

## W0050

**Development of a Real Time Timing-Shutter Performance Monitor for Protein Crystallography.** R.W. Alkire<sup>a</sup>, Michael Molitsky<sup>a</sup>, F.J. Rotella<sup>a</sup>, N.E.C. Duke<sup>a</sup>, John Lee<sup>b</sup>, Tim Madden<sup>b</sup>, Patrick De Lurgio<sup>c</sup>, <sup>a</sup>Structural Biology Center, Biosciences Div., <sup>b</sup>Advanced Photon Source, <sup>c</sup>High Energy Physics Division, Argonne National Laboratory, Argonne, IL 60439 USA.

One of the many instrument challenges facing protein crystallography synchrotron beamlines is the synchronization of fast sample rotation with shutter timing. In order to monitor shutter timing events and long-range shutter performance accurately, a timing shutter monitor has been developed. This monitor uses a photodiode to capture x-ray-induced fluorescence from the shutter blade. When synchronized with goniometer and shutter timing signals, opening and closing shutter delay times can be measured, along with the total x-ray exposure time for each data frame. Data are measured using a National Instruments counter/timer card and output is displayed on a Windows-based computer via a Visual Basic interface. Each shutter cycle is time stamped and output is written to a log file. Performance data using this device on bending magnet beamline 19BM at the Advanced Photon Source will be presented, along with details outlining future improvements.

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