

Time Calibration Updates

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Current Status of Time Calibrations

- ▶ Time walk was originally a 60 ns effect
- ▶ After two iterations of corrections, it is down to 10 ns effect
- ▶ Propagation speed also needed for μ TPC
- ▶ Inconsistent results between simulation, direct measurement, and cosmic ray data

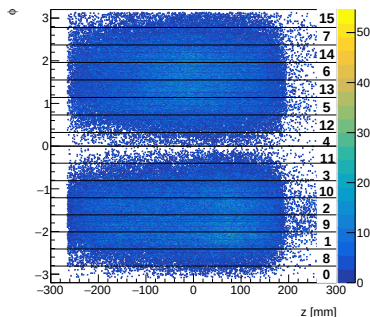
Measurement	$\times$ Strips	v Strips
Layer 2 Direct Measurement	$(0.51 \pm 0.05)c$	$(0.59 \pm 0.05)c$
Layer 3 Direct Measurement	$(0.35 \pm 0.04)c$	$(0.57 \pm 0.05)c$
Simulation	$0.36c$	$0.57c$
Layer 1 Cosmic Ray	$(0.24 \pm 0.06)c$	$(0.51 \pm 0.17)c$
Layer 2 Cosmic Ray	$(0.28 \pm 0.03)c$	$(0.20 \pm 0.04)c$

- ▶ Cosmic ray data also suffers from larger uncertainty
- ▶ Now my results only use FEBs with positive velocities in combined layer result (except layer 1 v)

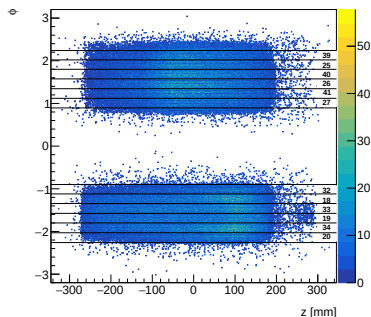
Review of Method

- ▶ Runs 11-17 after two iterations of time walk/reference
- ▶ z position from charge centroid method of CgemClusterCreate
- ▶ Reject noise with CgemLineFit ($\chi^2 < 300$), include alignment
- ▶ Require strip charge > 10 fC
- ▶ For Layer 1, use all FEBs except 15, 4, 11, 0
- ▶ For Layer 2, use FEBs 18-20, 25-27, 32-34, 39-41

Run 17 Layer 1: ϕ versus z

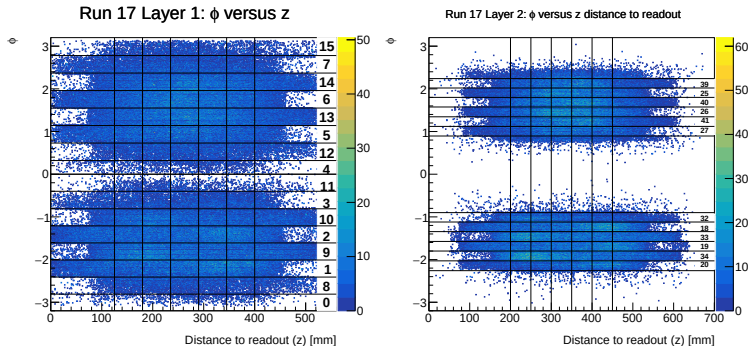


Run 17 Layer 2: ϕ versus z



Review of Method

► Bin in distance to readout and fit time distributions



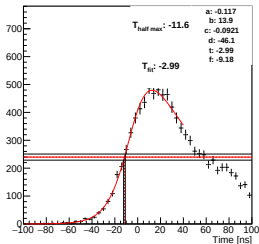
► Fit with usual function:

$$a + \frac{b \cdot e^{-c \cdot (x-d)}}{1 + e^{-(x-t)/f}}$$

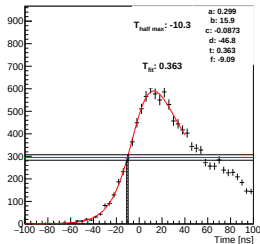
- Use time at half max instead of parameter t
- Gives more stable results, more intuitive
- Uncertainty in max propagated to find uncertainty in time

Example: Layer 1 FEB 2 x Results

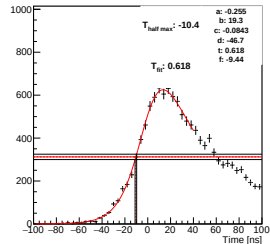
Readout 2 Time, 125<d<180 mm



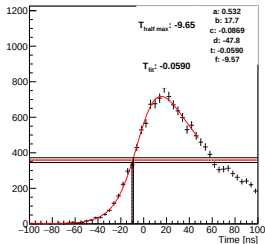
Readout 2 Time, 180<d<235 mm



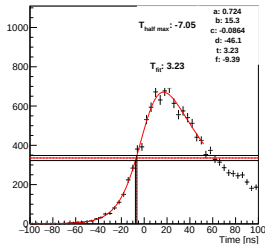
Readout 2 Time, 235<d<290 mm



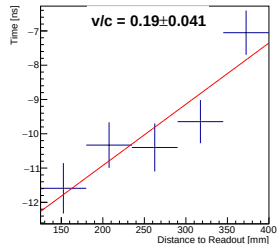
Readout 2 Time, 290<d<345 mm



Readout 2 Time, 345<d<400 mm



Time at Half Max (fit) versus Distance to Readout 2

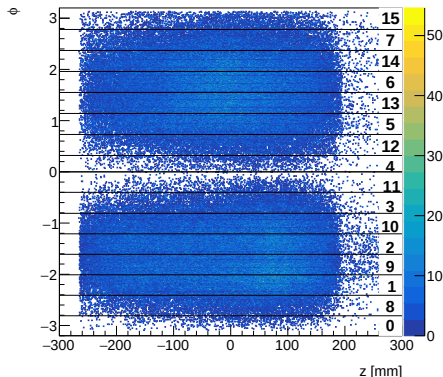


Layer 1 x Results

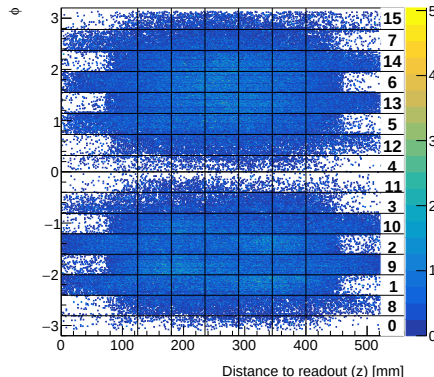
Feb	(v/c)	Readout Side	GEMROC
0	low statistics	West	0
1	0.31 ± 0.12	West	0
2	0.19 ± 0.04	West	0
3	0.27 ± 0.15	West	0
4	low statistics	West	1
5	0.21 ± 0.06	West	1
6	0.58 ± 0.39	West	1
7	0.12 ± 0.03	West	1
8	-0.11 ± 0.05	East	2
9	-0.60 ± 0.43	East	2
10	-0.15 ± 0.03	East	2
11	low statistics	East	2
12	-0.20 ± 0.12	East	3
13	-0.44 ± 0.24	East	3
14	-0.19 ± 0.05	East	3
15	low statistics	East	3

Mapping z to Distance to Readout Layer 1

Run 17 Layer 1: ϕ versus z



Run 17 Layer 1: ϕ versus z



FEB 0, 1, 2, 3, 4, 5, 6, 7 readout on west side

FEB 8, 9, 10, 11, 12, 13, 14, 15 readout on east side

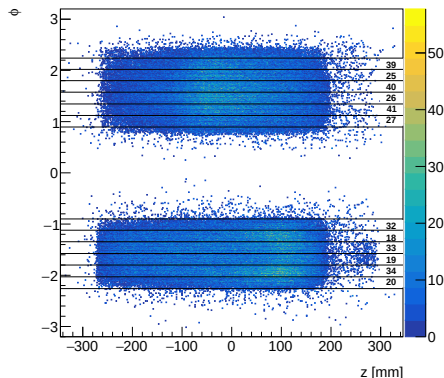
Distance to readout seems like it is mapped correctly

Layer 2 x Results

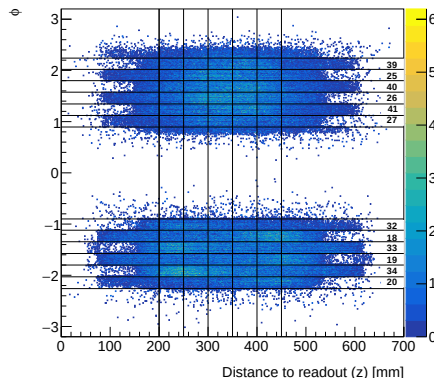
Feb	(ν/c)	Readout Side	GEMROC
18	0.13 ± 0.01	West	4
19	0.22 ± 0.04	West	4
20	0.31 ± 0.17	West	5
25	-2.1 ± 4.7	West	6
26	-0.20 ± 0.04	West	6
27	-0.20 ± 0.06	West	6
32	-0.13 ± 0.02	East	8
33	-0.23 ± 0.07	East	8
34	-0.43 ± 0.18	East	8
39	1.8 ± 4.9	East	9
40	0.31 ± 0.08	East	10
41	0.48 ± 0.24	East	10

Mapping z to Distance to Readout Layer 2

Run 17 Layer 2: ϕ versus z



Run 17 Layer 2: ϕ versus z distance to readout

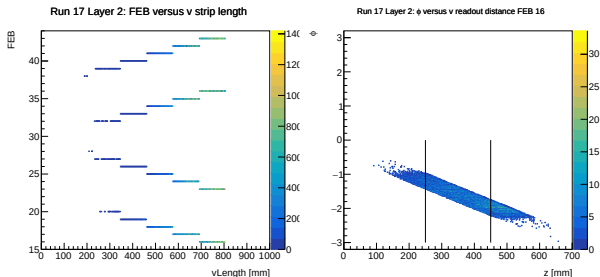


FEB 18, 19, 20, 25, 26, 27 readout on west side

FEB 32, 33, 34, 39, 40, 41 readout on east side

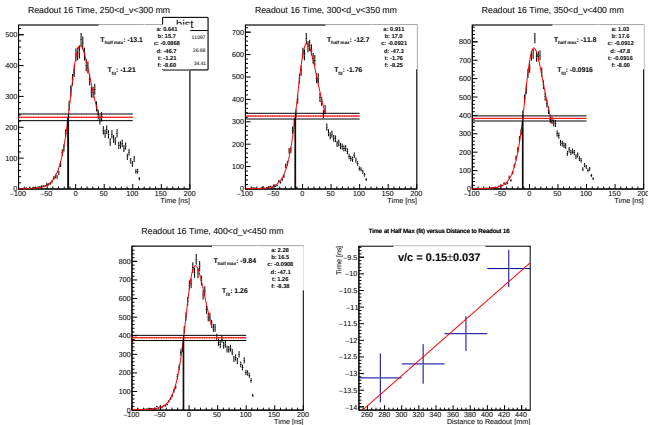
Distance to readout seems like it is mapped correctly

