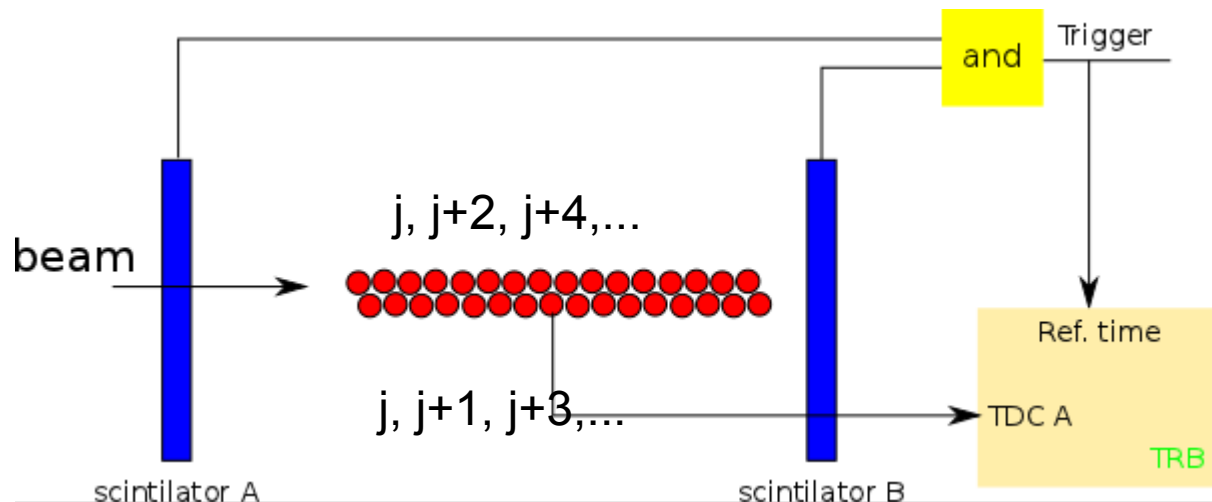


Juelich Test october 2012

- Beam momentum $p=0.9$ GeV/c , beam intensity $\sim 10^5$ / sec files:

te12266235528.hld.root	(day 266 23:55:28)	1800 V
te12267004949.hld.root	267 00:49:49	1750 V
te12267003239.hld.root	267 00:32:39	1900 V
te12267010614.hld.root	267 01:06:14	1700 V

- ASIC configuration (see next slide)
- Experiment set-up (& straw numbering)



ASIC set-up

The screenshot shows the Panda.FE configurator interface with the following settings for channels A through H:

Channel	Ch1_thr	Ch2_thr	Ch3_thr	Ch3_thr	Baseline	on/off	PreAmp gain	PreAmp T	Rp	Cp	Tp	Tail cancel.	Rt1	Ct1	Rt2	Ct2	BLH
A	1225	1263	1296	1257	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
B	1285	1200	1338	1311	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
C	1285	1236	1201	1252	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
D	1193	1233	1200	1252	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
E	1252	1200	1200	1280	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
F	1200	1252	1294	1185	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
G	1207	1203	1210	1276	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON
H	1244	1250	1290	1200	mV 1200	<input checked="" type="checkbox"/>	1	100	10	10	11	TC_on	19	13,5	11	1,65	ON

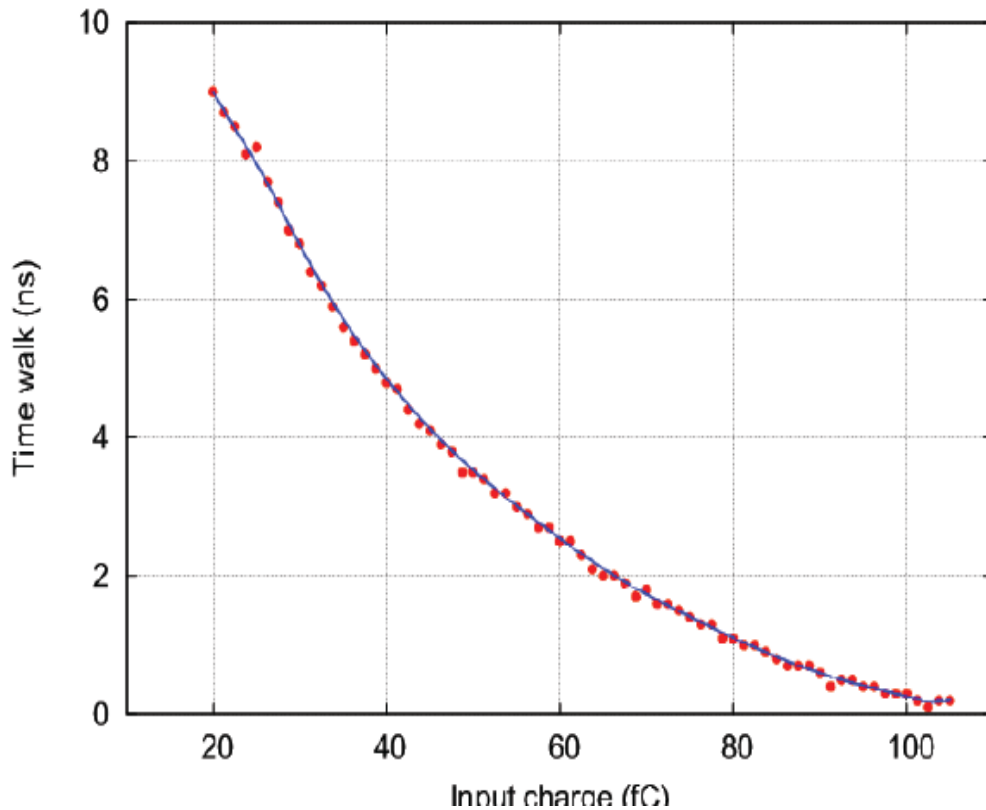
Log window content:

```
Settings restored!  
Settings restored!  
Settings restored!  
Settings restored!  
Settings saved!
```

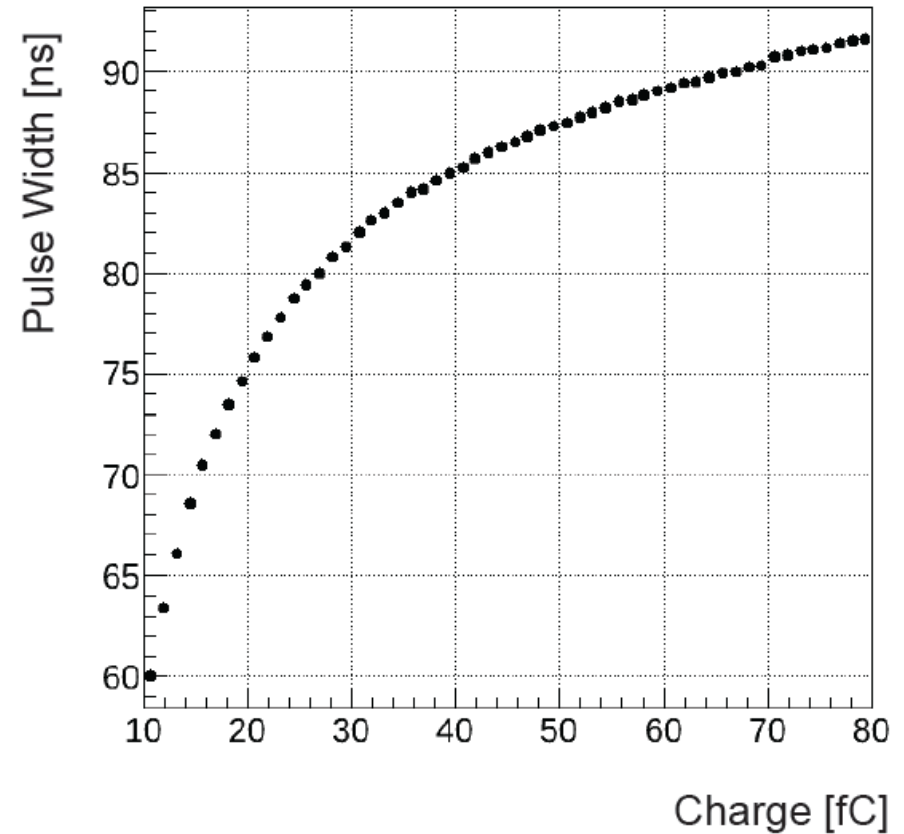
Buttons: Restore, Send!, Exit

Most of data taken with this set-up : Preamp Gain 1, rising time ~40 ns, pulse duration ~ 100 ns
stable ASIC operation (no oscillation etc)

FEE characteristics : reminder I: operating curves



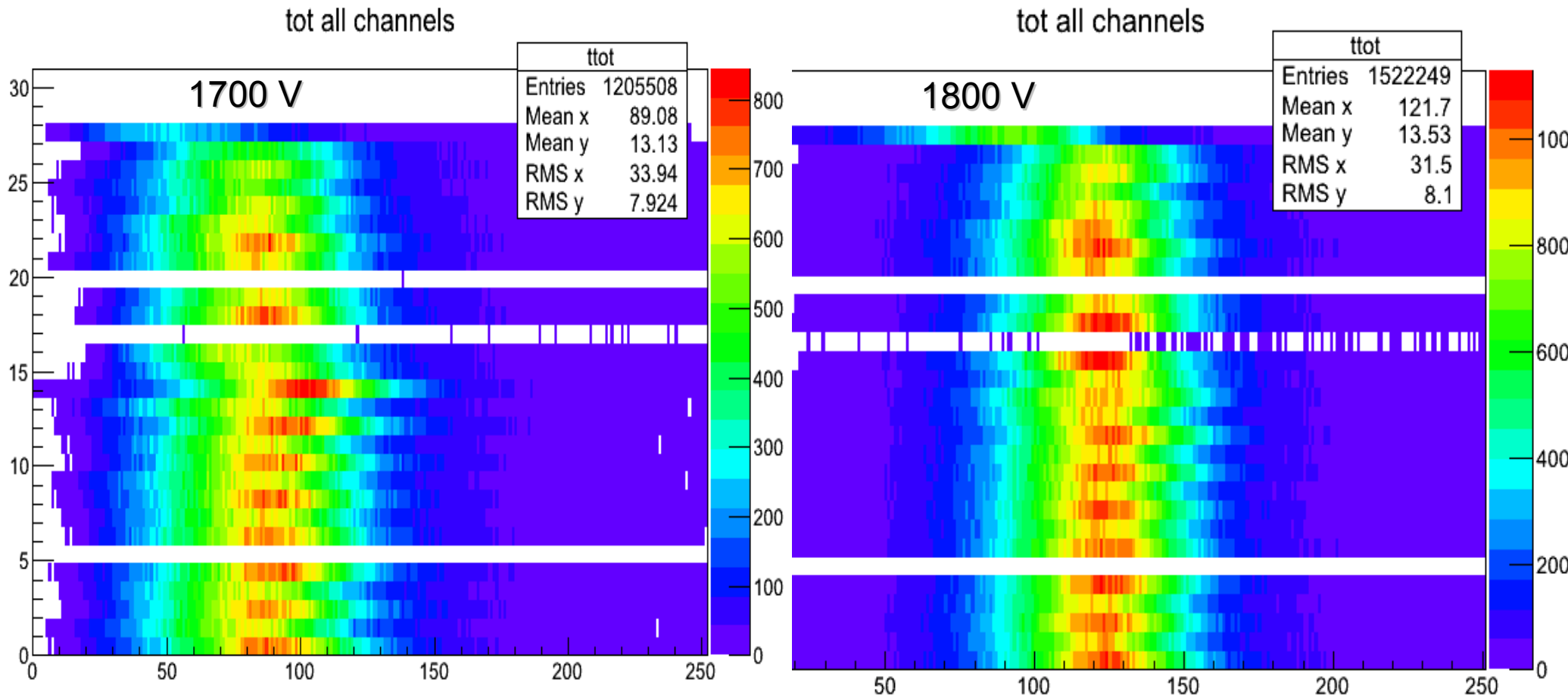
Max walk ~ 10 ns



flattening for $Q > 100$ fC

(Q for delta pulse (eq. to 6x larger detector pulse))

TOT -all channel



Threshold set-up above noise :

all channels shows similar TOT (small differences due to thresholds)

