CFT Data Quality Analyze (Cont.)

- Take a closer look of the Found Hot/Dead fibers from a number of runs.
- Using 7 Runs before the shutdown (Old)
- ...and 15 Runs after the shutdown (New)
- Combine lists of Hot/Dead fibers within each set. Remove fibers with <3 counts in (Old) set, and remove those with <4 counts in (New) set.
- Dead Fibers identified due to chip failure (contiguous block) are removed.

Always Hot/Dead

- Counts of Hot/Dead fibers which appear in both (Old) and (New)

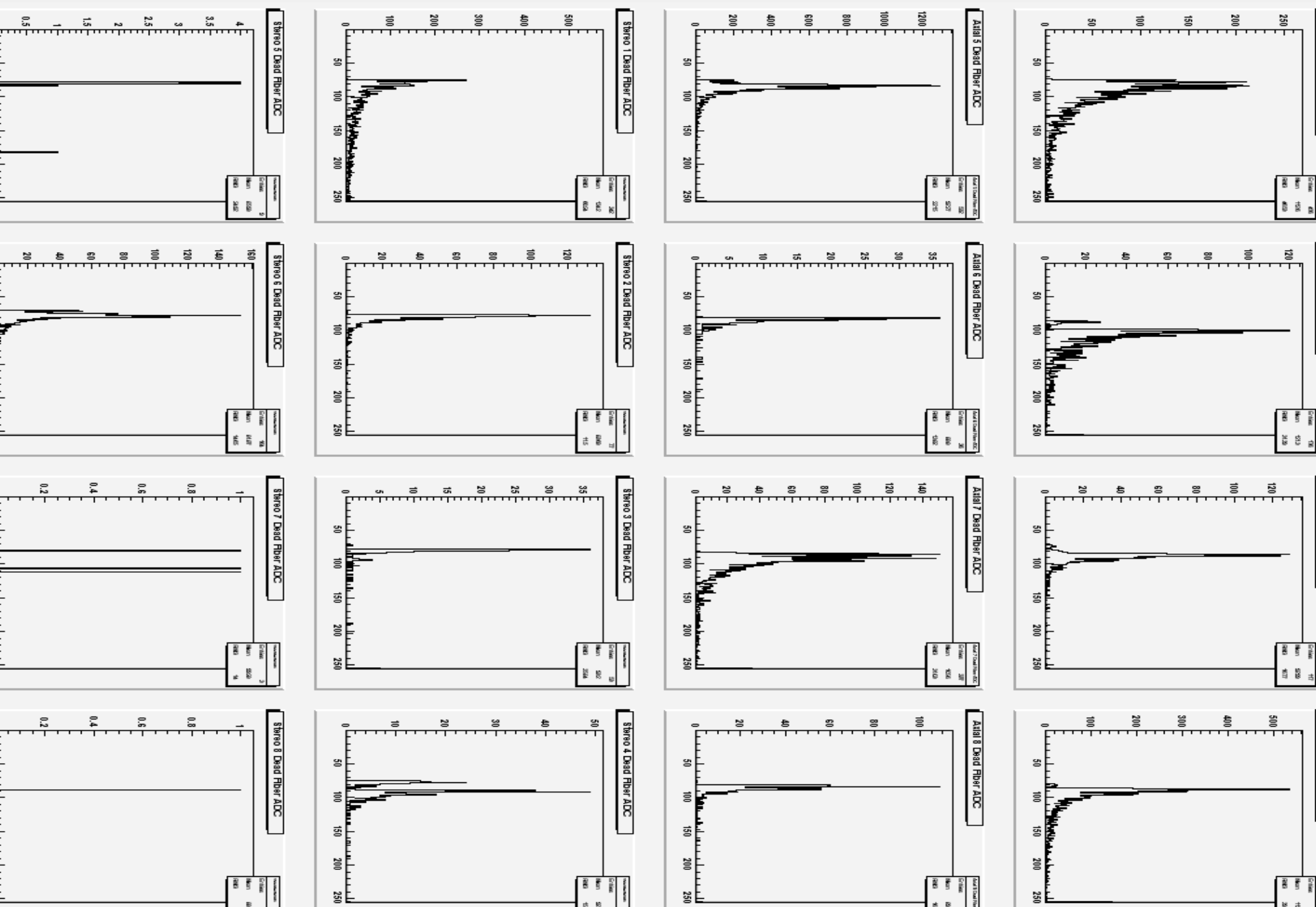
Layer	Hot	Hot Disc	Dead	Dead Disc
Axial 1	2	2	6	19
Axial 2	4	2	7	9
Axial 3	8	0	9	9
Axial 4	32	1	10	10
Axial 5	22	0	22	22
Axial 6	19	3	7	7
Axial 7	21	0	11	10
Axial 8	16	0	8	10
Stereo 1	0		8	
Stereo 2	2		7	
Stereo 3	0		8	
Stereo 4	8		9	
Stereo 5	1		2	
Stereo 6	0		11	
Stereo 7	2		5	
Stereo 8	1		3	
Total	138	8	133	96

New Hot/Dead Fibers

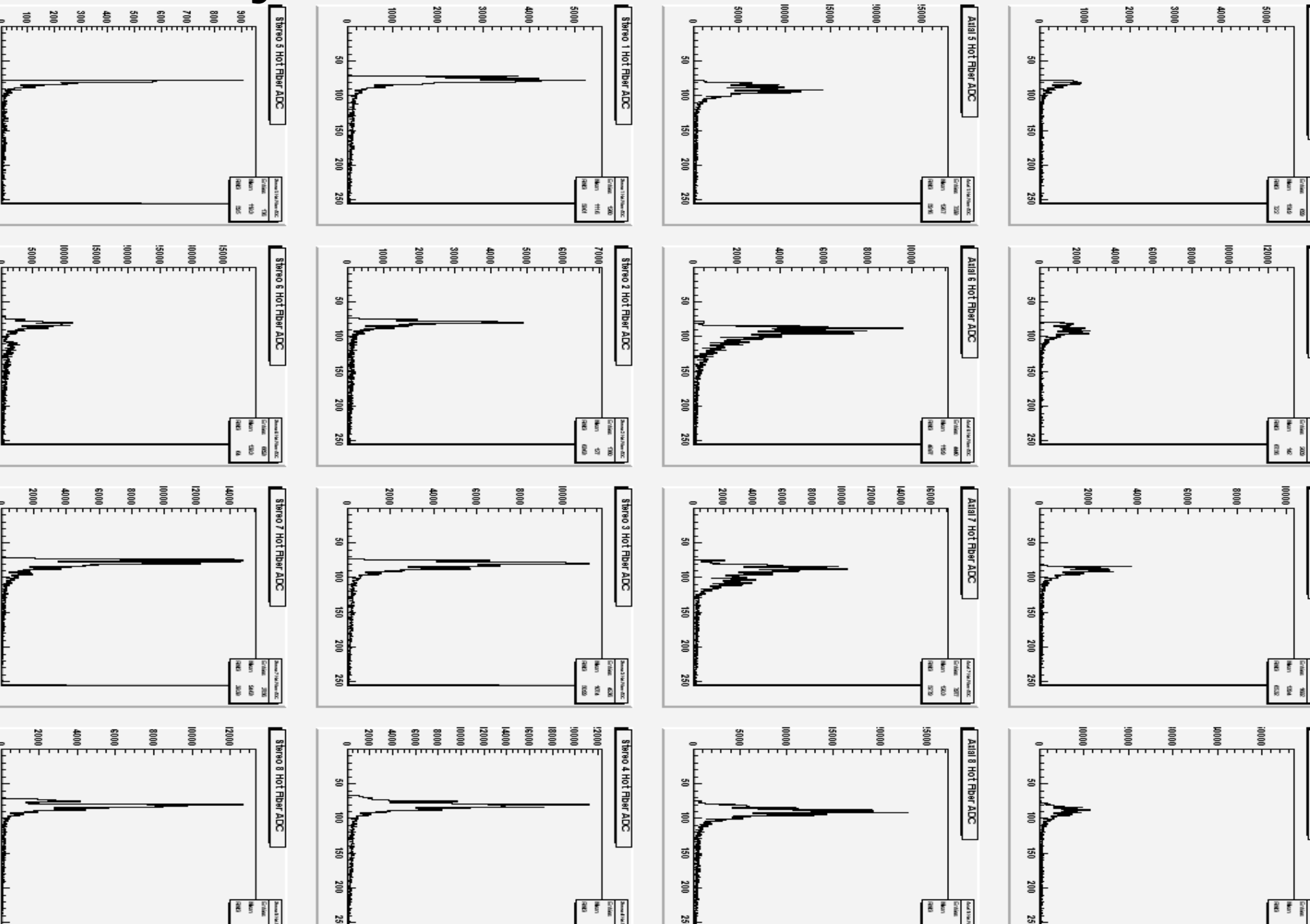
- Hot/Dead Fibers which are identified after the shutdown but not before.

Layer	Hot	Hot Disc	Dead	Dead Disc
Axial 1	4	1	6	6
Axial 2	12	12	11	11
Axial 3	10	2	18	18
Axial 4	69	0	4	3
Axial 5	45	1	16	18
Axial 6	27	2	24	24
Axial 7	48	2	20	22
Axial 8	82	5	23	28
Stereo 1	7		9	
Stereo 2	10		7	
Stereo 3	25		14	
Stereo 4	65		13	
Stereo 5	1		0	
Stereo 6	40		4	
Stereo 7	23		4	
Stereo 8	22		5	
Total	490	25	178	130

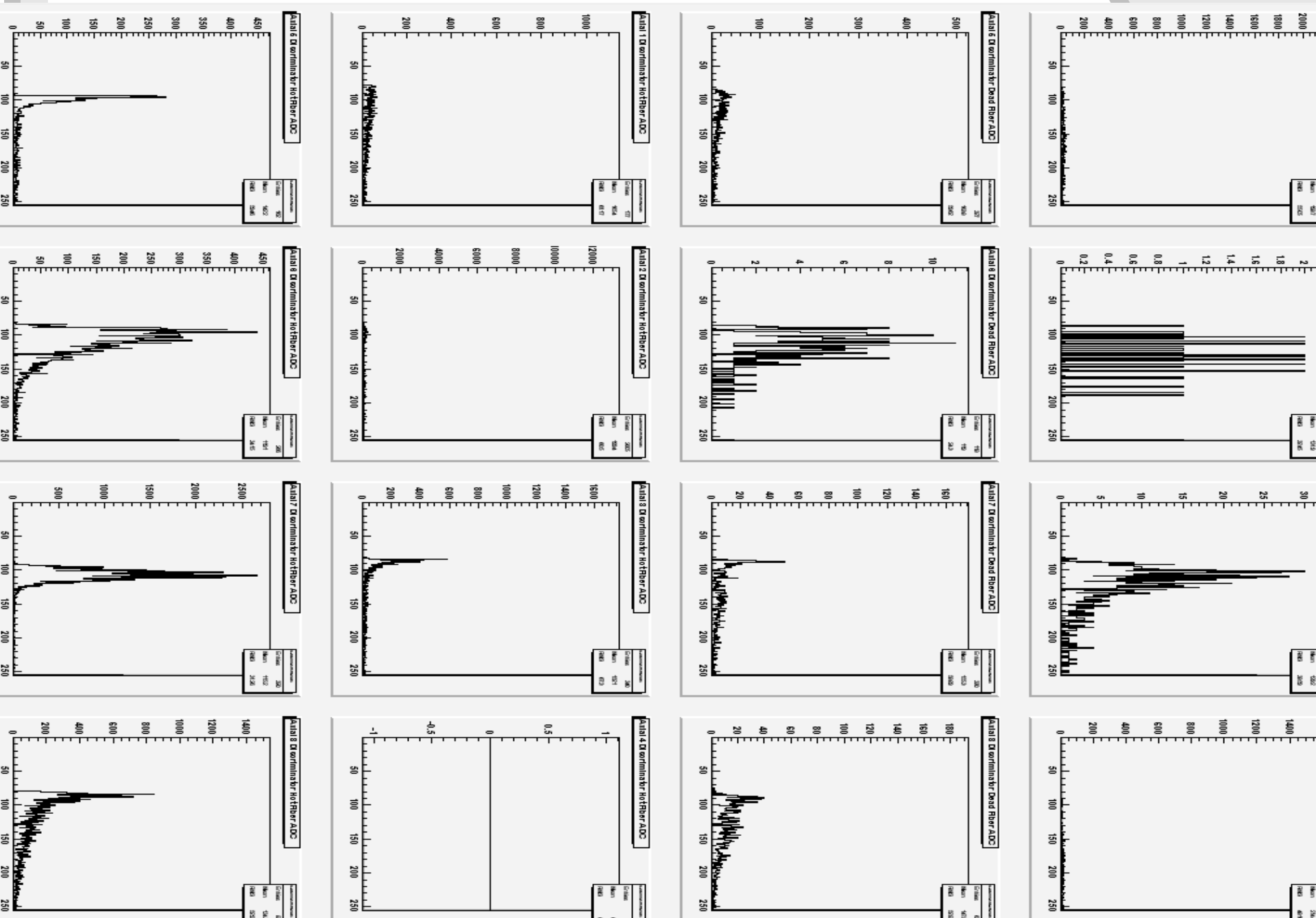
RUN 175034: Always Dead



Always Hot


Stereo 5 Hot Fiber ADC
Stereo 1 Hot Fiber ADC
Axial 5 Hot Fiber ADC
Stereo 6 Hot Fiber ADC
Stereo 2 Hot Fiber ADC
Axial 6 Hot Fiber ADC
Stereo 7 Hot Fiber ADC
Stereo 3 Hot Fiber ADC
Axial 7 Hot Fiber ADC
Stereo 8 Hot Fiber ADC
Stereo 4 Hot Fiber ADC
Axial 8 Hot Fiber ADC

Hot/Dead Discriminator

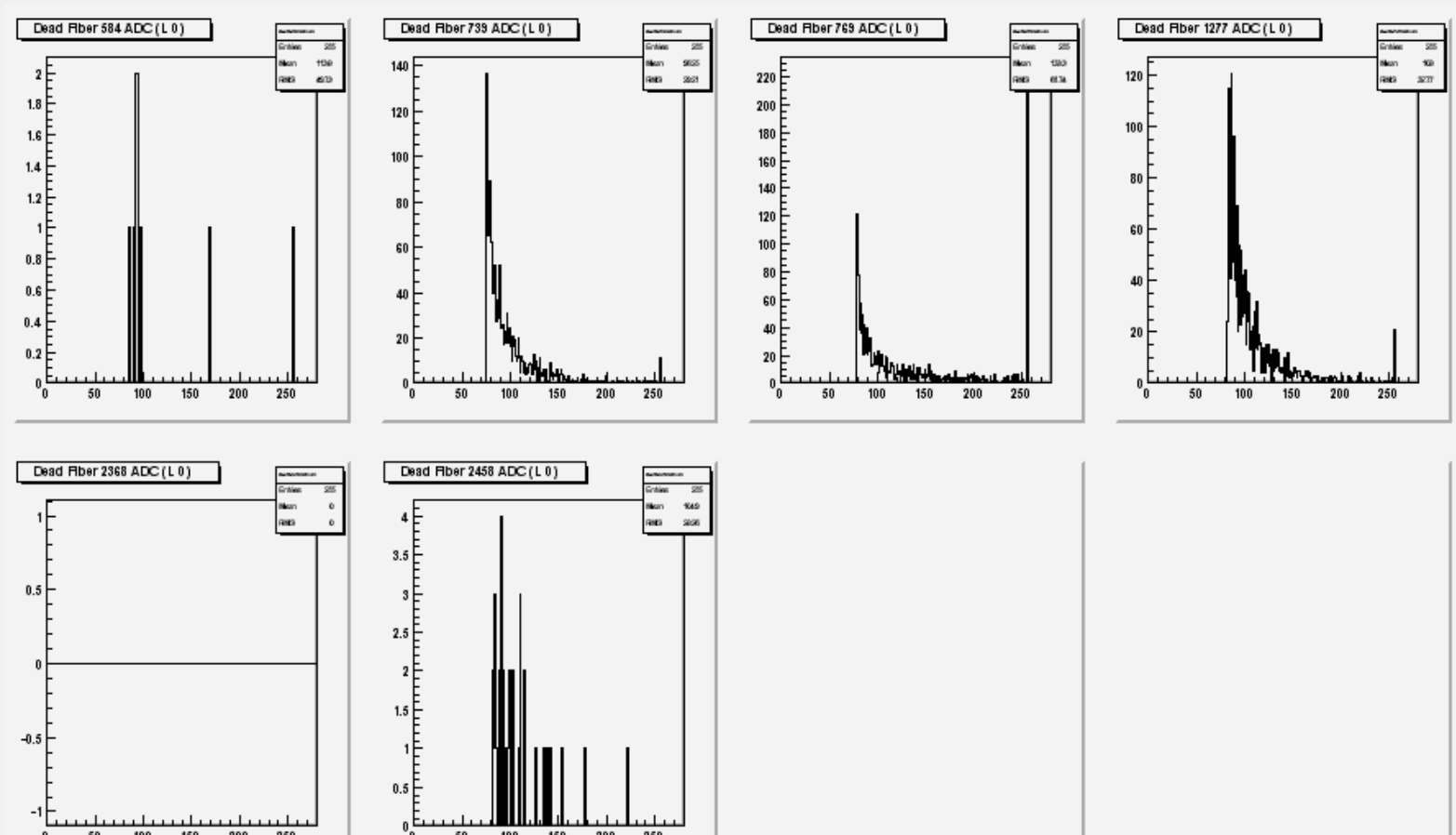


Individual Fibers...

- When hot/dead fibers are combined, some of them don't look that hot/dead at all, for example:
  - Dead fibers in Axial 1, 4
  - Hot fibers in Axial 1, 2, 3, 4
  - Dead Discriminator in Axial 1, 4, 5
  - Hot Discriminator in Axial 1, 2
- Look into individual fibers and see how effective our way in picking out the hot/dead fibers...

