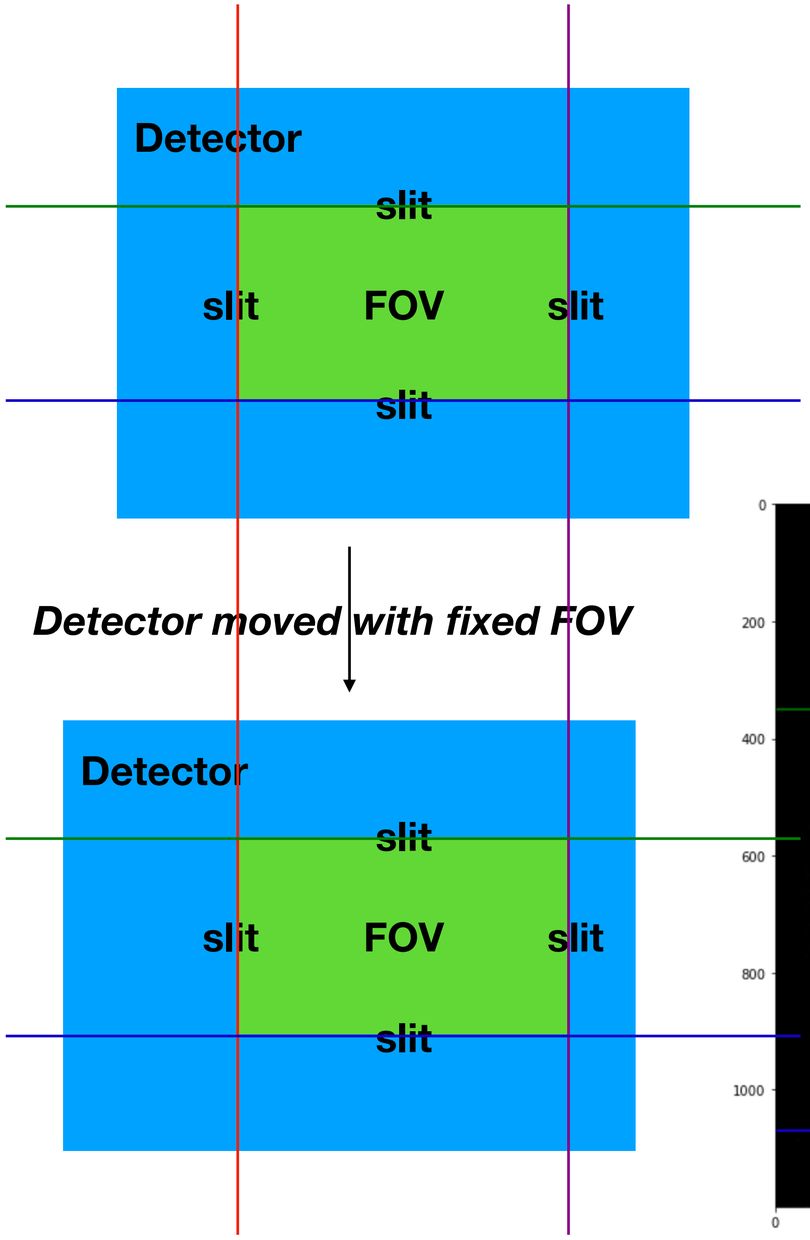
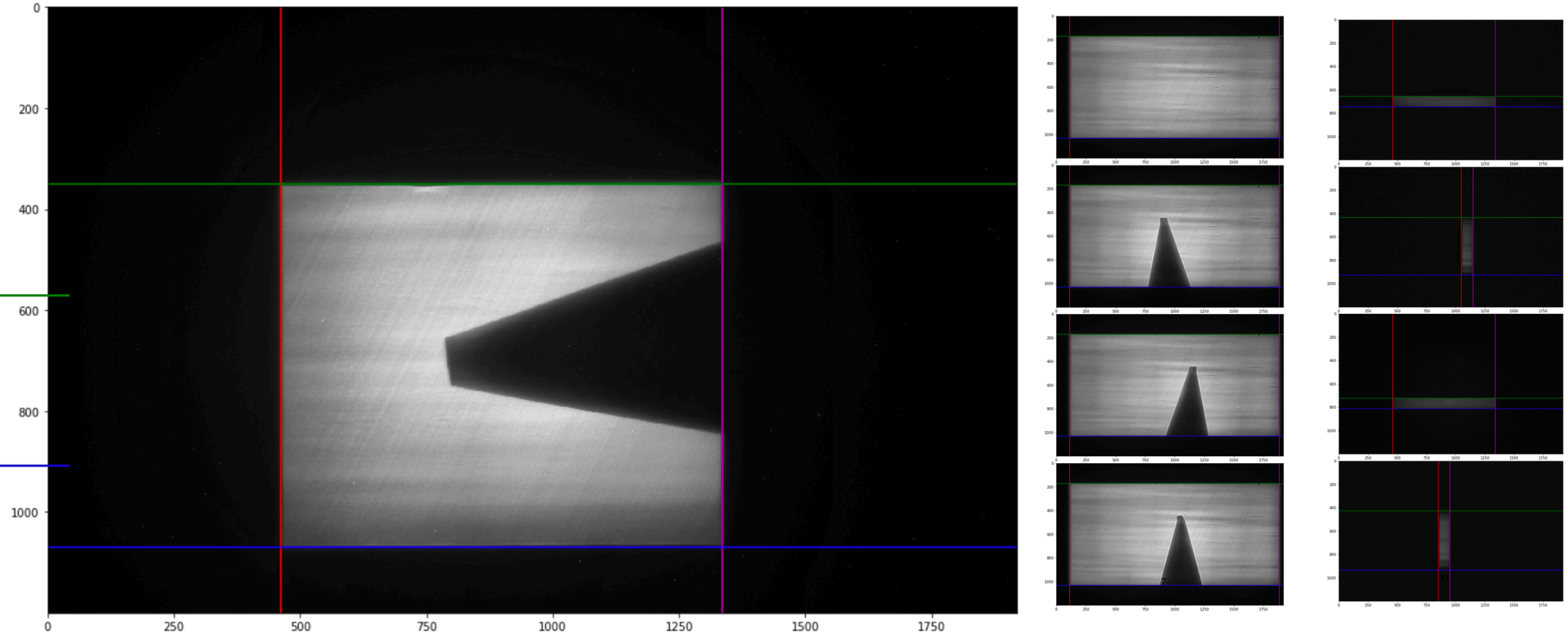
Auto-detect Detector Motion from Slit Corners

