TB2016 Data Analysis Status

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FCAL Hrdware Meeting
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APV Maps

http://alzt.tau.ac.il/~aborysov/beamtest_2015/

APVMap Class: `APVMap.h`
`APVMaps.C`

```
root -l APVMaps.C+
root [0]
Processing APVMaps.C+...
The following maps are avilable:
tb15_master
tb15_slave
tb16_master_divider
tb16_master_tab_divider
tb16_slave_divider
tb16_slave_tab_divider
Showing LumiCal sensor map for tb16_slave_divider and tb16_master_divider
.............................
```

APV Maps

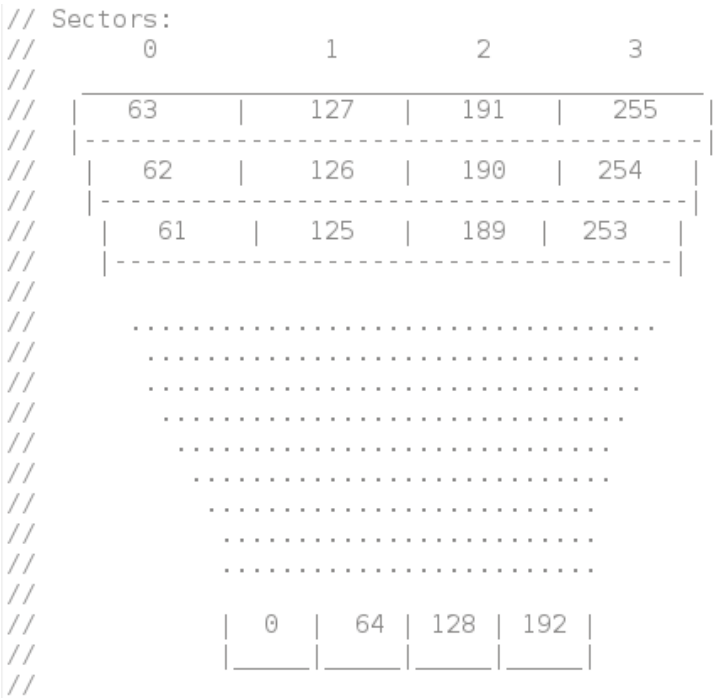
```
gROOT->ProcessLineSync(".L APVMaps.C+")
```

```
int GetLCPadId(const std::string &mapid, const unsigned int apv_ch)
```

Returns LumiCal sensor pad (according to the picture) for apv channel apv_ch and configuration defined by mapid.

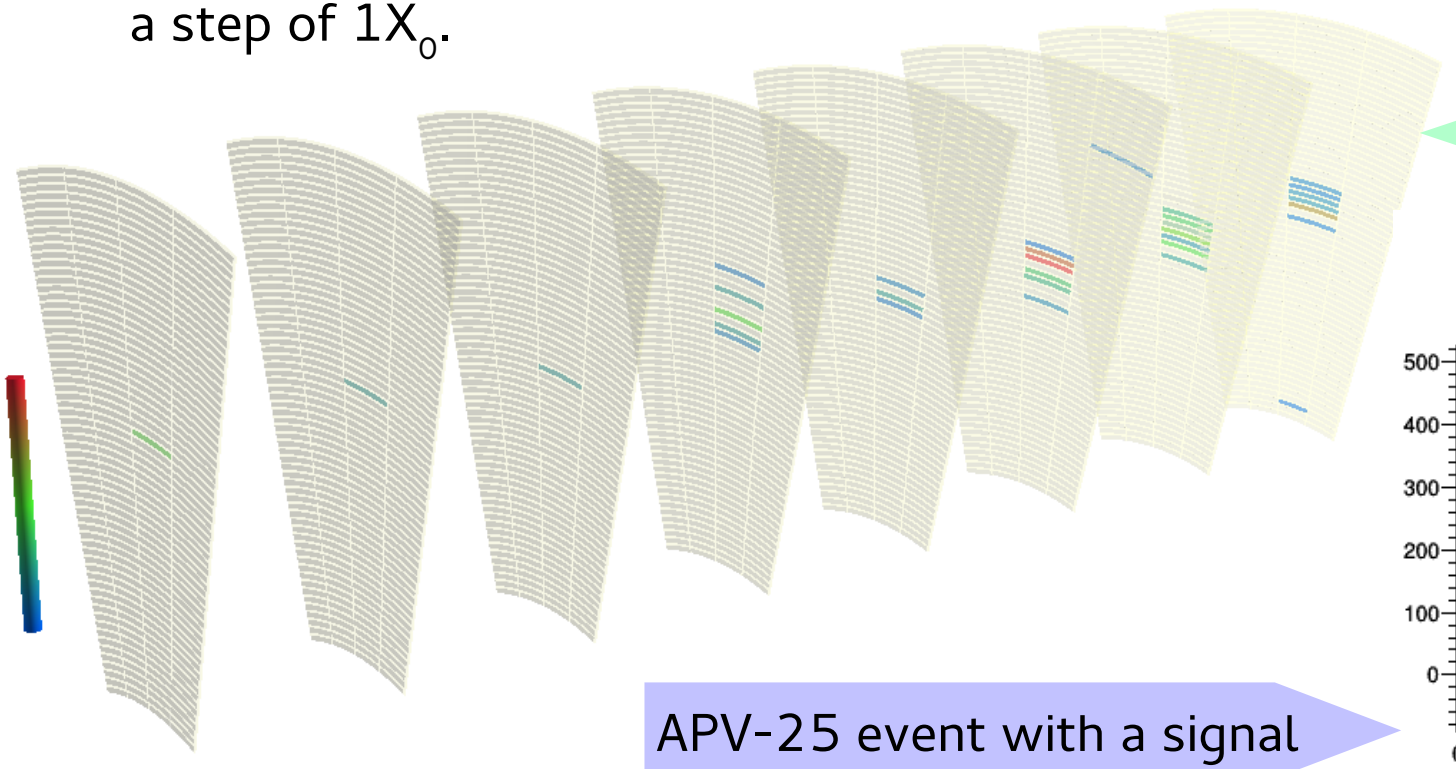
```
void GetLCPadId(mapid, apv_ch, int &sector, int &padid);

int GetLCSector(mapid, apv_ch);
int GetLCPadInSector(mapid, apv_ch);
```

Those returns LumiCal sensor pad and secor for apv channel apv_ch and configuration defined by mapid.

