

June 5, 2017

Created new 8-ID-E user with folder for WA-XPCS

Spec file is lineup170606.spec

Loaded macro for moving mono called move_diam.mac in conf.mac and edited conf.mac and ccd_settings.do for the 2017-2 run

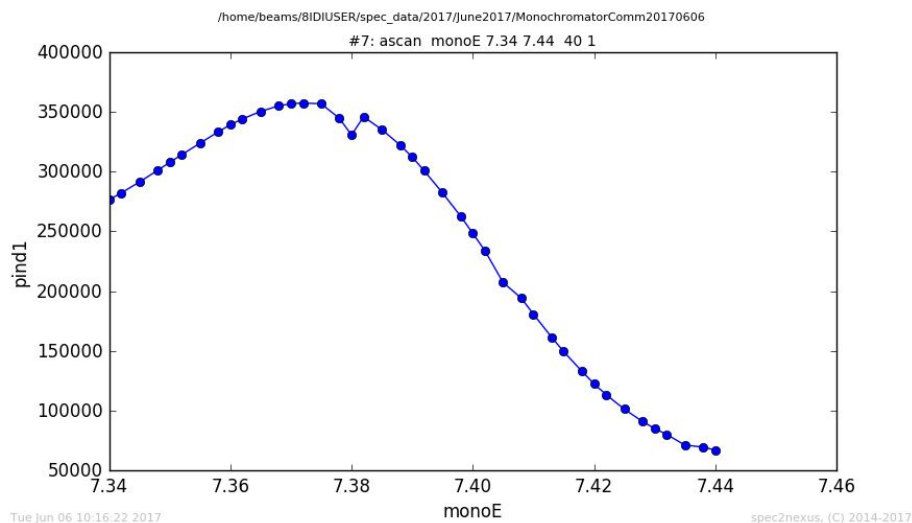
June 6, 2017

9h10 am Cleaned se2 horizontal blades with acetone, isopropanol and a cotton swab. Hardly changed the look. Suresh says I need to take the slit apart and clean it with a green scrubbing pad.

Vacuum on turbo with G isolated was 4×10^{-7} mbar. Started pumping both flight paths.

Everything is pumping nicely.

Suresh aligned 8-ID with 2 UA at 17.68 mm gaps. We went slightly lower in energy this time to avoid a glitch on the energy scan of 8-ID at 7.38 keV.



#2 lup diamchi -.04 .04 40 1 move to peak, but made mistake at move to -.52, way off

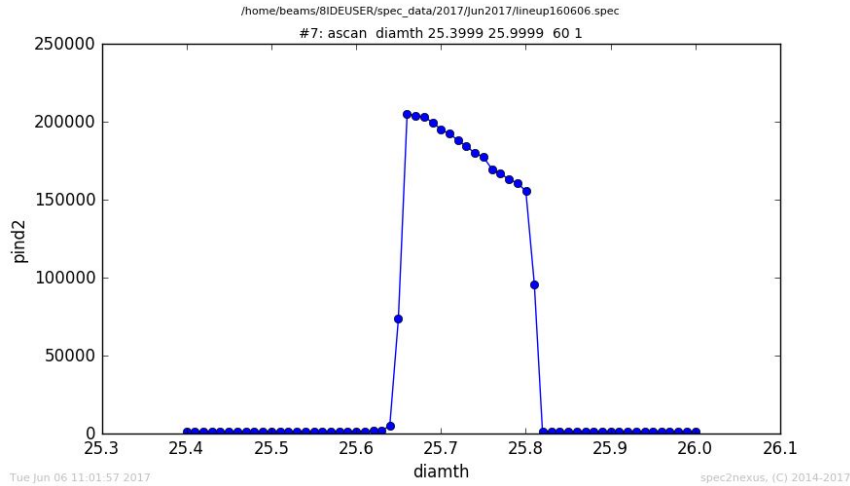
#3 lup diamth -.02 .02 40 1 (junk)

#4 lup diamchi -.04 .04 40 1 (repeat) moved to -.051.

#5 lup diamth -.04 .04 80 1 move to CEN

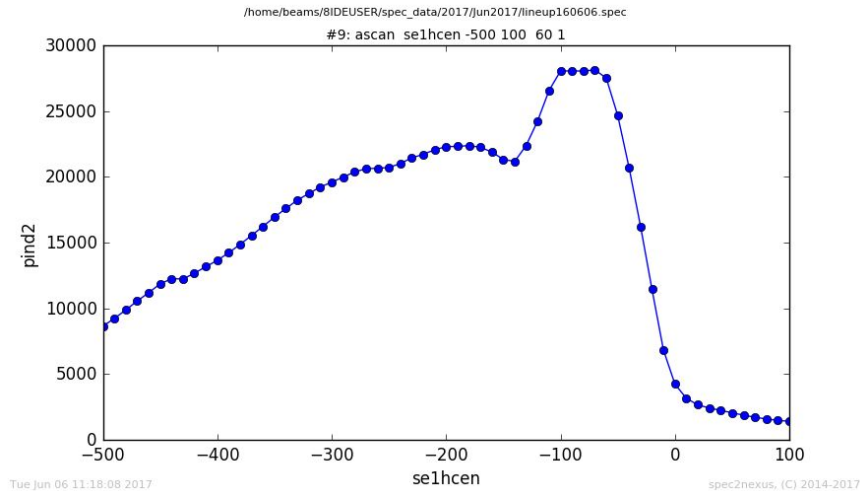
#6 lup diamth -.04 .04 80 1 with se1hgap =5000

#7 lup diamth -.3 .3 60 1 with se1hgap = 10000um. This scan is narrower than before. 0.16 deg. In June 2016, it was 0.24 deg. $10\text{mm}/2/1\text{m}=5\text{mrad}$ or ~ 0.3 deg, assuming lever arm from D mono is 1 m.



