Anton Paar

The SAXS/WAXS/GISAXS/RheoSAXS laboratory beamline

SAXSpoint 5.0

Ready for all future challenges

ONE SYSTEM FOR ALL EXPERIMENTAL CONDITIONS

Choose sample stages and holders for almost any application to characterize the sample under ambient and non-ambient conditions. Feel free to take advantage of the in-house expertise of Anton Paar. We are happy to design and manufacture customized solutions with you at any time.

SAXS

The highest resolution in a compact system – q_{min} = 0.01 nm^{-1} at 3.60 m system length.

Moving detector for fully automatic change of the sample detector distance (SDD) from ≤45 mm to >1600 mm.

WAXS

Optional static or movable WAXS module for simultaneous SAXS/WAXS studies.

GISAXS

Non-ambient GISAXS stage for GISAXS/GIWAXS measurements in the temperature range from -150 °C up to +500 °C.

BioSAXS

Robust high-throughput autosampler for sampling up to 192 samples from 96-well plates. High-precision injection of sample volumes down to 10 µL or less.

RheoSAXS

The clever combination of two world-class Anton Paar instruments: SAXSpoint 5.0 and the renowned DSR 502 dynamic shear rheometer (based on the MCR rheometer series).

The first commercially available setup for studying structural and rheological properties simultaneously in one setup in your lab.

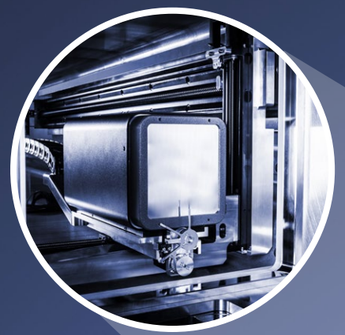
USAXS

For extending the size range to the micrometer scale – resolve particle sizes of >2.5 µm.

SAXSpoint 5.0 at a glance

SAXS and WAXS data in one go with the moving detector feature

SAXSpoint 5.0 integrates Slidemaster, a moving detector for automatic X-ray scattering experiments in a wide q-range. When combined with the patented TrueSWAXS feature you can vary the sample-to-detector distance (SDD) from ≤45 mm up to >1600 mm.



Excellent data quality in the shortest measurement time

SAXSpoint 5.0 has brilliant X-ray sources which give you brilliant results without resolution limits. It employs powerful standard microfocus or MetalJet X-ray sources combined with customized high-precision optics for ultimate flux and brilliance. Collect SAXS data at the highest resolution with a minimum scattering angle of q_{min} = 0.01 nm^{-1} at remarkable X-ray flux.

Synchrotron detector technology in a lab-scale instrument

With SAXSpoint 5.0 you get data quality at almost synchrotron level. It integrates the latest Dectris EIGER2 R detector series into a lab-scale SAXS system to provide exceptional data quality. For beamstop-less operation, EIGER2 R can be used in a windowless mode.

Automatic alignment of all components for easy and fast switching between configurations