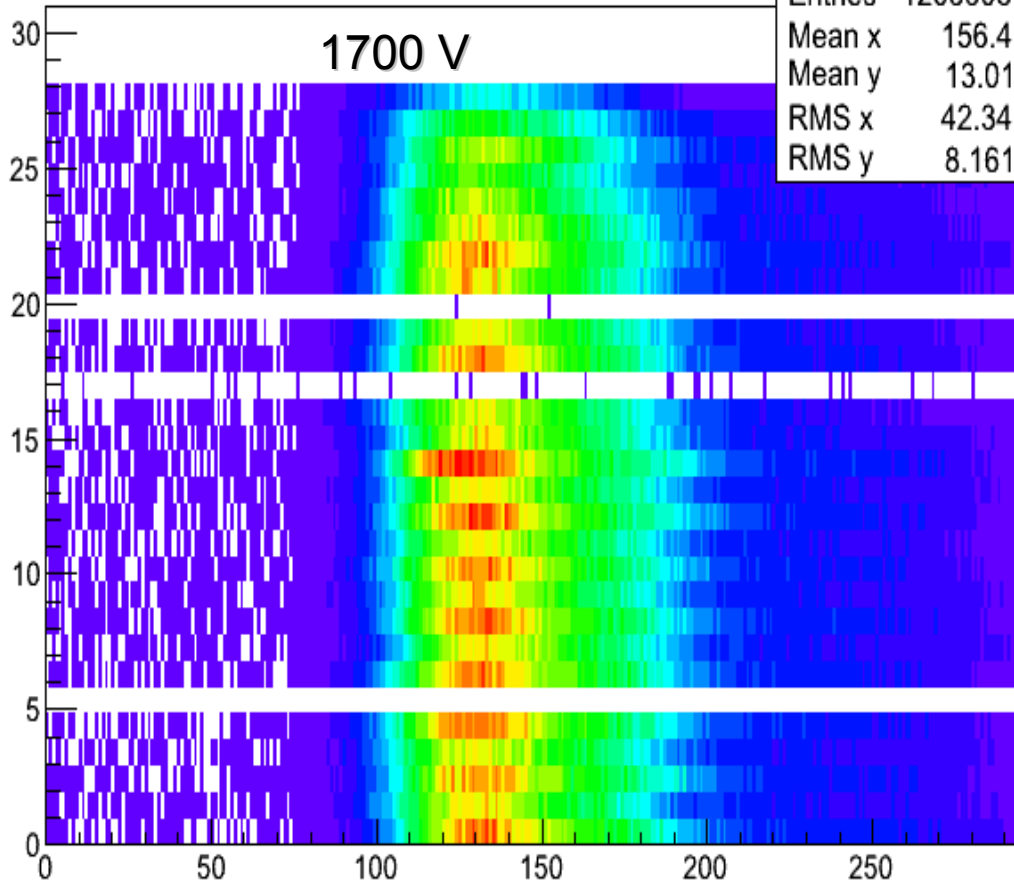
- TOT follows HV increase (as expected)

Drift time -all channels

drift time all channels

1700 V

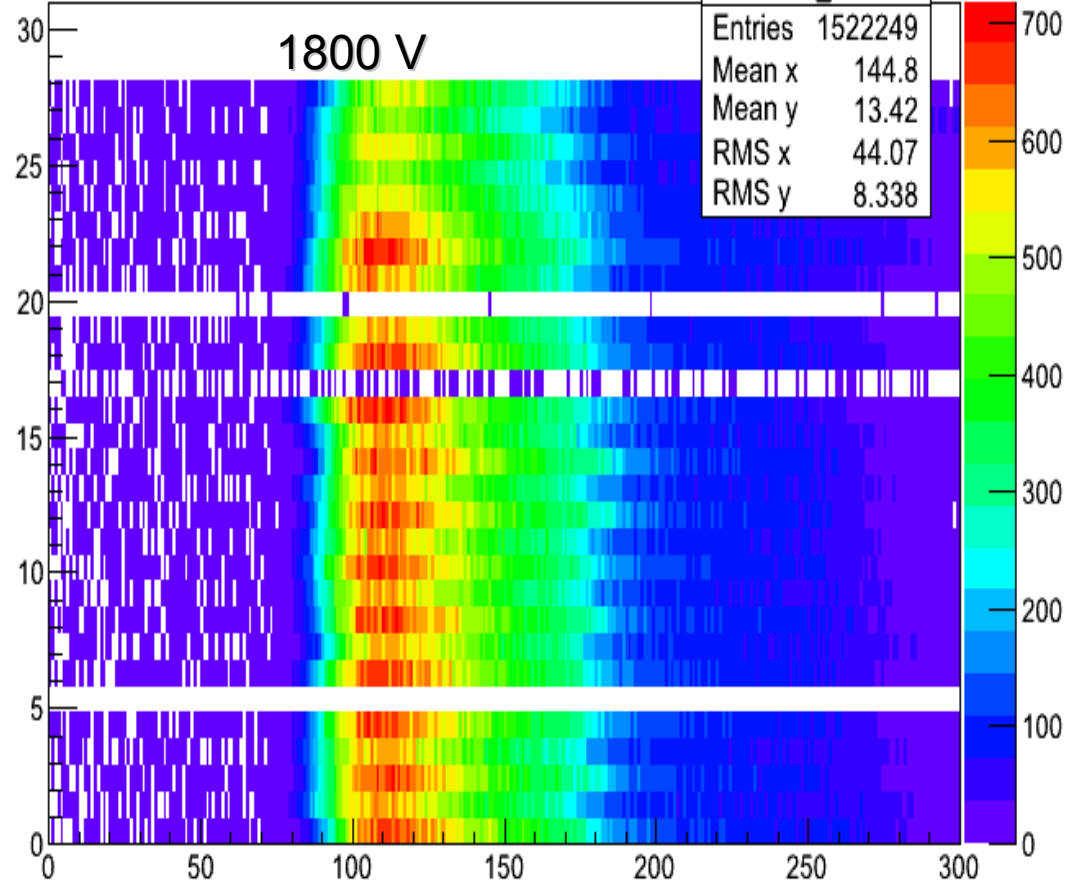
drift_all	
Entries	1205508
Mean x	156.4
Mean y	13.01
RMS x	42.34
RMS y	8.161



drift time all channels

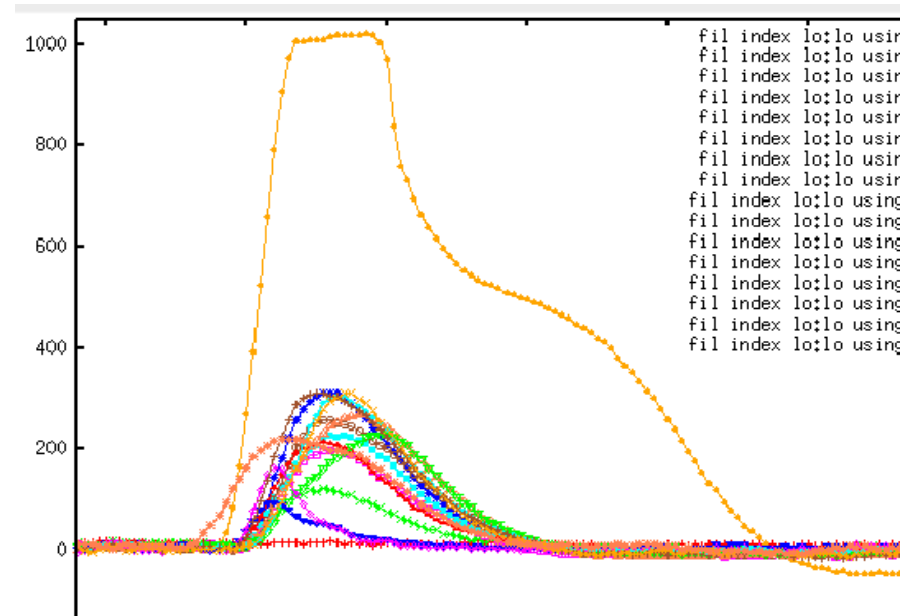
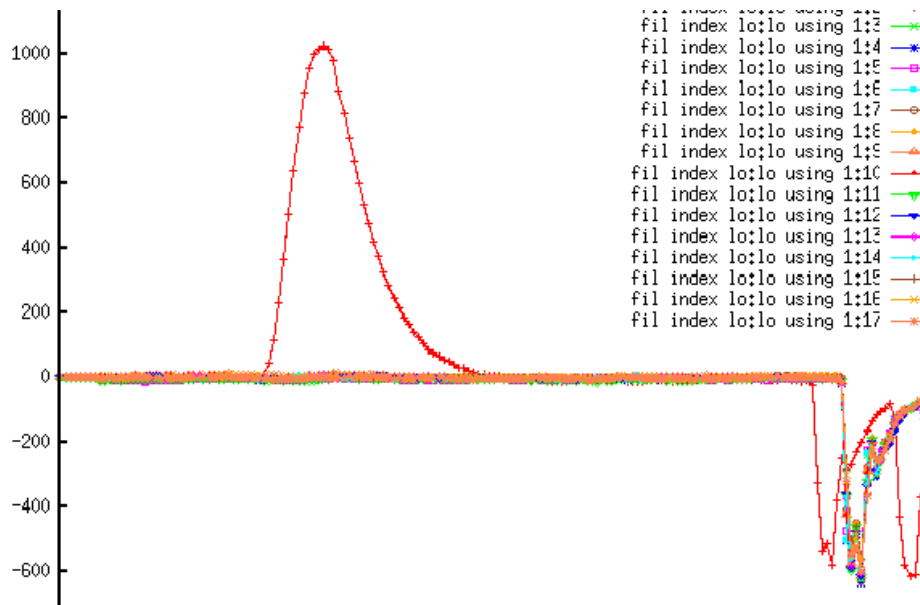
1800 V

drift_all	
Entries	1522249
Mean x	144.8
Mean y	13.42
RMS x	44.07
RMS y	8.338

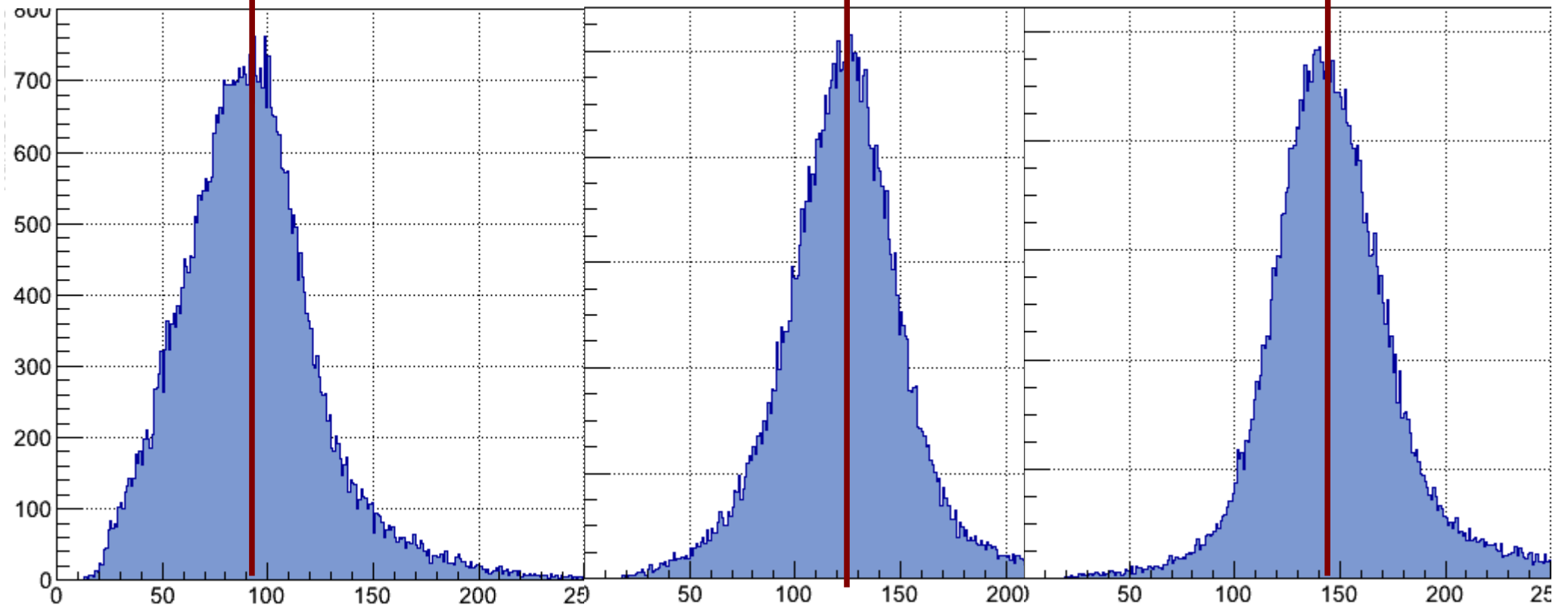


Signals from ASIC (vfQDC)