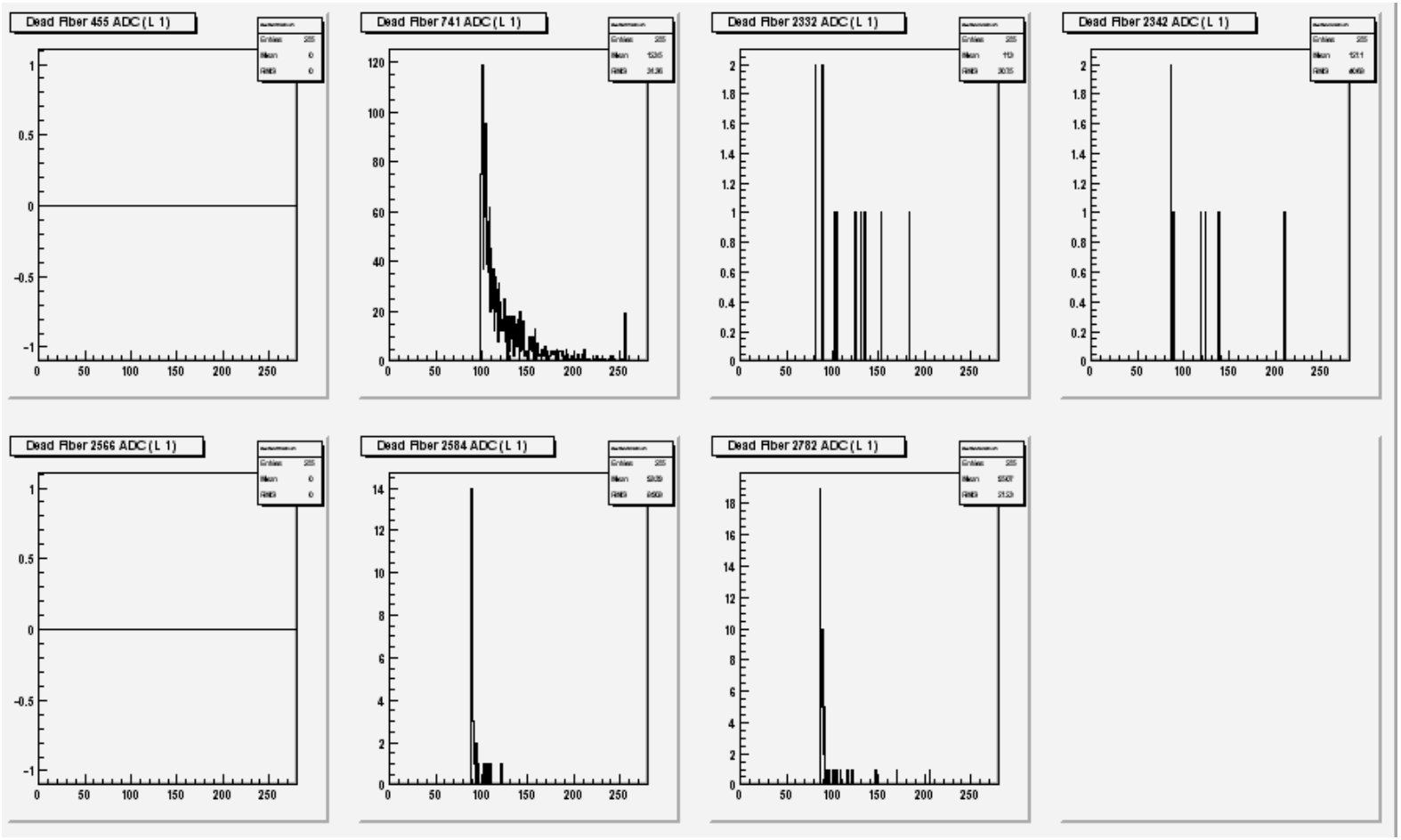
Axial 1 Dead (always)

- "Fake" if there is visible spike at ADC 255?
- 3 out of 6 fibers are not that "dead" at all.

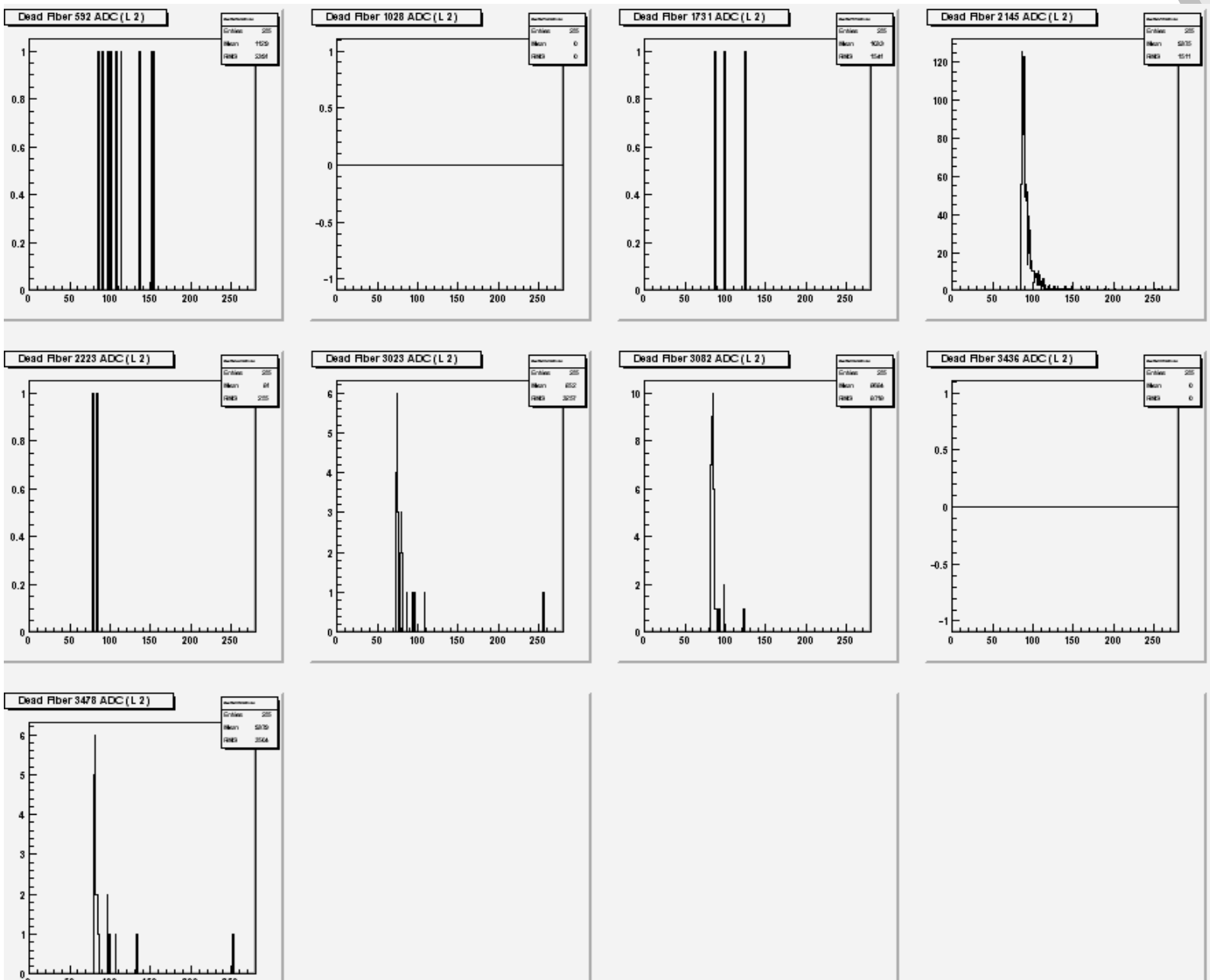


Axial 2 Dead (always)

- 1 out of 7 fibers is "fake" dead.

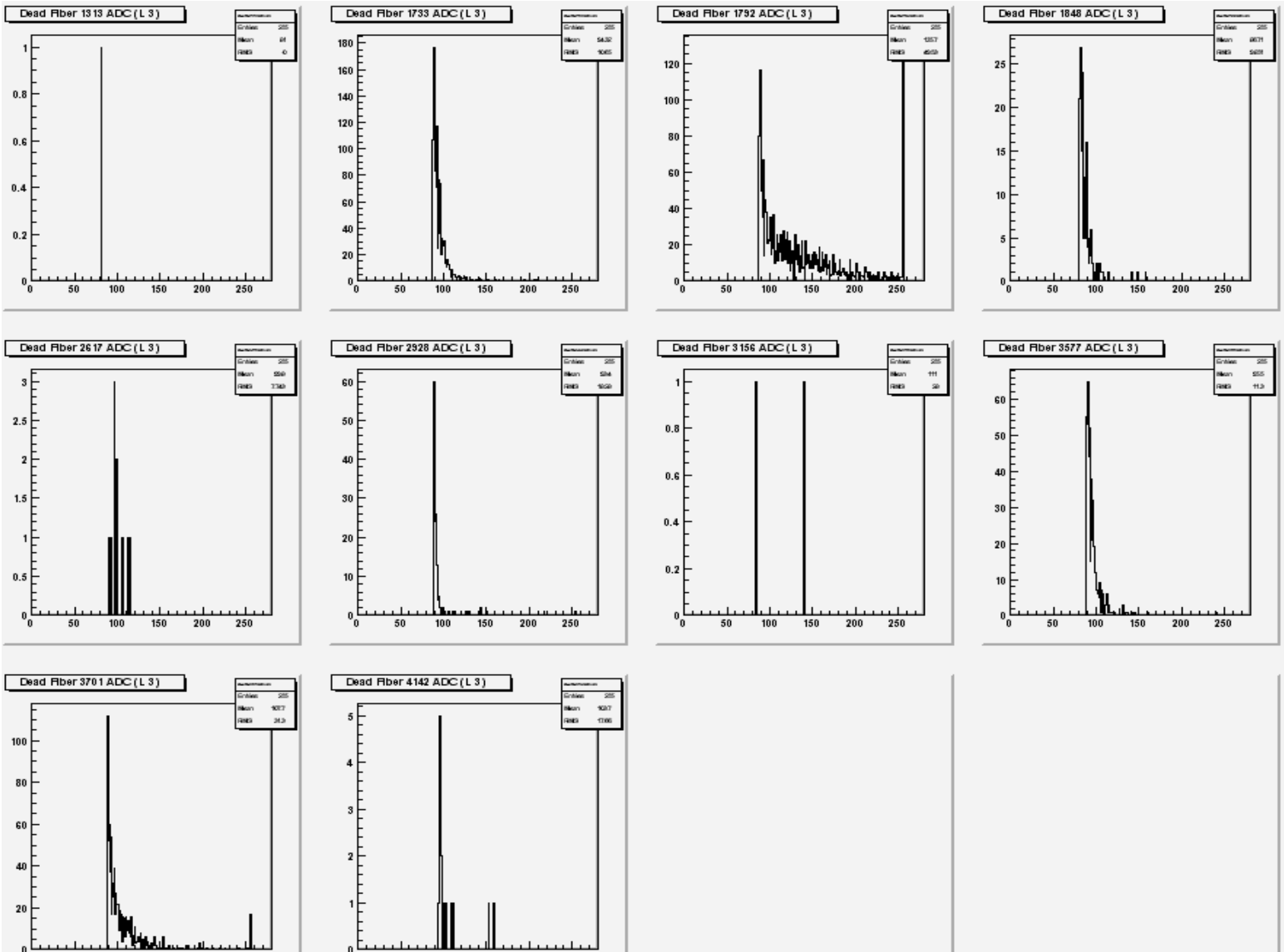


Axial 3 Dead (Always)

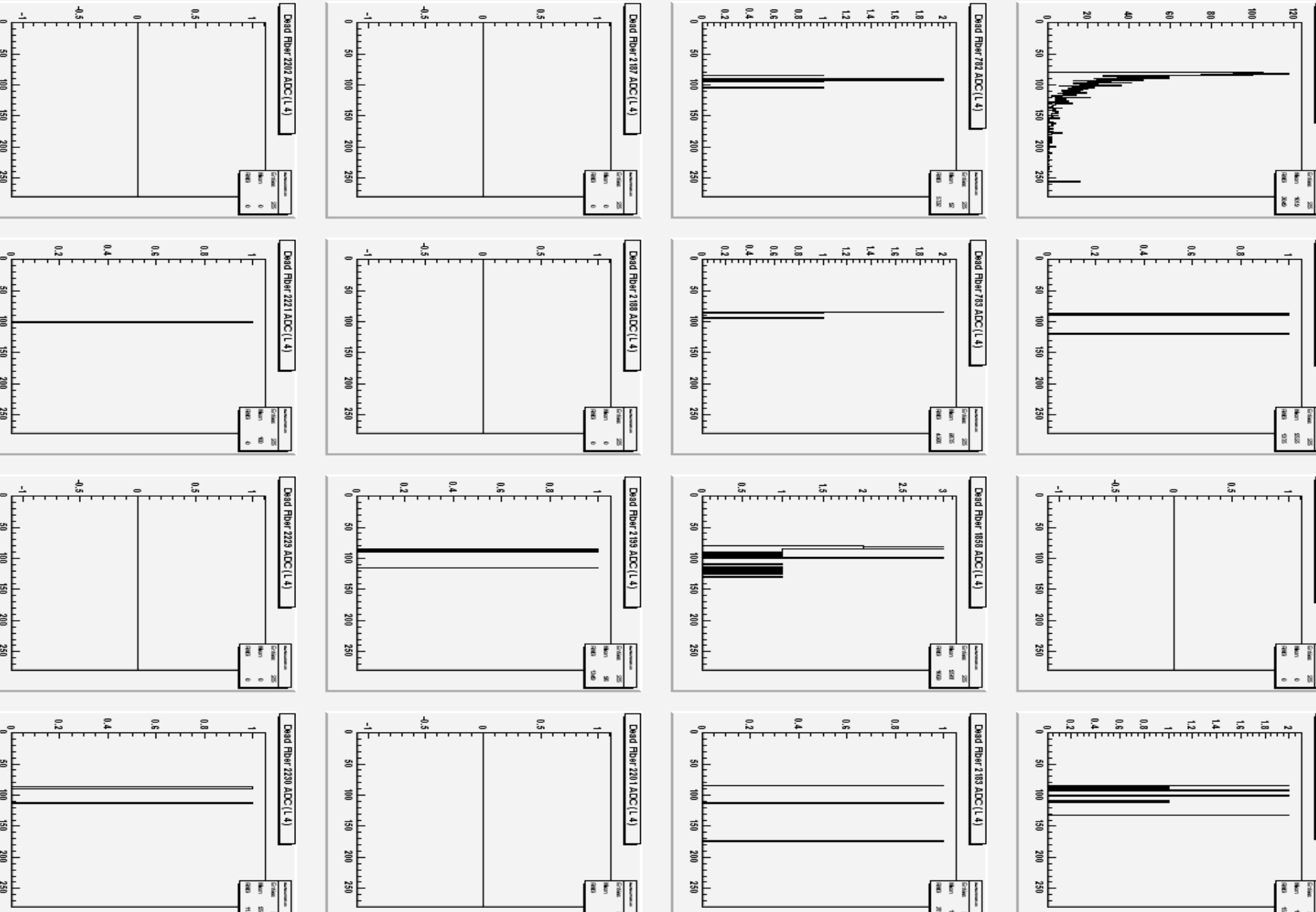


Axial 4 Dead (Always)

- 2 "fake" dead

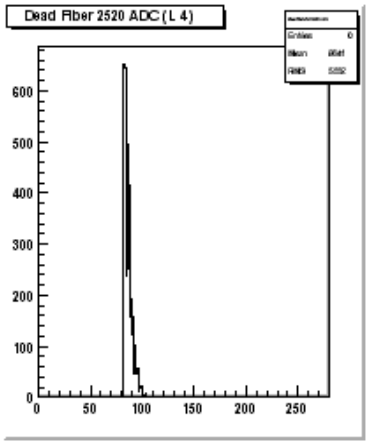


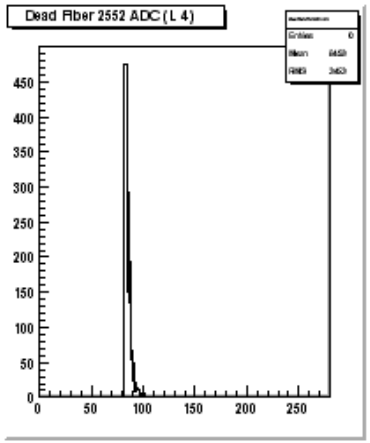
Axial 5 Dead (Always)

