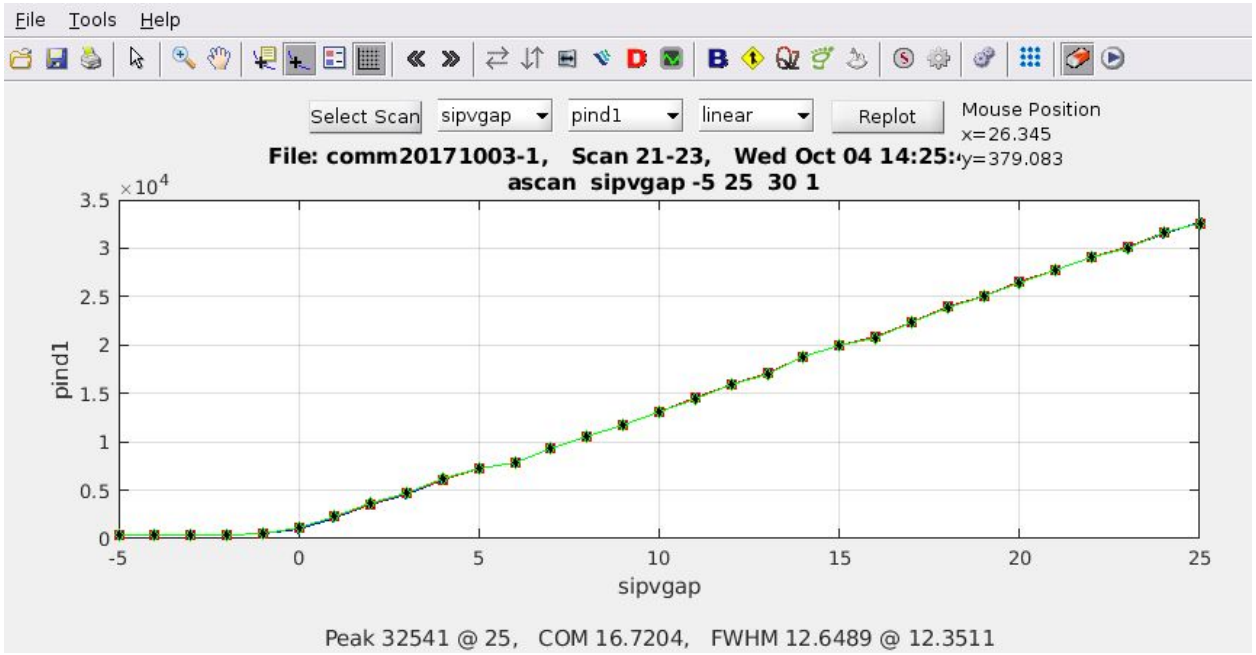
8-ID-I Logbook for 2017-3
Suresh, Eric and Alec, started Oct. 2017

N.B. I found a nice way to make a table of content. A daily entry is set with highlighting text as Heading level 2. If a subsection on the day is needed, one would use Heading level 3.

