

# Elog of FNAL Beam Test by FIT and UVA

Date: Oct. 11<sup>th</sup>, 2013

10:00 am (FNAL time)

- Check gas: Ar/CO2(70/30) has 1800psig, Ar/CO2(80/20) also about 1800psig.
- Gas flowing rate ~25 unit (from flow meter)
- Apply voltages to all the detectors, wait for beam.
- Detectors seem all in good condition.

5:45pm

- Beam comes back, **32GeV mixture hadrons**, rate ~460counts/spill, not as stable as expected.
- Take **new run 001 Pedestal, 5k events**. Rate from DATE is 200events/spill, **time window is 9**
- HV settings as below

Detectors	HV
Tracker 2 (UVa 10cm)	1800
Tracker 3 (UVa 10cm)	1800
SBS1 (UVa 50cm)	1800
Solid/EIC (UVa 1m)	1800
CMS/EIC zz (FIT)	1600
S4 (FIT 30cm)	2000
10cm zz 2 (FIT)	2000
10cm zz 1 (FIT)	2000
Tracker 4 (UVa 50cm)	1800
Tracker 1 (FIT 10cm)	1100

9:30pm

→ **Change Time window to 6**, and set time delay in FEC for each detector, then we see nice signals from all the detectors. (The first tracker (UVa) shows some lower efficiency problem, maybe gas, or a bad foil (hope not!))

IP (FEC#)	Time delay
10.0.5.2 (FEC)	From 60 to 63
10.0.3.2 (FEC4)	From 60 to 62
10.0.1.2 (FEC3)	60
10.0.10.2 (FEC5)	60

→Start taking real data. **New RUN 001, 25k events**. Rate from DATE: ~400events/spill. HVs are setting as below:

Detectors	HV
Tracker 2 (UVa 10cm)	1800?
Tracker 3 (UVa 10cm)	3950
SBS1 (UVa 50cm)	4125
Solid/EIC (UVa 1m)	4100
CMS/EIC zz (FIT)	3150
S4 (FIT 30cm)	4150
10cm zz 2 (FIT)	4050
10cm zz 1 (FIT)	4050
Tracker 4 (UVa 50cm, SBS2)	4100
Tracker 1 (FIT 10cm)	4100

→Take **New RUN 002 Pedestal, 5k events**. Beam intensity becomes higher and stable. The last run was recorded as the 1<sup>st</sup> point of 10cm zz's.

→Table moved 3.5cm up (vertically), then 3.5cm east (horizontally), so that beam hit in 2<sup>nd</sup> point in the frame below.

4 <sup>th</sup>	6 <sup>th</sup>	5 <sup>th</sup>
10cm zz		
(Center)		
3 <sup>rd</sup>	7 <sup>th</sup>	2 <sup>nd</sup>

Relative positions (10cm zz detectors on moveable table):

Center: H 2236, V 364.4

2<sup>nd</sup>: H 2270, V 399      6<sup>th</sup>: H 2237, V 329

3<sup>rd</sup>: H 2270, V 399      7<sup>th</sup>: H 2237, V 399

4<sup>th</sup>: H 2200, V 329

5<sup>th</sup>: H 2200, V 399

→Take data for 2<sup>nd</sup> point, as **New RUN 002 LUP, 35k events**, 6 time windows.

**Date: Oct 12**

→Table moved 7cm west (horizontally), **12:36am Oct 12**, take data for 3<sup>rd</sup> point, as **New RUN 003 LRP, 35k events**, 6 time windows.

→Table moved 7cm down (vertically), **1:39am Oct 12**, take data for 4<sup>th</sup> point, as **New RUN 004 DRP, 35k events**, 6 time windows.

Trigger rate 5951/spill, DATE rate 673/spill.

→Table moved 7cm east (horizontally), **2:39am Oct 12**, take date for 5<sup>th</sup> point, as **New RUN 005 DUP, 35k events**, 6 time windows.

❖ Notice that two 10cm UVa Trackers are no signal, check out that Ar/CO2(80/20) gas bottle was closed (don't know why). Open the gas bottle immediately!!

→ Move table 3.5cm west (horizontally) to 6<sup>th</sup> point, **3:43am Oct 12**, take data for 6<sup>th</sup> point, as **New RUN 006 6<sup>th</sup>, 35k events**, 6 time windows. (The UVa 10cm trackers are starting showing signals.)