- beam momentum 900 MeV/c
- HV at 1750 V



TOT vs HV -channel 11



HV 1700 V

1800 V

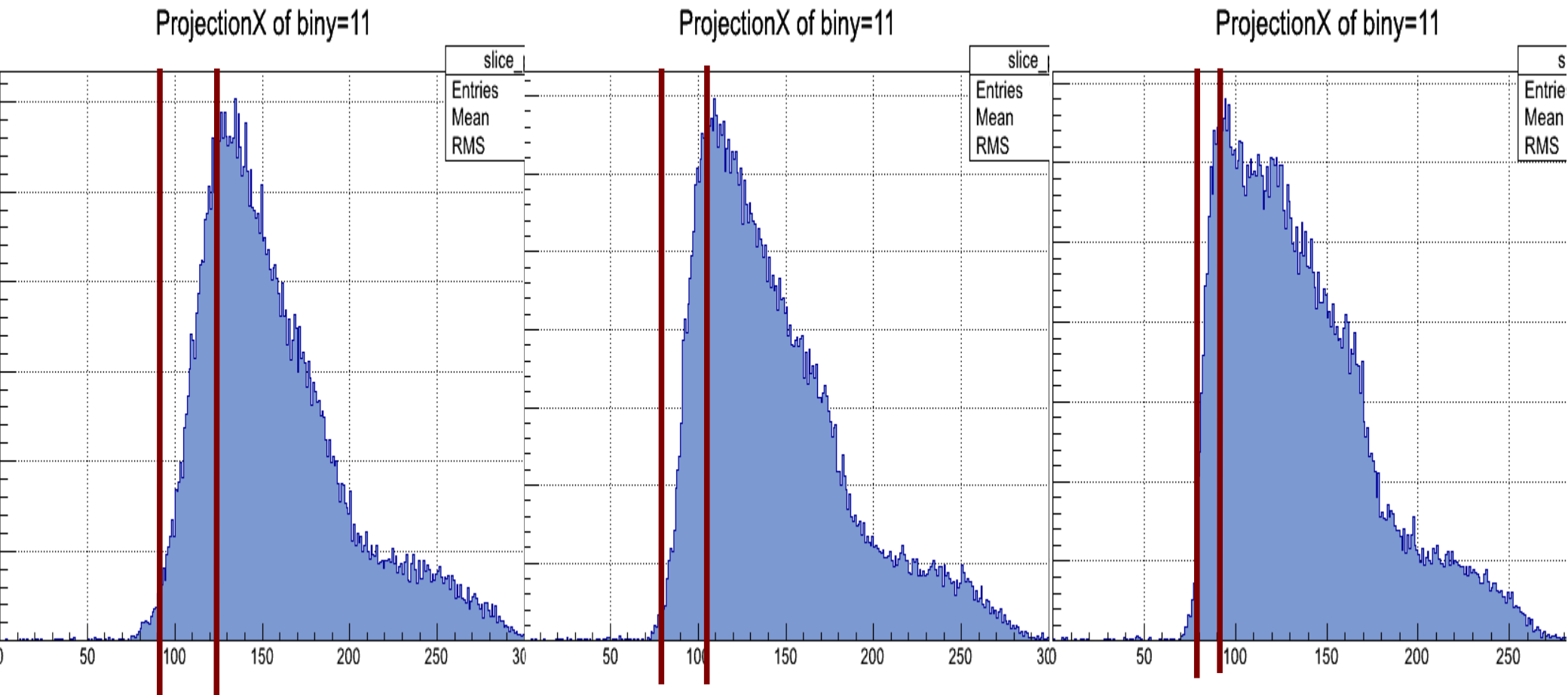
1900 V

Mean 90

124

145

Drift times- channel 11 vs HV



HV = 1700 V

$\Delta T = 30$ ns

1800 V

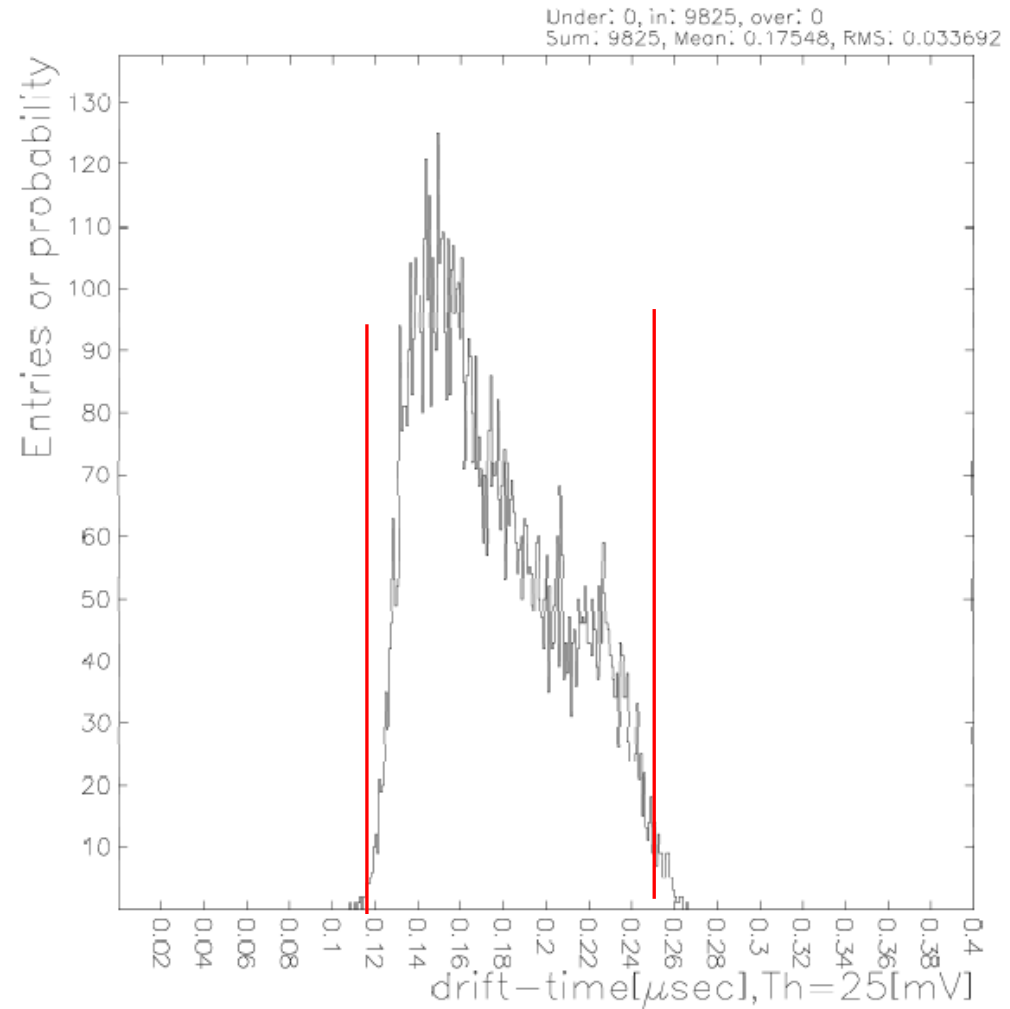
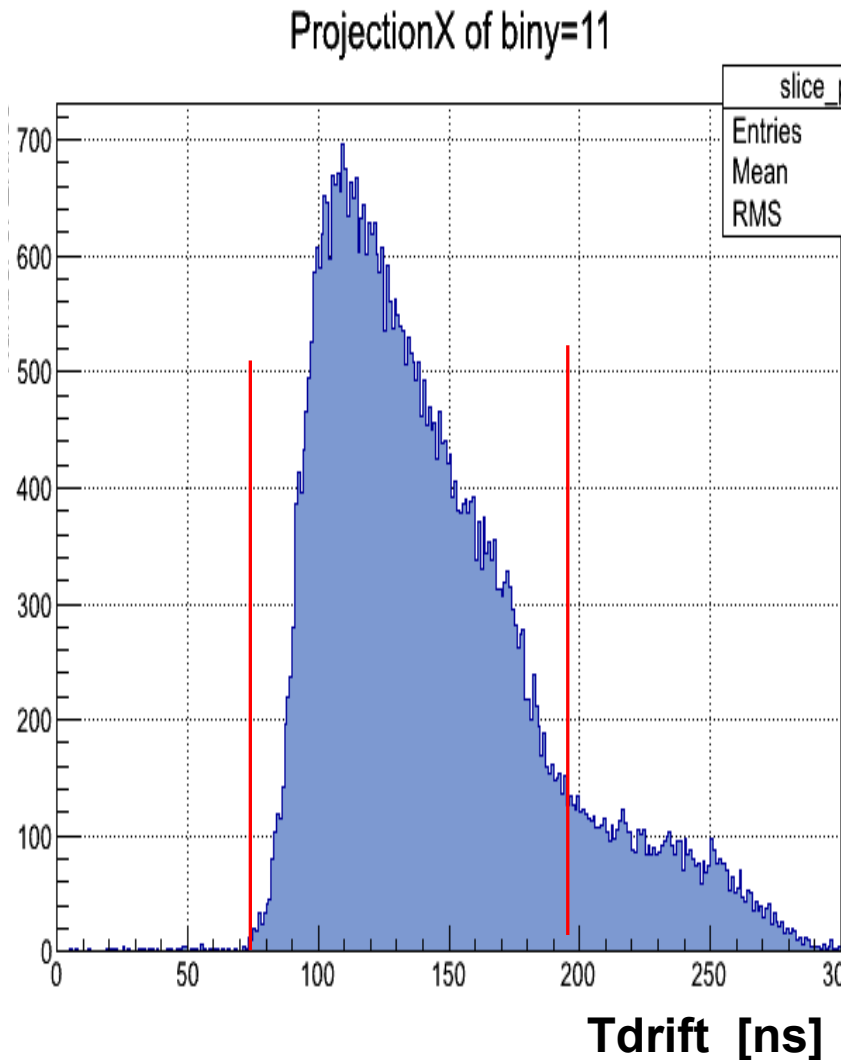
$\Delta T = 20$ ns