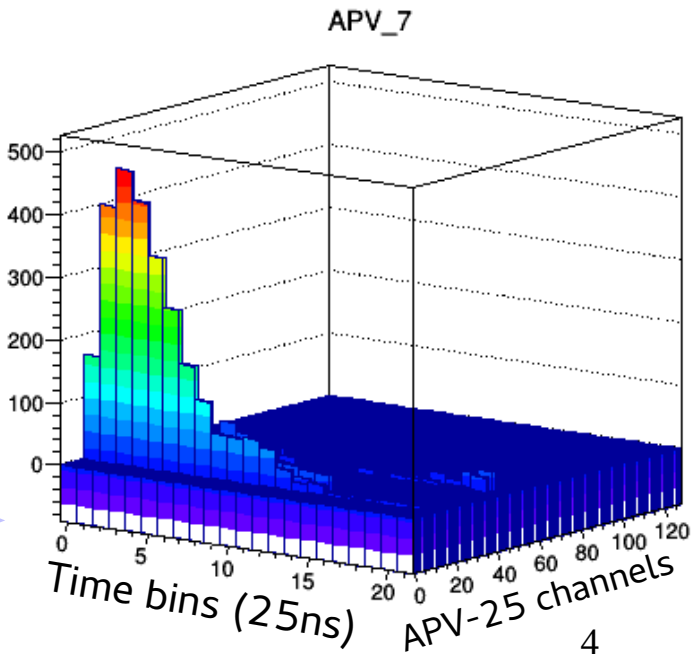


Event Example

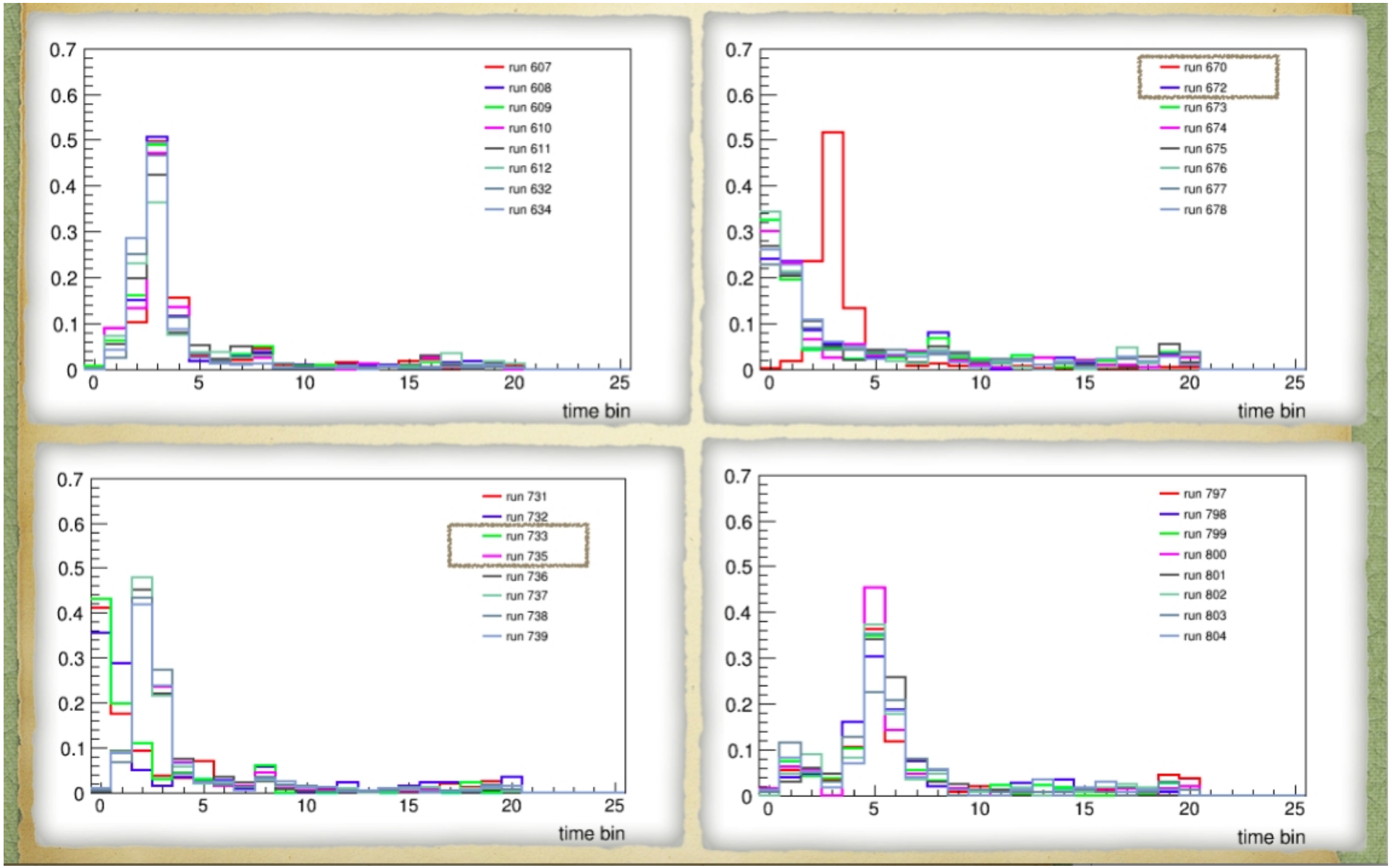
- First two planes are installed without absorbers - tracking detector:
  - The goal is to study the possibility of using a tracking detector in front of LumiCal for e/γ identification, it is important for various physics analysis at LC.
- Three absorbers are installed in front of the third plane ($3X_0$).
- One absorber is installed between other planes. Sampling from $4X_0$ to $7X_0$ with a step of $1X_0$.