→ Check that **beam spot is about 4cm**

→ **4:40am**, check that slave APV for 10cm zz's and two APVs for S4 are abnormal, stop the run 006, restart FEC, then start **New RUN 006 6<sup>th</sup>-1 for 30k events**.

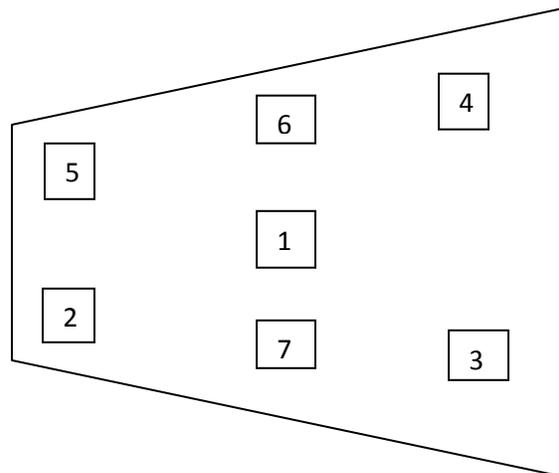
→ **5:40am**, Table moved 7cm up (vertically) to 7<sup>th</sup> point, take data for 7<sup>th</sup> point, **New RUN 007 7<sup>th</sup>, 30k events**.

The AmoreMonitor PC crashed when analyzing data, all configuration file can't be accessed, so from now on can't monitor the data (i.e, don't if data good or not). Need to fix the PC before we could see any raw data.

The DATE is still running on another PC, will not affect data taking.

Now all the data for 10cm zz detectors has been transferred to FIT cluster, ready for analysis.

→ **6:42am**, Table moved to (2351,418.2), corresponding to CMS zz sector6, take data **New RUN 008 CMS zz sector6, 30k events**, 6 time windows.



**10cm ZZ view from small to wide end**

Oct 12

3:00pm (around), ask a controlled access, rotate the 10cm zz detectors 10 degrees.

5:35pm beam comes back, 32GeV Hadron mixtures, beam rate ~500counts/spill from DATE.

Change the time window to 9, prepare to scan CMS zz detector

→Position at : H 2513, V 442.5

5:37pm lower down voltage to 2000V, take pedestal data. Save

newfitRun010\_Hadron32GeV\_CMSzzSCAN\_Pedestal\_20131012\_1736pm.raw, 5k events.

→Increase voltages to normal:

Detectors	HV	Gas(Ar/CO2)
Tracker 2 (UVa 10cm)	4100	80/20
Tracker 3 (UVa 10cm)	4050	
SBS1 (UVa 50cm)	4125	70/30
Solid/EIC (UVa 1m)	4100	
CMS/EIC zz (FIT)	3200	
S4 (FIT 30cm)	4150	
10cm zz 2 (FIT)	4050	
10cm zz 1 (FIT)	4050	
Tracker 4 (UVa 50cm, SBS2)	4100	
Tracker 1 (FIT 10cm)	4100	

→Points been supposed to be scanned:

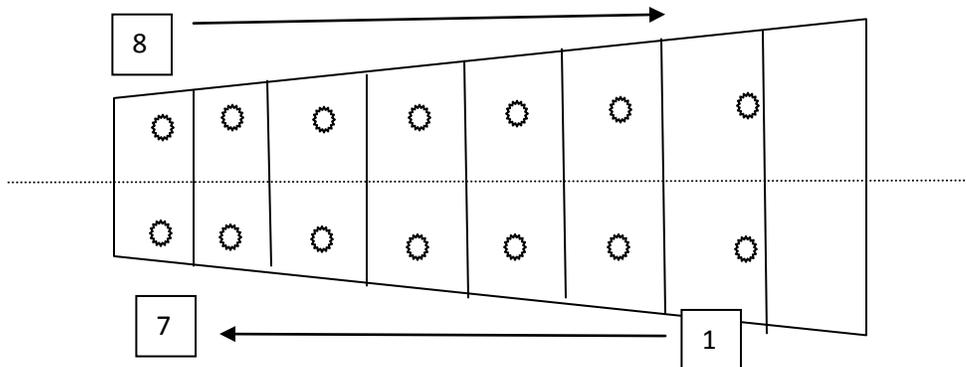


Table Relative Positions that want to be scanned (unit in mm) events of each run is 20k