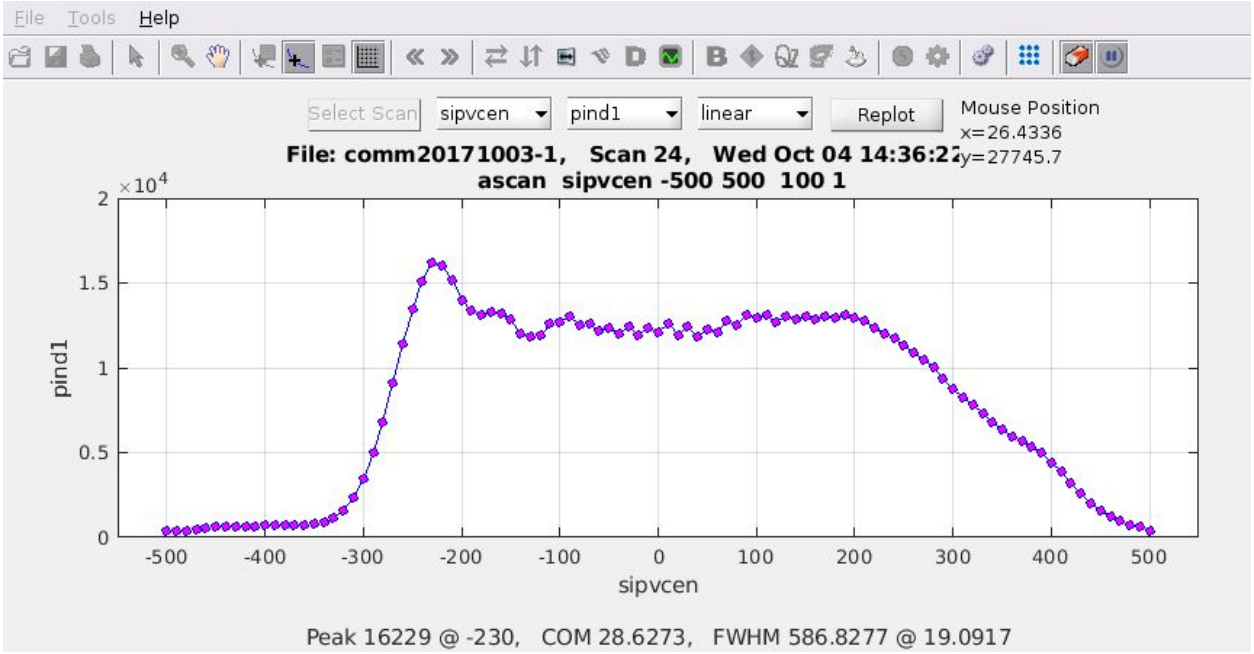
10/4/2017 Pink slit vertical tests

On Tuesday Oct. 4 we lined up the beamline. Suresh and I decided to move back the beamline to last summer's energy of 10.92 keV. After this, every beamline components worked well.

Eric did test the spec motors for sipink (sipvcen, sipvgap). The dials are inverted from the absolute position discussed in the beamline elogs because the direction is set to NEGative in the EPICS motor record. Scan 21 to 23 show the reproducibility of the slit blade motion. Moving up doesn't backlash, so a gap scan has one blade backlashing at all scan steps. A centroid scan should scan from negative to positive values.



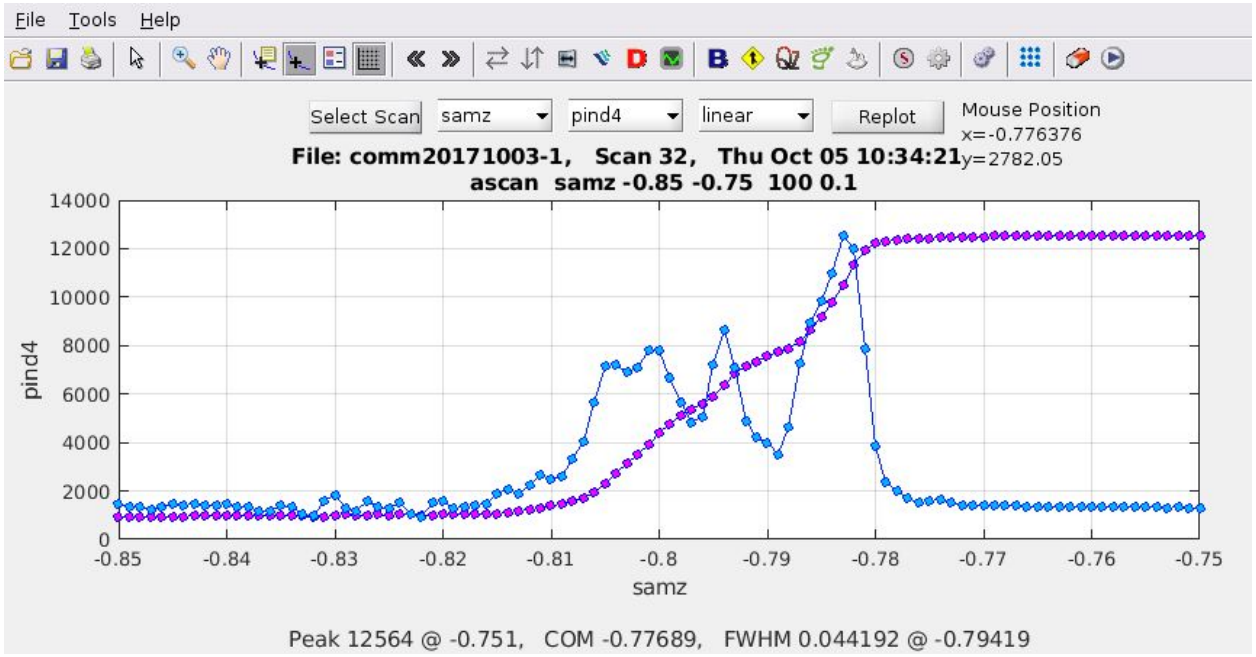
Scan 24 shows the centroid scan with a small vertical gap. The profile width is limited by the 8-ID-A pinhole. The FWHM is about 590 microns, about twice as large as the 8-ID-A pinhole. It is possible that the peak near the bottom edge is due to Fresnel diffraction, but it is not clear why the top edge is so soft.



