

# T1065, March 2015

Program: 120 GeV Photek 1, Photek 2,  
reproduce 9.6 ps first. Next 3 Xo W and 8, 16,  
32 GeV electrons with Photek 1, Photek 2.  
Next Photonis XP85011 with 16 pixels scan for  
spacing and timing. 8 GeV electron beam, 3 Xo  
of W, no other material before XP85011,  
reference Photek 1,

## March 23

9:00, Sergey, Artur, AIR

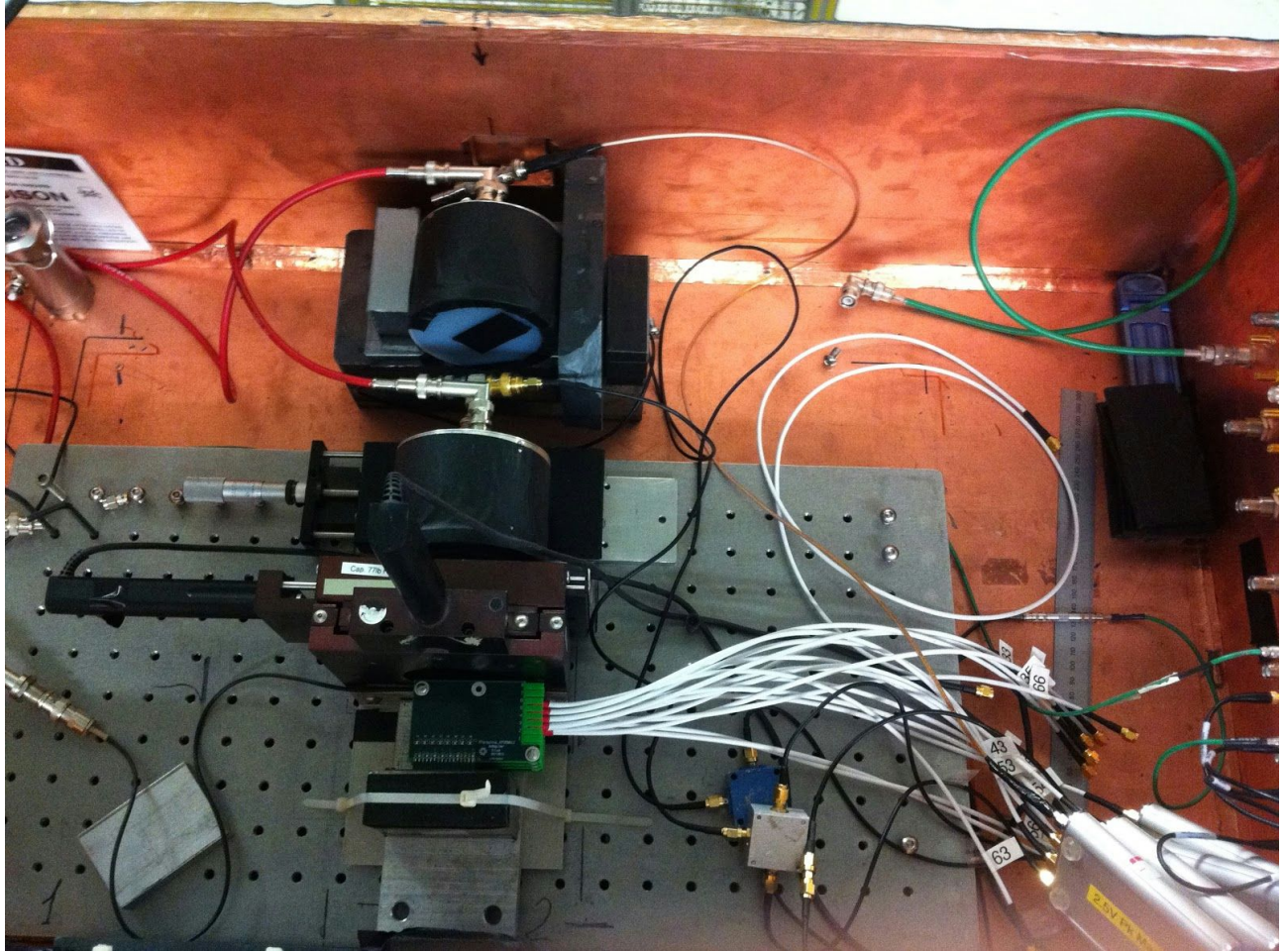
Setup installation. Channel mapping is below

2422: Ref, 43, 53, 63

2450: Ref, 44, 54, 64

2449: Ref, 45, 55, 65

2442: Ref, 46, 56, 66



For the first runs

2422: Ref, 43, 53, PH2

2450: Ref, 44, 54, 64

2449: Ref, 45, 55, 65

2442: Ref, 46, 56, CHER

For the first runs we will use the 2422 to get the time resolution around 10 psec, and then will remove the PH2, Artur.

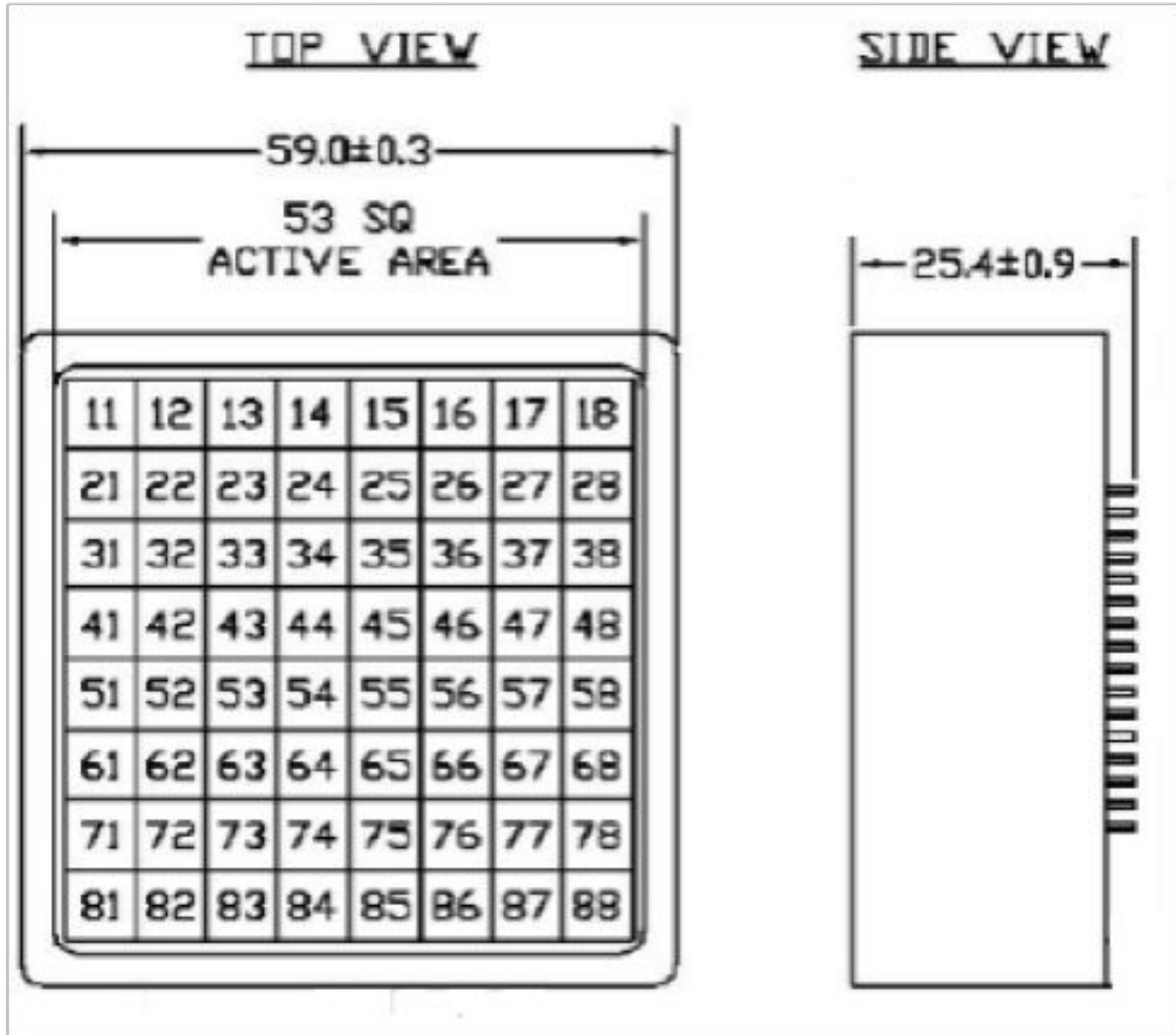
18:00, finished setup, asked “search and secure” team.