#8 lup diamth -.02 .02 40 1 go to peak

#9 lup se1hcn -300 300 60 1 with se1hgap=50. One strange scan?? Stay at -200.



#10 se1hgap -20 10 30 1 starting with a nominal 10 um opening. Zeroed at 2 um.

flux pind2 132677-1034

Amps_per_Volt(pind2) = 0.0001 A/V, CtpV = 100000, Length = 0.0400 cm, Element = Si

Ephot = 7413 eV, Si Elength = 0.0056 cm 131643 cps is a current of 13.2677 Amps

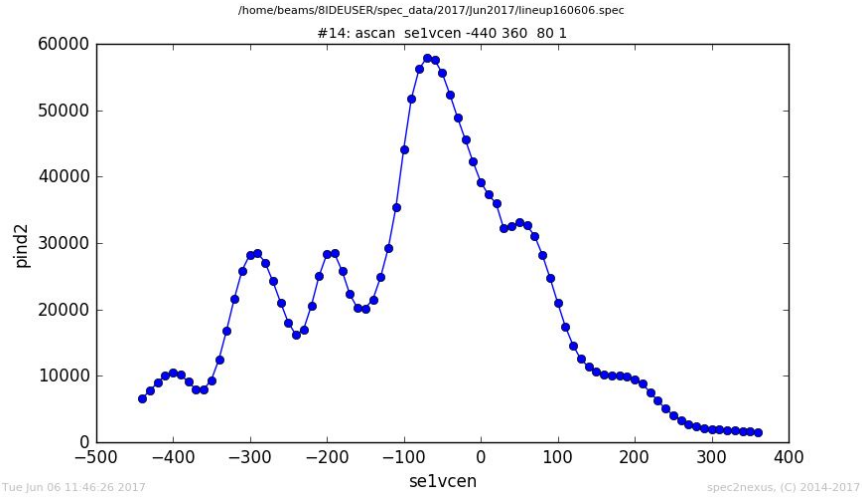
4.02e+11 photons per second This is consistent with March 7, 2017, in paper log book p2.

#11 lup diamth -0.02 .02 40 1, looks good

#12 lup se1vgap -20 10 30 1 zero is great, return to 150 um.

#13 lup se1vcen -400 400 80 1, was at -33um, decide to go to **-40**.

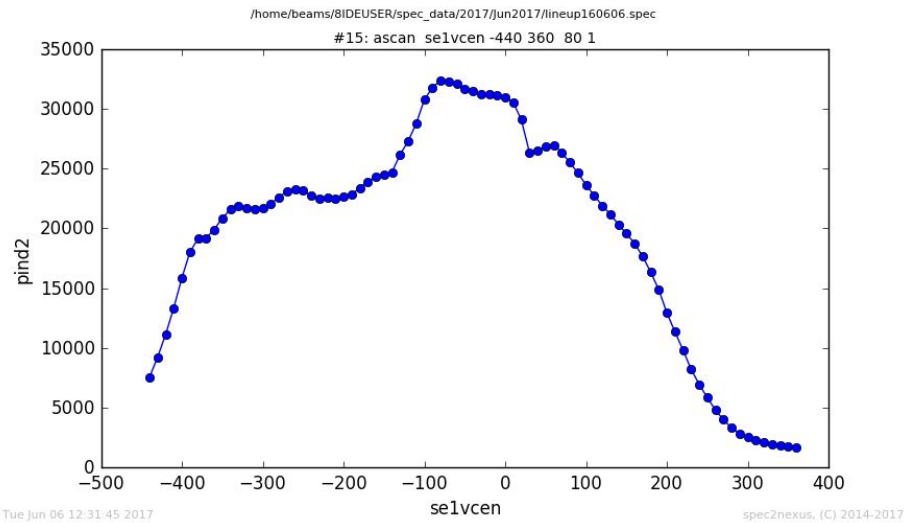
#14 lup se1vcen -400 400 80 1 with se1vgap=50, some crazy looking beam consistent with 8-ID-I measurements last weekend.



Working with Suresh in 8-ID-I around noon, we made the same scan and it looked very similar. We decided to move the mirror up by 0.5 mm, so mirror table was at 0.5 mm, now trying at 1 mm.

We moved the mirror by 1 mm. Table 2 is now 1.5 mm.

#15 lup se1vcen -400 400 80 1 with se1vgap=50 (after mirror move)



Go to -50 um. Flux is down. 88672 instead of 132700 cps.