Issues with v strips



- ▶ With longest strips, still only have 200 mm of data (4 bins in distance)
- ▶ Try with FEB 16, 23, 36, 43

Results for Layer 2 v Strips (New)

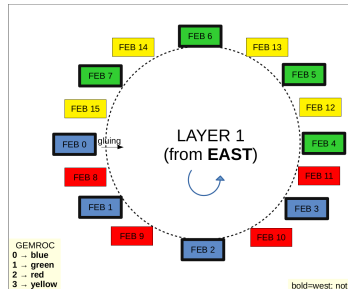
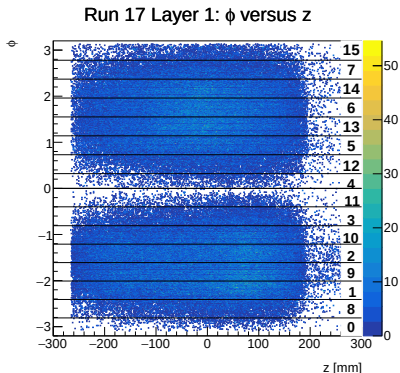


- ▶ FEB 16: $v = (0.15 \pm 0.04)$
- ▶ FEB 23: $v = (-0.07 \pm 0.01)c$
- ▶ FEB 36: $v = (-0.21 \pm 0.06)c$
- ▶ FEB 43: $v = (0.10 \pm 0.02)c$

Summary

- ▶ Combining FEBs with positive velocity, Layer 1 x , Layer 2 x and v have velocities between 0.2 and 0.28
- ▶ All FEBs used for Layer 1 v measurement, get $v=0.51$
- ▶ Half of all readouts give negative values
- ▶ Issue with mapping?
- ▶ Disagreement between hardware and documentation?

Layer 1 Mapping

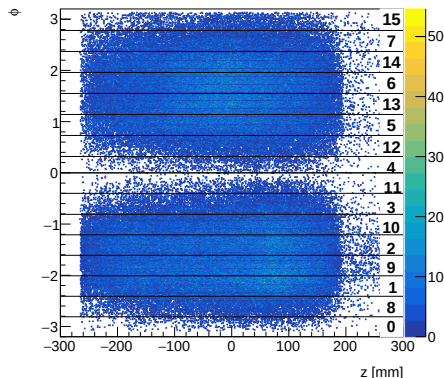


FEB 0, 1, 2, 3, 4, 5, 6, 7 readout on west side

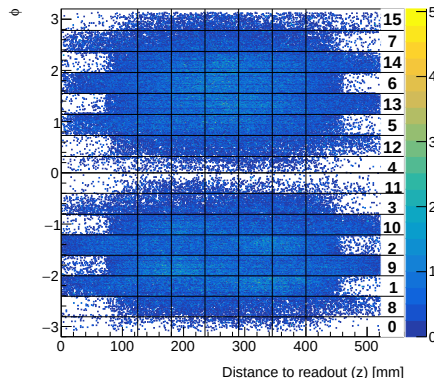
FEB 8, 9, 10, 11, 12, 13, 15, 15 readout on east side

Mapping z to Distance to Readout Layer 1

Run 17 Layer 1: ϕ versus z



Run 17 Layer 1: ϕ versus z



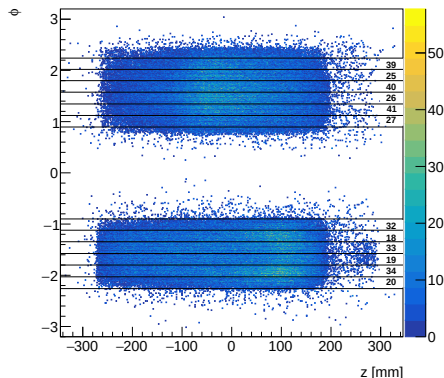
FEB 0, 1, 2, 3, 4, 5, 6, 7 readout on west side

FEB 8, 9, 10, 11, 12, 13, 14, 15 readout on east side

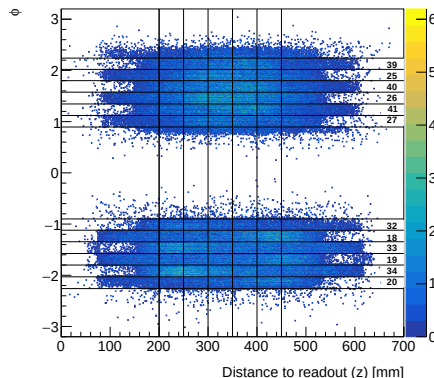
Distance to readout seems like it is mapped correctly

Mapping z to Distance to Readout Layer 2

Run 17 Layer 2: ϕ versus z



Run 17 Layer 2: ϕ versus z distance to readout



FEB 18, 19, 25, 26 readout on west side

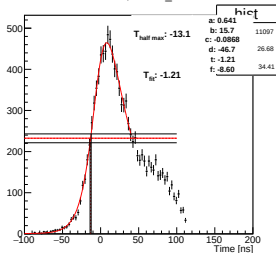
FEB 33, 34, 40, 41 readout on east side

Distance to readout seems like it is mapped correctly

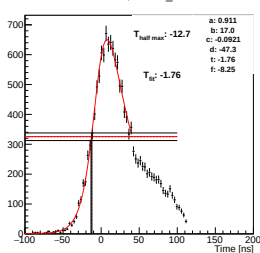
Layer 2 v Velocity Results For Each FEB

Layer 2 FEB 16 v Velocity Calculation

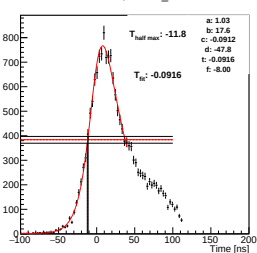
Readout 16 Time, 250<d_v<300 mm



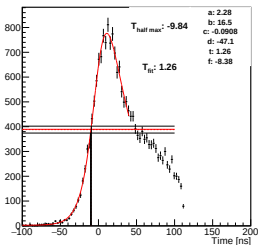
Readout 16 Time, 300<d_v<350 mm



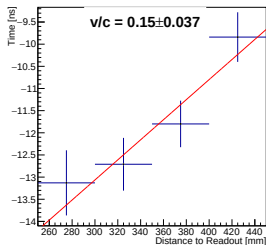
Readout 16 Time, 350<d_v<400 mm



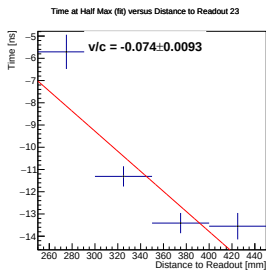
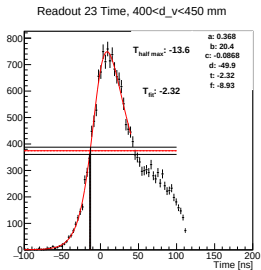
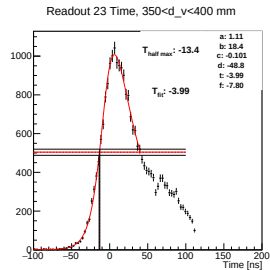
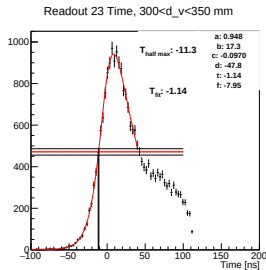
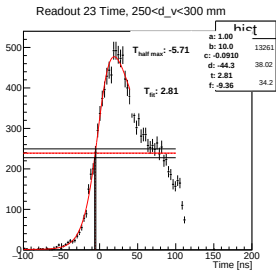
Readout 16 Time, 400<d_v<450 mm



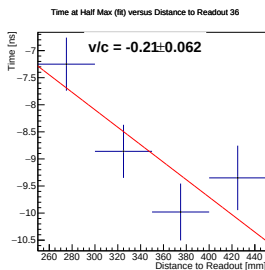
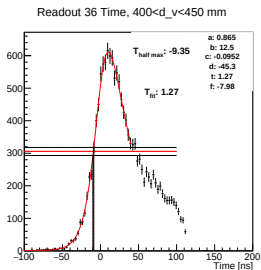
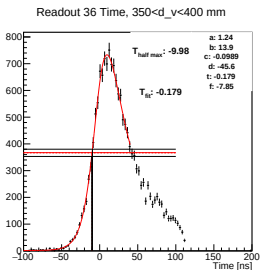
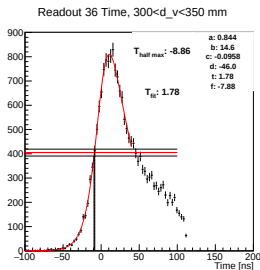
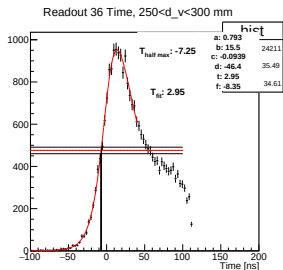
Time at Half Max (fit) versus Distance to Readout 16