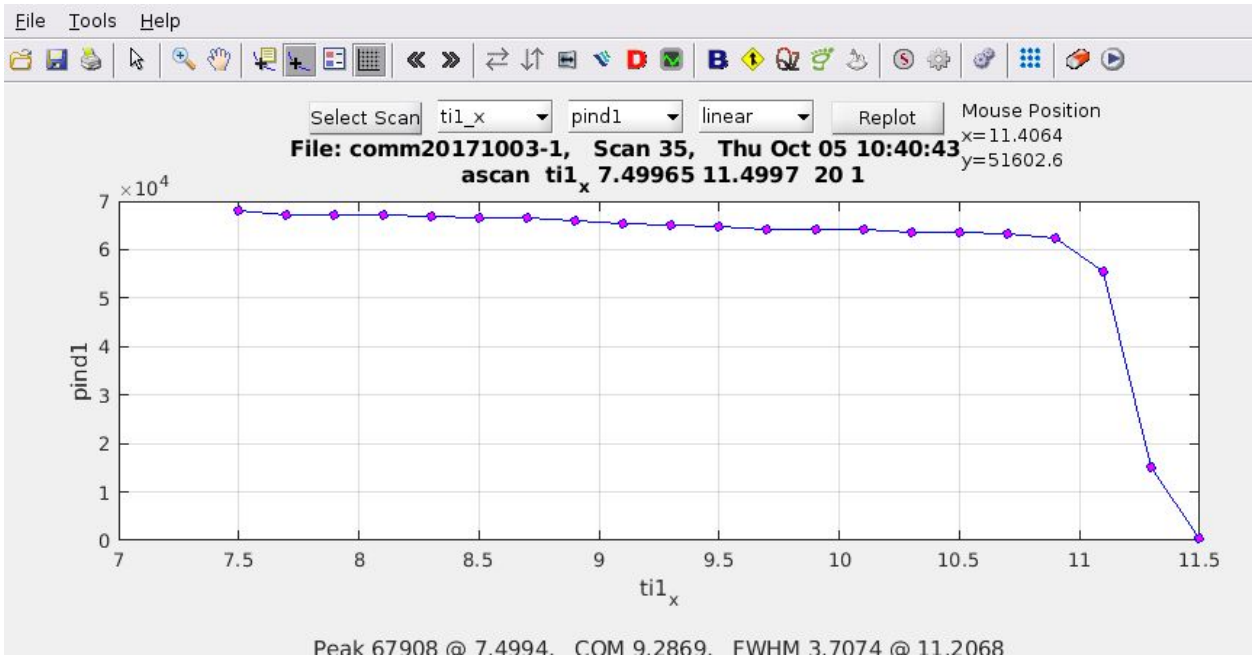
For the remainder of 10/4, Suresh set up the Eiger for beamline tests and measured the aerogel contrast as noted next.