Motivation & Experiment



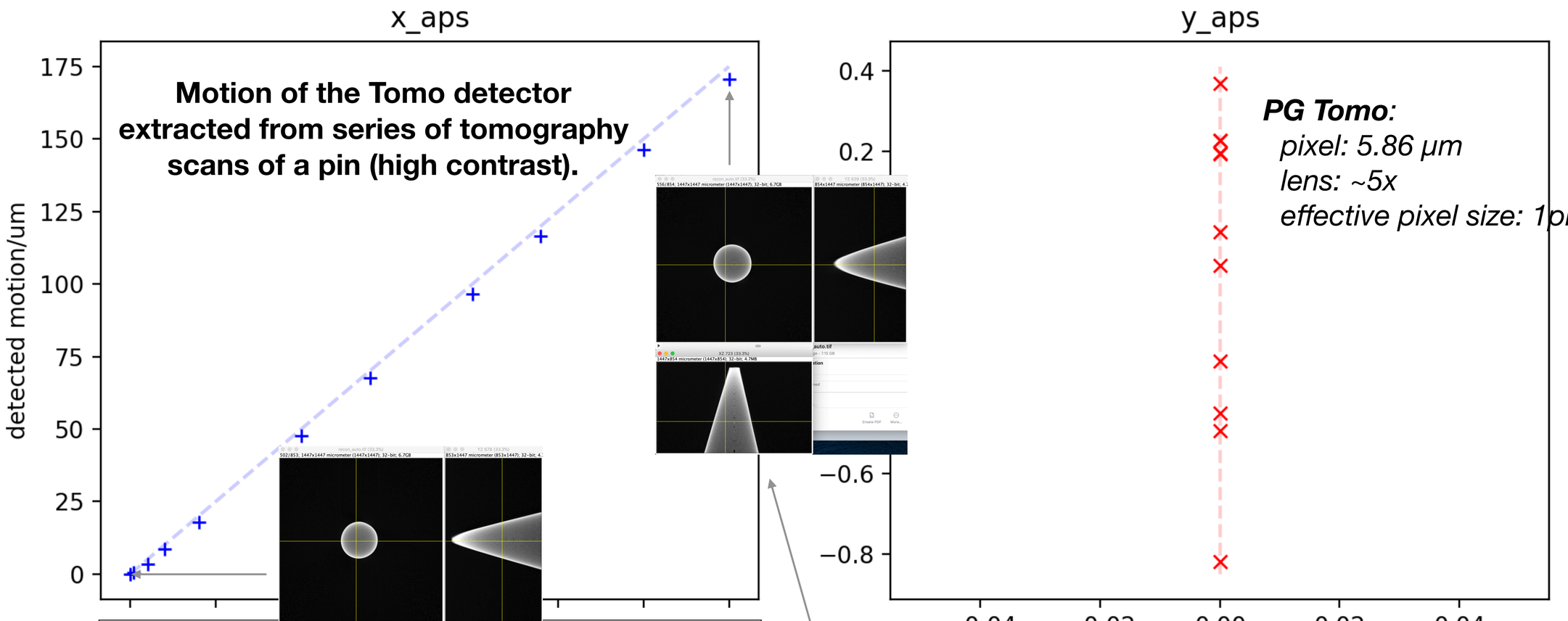
Since most of the motors has limited repeatability, it is possible that the Tomo detector cannot return to the exact position between different set of ff-HEDM scans.

Therefore, it is important to know if the **ambiguity** of the absolute detector position can be **bypassed** by **identifying the FOV** (fixed between ff-HEDM scans), which should be feasible using the slit corner detection from ***xproc.tomoproc*** (see examples below).

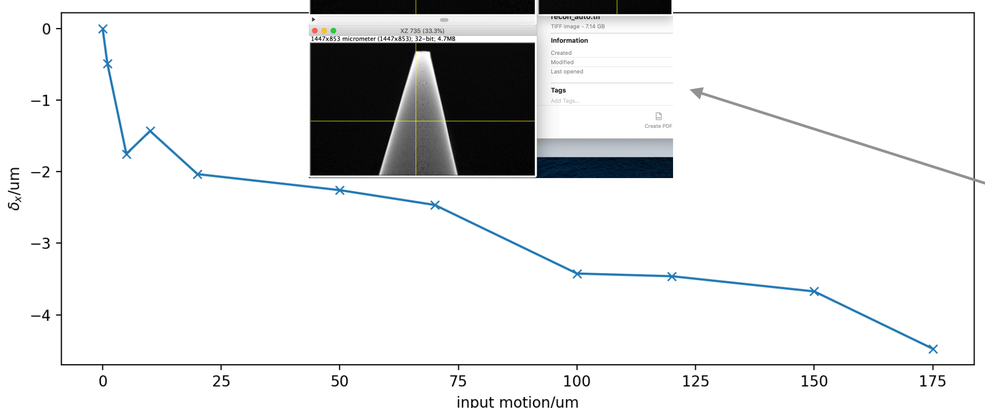


Results (pin)

The Tomo detector was systematically moved along x-axis (APS frame) between tomo scans with known amount.



Motion of the Tomo detector extracted from series of tomography scans of a pin (high contrast).

