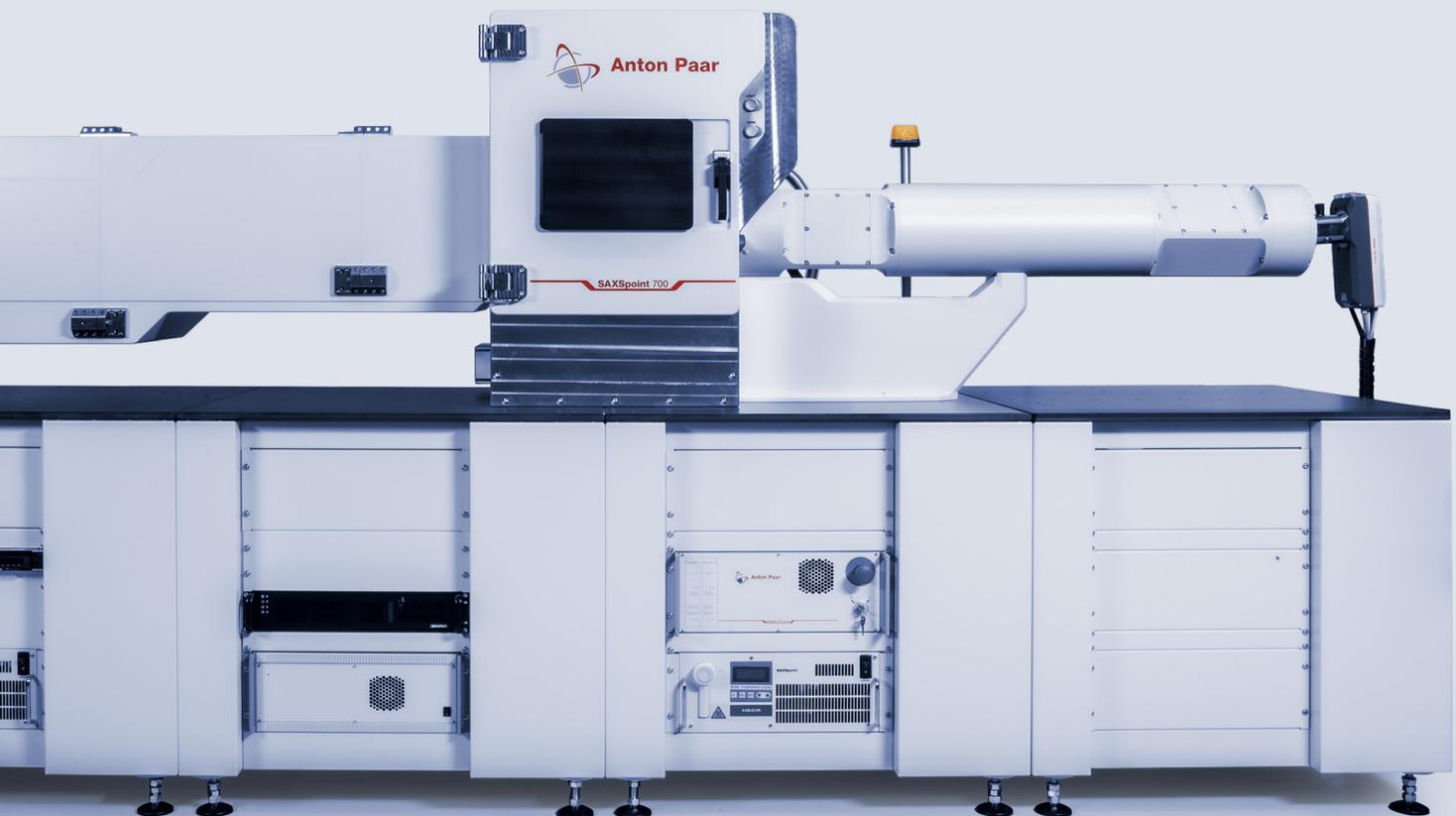# Pure Brilliance. Infinite Experimental Possibilities.

SAXSpoint 700

SAXSpoint 700: Pure Brilliance at the Best Price

SAXSpoint 700 offers flexible analysis of almost any material under ambient conditions, non-ambient conditions, and in air. With its new-and-improved measurement chamber, this system provides endless experimental possibilities. A wide range of features equip SAXSpoint 700 for future applications.