18:15, they did the search, and it is control access now. Lorenzo table upstream is still on the beam, it is about 1.7 Xo of Si.

18:25, we done for today, Sergey, Artur, AIR.

The dark box position:  $X=1298$ ,  $Y=350$  (initial position).





Photonis XP85011 and Photonis XP85012 (11 and 12 later) tested at SiDet with 405 nm Pilas laser head. We using now new PCB, made by Sergey. 16 chs readout separately.

Pixels numbers are:

33, 34, 35, 36

43, 44, 45, 46

53, 54, 55, 56

63, 64, 65, 66

Uniformity magnitude is in (...)

Uniformity of 11

33 (30), 34 (30), 35 (30), 36 (28)

43 (30), 44 (30), 45 (30), 46 (28)

53 (32), 54 (29), 55 (30), 56 (30)

63 (32), 64 (28), 65 (30), 66 (28)

Uniformity of 12

33 (30), 34 (32), 35 (30), 36 (29)

43 (30), 44 (29), 45 (28), 46 (28)

53 (30), 54 (30), 55 (30), 56 (29)

63 (30), 64 (28), 65 (29), 66 (28)

**18:37. AIR.**

**March 24,**

6:30, asked 120 GeV proton.

6:55, got 120 GeV proton.

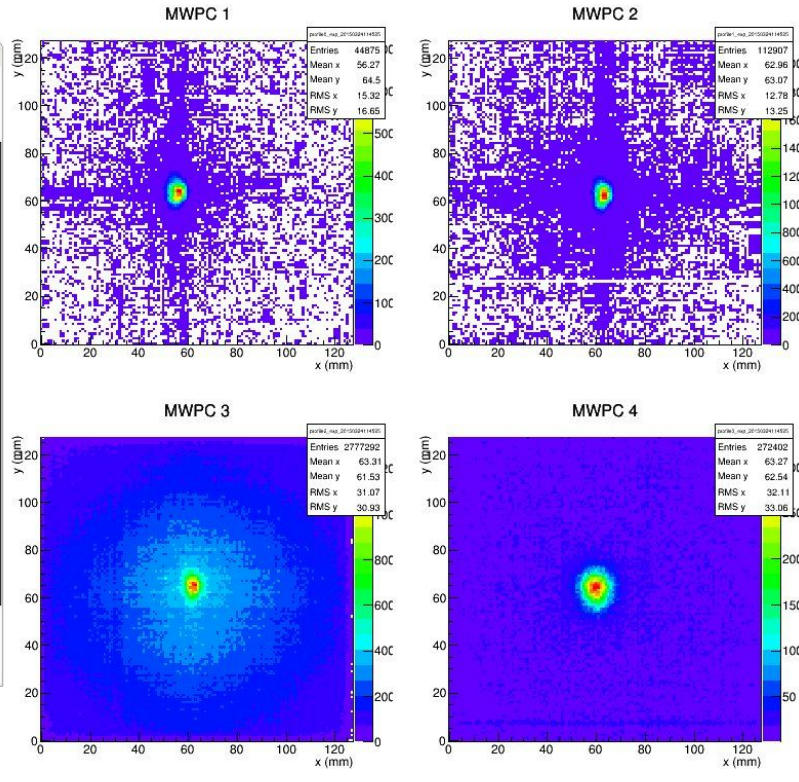
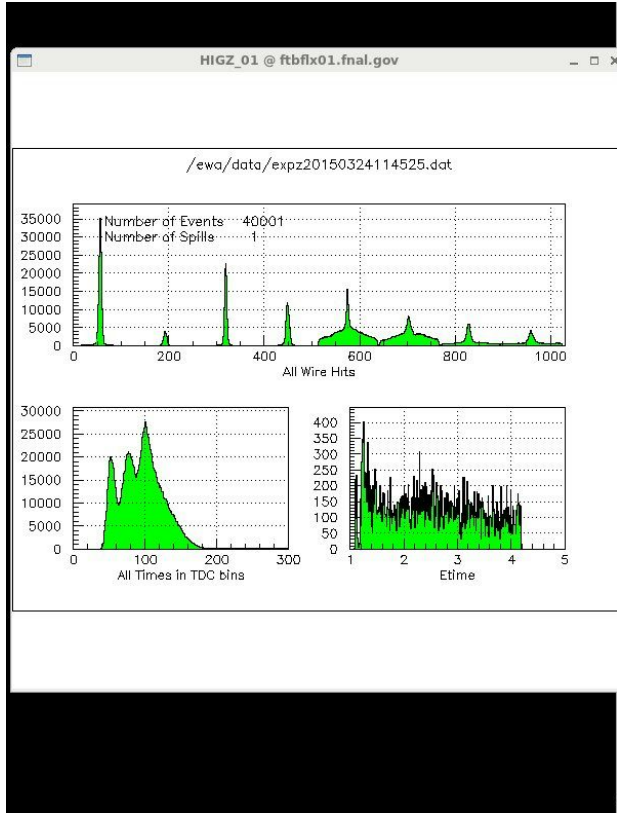
AIR

7:00, started box scan to find max proton intensity.

started with proton 600,000/spill, found the beam, sigma ~3mm.

asked intensity down by factor ~100.

HV Photek 1 = 4.6 kV, Photek 2 = 4.6 , Photonis 11 = 2.3 = 2.3 kV.



Beam Center (undercarriage) **X=1288, Y=342**

MT6SC1=6K, MTest=1.7E10

| Y \ X | 1280   | 1283    | 1286    | 1289    | 1292     |
|-------|--------|---------|---------|---------|----------|
| 349   |        |         | 81/6K2  | 37/7K3  |          |
| 346   |        | 36/6K2  | 209/5K4 | 130/5K7 | 46/7K5   |
| 343   | 14/5K2 | 109/7K2 | 452/6K3 | 732/8K1 | 133/10K3 |
| 340   |        | 45/6K6  | 566/6K8 | 466/6K7 | 89/5K9   |
| 337   |        |         | 288/6K4 | 108/5K6 |          |

Numbers are our T1 triggers / MT6SC1 (official MCR counts)

**11:30am**

Changed readout configuration:

DRS 2422: Ref(PH1), S1, S2, PH2

S1/S2 scintillator signals are delayed by 20ns with respect to PH1/PH2

HV S1 ~ 1.4 kV, HV S2 ~ 1.5 kV. Taking a self-trigger RUN.

Photek 1 HV = 4.9 kV, Photek 2 HV = 4.8 kV, 11 = 2.3 kV

**13:00.** S1 ~6,000/spill, DRS4s/100/spill.

2422: Ref, **S1, S2**, PH2

2450: Ref, 44, 54, 64

2449: Ref, 45, 55, 65

2442: Ref, 46, 56, CHER

in the self-trigger S1, S2 hooked up to 2422 (instead of 43, 42).

TR ~ 20 ps (for MIPs) between Ref (or P1) and PH2.

**13:40.**

2422: Ref, **S1, nothing**, PH2 (or P2)

2450: Ref, 44, 54, 64

2449: Ref, 45, 55, 65

2442: Ref, 46, 56, CHER

**Installed 2Xo of W before Ref (or P1).**

hooked up S2 to discr, discr to TTL, TTL to 2422.

Trigger (TTL) of 2422 is working now. (We have not seen 2422 working with TTL before). P1 and P2 HV = 5 kV

TR ~20 ps between P1 and P2 (for MIPs)

New run. P1 and P2 HV = 4.8 kV.