Sector	point	RUN#	H position	V position	point	RUN#	H position	V position
7	1	011	2513	442	14		2513	382
6	2	012	2346	"	13	024	2346	"

5	3	013	2227	"	12	023	2227	"
4	4	015	2099	"	11	022	2099	"
3	5	016	2007	"	10	021	2007	"
2	6	017	1916	"	9	020	1916	"
1	7	018	1835	"	8	019	1835	"

→ 5:56pm, start RUN 011 for CMS zz sector 7, save file 'newfitRun011\_hadron32GeV\_CMSzzScan\_Sector7\_20131012\_1756pm.raw', this could also be used as Solid/EIC scan for UVa.

→ 6:53pm, Table moved position to H 2346, V 442.5, start run 012, for CMS zz sector 6 / EIC,

→ 7:35pm, Table moved position to H 2226 V 442.3, start run 013, for CMS zz sector 5 / EIC,

→ 8:20pm, ask changing beam energy to 25GeV, reduce voltages to 2000V

→ 8:29pm, take pedestal data, run014,

→ Check gas: Ar/CO2(70/30)-→1400psi, Ar/CO2(80/20)- →2200psi.

→ 11:10pm, the 25 GeV beam seems unable to come out, still waiting for beam...

→ 11:45pm, beam come back, with energy 20GeV

→ Start taking Pedestal, 5k events.

"newfitRun014\_20GeV\_CMSzzEICScan\_Pedestal\_20131012\_1142pm.raw"

Oct 13

→ 12:18am Increase voltages to normal:

Detectors	HV	Gas(Ar/CO2)
Tracker 2 (UVa 10cm)	4100	80/20
Tracker 3 (UVa 10cm)	4050	
SBS1 (UVa 50cm)	4125	70/30
Solid/EIC (UVa 1m)	4100	
CMS/EIC zz (FIT)	3200	
S4 (FIT 30cm)	4150	
10cm zz 2 (FIT)	4050	
10cm zz 1 (FIT)	4050	
Tracker 4 (UVa 50cm, SBS2)	4100	
Tracker 1 (FIT 10cm)	4100	

→ 12:22am we were monitoring data and found that detectors were not showing any signal.

We checked gas, HV values, everything looks good but still there was no signal. The beam intensity is very low and hence we decided to move back to 32GeV

→ 1:04am Beam energy changed to 32GeV

We start run015 but we stopped in between because they are again changing beam energy to 20GeV

Also while taking data, we observed that online monitoring was not working properly. The code is crashing after processing the few number of events. So we couldn't monitor the raw data for the last run

→ 2:00am Tuning beam energy back to 20GeV

→ 2:16am start new run with 20GeV energy for CMS sector4

"newfirRun015\_20GeV\_CMSzzEICScan\_Sector4\_20131013\_0216am.raw" total events 20K with 9 TW

→ 3:08am Table moved by -92steps towards West to focus on sector 3

"newfirRun016\_20GeV\_CMSzzEICScan\_Sector3\_20131013\_0309am.raw" total events 20K with 9 TW

→ HV and gas pressure both are stable

→ Beam is not stable for this run

→ 3:53am Table moved by -84 steps towards west to focus on 2nd sector. Horizontal position at 1918. HV and gas pressure are stable

"newfirRun017\_20GeV\_CMSzzEICScan\_sector2\_20131013\_0354am.raw" total events 20K with 9TW

→ 4:41am Table moved by -81 steps towards west to focus on 1st sector. Horizontal position is 1833. HV and gas pressure are stable

"newfirRun018\_20GeV\_CMSzzEICScan\_sector1\_20131013\_0443am.raw" total events 20K with 9TW

→ 5:35am Table moved vertically down by 62 steps. HV and gas look stable.

"newfirRun019\_20GeV\_CMSzzEICScan\_sector1\_UP\_20131013\_0535am.raw" total events 20K with 9TW

For this run we were seeing signal in sector1 as well as in 2.

→ 6:25am Table moved towards east by 81 steps.