#16 check zero again of se1vgap. Fine.

#17 lup diamth -0.02 .02 40 1 (looks good)

flux pind2 88490-1030 is **2.67e+11** photons per second

N.B. **The Steve Ross's clock/CCD shutter module was off**, so the shutter wasn't working.

This is a 1U module under the NIMBIN below the 8ID-E ioc. I turned it on.

Something is still off with the attenuation? Att is set at 16 and stucked.

The module above the NIMBIN near the 8ID-E IOC was also disabled and this controls the second filter unit for att from 16-31. The **module above** the NIMBIN needs to be **ON**.

The filter unit called **XIA S1** is **controlled by the black XIA NIM** module with att 0-15.

The filter unit called **XIA S2** is **controlled by the blue XIA NIM** module needed with att 16-31. Still having issues with **s8idigui** in movie mode. Batches are fine. I restarted it and it now seems to be reliable. Still missing something. The counters are not read in the time scan?

Spoke to Suresh and the new version of spec roled out by Jeff during the May shutdown has a problem with ccdc not being read. Suresh fixed it by changing the soft link of fourc8IDE to /home/beams/**S8SPEC**/spec/install/spec_6.03.11_ce67_x64/bin/fourc8IDE

Now everything works.

Newfile is **lineup160606a.spec**

#5 lup lensx -2 2 40 1 CEN at -10.45, but slight dip. We operate at -10.

#6 lup lensz -1 1 80 1 moved to CEN=**8.35595 mm**

#7 lup lenspit -1 1 40 1 with si1vgap=150 um. Leave as is.

Moved to through hole.

#8,9 garbage **#10** lup lensx -1 1 80 .5

#11 lup lensz -1 1 80 .5

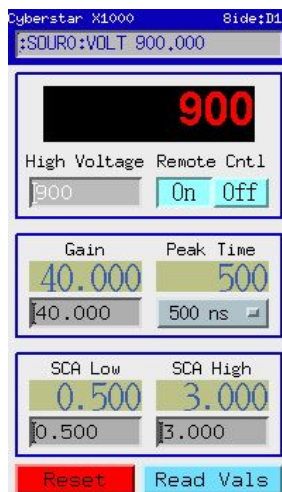
Useful positions: lens out lensx=-6.61250 lensz=8.3348mm

Lens in: lensx=-10 lensz=8.35595 mm

Flux pind3 72823-838 (2.2 e+11 ph/s at 100uA/V)

Flux pind2 82974-1034 (2.5e+11 ph/s at 100 uA/V)

Set up Oxford Cyberstar settings as <http://8id.xray.aps.anl.gov/eelog/8-ID/477>



Pin at samx=samy=0 samz=20.29mm. See p26 of Mar. 2017 log book

Aligned table te2 with x-ray eye. All worked well. Put pind4 at the end of Kapton window.

Aligned se2vcen scan 12-13. Moved to CEN and repeated.

Checked se2vgap scan #14. Zero is still good. Back at 50 um.

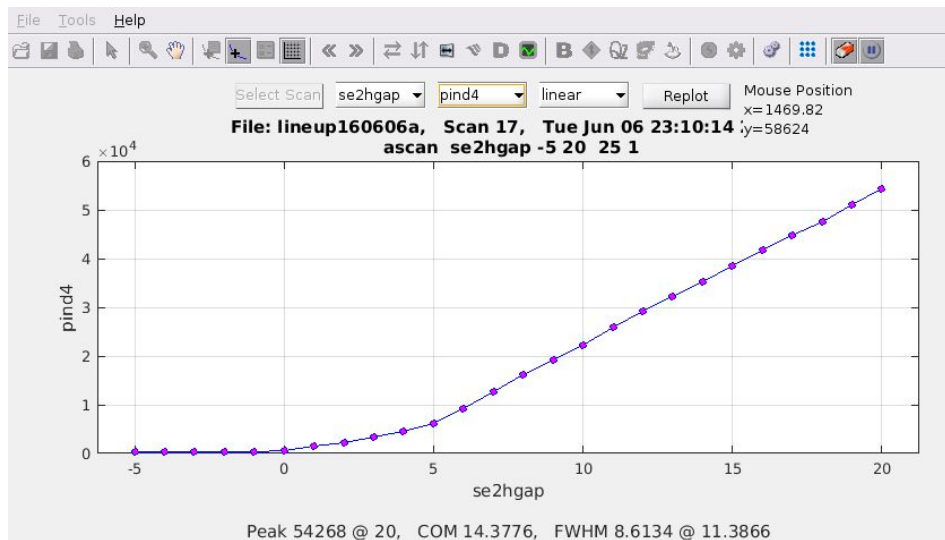
Aligned se2hcen #15. Is off some because of cleaning (likely). Moved to 50, repeat in scan **16**.

Doing this scan with narrower se1hgap 100um. Typically do it with wider 275 um slit opening.

Nice scan. Moved to CEN

#17 lup se2hgap -15 10 25 1 Still crappy looking as before. See below. Zeroed at 3 um.