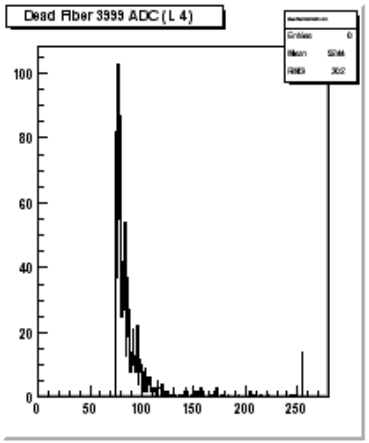


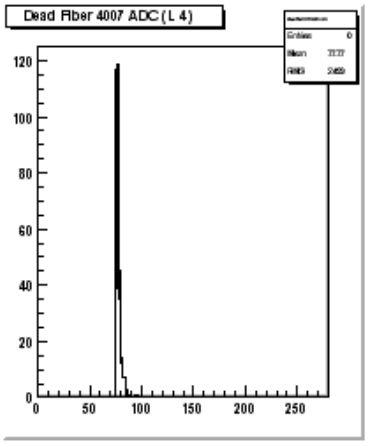
Axial 5 Dead (always) more

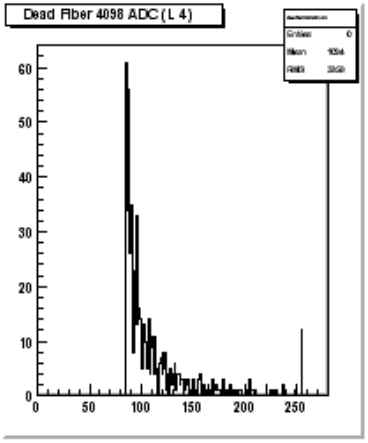
- 4 "fake" dead

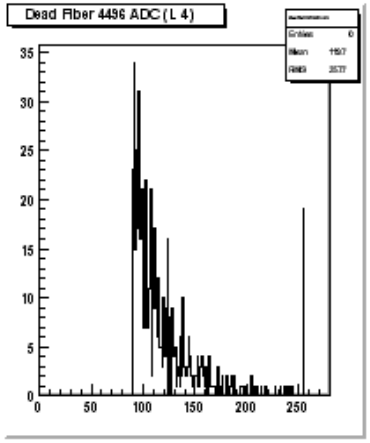




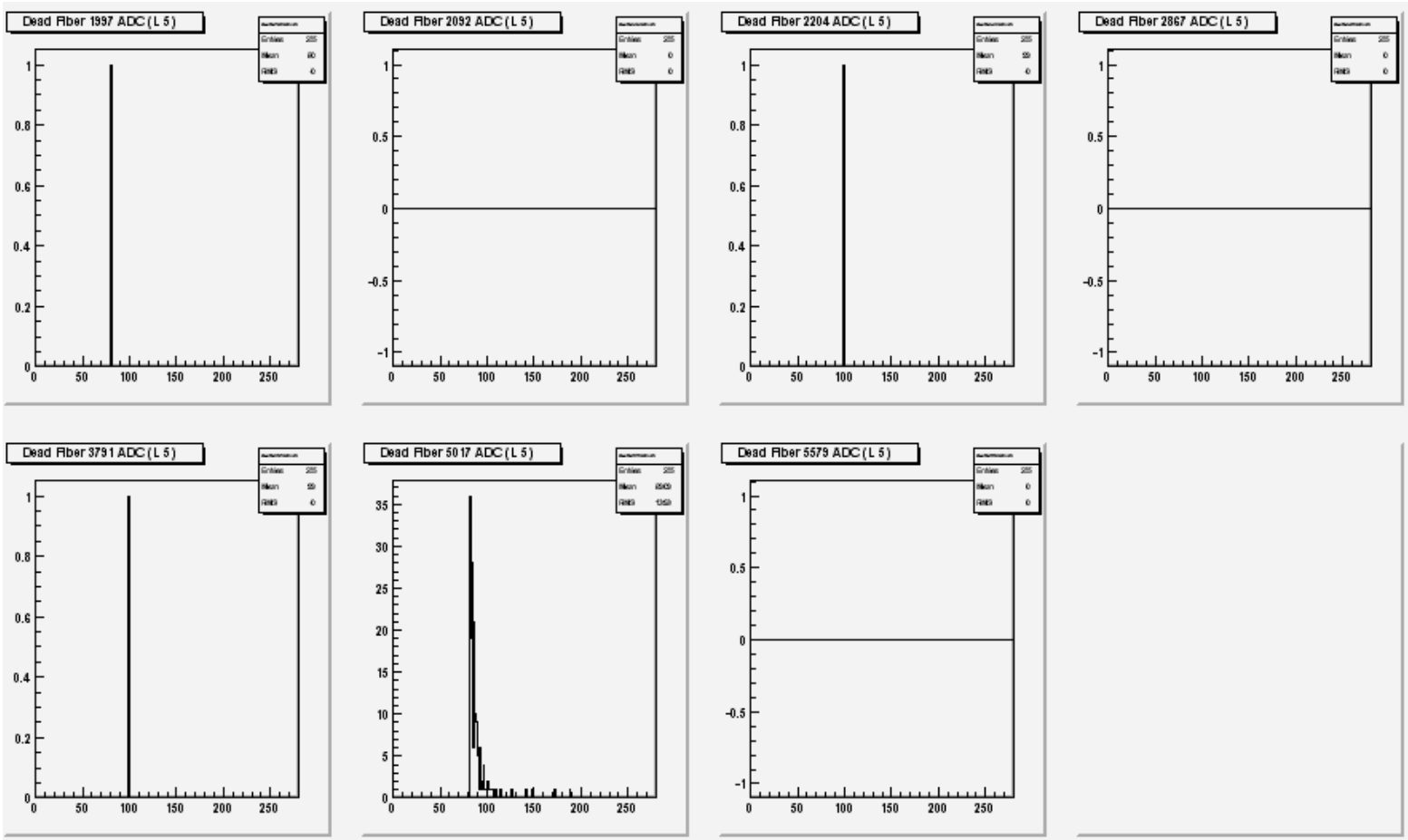






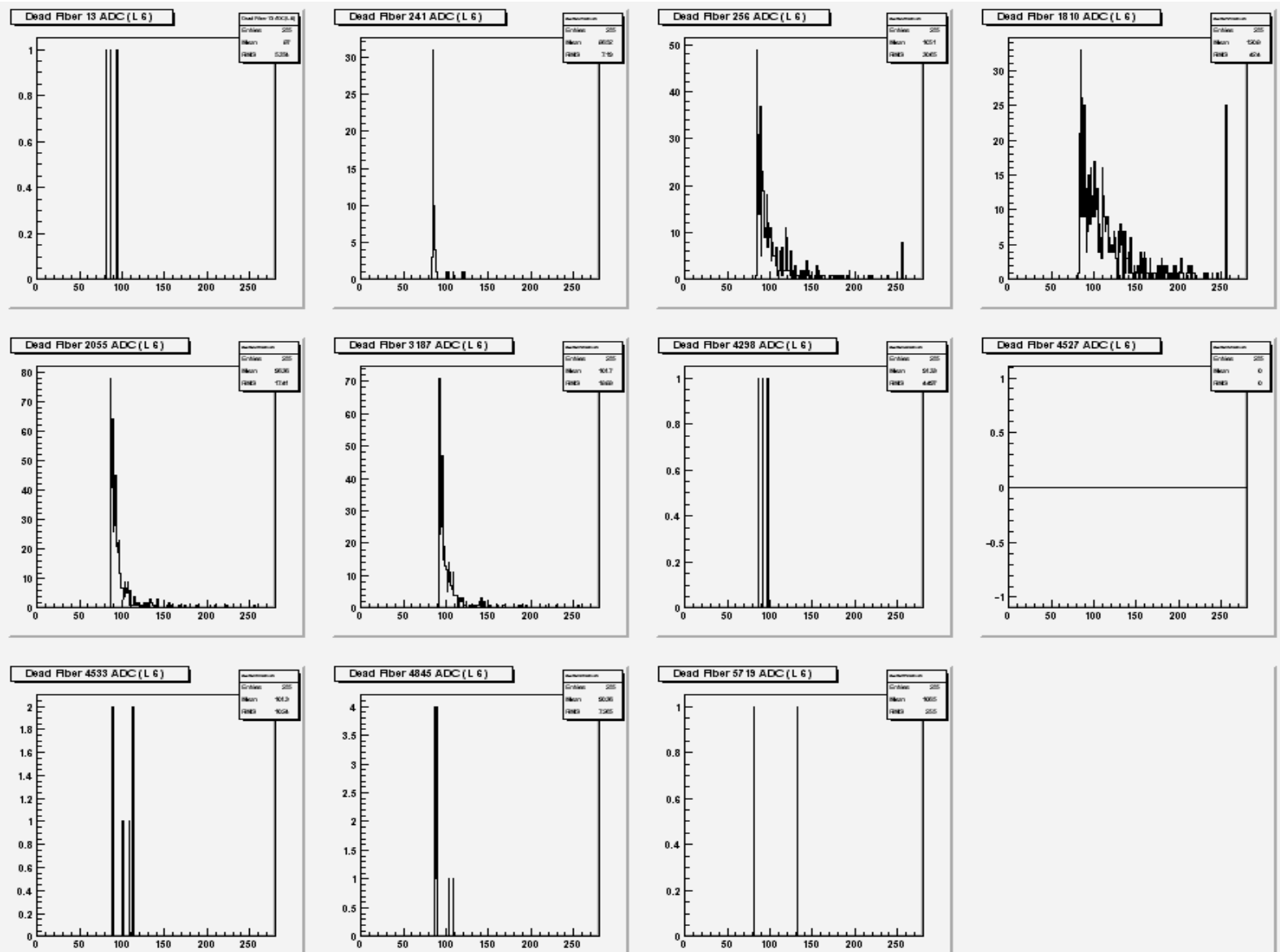


Axial 6 Dead (Always)

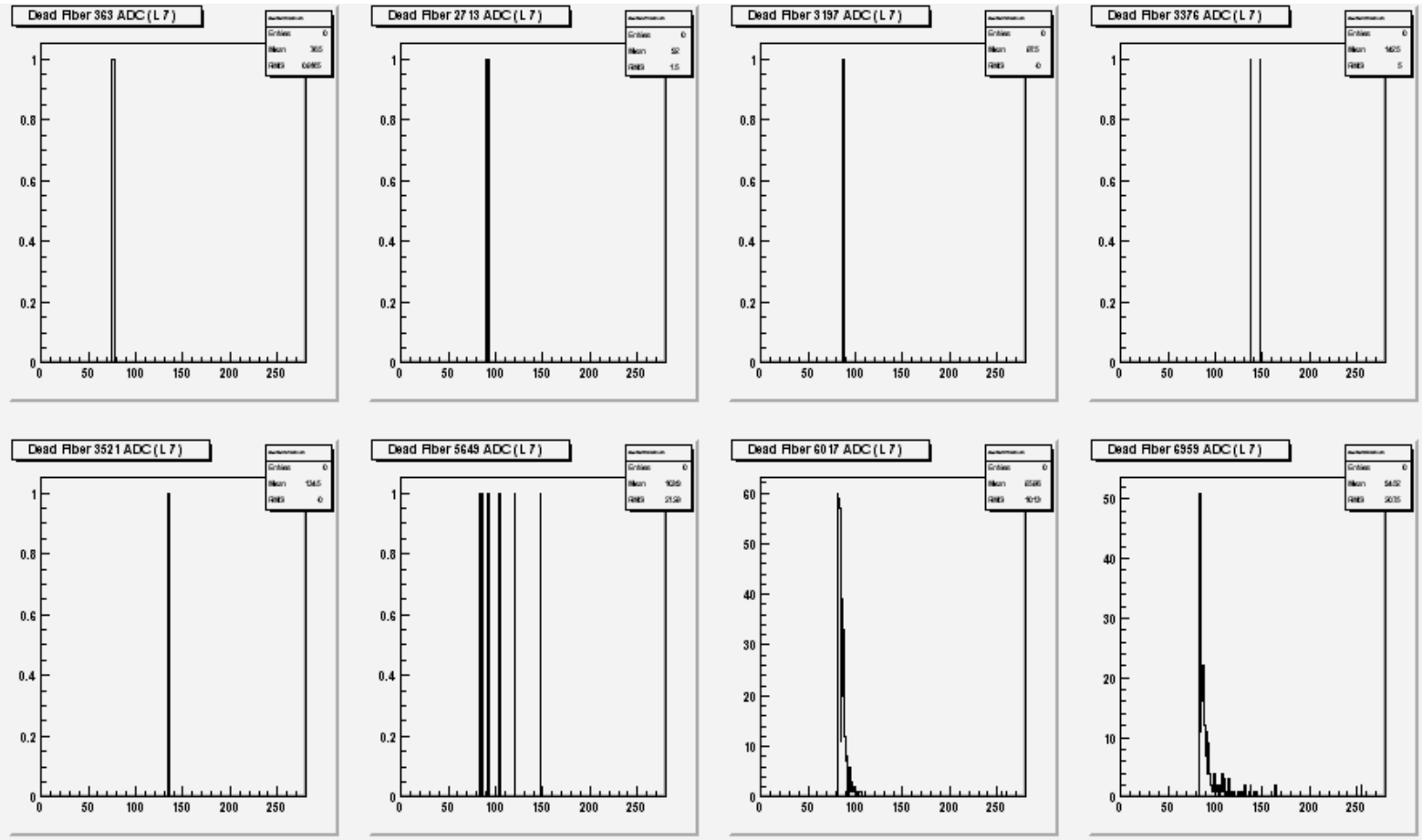


Axial 7 Dead (Always)

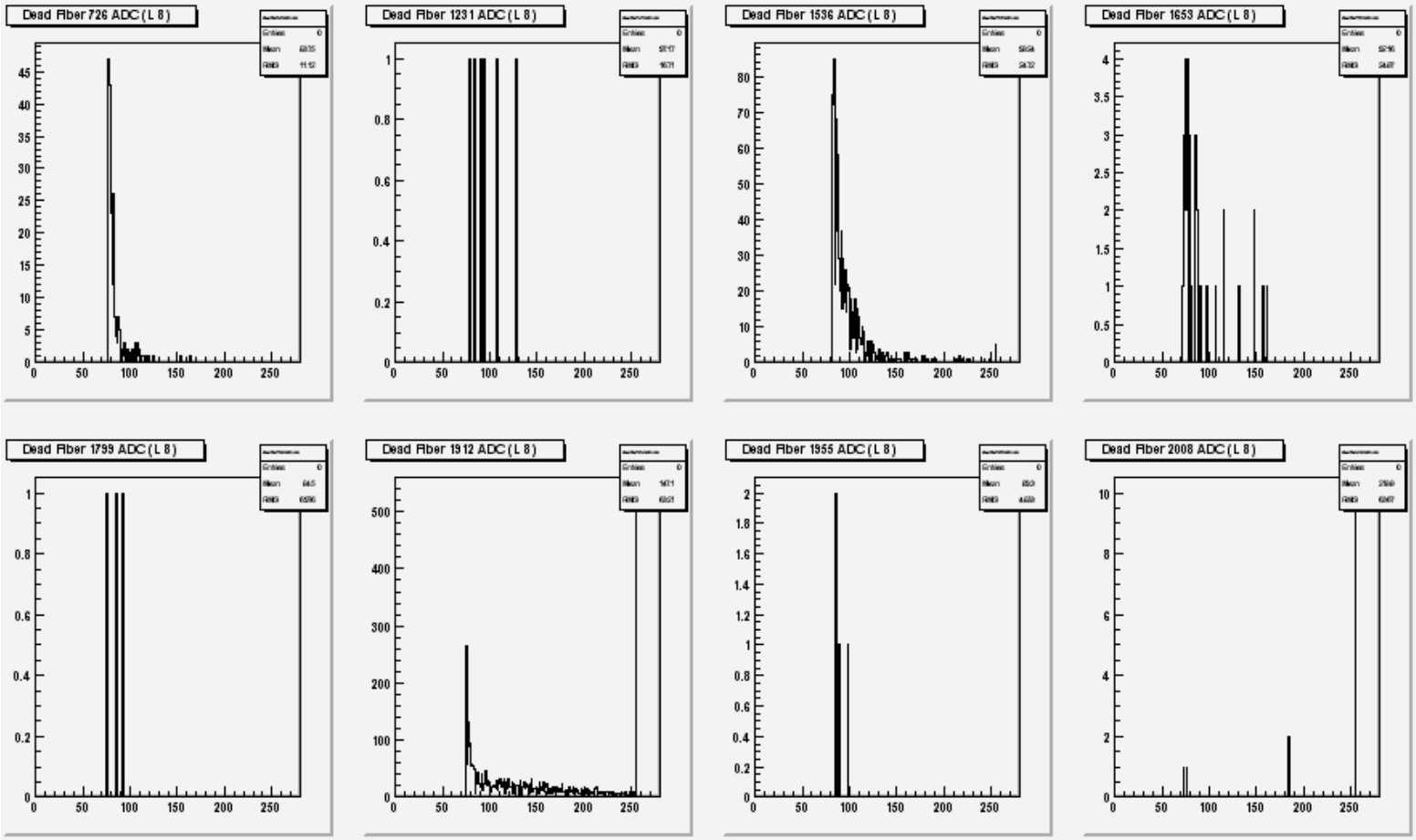
- 2 "fake" dead



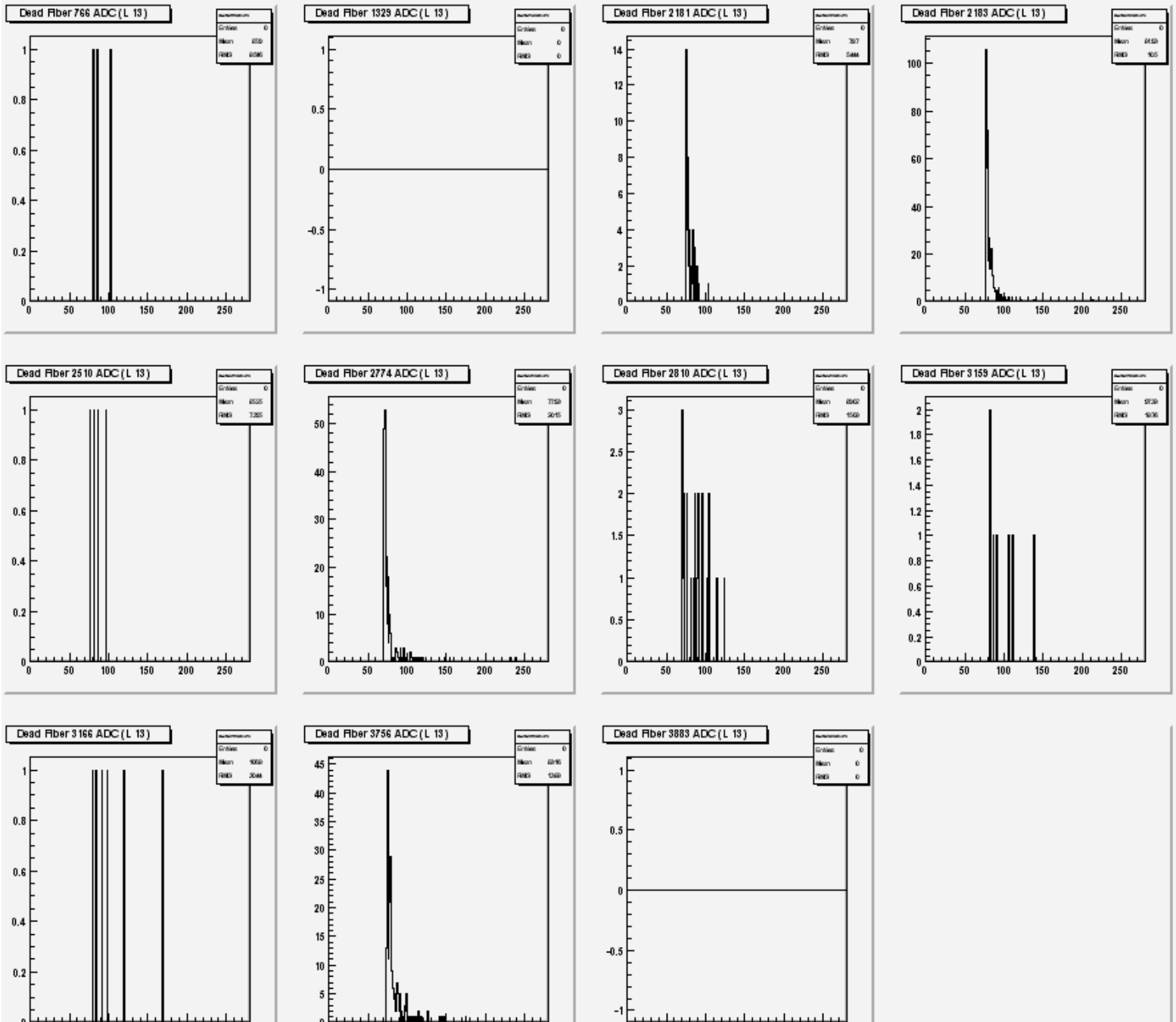
Axial 8 Dead (Always)