1900 V

$\Delta T = 10$ ns

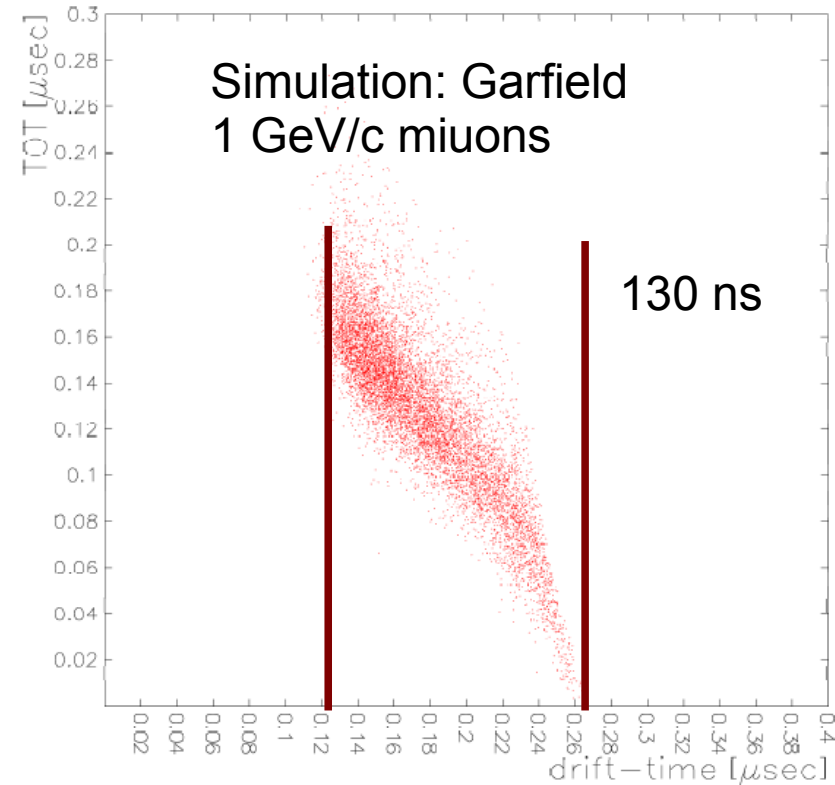
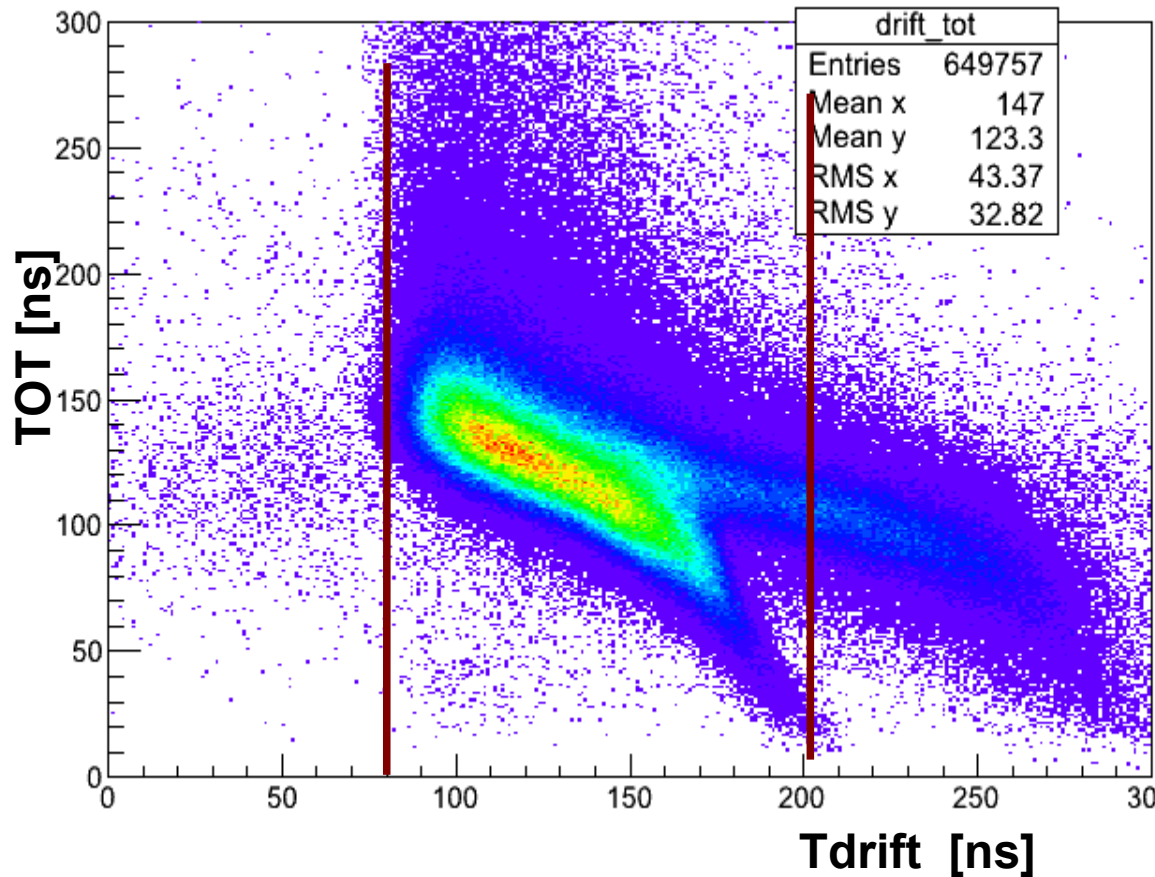
- Steeper rising for higher HV

Comparioson to simulation (Garfield+FEE transfer function)



TOT vs Tdrift -all straws (NS>13)

drift time vs TOT



The problem: second leg structure in TDrift > 130 ns !!

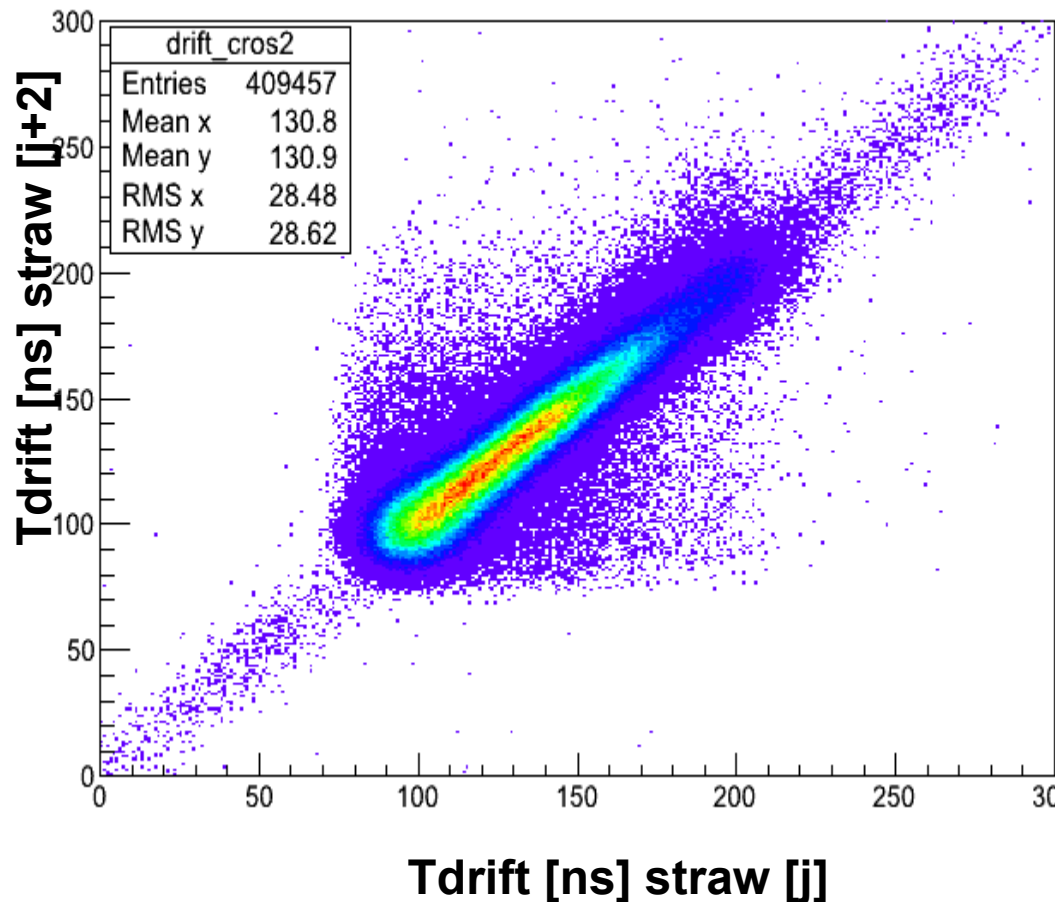
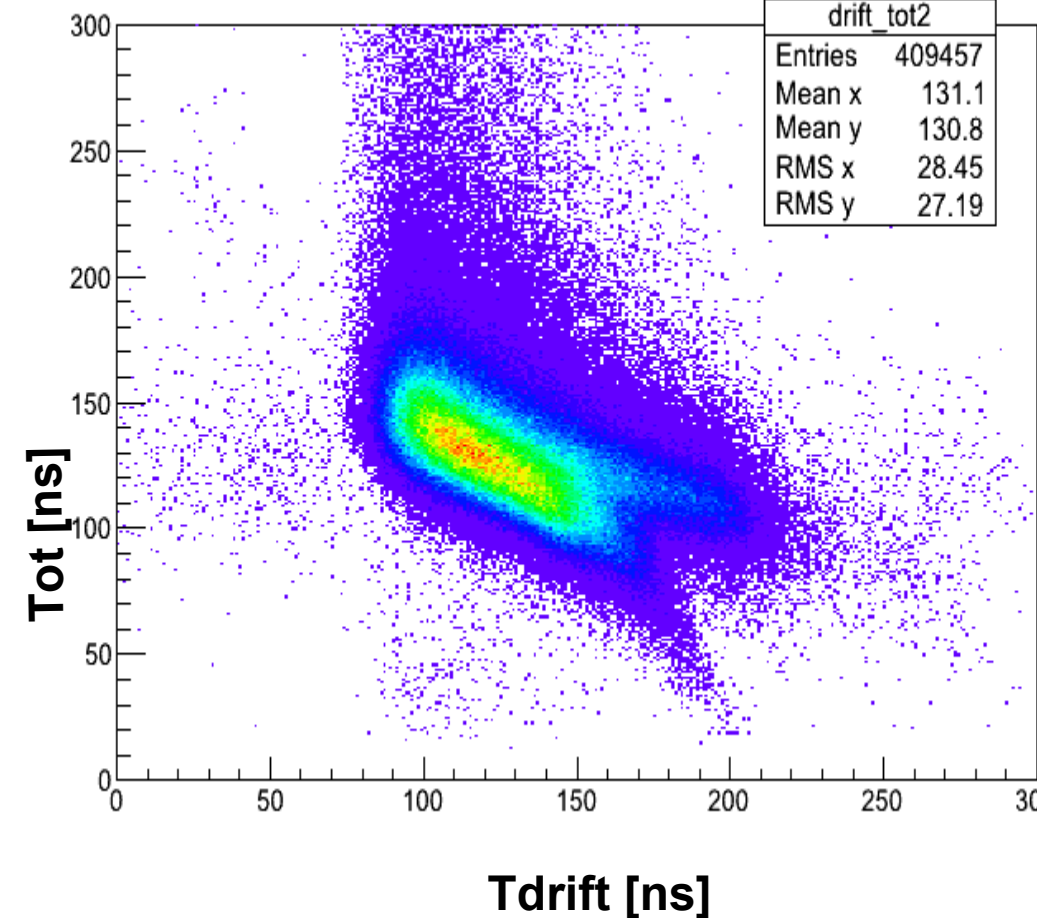
Possible explanation: pile-up due to micro bunch structure of beam: one beam particle makes trigger the second one (within 100 ns trigger window) crosses straws and makes delayed (by max 100 ns) distribution

TOT vs TDrift: straws in one layer (j,j+2,j+4)

drift time vs TOT

HV 1800 V

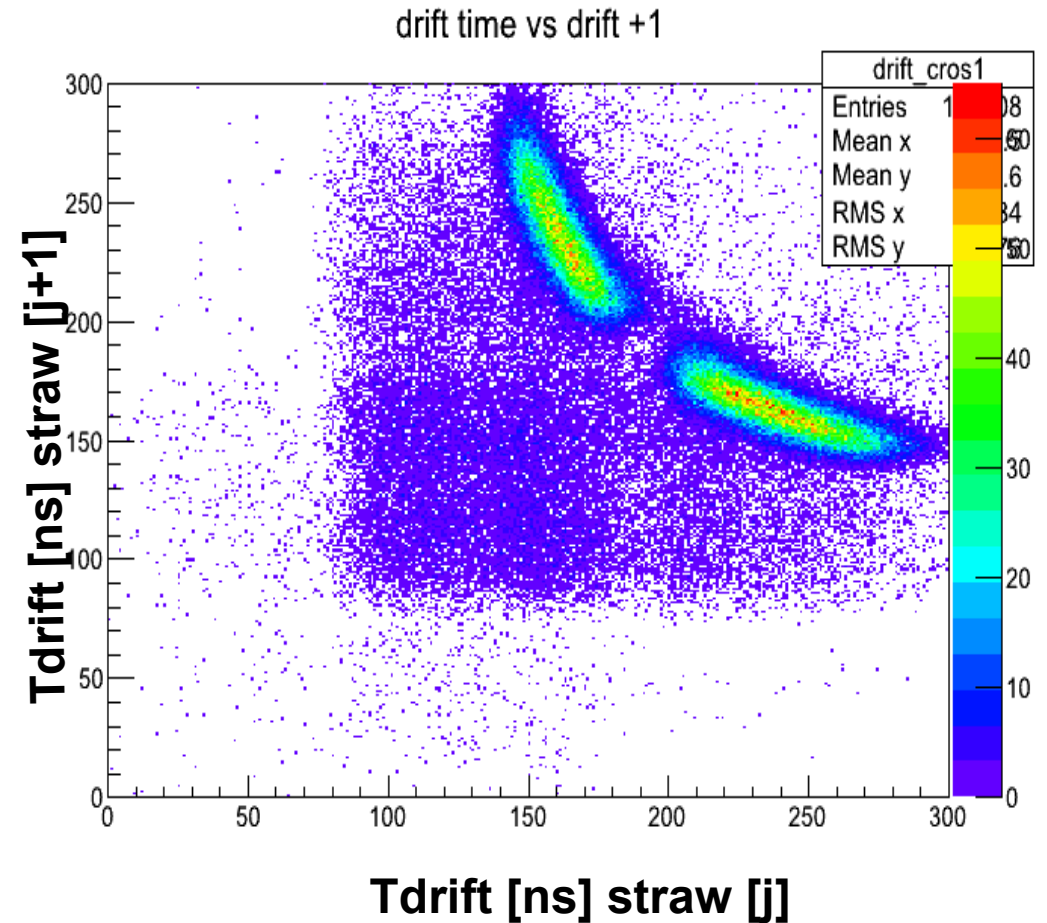
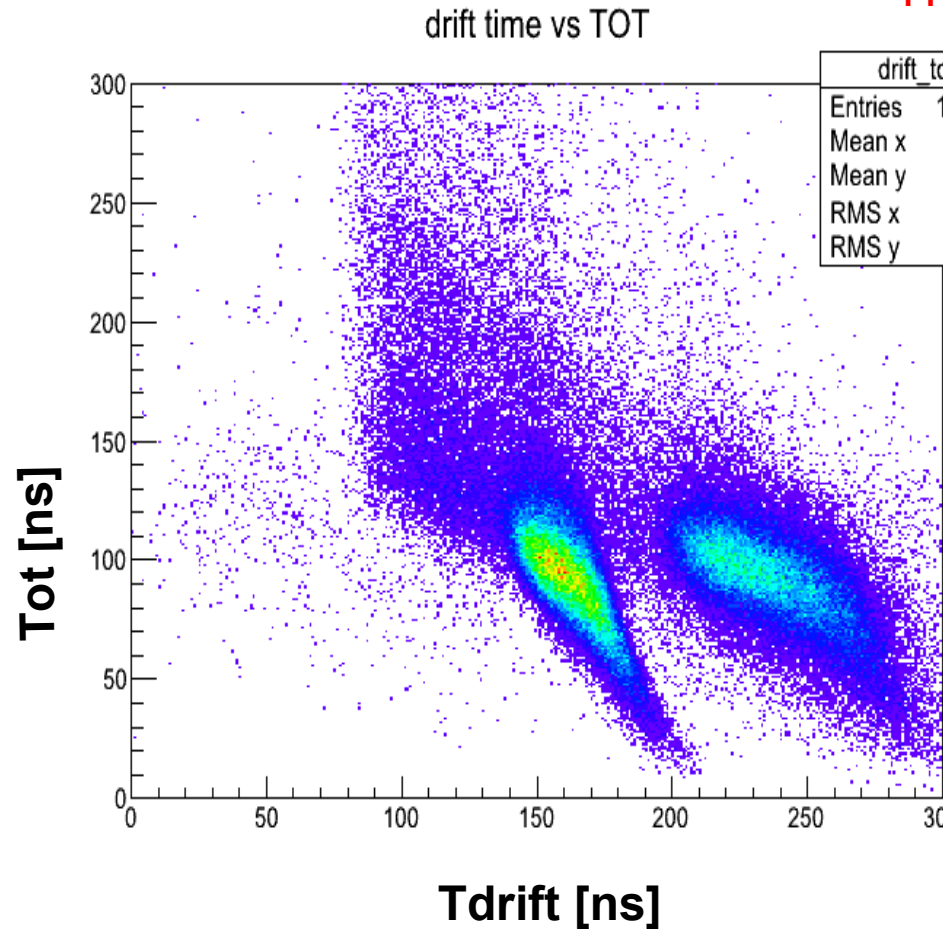
drift time vs drift +2