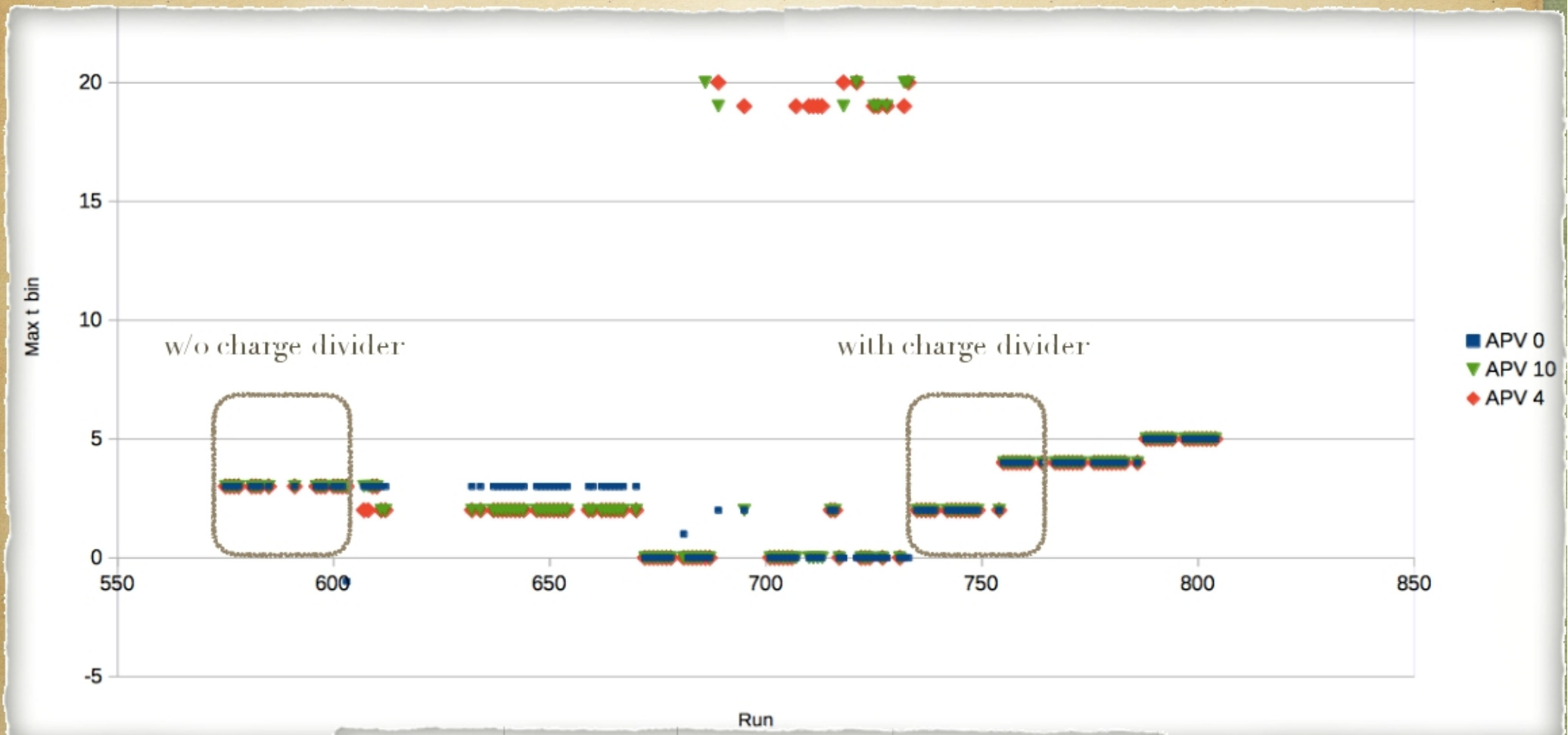
APV-25 event with a signal



Locating the Bin with Max Signal

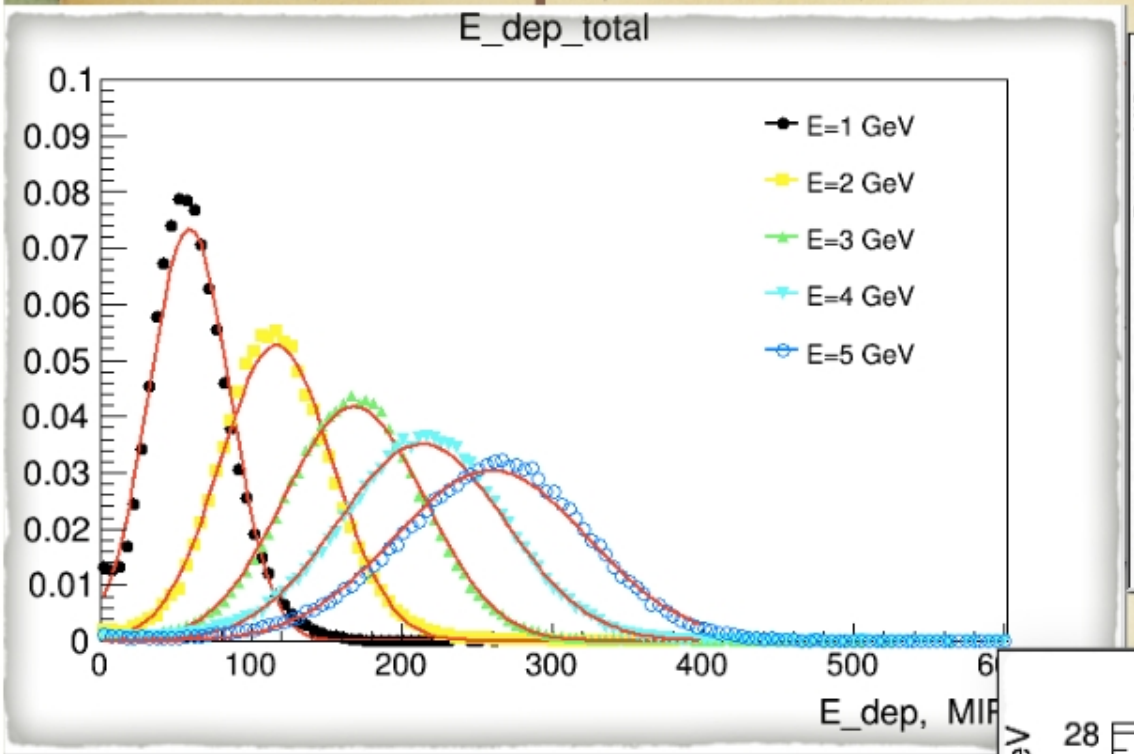


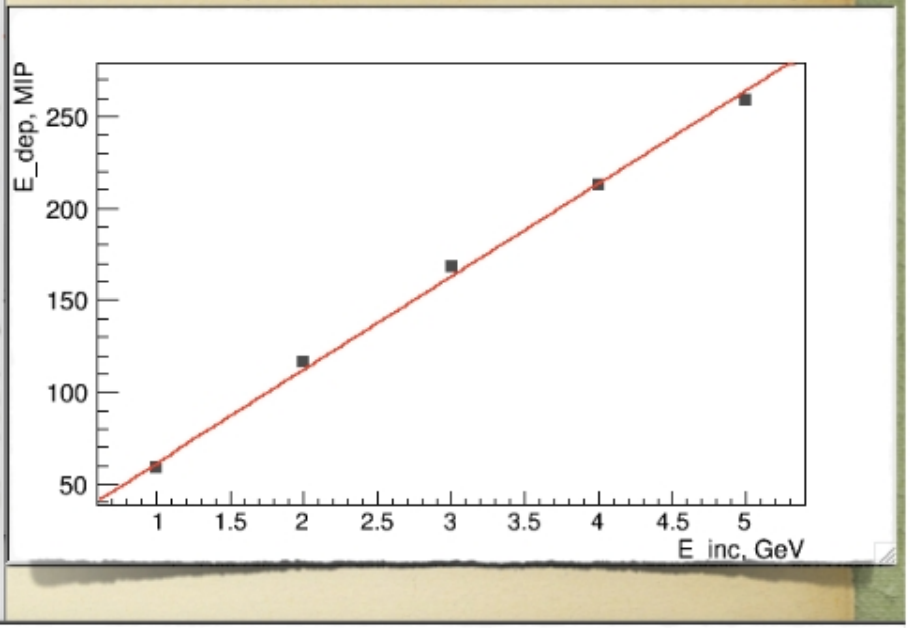
