# TLS 07A – The Multi-functional Hard X-ray Beamline for X-ray Absorption Spectroscopy and X-ray Scattering

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**Abstract**

TLS beamline 07A (TLS-07A) of NSRRC is designed for multi-functional hard x-ray endstation, including wide-angle x-ray diffraction (XRD), grazing incidence x-ray diffraction (GIXD), x-ray reflectivity (XRR), x-ray absorption spectrum (XAS), and resonant x-ray scattering. TLS-07A uses the radiation produced by an in-achromatic superconducting wiggler (IASW) insertion device, and delivers the high flux focused monochromatic beam with photon energy from 5 to 23 keV and photon flux of up to $10^{12}$ per second. A Si(111) double crystal monochromator has been employed to provide the mono-beam with energy resolution ($\Delta E / E$) ~ $10^{-4}$. There are two major endstation equipped to this beamline -- a XAS station and a X-ray scattering station. XAS station has a 2-axes sample stage with ion chambers (transmission mode), and a Lytle detector or a Silicon Drift Detector (SDD) for fluorescence mode. X-ray scattering station contains a Huber 8-circle diffractometer for XRD, GIXD, and XRR experiments. A scintillation counter on TTH arm serves for diffraction experiment as a point detector and a Mar345 image plate is also available for X-ray diffuse scattering experiment or powder diffraction. The low-temperature experiment is also performable on TLS-07A; a cryostat system mounted on the diffractometer could bring sample temperature in a range between 10K to 300K.

***Keywords - List key keywords here. No more than 5.***

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