10/5/2017 focus measurement and pink slit horizontal tests

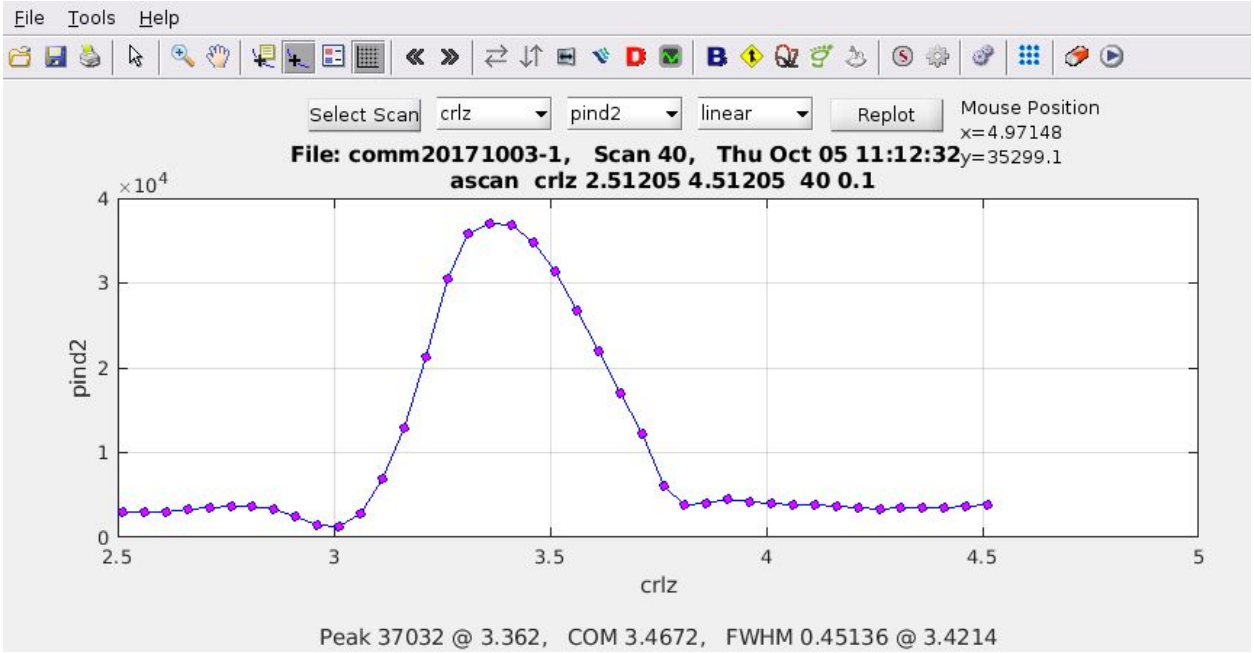
Suresh noticed this morning that the contrast was low and the focused beam looked terrible. See scan 32 and its derivative below.



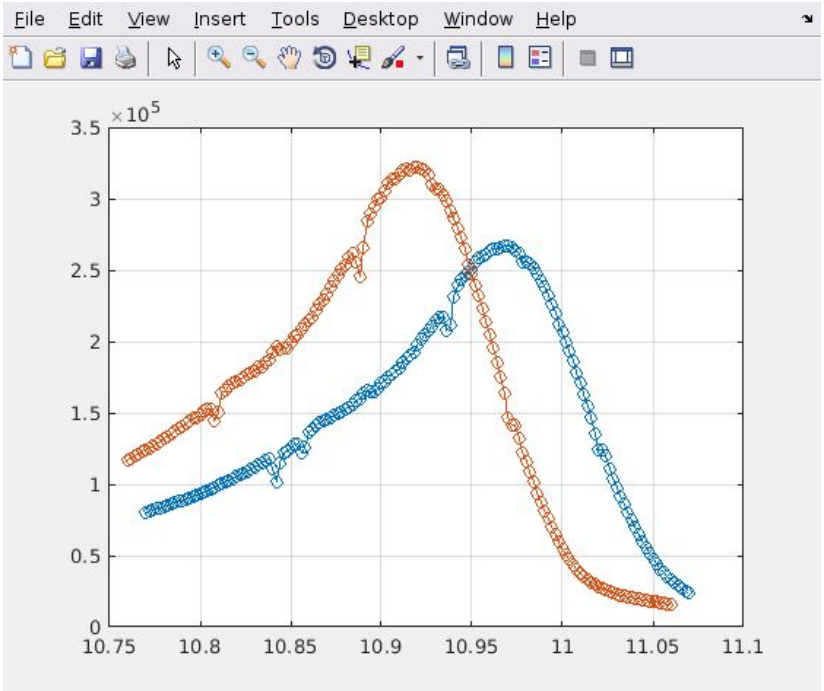
He took a nice scan of ti1_x with monoE near 10.92 keV which will be useful for pink beam operation. We left the table at ti1_x = 9.5 mm. Pink beam operation will be above 11. 5mm.