Max bins across all Runs, APV 0, 4,10

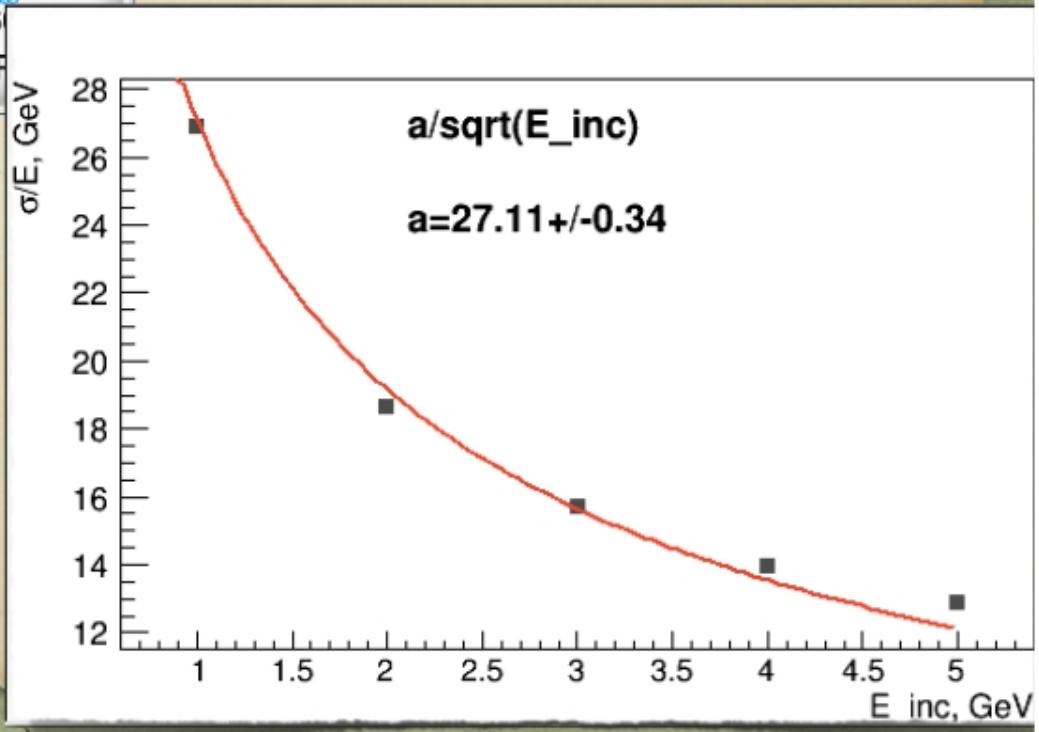


Runs	Tracker	Calorimeter,4	Calorimeter,10
575-610	3	3	3
611-670	3	2	2
672-733	0	0	0
715-716	2	2	2
735-754	2	2	2
755-786	4	4	4
788-804	5	5	5