**14:30 Readout Channel Assignment Now On:**

| Top    |    |           |           |           |    |    |    |      |
|--------|----|-----------|-----------|-----------|----|----|----|------|
| 81     | 71 | 61        | 51        | 41        | 31 | 21 | 11 |      |
| 82     | 72 | 62        | 52        | 42        | 32 | 22 | 12 |      |
| 83     | 73 | <b>63</b> | <b>53</b> | <b>43</b> | 33 | 23 | 13 | East |
| 84     | 74 | <b>64</b> | <b>54</b> | <b>44</b> | 34 | 24 | 14 |      |
| 85     | 75 | <b>65</b> | <b>55</b> | <b>45</b> | 35 | 25 | 15 |      |
| 86     | 76 | <b>66</b> | <b>56</b> | <b>46</b> | 36 | 26 | 16 |      |
| 87     | 77 | 67        | 57        | 47        | 37 | 27 | 17 |      |
| 88     | 78 | 68        | 58        | 48        | 38 | 28 | 18 |      |
| Bottom |    |           |           |           |    |    |    |      |

View of XP85011/12 mapping in the beam direction

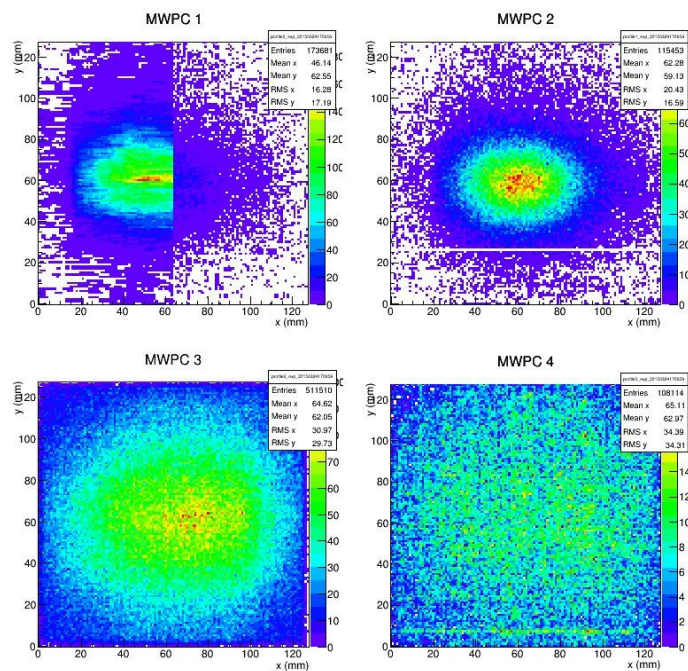
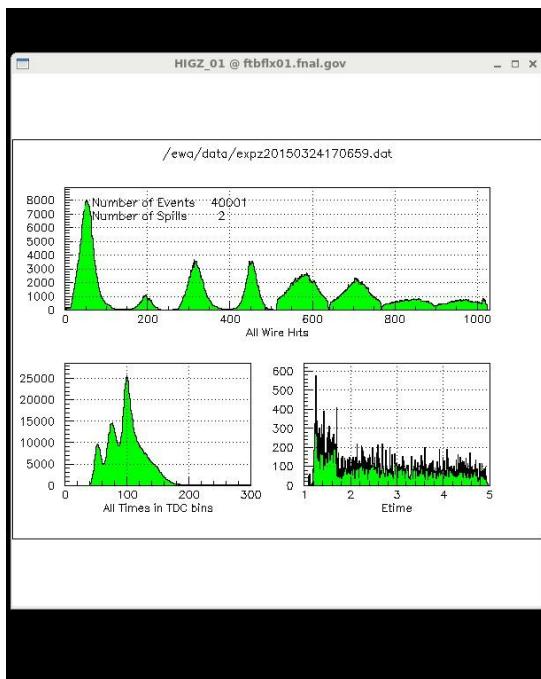
**15:10**

asked **8 GeV** electron beam with intensity  $\sim 6,000$ /spill.

Artur asked increase intensity up to  $\sim 30,000$ /spill

Run 005: electron 8 GeV, HV on Photeks 4.6 kV.

Channels, mapping is in the figure above. We get around 20psec with Photeks, old gaus fit no Splines. Taken with DRS oscilloscope.



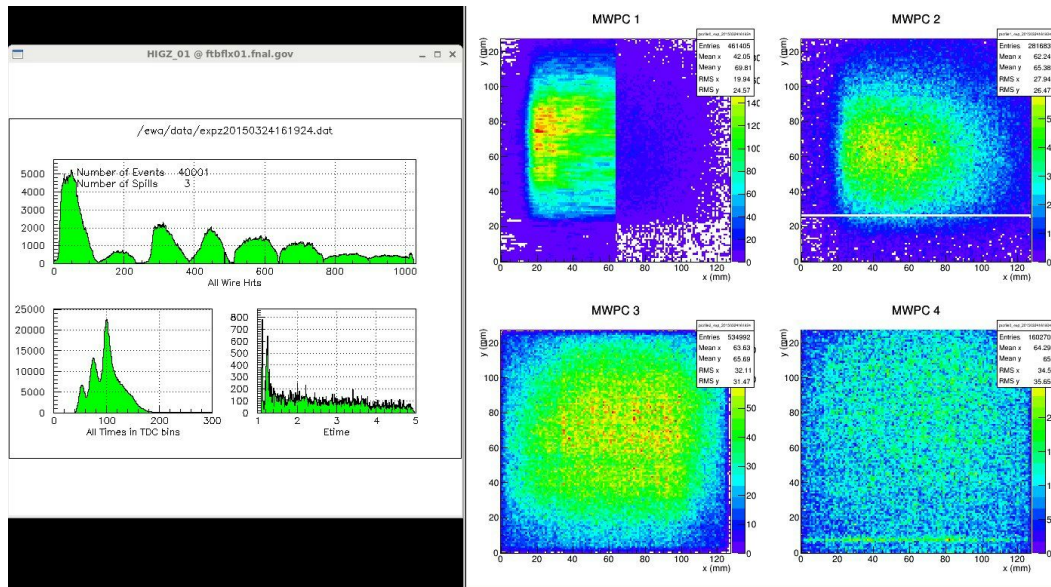


# 16:05

asked for 4 GeV electron beam.

Run 006: electron **4 GeV**, HV on Photeks 4.6 kV. Channels, mapping is in the figure above. We get around 20psec with Photeks, old gaus fit no Splines.

Taken with DRS oscilloscope



# 17:00 Readout Channel Assignment Now On:

|     |    |    |    |    |    |    |    |                                   |
|-----|----|----|----|----|----|----|----|-----------------------------------|
| Top |    |    |    |    |    |    |    |                                   |
| 81  | 71 | 61 | 51 | 41 | 31 | 21 | 11 |                                   |
| 82  | 72 | 62 | 52 | 42 | 32 | 22 | 12 |                                   |
| 83  | 73 | 63 | 53 | 43 | 33 | 23 | 13 | <b>DRS-2422 Ref, 43, 53, 63</b>   |
| 84  | 74 | 64 | 54 | 44 | 34 | 24 | 14 | <b>DRS-2450 Ref, 44,54,64</b>     |
| 85  | 75 | 65 | 55 | 45 | 35 | 25 | 15 | <b>DRS-2449 Ref, 45, 55, 65</b>   |
| 86  | 76 | 66 | 56 | 46 | 36 | 26 | 16 | <b>DRS-2442 Ref, 46, 56, Cher</b> |
| 87  | 77 | 67 | 57 | 47 | 37 | 27 | 17 |                                   |
| 88  | 78 | 68 | 58 | 48 | 38 | 28 | 18 |                                   |

Bottom

View of XP85011/12 mapping in the beam direction

Added 3Xo Tungsten absorber in front of XP85011 Photonis MCP-PMT

Tried the program to read all 4 DRS. Program works, with 65ns delay. However, the signals are all close to left edge of the DRS window. Tried to move the delay to 55ns, but the program got stuck. Moved the Delay to 85ns, but the program got stuck, need access to unplug/plug back in the USB hub. Leaving for today, will continue tomorrow. AA.