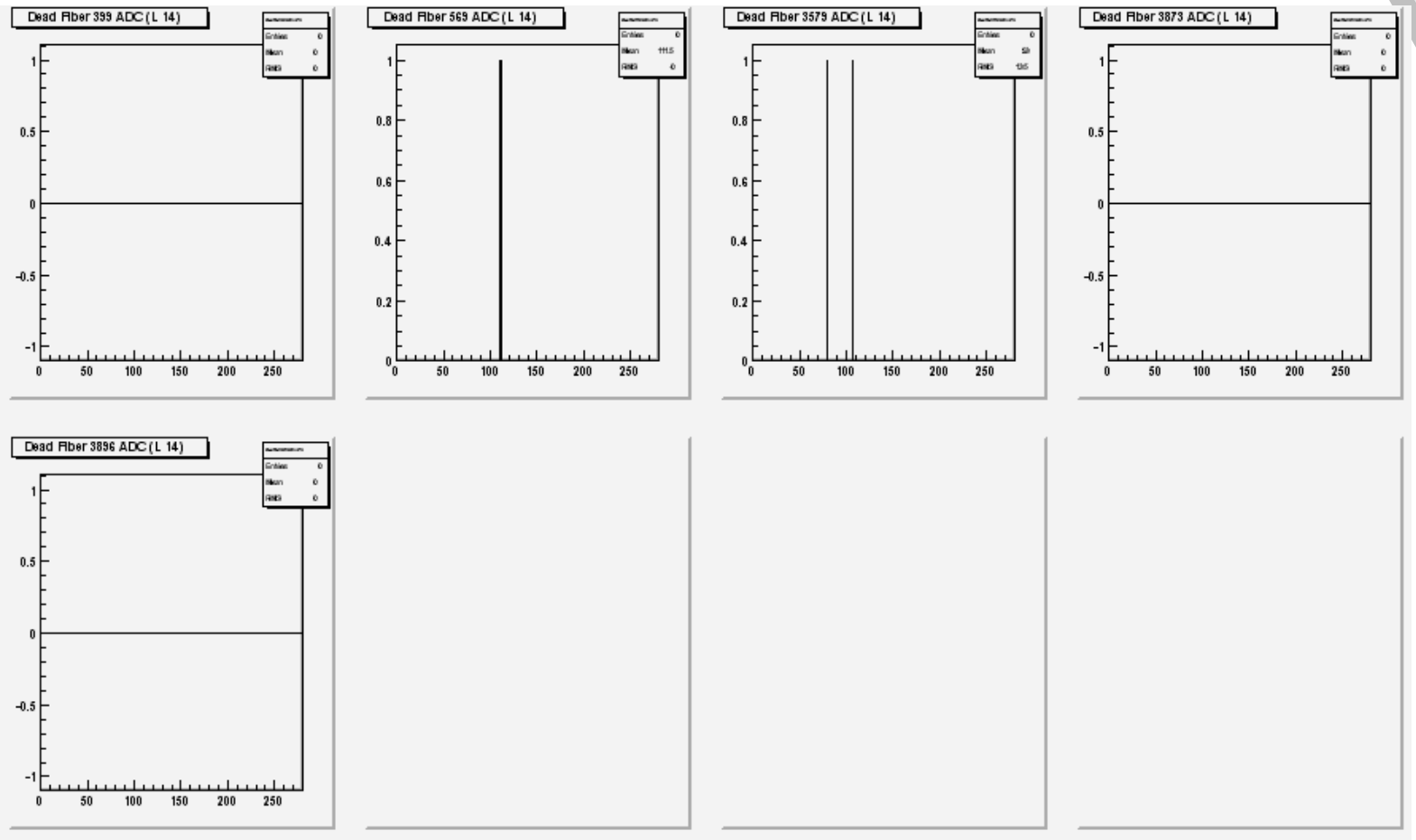
Stereo 1 Dead (Always)



Stereo 5 Dead (Always)



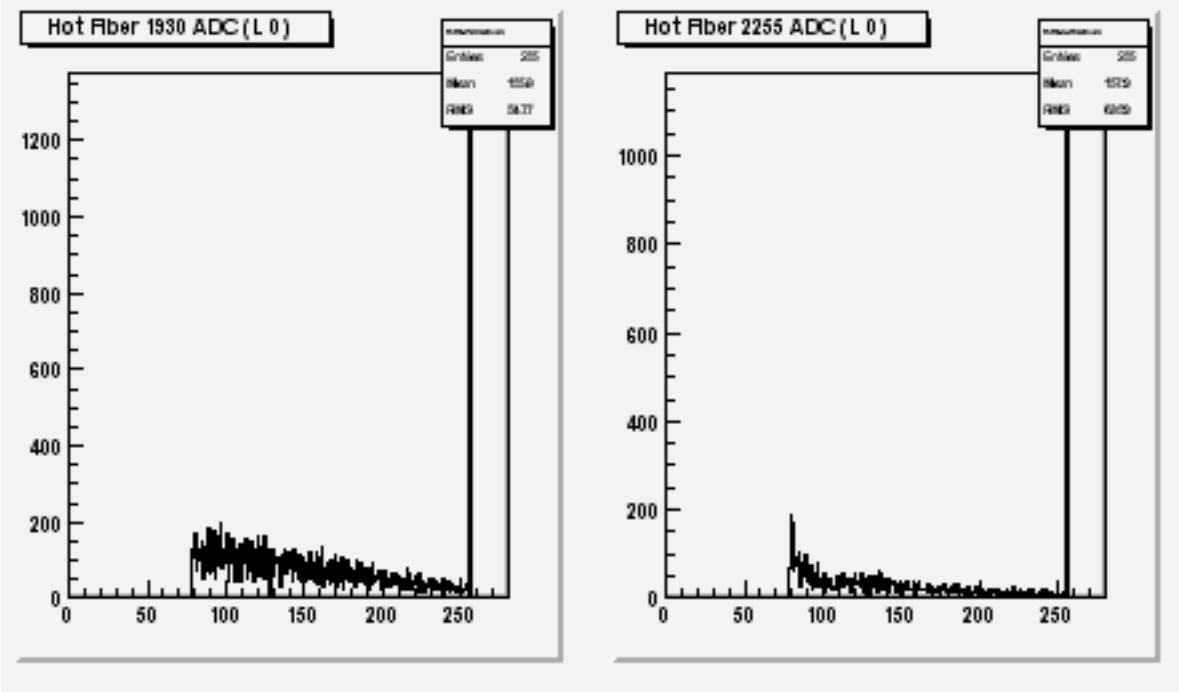
Stereo 8 Dead (Always)



- Less "fake" dead in Stereo Layers
- How about Hot Fibers?

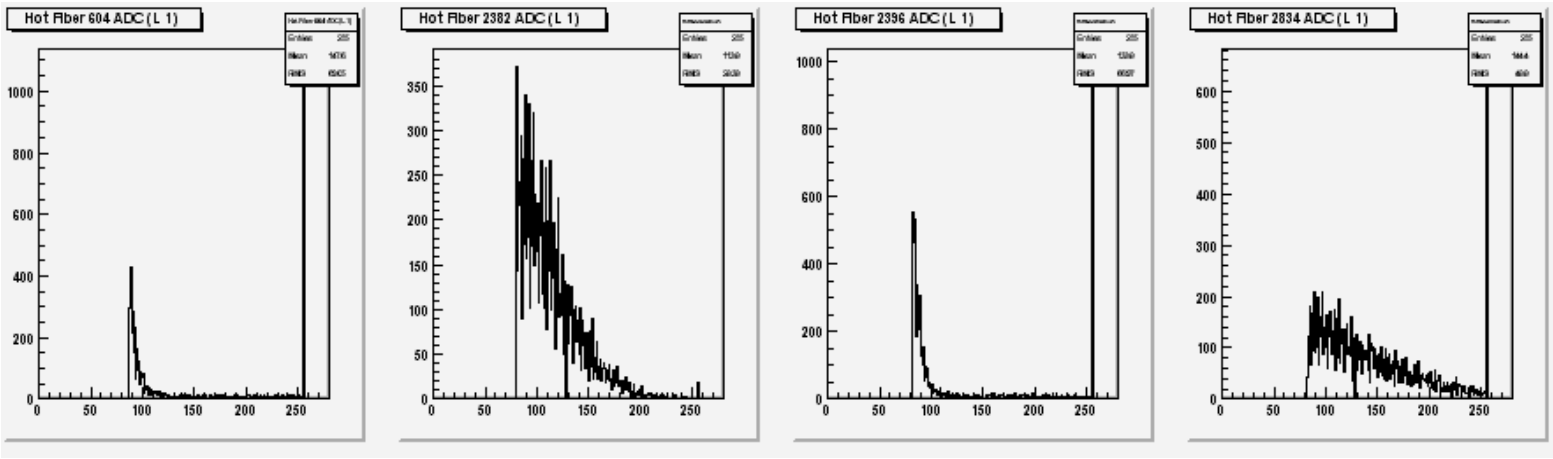
Axial 1 Hot (Always)

- Not that hot in Axial 1 either...
- 2 "fake" hot



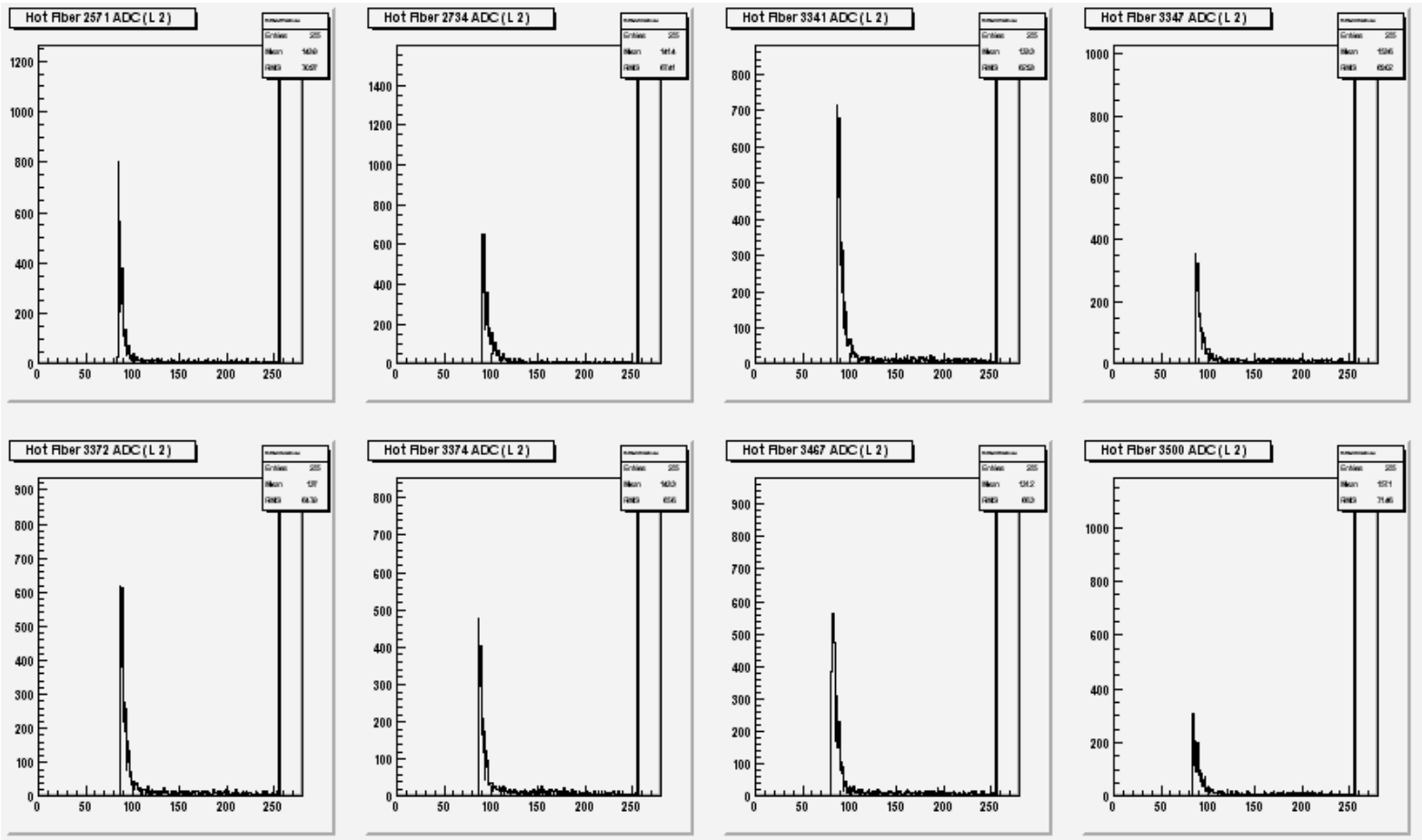
Axial 2 Hot (Always)

- Peak close to ADC 50-70: Incorrect Pedestals?

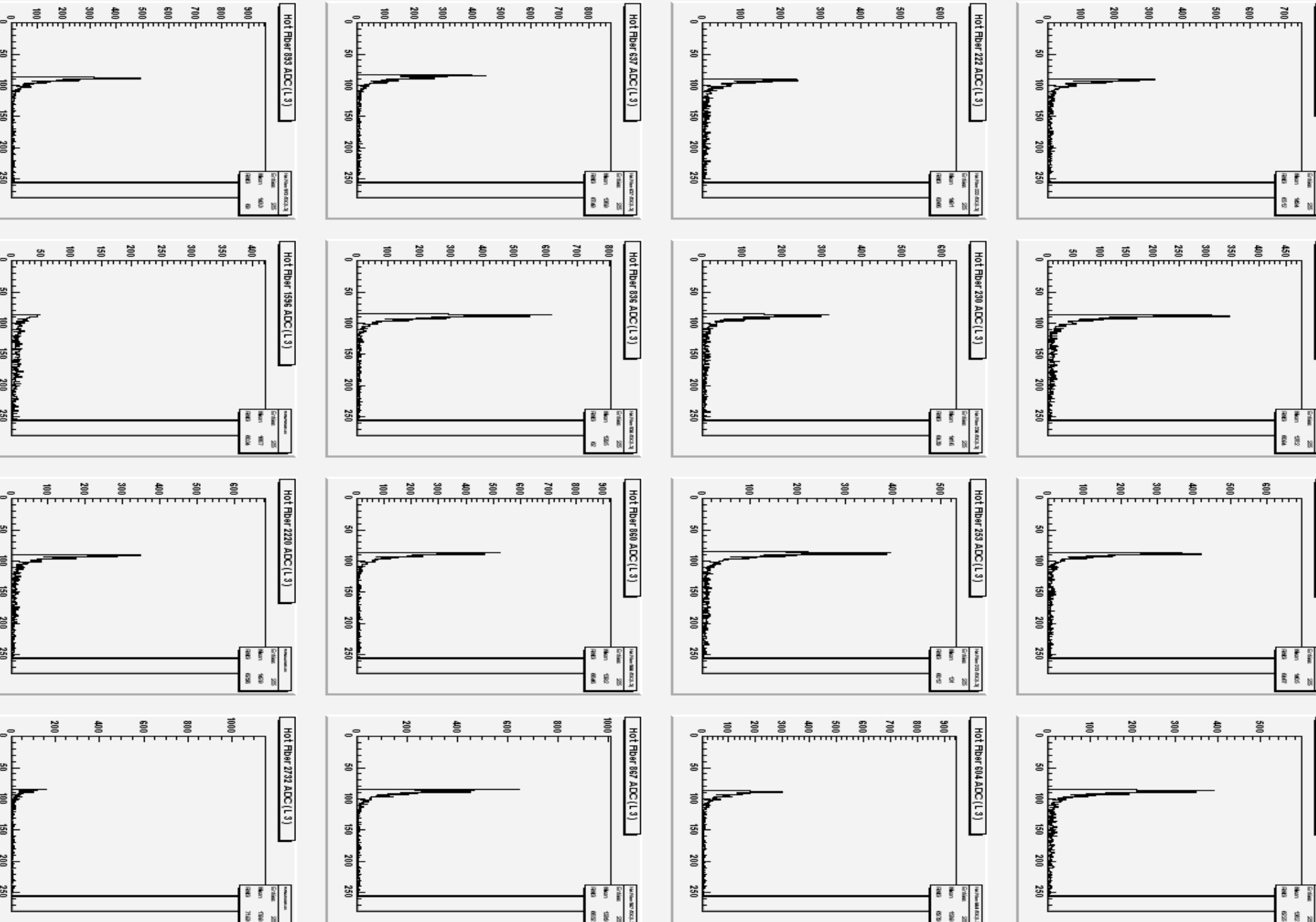


Axial 3 Hot (Always)