Layer 2 FEB 23 v Velocity Calculation

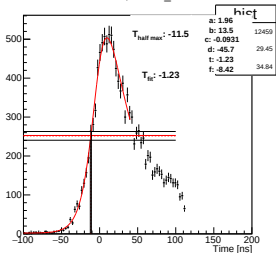


Layer 2 FEB 36 v Velocity Calculation

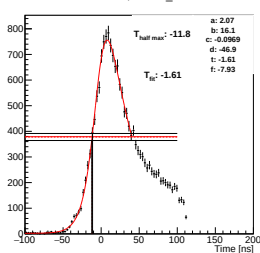


Layer 2 FEB 43 v Velocity Calculation

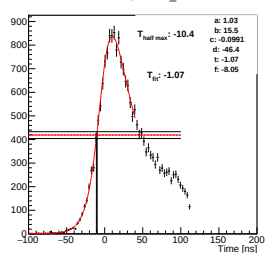
Readout 43 Time, 250<d_v<300 mm



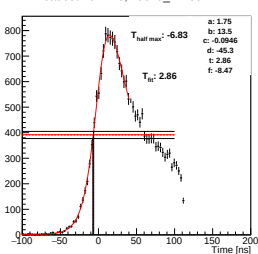
Readout 43 Time, 300<d_v<350 mm



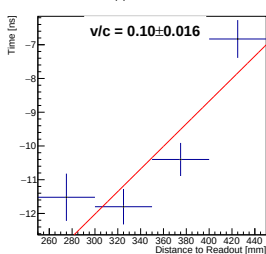
Readout 43 Time, 350<d_v<400 mm



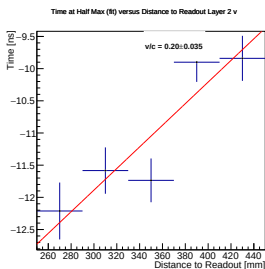
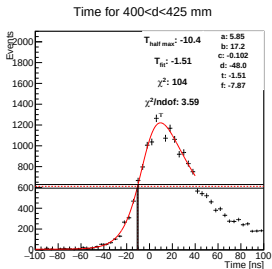
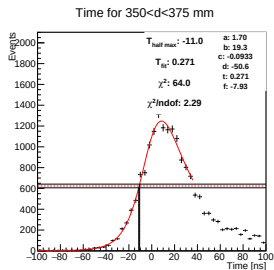
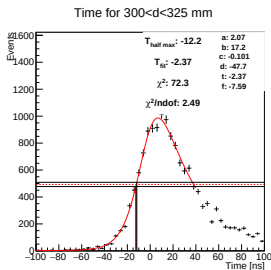
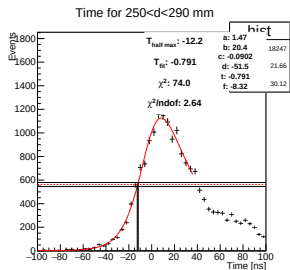
Readout 43 Time, 400<d_v<450 mm



Time at Half Max (fit) versus Distance to Readout 43

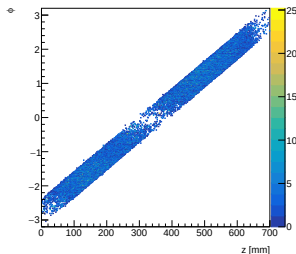


Layer 2 FEB 16 and 43 Combined v Velocity

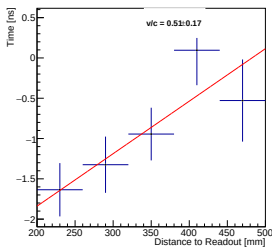


Layer 1 v Velocity Results All FEBs Combined

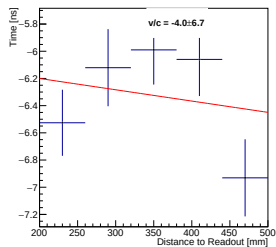
Run 17 Layer 1: ϕ versus v readout distance FEB 0



Fit Time versus Distance to Readout Layer 1 v



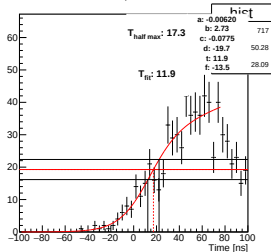
Fit Time at Half Max versus Distance to Readout Layer 1 v