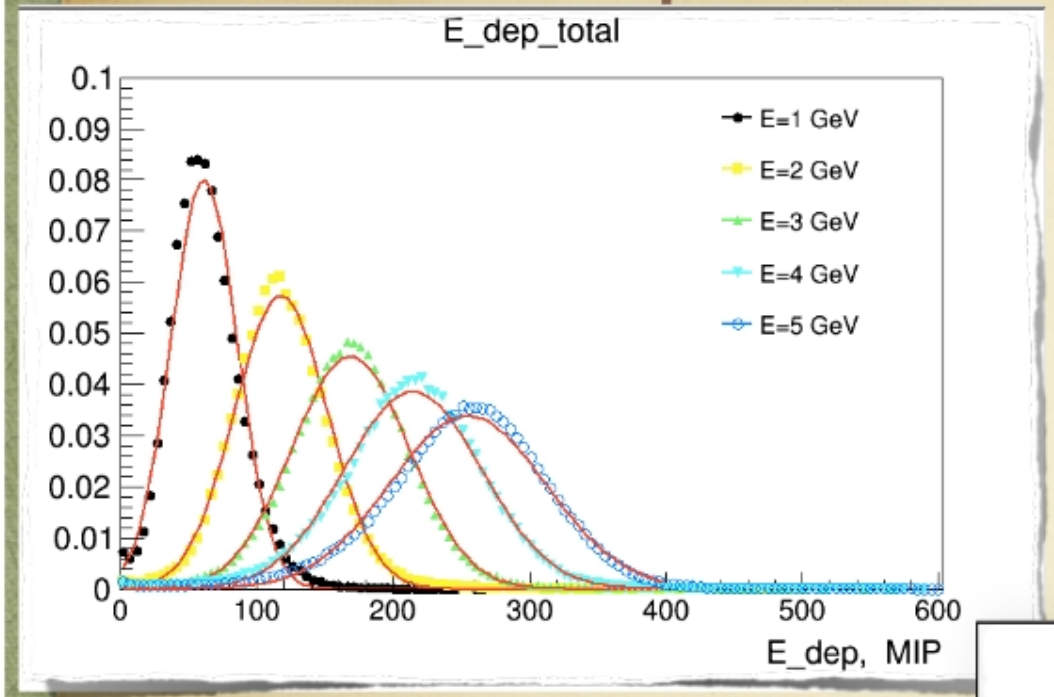
Total Deposited Energy, x= 43.7mm

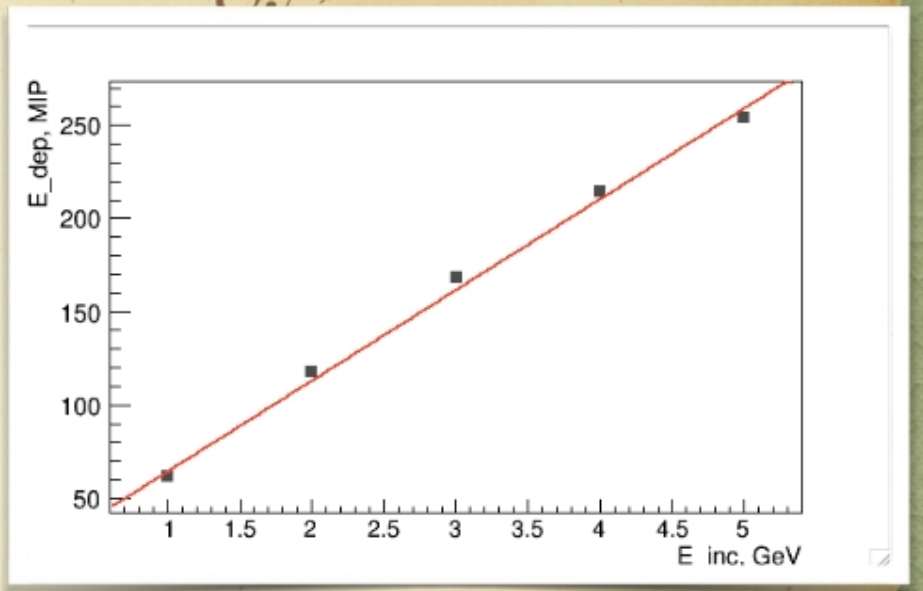


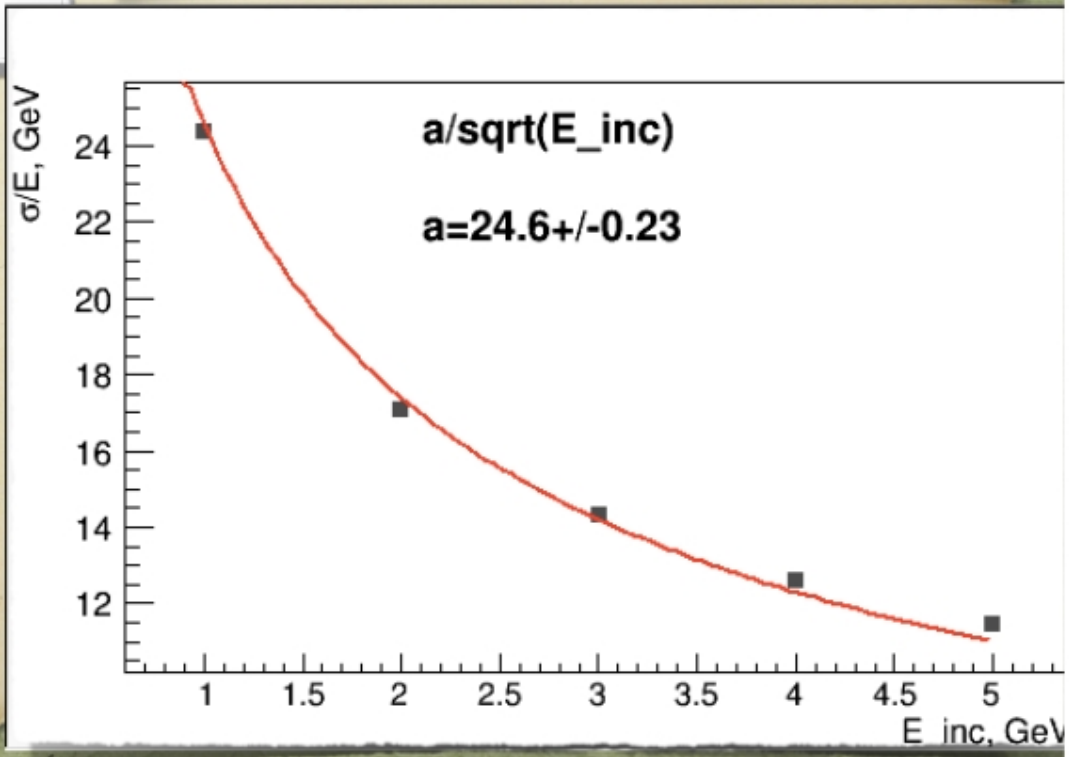




Total Deposited Energy, x= 94.1mm





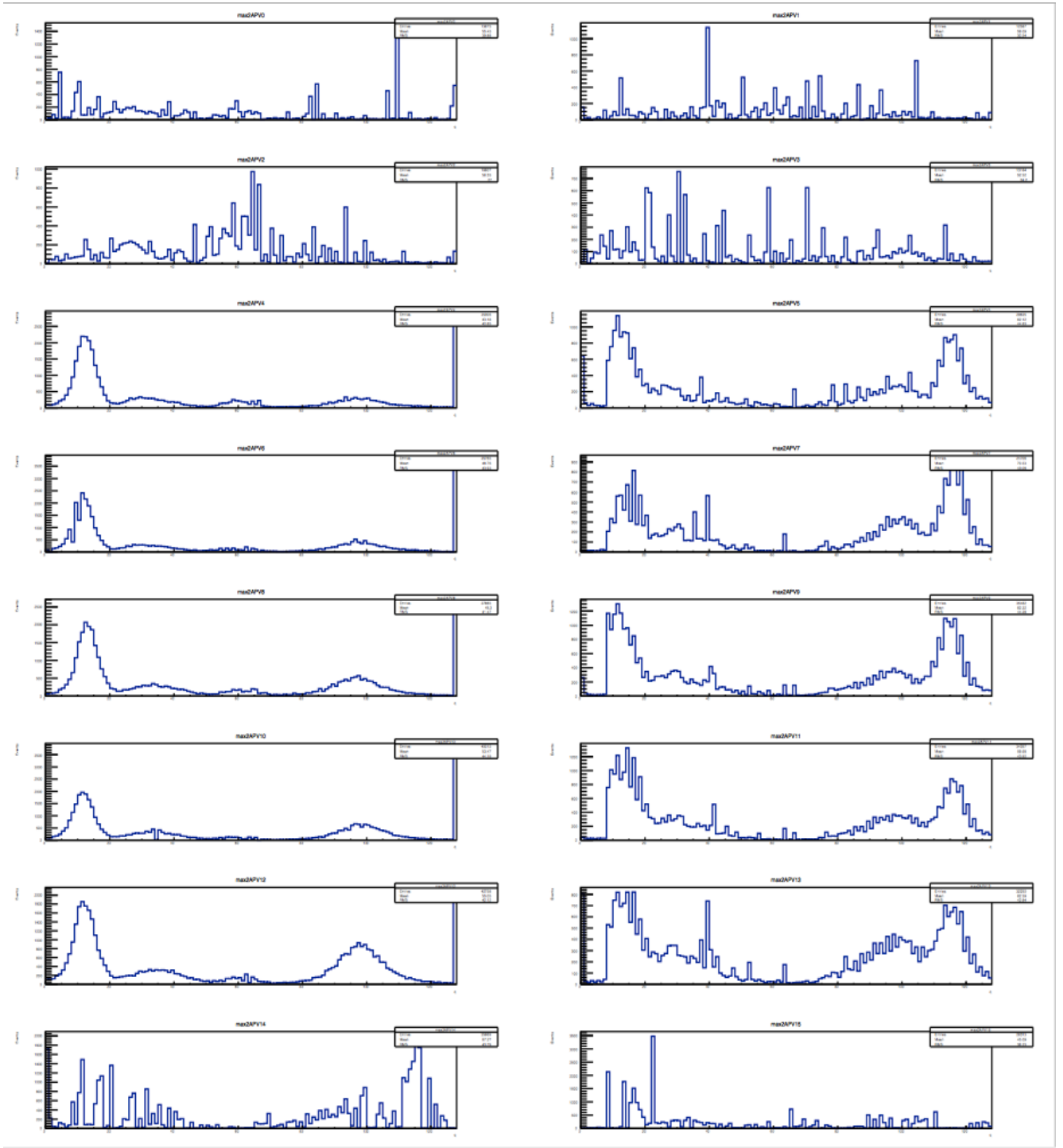