Find out more

SAXS
The highest resolution in a compact system: q_{min} = 0.01 nm^{-1} at 3.60 m system length. A moving detector enables fully automatic change of the sample detector distance (SDD) from ≤45 mm to >1,600 mm.

WAXS
Optional WAXS module for simultaneous SAXS/WAXS studies.

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

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

RheoSAXS
Renowned DSR 502 dynamic shear rheometer (based on the MCR series) for the simultaneous study of structural and rheological properties in a single lab setup.

USAXS
Extends the measurable size range to the micrometer scale for resolution of particle sizes up to 2.5 μm.

SAXSpoint 700: Beyond the Ordinary

SAXSpoint 700 is the ultimate SAXS/WAXS/GISAXS/USAXS/RheoSAXS laboratory beamline, featuring synchrotron detector technology for the highest resolution in a compact system. Anton Paar's brilliant SAXS system resolves nanostructures up to 620 nm and enables non-destructive investigation of material properties.
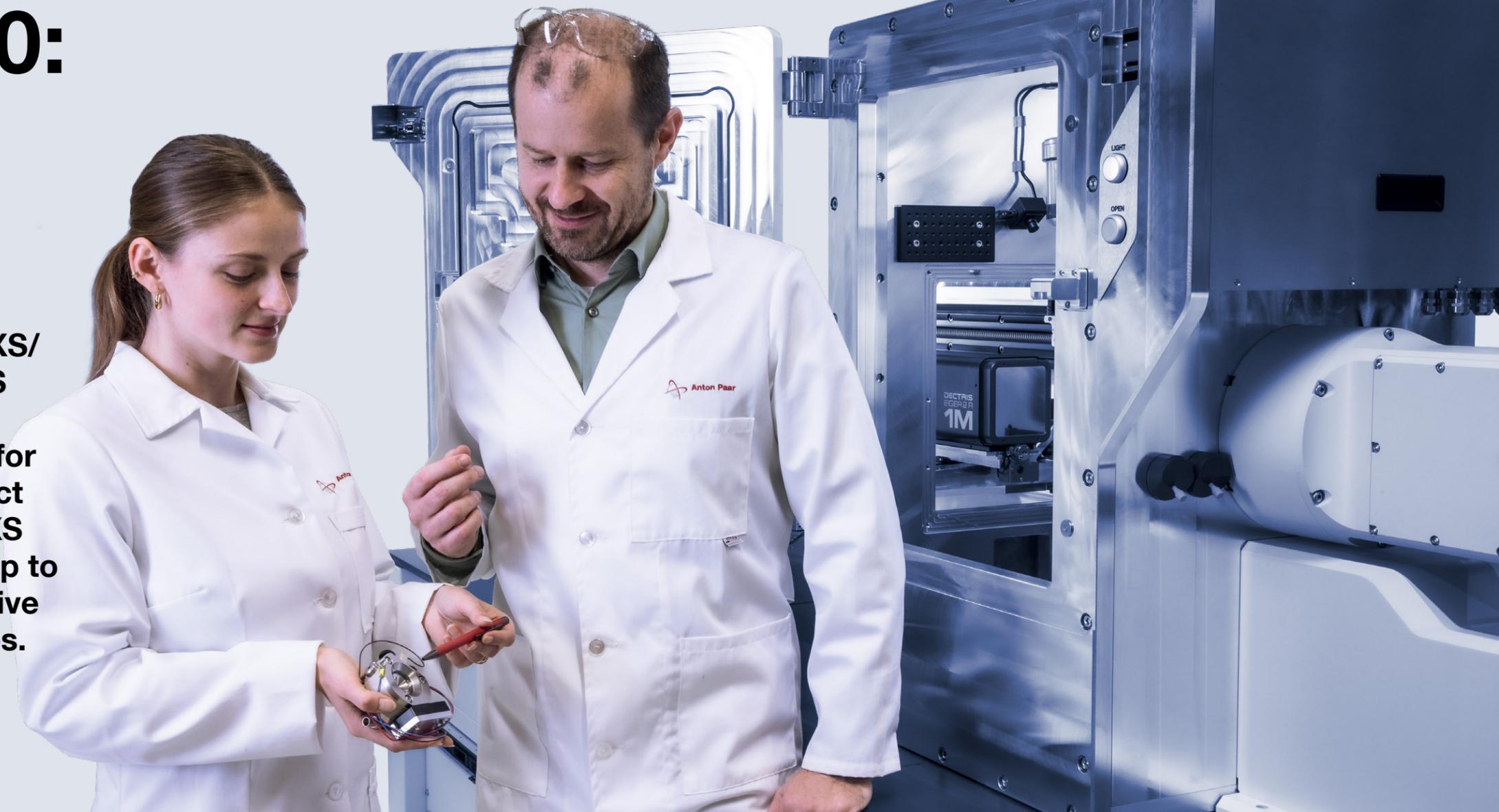
Endless experimental possibilities

