2:18
Dima & Chris. Start this new log file.
Aim for this night –> Practice and develop procedure for aligning detector
Go for coffee

2:39
Turn on beam
Beam still at 122, 112.
Ring E 3.1281, current 249.9

Moved from 2.8 to 3.8mm

- pos tboptX 3.8

this moves spot from 122,112 -> 123,94
moving 1mm on stage moves 112-94=18*55 =0.990 mm on image

2:49
beam off
Positions are noted in 'Record of Positions.xls'

Use View->Rotate 270 degrees to get orientation correct on Medipix Preview.
(then be careful you still read X,Y correctly !)
Ask position in y
>tboptY
At 18.0mm
Moved up on Medipix image, so need to mirror flip.

So correct options to view is
View->Rotate 270
View -> mirror flip

X, Y movements understood.
X stage movements move approximately in Y in Medipix
Y stage movements move approximately in X in Medipix

3:13
Try to understand rotations

3:45
Access to beam area, to ensure enough space for rotations
Crashed camera 5
Crashed camera 4
Can access cameras through wiki then are OK, and can zoom etc..

4:05
Theta control (rotn around y) is now fine. We can rotate by +45 and -45 freely.
We adjusted the mounting of the USB box to allow this.

Now, lets see about phi (rotn around X)
Can rotate by very close to 10 degrees (9.9996), but not quite 10. So lets use rotations by 9.9 degrees.

4:21
Beam on.
Same pixel illuminated.

The following calculation is 'Measurement 1 Phi' in Record of Postions.xls

Rotate 45 degrees in theta from theta=6 to theta=+51
See pixel moving on screen to left (high Y), but rotates off the screen.
Make translation in x to bring it back.
Moved to tboptX 28.8 mm, this is maximum allowed. The image is on screen – but cannot move further to position. Need to use coarse X.
tboptXcoarse=545.0 mm
adjusted
tboptXcoarse=552.0mm
now for extreme right of Medipix screen tboptX 28.1mm
Cannot move to extreme left of screen – box must get in way of beam.
Furthest we can move is tboptX 21.1 mm
Rotate to -45 degrees and make measurements at two positions. ONLY moving tboptX (not touching coarse, as we don't know this is aligned with fine)
Make calculation of theta offset. Theta =0.636

5:17
So we should rotate back to 6 in theta and add 0.636, so starting guess is 6.636
Made measurements for –ve rotation first.
Then rotated.
Pixel man crashed – we think cable got pulled out on rotation.
Go for beam intervention.
Cable from detector to USB got caught round pin on rotation stage and got pulled out.
Remount so cable more out of way.

6:05

Rotate back to –ve rotation (-38.364), and remake measurement.
Got angle of -1.5 (presumably it got moved during recabling)

Apply -1.5 correction and remake measurement.

6:58
Got angle of 0.19 degrees. So we are aligned. Hooray - the procedure works !

Apply, the 0.19 as a final correction. So correct angle in theta is 5.319
Go for coffee.

7:58
The following calculation is ‘Measurement 1 Theta’ in Record of Postions.xls

Made measurement in Phi with 9.9 degree rotation.
It was already very accurately aligned.
Get a phi offset of 0.065, from original angle of 0.
Sufficiently small that we need not iterate.
So correct angle in phi is 0.065.

8:15
DAC scan aka energy calibration
Creating filter chain. Right click on Medipix loader in the task bar and call Utilities->filter chain editor. There should be filter called FrameCrop created by Dima. Double click on it and modify values according to values where your spot is.
Go back to preview and select the filter from the Filter chain menu (bottom right corner). The preview will zoom around the chosen area.

Go and do DAC scan now…
DAC value before the DAC scan 345 (THL-FBK = -0.0043).

9.45

Aaron and Nicola check the beam intensity before starting an area scan. Nothing is changed in the detector alignment and in the settings of Medipix.

The pixel with the maximum count rate is (158,120) with 661 counts, acquisition time 0.1 second.

THL = 345, THL-FBK = 0.000

tboptX = -5.000 tbpotY = 16.000 tboptXcoarse = 552.0 tboptZcoarse = 4.50

tboptChi = 0.0 tboptPhi = 0.0648 tboptTheta = 5.3190

tbbaseY1 = -8.0 tbbaseY2 = -8.0

10.13
Set scan
Scan Size=75µm with Step Size=2.5µm
wait times of 0.2 and 1s
Number of frames=2

Therefore in Pixelman set 1801 acquisitions (1 extra to be sure that we have 1800 frames/triggers)
Should take ~36minutes

GDA command: scan tboptX -5.0 -5.075 -0.0025 tboptY 16.0 16.075 tbdiagX 8.0 8.21 0.2 w 0.2 pcotrig 1 rc t

Data file: 12422.dat

The acquisition was set at 1801 frames, so actually the last point acquired was -5.0725, 16.0025). The are scanned completely is [(-5.0,16.), (-5.07,16.075)].

The number of points acquired is considered sufficient.

12.05

The data taken look fine. We check again the beam with the detector. The position (-5.0025, 16.0775) looks in the middle of four pixels. [(156,120),(157,121)].
This corresponds to frame ~870.
We decide to start a new scan around that position.

12.18

Acquisition started

GDA command: scan tboptX -4.9475 -5.0225 -0.0025 tboptY 16.0675 16.1425 tbdiagX 8.0 8.81 0.2 w 0.2 pcotrig 1 ch15 rc t

The signal from the ion chamber as beam intensity monitor is added to the data acquired.