electron gamma

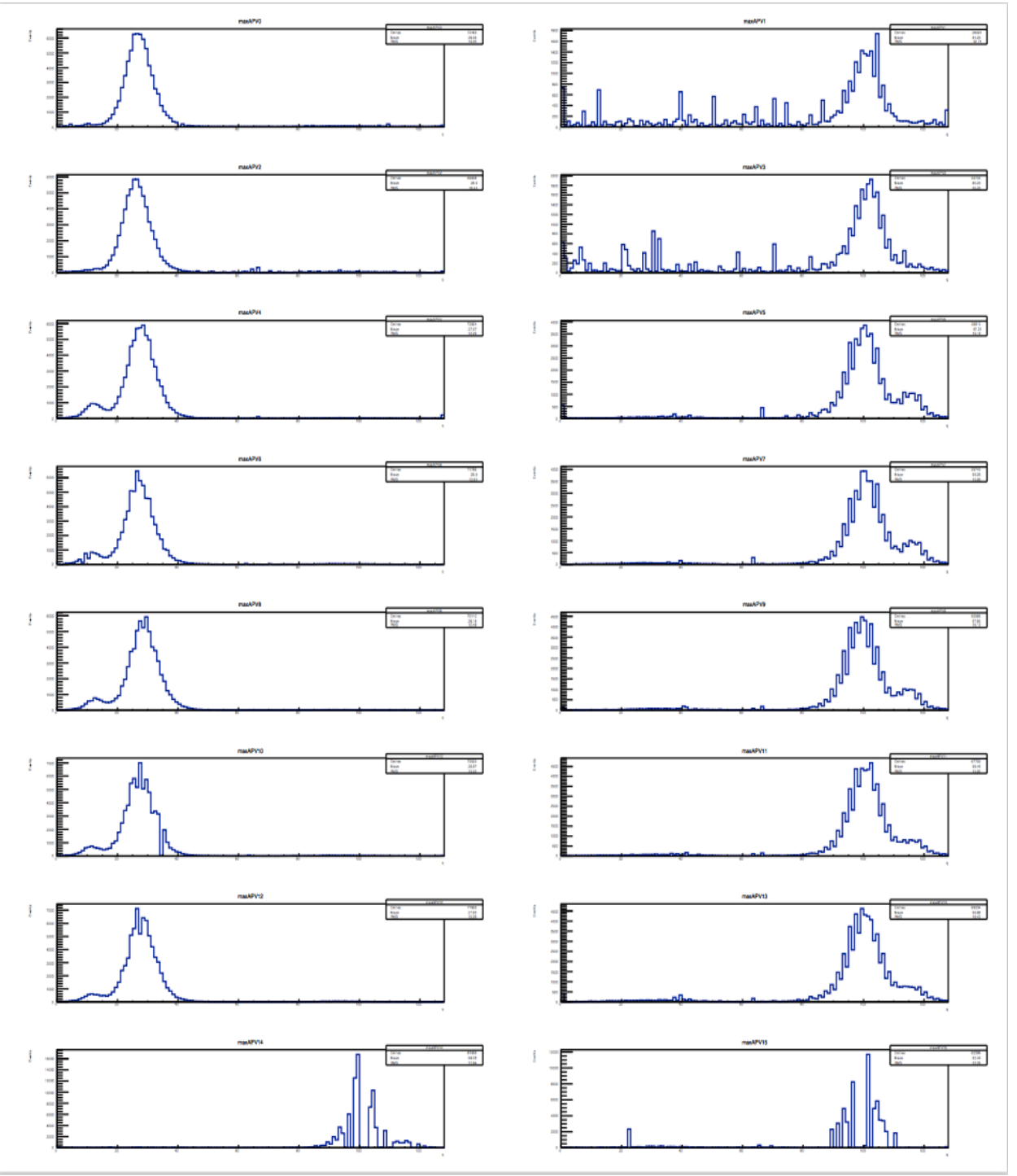
cuts

- Run 654
- Search for the first maximum (max1) in time slot =2/3
- search the second maximum(in time slot 2/3), at least 10 pads radius of max1

