

## Poster Presentation

**MS44.P03**

### *Data collection strategies for the Rayonix MX300HS 10 Hz CCD Detector*

Z. Jin<sup>1,2</sup>, J. Chrzas<sup>1,2</sup>, J. Fait<sup>1,2</sup>, Z. Fu<sup>1,2</sup>, R. Salazar<sup>1,2</sup>, J. Gonczy<sup>1,2</sup>, U. Chinte<sup>1,2</sup>, P. Kandavelu<sup>1,2</sup>, J. Rose<sup>1,2</sup>, B. Wang<sup>1,2</sup>

<sup>1</sup>SER-CAT, Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois, USA, <sup>2</sup>University of Georgia, Department of Biochemistry and Molecular Biology, Athens, Georgia, USA

Investigating Data Collection Strategies for the Rayonix MX300HS 10 Hz CCD Detector Zhongmin Jin, John Chrzas, James Fait, Zheng-Qing Fu, Rod Salazar, John Gonczy, Unmesh Chinte, Palani Kandavelu, John P. Rose and Bi-Cheng Wang SERCAT, APS, Argonne National Lab, Argonne, IL 60439 and Department of Biochemistry & Molecular Biology, University of Georgia, Athens, GA 30602, USA. Earlier this year SER-CAT received its Rayonix MX300HS high-speed area detector purchased with funds awarded from an NIH grant. The detector is CCD based (4X4 taper/chip array) with a 1-2 millisecond readout speed and 8e-/pixel (78 micron/pixel) readout noise providing 10Hz data collection capabilities. In its slower readout mode, the readout noise can be further reduced to about 4e-/pixel, which is less than 1 ADU. The detector was installed in late January on beamline 22BM for integration with SER-CAT's beamline control system and commissioning. This detector is the first of its kind and its fast readout time will allow us to collect data in the traditional shuttered mode with both normal and low noise readout; or in shutter-less mode using 0.1 second exposures with constant rotation of crystal. Importantly, the shutter-less mode may enhance system precision and improve the quality of the resulting data since it should eliminate mechanical errors associated with shutter jitter, shutter synchronization and goniometer backlash during data collection. Based on our preliminary tests, shutter-less mode data collection has confirmed the expectation of being capable for providing better quality data than that from shuttered mode. Shutter-less data collection also offers the ability to efficiently collect fine slice data, which will further improve the signal to noise in the data. We will present the results from systematic tests of the detector in terms of frame width (rotation angle per frame), rotation speed, exposure time, dynamic range etc. Work supported in part by NIH NCRR (S10RR028976), SER-CAT, The University of Georgia and the Advanced Photon Source.

**Keywords:** MX300HS 10HZ CCD detector, SER-CAT, shutterless data collection