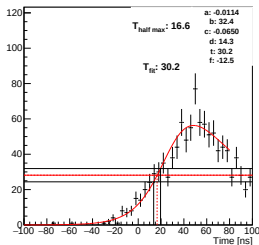
Layer 1 x Velocity Results For Each FEB

Layer 1 FEB 0

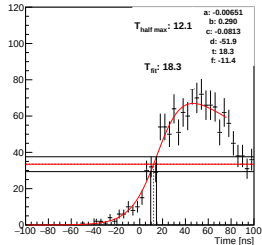
Readout 0 Time, 125<d<180 mm



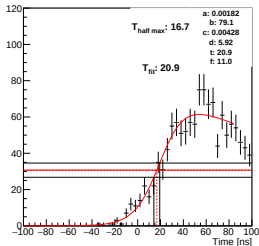
Readout 0 Time, 180<d<235 mm



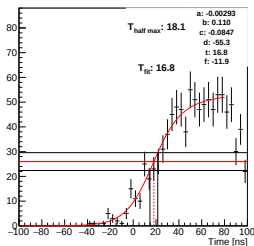
Readout 0 Time, 235<d<290 mm



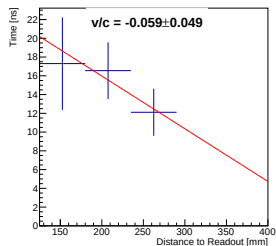
Readout 0 Time, 290<d<345 mm



Readout 0 Time, 345<d<400 mm

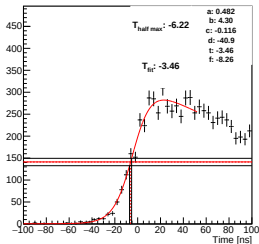


Time at Half Max (fit) versus Distance to Readout 0

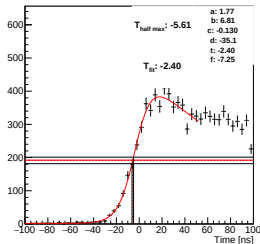


Layer 1 FEB 1

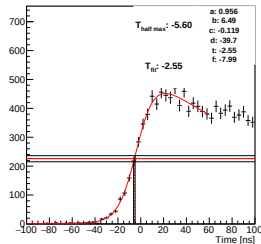
Readout 1 Time, 125<d<180 mm



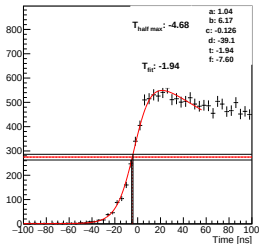
Readout 1 Time, 180<d<235 mm



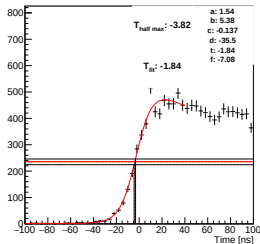
Readout 1 Time, 235<d<290 mm



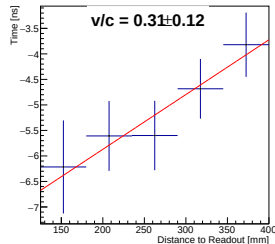
Readout 1 Time, 290<d<345 mm



Readout 1 Time, 345<d<400 mm

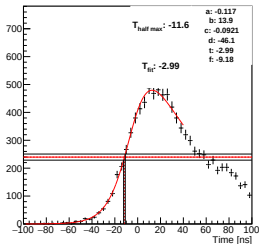


Time at Half Max (fit) versus Distance to Readout 1

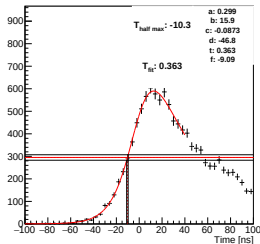


Layer 1 FEB 2

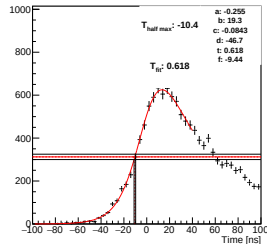
Readout 2 Time, 125<d<180 mm



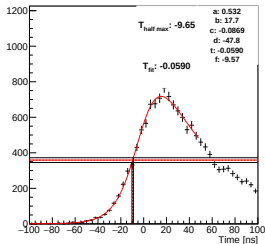
Readout 2 Time, 180<d<235 mm



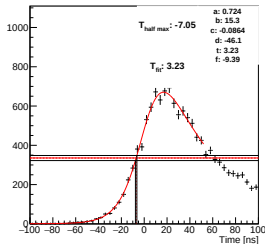
Readout 2 Time, 235<d<290 mm



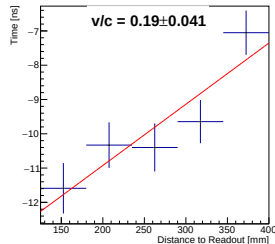
Readout 2 Time, 290<d<345 mm



Readout 2 Time, 345<d<400 mm

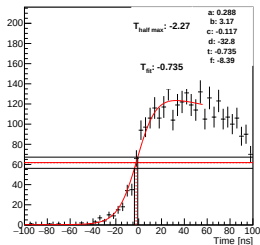


Time at Half Max (fit) versus Distance to Readout 2

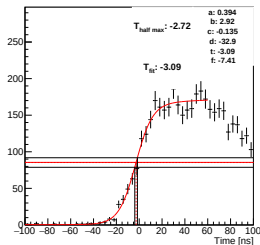


Layer 1 FEB 3

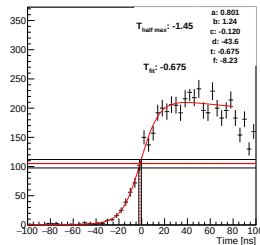
Readout 3 Time, 125<d<180 mm



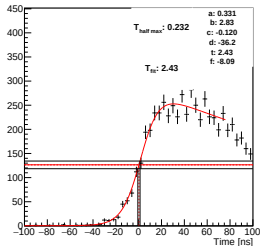
Readout 3 Time, 180<d<235 mm



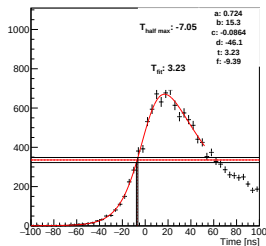
Readout 3 Time, 235<d<290 mm



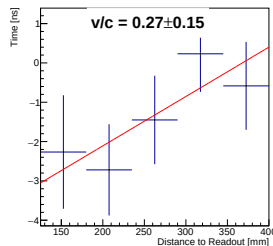
Readout 3 Time, 290<d<345 mm



Readout 2 Time, 345<d<400 mm

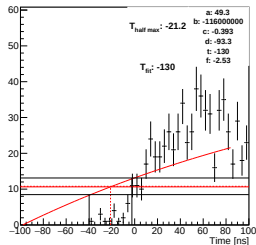


Time at Half Max (fit) versus Distance to Readout 3

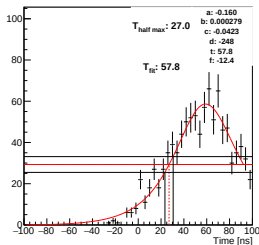


Layer 1 FEB 4

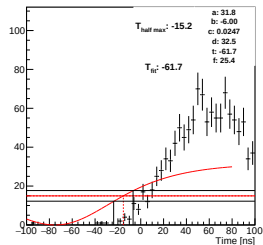
Readout 4 Time, 125<d<180 mm



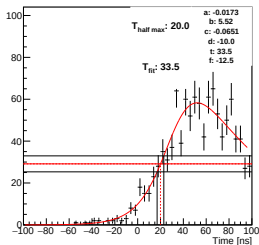
Readout 4 Time, 180<d<235 mm



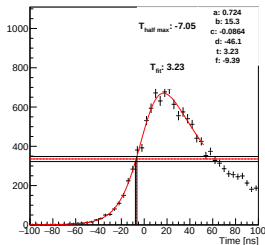
Readout 4 Time, 235<d<290 mm



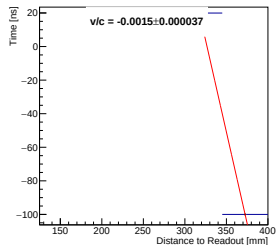
Readout 4 Time, 290<d<345 mm



Readout 2 Time, 345<d<400 mm

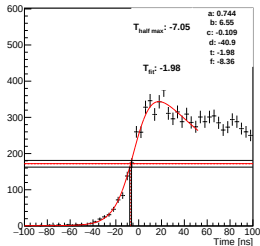


Time at Half Max (fit) versus Distance to Readout 4

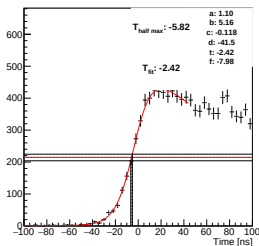


Layer 1 FEB 5

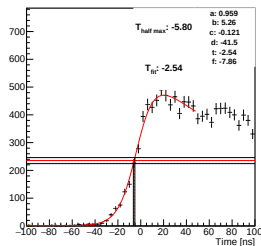
Readout 5 Time, 125<d<180 mm



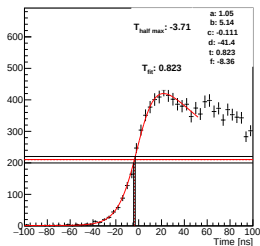
Readout 5 Time, 180<d<235 mm



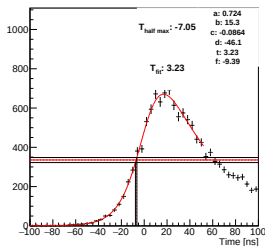
Readout 5 Time, 235<d<290 mm



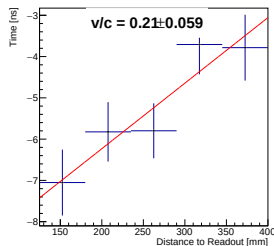
Readout 5 Time, 290<d<345 mm



Readout 2 Time, 345<d<400 mm

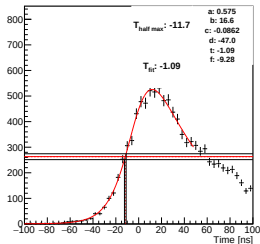


Time at Half Max (fit) versus Distance to Readout 5

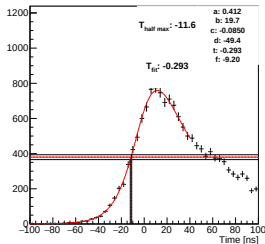


Layer 1 FEB 6

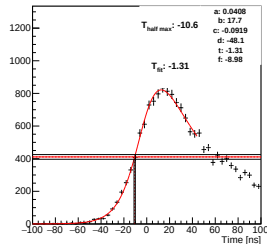
Readout 6 Time, 125<d<180 mm



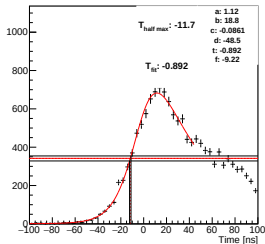
Readout 6 Time, 180<d<235 mm



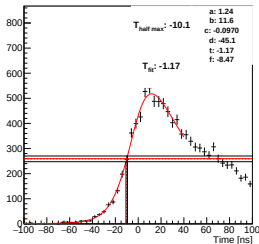
Readout 6 Time, 235<d<290 mm



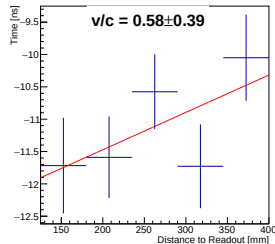
Readout 6 Time, 290<d<345 mm



Readout 6 Time, 345<d<400 mm

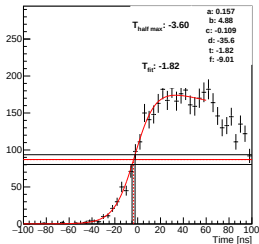


Time at Half Max (fit) versus Distance to Readout 6

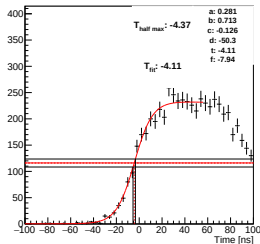


Layer 1 FEB 7

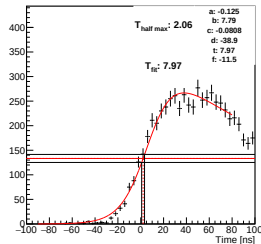
Readout 7 Time, 125<d<180 mm



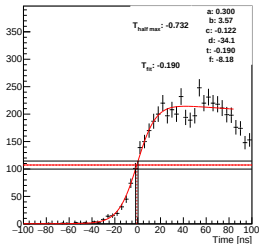
Readout 7 Time, 180<d<235 mm



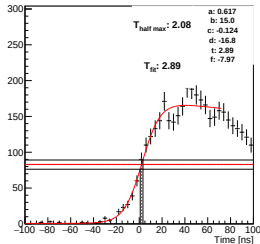
Readout 7 Time, 235<d<290 mm



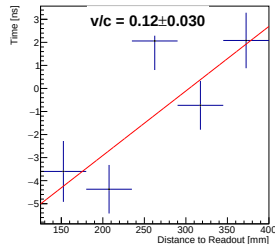
Readout 7 Time, 290<d<345 mm



Readout 7 Time, 345<d<400 mm

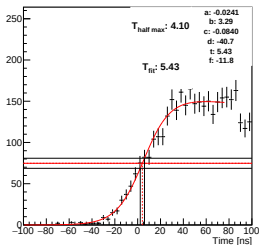


Time at Half Max (fit) versus Distance to Readout 7

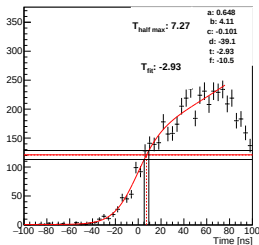


Layer 1 FEB 8