→ NO BEAM from 6.27am to 6.50am

"newfirRun020\_20GeV\_CMSzzEICScan\_sector2\_UP\_20131013\_0655am.raw" total events 20K with 9TW

All files are copied to the cluster

→ 7:42am Table moved by 86 steps towards east

"newfitRun021\_20GeV\_CMSzzEICScan\_sector3\_UP\_20131013\_0747am.raw" total events 20K with 9TW

→ 8:36am, Table moved by 99 steps towards east

"newfitRun022\_20GeV\_CMSzzEICScan\_sector4\_UP\_20131013\_0836am.raw" total events 20K with 9TW

In this run, we notice that signal in **S4** detector is pretty nice!

→ 9:28am, Table moved by 120s steps towards east

"newfitRun023\_20GeV\_CMSzzEICScan\_sector5\_UP\_20131013\_0930am.raw" total events 20K with 9TW

In this run, we are still seeing signals in **S4** detector! Also we see signal from 10cm zz detectors.

✓ This run can be used as 10 degrees for 10cm zz detectors.

→ 10:18am, Table moved by 116s steps towards east

"newfitRun024\_20GeV\_CMSzzEICScan\_sector6\_UP\_20131013\_1018am.raw" total events 20K with 9TW

→ 10:40am, check gas: Ar/CO2(70/30):1350psi, Ar/CO2(80/20): 2200psi. flowing rate is stable(30cc/min).

→ 10:55am, Table moved by 166s steps towards east

"newfitRun025\_20GeV\_CMSzzEICScan\_sector7\_UP\_20131013\_1055am.raw" total events 20K with 9TW

→ At around 11:30am, we finished CMS zz scan.

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→ 11:40am, Kondo starts scanning SBS1 detector.

→ Table position now: H 2513, V 482.

Save file: newUVARun001\_20GeV\_SBS1\_ScanP42\_20131013\_1145am.raw, 10k events.

→ 12:05pm, Table position now: H 2411, V482

Save file: newUVARun002\_20GeV\_SBS1\_ScanP42\_20131013\_1205pm.raw, (didn't set event number..).

→ Around 12:40pm, beam is gone.

→ 14:30pm, get to know the event number is not set, the run will not stop... So I just stop that run, and start a new run for 10k events for this position.

Save file: newUVARun002\_20GeV\_SBS1\_ScanP42\_20131013\_1439pm-1.raw, 10k events.

→ 15:07pm, move table to H 2310, V 482, start run 003,

Save file: `newUVARun003_20GeV_SBS1_ScanP42_20131013_1507pm.raw`, 10k events.

→ Beam rate ~18k/spill.

→ `15:27pm`, move table to H 2210, V 482, start run 004,

Save file: `newUVARun004_20GeV_SBS1_ScanP44_20131013_1527pm.raw`, 10k events.

Can see signal on CMS zz sector 5&6

→ `15:50pm`, move table to H 2110, V 482, start run 005,

Save file: `newUVARun005_20GeV_SBS1_ScanP45_20131013_1550pm.raw`, 10k events.

Can see signal on CMS zz sector 4.

→ `16:00pm`, ask change beam energy to 25GeV.

→ `16:15pm`, beam back, at 25GeV.

→ start run005 again

→ `16:40pm`, get a controlled access into the beam room, rotate the 10cm zz detectors another 10 degrees. (Now the detectors are 20 degrees inclined.)

→ `17:07pm`, start scan 006.

`run006_UVaSBS1_25GeV_ScanP46_20131013_1707pm.raw`

We can see signal from sector3 of CMS zz detector.

→ `17:30pm`, move table to H 2020, V 358, start run 007.

Save file: `run007_UVaSBS1_25GeV_ScanP36_20131013_1730pm.raw`

Can see signal from sector3 of CMS zz detector.

→ `18:15` Table moved to H 2115 V358 start run008

`run008_UVaSBS1_25GeV_ScanP35_20131013_1845pm.raw`

We are seeing signal from S4 detector on channel 0 and from 4th sector of CMS zz @ channel 3.