SAXSpoint 700's spacious measurement chamber opens up endless possibilities. Tailor your system to your requirements so that you can take on nanostructured material analysis with ease. Seamlessly switch between different sample stages with SAXSdrive software, which offers automatic stage recognition, automatic alignment, and support for integrating third-party or home-built hardware. Combine full rheological and nanostructural investigations with the RheoSAXS module, and conduct automated studies with temperature-controlled samplers, even in air.

Pure brilliance

Take on difficult samples with the help of the best-in-class beam delivery system. Thanks to a brilliant X-ray beam with the highest spectral purity (>99.9 % Cu K_α) and scatterless beam collimation, users are guaranteed synchrotron-like data quality (for SAXS/WAXS/GISAXS/USAXS/RheoSAXS) with minimum effort and the shortest exposure times. Industry-leading resolution is ensured with this brilliant setup, resolving structures up to 620 nm (USAXS up to the µm range) with the most compact system size (3.6 m x 0.9 m) of its class.

SAXS and WAXS in one go

Obtain SAXS and WAXS data in one go with Slidemaster. With no additional realignment of the system necessary, you save time by cutting out any setup steps between measurements. Simply choose your optimum q-range – from the highest SAXS resolution to a wide WAXS regime – depending on your measurement needs. Automatic beamstop selection eliminates another step in the process, saving you time and effort. The windowless mode of the EIGER2 R detectors even enables beamstop-less operation.

Powerful software and unique scripting capabilities

The SAXSdrive and SAXSanalysis software solutions are combinable with automated routine steps. Analyze your 1D and 2D data sets using customizable templates, and determine parameters such as radius of gyration (Rg), particle size and distribution, Porod constant, specific surface, and Kratky plots. Export your data to all popular packages. You can fully control your experiments with scripting capabilities provided by a unique Python API.

Support when you need it

Get the most out of your investment with Anton Paar's standard three-year warranty. Benefit from a global support network, guaranteeing maximum uptime. With subsidiaries across the globe, expert advice and on-site support are never far away.

Sources and Detectors

Powerful X-ray sources

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 option: Primux 100 micro from Anton Paar

→ This brilliant, maintenance-free microfocus X-ray source, combined with advanced ASTIX optics by AXO Dresden, provides outstanding X-ray flux and the highest spectral purity. Primux 100 micro is available with Cu and Mo target materials, with other materials available on request).