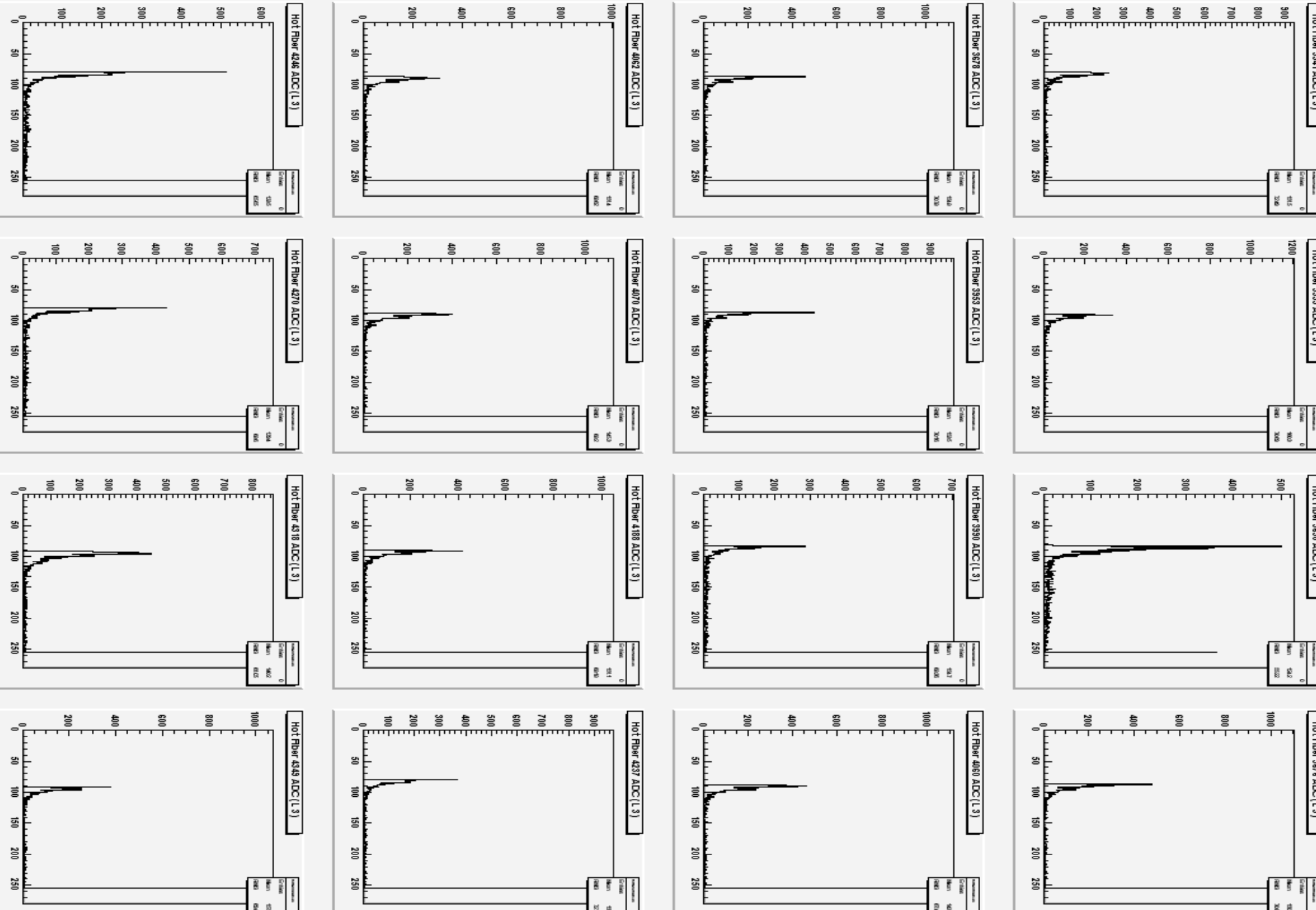
- Again, most appear hot due to the peak close to the pedestal.



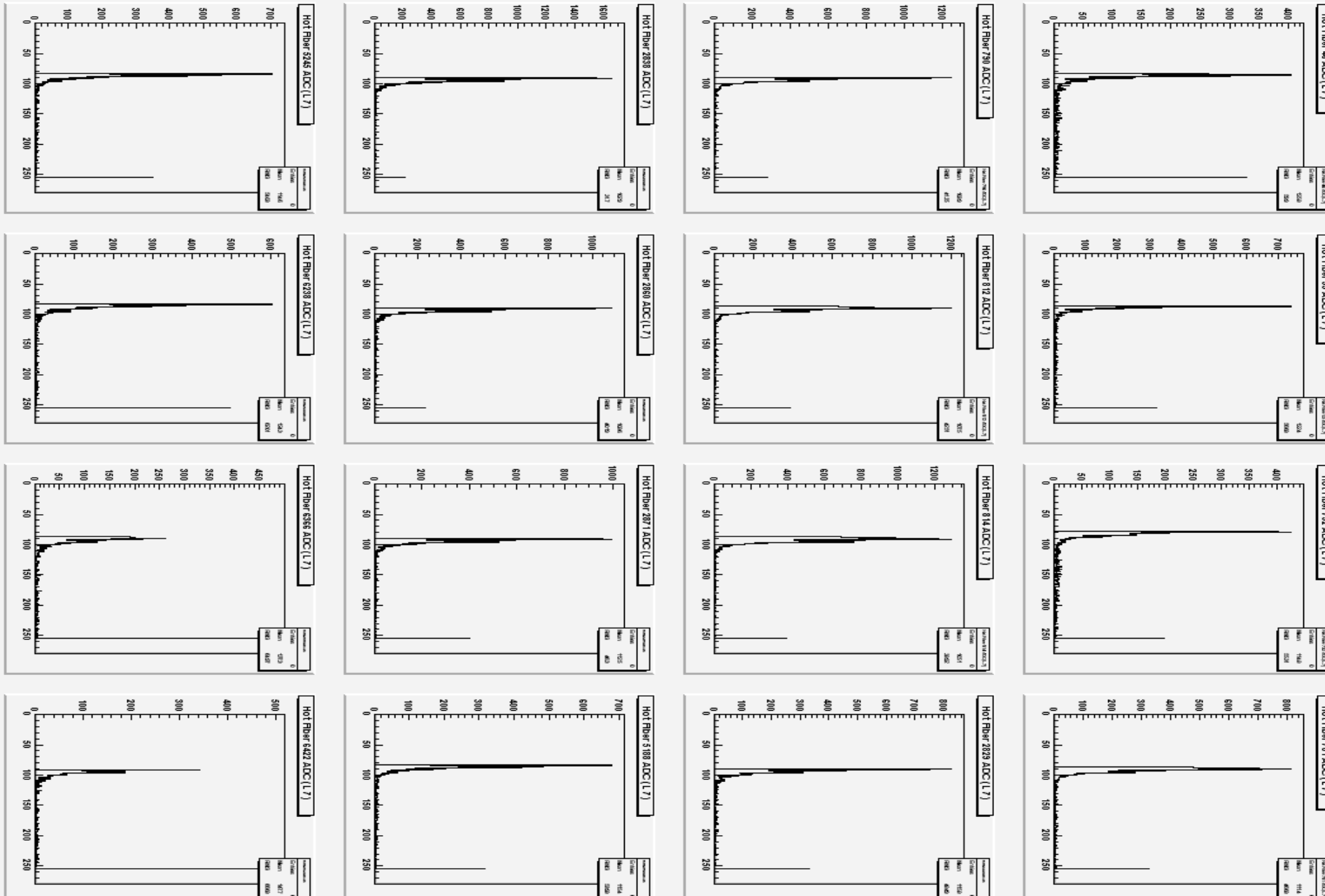
Axial 4 Hot (Always)



Axial 4 Hot (Always) (cont.)

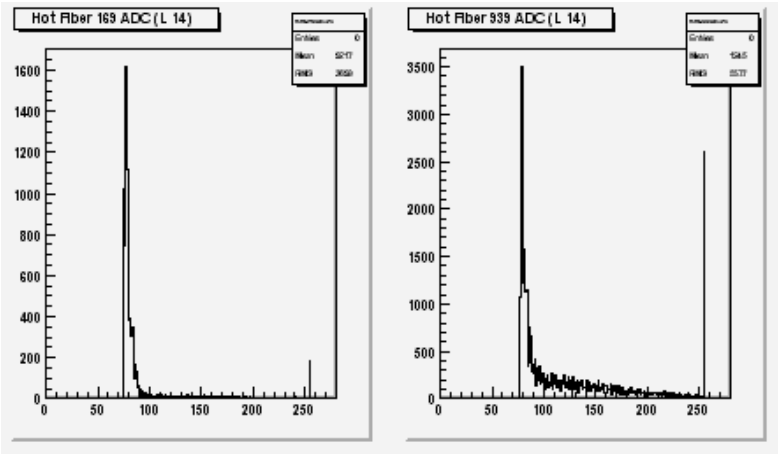


Axial 8 Hot (Always)

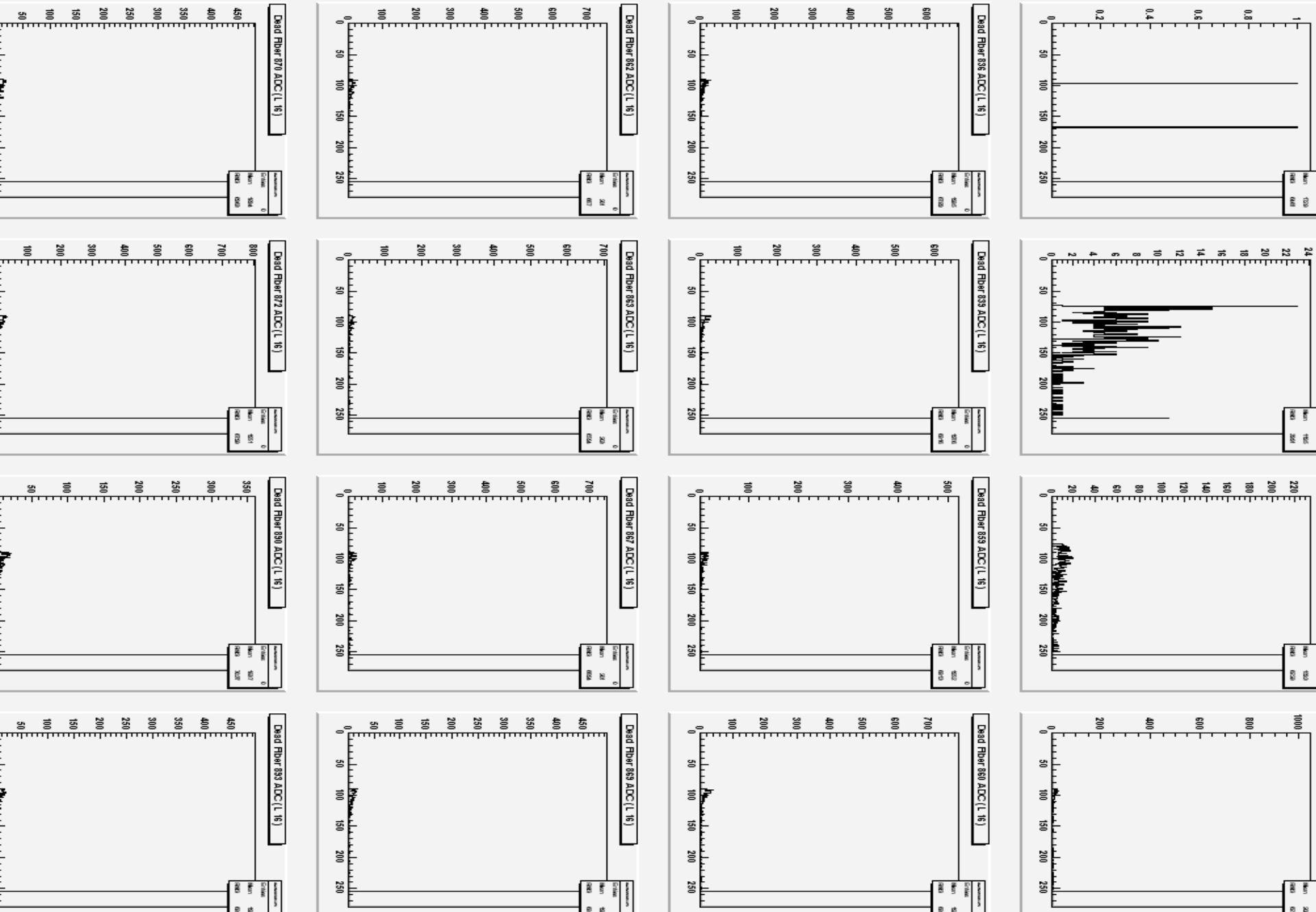


Stereo 7 Hot (Always)

- Much less hot fibers in Stereo layers. (no "fake").
- Less fake rate in hot fibers in general.
- How about discriminators?

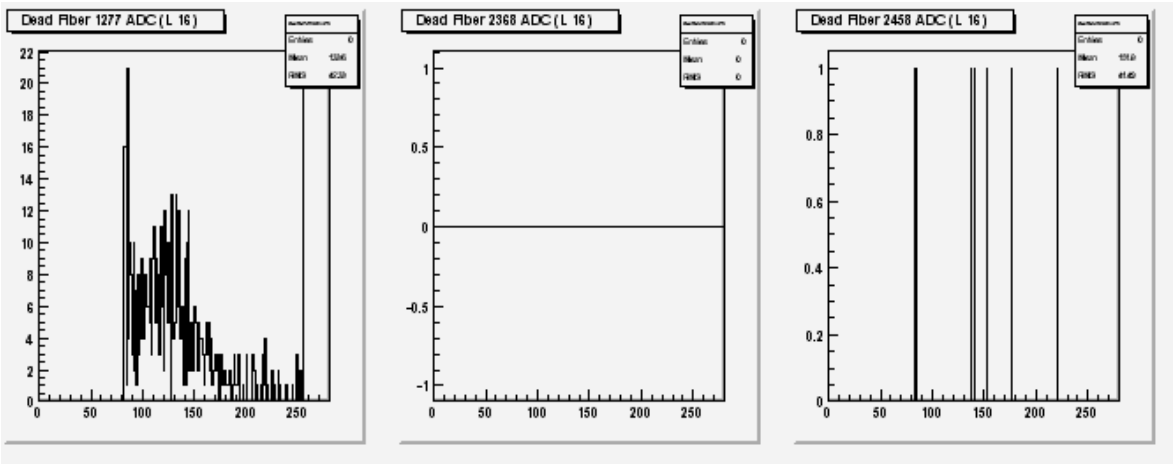


Discriminator 1 Dead (Always)



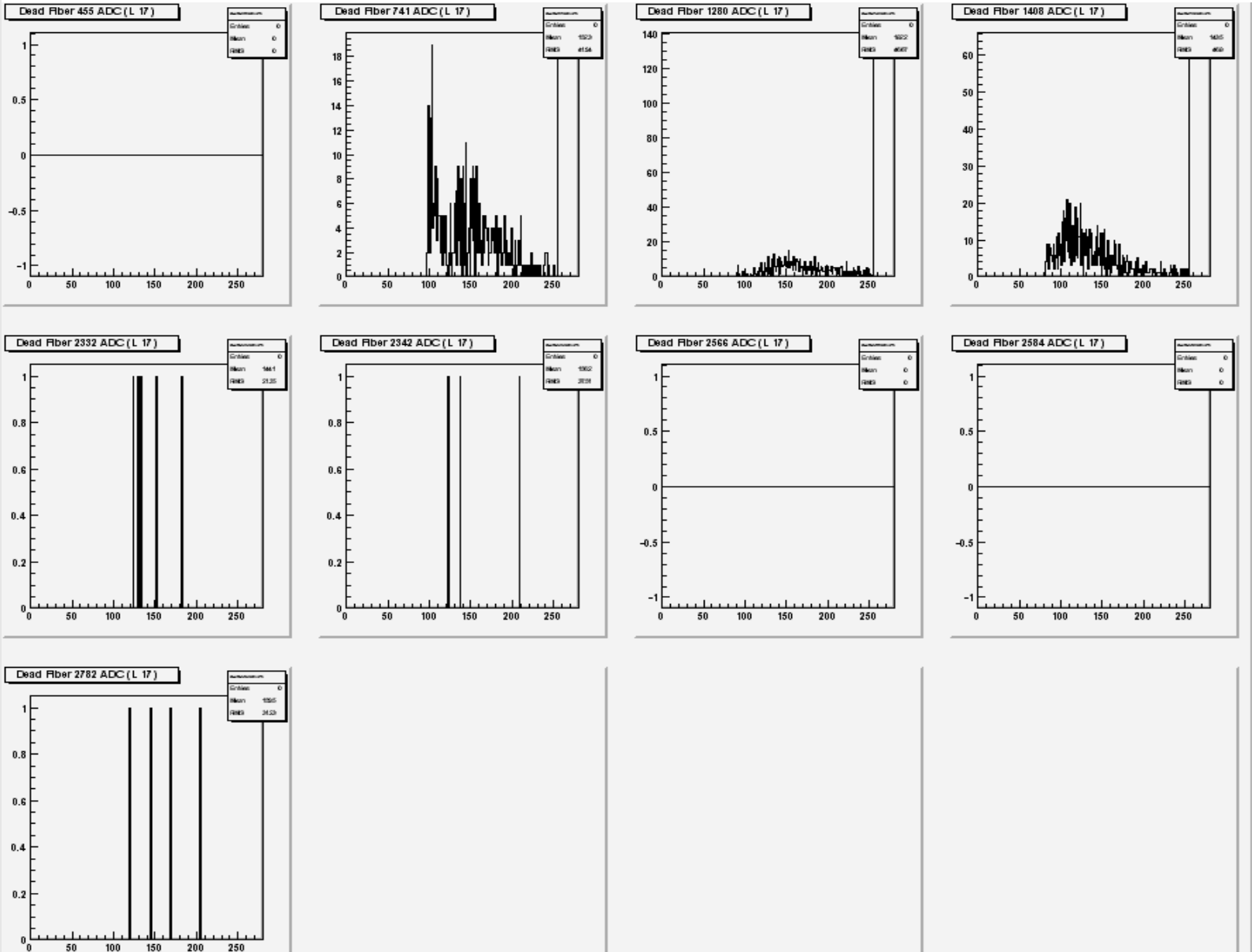
Discriminator 1 Dead (Always)

- Lots of "fake" dead in layer 1 (14/19).
- Those that are not "fake" are identified as dead fibers in layer 1 also.