→ `18.48` Table move to H 2215 V 358 Run009P34

`run009_UVaSBS1_25GeV_ScanP34_20131013_1848pm.raw`

We are seeing signal from S4 on channel 2, both 10cm zigzag and CMsZZ sector 5 i.e. channel 4

→ `19.09` Table move to H 2315 V 258 Run10P33

run010\_UVaSBS1\_25GeV\_ScanP33\_20131013\_1910pm.raw

We see signal from S4 channel 2 and sector 6 od CMSZZ from channel 5

→ 19.39 H2415 V 358

run011\_UVaSBS1\_25GeV\_ScanP32\_20131013\_1939pm.raw

Signal from sector 6 &7 from CMSZZ

For Run details please check the spread sheet detail\_run\_eleg

### Oct 14

→ 0:10am, Kondo's scanning last line ( 5 points) of SBS1 detector. In this line we don't expect to see signals from FIT detectors because of beam position out of FIT detectors range.

→ 0:35am, Aha, see some signals from CMS zz sector 8!! File name:

'run023\_UVaSBS1\_25GeV\_ScanP15\_2013101\_0035pm.raw'

→ 0:55am, last point of Kondo's SBS1 scanning. File

'run024\_UVaSBS1\_25GeV\_ScanP15\_20131014\_0055pm.raw'

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### Oct 14

1:40am, measure the 10cm zz at 20 degrees (scan 3 point s horizontally). Position at H 2232, V 355

Save: "10cmzz20degrees\_Run001\_P1\_25GeV\_20131014\_0140am.raw", 10k events.

In this file, we can see signal from CMS zz sector 5 and S4.

1:58am, move table 3.5cm to west, hit the wide end of zz strips. Position at H 2200,V 355

Save: "10cmzz20degrees\_Run002\_P2\_25GeV\_20131014\_0200am.raw", 10k events.

2:20am, move table 7cm to east, hit the small end of zz strips. Position at H 2270, V 355

Save: "10cmzz20degrees\_Run003\_P3\_25GeV\_20131014\_0220am.raw", 10k events.

2:50am, ask a controlled access to the beam room, rotate the 10cm detectors to 30 degrees position.

3:00am, prepare for HV scan for FIT and UVa detectors:

Point #	CMS zz	10cm zz & S4	SBS1 & Solid	HV of Trackers: FIT:4000V UVA:4050V, 4000V
1	3000	3800	3800	
2	3050	3850	3850	
3	3100	3900	3900	
4	3150	3950	3950	
5	3200	4000	4000	
6	3250	4050	4050	
7	3300	4100	4100	
8	3350	4150	4150	
9	3400	4200	4200	
10				

Each run will take 10k events.!

03:46am, start taking data for HV point 1. Save: [Run001\\_HVScan...\\_20131014\\_0346am.raw](#). 10k events.

04:13am, start HV point 2. Save : [Run002\\_HVScan...\\_20131014\\_0413am.raw](#).

04:42am, start HV point 3. Save : [Run003\\_HVScan...\\_20131014\\_0442am.raw](#).

05:04am, start HV point 4. Save : [Run004\\_HVScan...\\_20131014\\_0504am.raw](#).

05:30am, start HV point 5. Save : [Run005\\_HVScan...\\_20131014\\_0530am.raw](#).

05:52am, start HV point 6. Save : [Run006\\_HVScan...\\_20131014\\_0552am.raw](#).

06:17am, start HV point 7. Save : [Run007\\_HVScan...\\_20131014\\_0617am.raw](#).

06:39am, start HV point 8. Save : [Run008\\_HVScan...\\_20131014\\_0639am.raw](#).

07:01am, start HV point 9. Save : [Run009\\_HVScan...\\_20131014\\_0701am.raw](#).

07:27am, decrease all HV to 2000V, take pedestal, save:  
[Run010\\_HVScan\\_Pedestal\\_20131014\\_0727am.raw](#), 5k events.

What to do in the day time:

Copy data, to cluster and to hard disk.

Scan S4, three points:

HV set as:

10cm zz: 4050, S4: 4100, CMS: 3250

## Oct. 14

In the day time, we scanned S4 detector at a little higher statistic (50k events) at three points.

The filenames are:

Run001_S4threePointScan_25GeV_20131014_0927am.raw, file size 5.4Gb (30k events)
Run002_S4threePointScan_25GeV_20131014_0927am.raw, file size 6.9Gb (?)
Run003_S4threePointScan_25GeV_20131014_0927am.raw, file size 9.0Gb (50kevents);
These three runs are at the first point (the center point of S4 detector, between sector 2 and 3).