## March 25

**6:00**

Lorenzo asked for ~1 hour.

**6:30**

Ray trying to fix X-Y moving stage problem.

**7:15**

Lorenzo is done.

**7:30**

Ray fixed X-Y. (may be updated later).

The procedure to operate the X-Y.

1. go to rdp
2. connect with `ncdflap45.dhcp.fnal.gov`
3. use as username in KRDC - `fermi\ppd-cap-ncdflap45`
4. PWD: `Ftbf_user00`

after that should get the X-Y main window in:

`rdp://fermi%5Cppd-cap-ncdflap45.dhcp.fnal.gov`

Note: dont hit ENTER, when operating with the X-Y. To move X-Y hit right button in Jog instead. AIR.

**8:30**

controlled access completed (Sergey, AIR)

1. X-Y new position.
2. 3Xo of W in front of 11. Nothing else before 11. Lorenzo put down his table upstream of our setup.
3. Sergey hooked up the remote power supply for USB HUB. Asked 8 GeV electron beam. HV: S1, S2 = 1.4 kV, 11 = 2.4 kV, P1 = 4.7, P2 not used.

It is NO BEAM. Main injector and Linac problems.

**9:00**

It is NO BEAM. Water leak in klistron. Not good at all.

I left to SiDet, Sergey is going to HR.

**12:00**

Beam is back.

Asked 8 GeV electron beam. Intensity 60, 000/spill. HV: S1, S2 = 1.4 kV, 11 = 2.4 kV, P1 = 4.7, P2 not used.

**13:07**

Moved PMT X/Y stage **6mm Up** (0/+6 with respect to the ORIGINAL position, even though it is being reset to 0/0 every time the program is restarted)

Run 7: 200 events with 8 GeV electrons, DRS command line program, delay is set at 55. Goal is to see where the beam is hitting. Channel mapping is per DRS as below

b1: 2449

b2: 2450

b3: 2422

b4: 2442

Run 8: 2000 events same setting as Run 7

Moved 6mm up, goal is to hit pixel 54.

Run 9: 400 events. We find signals in pixels 63, 53, 43, 64, and 65, the rest is empty. We move XY table by 6mm west to position beam on pixel 54.

Run 10: 400 events. We still find signals in pixels 63, 53, 43, 64, and 65, the rest is empty. The goal is to hit 54. We move XY table by 6mm west to position beam on pixel 54.

Run 11: 400 events. We still find signals in pixels 63, 53, 43, 64, and 65, the rest is empty. The goal was to hit 54, but we hit the limit of the XY table controller. Decision is to go in and replace the 011 with 012 PMT. 012 has the PC ON/OFF feature.

14:30 Access to replace the MCP-PMT, and visually align.

Post-access summary: turned out the XY table was moving in the wrong direction. The MCP was changed, now we have the ON/OFF MCP on the beam.

**14:50**

Moved PMT X/Y stage **18mm West** (+6/+12 with respect to the ORIGINAL position)

**West** corresponds to the **right arrow** in software

**East** corresponds to the **left arrow**

**15:00**

Moved PMT X/Y stage **6mm West** (+12/+12 with respect to the ORIGINAL position)

**Trigger PMT1 and PMT2 at 1400V**

**Photonis XP85012 (PhC ON) at 2300V**

**Photek (reference) at 4700V**

Run 13: In Run we were hitting pixels 63, 64, 65. Need to move beam more to the right. Still see the same pixels lit up, but not 54... Decide to move up 6mm to see if there is any change, but hit the limit of XY stage, moved only 3mm

Run 14:

**16:00**

**Trigger PMT1 and PMT2 at 1400V**

**Photonis XP85012 (PhC ON) at 2200V**

**Photek (reference) at OFF**

PMT X/Y stage (+12/+15 with respect to the ORIGINAL position), **3Xo L EAD**

Top

|    |    |    |    |    |    |    |    |                                |
|----|----|----|----|----|----|----|----|--------------------------------|
| 81 | 71 | 61 | 51 | 41 | 31 | 21 | 11 |                                |
| 82 | 72 | 62 | 52 | 42 | 32 | 22 | 12 | East                           |
| 83 | 73 | 63 | 53 | 43 | 33 | 23 | 13 | <b>DRS-2422 33, 43, 53, 63</b> |
| 84 | 74 | 64 | 54 | 44 | 34 | 24 | 14 | <b>DRS-2450 34, 44, 54, 64</b> |
| 85 | 75 | 65 | 55 | 45 | 35 | 25 | 15 | <b>DRS-2449 35, 45, 55, 65</b> |
| 86 | 76 | 66 | 56 | 46 | 36 | 26 | 16 | <b>DRS-2442 36, 46, 56, 66</b> |
| 87 | 77 | 67 | 57 | 47 | 37 | 27 | 17 |                                |
| 88 | 78 | 68 | 58 | 48 | 38 | 28 | 18 |                                |

Bottom

View of XP85012 mapping in the beam direction

During this access we removed all Photek reference connectors from DRSs, and also removed Cherenkov. Now all channels from Photonis are connected to 4 DRS boards. We see signals from all channels on periphery, but no signals from pixels 45, 55, 44, 54. Decision is to go into access and **swap channels** 64 and 54, 44 and 34, 65 and 55, 45 and 35. The goal will be to see if this is the fault of DRS boards or not.

**16:30** [Readout Channel Assignment Now On:](#)

Top

|    |    |    |    |    |    |    |    |                                     |
|----|----|----|----|----|----|----|----|-------------------------------------|
| 81 | 71 | 61 | 51 | 41 | 31 | 21 | 11 |                                     |
| 82 | 72 | 62 | 52 | 42 | 32 | 22 | 12 | East                                |
| 83 | 73 | 63 | 53 | 43 | 33 | 23 | 13 | <b>DRS-2422 Ref, 43, 53, 63</b>     |
| 84 | 74 | 64 | 54 | 44 | 34 | 24 | 14 | <b>DRS-2442 Ref, 44, 54, 64</b>     |
| 85 | 75 | 65 | 55 | 45 | 35 | 25 | 15 | <b>DRS-2450 Ref, n/c, n/c, 55</b>   |
| 86 | 76 | 66 | 56 | 46 | 36 | 26 | 16 | <b>DRS-2449 Ref, n/c, n/c, Cher</b> |
| 87 | 77 | 67 | 57 | 47 | 37 | 27 | 17 |                                     |
| 88 | 78 | 68 | 58 | 48 | 38 | 28 | 18 |                                     |

Bottom

View of XP85012 mapping in the beam direction

**Trigger PMT1 and PMT2 at 1400V**  
**Photonis XP85012 (PhC ON) at 2200V**  
**Photek (reference) at 4700V**

**Run 16:2000 electron 8 GeV run. with configuration above.**

**~ 18:30, the run completed.**

## **March 26,**

**5:30**

Lorenzo running 120 GeV, his table is up.

Heejong will bring one DRS4, v.4, I also will bring one. As he said we can try DAQ with 2 DRS4, v.5 and 2 DRS4, v.4. So, we can try 2 DRS4, v.5 (all channels) working and 2 DRS4, v.4 with also all channels working. AIR.

**7:30**

asked 8 GeV negative beam (with electrons), 60,000/spill. S1, S2 HV = 1.4 kV.

**7:45**

S1 counting rate per spill ~300, normal.