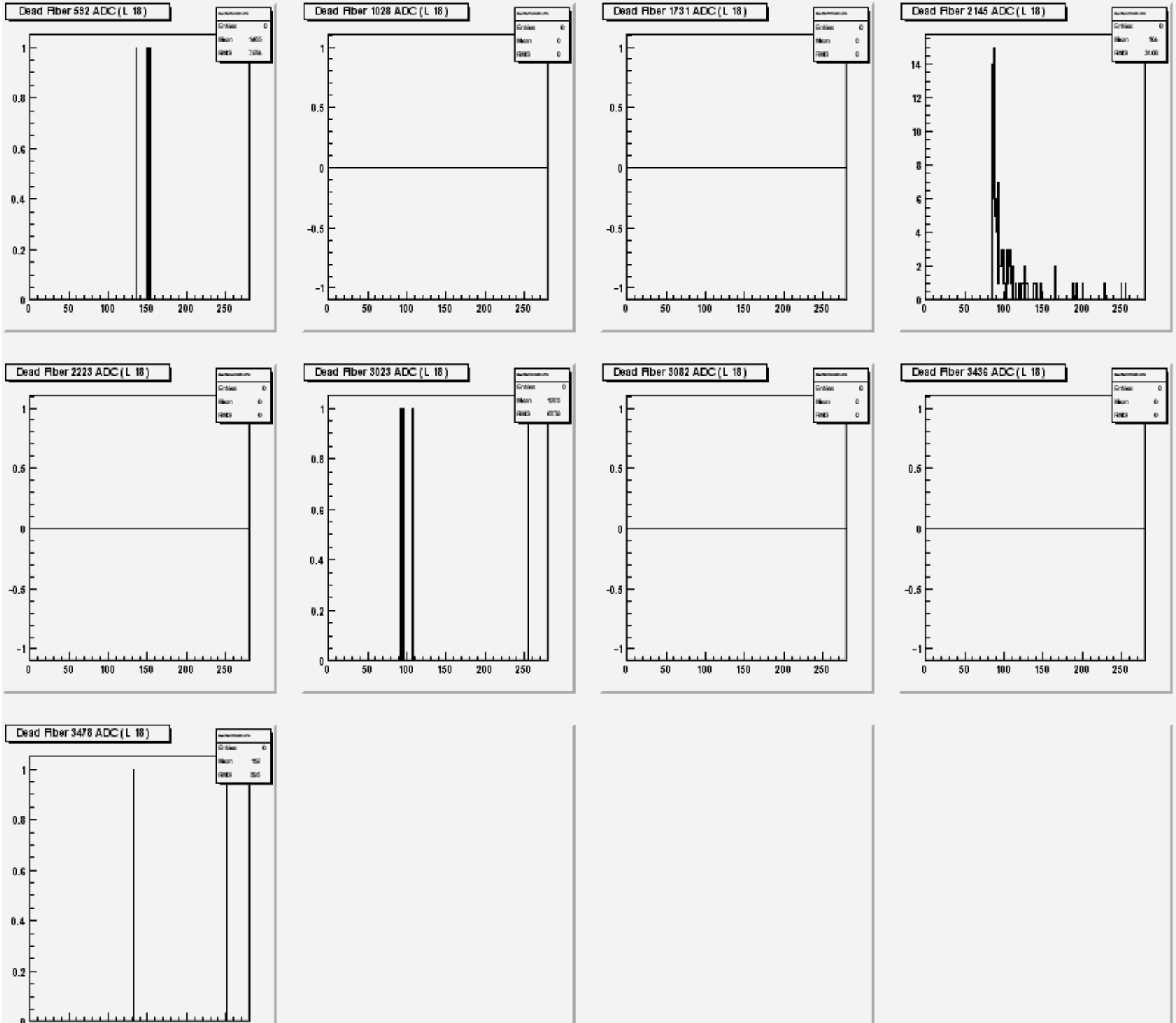


Discriminator 2 Dead (Always)

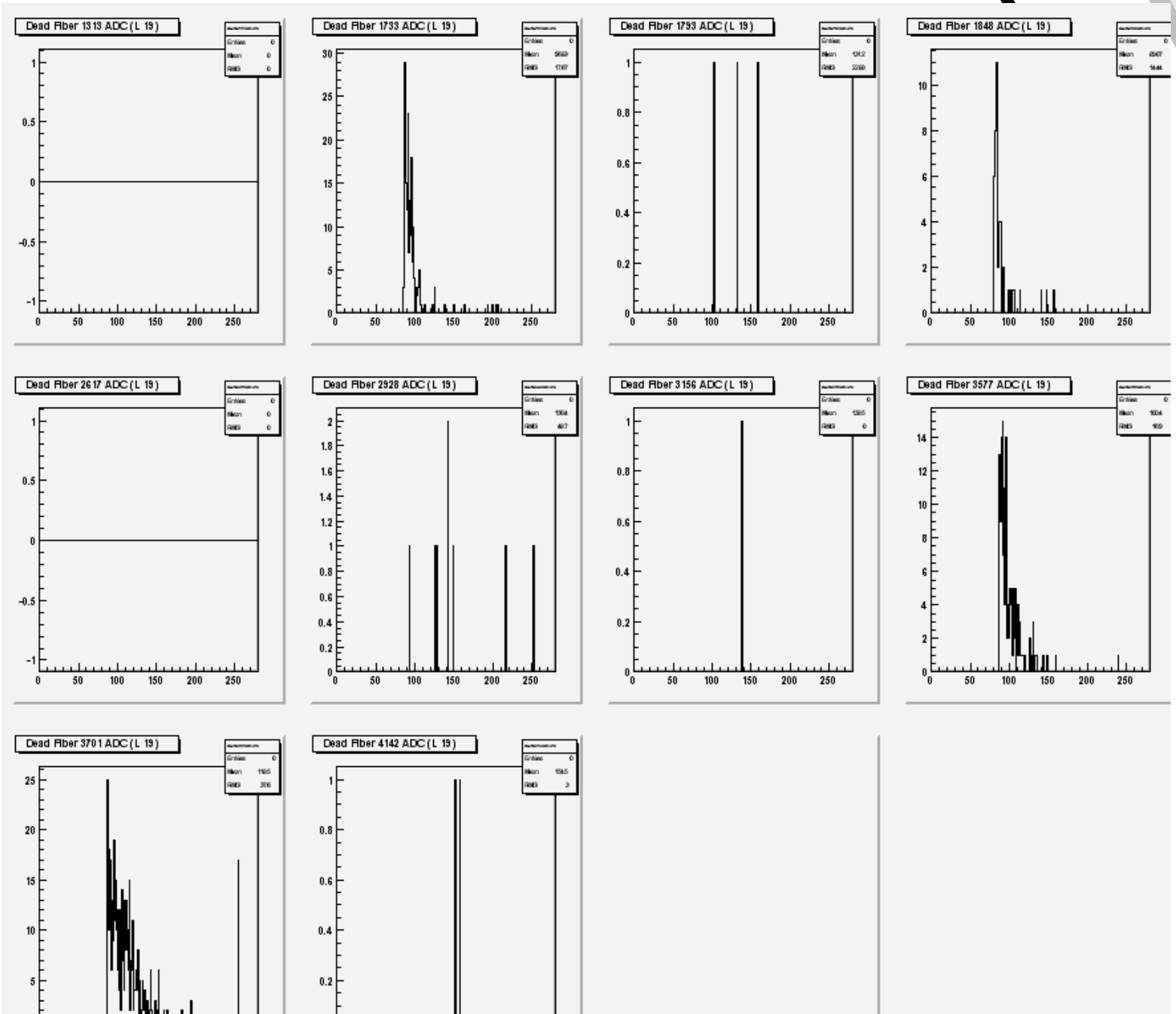
- Only 2 "fakes"



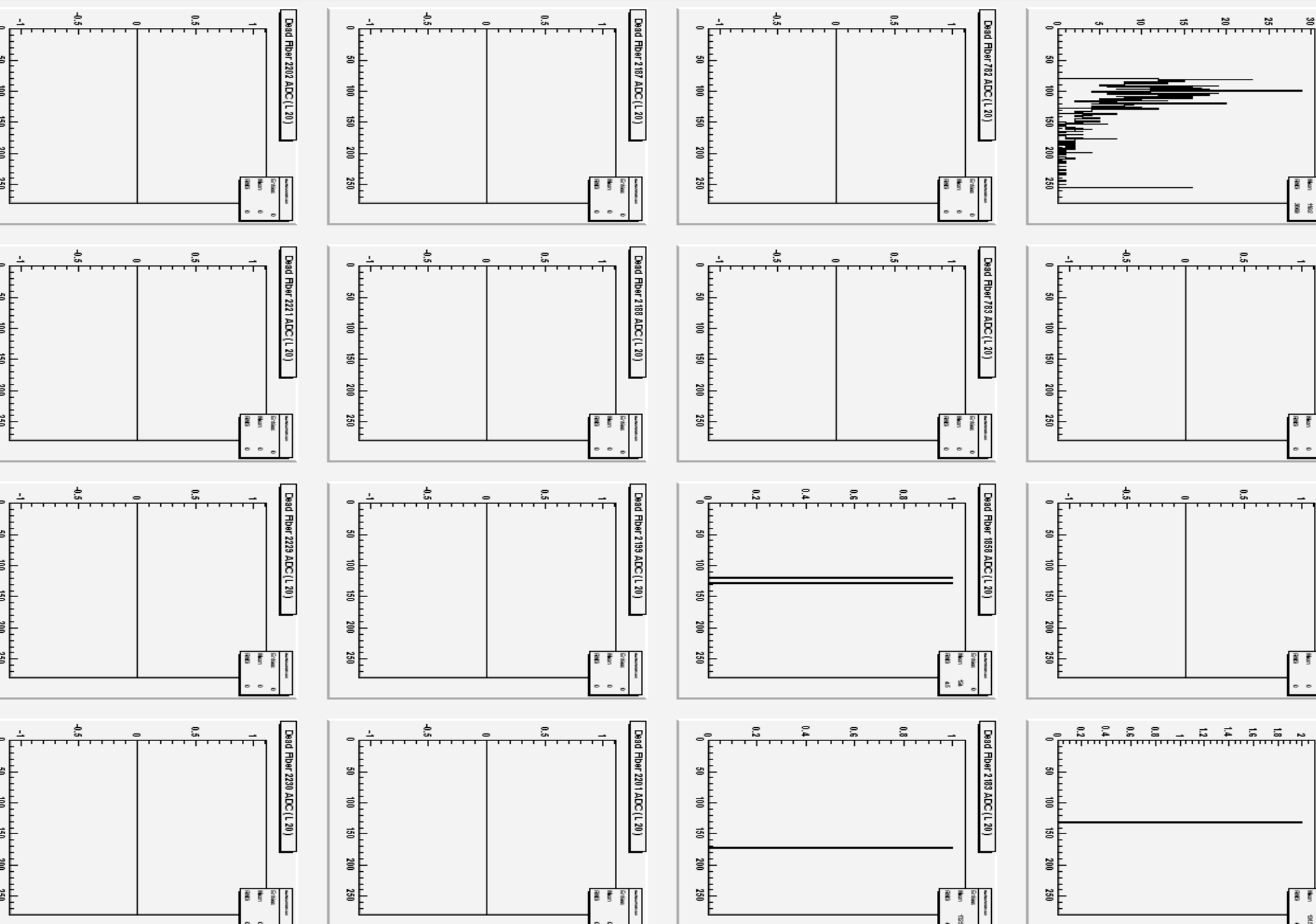
Discriminator 3 Dead (Always)



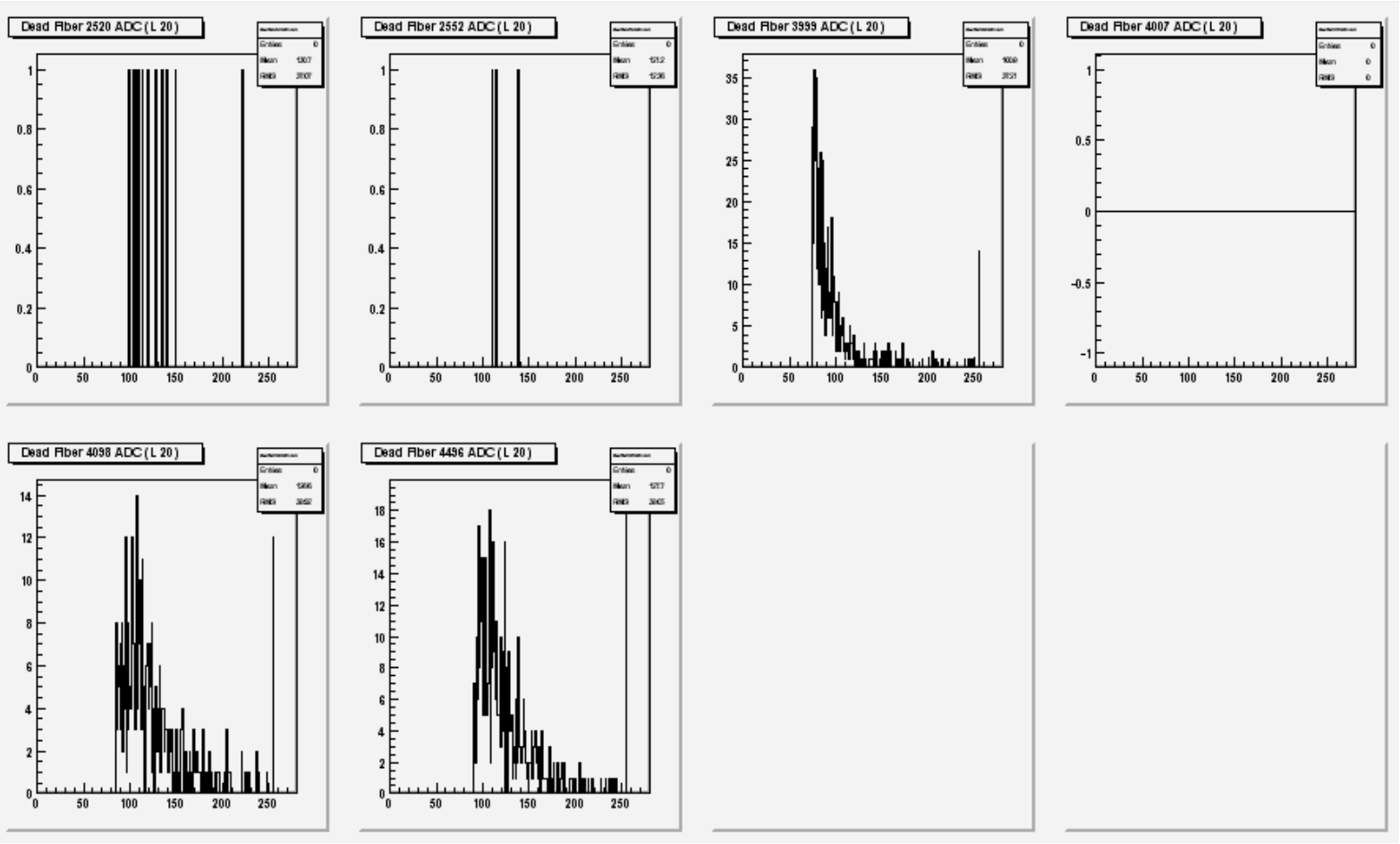
Discriminator 4 Dead (Always)



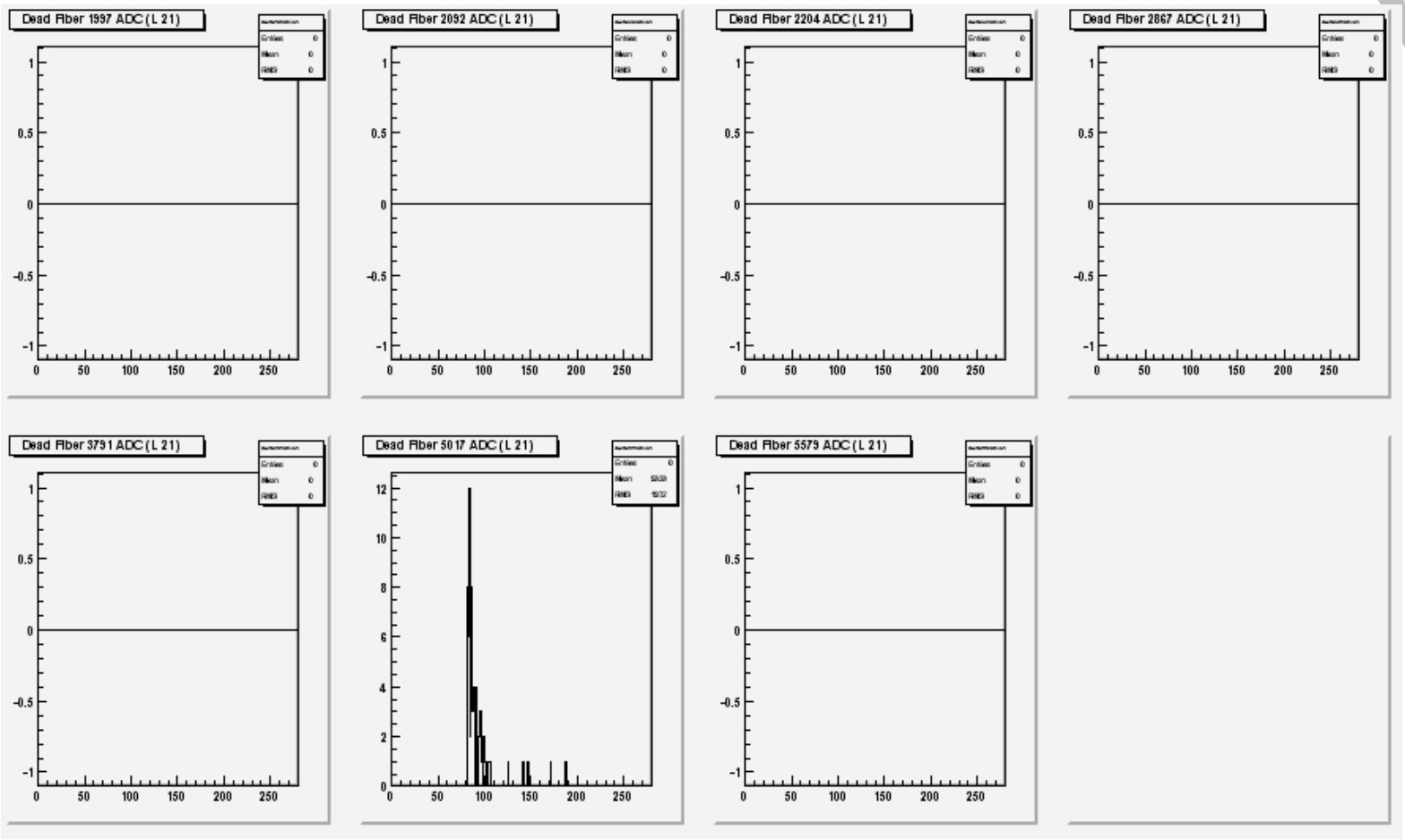
Discriminator 5 Dead (Always)



Discriminator 5 Dead (Always)

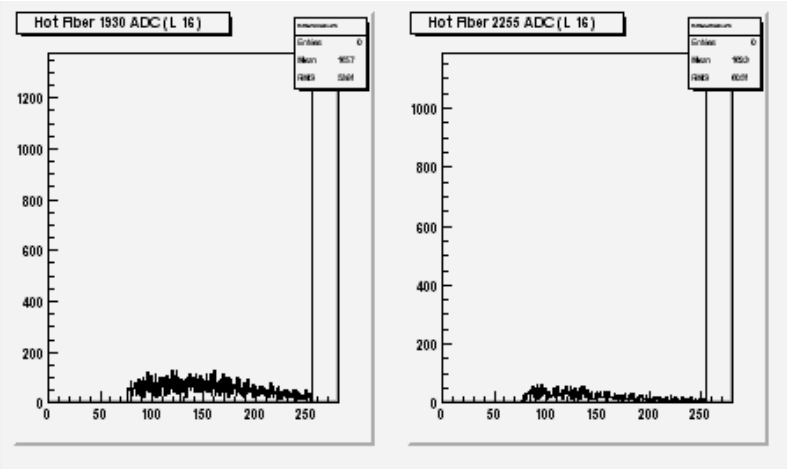


Discriminator 6 Dead (Always)

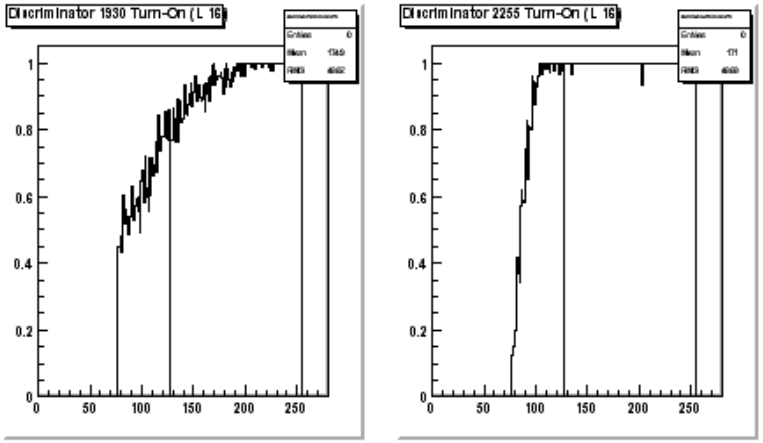


- Less "fakes" in the rest of the layers.