Run004\_S4threePointScan\_25GeV\_20131014\_1536pm.raw, file size 9.0Gb (50k events), this is the second point

Run005\_S4threePointScan\_Point3\_25GeV\_20131014\_1737pm.raw, file size 2.2 Gb. This run not finished because people ask changing energy to 40GeV

After quite a longer time, the 40 GeV energy was not able to come out...so back to 32GeV

Run007\_S4threePointScan\_Point3\_32GeV\_20131014\_1052pm.raw, file size 9.0Gb, 50k events

--> the three points are scanned as above...

Then move to the center point, for taking high statistic data (at this point the CMS zz and 10cm zz detectors all have signals.).

Run008\_S4threePointScan\_Point1\_32GeV\_20131015\_0325pm.raw, file size 9.0Gb,50k events

Run009\_S4threePointScan\_Point1\_32GeV\_20131015\_0540pm.raw, file size 1.3G, less than 10k events. This run not finished because of beam off at 6am.

## Oct.15

Change CMS zz readout board with straight strips readout board.

Change 10cm 30channels zz readout boards with 48 channels r/o boards.

Put the detectors back to the same positions as before, and start flowing gas.

Oct. 16

9:30pm, Beam come back finally. Beam energy 32GeV, intensity 10k/spill.

9:35pm, set all detectors at 2000V, take pedestal, still use 9 time windows.

Save file: 'run000\_Pedestal\_20131016\_0934pm.raw', 5k events.

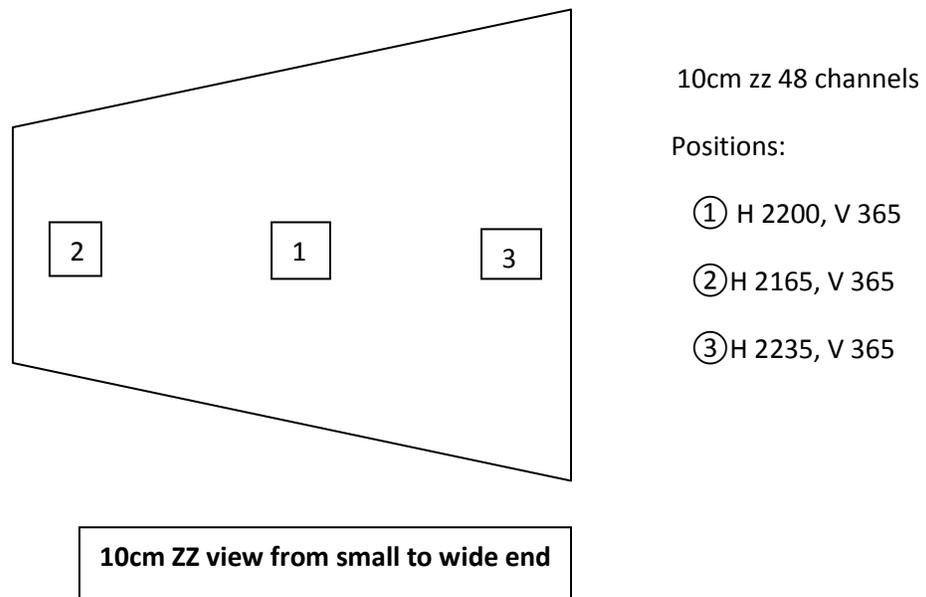
10:10pm, start taking data, voltage set as:

Detetors	HV	Gas(Ar/CO2)
Tracker 2 (UVa 10cm)	4000	80/20
Tracker 3 (UVa 10cm)	4000	
SBS1 (UVa 50cm)	4150	70/30
Solid/EIC (UVa 1m)	4150	
CMS straight (FIT)	3300	
S4 (FIT 30cm)	4050	
10cm zz 2 (FIT, 48 channels)	4000	
10cm zz 1 (FIT, 48 channels)	4000	
Tracker 4 (UVa 50cm, SBS2)	4000	
Tracker 1 (FIT 10cm)	4000	

\*. CMS detector voltage is a little higher than when zz readout was used.

Beam position at H 2200 V 365, this is the center of the 10cm zz and is hitting CMS sector 5.

Scanning positions plan:



Save file : 'run001\_10cmZZScan\_P1\_20131016\_1030pm.raw', 10k events.