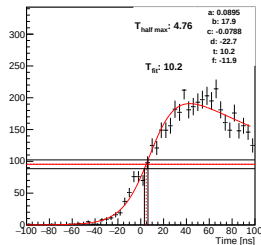
Readout 8 Time, 125<d<180 mm



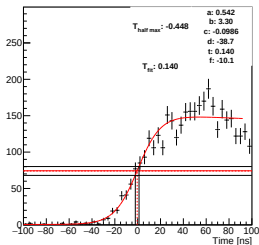
Readout 8 Time, 180<d<235 mm



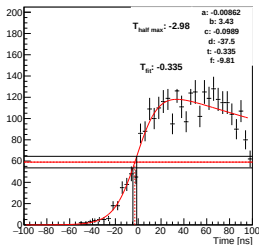
Readout 8 Time, 235<d<290 mm



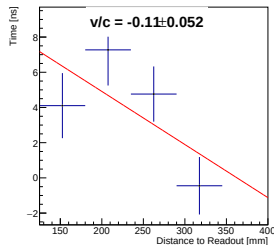
Readout 8 Time, 290<d<345 mm



Readout 8 Time, 345<d<400 mm

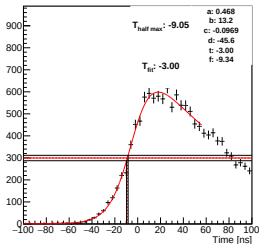


Time at Half Max (fit) versus Distance to Readout 8

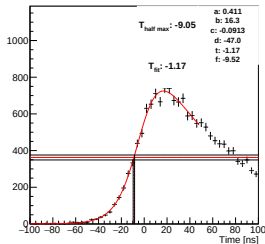


Layer 1 FEB 9

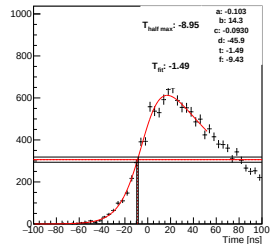
Readout 9 Time, 125<d<180 mm



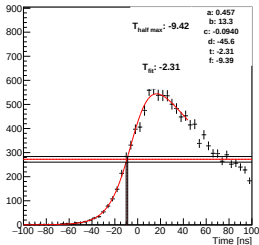
Readout 9 Time, 180<d<235 mm



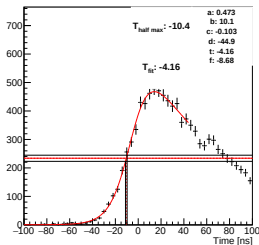
Readout 9 Time, 235<d<290 mm



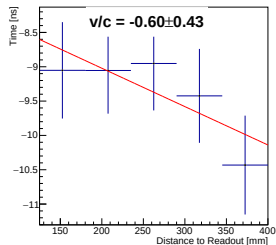
Readout 9 Time, 290<d<345 mm



Readout 9 Time, 345<d<400 mm

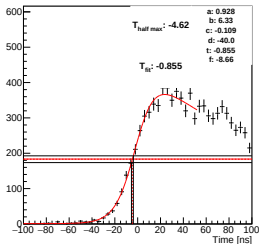


Time at Half Max (fit) versus Distance to Readout 9

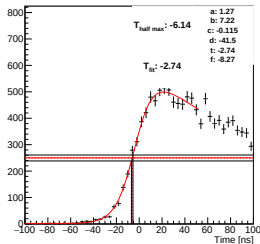


Layer 1 FEB 10

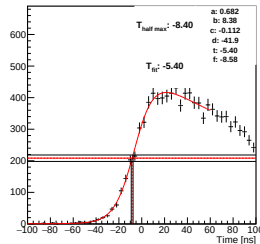
Readout 10 Time, 125<d<180 mm



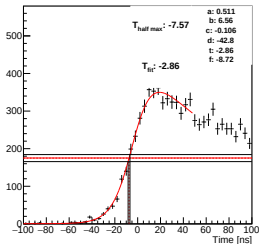
Readout 10 Time, 180<d<235 mm



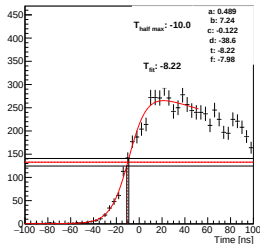
Readout 10 Time, 235<d<290 mm



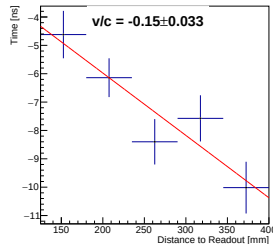
Readout 10 Time, 290<d<345 mm



Readout 10 Time, 345<d<400 mm

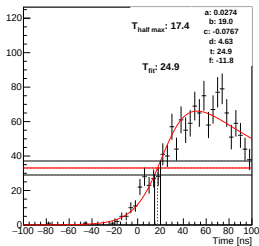


Time at Half Max (fit) versus Distance to Readout 10

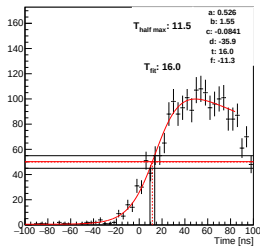


Layer 1 FEB 11

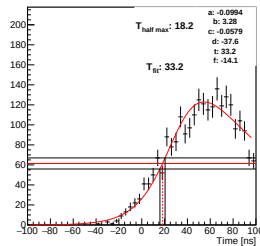
Readout 11 Time, 125<d<180 mm



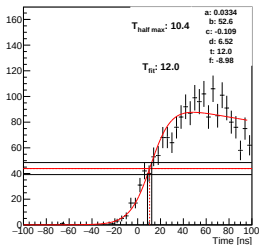
Readout 11 Time, 180<d<235 mm



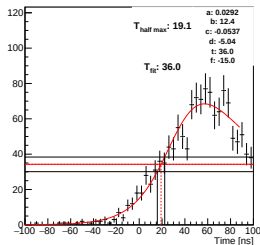
Readout 11 Time, 235<d<290 mm



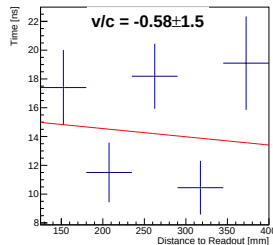
Readout 11 Time, 290<d<345 mm



Readout 11 Time, 345<d<400 mm

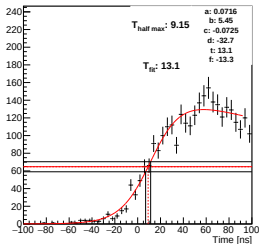


Time at Half Max (fit) versus Distance to Readout 11

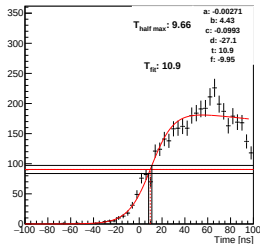


Layer 1 FEB 12

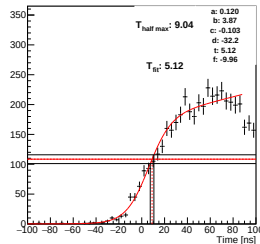
Readout 12 Time, 125<d<180 mm



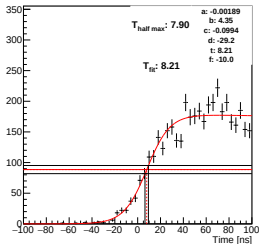
Readout 12 Time, 180<d<235 mm



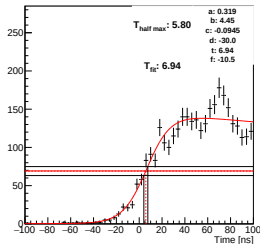
Readout 12 Time, 235<d<290 mm



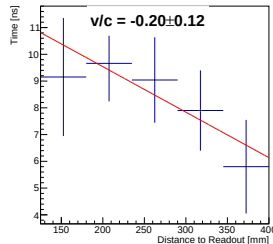
Readout 12 Time, 290<d<345 mm



Readout 12 Time, 345<d<400 mm

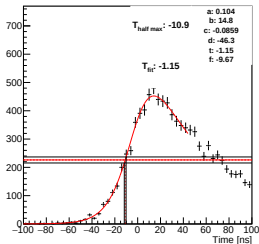


Time at Half Max (fit) versus Distance to Readout 12

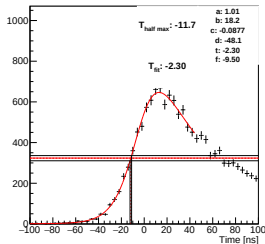


Layer 1 FEB 13

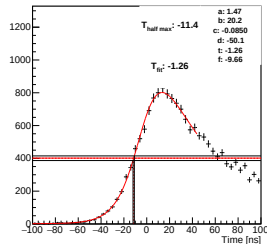
Readout 13 Time, 125<d<180 mm



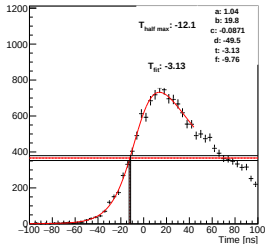
Readout 13 Time, 180<d<235 mm



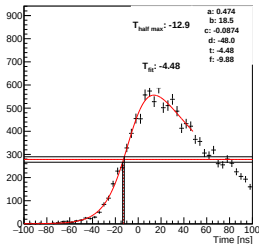
Readout 13 Time, 235<d<290 mm



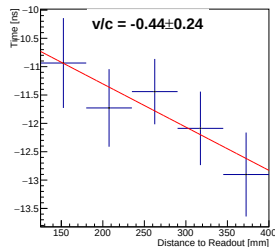
Readout 13 Time, 290<d<345 mm



Readout 13 Time, 345<d<400 mm

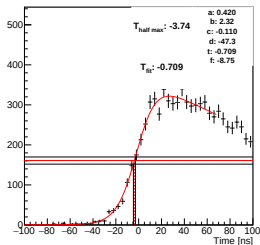


Time at Half Max (fit) versus Distance to Readout 13

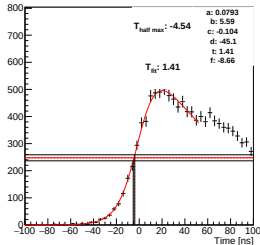


Layer 1 FEB 14

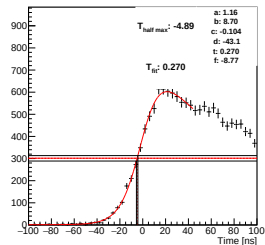
Readout 14 Time, 125<d<180 mm



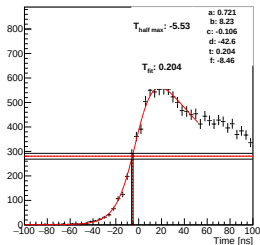
Readout 14 Time, 180<d<235 mm



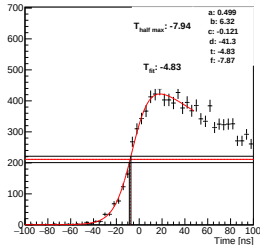
Readout 14 Time, 235<d<290 mm



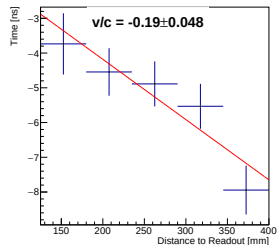
Readout 14 Time, 290<d<345 mm



Readout 14 Time, 345<d<400 mm

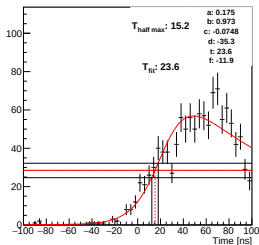


Time at Half Max (fit) versus Distance to Readout 14

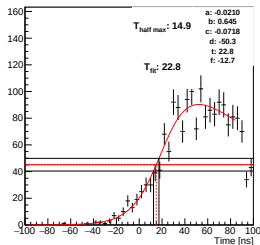


Layer 1 FEB 15

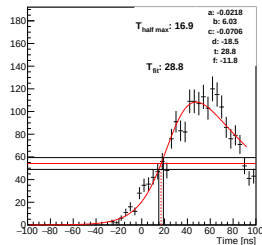
Readout 15 Time, 125<d<180 mm



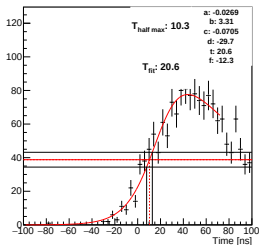
Readout 15 Time, 180<d<235 mm



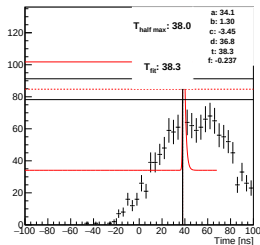
Readout 15 Time, 235<d<290 mm



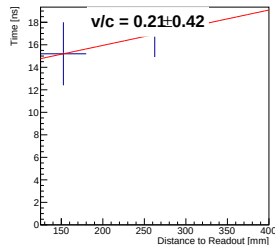
Readout 15 Time, 290<d<345 mm



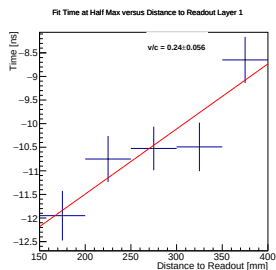
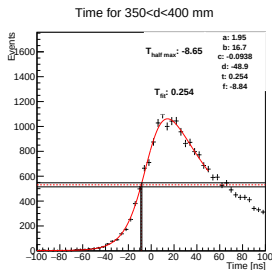
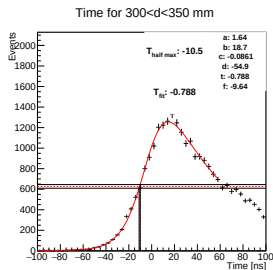
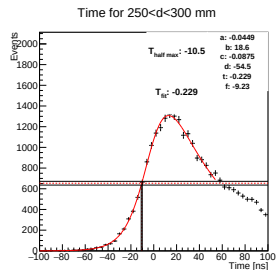
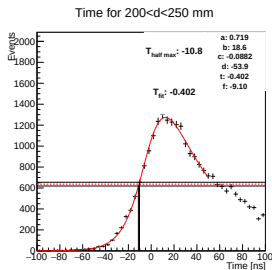
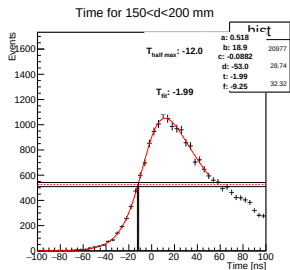
Readout 15 Time, 345<d<400 mm