Tracks crossing ONLY one layer (upper one) : nice correlation visible

TOT vs Tdrif: straws in one layer (j,j+1,j-1),..)

HV 1800 V



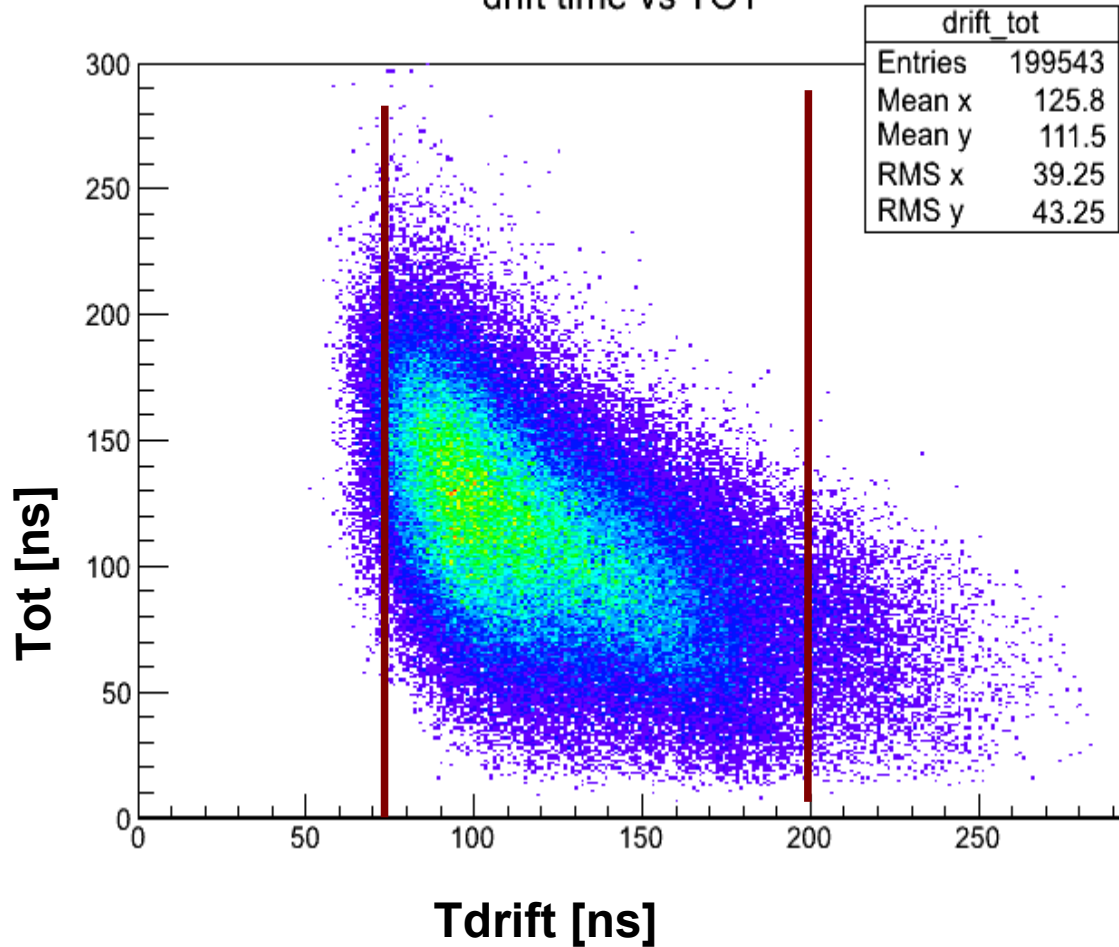
Tracks crossing TWO layers (upper and lower one)

35 % of one layer events (much more than expected from geometry ~15%)

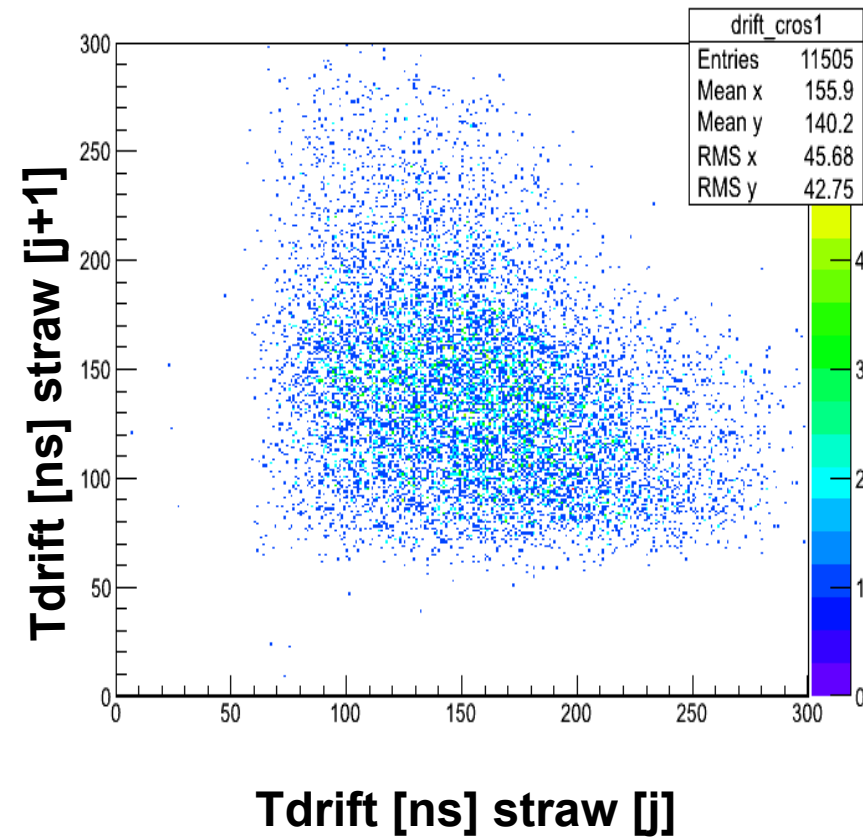
Second structure more pronounced

Cross check with Sr90

drift time vs TOT



drift time vs drift +1

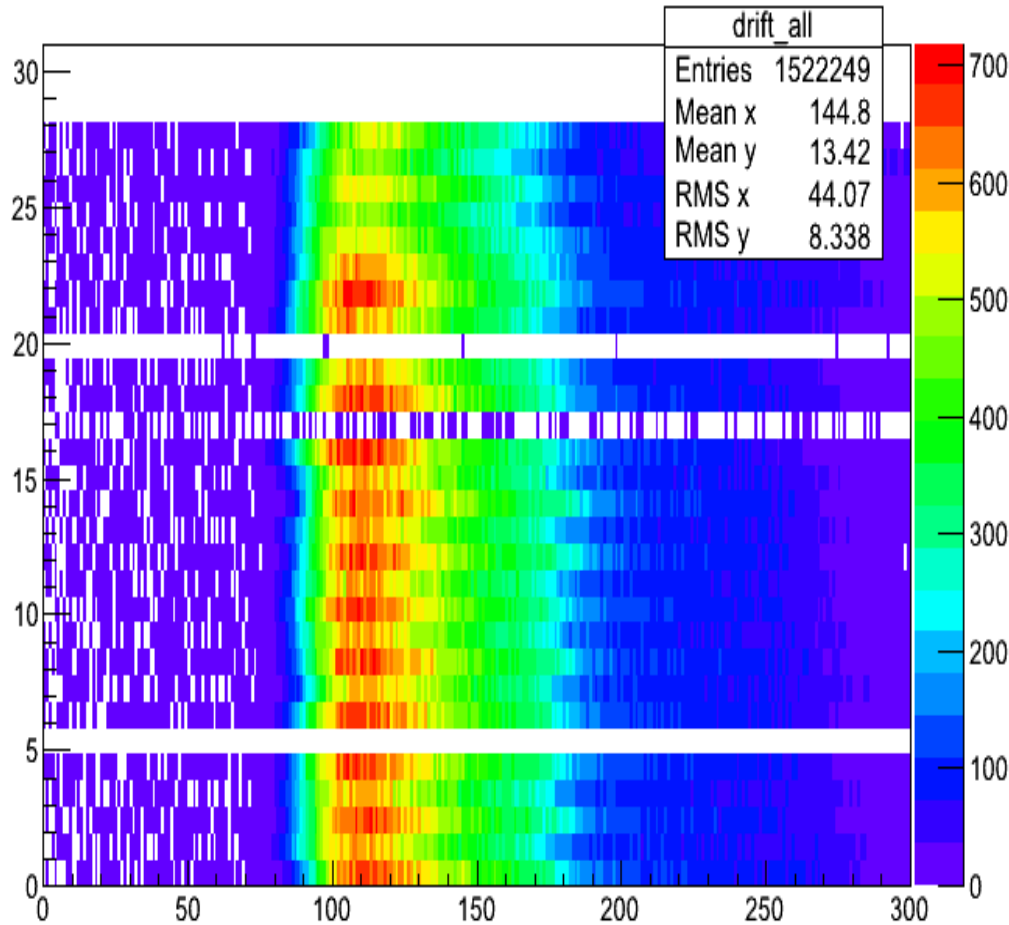


10% of one layer events

Kraków set-up with trigger as in Juelich test
No second leg visible
distributions more smear-out (low energy electrons)