**8:50**

**Trigger PMT1 and PMT2 at 1400V**

**Photonis XP85011 at 2300V**

**Photek (reference) at 4700V**

**X/Y stage is 12/12 absolute (after homing to 0/0 with its controller)**

**We have replaced DRS-2450 for DRS-2216 with all working channels**

**XP85012 with ON/OFF Photo Cathode was replaced with XP85011**

**because of a huge cross-talk**

**Tungsten absorber 3Xo**

**Readout Channel Mapping was changed:**

|        |    |    |    |    |    |    |    |                              |
|--------|----|----|----|----|----|----|----|------------------------------|
| Top    |    |    |    |    |    |    |    |                              |
| 81     | 71 | 61 | 51 | 41 | 31 | 21 | 11 |                              |
| 82     | 72 | 62 | 52 | 42 | 32 | 22 | 12 | East                         |
| 83     | 73 | 63 | 53 | 43 | 33 | 23 | 13 | DRS-2422 Ref, 43, 53, 63     |
| 84     | 74 | 64 | 54 | 44 | 34 | 24 | 14 | DRS-2442 Ref, 44, 54, 64     |
| 85     | 75 | 65 | 55 | 45 | 35 | 25 | 15 | DRS-2216 Ref, 45, 55, 65     |
| 86     | 76 | 66 | 56 | 46 | 36 | 26 | 16 | DRS-2449 Ref, n/c, n/c, Cher |
| 87     | 77 | 67 | 57 | 47 | 37 | 27 | 17 |                              |
| 88     | 78 | 68 | 58 | 48 | 38 | 28 | 18 |                              |
| Bottom |    |    |    |    |    |    |    |                              |

View of XP85011 mapping in the beam direction

**9:40**

**X/Y moved to 12/18 (6mm up)**

Run 17: 100 events with 8 GeV electron to find the pixel 54. From amplitudes it seems that the beam is hitting mostly pixel 53 and 54, so we move the XY a bit more up.

**9:56**

**X/Y moved to 12/24 (6mm up)**

**10:04**

**X/Y moved to 12/21 (3mm down)**

Run 18: 100 events with 8 GeV electron to find the pixel 54. From amplitudes it seems that the beam is hitting mostly pixel 54 and 55, so we move the XY a 3mm down.

**10:11**

**X/Y moved to 12/22 (1mm up)**



Run 19: 100 events with 8 GeV electron to find the pixel 54. From amplitudes it seems that the beam is hitting mostly pixel 54, with small spillover to 53, so we move the XY a 1mm up.

### **10:11 Scanning for positional/time resolution at 8Gev electrons**

Run 20: 100 events with 8 GeV electron to find the pixel 54. From amplitudes it seems that the beam is hitting mostly pixel 54, we are happy.

Run 21: 2000 events with beam centered on pixel 54. We will do a scan up and left in 1mm steps, and down and right in 2mm steps. The plan is to take 2000 events per step. We get about 100 psec on 54 vs its reference, 64 vs its reference, and 46 vs its reference.

Run 22: moved the table 1 mm down. 2000 events 8 GeV electron beam. We get resolutions similar to Run 21. We decide to turn off everything and redo the calibrations.

### **11:06**

**Photonis XP85011 and Photek Off (0V) for DRS calibration**

**11:18**

**Photonis XP85011 and Photek are ON at 2300V/4700V**

**Controlled access:** DRS-2442 disconnected from input cables and calibrated, then cabled back.

**Run 23:** moved the table 1 mm up to starting position, with the recalibrated 2442. The goal is to see if we get better time resolution on pixel 54 vs its own reference. **SigmaDT(1,3)=49.9 psec,**

**SigmaDT(5,7)=90 psec, SigmaDT(9, 11) = 53 psec**

**Run 24:** moved the table to Y=21mm, **SigmaDT(1,3)=51 psec,**

**SigmaDT(5,7)=76 psec, SigmaDT(9, 11) = 48 psec**

**Run 25:** moved the table to Y=20mm, **SigmaDT(1,3)=51 psec,**

**SigmaDT(5,7)=85 psec, SigmaDT(9, 11) = 72 psec**

**Run 26:** moved the table to Y=19mm, **SigmaDT(1,3)=51 psec,**

**SigmaDT(5,7)=78 psec, SigmaDT(9, 11) = 165 psec.** DT(9,11) gets around **50 psec** if cut on  $\text{ch11Amp} > 0.1$

**Run 27:** moved the table to Y=18mm, **SigmaDT(1,3)=51 psec,**

**SigmaDT(5,7)=88 psec, SigmaDT(9, 11) = 198 psec,** DT(9,11) gets around **60 psec** if cut on  $\text{ch11Amp} > 0.1$ , DT(9,11) gets around 50 psec if cut on  $\text{ch11Amp} > 0.1$

**Run 28:** moved the table to Y=17mm, **SigmaDT(1,3)=57 psec,**

**SigmaDT(5,7)=78 psec,** channel 11 Amp is too small, with a constrained fit we get around **58 psec**

**Run 29:** moved the table to Y=16mm, **SigmaDT(1,3)=52 psec,**

**SigmaDT(5,7)=78 psec,** channel 11 Amp is too small, with a constrained fit we get around **58 psec**

### X/Y Scan Tables

| Y<br>mm    | 16<br>down | 17        | 18        | 19        | 20        | 21               | 22                      | 24 | 26 | 27<br>up |
|------------|------------|-----------|-----------|-----------|-----------|------------------|-------------------------|----|----|----------|
| <b>Run</b> | 29,<br>36  | 28,<br>35 | 27,<br>34 | 26,<br>33 | 25,<br>32 | 22,<br>24,<br>31 | 21,<br>23,<br>30,<br>46 | 37 | 38 | 39       |

Vertical scan at X=12mm (up and down - in terms of X/Y table position)

| X<br>mm    | 6<br>west | 7 | 8  | 9 | 10 | 11 | 12                      | 14 | 16 | 18<br>east |
|------------|-----------|---|----|---|----|----|-------------------------|----|----|------------|
| <b>Run</b> | 42        |   | 41 |   | 40 |    | 21,<br>23,<br>30,<br>46 | 43 | 44 | 45         |

Horizontal scan at Y=22mm (west and east - in terms of X/Y table position)

| Top    |    |    |    |    |    |    |    |                              |
|--------|----|----|----|----|----|----|----|------------------------------|
| 81     | 71 | 61 | 51 | 41 | 31 | 21 | 11 |                              |
| 82     | 72 | 62 | 52 | 42 | 32 | 22 | 12 | East                         |
| 83     | 73 | 63 | 53 | 43 | 33 | 23 | 13 | DRS-2422 Ref, 43, 53, 63     |
| 84     | 74 | 64 | 54 | 44 | 34 | 24 | 14 | DRS-2442 Ref, 44, 54, 64     |
| 85     | 75 | 65 | 55 | 45 | 35 | 25 | 15 | DRS-2216 Ref, 45, 55, 65     |
| 86     | 76 | 66 | 56 | 46 | 36 | 26 | 16 | DRS-2449 Ref, n/c, n/c, Cher |
| 87     | 77 | 67 | 57 | 47 | 37 | 27 | 17 |                              |
| 88     | 78 | 68 | 58 | 48 | 38 | 28 | 18 |                              |
| Bottom |    |    |    |    |    |    |    |                              |

**14:10 Lowering XP85011 voltage to get rid of saturated events**

**Trigger PMT1 and PMT2 at 1400V**

**Photonis XP85011 at 2200V**

**Photek (reference) at 4700V**

**Scanning X/Y again :) starting with x=12, y=22 mm**

**Run 30:** moved the table to x=12, y=22 mm, **SigmaDT(1,3)=47 psec,**  
**SigmaDT(5,7)=83 psec, SigmaDT(9, 11) = 43 psec**

**Run 31 - 14:34 -** moved the table to x=12, y=21 mm, **SigmaDT(1,3)=48**  
**psec, SigmaDT(5,7)=77 psec, SigmaDT(9, 11) = 46 psec**