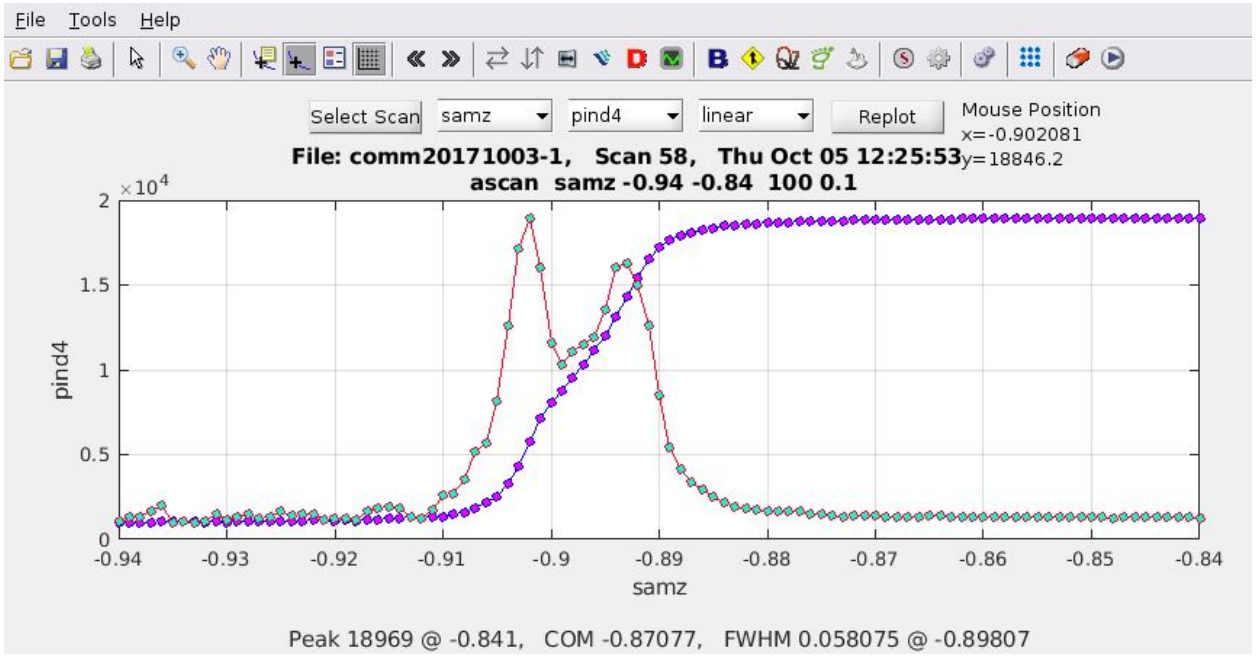
We then checked the lens alignment with a crlz scan and found the profile below in scan 40.



The beam centroid had drifted by about 100 microns so we moved to the peak. Once this was done, we got extremely small focal spots which sent both of us in total confusion. The focal spot was about 5 microns. We then investigated the beam energy as shown in scan 47 (blue) below taken today, and scan 6 (red) taken yesterday. The peaks are off by 50 eV after we homed monoE again today. This would lead to a focal length change of 0.9% from the ratio of index of refraction decrement or about 2 cm focal displacement. We still don't know why the mono energy motor position changed but we realized we needed to move all the SAXS camera slit centers so once these scans were completed, the focal spot and coherent flux made more sense. Recall that for N=14 (downstream focus) and 16 (on sample focus) , dN/N is ⅛ or 12.5% so 0.9 % a 50 eV shift is minor.