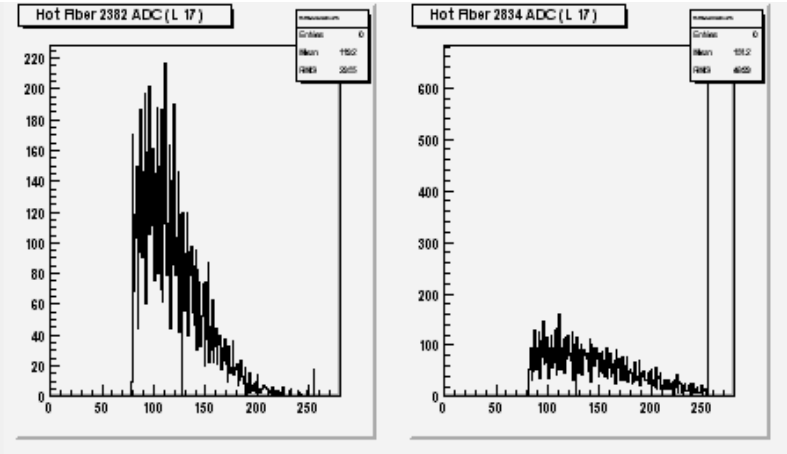
Discriminator 1 Hot (Always)

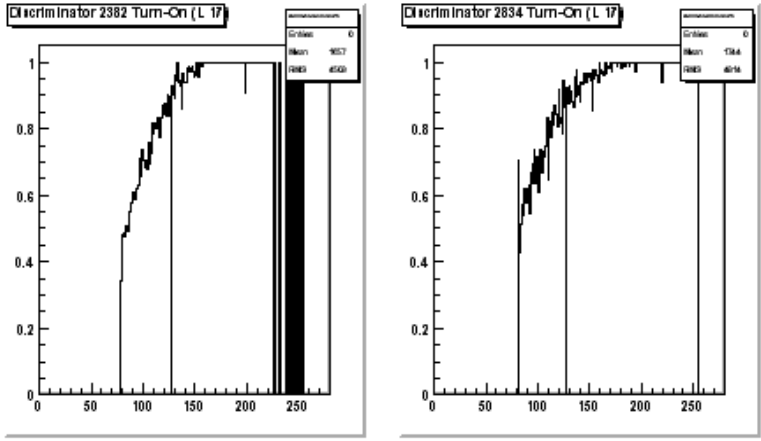


- Fake? Look at VSVX turn-on curve also:

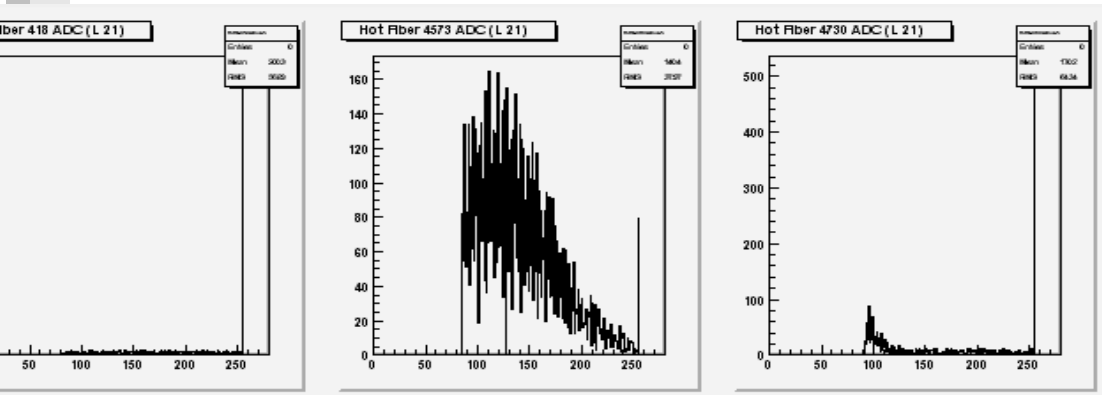


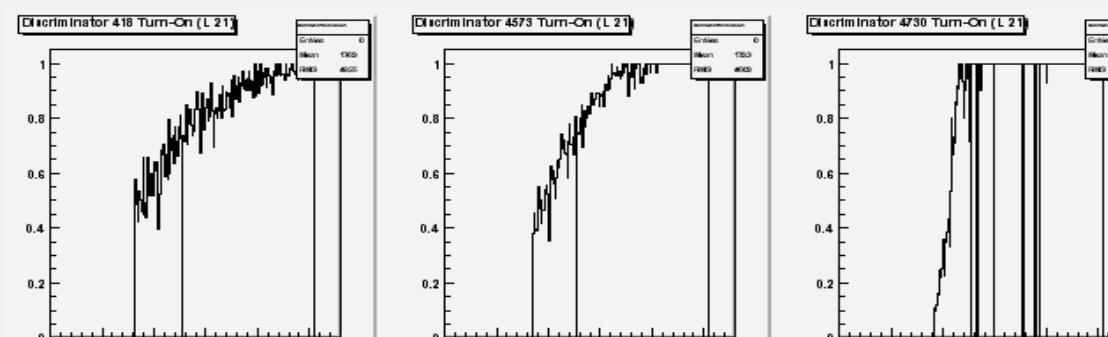
Discriminator 2 Hot (Always)





Discriminator 6 Hot (Always)





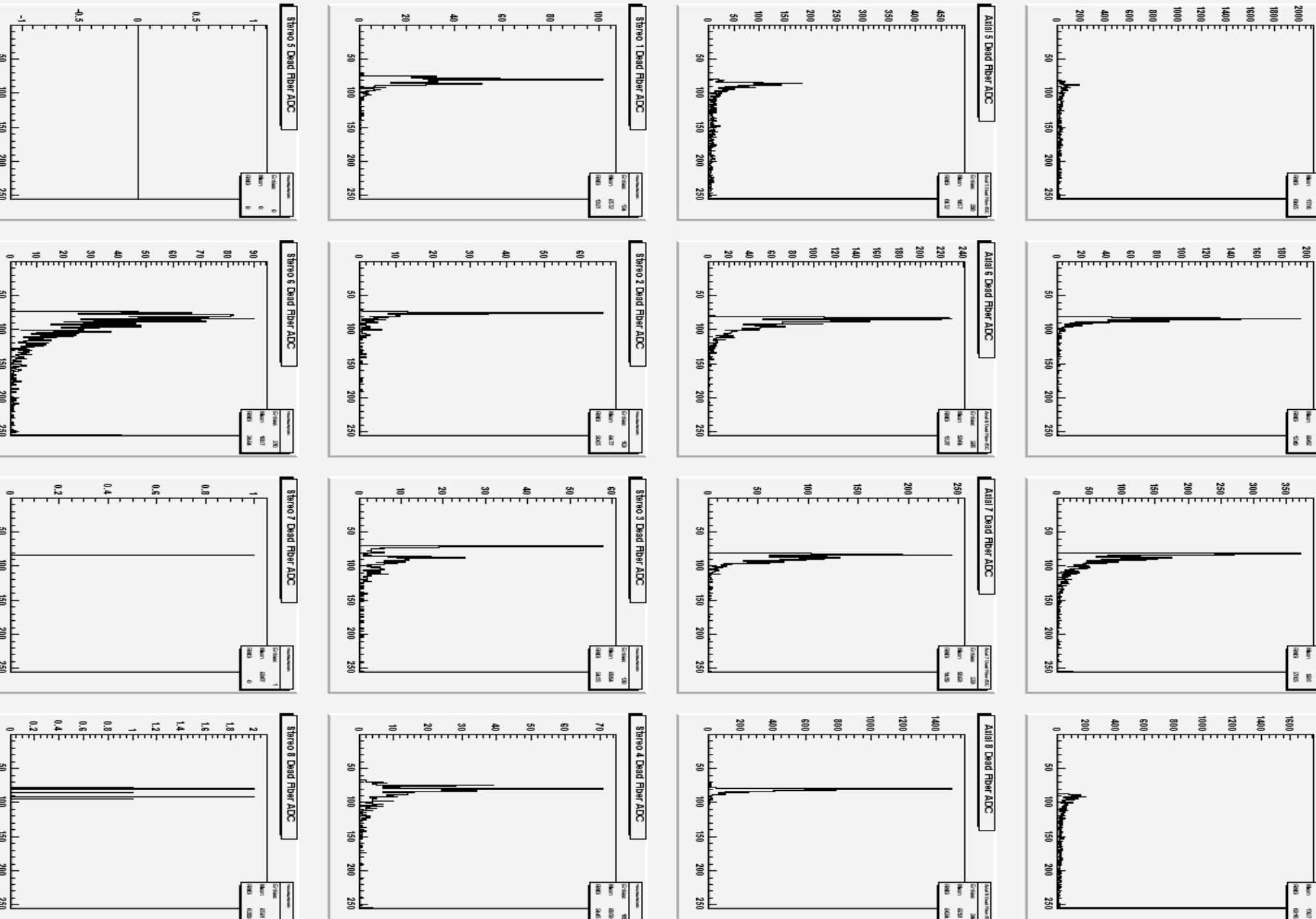
Always Hot/Dead Results:

- Seems to have more fake in Axial 1 (maybe sigma used is too small)

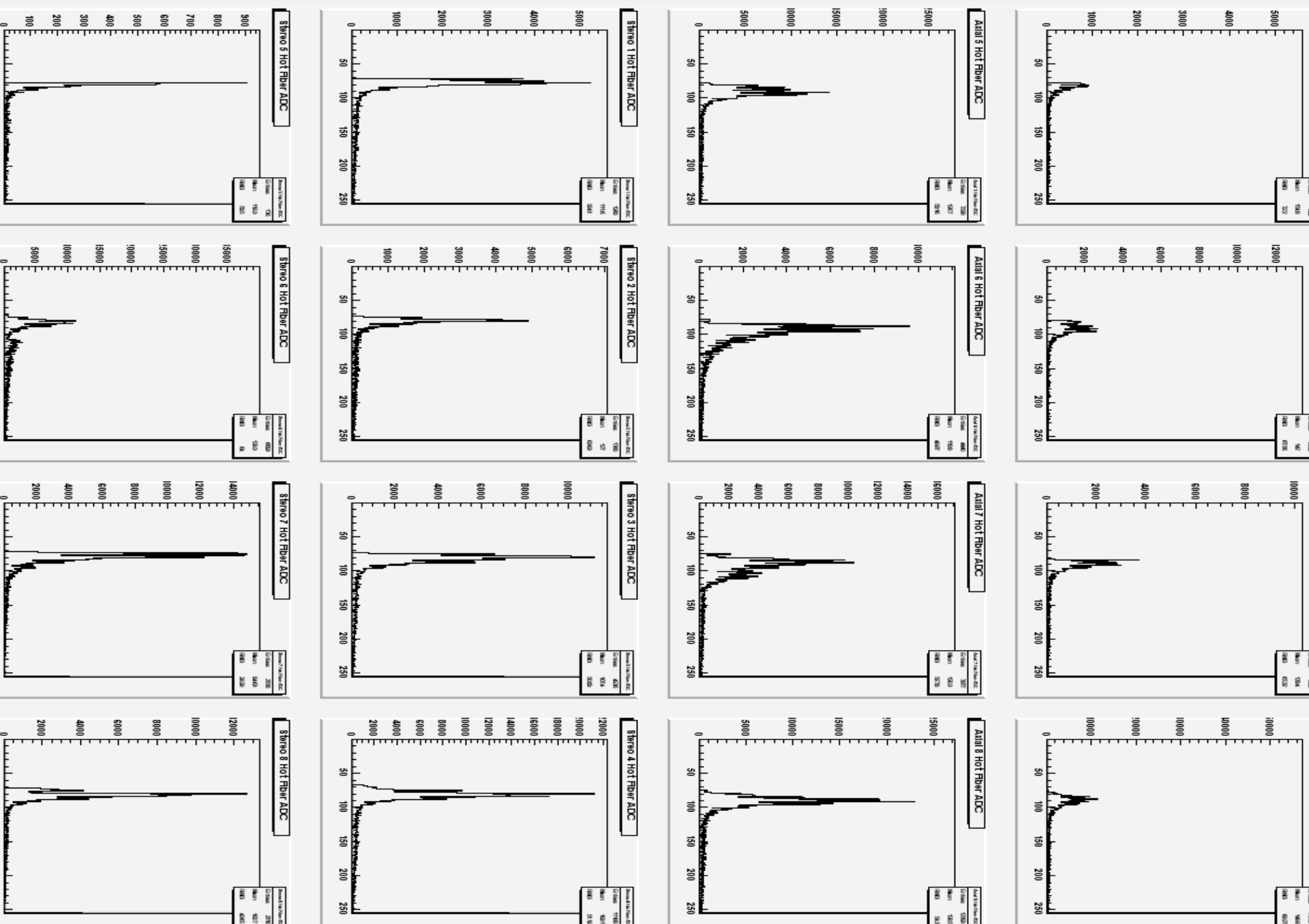
Layer	Fake Hot	Hot Disc	Fake Dead	Dead Disc
Axial 1	2	?	2	14
Axial 2	0	?	1	2
Axial 3	0	?	0	0
Axial 4	2	?	2	0
Axial 5	0	?	4	0
Axial 6	1	?	0	0
Axial 7	0	?	2	0
Axial 8	0	?	0	0
Stereo 1	0		1	
Stereo 2	0		0	
Stereo 3	0		0	
Stereo 4	0		0	
Stereo 5	0		0	
Stereo 6	0		0	
Stereo 7	0		0	
Stereo 8	0		0	
Total	5	0	12	16

- "Fake rate": 4% for hot, 9% for dead

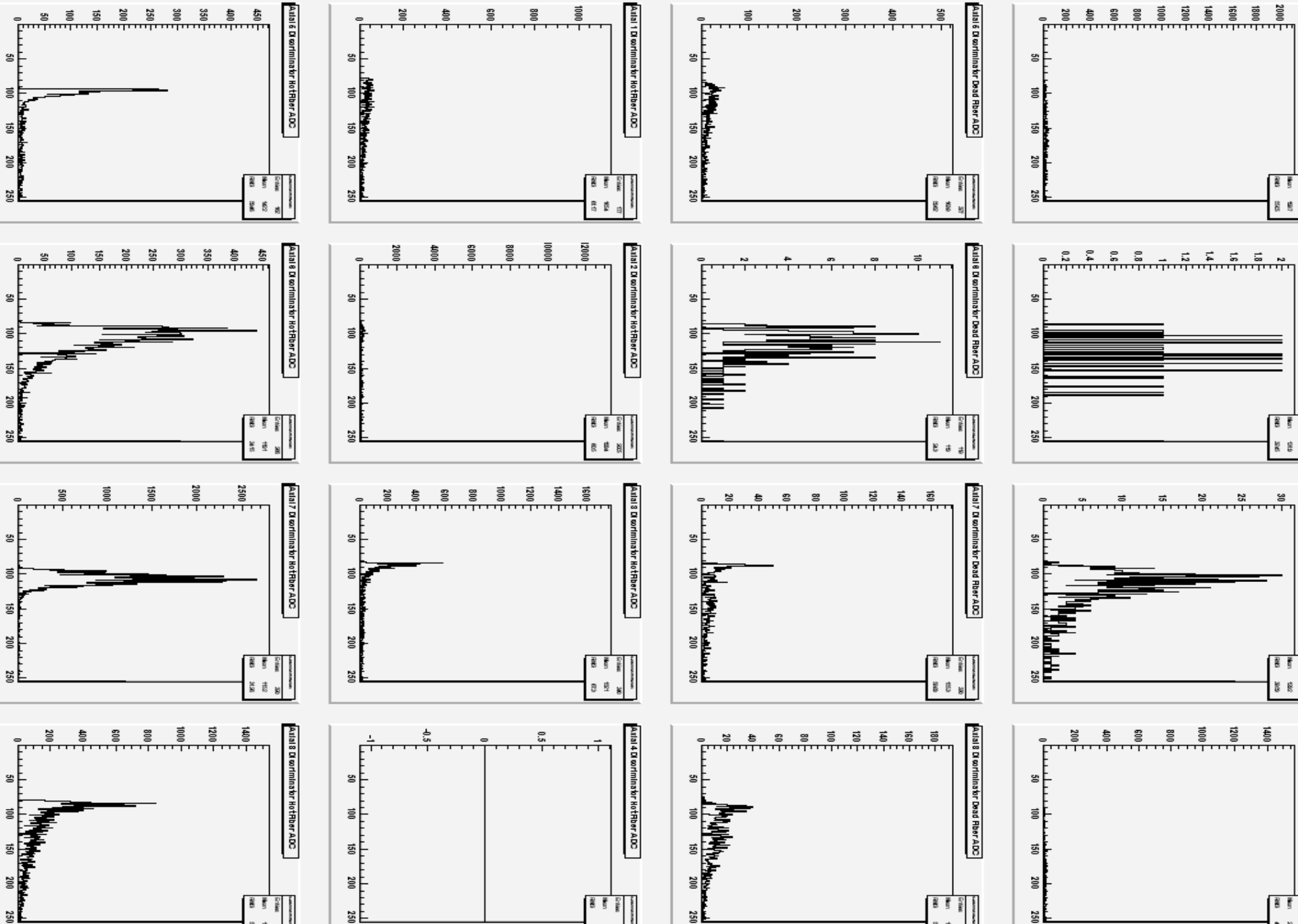
New Dead (combined)