electron
gamma

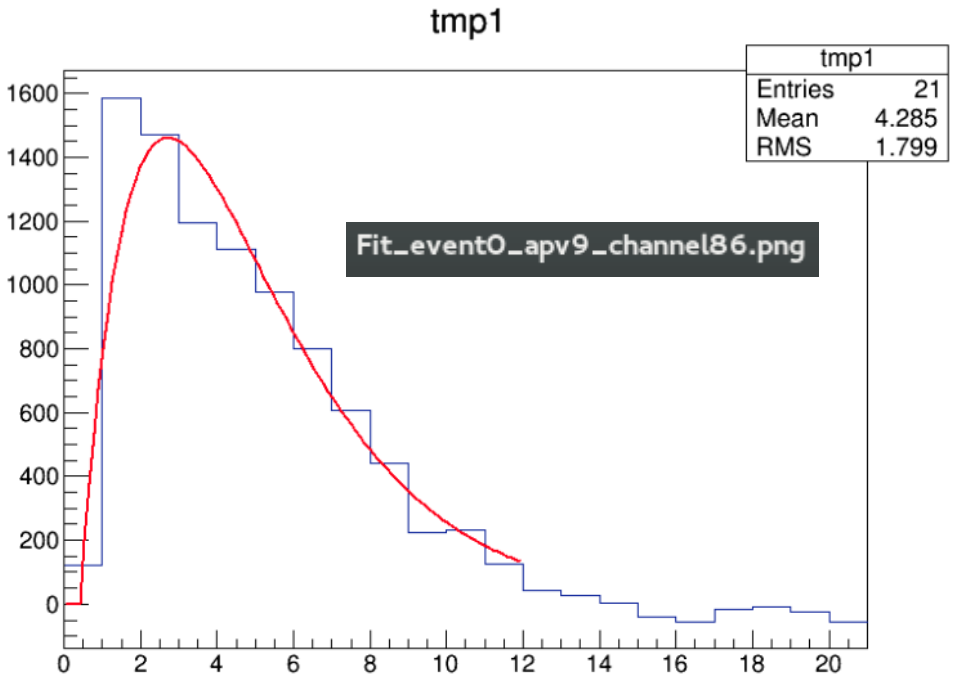


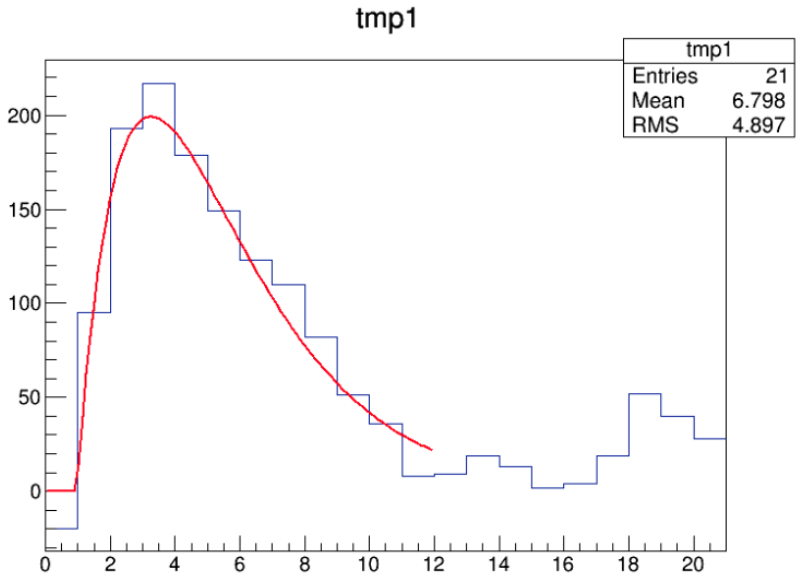
electron
gamma

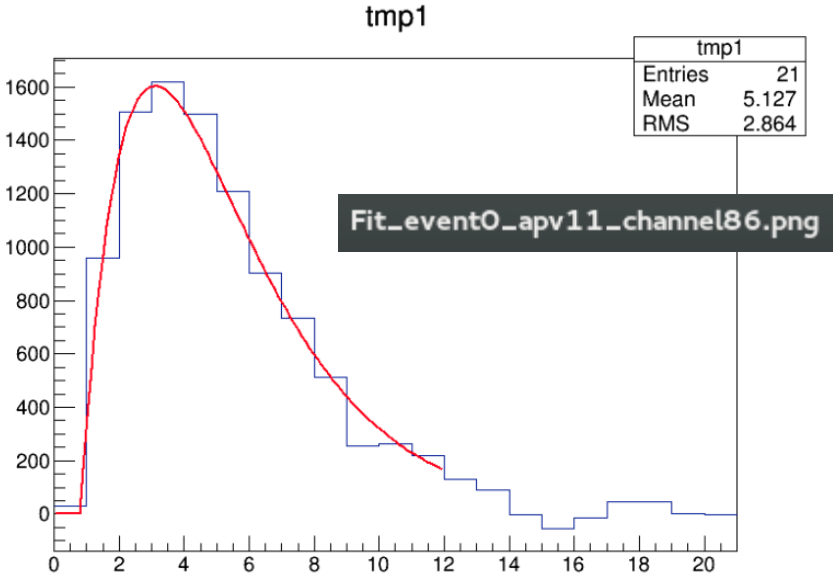


TB2016 Data. Signal Shape at Saturation

Runs 603, 604;
6 GeV, (energy scan)

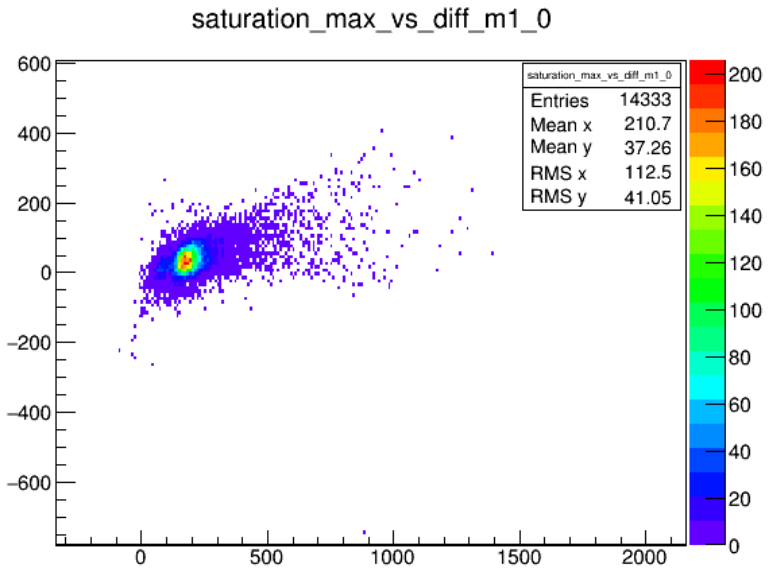


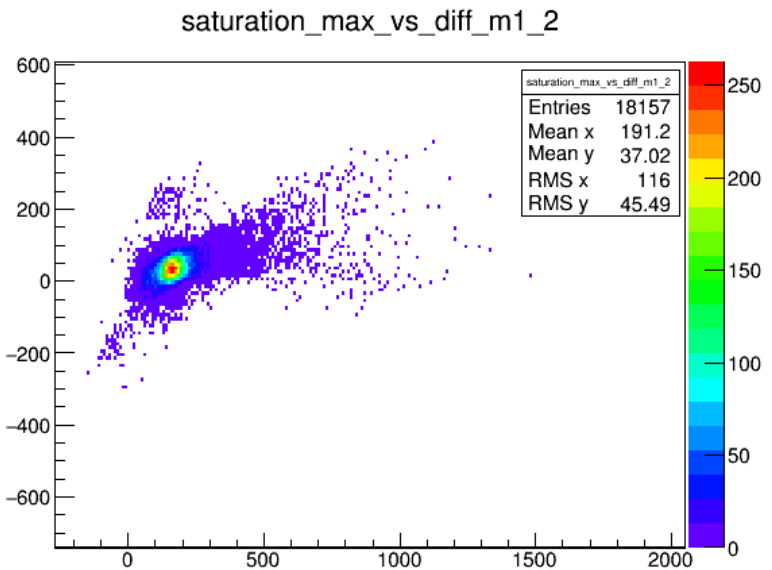


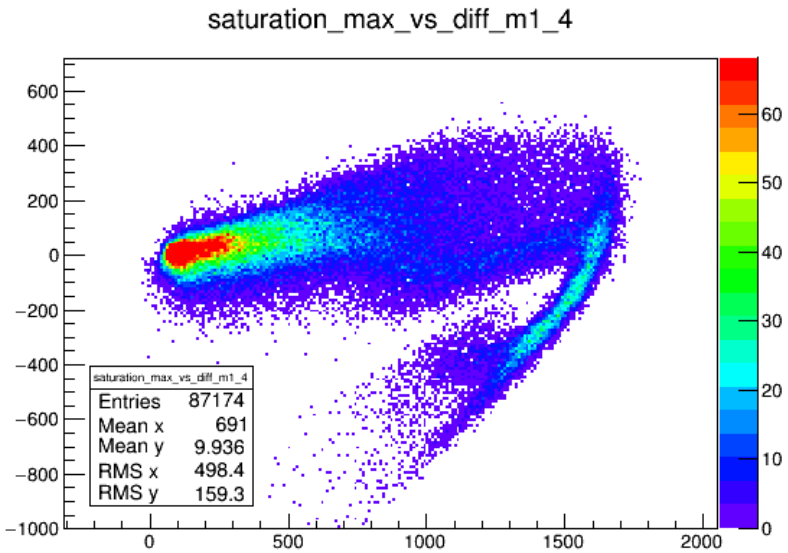


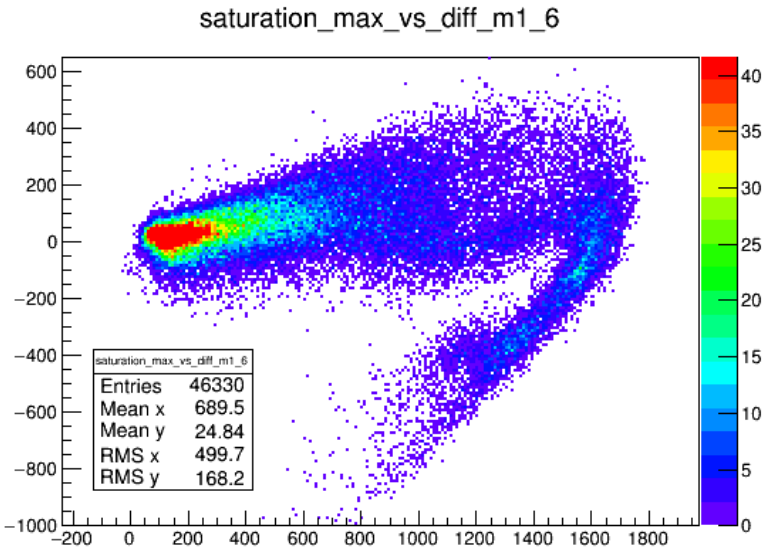
When saturation occurs the signal reaches maximum earlier, (maximum of the signal is in smaller bins) ?