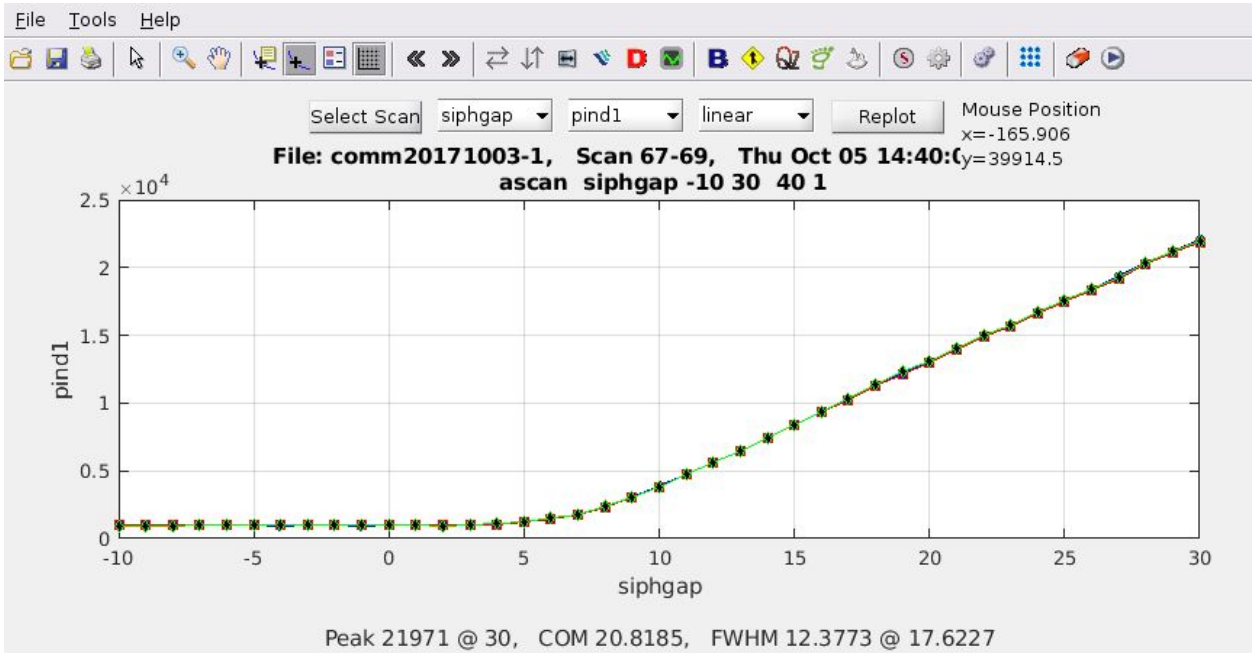


The final focus at 10.97 keV is shown below. The focal spot is 15 microns, and clearly it is not great looking. Suresh found the contrast is about what it was last run (6.5%?).