Stopped this run as CMS and 10cm ZZ APV went crazy. Restarted the FEC and started a new run

'run001\_10cmZZScan\_P1\_20131016\_1055pm.raw'

23:26 Move table to second position and now we are seeing signal in both 10cm ZZ detector, from entire S4 detector i.e. from both APVs attached to S4 and lastly from CMS detector sector 4.

File name: "run002\_10cmZZScan\_48strips\_32GeV\_20131016\_1128pm.raw" 10K events

Move table to third position data for S4 channel 2 and 10cm ZZ detectors

"run003\_10cmZZScan\_48strips\_32GeV\_20131016\_1157pm.raw" 10K events

### CMS Detector position scans (along center line)

00:28am Move position H: 2320 V: 396 Sector 6

"run001\_CMSScan\_eta6\_32GeV\_20131017\_1228am.raw" 15K events

Observed signal from sector 5 and sector 6 from CMS detector and channel 2 from S4 detector.

1:20am Move table to the next position H:2320 V:386

"run002\_CMSScan\_eta7\_32GeV\_20131017\_0120am.raw" 15K events

Observed signal just from sector 7 of CMS detector

02:02am Move table to the position H:2505 V 396

"run003\_CMSScan\_eta7-8\_32GeV\_20131017\_0202am.raw" ,15K events

02:48am, move table to H 2207, V 401,

'run004\_CMSScan\_eta5\_32GeV\_20131017\_0248am.raw' ,15K events. Observed signal from 10cm zz and S4(Slave APV, radial zigzag).

03:34am, move table to H 2103, V 401,

'run005\_CMSScan\_eta4\_32GeV\_20131017\_0334am.raw' ,15K events. Observed signal from S4(Master APV, straight zigzag).

04:12am, move table to H 2000, V 401

'run006\_CMSScan\_eta3\_32GeV\_20131017\_0412am.raw' ,15K events. Can't see signal for other FIT detectors.

04:52am, stop the above run, and start new run for sector 3. Because of APV abnormal, restart FECs.

'run006\_CMSScan\_eta3\_32GeV\_20131017\_0452am.raw', 15K events again.

05:46am, move table to H 1886, V 401

'run007\_CMSScan\_eta2\_32GeV\_20131017\_0546am.raw', 15K events.

06:29am, move table to H 1886, V 401

'run008\_CMSScan\_eta1\_32GeV\_20131017\_0629am.raw', 15K events. Here we mainly see signals from sector 2 but not sector 1. There is no space to move the table to let beam hitting sector 1...

07:14am, finished first round scan of CMS detector with straight strip readout.

Take pedestal again. (Lower voltage to 2000V), save

'run009\_CMSScan\_Pedestal\_32GeV\_20131017\_0714am.raw', 5k events.

### HV scans (in the center point)

Move the table to H 2200, V 365

Voltage points to scan:

Point #	CMS zz	10cm zz & S4	SBS1 & Solid	HV of all Trackers:
1	2900	3800	3800(not applied)	4000V
2	2950	3850	3850	
3	3000	3900	3900	
4	3050	3950	3950	
5	3100	4000	4000	
6	3150	4050	4050	
7	3200	4100	4100	
8	3250	4150	4150	
9	3300	4200	4200	
10	3350	4050	4150	
11	3400	4050	4150	

07:44am, start taking data at first point, save:

'run010\_HVScan\_3800V\_32GeV\_20131017\_0744am.raw', 15k events. After data finished, found HV for UVa/SBS1 was not applied.

08:31am, take data for 2nd point,

'run011\_HVScan\_3850V\_32GeV\_20131017\_0831am.raw', 15k events.

09:19am, take data for 3rd point,

'run012\_HVScan\_3900V\_32GeV\_20131017\_0919am.raw', 15k events.

09:57am, take data for 4<sup>th</sup> point,

'run013\_HVScan\_3950V\_32GeV\_20131017\_0957am.raw', 15k events.

10:41am, take data for 5<sup>th</sup> point,

'run014\_HVScan\_4000V\_32GeV\_20131017\_1041am.raw', 15k events.

11:23 6<sup>th</sup> point for 4050V

"run015\_HVScan\_4050V\_32GeV\_20131017\_1123  
am.raw", 15k events.

12:07 take data for point 7 for 4100V

"run0016\_HVScan\_4100V\_32GeV\_20131017\_1207pm.raw", 15K events

12:54 take data at 4150V

"run0017\_HVScan\_4150V\_32GeV\_20131017\_1254pm.raw", 15K events

after this run when we saw the cluster charge plots, we observed that signal is saturating for 10cm ZZ and for S4.