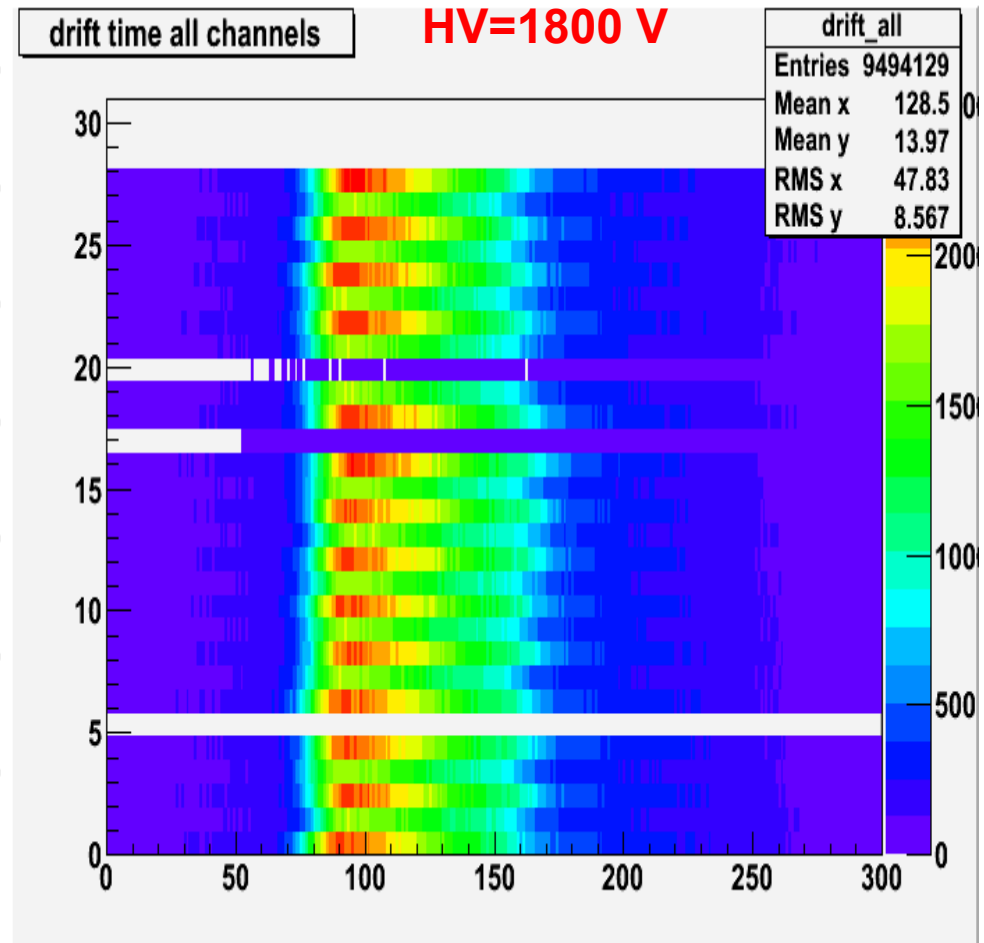
Comparison to results from december test (0.6 GeV protons)

drift time all channels



September

beam crosses both layers almost evenly

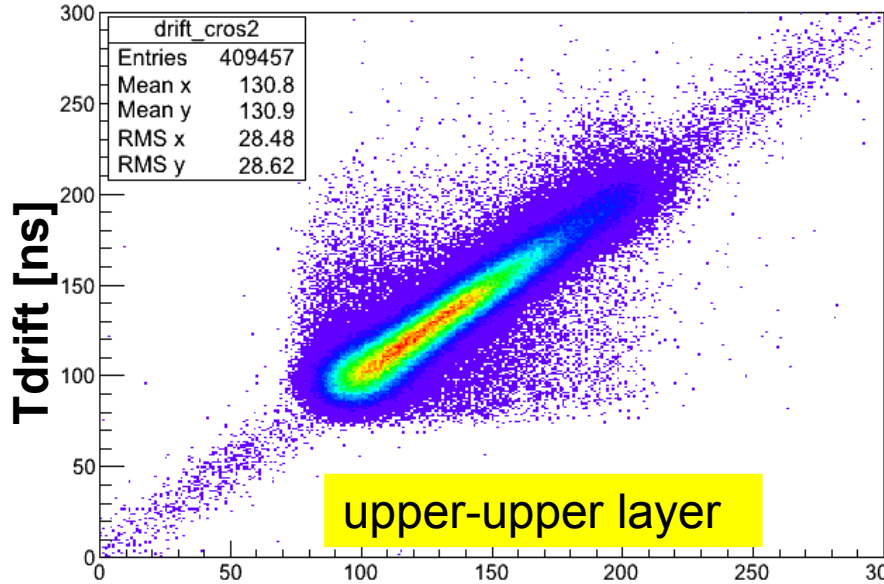


December

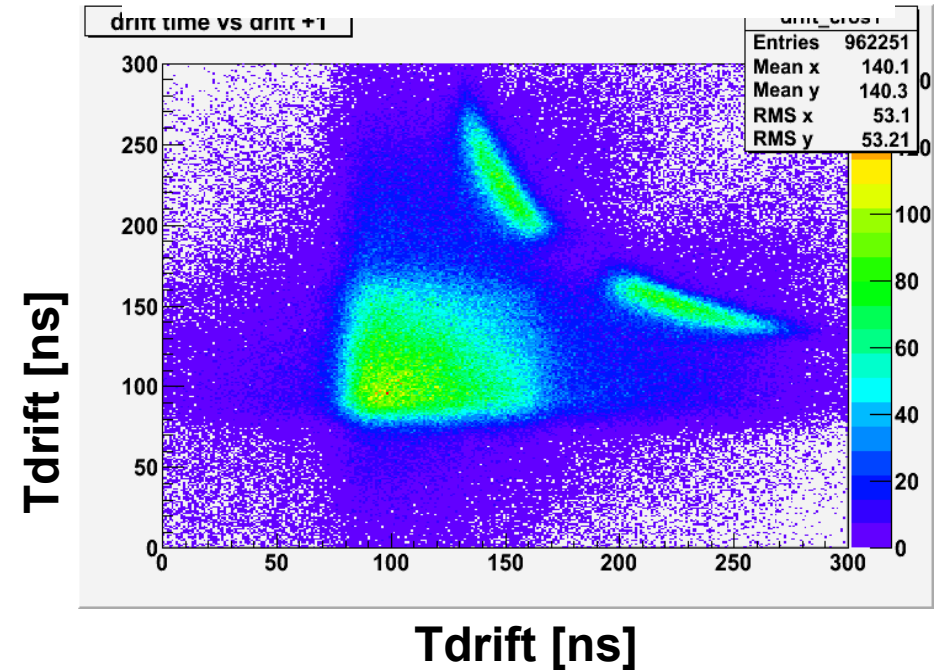
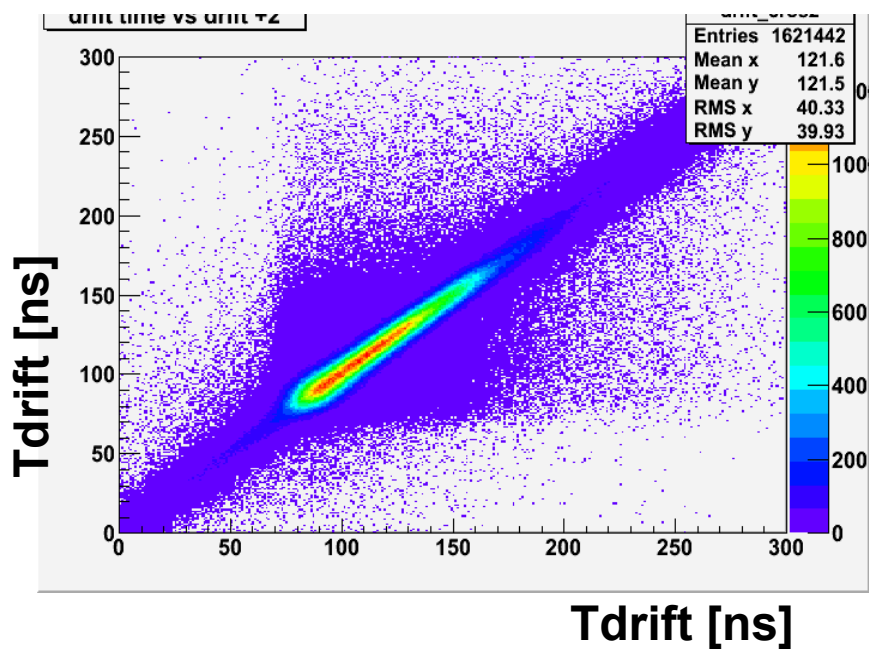
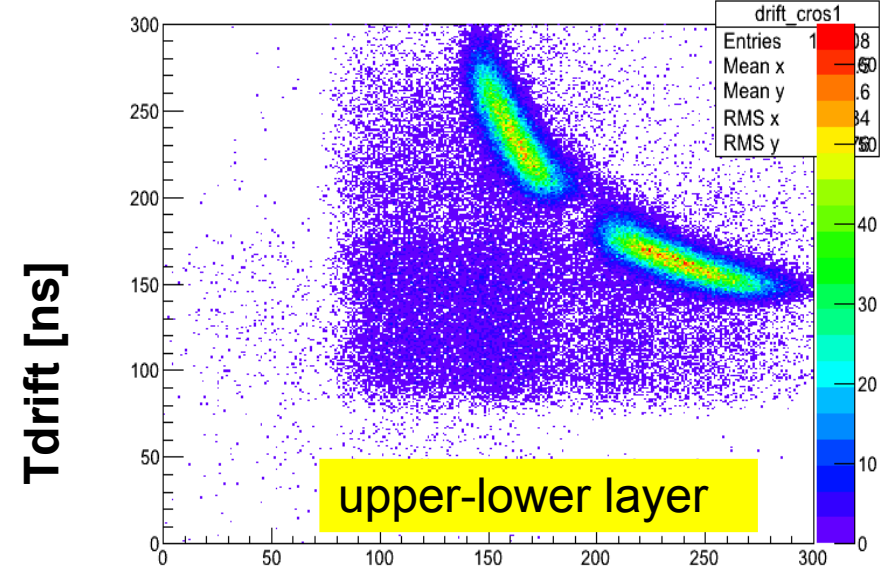
beam crosses more upper layer
various Pramp gain tested

Comparison of cross correlations

drift time vs drift +2



drift time vs drift +1

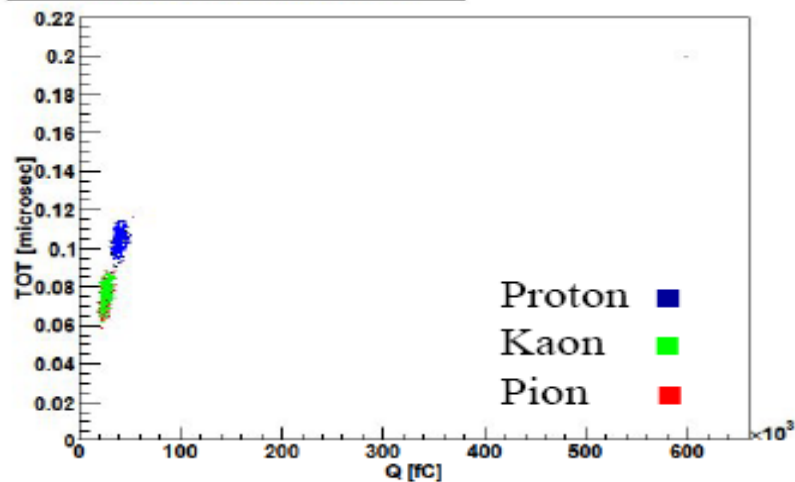


TOT : reminder II: simulation results

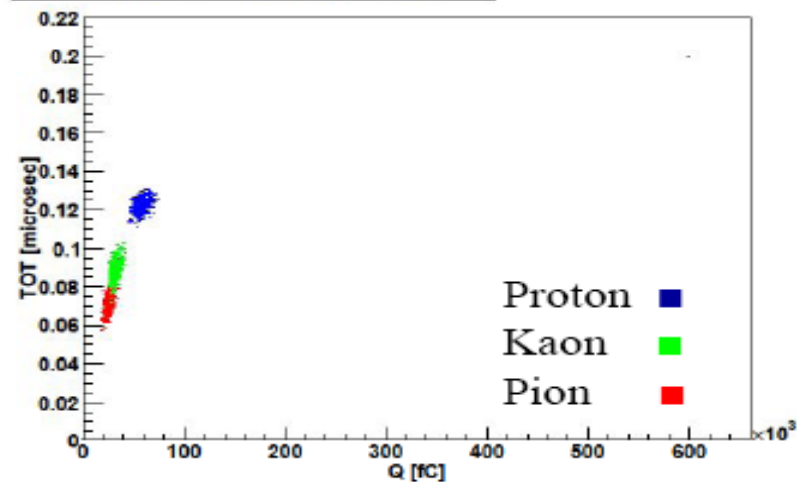
Sadigheh Jowzaee
Garfiled + FEE transfer function
threshold = 100 μA

TOT vs. Charge (Threshold=100 μA)

