOSTRUCTURE – a built-in chemist.

AUTOSTRUCTURE is a module for the automated completion of the structure. It is ideal for synthetic chemistry research groups.

It knows all the tricks for solving and refining a crystal structure. AUTOSTRUCTURE nicely reduces the workload of service crystallographers and lets them focus on the more challenging aspects of crystallography.

Report generation and CIF editing.

Bruker’s flexible template-based report generation module has transformed the tedious task of writing reports into an automated process. The HTML report incorporates an interactive molecule display that not only displays the molecule but also provides tools for interacting with structures, including measuring distances and angles.

XPRESSO – automation at its finest.

Service crystallographers are often overwhelmed by an enormous workload. Ordinary crystals often do not provide a crystallographic challenge, but the vast number of crystals to be handled prevents crystallographers from focusing on challenging problems. We are therefore proud to introduce XPRESSO, an application that drives the complete experiment. You mount the crystal, you start XPRESSO, and we provide you with the CIF file of the structure. Of course, XPRESSO may encounter crystallographic problems requiring a human scientist. In these cases, it defers to you: the expert.

APEX2 – easy to use for the novice, with all the features for the experts!



Join the Bruker User group!

Using a Bruker system gives you instant access to the Bruker SC-XRD User Group, a global scientific network linking scientists from more than 1,000 Bruker installations.

For many years, this group has been steadily growing – along with its collective experience and knowledge.

Sit Back and Relax – You Can Count on Us!

At the pulse of your system.

Bruker understands that customer support means much more than providing help when the roof is on fire. That is important, but Bruker's support is far more comprehensive: we successfully run a dedicated global customer support network that guarantees the best support for your system – easy, reliable, expert, and cost-effective.

Your local partners – with more than 160 technicians worldwide – know all the bits and pieces of your system and its history. They provide installation and subsequent help, whenever it is needed.

Our customer support team is keeping itself in good shape at our factory training center and will be ready for you – online or on site.

Technical Data

Configuration	D8 QUEST	System for Single Crystal Diffraction with one X-ray source			
	Exterior dimensions (h x w x d)	187 x 130 x 114 cm			
	Weight	approx. 750 kg ¹⁾			
	D8 VENTURE	System for Single Crystal Diffraction with one or two X-ray sources			
	Exterior dimensions (h x w x d)	202 x 168 x 129 cm			
	Weight	79.5 x 66.0 x 50.6 inch approx. 950 kg ¹⁾			
Detector	PHOTON 100	100-cm ² CMOS Sensor			
	Active area	Air-cooled			
	Cooling	1,024 * 1,024			
	Sensor format	5,000,000			
	Sensor Full well (electrons)	96			
	Pixel size (microns)	1:1 (no taper)			
	Demagnification	450			
	Quantum gain (electrons, Mo K α)	1.8 (t < 10 s); 1.7 (t = 120 s)			
	Signal-to-noise				
X-ray sources	Sealed tube	Copper, Molybdenum			
	Available wavelengths	Min. 4 l/min, temperature: 10 °C to 20 °C			
	Cooling water supply	Single-phase: 208 to 240 V or Three-phase: 120 V, 230 V, 240 V; 47 to 63 Hz			
	Power supply				
	µS Microfocus Source	Copper, Molybdenum, Silver			
	Available wavelengths	Air-cooled			
	Cooling water supply	Single Phase: 120 V, 240 V; 47 to 63 Hz			
	Power supply				
Goniometer	Stepper motors with optical encoders				
	2theta, omega				
	2theta Angular Range ¹⁾	better than -148° to +159°			
	omega Angular Range ²⁾	-270° to +270°			
	Speed	0.00°/min – 1200°/min			
	Accuracy	0.005°			
	Reproducibility	0.0002°			
	Manual Detector Mount				
	Range ²⁾	30 – 240 mm, including distance detection system			
	Motorized Detector Mount				
	Range ²⁾	30 – 240 mm			
	Speed	900 mm/min			
	Accuracy	≤ 50 µm			
	Reproducibility	≤ 10 µm			
Stages	FIXED-CHI Stage				
	Stepper motor with optical encoders	Angular Range	Speed	Accuracy	Reproducibility
	phi	n * 360°	0.00°/min – 1,500°/min	0.025°	0.001°
	chi Magic Angle	54.7°			
	KAPPA Stage				
	DC motors with optical encoders	Angular Range	Speed	Accuracy	Reproducibility
	phi	n * 360°	0.00°/min – 3,000°/min	0.015°	0.001°
	kappa	-175° to +175° ²⁾	0.00°/min – 1,000°/min	0.015°	0.001°
Sphere of confusion	< 7 µm				

¹⁾ single source system, depending on configuration and accessories

²⁾ depending on accessories and detector position

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