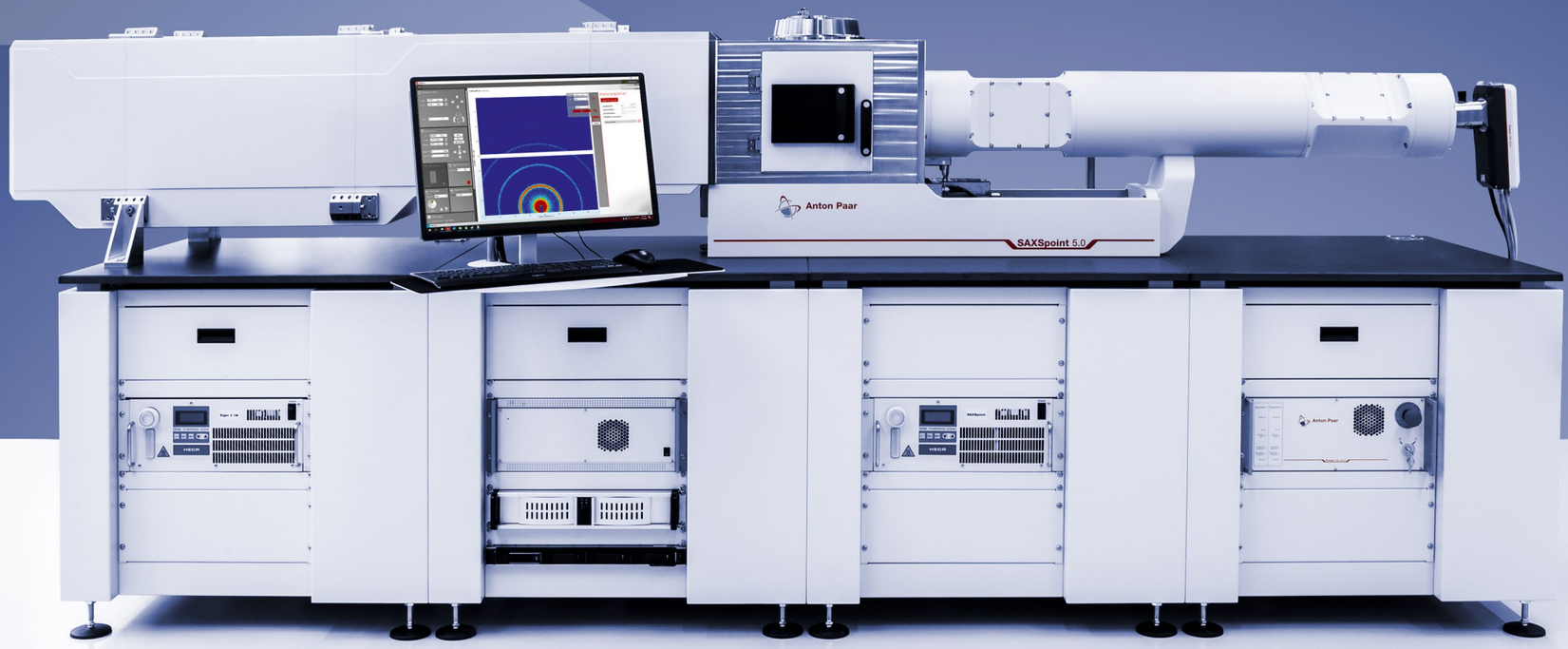
With TrueFocus you only need to focus on your sample. Alignment of all X-ray components and sample stages is automatic and precise, leading to the best possible results for your setup. This also eliminates configuration mismatches that might lead to inaccurate results, especially in the case of inexperienced users.

Automatic recognition of sample stages reduces setup time

Stagemaster helps you avoid errors by automatically recognizing the mounted sample stage and configuring the system accordingly.

Automatic beamstop selection and positioning simplifies your daily lab routine

Save time when setting up: A motorized rotor selects from three different beamstop sizes and then positions the beamstop automatically. The windowless mode of the Eiger2 R detectors even enables beamstop-less operation.



Choose your X-ray source

Achieve measurements down to ultra-low scattering angles of q_{min} = 0.01 nm^{-1} at high X-ray flux, resulting in exceptionally short exposure times.

Single source: Primux 100 micro from Anton Paar

SAXSpoint 5.0 is equipped with this brilliant and maintenance-free microfocus X-ray source, manufactured by Anton Paar. Combined with advanced ASTIX optics by AXO Dresden, it provides outstanding X-ray flux combined with the highest spectral purity. Primux 100 micro is available with Cu and Mo target materials (other target materials on request).

Dual sources: Combined X-ray sources

To increase experimental flexibility, Cu and Mo X-ray sources are available as a combined dual X-ray source for easy switching between both sources (also available as an automated option). Combinations of other target materials (Ag, Cr) and microsource with MetalJet are possible on request.

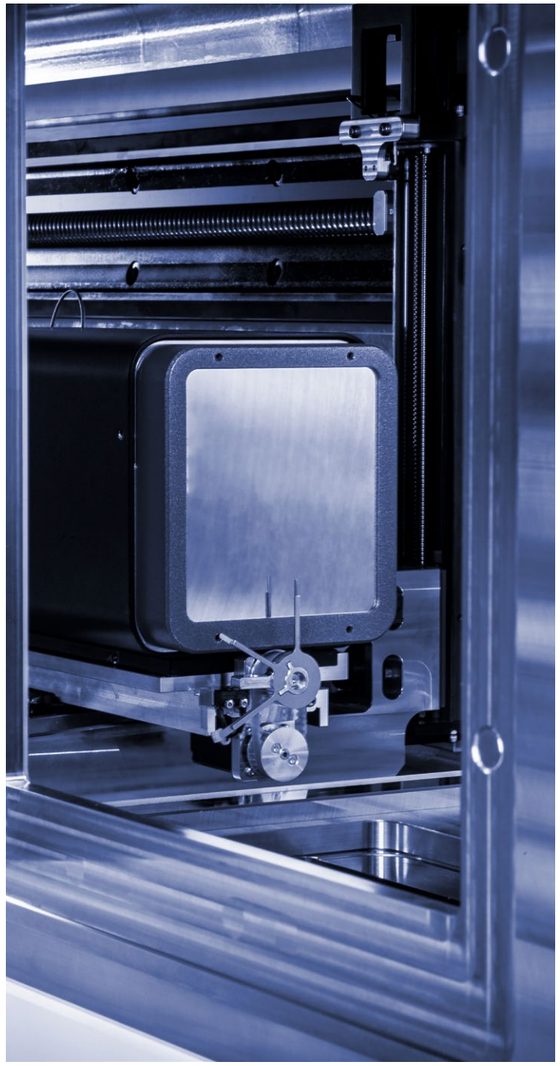
MetalJet source: The highest X-ray flux available in the lab

