The Brockhouse x-ray diffraction and scattering beamlines at the Canadian Light Source

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In this work, we will present the opportunities for structural characterization of materials at the Brockhouse sector beamlines at the Canadian Light Source (CLS). The Brockhouse sector includes three hard x-ray beamlines for x-ray diffraction and scattering for materials science and it has been operational for the past two years. The techniques available allow the structural characterization through multiple length-scales, from sub-Å to over 100 nm, and find applications in numerous areas of materials science including catalysis, batteries, energy materials, geology, environment, polymers, new alloys, microelectronics, among many others.

An in-vacuum wiggler and an in-vacuum undulator provide competitive photon flux at the end-stations. The lower energy wiggler beamline, with energies from 7-21 keV, hosts the high-resolution powder diffraction station, the SAXS/WAXS station and an RTA in-situ XRD station [1]. The higher energy wiggler beamline, from 25-95 keV, focuses in total scattering (PDF), high energy XRD and extreme conditions experiments [2]. The undulator beamline, with energies from 5-24 keV, is ideal for thin films and single crystal characterization through reciprocal space maps (RSM), x-ray reflectivity, anomalous and magnetic scattering [3].

![Figure 1. Brockhouse sector beamlines layout: Lower Energy (LE) wiggler, Higher Energy (HE) wiggler and Undulator beamlines.](image)

We have several fast detectors for time resolved experiments. A variety of sample environments can be used during the experiments -temperature, pressure, gases, voltage, etc.-; some are owned by the CLS and many others are brought by the users for their specific experiments. Our goal is to provide our growing user community with the right tools to enable great science [4-9]. For more info, please, visit our website: https://brockhouse.lightsource.ca/