#18 redo last scan after zeroing



Opened up **se1vgap=150, se1hgap 275um**

Scan #19 lup te2_z -0.04 0.04 40 1 after moving up 22 um. Still not enough. Moved an addition 20 um. Repeated #20, move to CEN.

#21 lup **se2vgap -60 60 60 1** typical looking, **stay at 50 um.** (~4% cut of coh. flux)
flux pind4 66391-410

Amps_per_Volt(pind4) = $1e-06$ A/V, CtpV = 100000

Length = 0.0400 cm, Element = Si, Ephot = 7412 eV, Si Elength = 0.0055 cm

65981 cps is a current of 0.066391 Amps

2.01e+09 ph/s

Lineup telescope crosshair on pin.

Mounted Fe3Al, at samx=-2, samy = -1, samz = 19.94, th=18.093, tth 29.253, chi =-90.5

#22 lup th -0.5 0.5 40 1 aligned.

#23 lup tth -0.5 0.5 40 1. Looks good enough let's put CCD in.

Beam on CCD, problem with TV mode on 8idigui. Intermittent stop of focus mode?

Could be matlab problem?

Took first data set R001_fe3al_att2_001 ccdtimescan 20 300 1 0.5

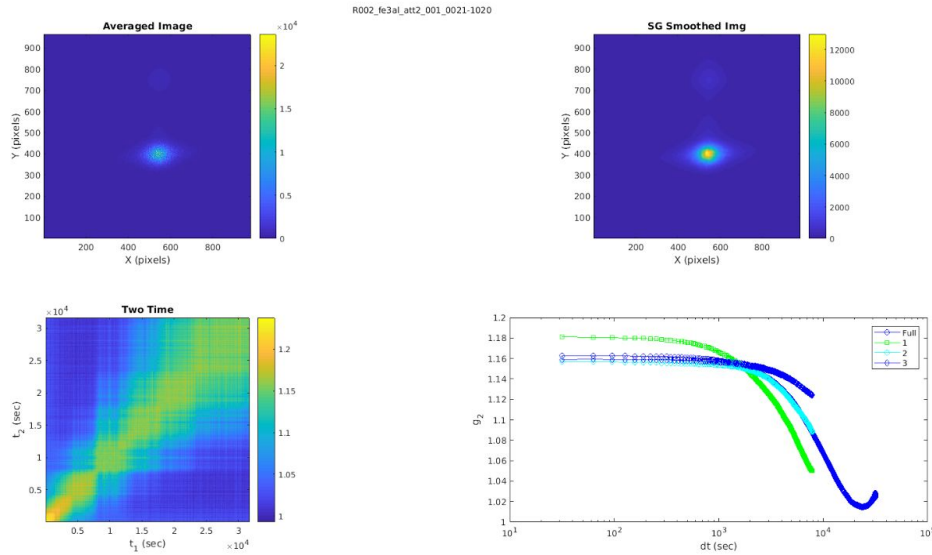
Started overnight scan #26-27

R002_fe3al_att2_001

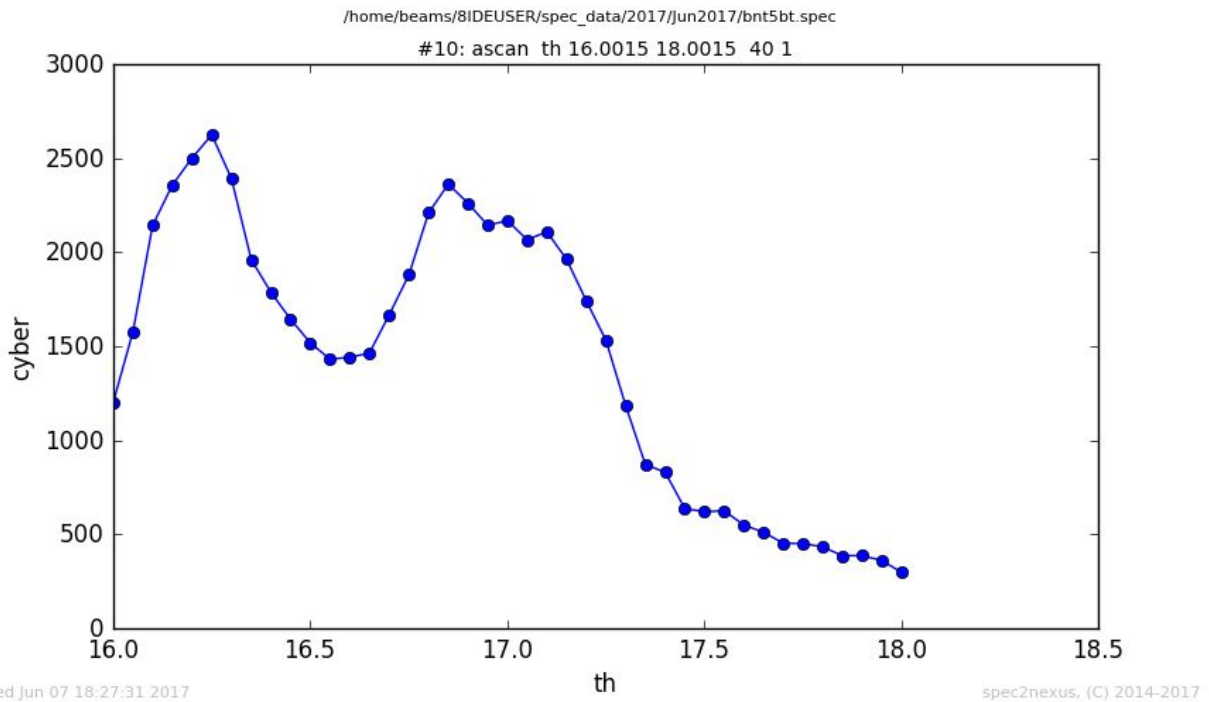
ccdtimescan 20 1000 1 0.5 30 Should run for 8 hours or so