As an option, SAXSpoint 5.0 can be configured with a MetalJet X-ray source by Excillum – the world's brightest X-ray source for laboratory use. This will bring your SAXSpoint 5.0 installation even closer to synchrotron level, offering flux rates of >1 x 10^9 ph/s providing high-quality data even for weakly scattering samples and time-resolved investigations.

Choose your detector

SAXSpoint 5.0 comes with the latest detector technology from Dectris. It integrates the high-resolution EIGER2 R series of detectors (EIGER2 R 1M or EIGER2 R 4M) with hybrid photon-counting (HPC) technology – optionally operated in a windowless mode for beamstop-less measurements.

The system can be optionally equipped with a high-resolution WAXS detector based on the EIGER2 R 500k detector for simultaneous WAXS measurements.



Slidemaster: Automatically moving to any resolution

SAXSpoint 5.0 comes with Slidemaster, which uses automatic detector movement to enable fully automatic X-ray scattering experiments over a wide q-range from the highest SAXS resolution to wide scattering angles in the WAXS regime.

With Slidemaster you benefit from:

- Highly precise detector translation for in-vacuum positioning of the detector in the lateral and vertical direction, as well as along the beam axis.
- Utmost experimental flexibility in combination with TrueSWAXS, allowing you to choose the optimum q-range for your experiment over a large sample-to-detector distance (SDD) range from ≤45 mm to >1600 mm.
- Fully automated SAXS and WAXS measurements.
- Automatic selection and positioning of the beamstop suitable for the selected measurement mode.
- EIGER2 R 1M or EIGER2 R 4M detectors (other detectors available on request).
- Generation of gap-free data and full 2-dimensional q-maps by sequential detection of scattering patterns at multiple detector positions.

Choose your stages:
One system for all experimental conditions

SAXSpoint 5.0 gives you

Precision

Choose from off-the-shelf high-quality and high-precision sample stages and holders for almost every type of sample material. All stages are fully integrated in the software and hardware of SAXSpoint 5.0, automatically recognized and configured for the setup.

Flexibility

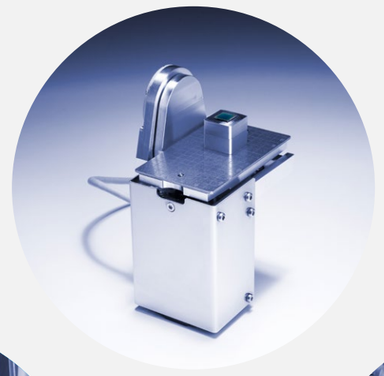
SAXSpoint 5.0 lets you set up your experiment to fit your research. You get excellent insights into your sample under ambient or non-ambient conditions, specific shear rates, high tensile stress, etc.

Customized design

Do you face special experimental challenges? Contact us, we can design and implement customized sample environments and even combinations with other instruments or complementary methods.

Temperature-controlled studies of single samples

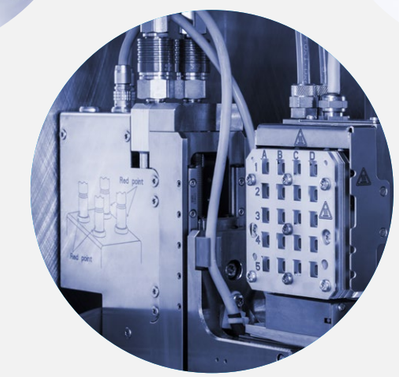
Grazing-incidence small- and wide-angle X-ray scattering (GISAXS/GIWAXS) studies