Dual source option: Combined X-ray sources

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

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

→ The MetalJet X-ray source by Excillum – the world's brightest X-ray source for laboratory use – puts your installation even closer to synchrotron-level, offering flux rates of $>4 \times 10^9$ ph/s and providing high-quality data even for weakly scattering samples and time-resolved investigations.
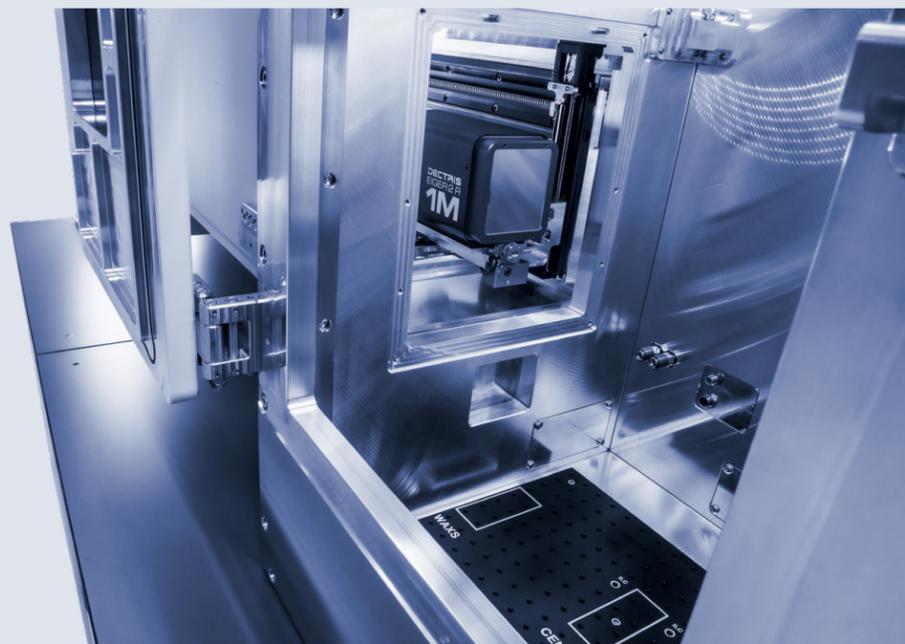
Synchrotron detector technology in a lab-scale instrument

SAXSpoint 700 comes with the latest detector technology from Dectris, integrating high-resolution EIGER2 R or PILATUS4 R series of detectors with hybrid photon-counting (HPC) technology, and supporting windowless operation (EIGER2 only) 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.

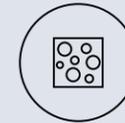# Structural Investigations at the Nanometer Scale

Size
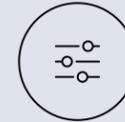Obtain the size and size distribution of your sample.

Shape
Learn about the shape of biological nanostructures, e.g. in protein research.

Specific surface area and porosity
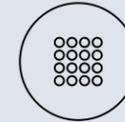Measure the specific surface area of your sample and obtain information on the porosity in a single measurement.

Orientation
Monitor changes in nanostructure orientation of your sample while applying an external force, e.g. shear.
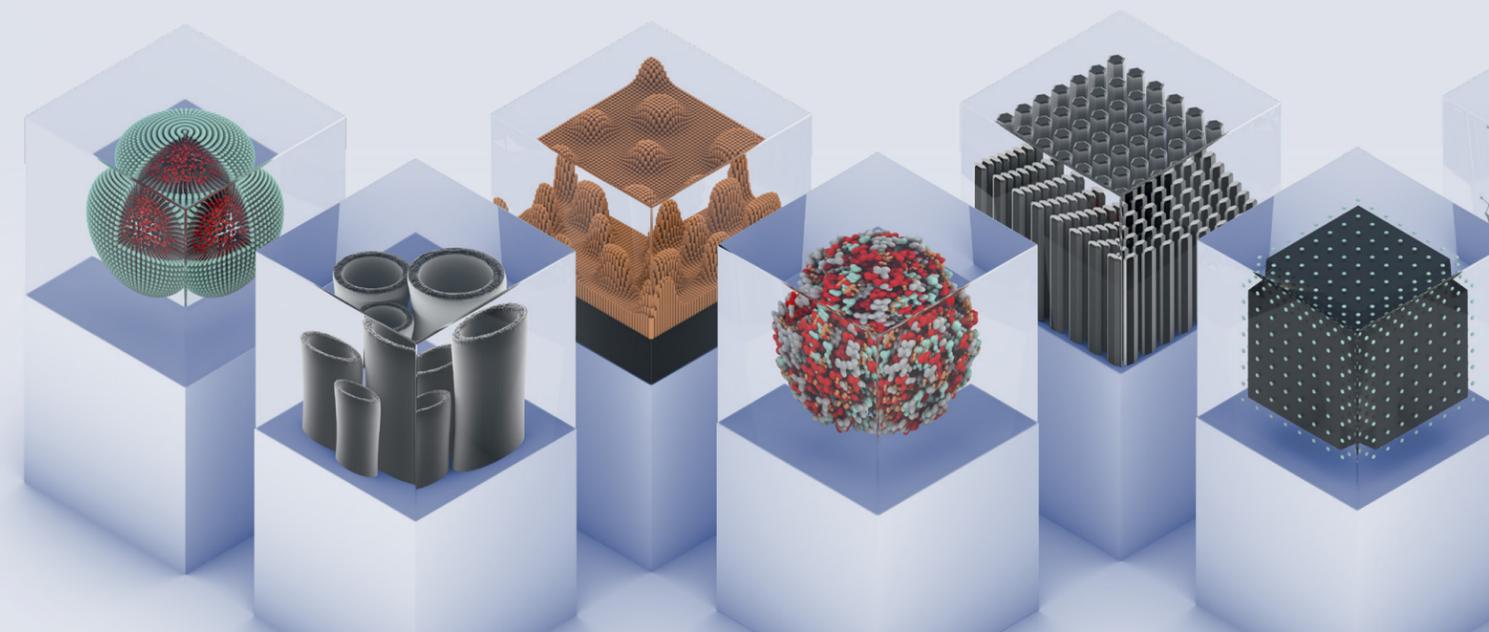
Internal structure
Obtain information on the internal structure of, e.g., core/shell systems as in LNPs loaded with mRNA.

