

Small-Angle X-ray Scattering (SAXS)

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1 Visit three beamlines: BL40XU, BL40B2, BL45XU

These three SAXS beamlines in SPring-8 have entirely different x-ray sources and optics. To have an actual look at these beamlines is a valuable experience.

BL40XU:

http://www.spring8.or.jp/wkg/BL40XU/instrument/lang-en/INS-0000000353/instrument_summary_view

BL40B2:

http://www.spring8.or.jp/wkg/BL40B2/instrument/lang-en/INS-0000001280/instrument_summary_view

BL45XU:

http://www.spring8.or.jp/wkg/BL45XU/instrument/lang-en/INS-0000000334/instrument_summary_view

2 Understanding optics for SAXS

Using above three beamlines as examples, different designs of SAXS beamlines are explained.

BL40XU: helical undulator --- double focusing mirrors

BL40B2: bending magnet --- double crystal monochromator --- bent cylindrical mirror

BL45XU: tandem vertical undulators --- double crystal diamond monochromator --- double focusing mirrors

3 Understanding detectors for SAXS

Several different types of detectors are used at the above three beamlines. Apart from basic detectors such as ion chambers, they are all area detectors.

RAXIS: image plate detector

X-ray image intensifier + CCD camera: high sensitivity and fast readout

RAPID: microgap gas multiwire detector

CMOS flatpanel: solid-state area imager

4 Practise optics alignment at BL40XU

Focusing, removing scatter, aligning the backstop, etc.

5 Actual SAXS measurements at BL40XU

Data acquisition using test samples such as collagen.

6 Practical data analysis

Introduction to widely used softwares (fit2D, PRIMUS, etc.)