Time at Half Max (fit) versus Distance to Readout 15



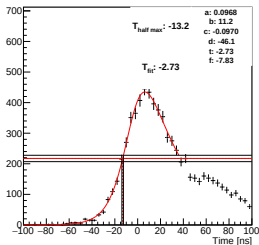
Layer 1 Combined



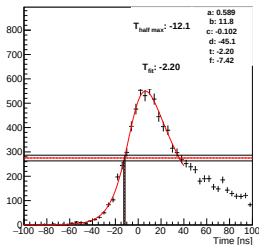
Layer 2 x Velocity Results For Each FEB

Layer 2 Feb 18

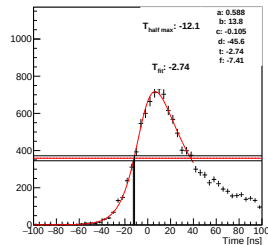
Readout 18 Time, 200<d<260 mm



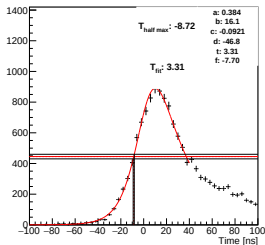
Readout 18 Time, 260<d<320 mm



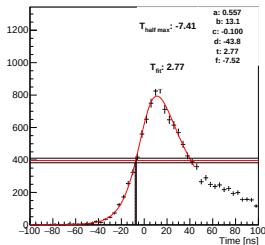
Readout 18 Time, 320<d<380 mm



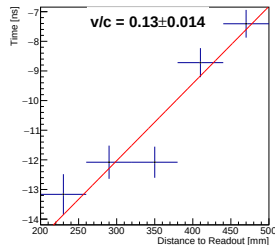
Readout 18 Time, 380<d<440 mm



Readout 18 Time, 440<d<500 mm

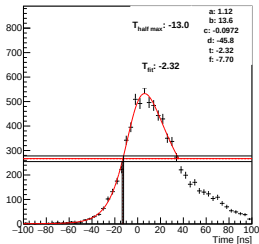


Time at Half Max (fit) versus Distance to Readout 18

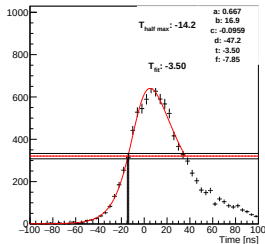


Layer 2 Feb 19

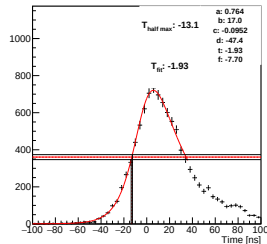
Readout 19 Time, 200<d<260 mm



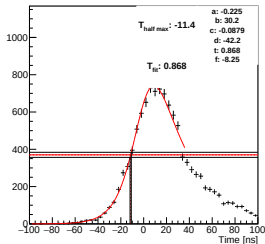
Readout 19 Time, 260<d<320 mm



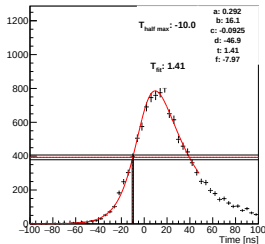
Readout 19 Time, 320<d<380 mm



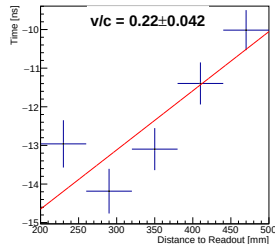
Readout 19 Time, 380<d<440 mm



Readout 19 Time, 440<d<500 mm

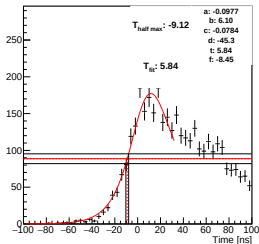


Time at Half Max (fit) versus Distance to Readout 19

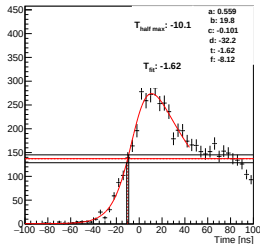


Layer 2 Feb 20

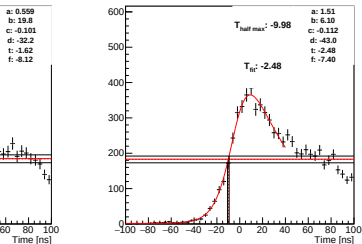
Readout 20 Time, 200<d<260 mm



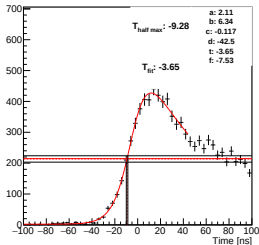
Readout 20 Time, 260<d<320 mm



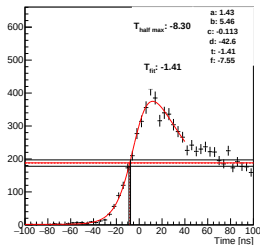
Readout 20 Time, 320<d<380 mm



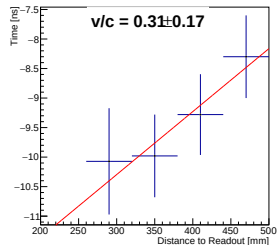
Readout 20 Time, 380<d<440 mm



Readout 20 Time, 440<d<500 mm

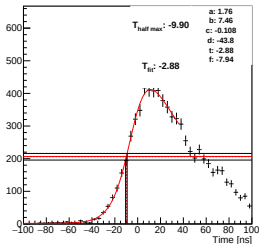


Time at Half Max (fit) versus Distance to Readout 20

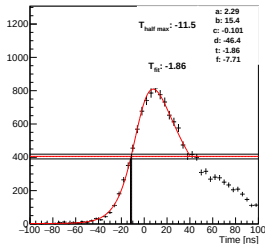


Layer 2 Feb 25

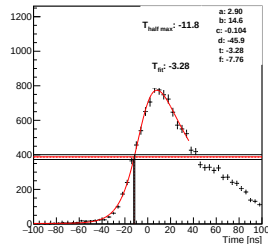
Readout 25 Time, 200<d<260 mm



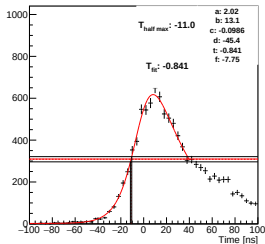
Readout 25 Time, 260<d<320 mm



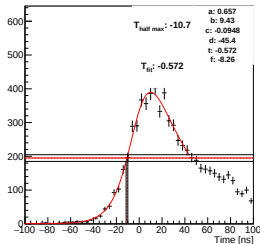
Readout 25 Time, 320<d<380 mm



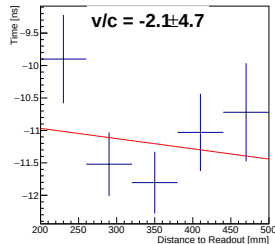
Readout 25 Time, 380<d<440 mm



Readout 25 Time, 440<d<500 mm

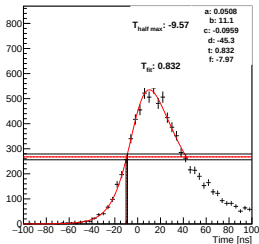


Time at Half Max (fit) versus Distance to Readout 25

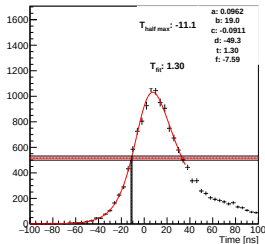


Layer 2 Feb 26

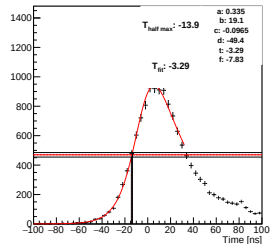
Readout 26 Time, 200<d<260 mm



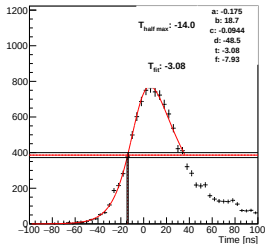
Readout 26 Time, 260<d<320 mm



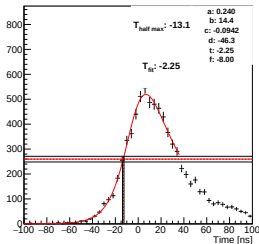
Readout 26 Time, 320<d<380 mm



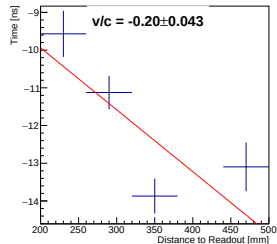
Readout 26 Time, 380<d<440 mm



Readout 26 Time, 440<d<500 mm

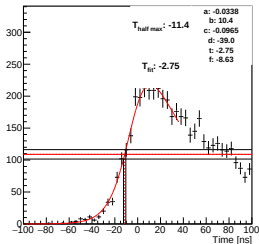


Time at Half Max (fit) versus Distance to Readout 26

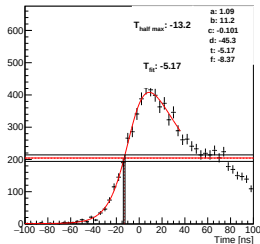


Layer 2 Feb 27

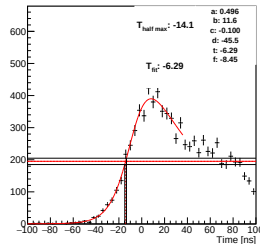
Readout 27 Time, 200<d<260 mm



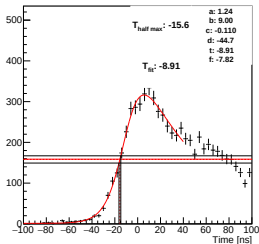
Readout 27 Time, 260<d<320 mm



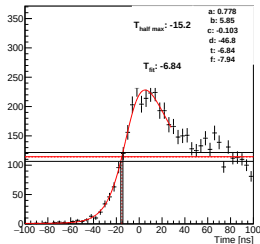
Readout 27 Time, 320<d<380 mm



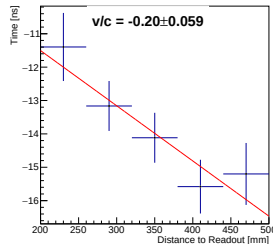
Readout 27 Time, 380<d<440 mm



Readout 27 Time, 440<d<500 mm

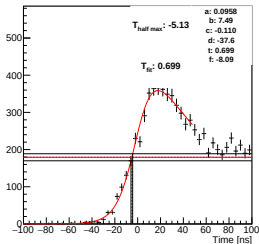


Time at Half Max (fit) versus Distance to Readout 27

