

Alignment and Data Collection for GISAXS/GIWAXS Users: Pilatus 1M-F

Change the sample, search and interlock the hutch

- 1) Make the name of the spec datafile appropriate for your sample: Spec> newfile filename
- 2) Spec> go_apd
- 3) Change the sample, search and interlock the hutch
- 4) Open the photon shutter
- 5) Move the giwaxs beamstop out of the way: Spec> umv bstop3 -5 (or "bstop3out")
- 6) Adjust the sample height until the sample cuts the beam 20-80%: Spec> umvr samz [increment in mm]
- 7) [If it hasn't been done recently, run the tth alignment macro: Spec> realign_tth]
- 8) Spec> zcen
- 9) (Optional) if the last sample was on a different substrate: Spec> thcen_coarse
- 10) Spec> thcen
- 11) If scan looks ok, reset the zero value: Spec> set th 0
- 12) Repeat steps (9), (11), (12) as needed
- 13) Look at a reflection: Spec> an 0.4 0.2
- 14) (Optional) May want to decrease attenuation: Spec> att [att value]
- 15) Spec> lup th -0.05 0.05 20 0.2
- 16) Spec> umv th CEN
- 17) Spec> set th 0.2
- 18) Spec> an 0.2 0.1
- 19) Adjust the attenuation to get APD readout to 50-80K: Spec> att [14]
- 20) Run reflectivity macro. For example: Spec> NUref or Spec> refqc
- 21) Choose the incident angle you want for giwaxs, *thinc*
- 22) Spec> an 2**thinc thinc* ; showbeam
- 23) Put giwaxs beamstop back into position and confirm that beam is blocked: Spec> umv bstop3 0
- 24) Did APD counts go to zero (dark count rate)? Try it without attenuation: Spec> att 0
- 25) Are APD counts still small?
- 26) Update the Filename and File # fields on the Pilatus GUI
- 27) [Take a test image, note the maximum counts, Pilatus can count up to 10⁶ counts] Spec> pilexp [time in seconds]
- 28) Run the giwaxs macro. For example: Spec> NUgiwaxs [time in seconds]

GIWAXS

- 1) Mount samples
- 2) Spec> att 16 (put in attenuation)
- 3) Spec> bstop3out (take beamstop out)
- 4) Open photon shutter
- 5) Open fast shutter
- 6) Spec> pilct (puts Pilatus in Alignment mode, starts taking 1 sec exposures)
- 7) { Spec> stoppil stops the Pilatus and takes it out of Alignment mode, if desired) }
- 8) Move samx2 to select desired sample (watch the video monitor, blue stripe shows approx beam position)
- 9) Spec> umv th 0
- 10) Change height of sample to cut 20-80% of beam
- 11) Spec> zpil (scans and moves samz to correct height to cut beam in half)
- 12) Spec> thpil (scant th in the direct beam, moves th to CEN value. Inspect: the maximum position may be more sensible)
- 13) If peak looks ok and CEN value good, Spec> set th 0
- 14) Iterate 10-12 as necessary
- 15) Spec> bstop3in (position the giwaxs beamstop – should go to zero)
- 16) Go to the desired incident angle: Spec> umv th [*incident angle*]
- 17) Update Filename and File# on Pilatus interface, change Exposure Time to 1 sec
- 18) TAKE A 1 sec EXPOSURE ON THE PILATUS WITH ATT 16 – verify that beamstop is in position:
Spec> pilexp 1
- 19) Spec> att 0 (remove attenuators)
- 20) Spec> pilexp 1 (take 1 sec exposure, inspect max counts on ROI 2)
- 21) Take additional exposures at desired incident angles
- 22) Spec> pildown (move Pilatus to the 'down' position)
- 23) Repeat the exposures to have data to fill in gaps if desired
- 24) Spec> pilup
- 25) Go back to step 2 and repeat procedures for the other samples