So I started reducing voltage by 50 volts and eventually observed that the cluster charge plots were better at 3900V for 10cm ZZ and 3950V for S4 detector. On other hand the CMS detector is doing fine at 3250V

Note: we should make sure that we should you these 3900V and 3950V voltages while scanning the position for resolution purpose.

15:45 took data at 4200V

"run0018\_HVScan\_4200V\_32GeV\_20131017\_1547pm.raw" 15K

16:32 10cmZZ 3900V S4 3950V CMS 3350V

"run0019\_HVScan\_3900V\_CMS3350V\_32GeV\_20131017\_0438pm.raw", 15K events

@3350V stared seeing saturation in cluster charge plots.

This run can be used for 10cm ZZ scan for resolution

So ideal voltage range for higher statistics is 3900V for 10cmZZs, 3950V for S4 detector and 3250V for CMS detector.

10cmZZScan again

Position 2 H:2165 V:365

run001\_10cmZZScan\_3900V\_CMS3350V\_32GeV\_20131017\_0519pm.raw

18:05 Position 3 H: 2235 V:365

run002\_10cmZZScan\_3900V\_CMS3350V\_32GeV\_20131017\_0606pm.raw

### High Statistic Data

Position: H: 2200 V: 365, (in the center position so that all detectors have signals.)

Voltages: 10cmZZ 3900V, S4 3950V CMS 3250V

Detectors	HV	Gas(Ar/CO2)
Tracker 2 (UVa 10cm)	4000	80/20
Tracker 3 (UVa 10cm)	3900	
SBS1 (UVa 50cm)	4050	70/30
Solid/EIC (UVa 1m)	4000	
CMS straight (FIT)	3250	
S4 (FIT 30cm)	3950	
10cm zz 2 (FIT, 48 channels)	3900	
10cm zz 1 (FIT, 48 channels)	3900	
Tracker 4 (UVa 50cm, SBS2)	3950	
Tracker 1 (FIT 10cm)	4000	

“run001\_highstat\_10cmZZ3900V\_S43950V\_CMS3250V\_32GeV\_20131017\_0655pm.raw”

100K events

“run002\_highstat\_10cmZZ3900V\_S43950V\_CMS3250V\_32GeV\_20131017\_1009pm.raw”

100K events

Oct 18

At 1:33am, Oct 18, change 10cm zz voltage to 3950, S4 to 4000 (i.e., increase 50V). Taking data:

“run003\_highstat\_10cmZZ3950V\_S4000V\_CMS3250V\_32GeV\_20131018\_0133pm.raw”

100K events”

“run003\_highstat\_10cmZZ3950V\_S4000V\_CMS3250V\_32GeV\_20131018\_0531pm.raw”

20K events”, this run not finished.

Take a Pedestal,

“Run004\_Pedestal\_20131018\_0757am.raw”, 5k events.

**Oct 19**, prepare taking data for 10cm zz detectors at 10degrees.

Voltages: CMS:3250, 10cm zz 3950, S4 3950.

8:12am, take pedestal. Voltages set at 2000V. Table position at H 2042, V 482.

Save file: ‘20131019\_0812am\_32GeV\_Pedestal\_2000V.raw’, 5k events.

8:37am, take data at an edge point of 10cm zz detectors,

Save file: ‘20131019\_0837am\_32GeV\_10cmZZ\_10deg\_p1\_3950V.raw’, 15k events.

9:50am, move table 3.5cm to east so that beam hit center of 10cm zz detectors. Take data:

Save file: ‘20131019\_0953am\_32GeV\_10cmZZ\_10deg\_p2west\_3950V.raw’, 15k events. (Now, the beam rate is very low, from DATE we get 60/spill)

11:07am, move table 3.5cm to east again so that beam hit another edge of 10cm zz detectors.

Save file: ‘20131019\_1107am\_32GeV\_10cmZZ\_10deg\_p3west\_3950V.raw’, 15k events.

13:27pm, move table to let beam hit CMS sector2, start taking data.

Save file: “20131019\_1327m\_32GeV\_CMS\_7deg\_sector2\_3250V.raw”, 15k events.