**Run 32 - 15:04 -** moved the table to x=12, y=20 mm (2000 events)

**Run 33 - 15:26 -** moved the table to x=12, y=19 mm

**Run 34 - 15:46 -** moved the table to x=12, y=18 mm

**Run 35 - 16:05 -** moved the table to x=12, y=17 mm

**Run 36 - 16:29 -** moved the table to x=12, y=16 mm

**Run 37 - 17:59 -** moved the table to x=12, y=24 mm

**Run 38 - 17:20 -** moved the table to x=12, y=26 mm

**Run 39 - 17:47 -** moved the table to x=12, y=27 mm

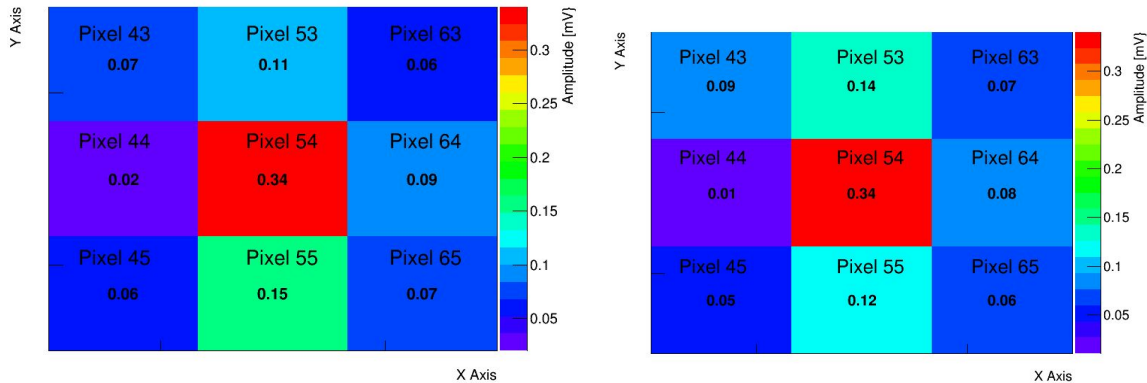
**Run 40 - 18:06 -** moved the table to x=10, y=22 mm

**Run 41 - 18:27 -** moved the table to x=8, y=22 mm

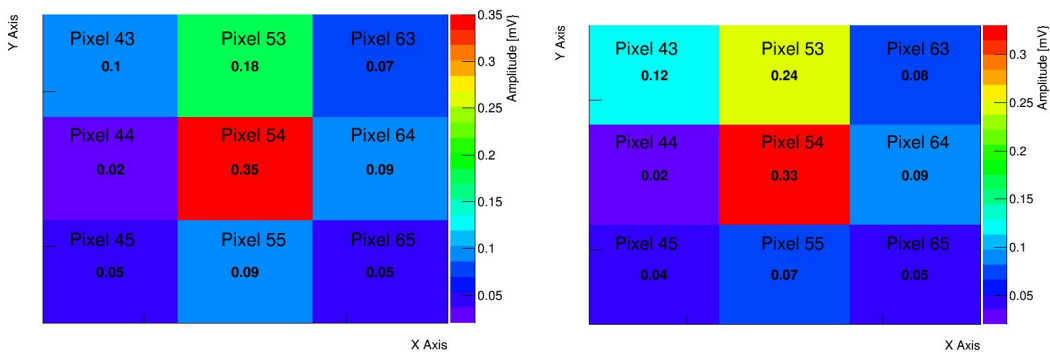
**Run 42 - 18:45 -** moved the table to x=6, y=22 mm

**19:00PM FINISHED for the day. Amplitude scan plots below.**

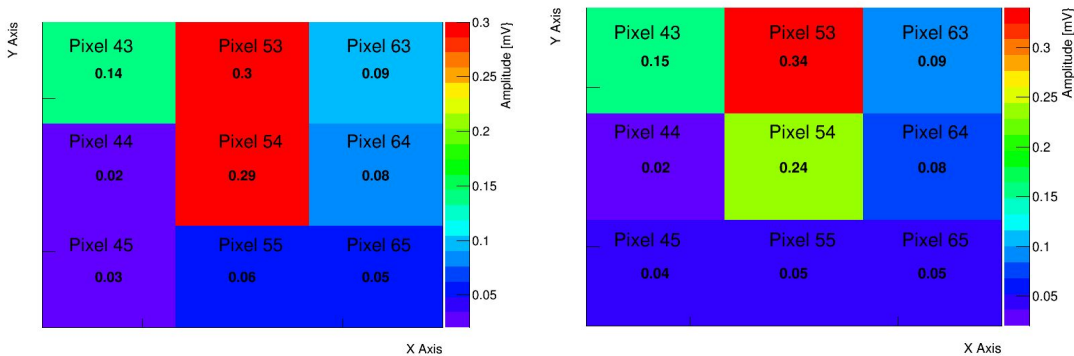
**Run 30 and 31: Mean amplitudes with Cherenkov**



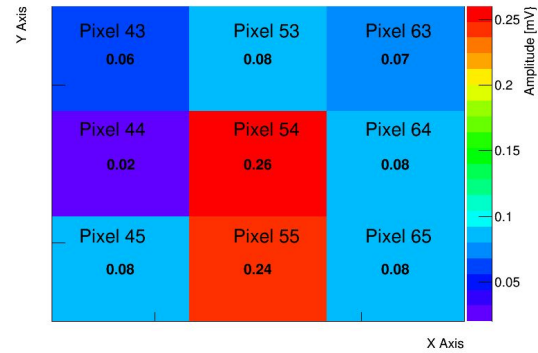
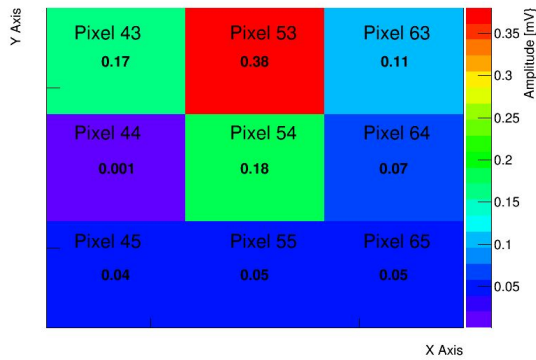
**Run 32 and 33: Mean amplitudes with Cherenkov**



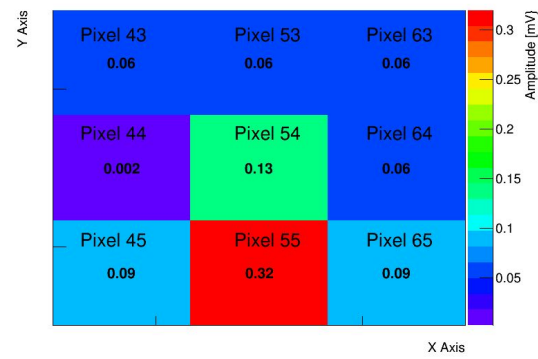
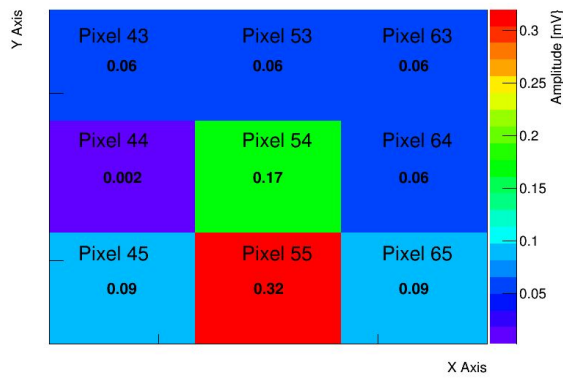
**Run 34 and 35: Mean amplitudes with Cherenkov**



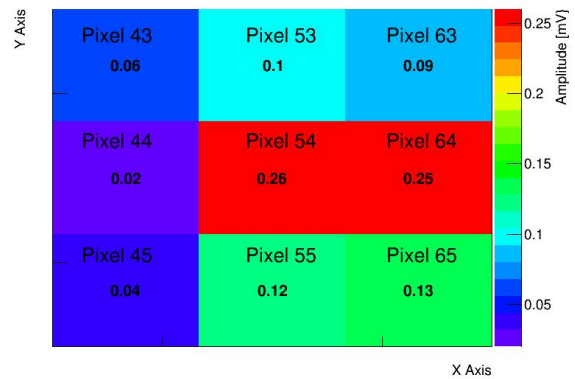
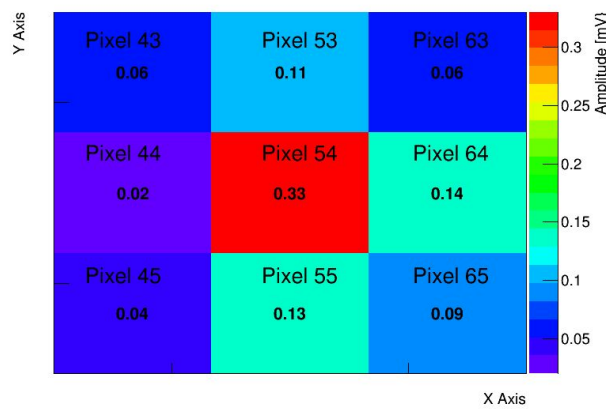
## Run 36 and 37: Mean amplitudes with Cherenkov



