

## BL40B2: Small-Angle X-ray Scattering (SAXS)

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### 1. Learning what is SAXS ...and WAXS

Non-crystalline diffraction ... what is diffraction? what is scattering?  
Hierarchy in non-crystalline materials  
Pitfalls in SAXS

### 2. Visiting three beamlines: BL40XU, BL40B2, BL45XU

These three SAXS beamlines in SPring-8 have 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](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](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](http://www.spring8.or.jp/wkg/BL45XU/instrument/lang-en/INS-0000000334/instrument_summary_view)

### 3. Understanding optics for SAXS

Using the above three beamlines as examples, 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

Other beamlines: BL20XU and beamlines in other facilities.

### 4. 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

CMOS flatpanel: solid-state area imager

Platus: photon-counting pixel detector

### 5. Protein solution scattering measurements at BL40B2

Data acquisition using samples such as calmodulin.

### 6. Practicing data analysis

Introduction to widely used SAXS data processing software (fit2D, PRIMUS, etc.)