Crystallinity
Analyze the order of your nanostructure on the mesoscopic scale.

Choose Your Stages

One System for All Your Needs

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

Flexibility
Set up your experiment to suit your research and obtain excellent insights into your sample under ambient or non-ambient conditions, specific shear rates, high tensile stress.

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

(1) TS 600 Tensile Stage
Stress/strain investigations

(2) Temperature-controlled autosamplers for multiple samples
Automated sampling/mapping of multiple samples

(3) Humidity Stage
Experiments at different humidity levels in both transmission and reflection geometry (GISAXS)

(4) RheoSAXS
Combined rheology and scattering experiments on liquids

(5) USAXS Stage
Automatic USAXS, SAXS, and WAXS studies

(6) Battery Cell
Electrochemical/battery cell for operando scattering studies of energy storage or conversion materials

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

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

Material research for key technologies requires structural investigations at the nanometer scale – from understanding material properties and interactions within inorganic and organic matrices to developing new materials and exploring chemical and biological processes.
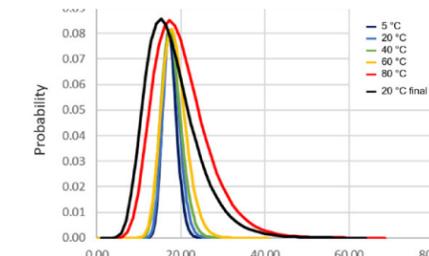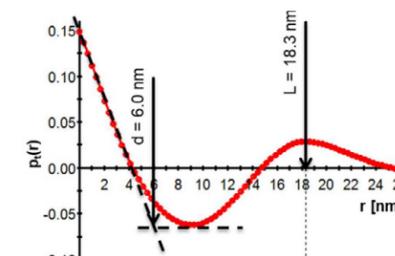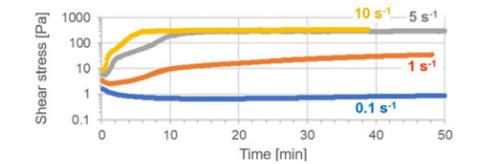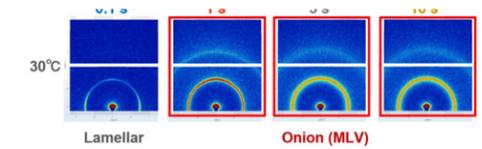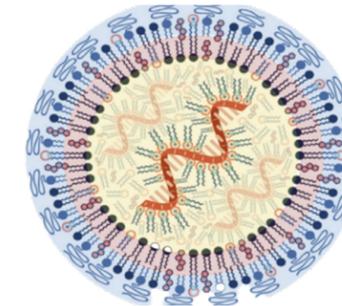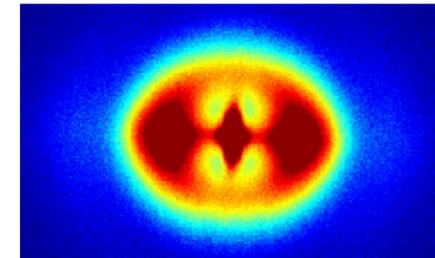
Shear rate [s⁻¹]	No. of bilayers	d-spacing [nm]	Caillé parameter
0.1	18.6	8.43	0.271
1	19.4	8.34	0.230
5	7.75	8.12	0.231
10	7.76	8.07	0.246

