

# TLS-13A Experimental Station for X-ray Scattering and Diffraction

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## **Abstract**

TLS Beamline 13A (BL13A) is an insertion-device beamline designed chiefly for studying lamellar structure. As a side-branch beamline, bl13a has been designed to fully utilize the sideways output of the superconducting multipole wiggler (smpw) and could provide hard x-ray photons up to  $6 \times 10^{10}$  per second at 12 keV. An asymmetric-cut curved crystal monochromator (ACCM) has been employed to offer monochromatic-beam with energy resolution ( $E/\Delta E$ )  $\sim 700$ . A four-circle Huber diffractometer with a scintillation detector is placed in the experimental hutch and provide the capability for high resolution wide-range x-ray diffraction experiments, such as x-ray diffraction (XRD), x-ray reflectivity (XRR), and lamellar x-ray diffraction. Another two-dimension detector assembly is also available. A Rayonix SX165 which is a round CCD detector with 165 mm diameter active area is used to collect 2D x-ray scattering pattern with available  $q$  range from  $0.05 \text{ \AA}^{-1}$  to  $2.7 \text{ \AA}^{-1}$ . For different experiment requirements, several setups have been designed -- a regular sample rod for general XRD and XRR, a heatable stage with temperature range from room temperature to  $250^\circ\text{C}$ , a heatable transmission chamber for liquid and solution, and a chamber with temperature and humidity control for bio-membrane sample.

**Keywords** - *TLS beamline, lamellar x-ray diffraction, x-ray diffraction, x-ray reflectivity.*