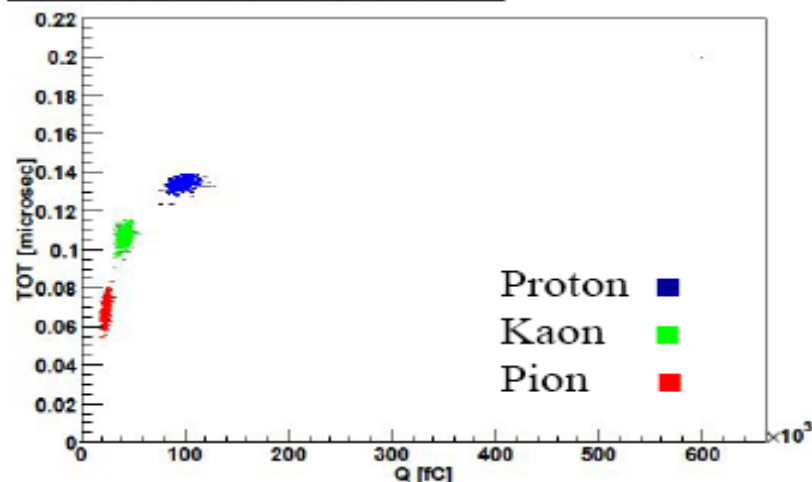
TOT vs Q, Th=100 μA , p=1 GeV/c



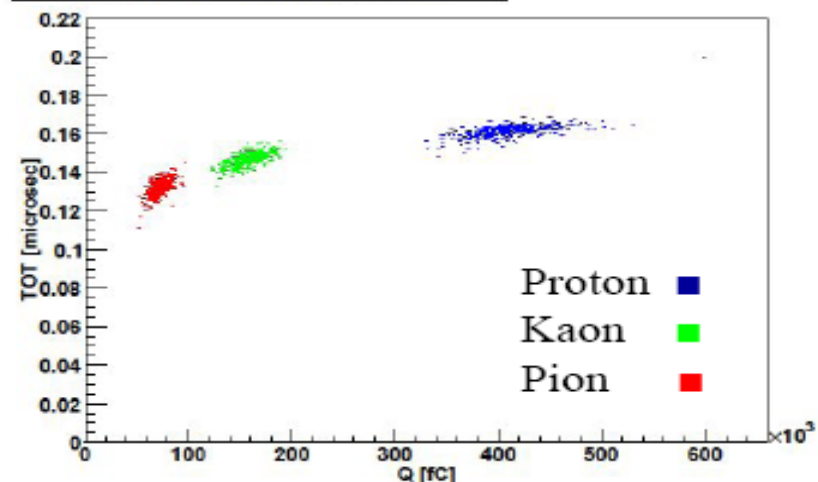
TOT vs Q, Th=100 μA , p=0.7 GeV/c



TOT vs Q, Th=100 μA , p=0.5 GeV/c

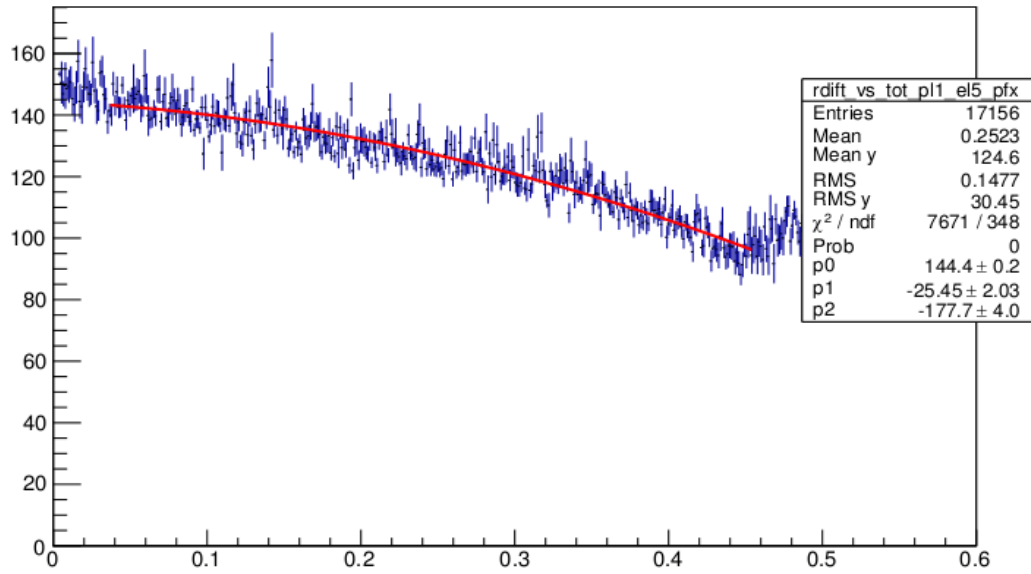


TOT vs Q, Th=100 μA , p=0.4 GeV/c

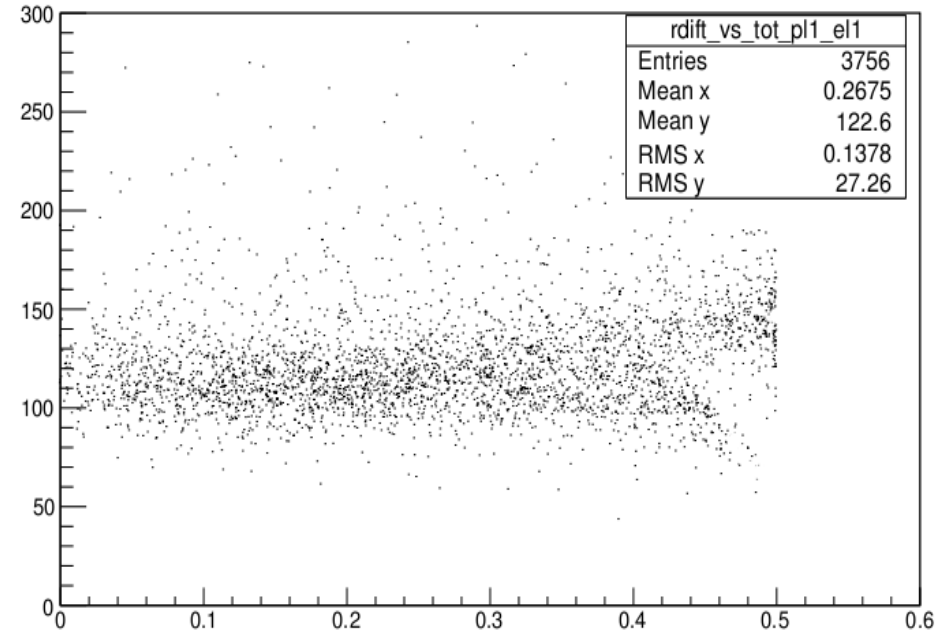


TOT vs rdrift : calibration

rdift_vs_tot_pl1_el5

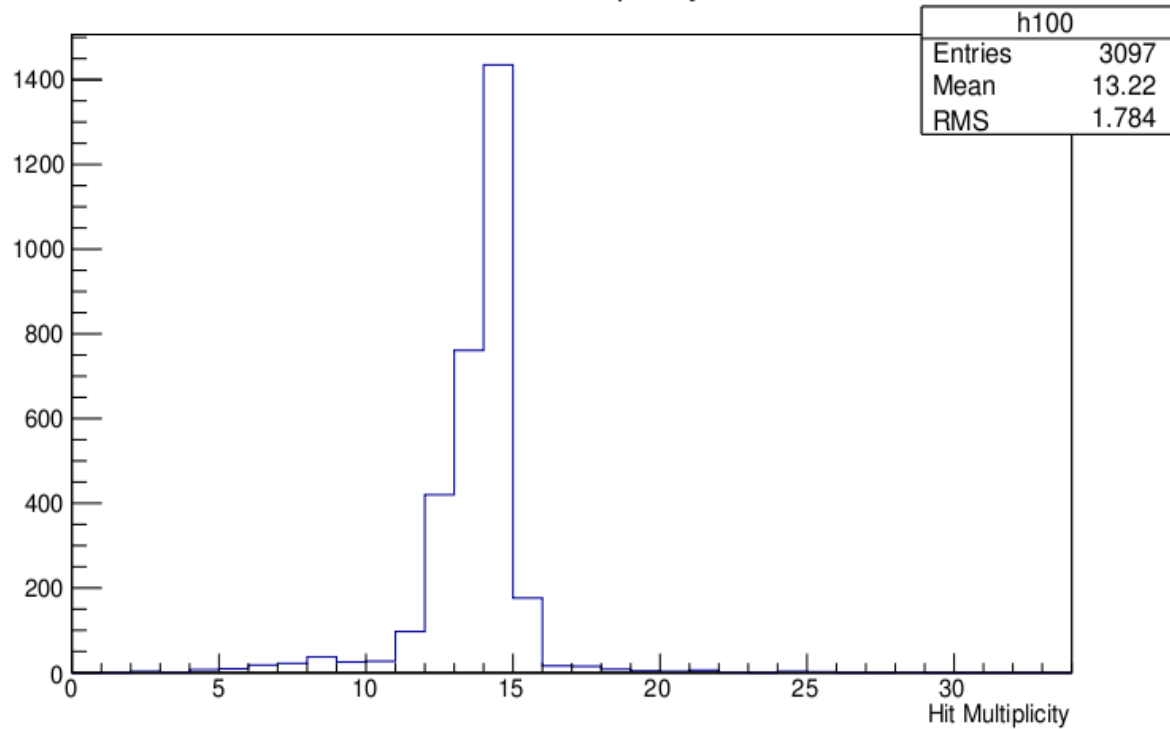


rdift_vs_tot_pl1_el1

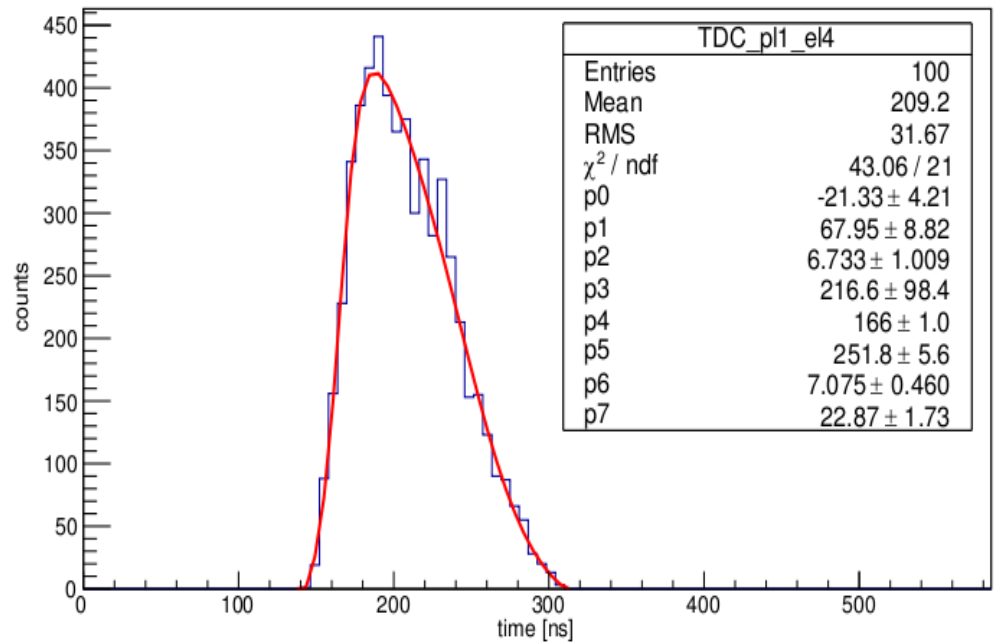


HV = 1800 V

Sr, Hit Multiplicity



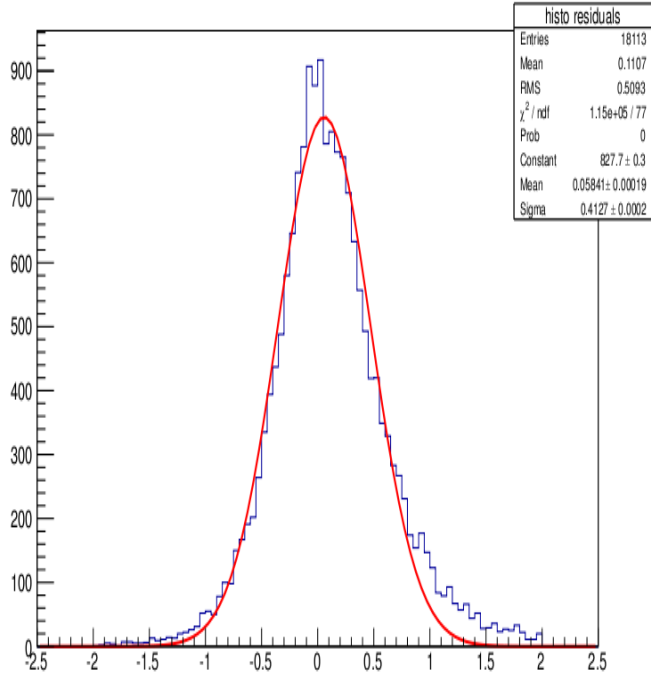
TDC_pl1_e14