Finished Wed Jun 07 09:41:55 2017

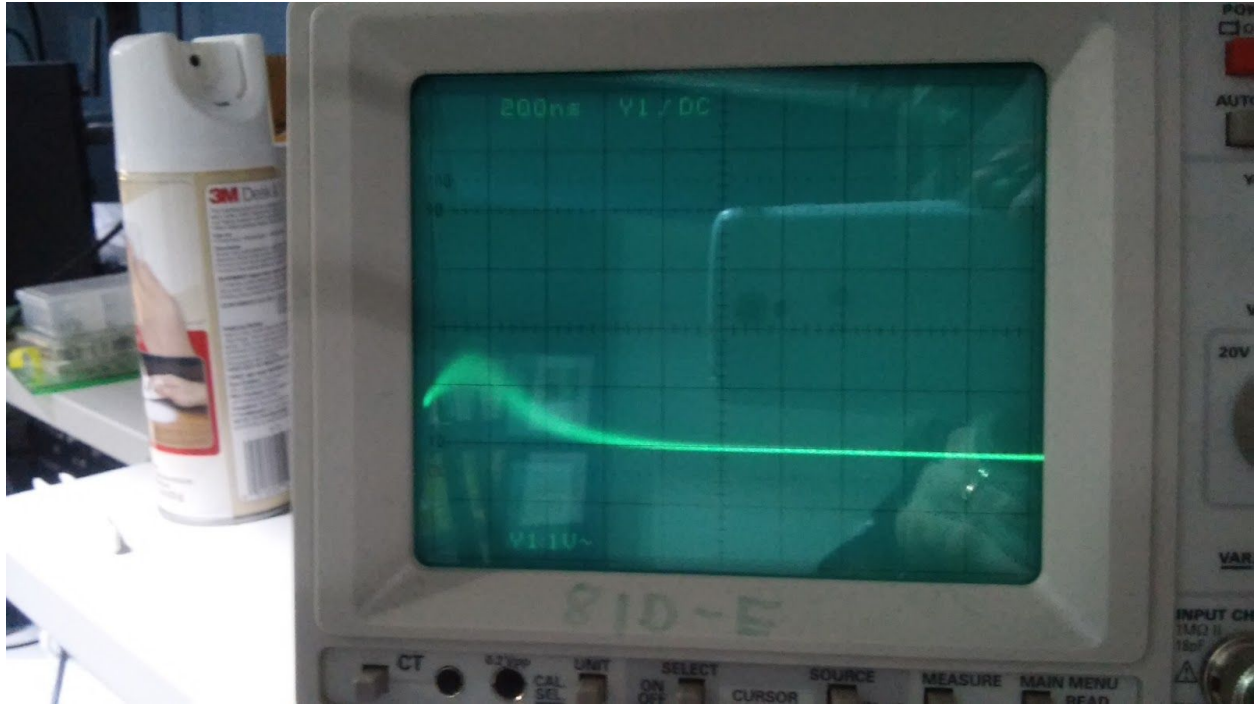
TwoTime plot shown below (about 16% contrast)