## Run 38 and 39: Mean amplitudes with Cherenkov



## Run 40 and 41: Mean amplitudes with Cherenkov



## March 27

**6:45** - asked 8 GeV, intensity 60,000/spill, under the intensity  
S1 counts  $\sim$ 250/spill. HV: XP85011=2.2kV, P1=4.7kV

**Run 43** - 8:18 - moved the table to  $x=14, y=22$  mm (2000 events)

**Run 44** - 8:38 - moved the table to  $x=16, y=22$  mm

**Run 45** - 8:55 - moved the table to  $x=18, y=22$  mm

**Run 46** - 9:13 - moved the table to  $x=12, y=22$  mm

(central pixel, 5000 events)

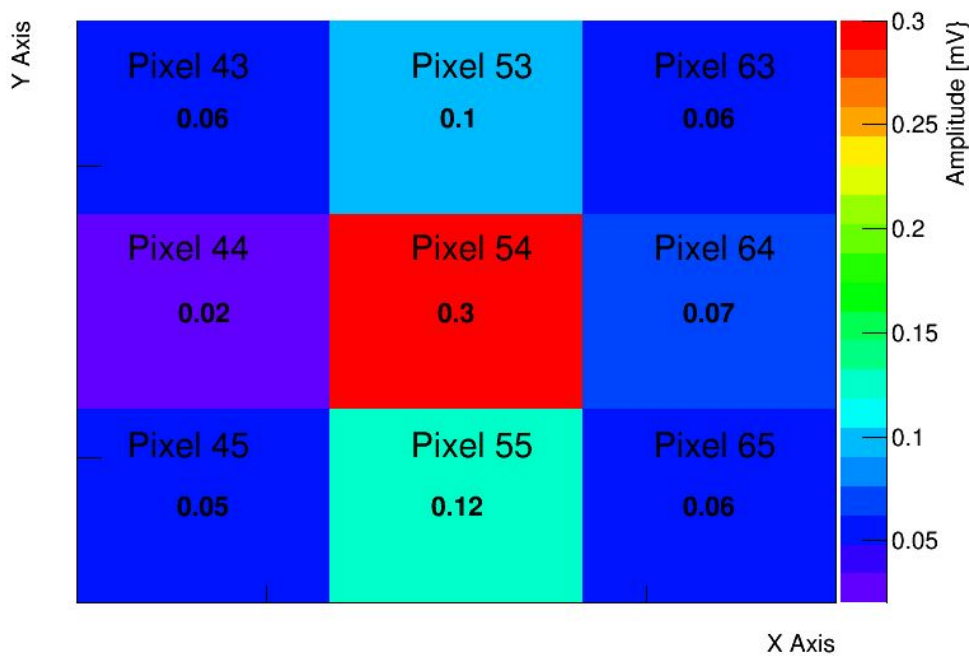
**Run 47** - 10:00 - 4 GeV electrons, table at  $x=12, y=22$  mm

(central pixel, 2000 events)

**Run 48** - 10:00 - 4 GeV electrons, table at  $x=12, y=22$  mm

(central pixel, 2000 events)

### Run 47 and 48: Mean amplitudes with Cherenkov



## 11:00 Access to install the Argonne MCP-PMT

**DAQ Channel Assignment (as viewed along the beam):**

| <b>Top</b>    |         |            |                                   |
|---------------|---------|------------|-----------------------------------|
|               | Strip 1 |            |                                   |
|               | Strip 2 |            |                                   |
|               | Strip 3 |            |                                   |
|               | Strip 4 |            |                                   |
|               | Strip 5 |            |                                   |
| <b>S6L</b>    | Strip 6 | <b>S6R</b> | DRS-2422 Ref, S6L, S6R, n/c       |
| <b>S7L</b>    | Strip 7 | <b>S7R</b> | DRS-2442 Ref, S7L, S7R, n/c       |
| <b>S8L</b>    | Strip 8 | <b>S8R</b> | DRS-2216 Ref, S8L, S8R, n/c       |
|               | Strip 9 |            | DRS-2449 Ref, n/c, n/c, Cherenkov |
| <b>Bottom</b> |         |            |                                   |

When X/Y stage is at 12/6mm the beam should be in strip 6, 1/4 from the left side

Trigger PMT1 and PMT2 at 1400V

Argonne MCP PMT at 2300V

Photek (reference) at 4700V

**X/Y Scan Table for the Argonne MCP PMT / 8 Gev electrons**

| Y<br>mm | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---------|----|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Run     | 52 | 54 |    |    | 58 | 59 | 49 |    |   |   |    |    |    | 50 |    |    |    |    |    |    | 51 |
|         |    | 55 | 56 | 57 |    |    | 60 | 61 |   |   |    |    |    |    |    |    |    |    |    |    |    |

Vertical scan at X=12mm (up and down - in terms of X/Y table position)

**Y=4mm is Strip 7 center**

**Y=11mm is Strip 8 center**

Run 49 - 12:00 - moved the table to x=12, y=6 mm (1000 events)



**Run 50 - 12:18 - moved the table to x=12, y=13 mm (2000 events)**

**Run 51 - 12:40 - moved the table to x=12, y=20 mm (2000 events)**

**Run 52\* - 13:08 - moved the table to x=12, y=3 mm (2000 events)**

**HV for Argonne MCP tripped, etc.**

**Argonne MCP PMT at 2400V (5.6uA)**

**16 Gev electrons / 5Xo Tungsten**

**Run 53\* - 13:47 - moved the table to x=12, y=1 mm (200 events)**

**HV on MCP tripped**

**Run 54 - 13:52 - moved the table to x=12, y=1 mm (200 events)**

**Argonne MCP PMT at 2300V**

**Run 55 - 13:58 - moved the table to x=12, y=1 mm (2000 events)**

**Run 56 - 14:15 - moved the table to x=12, y=2 mm (2000 events)**

**14 : 35, Lorenzo asked few minutes for his access.**

**Run 57 - 14:50 - moved the table to x=12, y= 3 mm (2000 events)**

**Run 58 - 15:12 - moved the table to x=12, y= 4 mm (2000 events)**

**Run 59 - 15:35 - moved the table to x=12, y= 5 mm (2000 events)**

**Run 60 - 15:51 - moved the table to x=12, y= 6 mm (2000 events)**

**Run 61 - 16:11 - moved the table to x=12, y= 7 mm (2000 events)**

**Run 62 - 16:35 - moved the table to x=2 mm, y= 4 mm (2000 events)**

**Run 63 - 16:55 - moved the table to x=22 mm, y= 4 mm (2000 events)**

**Run 64 - 17:15 - moved the table to x=12 mm, y= 4 mm (2000 events)**

**X Scan Table for the Argonne MCP PMT / 8 Gev electrons**

|             |           |           |           |
|-------------|-----------|-----------|-----------|
| <b>X mm</b> | <b>2</b>  | <b>12</b> | <b>22</b> |
| <b>Run</b>  | <b>62</b> | <b>58</b> | <b>63</b> |

**Horizontal scan at Y=4mm**

**Preliminary for the LAPPD TR along the Strip Line ~27 ps. The LAPD propagation speed 0.66c (prior measurements), so the space resolution along the line, sigma ~4.5 mm**