Humidity experiments

Shear Cell for simple shear experiments in SAXS/WAXS

Automated sampling/mapping of multiple samples

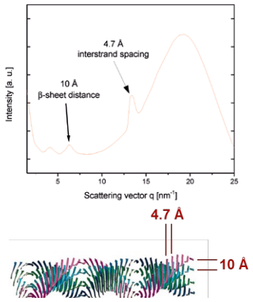


Stress/strain investigations with the Tensile Stage

RheoSAXS module for combined rheology and scattering experiments on liquids

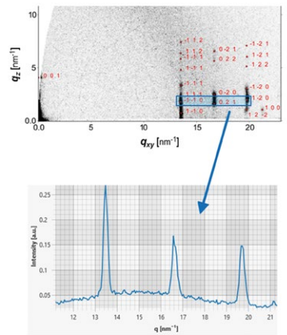
World of SAXS/WAXS/GISAXS/GIWAXS/RheoSAXS applications

Material research for key technologies requires structural investigations at the nanometer scale to understand material properties and interaction behavior within inorganic and organic matrices, to develop new materials, and to investigate chemical and biological processes.



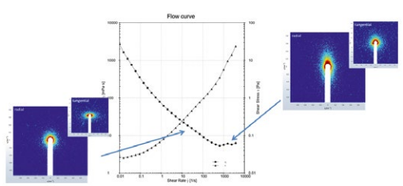
BioSAXS
β-amyloid fibril formation

β-amyloid is a protein which is closely linked to diseases such as Alzheimer's. The aggregation of β-amyloid fibrils in the brain tissue (plaque) appears to be a major factor in the disease's development. With the scattering pattern of simultaneous SAXS/WAXS measurements the β-sheet distance and the interstrand distance of the β-amyloid fibrils can be clearly identified.



GIWAXS/GIXD studies
Semiconductor material – pentacene thin film

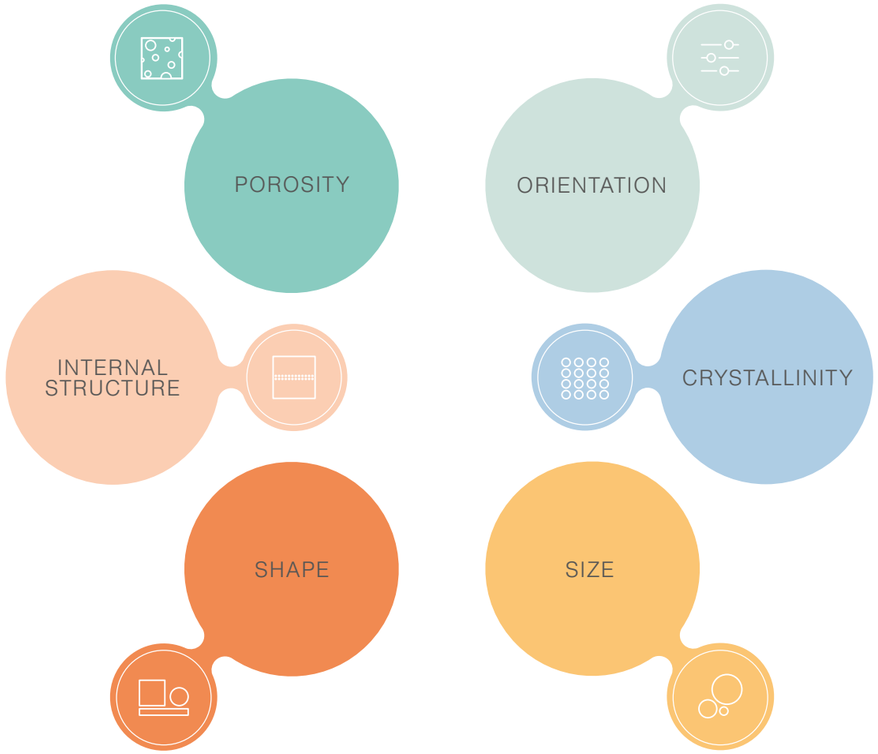
Pentacene is one of the most widely studied organic semiconductor materials. Pentacene thin films are flexible, thin, and exhibit excellent charge-carrier mobility. For analyzing such samples with weak scattering contrast and very fine structural details a highly brilliant and very precise X-ray beam is necessary. SAXSpoint 5.0 provides the highest GIXD data quality, which is comparable to synchrotron GIXD measurements.