Material Science

SAXS study of a polyolefin
Polyethylene (PE) is widely used in technical products due to its durability, chemical resistance, and cost-effectiveness. Its properties directly relate to its nanostructure, which can be analyzed by scattering. SAXS reveals the substructure of the PE fiber, consisting of fibrillar and lamellar domains, and provides information on the crystallites and their next-neighbor distance.

Pharma[1]

SAXS study of mRNA-LNP vaccines
Lipid nanoparticles (LNPs) are widely used as carriers for pharmaceuticals. In the case of mRNA vaccines, the LNP nanostructure (size, composition) directly impacts both efficacy and stability. SAXS enables the analysis of mRNA-LNP samples in solution, preserving their native state. For example, SAXS can be used to monitor vaccine stability under external influences (e.g., aging, pH, temperature stability) by evaluating the size distribution.

Rheo SAXS[2]

Correlating flow behavior and structure
The flow behavior and structure of non-ionic surfactants can positively influence key characteristics of health and personal care products. Combined studies with the unique RheoSAXS module for SAXSpoint reveal the formation of an onion-like structure of a polyoxyethylene alkyl ether surfactant at a higher shear rate and elevated temperature. These measurements provide valuable insights into bilayer structure and flexibility.

1 Buschmann, M.D. et al., *Vaccines* 2021, 9, 65
2 Sample kindly provided by Nikko Chemicals Co., Ltd.

Dedicated Software for the Best SAXS/WAXS/ GISAXS Results

If you process and analyze a multitude of scattering data you need optimized and powerful software. With SAXSdrive and SAXSanalysis, you can easily set up automated serial measurements, including integrated sampling and temperature control. Automated data processing supports a range of evaluation possibilities.

System control and data acquisition

SAXSdrive can be used to control all system components and easily program automated SAXS/WAXS/GISAXS/RheoSAXS experiments. You can also design your own experiments using the Python scripting interface.

Scripting

Benefit from full control of your experiments with scripting capabilities provided by a unique Python API. Create your own experimental sequences, interface data acquisition with powerful numerical tools, and take advantage of python scientific libraries. The API lets you steer and control all SAXSpoint 700 components, enabling you to combine acquisition with data processing and explore experimental ideas without limits.

Data processing and analysis

SAXSanalysis offers a comprehensive data reduction and analysis package for 2D and 1D scattering data. Benefit from automatic processing to obtain your results quickly, even from a large amount of scattering data. The data layout follows the commonly used Nexus convention.
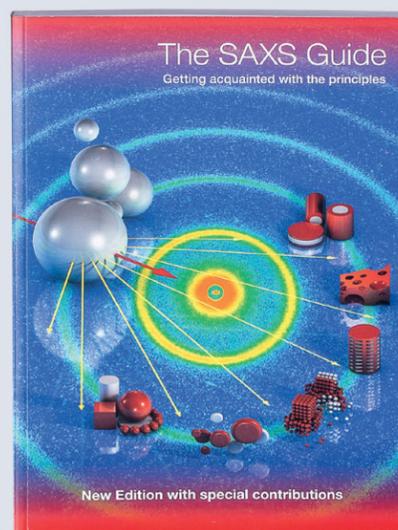
→ Receive scattering data in absolute units fully automatically without the need to measure a reference sample

→ Determine important parameters and obtain information on the particle size and size distribution, the specific surface area, the pair-distance distribution function (P(r)), and more with just a few clicks

