Current TB analysis status

Straw TB team

February 21, 2023

April TB (APV + VMM3)

- Parameters: 1750 V, 1 mv/fC, 100 ns slope, 25 ns peaking time
- Threshold: 209.63 mV (213 DAC counts)

VMM run	APV run	μ / spill (481 scintillator)	N_{spills}	Estimated N_{tracks} / straw	Comment
0826	418	$5.5 \cdot 10^5$	111		
0818	411	$8 \cdot 10^4 \rightarrow 1.4 \cdot 10^5$	1921	76K (at 120 merged ev/spill)	

July TB (APV + VMM3)

- Parameters: 1750 V, 1 mv/fC, 100 ns slope, 25 ns peaking time
- Threshold: 193.86 mV (190 DAC counts)

VMM run	APV run	μ / spill (481 scintillator)	N_{spills}	Estimated N_{tracks} / straw	Comment
0093	49	$2.4 \cdot 10^5$	110		
0103	59	$1.4 \cdot 10^5$	1675	66K (at 120 merged ev/spill)	

October TB (TIGER)

- Parameters: 1750 V, [tiger default: 12 mv/fC, 7.5 ns slope, 60 ns peaking time (time branch), 170 ns peaking time (energy branch)]
- Threshold: MM & scintillator – 5 σ (2022-10-31), straw – by hand with double thresholds

Run	μ / spill (481 scintillator)	Estimated N_{tracks} / straw	Comment
51	$6.4 \cdot 10^4$	400K	

Outline

Current studies:

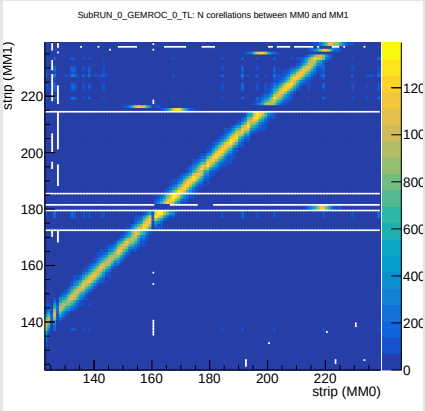
- APV & VMM3 (April + July TB):
  - Continuing work on clusterizing for VMM and APV (see Andrei slides)
- TIGER (October TB):
  - Some TIGER mapping changes
  - Noise study
  - **R(T)** curve construction, accuracy estimate (see Andrei slides)

October TB: TIGER 2 mapping problems (MM1 mapping)

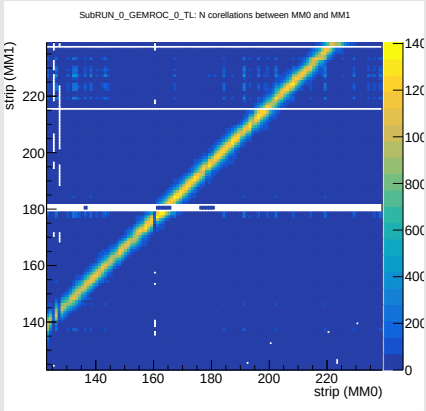
TIGER 2 changes:

- On tiger 2 for **even** channels 36-52: MM strips assigned from channel +2.
- Tiger 2, channel 54 not used.

Before



After



October TB: Mapping change

TIGER re-mapped channels connected to different strips during October TB

A-board (up to RUN 50)

TIGER	channel	Strip (before)	Strip(after)
2	36	232	229
2	38	229	224
2	40	224	179
2	42	179	188
2	44	188	187
2	46	187	234
2	48	234	222
2	50	222	223
2	52	223	192
2	54	192	not used

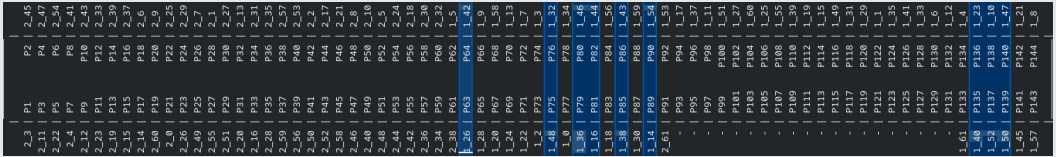
B2-board (RUNs 51 - 63)

TIGER	channel	Strip (before)	Strip(after)
2	36	237	not used
2	38	not used	216
2	40	216	172
2	42	172	181
2	44	181	180
2	46	180	235
2	48	235	214
2	50	214	215
2	52	215	185
2	54	185	not used

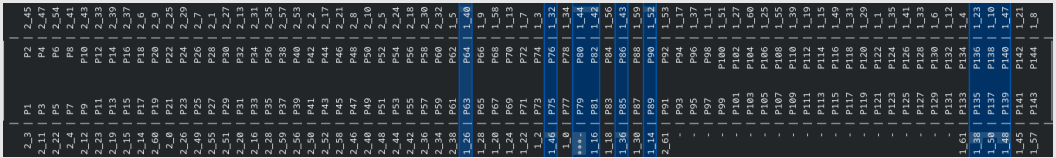
October TB: Mapping change (FEB connector)

Since it seems like tiger problem, FEB connector to tiger mapping can be updated for this TIGER

Normal FEB mapping

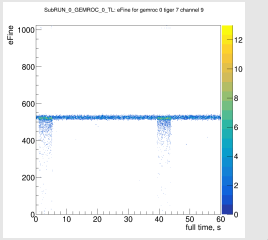


FEB mapping for October TB FEB1

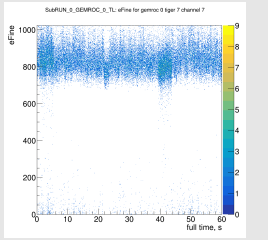


RUN 51: Strange channel

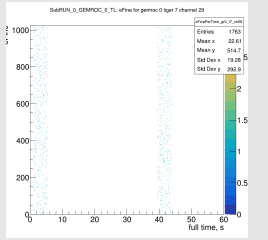
eFine example for "normal" channel (TIGER 7, channel 9)



