Contribution ID: **183** Contribution code: **THMR010** Type: **Poster Presentation with Mini Oral**

Signal response and analysis of large micro channel plate driven delay line detectors

Thursday 25 September 2025 15:27 (3 minutes)

For soft X-ray spectroscopy beamlines, delay line detectors are often the main system for detecting the photons from the sample and hence also a component determining the overall beamline performance as it might be a limiting factor of both measurement speed, noise, artifacts, and resolution. As such, and even more with larger micro channel plate driven delay line detectors, the signal readout must be fast and robust to minimize noise and artifacts while still accommodating even the flux from 4th generation synchrotrons. This paper studies the signal response of a delay line detector and how the ns current signal pulses can be filtered, amplified, and converted to voltage before the digitization. The digitizer is a 12 bit 2.5 GSPS 6 channel system, which is set up in a manner to minimize noise and enable post signal analysis integrated into the Sardana control system and live view. The early results indicate that many of the currently present image artifacts are, to a very high degree, suppressed due to analog signal treatment and proper triggering. The digitized signals are fitted using the python tool lmfit to different signal models, such as the exponentially modified Gaussian, to extract the peak of the main signal after identifying the common background response in all channels with the aim to even further improve the resolution of the detector. To optimize sampling, the system is also stress tested with regards to e.g. sampling length and out of range measurement.

Footnotes

Funding Agency

Author: Dr SJÖBLOM, Peter (MAX IV Laboratory)

Co-authors: EKHOLM, Victor (Lund University); Dr KJELLSSON, Ludvig (MAX IV Laboratory); Dr GRIMM, Oliver (MAX IV Laboratory)

Presenter: Dr SJÖBLOM, Peter (MAX IV Laboratory)

Session Classification: THMR Mini-Orals (MC06, MC09)

Track Classification: MC09: Experiment Control and Data Acquisition