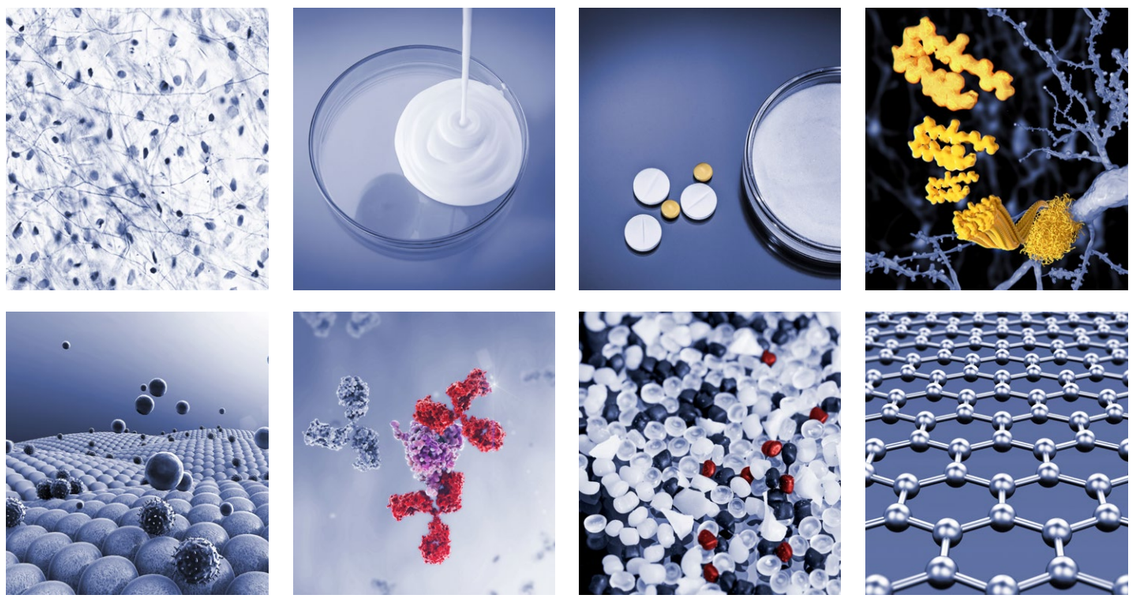


RheoSAXS
Smart materials – graphene oxide

The visualization of structural information in the nano scale is important in material research to complement simultaneous investigation of the rheological behavior. With the RheoSAXS module the alignment of the nm-thin graphene oxide flakes can be studied. Graphene oxide shows shear-thinning behavior at low to medium shear rates, which changes to ideally viscous behavior at higher shear rates.

Analyze almost any sample with SAXS





Dedicated software for the best SAXS/WAXS/GISAXS/RheoSAXS results

If you process and analyze a multitude of scattering data you need optimized and powerful software packages. With the SAXSdrive™ and SAXSanalysis™ software packages of SAXSpoint 5.0 you can easily create automated serial measurements with already included automated sampling and temperature scans. Even large scattering data sets can be analyzed by using customizable templates.

SAXSdrive™: System control and data acquisition

Use SAXSdrive™ to control all SAXSpoint 5.0 system components. It allows you to easily program and run automated SAXS/WAXS/GISAXS/RheoSAXS experiments.

SAXSanalysis™: Data processing and analysis

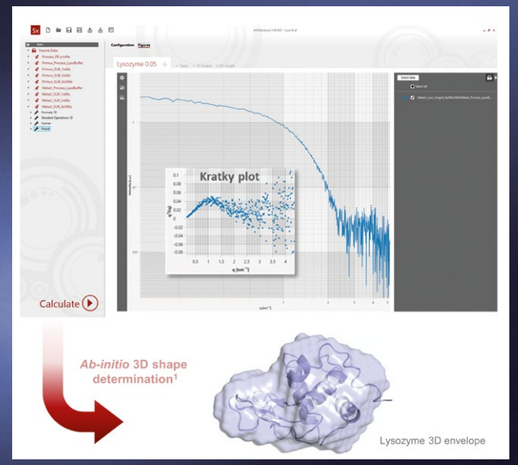
Use this comprehensive data reduction and analysis package for 2D and 1D scattering data.
SAXSanalysis™ has fully customizable templates and a batch processing concept so you can handle a large amount of data. The data layout follows the commonly used Nexus convention.