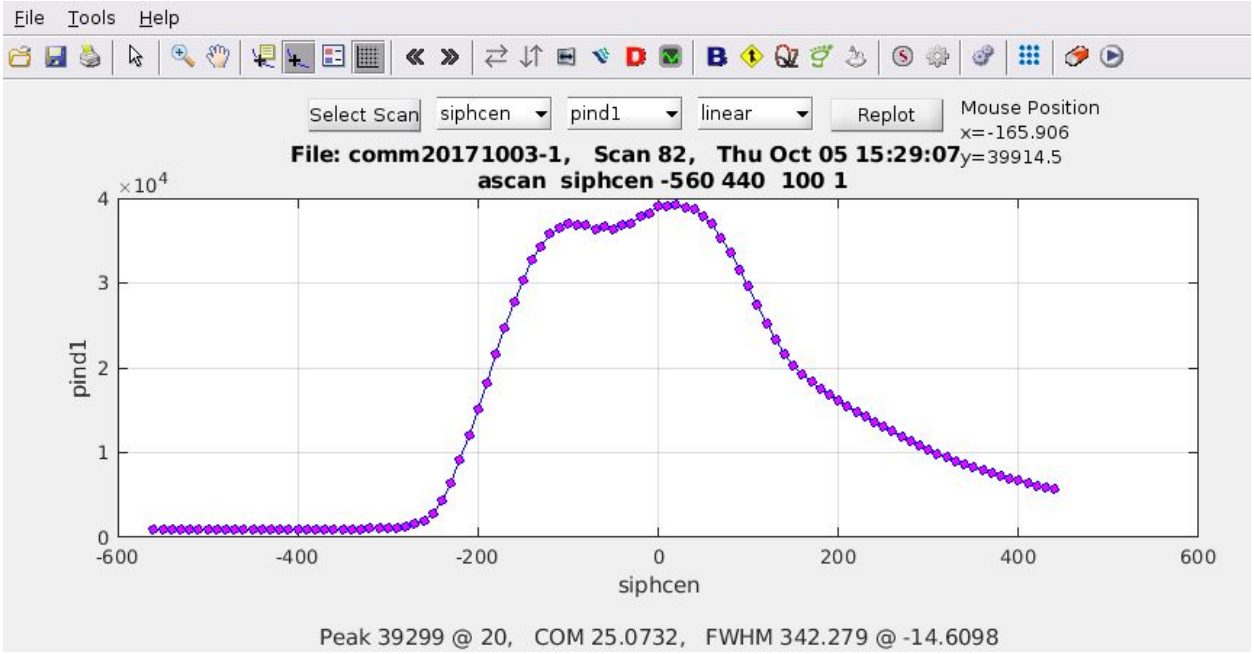


10/5/17 2PM Pink slit horizontal alignment

The horizontal motors moved reproducibly, and the slit performance is shown below. Scan 67-69 show three horizontal gap scans are reproducible.

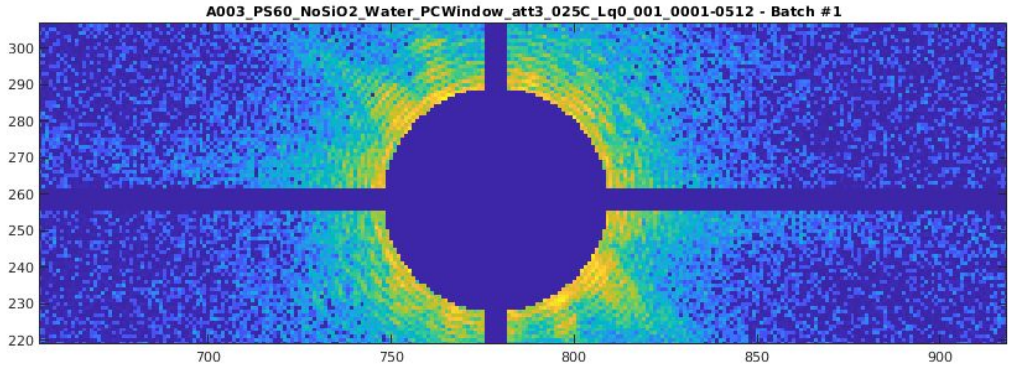


Scan 82 shows the beam profile before the monochromator with a siphcen scan with a gap of about 10 microns. The sharp slope near siphcen=-200 is the shadow of the 8-ID-D Si (111) crystal. Scan 82 was performed after opening both blades and hitting the fully opened limits, and then coming back to beam centroid position. The positions were reasonably close to where we started.



November 1, 2017 Weird polycarbonate speckle pattern on window

Suresh started quickly today on 8-ID-I, alignining/tweaking the mirror quickly and checking diamx which was unchanged. He checked si2 gaps, and checked the centers of the other slits. On Ryan's sample, we noticed a huge speckle pattern that looked like a pinhole pattern. Suresh identified it as coming from the two polycarbonate windows on the beamline exit to the sample and entrance to the detector. The image below shows this static speckle pattern.


A003_PS60_NoSiO2_Water_PCWindow_att3_025C_Lq0_001_0001-0512 - Batch #1
300
290
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