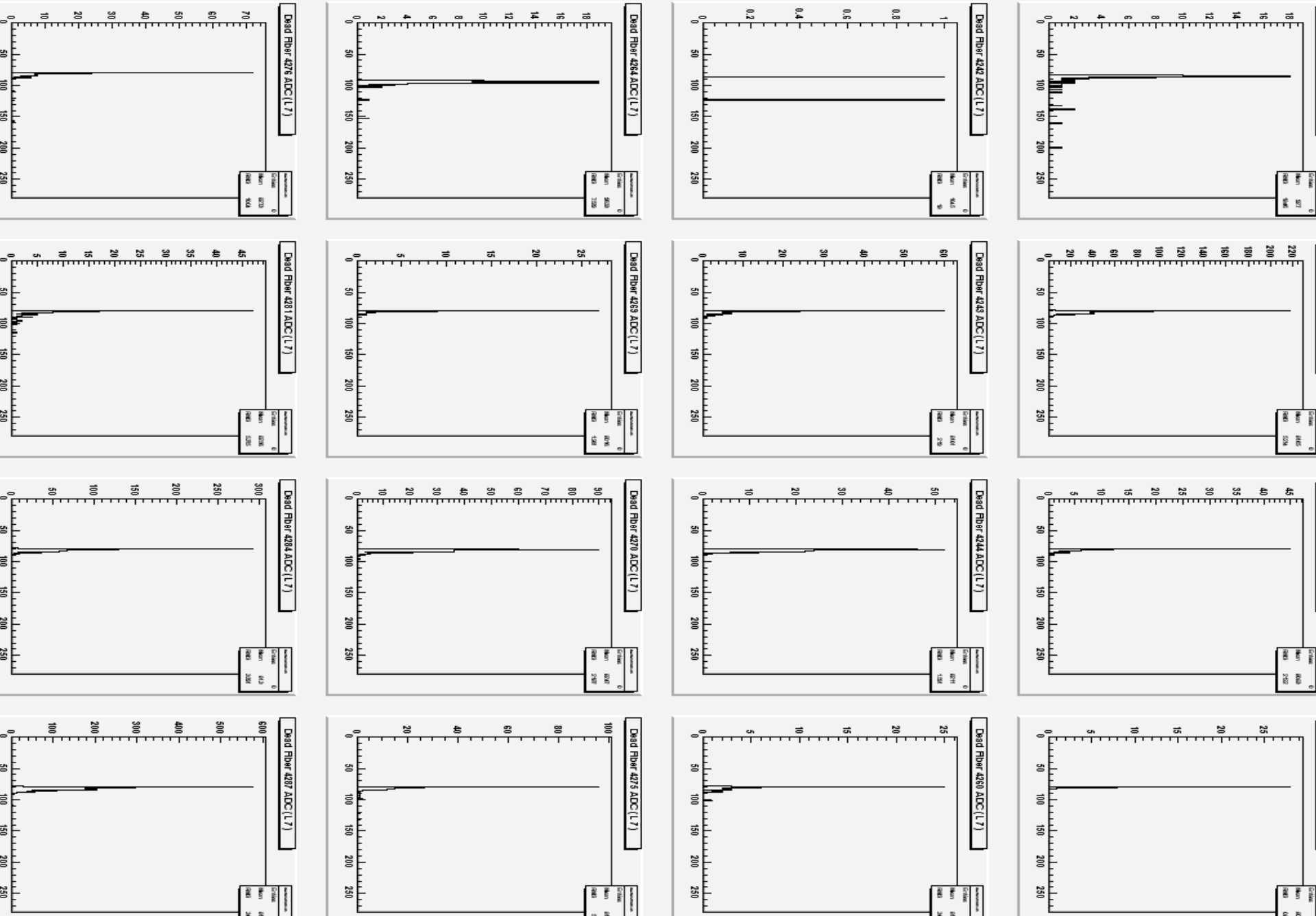
New Hot (combined)



Discriminator (combined)



Axial 8 Dead (New)



New Hot/Dead Fibers Results

- Identified less fake hot/dead fibers.
- Lots of "small spikes" in dead fibers.

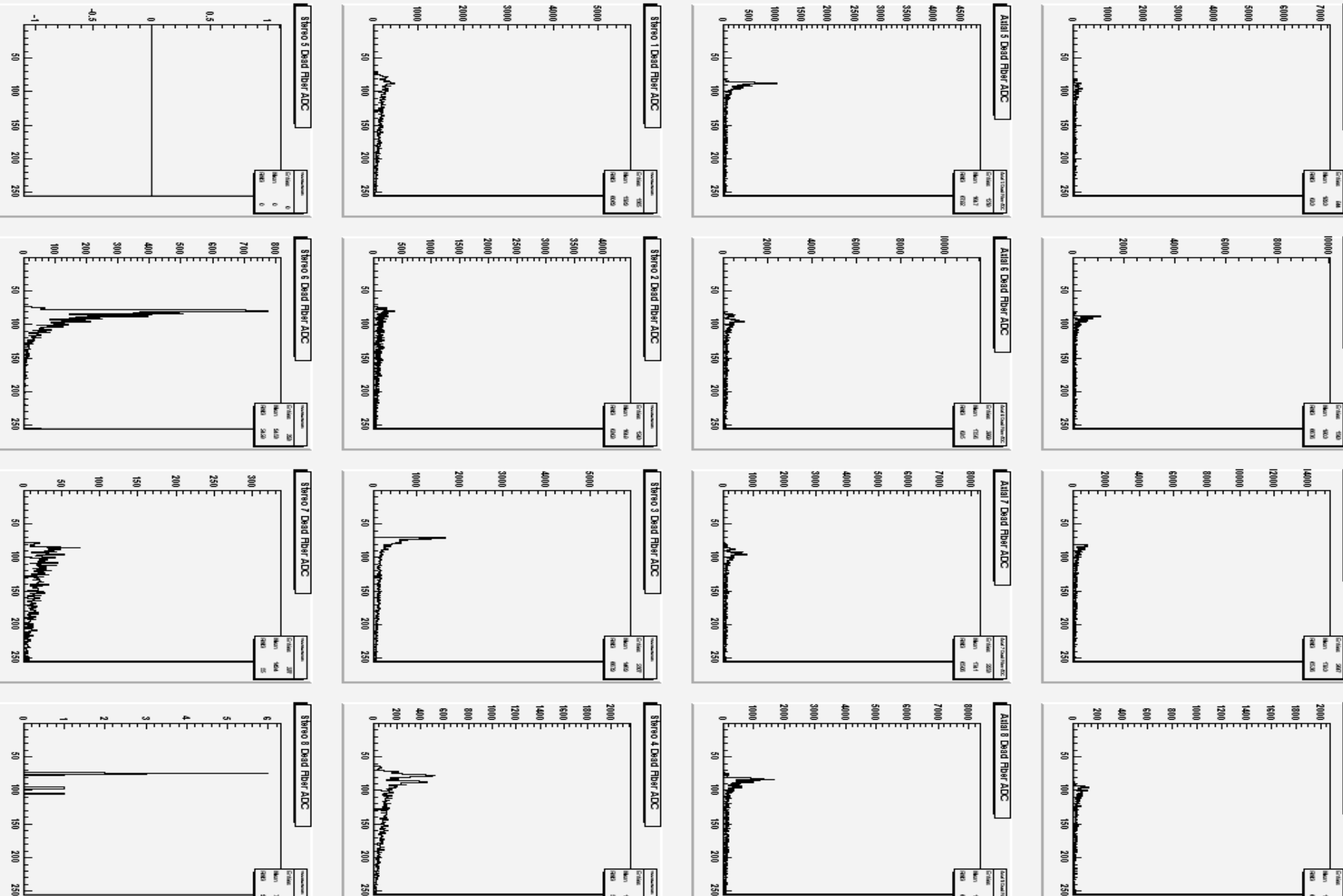
Layer	Hot	Hot Disc	Dead	Dead Disc
Axial 1	0	1	2	2
Axial 2	0	12	0	0
Axial 3	0	0	1	1
Axial 4	0	0	3	2
Axial 5	0	0	1	2
Axial 6	0	0	0	0
Axial 7	1	1	0	2
Axial 8	0	0	0	5
Stereo 1	0		0	
Stereo 2	0		0	
Stereo 3	0		0	
Stereo 4	0		1	
Stereo 5	0		0	
Stereo 6	3		2	
Stereo 7	0		0	
Stereo 8	0		0	
Total	4	14	10	14

- "Fake rate": 1% for hot, 6% for dead

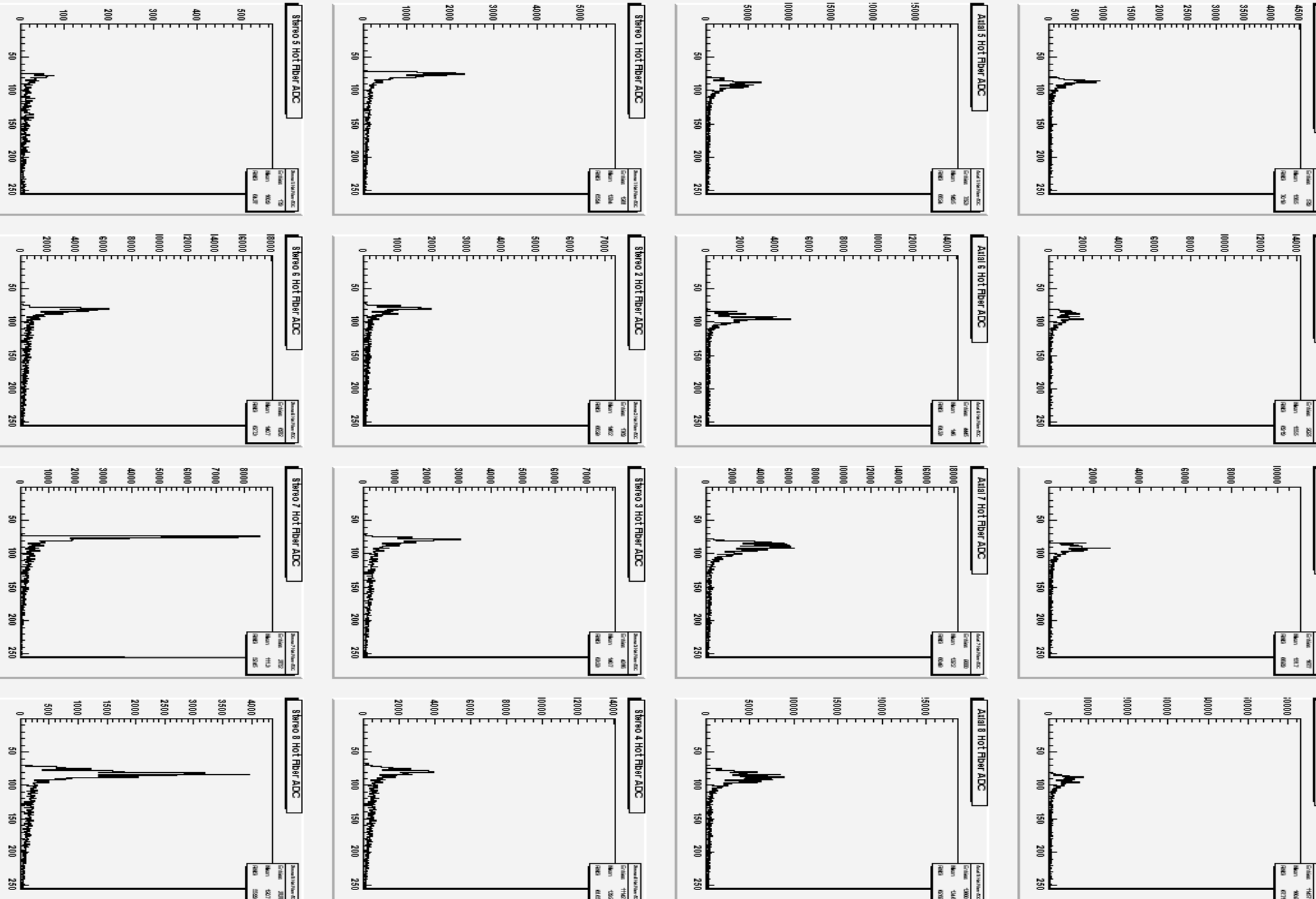
Run 170371(before shutdown

- Try to obtain the ADC distributions of the hot/dead fibers found after the shutdown (but not identified before the shutdown).
- Should obtain the "expected" ADC distribution.

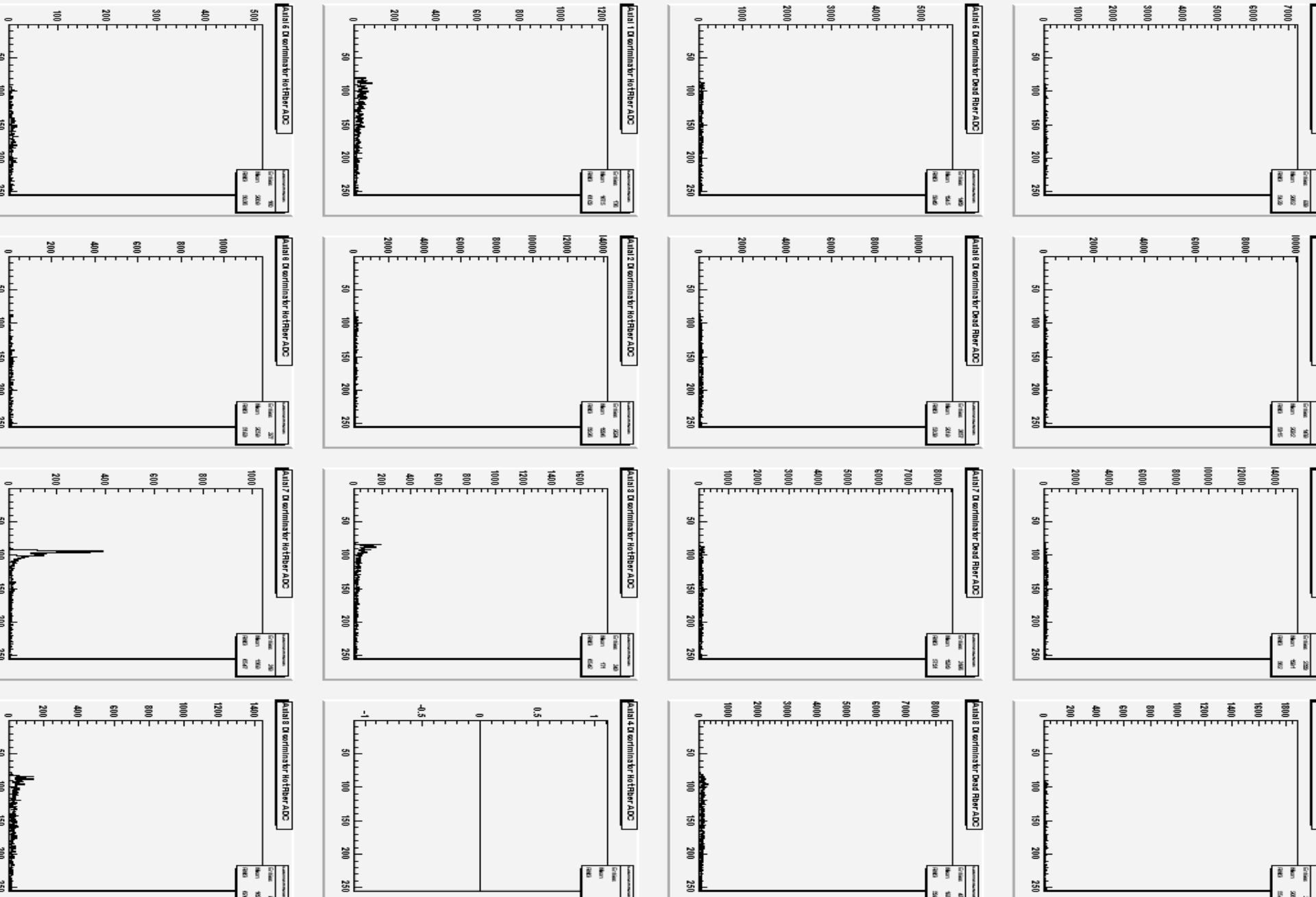
Run 170371 Dead Fibers



Run 170371 Hot Fibers



Run 170371 Discriminators



Summary

- Have also looked into the ADC distributions of the always hot/dead fibers in run 170371 (Old) -No significant difference between the (Old) and (New).
- May need to re-tabulate the sigma for axial 1 and 4 to reduce the "fakes".
- Hot fibers are mostly due to bad pedestals.
- In general, the analysis is suitable for picking out ill-behaving fibers for further investigation.