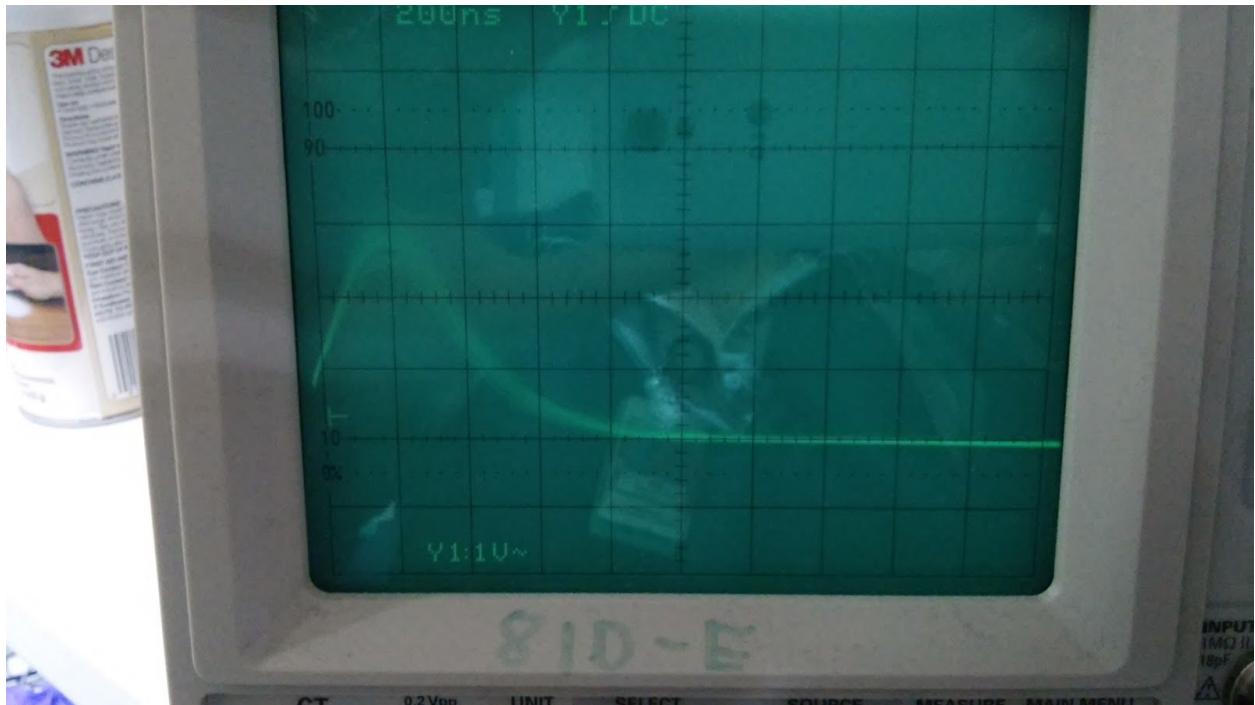
In the afternoon of June 7, we moved to the BNT5BT sample, with a surface normal of (001). We easily found the (002) peak at the correct Bragg angle, but we got fooled with the high energy second harmonics signal so after setting the SCAN Upper Discriminator window to 2 from 3 V, the double peak in the image below disappeared. This is taken near the 001 location.



The next three images show how we observed harmonics contamination.

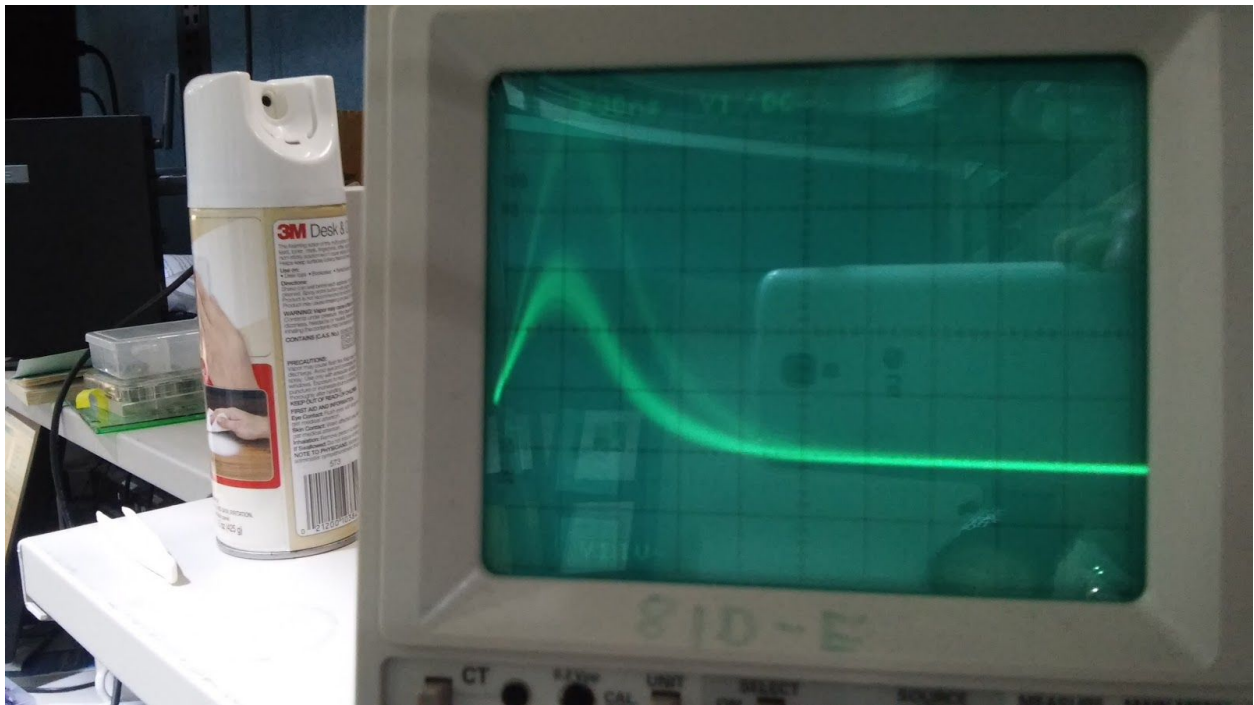


(above) An image of the scope of a strong diffraction peak where 7.35 keV is the sole energy diffracted. The peak height ranges between 1-1.5 V.