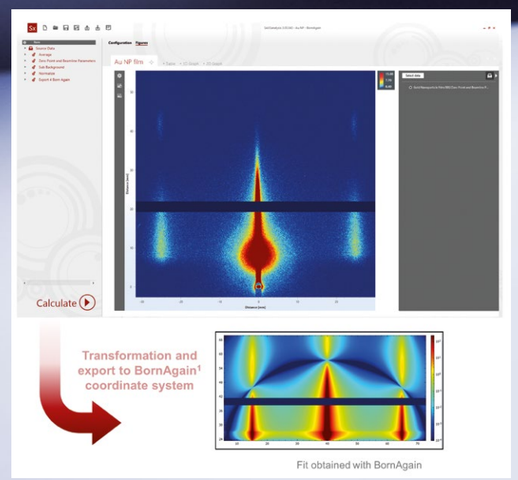
Your benefits

- Receive scattering data in absolute units fully automatically without the need to measure a reference sample.
- Determine important parameters and plots such as radius of gyration R_G, particle size, Porod constant, specific surface, and Kratky plots.
- Free yourself from manual file conversions with automatic data export routines to common IFT and model-fitting software packages (GIFT, ATSAS, SASfit, macSAS, BornAgain, and others).

PCG software: Advanced structure interpretation

Use PCG to retrieve structural information such as particle size, size distribution, shape, and inner structure using IFT and deconvolution techniques. Interpret scattering data of interacting (i.e. concentrated or charged) particle systems.





Ref.: Durniak,C., et al., BornAgain, http://bornagainproject.org (2017)

We support you

We don’t just sell you a SAXS instrument, your purchase is the start of a partnership with Anton Paar which lasts for the lifetime of the product.

We provide

- Installation and commissioning of SAXSpoint 5.0 at your site
- Thorough on-site user training
- Application support
- Service specialists close to you
- Phone support by our SAXS specialists
- 3-year warranty
- Over 60 years of SAXS experience

Built by experts

Anton Paar has more than 60 years of expert knowledge in the field of SAXS. Most high-precision instrument parts are manufactured directly by Anton Paar in Austria. This means you buy a high-quality product with outstanding durability.

Global support network

Rely on a worldwide network of application and service specialists. Our SAXS/WAXS/GISAXS/RheoSAXS experts are there for you via phone, email, and for on-site visits.

System specifications

X-ray source	- Primux 100 micro microfocus X-ray source (Cu, Mo; other target materials on request) - Optional dual microfocus X-ray source (Cu and Mo; other target materials on request) - High-performance Ga/In MetalJet source
X-ray optics and collimation	- Custom-designed ASTIX optics (fully evacuated) providing an X-ray flux of >1x10^8 ph/s - Automated scatterless beam collimation (fully evacuated)
Sample stages and autosamplers	- TCStage temperature-controlled stages (-150 °C to 600 °C) - GISAXS stage with heating/cooling option (-150 °C to 500 °C) - Tensile Stage with heating/cooling option (-150 °C to 350 °C) - Humidity Stage - Temperature-controlled autosamplers for multiple samples (-150 °C to 350 °C) - RheoSAXS module - Shear Cell - ASX autosamplers for up to 192 liquid samples
Special features	Slidemaster: moving detector (translation in X,Y,Z) TrueFocus: automatic self-alignment TrueSWAXS: continuous and simultaneous SWAXS studies Stagemaster: XYZ stage with auto-recognition of sample stages Optional high-resolution WAXS module Optional high-performance optics providing an X-ray flux of >4 x 10^8 ph/s Optional USAXS module Optional integrated low-volume autosampler
Temperature range	-150 °C to 600 °C
Temperature accuracy	±0.1 °C
Atmosphere	Vacuum, air, inert gas, humidity (reactive gases on request)
Sample holders	- Quartz capillary for liquids - Low-parasitics SiN cell - Sample holder for solids - PasteCell for viscous and powder samples - RotorCell for sample spinning - High-pressure cell - µ-Cell for small sample volumes - FlowCell and TubeCell for automation - Holders for multiple samples - Multicuvette holder - UV-Vis cell - Osmotic cell - Customized solutions on request
Detectors	2D EIGER2 R series of HPC detectors q_{min} = 0.01 nm^{-1} and q_{max} = 49.3 nm^{-1} Optional high-resolution EIGER2 R 500k WAXS module for WAXS measurements
Software	- SAXSdrive™ measurement and acquisition software - SAXSanalysis™ data processing and analysis software - PCG advanced data interpretation software
Footprint	- 3.6 m x 0.9 m (microsource version, L x W) - 4.5 m x 0.9 m (MetalJet version, L x W)

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