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## Engineering design of the CDI beamline endstation at NSLS-II

*Tuesday 16 September 2025 17:00 (1 hour)*

The Coherent Diffractive Imaging (CDI) beamline is one of the three advanced beamlines developed through the NSLS-II Experimental Tools (NEXT II) project at Brookhaven National Laboratory. This advanced hard X-ray beamline supports a photon energy range from 5 keV to 15 keV, enabling high-resolution imaging and characterization techniques. The CDI endstation integrated a custom-built beam conditioning system with an in-house-developed microscope, a six-degree-of-freedom sample positioning system, and a Two-Detector Motion System (TDMS). Key engineering challenges included achieving high stability, enabling nanometer-scale sample positioning, and developing a large-scale TDMS. The TDMS exceeds 9 tons in mass, occupies over 100 square meters, and is capable of independently and synchronously supporting two state-of-art X-ray detectors. The detectors can be positioned around the sample with up to 9 m of variable drift, and horizontal angular range of 125 degrees, and a vertical range of motion of about 1.65 m the scale, complexity, and novel architecture of the TDMS impose significant demands on interface engineering, presenting challenges that are arguably without precedent.

### Footnotes

### Funding Agency

**Author:** ZHU, Yi (National Synchrotron Light Source II)

**Co-authors:** Dr YUAN, Gao (National Synchrotron Light Source II); Dr WILLIAMS, Garth (National Synchrotron Light Source II); Mr HAWKES, Jake (National Synchrotron Light Source II); Dr BERMAN, Lonny (National Synchrotron Light Source II)

**Presenter:** ZHU, Yi (National Synchrotron Light Source II)

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