

Introduction of State-of-the-art Laboratory SAXS system

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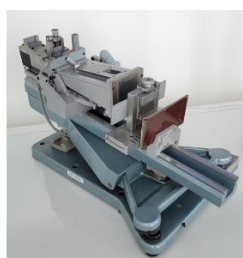
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The first commercial SAXS camera was developed by Otto Kratky and Anton Paar in 1957, and this type of instrument was improved as Kratky compact camera system in 1981. (Figure 1) Anton Paar was working as a manufacturer of Kratky-type SAXS instruments, and developed a laboratory line-collimation SAXS system (SAXSess) in cooperation with Otto Glatter in 2003. SAXSess system was widely used in research fields of soft material such as colloidal science and pharmaceutical industry. Due to the simultaneous SAXS-WAXS measurement with using an imaging plate detector, the users can obtain a wide q -range data ($0.05 < q < 28 \text{ nm}^{-1}$) in one measurement, which was one of the key features of the Anton Paar's SAXS instrument.

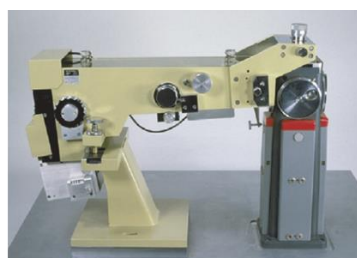
Anton Paar also developed a prototype point-collimation SAXS system (SAXSpoint 1.0) in 2015, and improved this system to a high-resolution and fully automated system as SAXSpoint 5.0 in 2020. SAXSpoint 5.0 achieved a better SAXS resolution ($q_{\text{min}} \sim 0.01 \text{ nm}^{-1}$) and motorized-detector moving system (SlideMaster) in compact foot print. (Figure 2) Using this moving detector feature, users can automatically obtain a wide q -range data ($0.01 < q < 40 \text{ nm}^{-1}$) without a manual operation.

In March 2024, SAXSpoint 5.0 system was installed in NanoTerasu BL08W for the first time as a combination of laboratory-SAXS system and synchrotron X-ray beam. The collimated X-ray beam enters into the beam path of SAXSpoint 5.0 housing where the whole area is evacuated for reducing air-scattering. BL08W user can complete one measurement within a few minutes, and freely change the sample-to-detector distances (SDD) within several seconds by entering the desired SDD values.

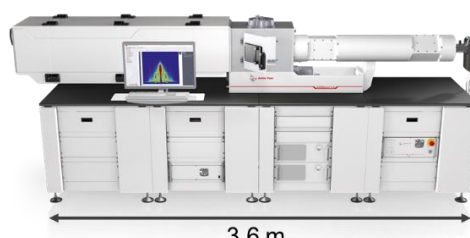
SAXSpoint 5.0 can also adapt for GISAXS, USAXS, and RheoSAXS measurement modes by changing the sample stages to the corresponding modules, which enables the highest measurement flexibility for the users.



The First SAXS camera
(1957)



Kratky compact camera
(1981)



3.6 m
SAXSpoint 5.0

Figure 1: Early laboratory SAXS instruments. Photos were taken in Anton Paar GmbH.

Figure 2: Exterior of SAXSpoint 5.0 system. Its foot print is $3.6 \times 0.9 \text{ m}$.