(above) The image of the scope of a weak diffraction peak where 14.7 keV is the primary energy diffracted. The peak height ranges between 2.5-3 V. The count rates were not to high so there is no pileup. The amplifier is the same for all 3 images. The 2nd harmonics caused

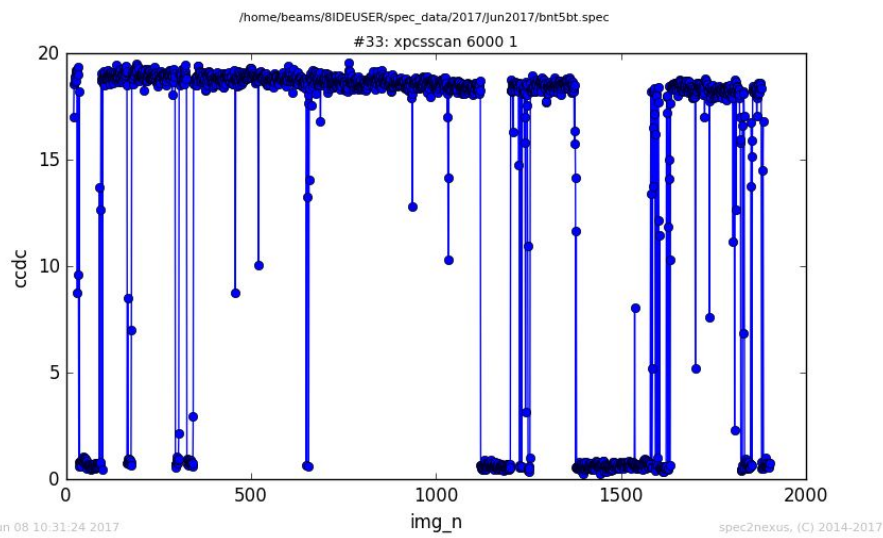
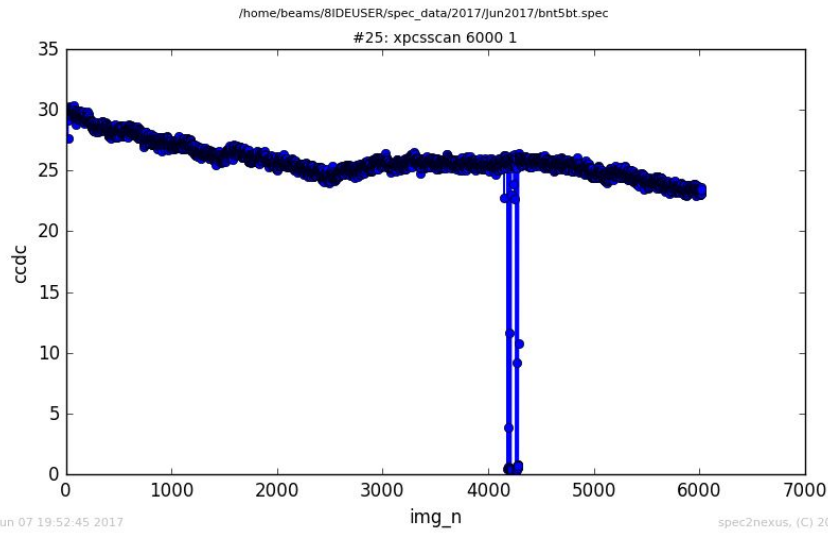
problems in our search for a very weak reflection as it would get counted in the fundamental energy SCA window which had been set to wide.



(above) The image of the scope of a weak diffraction peak where 14.7 keV and higher energies are diffracted.

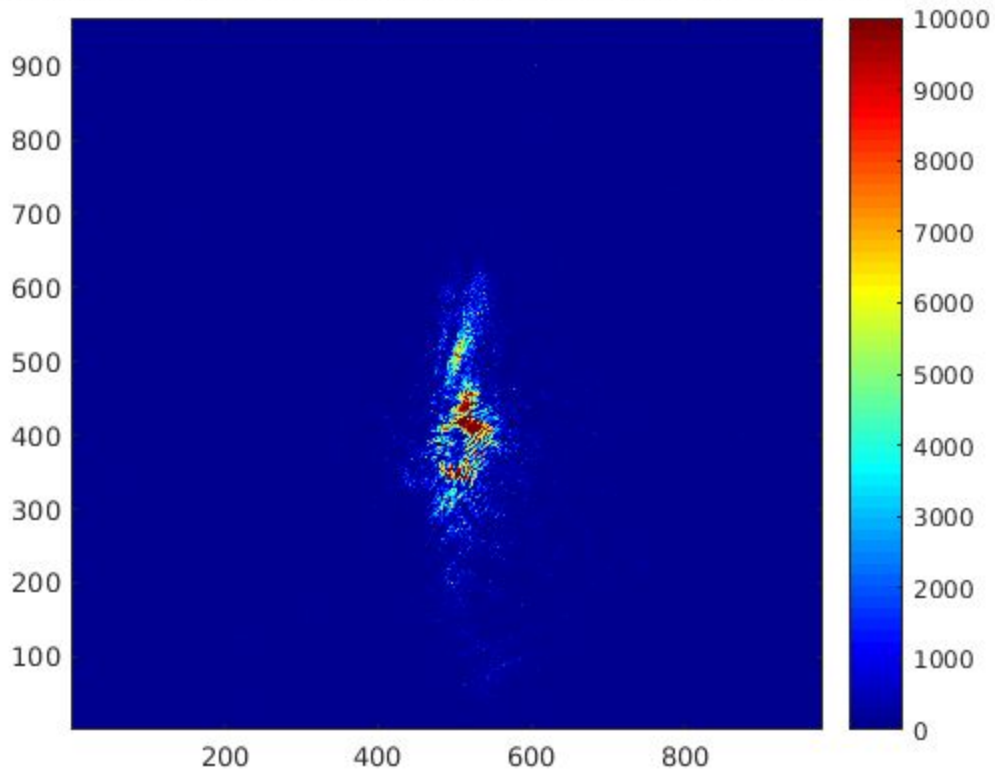
Qian and Qingteng took XPCS time scan on the 002 overnight. The shutter is not working again correctly.