Spatial resolution

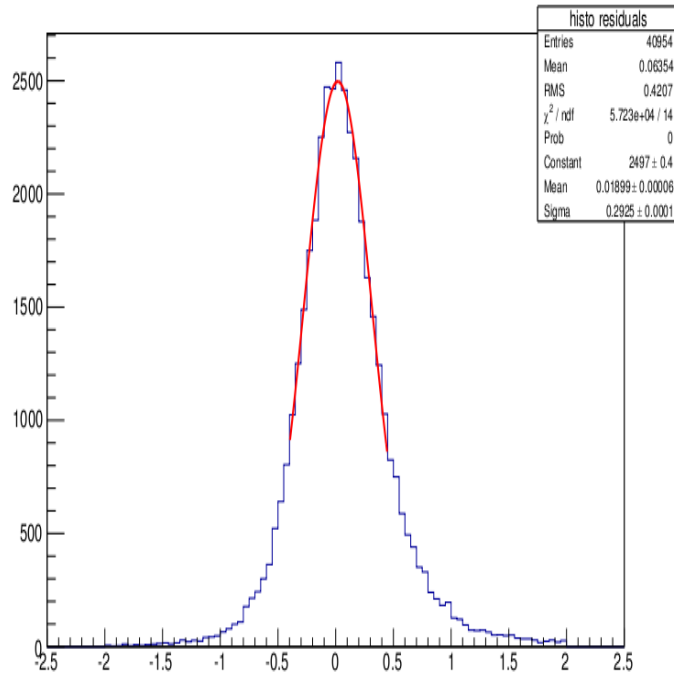
1750V

histo residuals



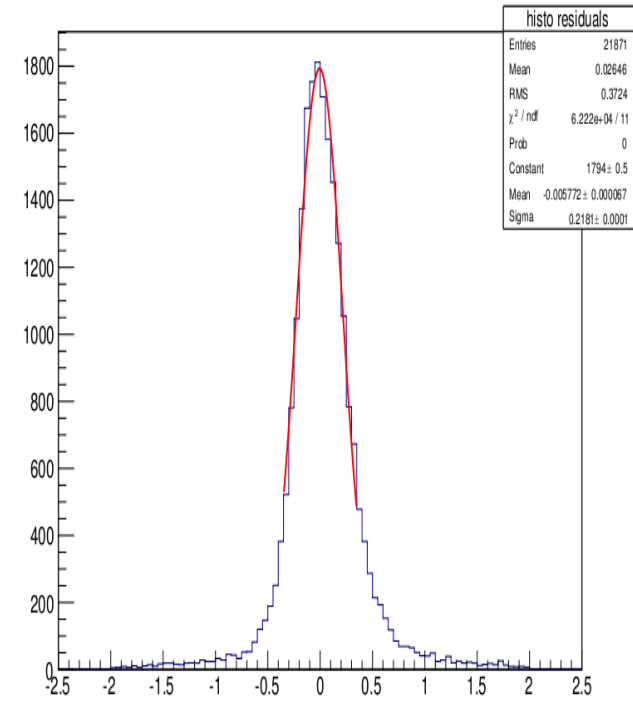
1800V

histo residuals



1900V

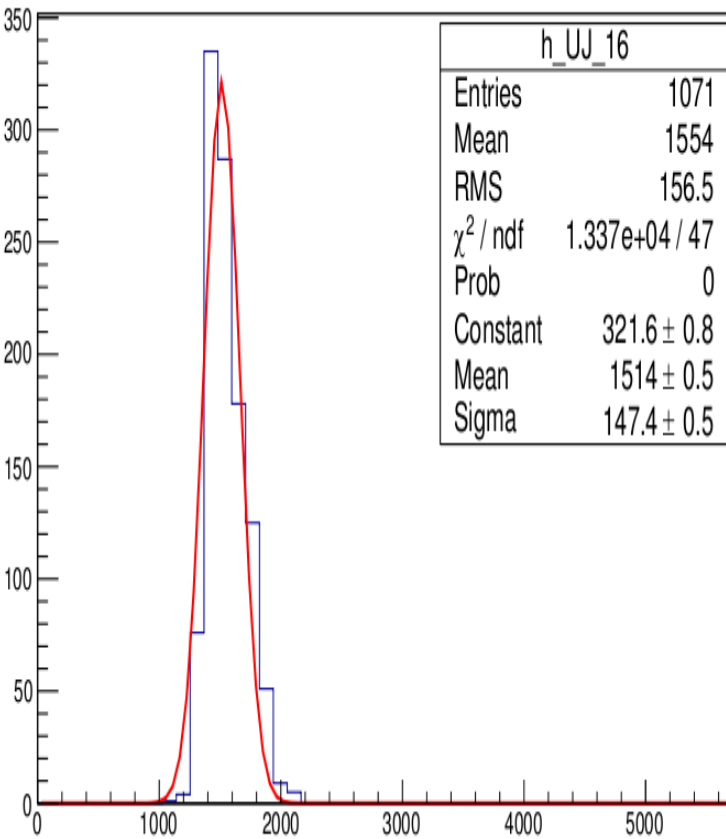
histo residuals



ToT 14 straw tracks

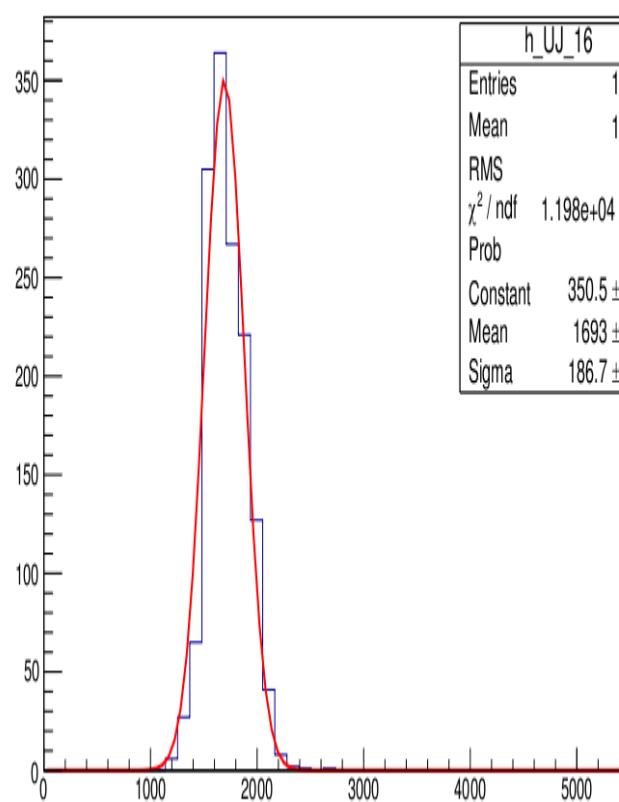
1750V

tot 14 straws



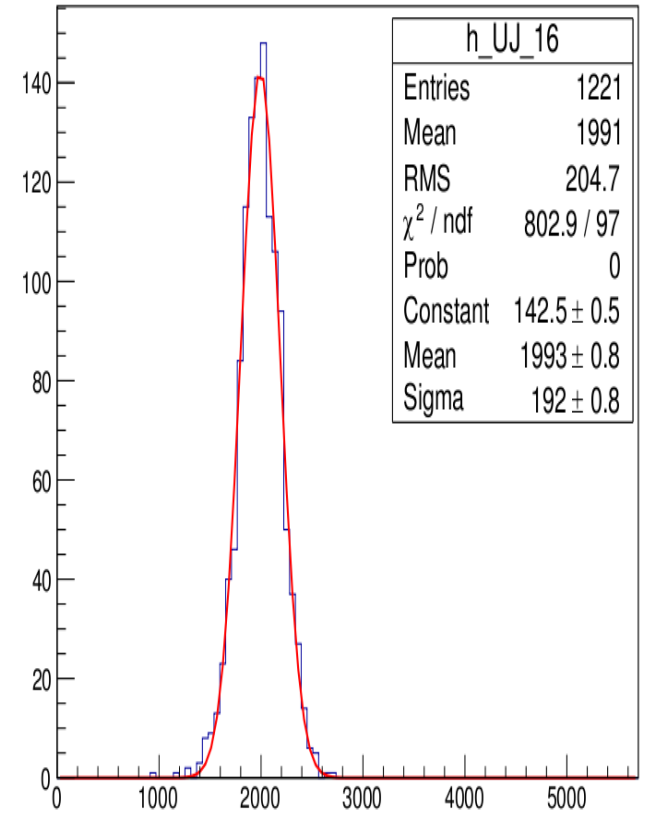
1800V

tot 14 straws



1900V

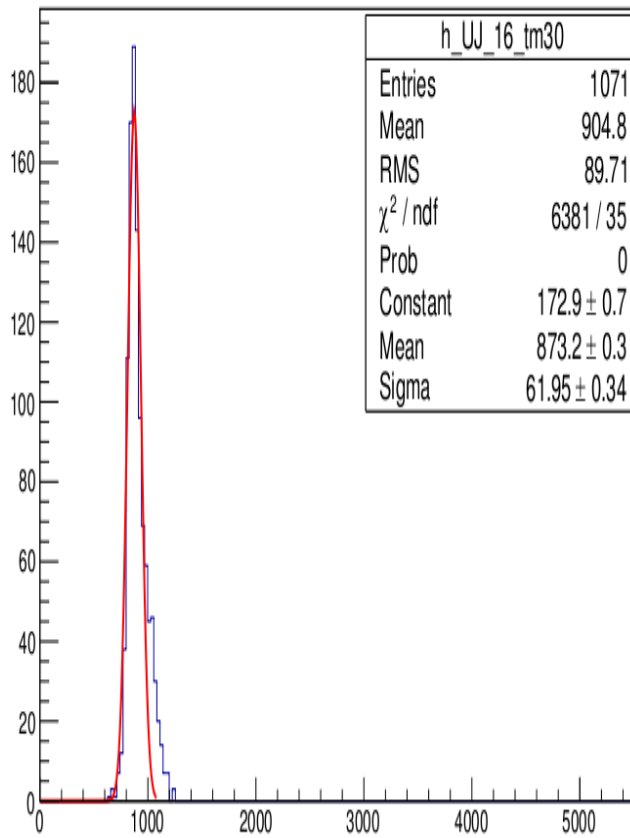
tot 14 straws



TM30

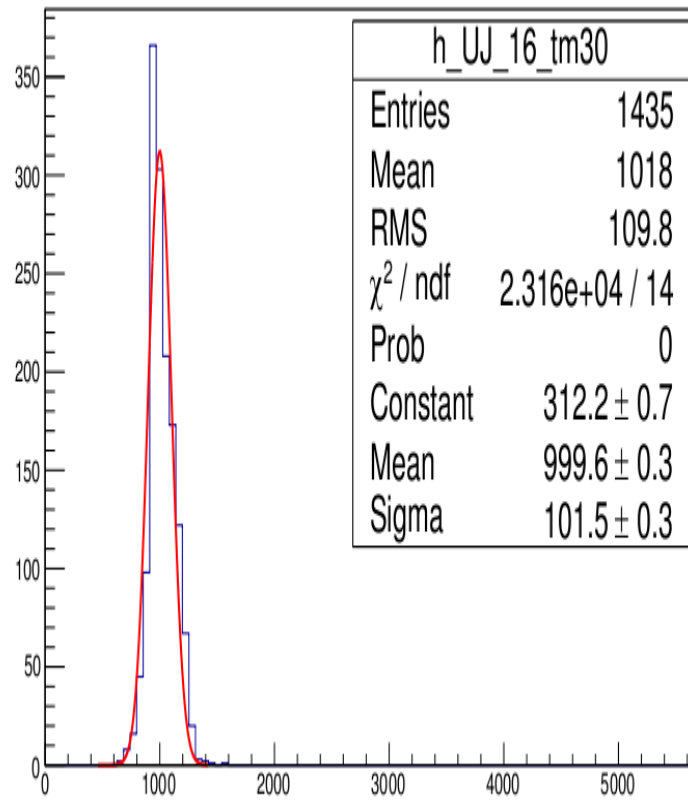
1750V

tot 14 straws tm30



1800V

tot 14 straws tm30



1900V

tot 14 straws tm30