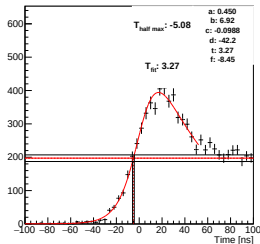


Layer 2 Feb 32

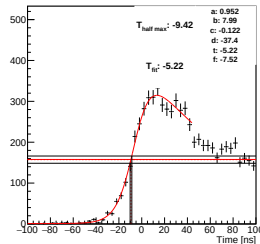
Readout 32 Time, 200<d<260 mm



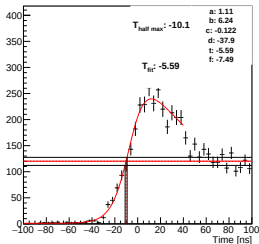
Readout 32 Time, 260<d<320 mm



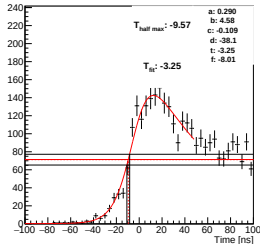
Readout 32 Time, 320<d<380 mm



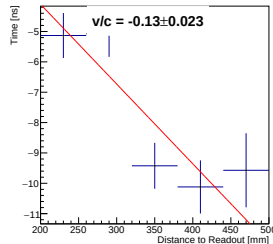
Readout 32 Time, 380<d<440 mm



Readout 32 Time, 440<d<500 mm

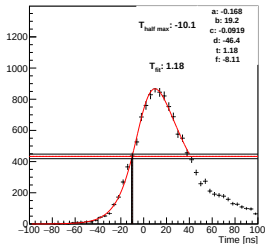


Time at Half Max (fit) versus Distance to Readout 32

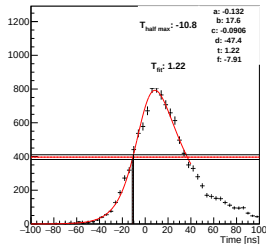


Layer 2 Feb 33

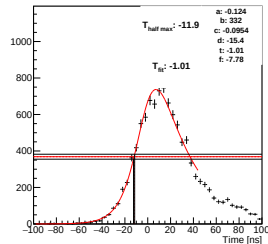
Readout 33 Time, 200<d<260 mm



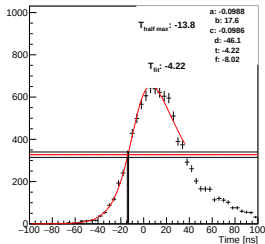
Readout 33 Time, 260<d<320 mm



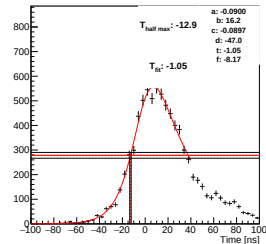
Readout 33 Time, 320<d<380 mm



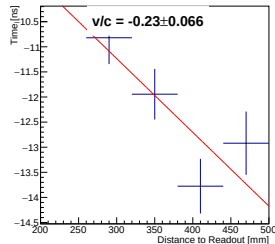
Readout 33 Time, 380<d<440 mm



Readout 33 Time, 440<d<500 mm

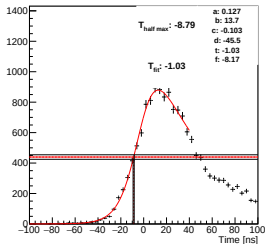


Time at Half Max (fit) versus Distance to Readout 33

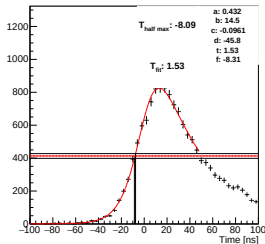


Layer 2 Feb 34

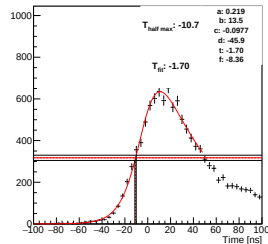
Readout 34 Time, 200<d<260 mm



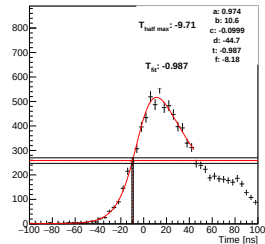
Readout 34 Time, 260<d<320 mm



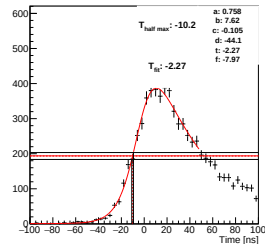
Readout 34 Time, 320<d<380 mm



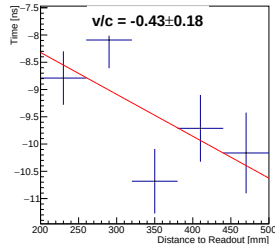
Readout 34 Time, 380<d<440 mm



Readout 34 Time, 440<d<500 mm

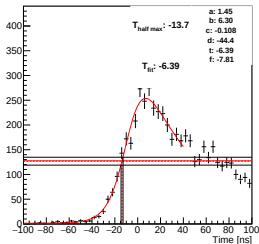


Time at Half Max (fit) versus Distance to Readout 34

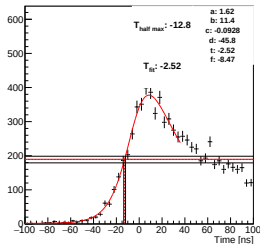


Layer 2 FEB 39

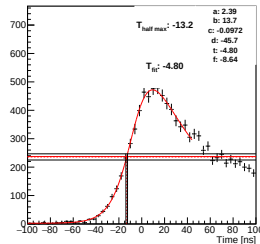
Readout 39 Time, 200<d<260 mm



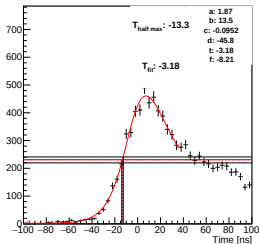
Readout 39 Time, 260<d<320 mm



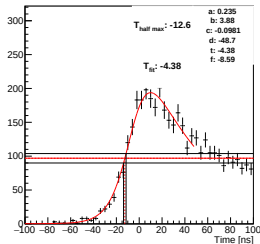
Readout 39 Time, 320<d<380 mm



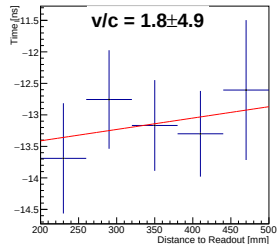
Readout 39 Time, 380<d<440 mm



Readout 39 Time, 440<d<500 mm

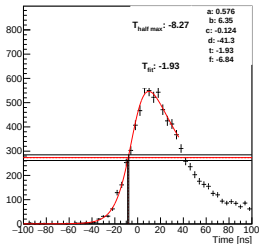


Time at Half Max (fit) versus Distance to Readout 39

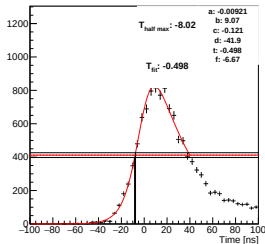


Layer 2 FEB 40

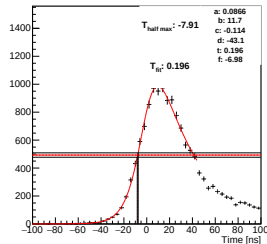
Readout 40 Time, 200<d<260 mm



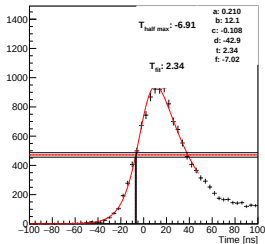
Readout 40 Time, 260<d<320 mm



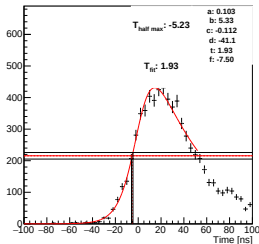
Readout 40 Time, 320<d<380 mm



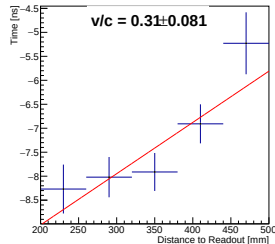
Readout 40 Time, 380<d<440 mm



Readout 40 Time, 440<d<500 mm

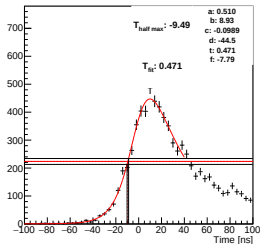


Time at Half Max (fit) versus Distance to Readout 40

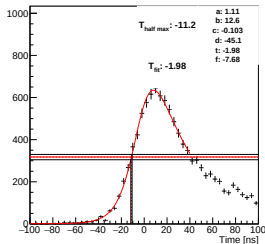


Layer 2 Feb 41

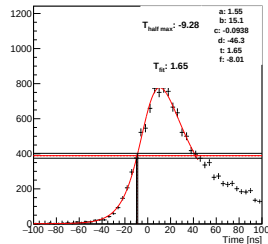
Readout 41 Time, 200<d<260 mm



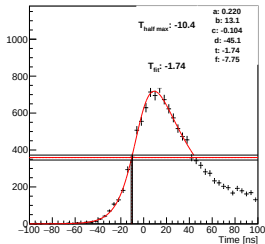
Readout 41 Time, 260<d<320 mm



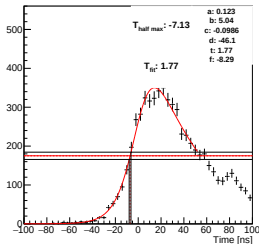
Readout 41 Time, 320<d<380 mm



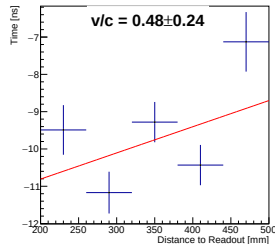
Readout 41 Time, 380<d<440 mm



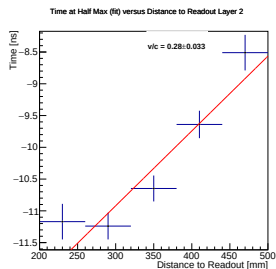
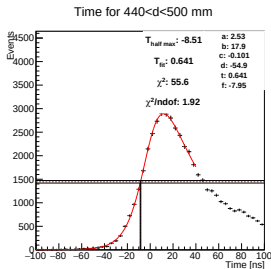
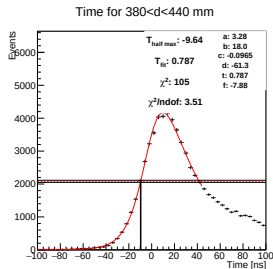
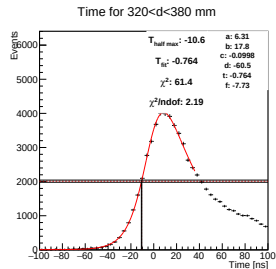
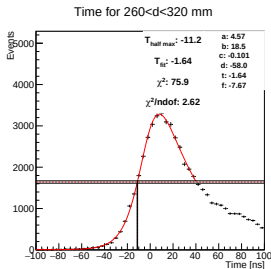
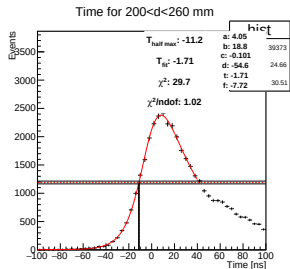
Readout 41 Time, 440<d<500 mm