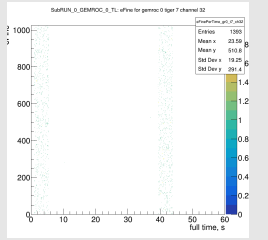
eFine for TIGER 7, channel 7 (MM3 strip 205)



eFine for TIGER 7 channel 29 (MM3 strip 206)



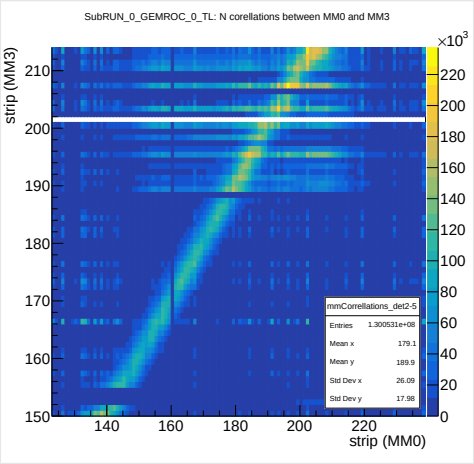
eFine for TIGER 7 channel 32 (MM3 strip 188)



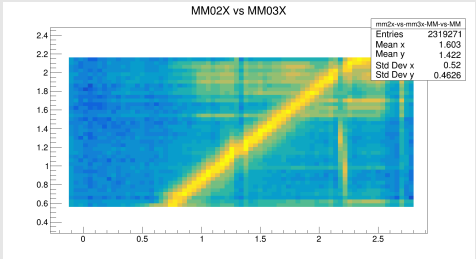
These TIGER 7 channels will not be used in analysis

RUN 51: Noise in MM 3

Hit corellation between hits in MM0 and MM3



Corellation between clusters in MM0 and MM3

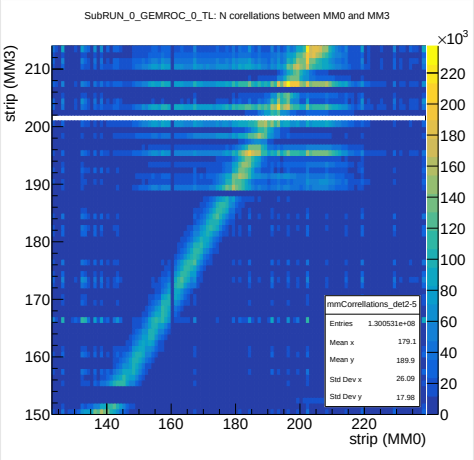


1. The same problem seen on both, per-hit and per-claster data
2. Most of noise channel on TIGER 7
3. Additional noise is corellated with some signal
4. 5fC cut significantly reduces that MM3 noise

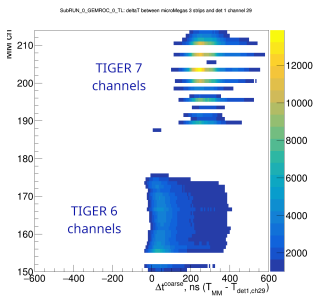
We are working on searching that noise problem

RUN 51: Noise in MM 3

Hit corellation between hits in MM0 and MM3



On figure:
Time difference between hits in MicroMegas 3 (connected to **TIGER 6** and **7**) strips and Straw 29 hits (connected to **TIGER 7**)



1. The same problem seen on both, per-hit and per-claster data
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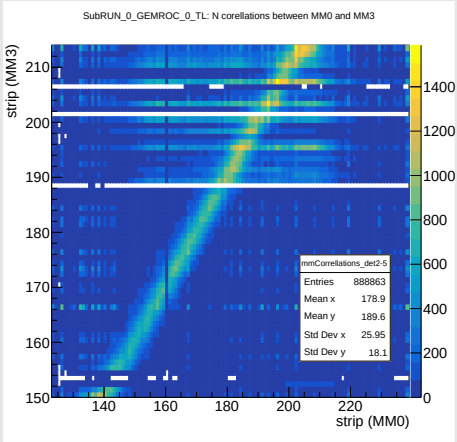
We are working on searching that noise problem

RUN 51: Charge cut on MM3

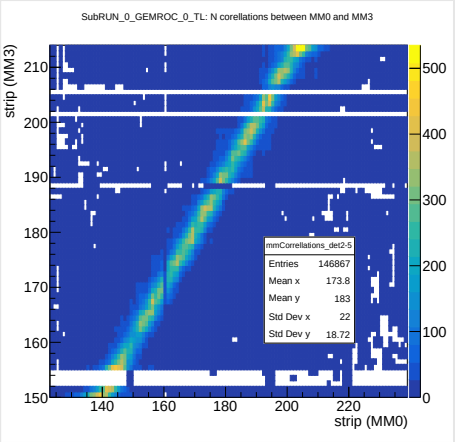
As a solution, 5fC cut can be applied on MicroMegas hits. Problems:

- Need to estimate efficiency changes
- Need to understand source of problems

MM0 and MM3 corellation, without cut



MM0 and MM3 corellation, with 5fC cut



Summary

- Corrected TIGER 2 (connected to MicroMegas 1) mapping
- 3 channels on TIGER 7 disabled in analysis
- Working on localizing source of noise in MicroMegas 3 data
- Will check problem with corellation between Y-axis and X-axis MicroMegas