**A NIMA paper on Argonne 6cm x 6cm detector**

**<http://www.sciencedirect.com/science/article/pii/S0168900214012078>**

## 18:00 Access to install a different XP85011 MCP PMT

Trigger PMT1 and PMT2 at 1400V

Photonis XP85011 at 2300V

Photek (reference) at 4700V

Top

|    |    |    |    |    |    |    |    |                              |
|----|----|----|----|----|----|----|----|------------------------------|
| 81 | 71 | 61 | 51 | 41 | 31 | 21 | 11 |                              |
| 82 | 72 | 62 | 52 | 42 | 32 | 22 | 12 | East                         |
| 83 | 73 | 63 | 53 | 43 | 33 | 23 | 13 | DRS-2422 Ref, 43, 53, 63     |
| 84 | 74 | 64 | 54 | 44 | 34 | 24 | 14 | DRS-2442 Ref, 44, 54, 64     |
| 85 | 75 | 65 | 55 | 45 | 35 | 25 | 15 | DRS-2216 Ref, 45, 55, 65     |
| 86 | 76 | 66 | 56 | 46 | 36 | 26 | 16 | DRS-2449 Ref, n/c, n/c, Cher |
| 87 | 77 | 67 | 57 | 47 | 37 | 27 | 17 |                              |
| 88 | 78 | 68 | 58 | 48 | 38 | 28 | 18 |                              |

Bottom

Preliminary pixel 54 position is 12 / 22 mm

## 16 Gev Electrons / 3Xo Tungsten

Run 65 - 19:21 - table to X=12 mm, Y= 22 mm (2000 events)

Run 66 - 19:41 - table to X=12 mm, Y= 22 mm (2000 events)

## 20:00 Access to remove Tungsten

Switched to 120Gev Protons / 9K counts on MT6SC1

Trigger PMT1 and PMT2 at 1400V

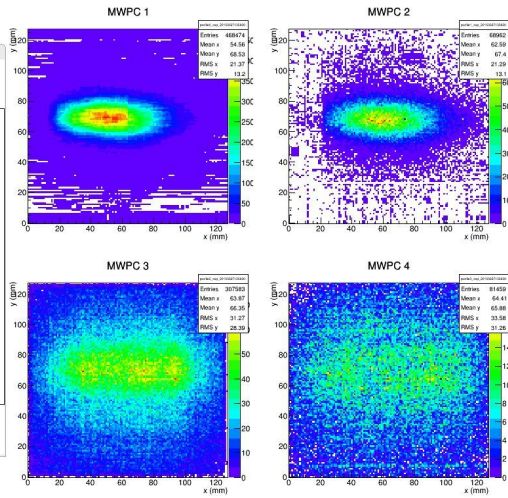
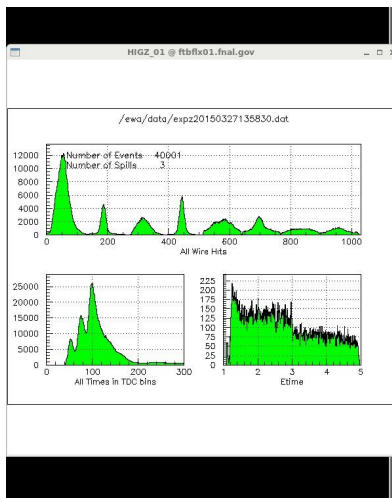
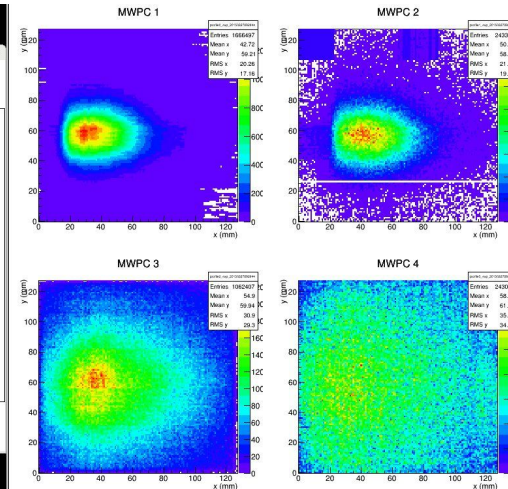
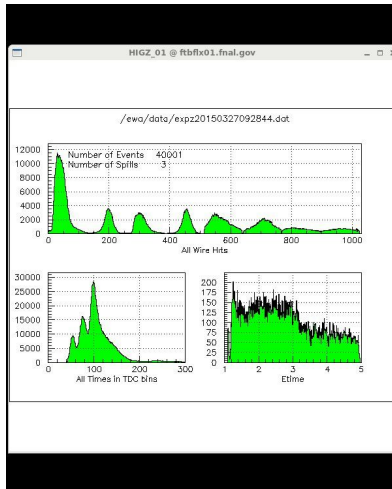
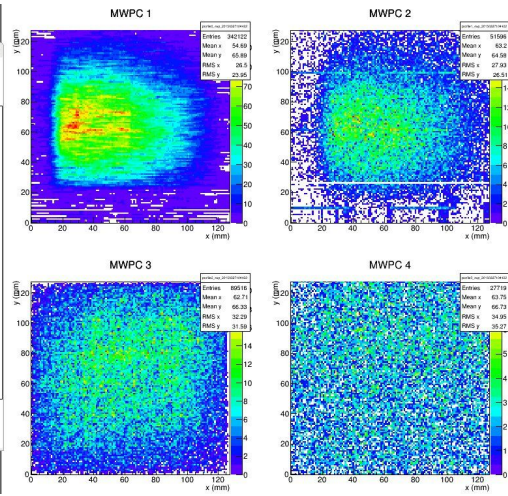
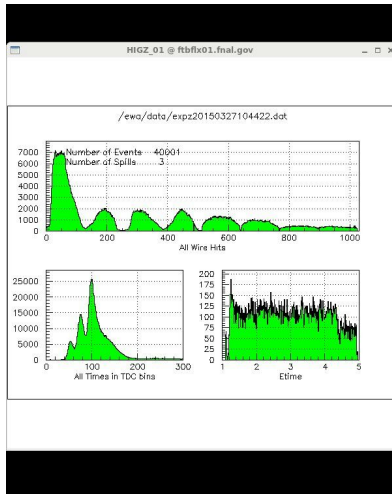
Photonis XP85011 at 2500V

Photek (reference) at 4700V

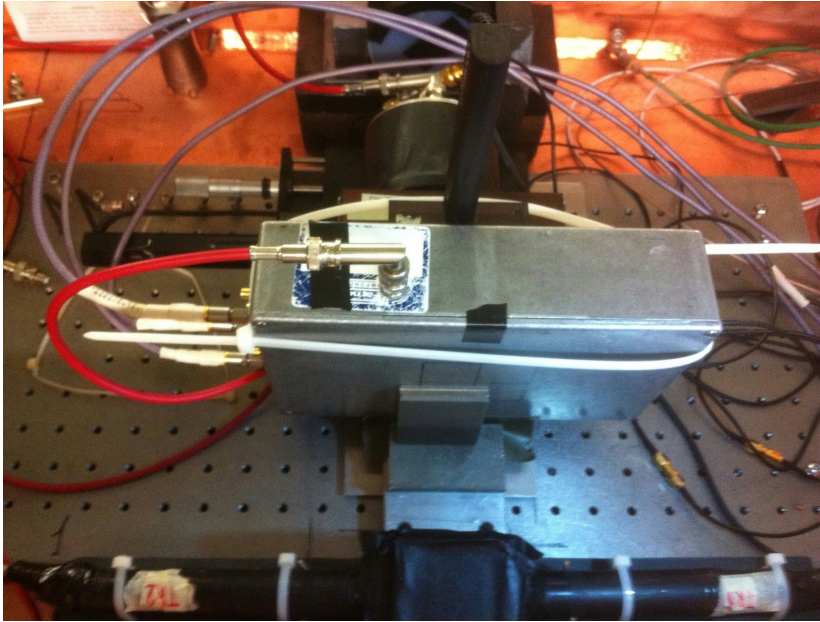
Trigger rate is low (30), have to move the dark box table to find beam

Run 67 - 20:44 - table to X/Y=12/22 mm, Box 1280/342mm (2000 events)

Done for tonight , shabbat shalom!



**Note: 8 GeV beam set ( in X) is different if to compare with March 24.**



**Setup with ANL LAPD**

**March 30,**

All T1065 equipment removed from MT6, section 2 to SiDet. The Photonis XP85011 failed on March 27 (last tb day) has number 111464 (paper sticker) and bar code # 9000103. The another one, XA85011 50, S/N 7301617 was used instead of failed. AIR.