→ Free yourself from manual file conversions with automatic data export routines to common model-fitting (SasView, ATSAS, McSAS, Sasfit, BornAgain, etc.) and IFT packages
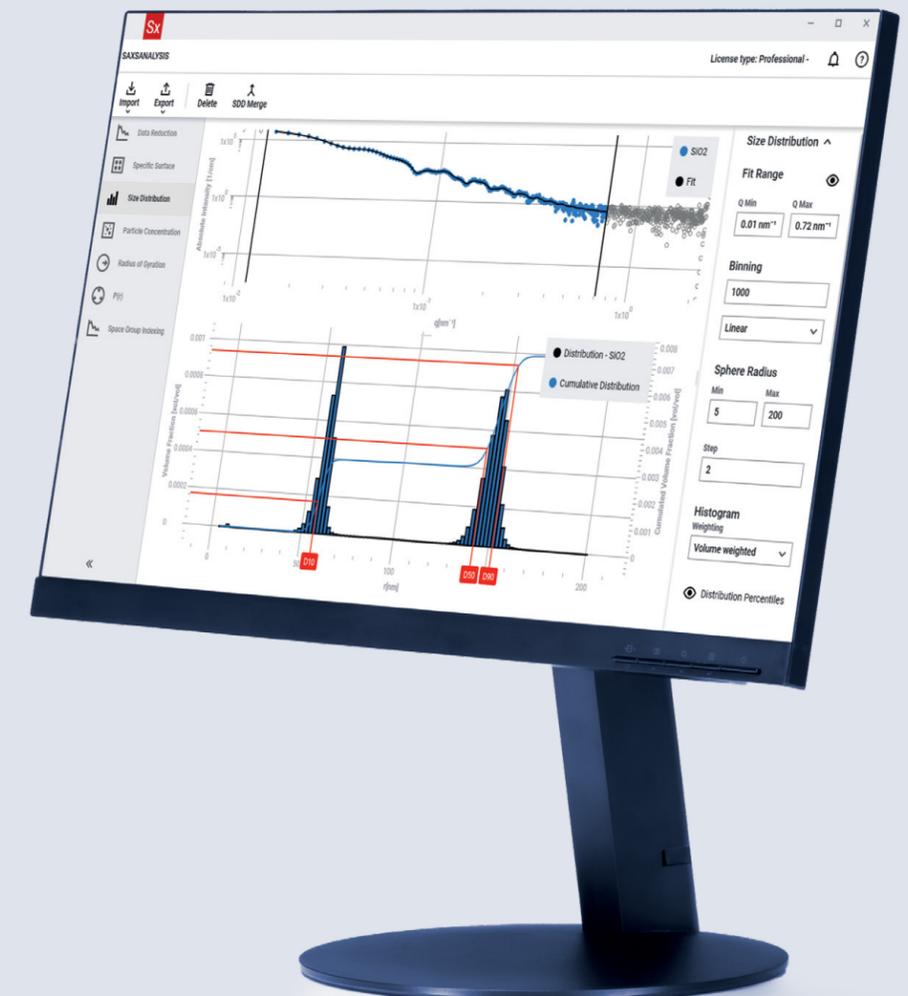
We Support You

We don't just sell you a SAXS instrument: Your purchase is the start of a partnership with Anton Paar which lasts for the entire lifetime of the product. Anton Paar has more than 65 years of expert knowledge in the field of SAXS. Rely on a worldwide network of application and service specialists. Our experts are here for you!

The SAXS Guide
Getting acquainted with the principles

New Edition with special contributions

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	SAXSpoint 700
X-ray source	- Primux 100 micro microfocus X-ray source (Cu, Mo, other target materials on request) - Optional dual microfocus X-ray sources (Cu and Mo, other target materials on request) - High-performance Ga/In MetalJet source
X-ray optics and collimation	- Custom-designed AXO ASTIX/ASTIX++ optics (fully evacuated) - Automated scatterless beam collimation (fully evacuated)
Sample stages and autosamplers	- 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 - USAXS Stage - Battery 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 >6 x 10^8 ph/s
Temperature range	-150 °C to +500 °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 available on request (please contact us)
Detectors	- 2D EIGER2 R and PILATUS4 R series HPC detectors - High-resolution WAXS module (EIGER2 R series)
Accessible q-range	0.01 nm^{-1} to 49.3 nm^{-1} (main detector)
Software	- SAXSdrive measurement and acquisition software - SAXSanalysis data processing and analysis 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)

Trademarks: SAXSdrive (013414561, UK00913414561), SAXSpoint (014036024)

Reliable. Compliant. Qualified.

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