Time at Half Max (fit) versus Distance to Readout 41

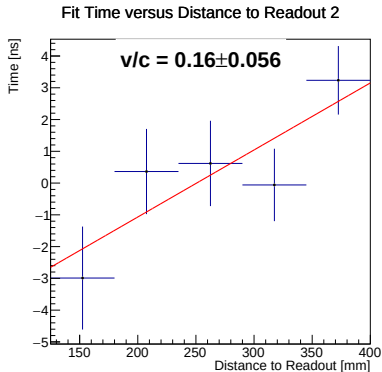
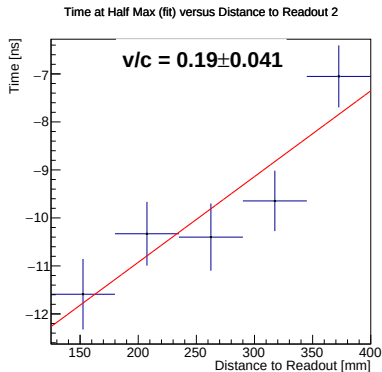


Fits for FEBs 17-20 and 39-41 combined



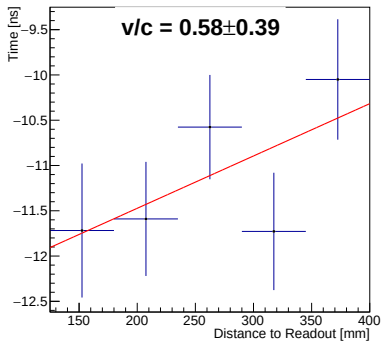
Comparisons of Fit Time and Half Max Time

Feb 2 Fit and Half Max Results

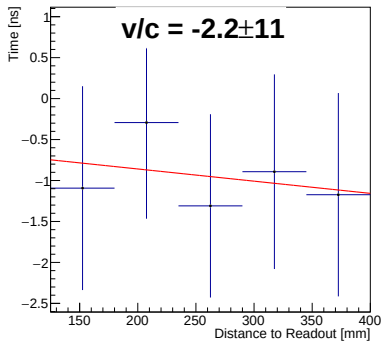


Feb 6 Fit and Half Max Results

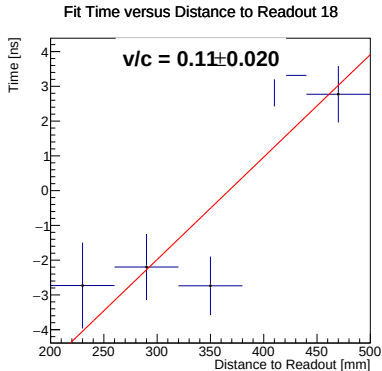
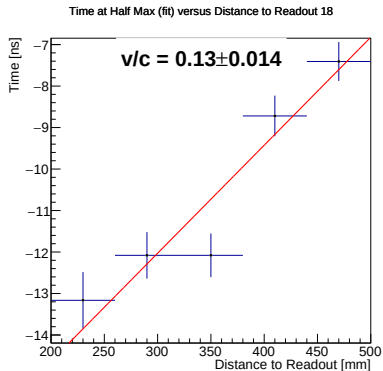
Time at Half Max (fit) versus Distance to Readout 6



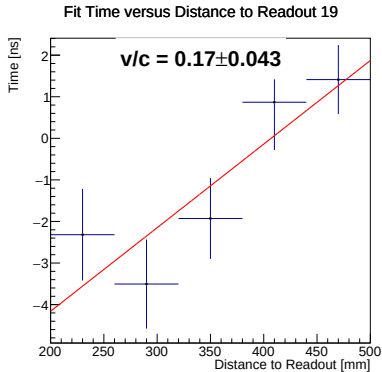
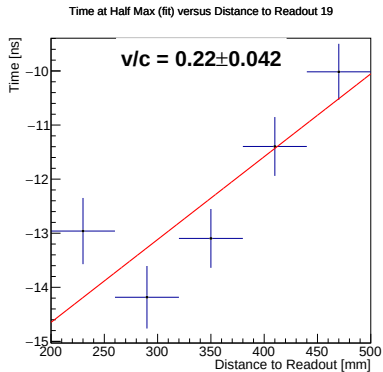
Fit Time versus Distance to Readout 6



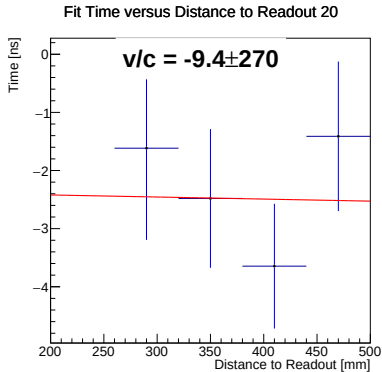
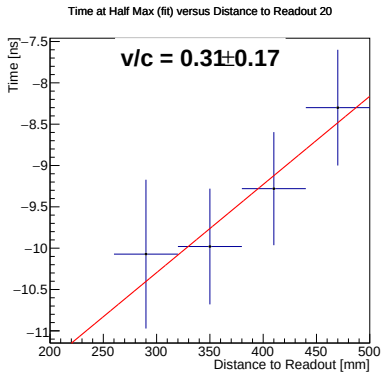
Feb 18 Fit and Half Max Results



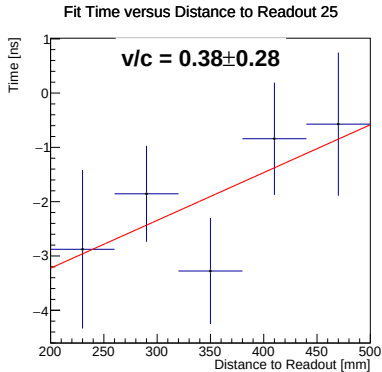
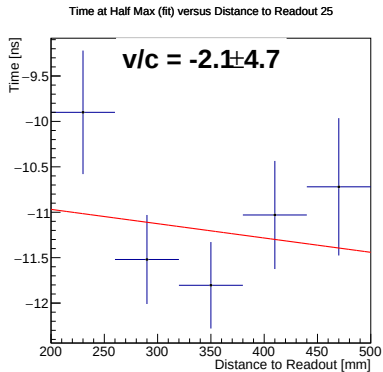
Feb 19 Fit and Half Max Results



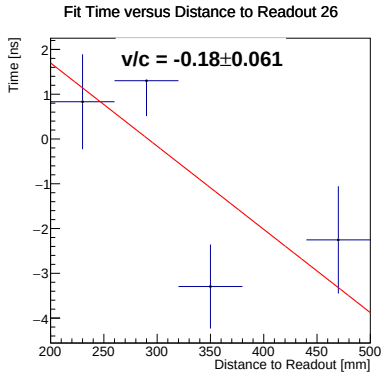
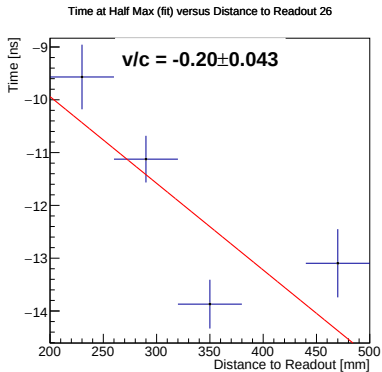
Feb 20 Fit and Half Max Results



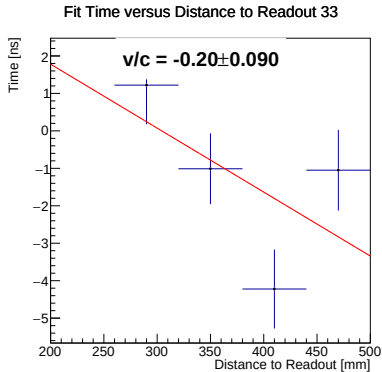
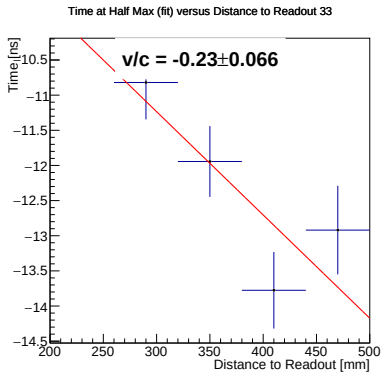
Feb 25 Fit and Half Max Results



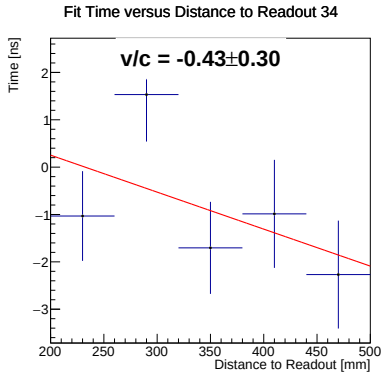
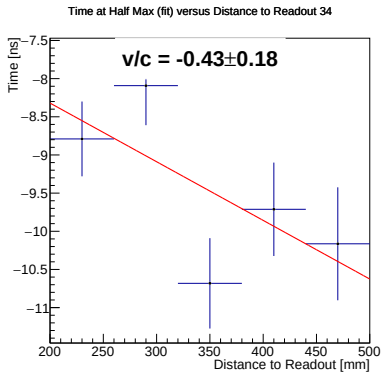
Feb 26 Fit and Half Max Results



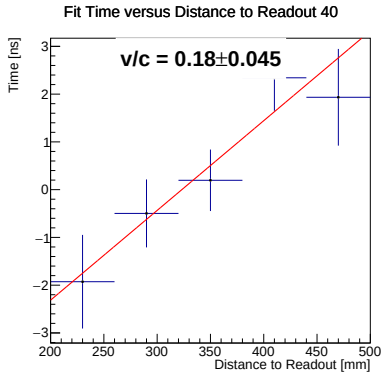
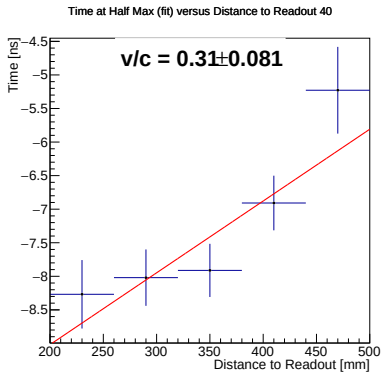
Feb 33 Fit and Half Max Results



Feb 34 Fit and Half Max Results

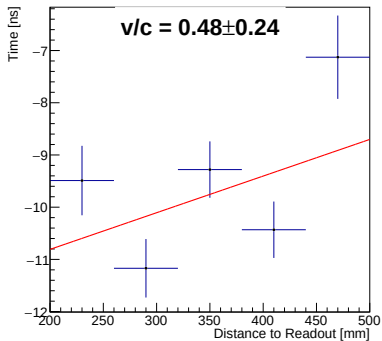


Feb 40 Fit and Half Max Results



Feb 41 Fit and Half Max Results

Time at Half Max (fit) versus Distance to Readout 41



Fit Time versus Distance to Readout 41