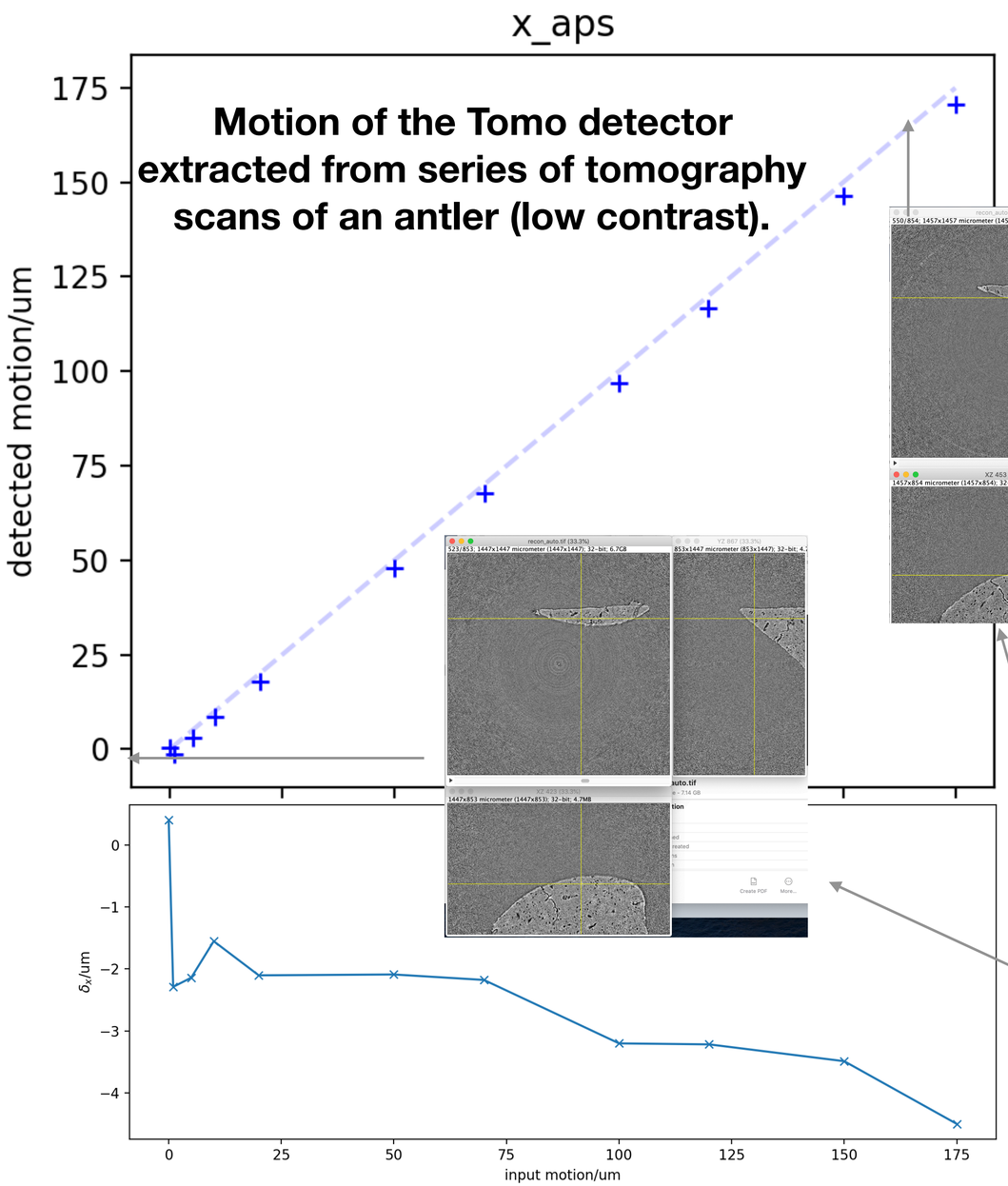


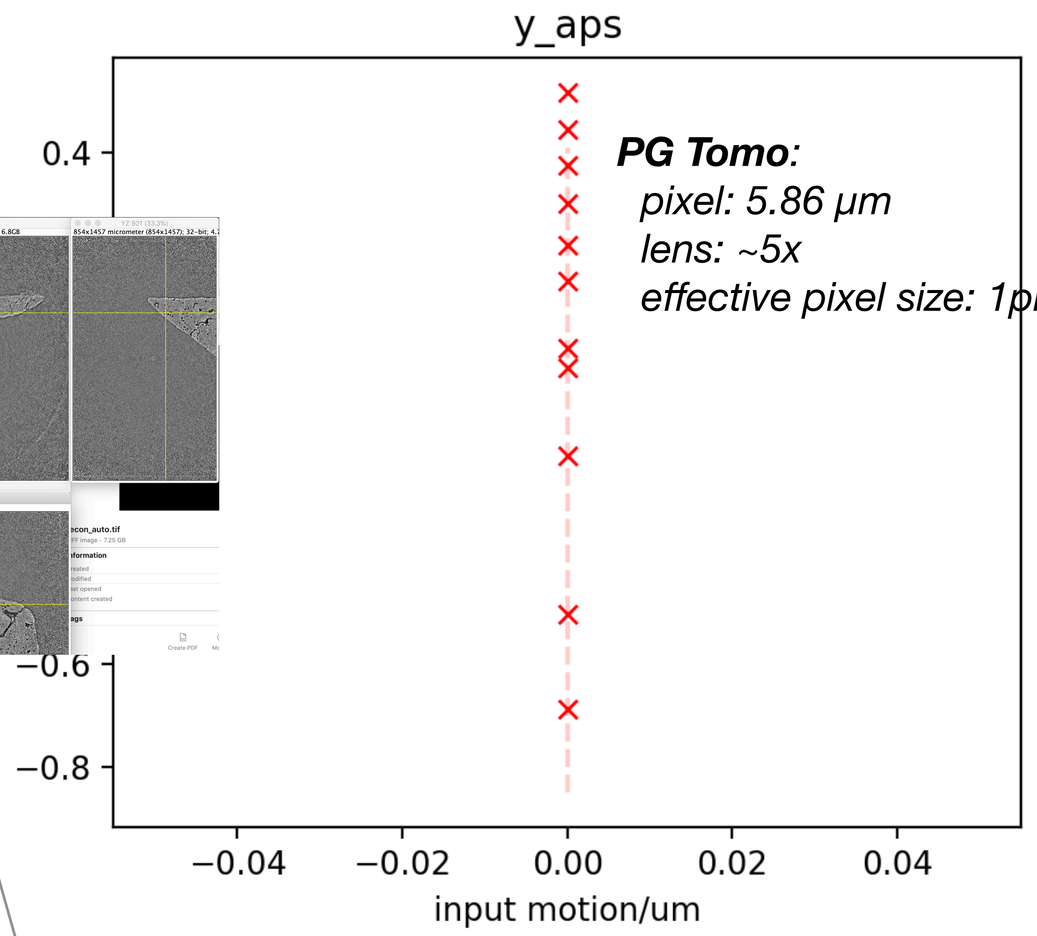
***PG Tomo**:*
pixel: 5.86 μm
lens: ~5x
effective pixel size: 1pixel ~ 1.172 μm

After correcting for the detector motion, there are very little discrepancies among the reconstruction results of the pin at different x-positions.

Results (antler)

The Tomo detector was systematically moved along x-axis (APS frame) between tomo scans with known amount.





***PG Tomo**:*

pixel: 5.86 μm

lens: ~5x

effective pixel size: 1pixel ~ 1.172 μm

After correcting for the detector motion, there are very little discrepancies among the reconstruction results of the antler at different x-positions.

Summary

- The existing **slit corner detection** from **xproc.tomoproc** is **sufficient** to identify the active **FOV**, regardless of the actual/physical position of the tomo detector.
  - We can (if necessary) **use a single y-motion to move** tomo detector out of the diffraction cone as the auto slit corner detection can be used to counter the limited motor position repeatability.
- The slit corner detection works for both **high contrast** samples (tungsten pins) and l**ow contrast** samples (bone).
- We still need to test the **auto rotation center finder**, which requires moving the rotation center while keeping detector position fixed.