Signal vs Time Bin Difference



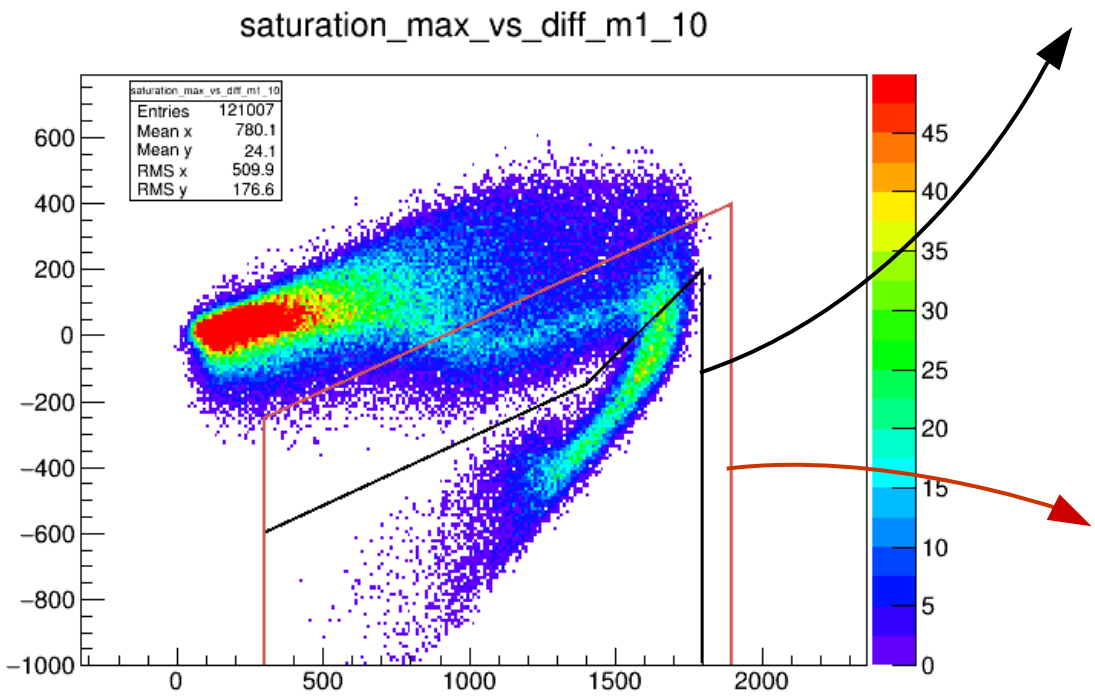




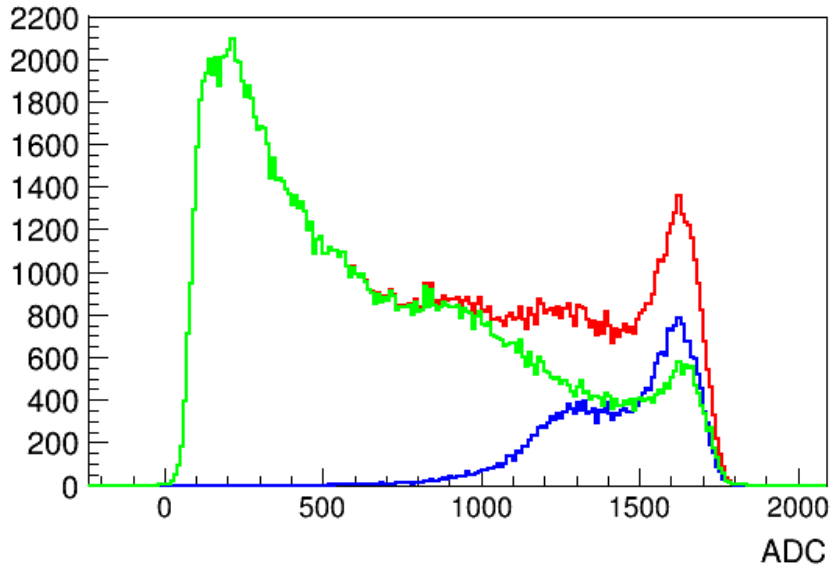


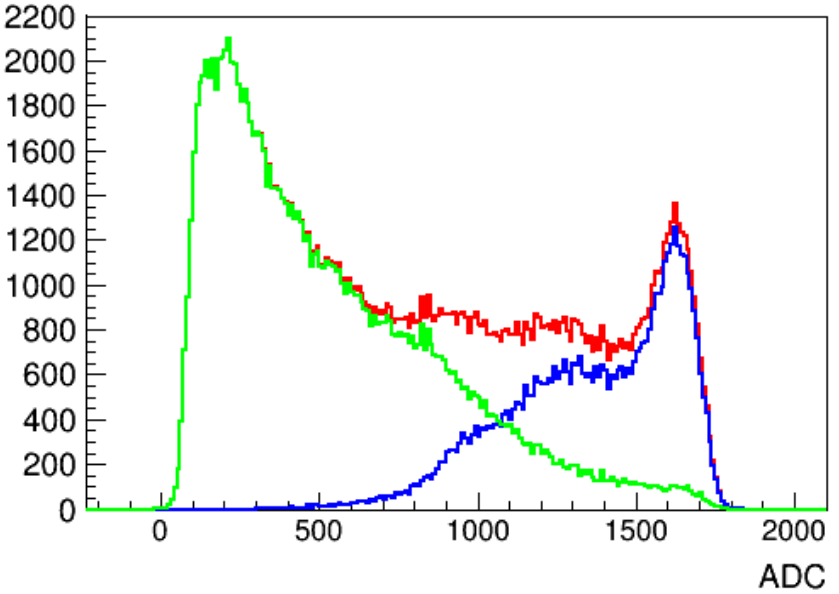
Signal vs Time Bin Difference

- Signal is the value in time bin 3 (starting from 0);
- 2D histogram shows the distribution of bin[3] (signal) vs (bin[3] – bin[2]) for run 603(4).
- Both runs are of type “energy scan” with 6 GeV electrons.



ProjectionX with different TCutG





Summary

- Noise and Pedestal were extensively studied by Veta. Results were presented in several of TB analysis meetings (Thursday at 1 pm).
- Maps to transform the APV channel to LumiCal sensor physical pad (its position) have been completed for all configurations (w/o and w/ CD for regular design and for TAB).
- The maximum bin position for each run was documented to use with maximum element method of signal measurement.
- There are preliminary results of energy scan runs.
- Ongoing study of electron gamma separation.
- Ongoing work to optimize signal extraction from the raw data.
- Alina started working on MC simulation.
- Regular technical meetings every Thursday at 1 pm. Everybody is welcome with questions and ideas.