See scan 25 and 33 below. The problem is getting worse, starting from scan 25, 27, 29, 31, 33.



We used fourc8IDE to find a reflection (0 0.5 2.5) on BNT5BT single crystal with a (0 0 1) surface normal. We could find the (0 0 2), but never found the (0 0 1). Not clear why. Got nice CDI speckle on the (0 0.5 2.5).

06/A001_BNT5BT_00p52p5_att0_008/A001_BNT5BT_00p52p5_att0_008:71 : Recorde



To fix, to do:

all pind2, pind3 mono_init macros so that they produce this output: Note invert and input offset polarity.

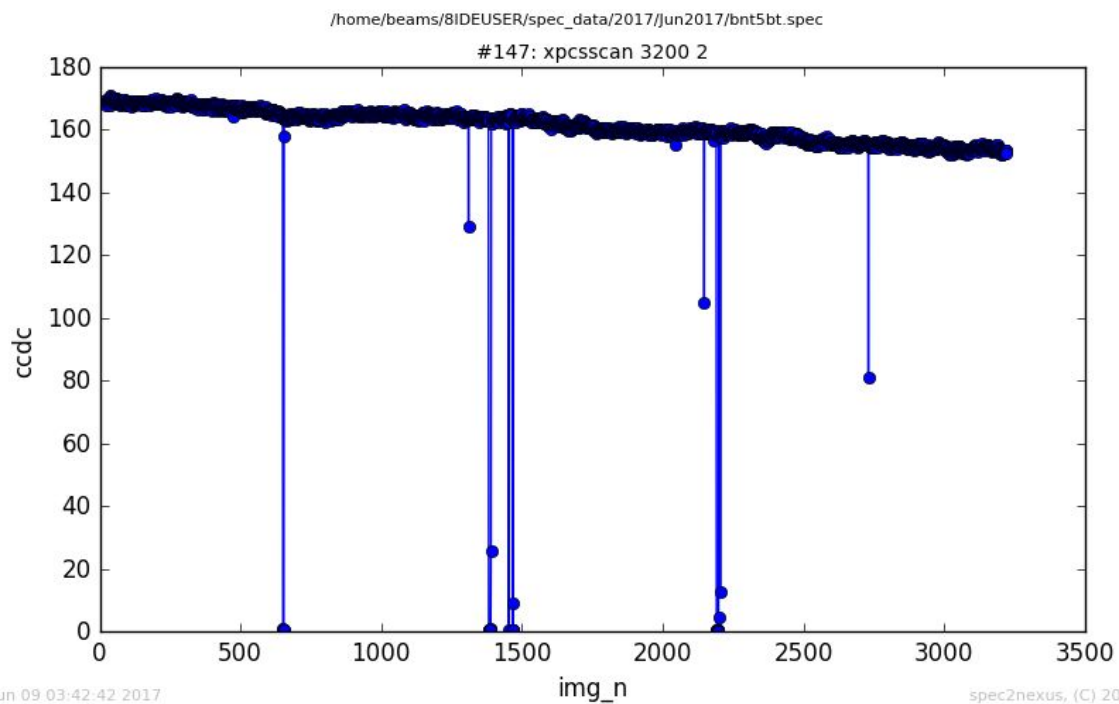
#A1 PIND2 SR570 CURRENT PREAMPLIFIER

BIAS VOLTAGE 0 mV < 1 > OFF	FILTER No filter [] RESET lowpass 3dB freq. 0.03 Hz [] highpass 3dB freq. 0.03 Hz []	GAIN MODE LOW NOISE []	INVERT ON []
0 $\frac{FS}{1000}$ < 1 > CAL []	INPUT OFFSET ON [] - [] 1 [] uA []	SENSITIVITY 100 [] uA/V []	BLANK OFF []
			Less

SET ALL []
DEFAULT []



Investigate shutter problem



Useful parameters in spec

- CEN Moves to center calculated from FWHM positions
- pl_CFWHM
- pl_FWHM
- pl_MAX
- pl_MIN
- pl_SUM
- pl_UHMX
- pl_xMIN

pl_COM
pl_LHMX
pl_MAXX
pl_MINX
pl_SUMSQ
pl_xMAX

Moves to x position of MAX