We acquire 5 frames with 0.7 ms each.

Data file: 12423.dat

!!! THIS ACQUISITION IS STOPPED AFER A FEW MINUTES BECAUSE WE REALIZED THAT WE HAD NOT PUT ENOUGH FRAMES TO BE ACQUIRED BY PIXELMAN!!!

Set 5000 acquisitions in Pixelman

12.35

We start the acquisition again. Same GDA command and same parameters as before.

Data file: 12424.dat

!!!!ACQUISITION STOPPED AGAIN. SOMETHING LOOKED WRONG WITH THE DATA!!!!

12.40

We start a new acquisition. Same GDA command and same parameters as before.

Data file: 12426.dat
Data saved in: \day2\2ndPixelScan_5aq_70ms\SecondPixelScan.txt

Data analyst: please look at Chris's important note in next page

Celeste here.

The detector has been biased at 5V since 19:00 yesterday! Remember to check detector parametes at end of scan

15:38 end of scan. Enter the beam area.
Vbias = 5V
Bias current in Pixelman = 0.083618
Bias V verification = 0.092163

Put 0V in detector. Bias V verify = 0.092613, Bias current = 0.083618

15:41 Bias the detector at 20V

Bias current in Pixelman = 0.084229
Bias V verification = 0.092773
Similar as before. We have external biasing. Do these parameters mean anything?

Repeat the scan above at 20V. THL = 345, we expect it to be half the beam energy. 5000 frames, 0.7 seconds acquisition.

15.55: Use the same pixel. Go back to starting position and repeat the scan.

Data saved in
C:\3DMedipixMay09\day2\3rdPixelScan_5aq_70ms_20V\ThirdPixelScan.txt
Log data 12428.dat We have increased the sensitivity of the ion chamber.

Kawal arrives and says the extra hits in neighboring pixels might be due to scattered radiation in the Al foils

16:03
Chris - I made a mistake in the angle correction last night.
For the Phi angle calculation I did not input the 9.9 degree rotation but used 45 instead.
The correct value should have Phi=0.370 degrees, rather than 0.065
So, after applying the incorrect correction, the data has been taken at an angle offset from optimal by 0.370-0.065=0.305 degrees. This is a small effect so will not affect the data significantly.

This applies to both scans of the 3d Ntype: 5V and 20V

18:30
Dima and Eva leave to do energy calibration of PType MXR and TPIX and planar MXR with sources.

19:05
Acquisition ends (time=3h15')
Logfile is 12428.dat
Detector parameters from Pixelman same as before. It seems they don't mean anything with external bias.

Run a THL scan in illuminated pixel with Dima's filter to get energy calibration. Results don't make a lot of sense: can't see the 15 keV peak anywhere.
Scan is in C:\3DMedipixMay09\day\THLScanInSinglePixel.txt

20:45 Aaron, Eva, Celeste

New scan with THL = 368 (close to the noise). 20V. Quarter of a pixel. (same pixel as before)
The scans above are with THL350, in theory halfway between the noise and the 15keV peak.
Now we move to the 25% point, closer to the noise: THL=368

Want to scan ¼ of a pixel. By looking at the pixel map from matlab we choose the new start and end positions. We know that:

- Origin of optical table scan is in top left corner of the pixel map
- X moves vertically downwards
- Y moves horizontally to the right

New scan parameters:
Y0 = 16.0675 (same as before)
17 positions instead of 31
Step 2.5um
Yend = 16.1075

X0 = -4.9500 (1 position lower than before to start closer to hole)
17 positions instead of 31
Step 2.5um
Xend = -4.9900

As before, take 5 acquisitions in each position

GDA command: scan tboptX --4.9500 -4.9900-0.0025 tboptY 16.0675 16.1075tbdiagX 8.0 8.81 0.2 w 0.2 pcotrig 1 ch15 rc t

Acq time is 0.7s as before. Have ~5600 count in center pixel

Results in C:\3DMedipixMay09\day2\4thPixelScan_5aq_70ms_20V_THL368_quarter
Logfile is 12430.dat

21:33 Scan ends

21:40
Repeat with same parameters, 5V
Set V in external source to 5V

New scan with THL = 368 (close to the noise). 5V. Quarter of a pixel. (same pixel as before (156,120))
Results in C:\3DMedipixMay09\day2\5thPixelScan_5aq_70ms_5V_THL368_quarter
Logfile is 12431.dat

~3000 counts in center pixel
Scan ends at 22:35

22:38 Repeat with 5V, high THL (75% point): THL= 323
New scan with THL = 323 (away from the noise). 5V. Quarter of a pixel. (same pixel as before (156,120))
Results in:C:\3DMedipixMay09\day2\6thPixelScan_5aq_70ms_5V_THL323_quarter\6thPixelScan.txt
Logfile is 12432.dat

~1300 counts in center pixel
Scan ends at 23:30

23:54 Repeat with **20V**, high THL (75% point): THL= 323
New scan with THL = 323 (away from the noise). 20V. Quarter of a pixel. (same pixel as before (156,120))
Results in:
C:\3DMedipixMay09\day2\7thPixelScan_5aq_70ms_20V_THL323_quarter\7thPixelScan.txt
Logfile is 12433.dat

~1200 counts in center pixel
Scan complete at 00:48

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NOTE: Renamed the folders of day2 to include complete information of the scan: 2ndPixelScan_5aq_70ms_5V_THL345_3DN and so on