Update Hot Channel Finder

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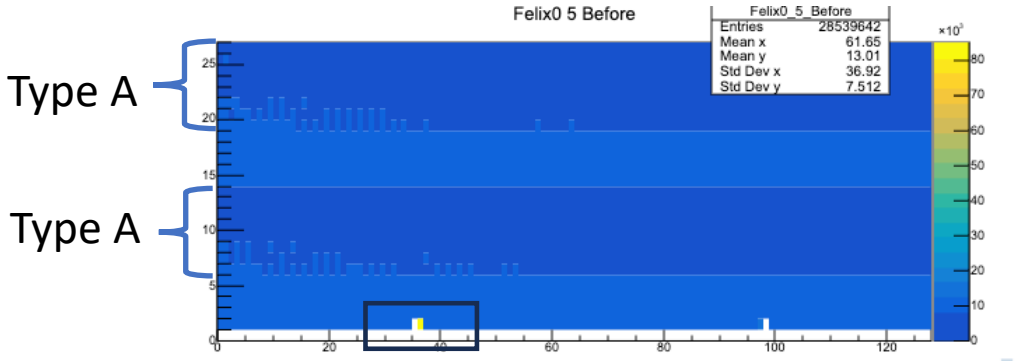
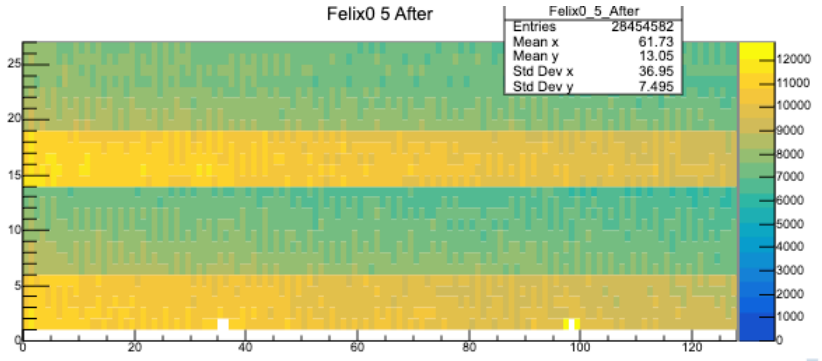
Hot Channel Finder(1)

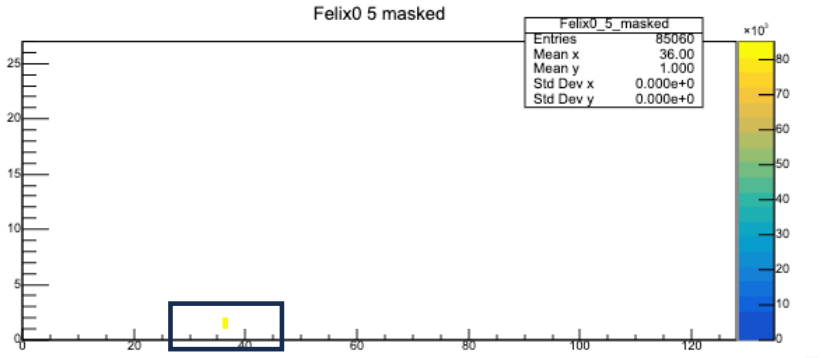
Definition of Hot Channel

1. Calculate average # of hit of all channels on same chip type in half ladder.
2. Definition of Hot Channel

$$(\#\text{ of hits}) > \frac{\text{Total \# of hits of type A(B)}}{\#\text{ of hit Channels of type A(B)}} \times C$$ (I use C = 3 for now.)







But, How to define the C?
We need logical way to define the hot channel

Hot Channel Finder(2)

Definition of Hot Channel by Gaussian fitting(similar to Yuka's algorithm)

# of hits distribution of beam data is supposed to follow the Gaussian distribution

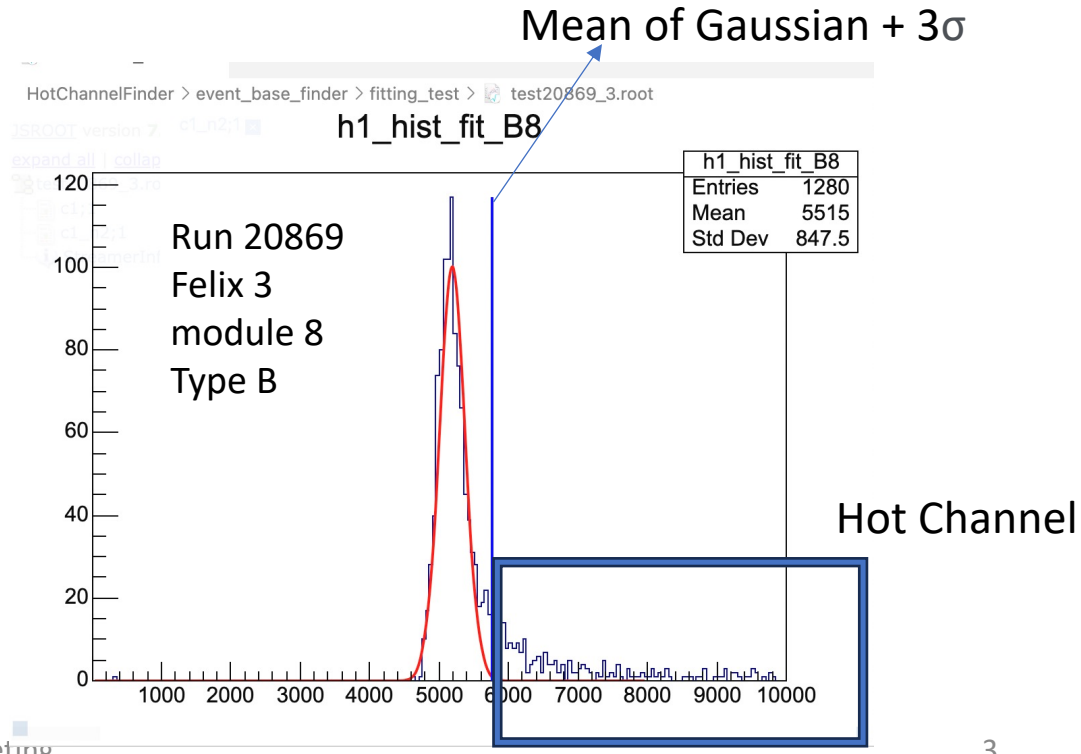
1. Normalize the # of hits by chip size.
   (Type A -> Divided by 1.6 [cm] Type B -> Divided by 2.0 [cm])

2. Make a # of hits distribution chip type by type

3. Do Gaussian fitting and estimate if the channel is hot.

Definition of hot channel

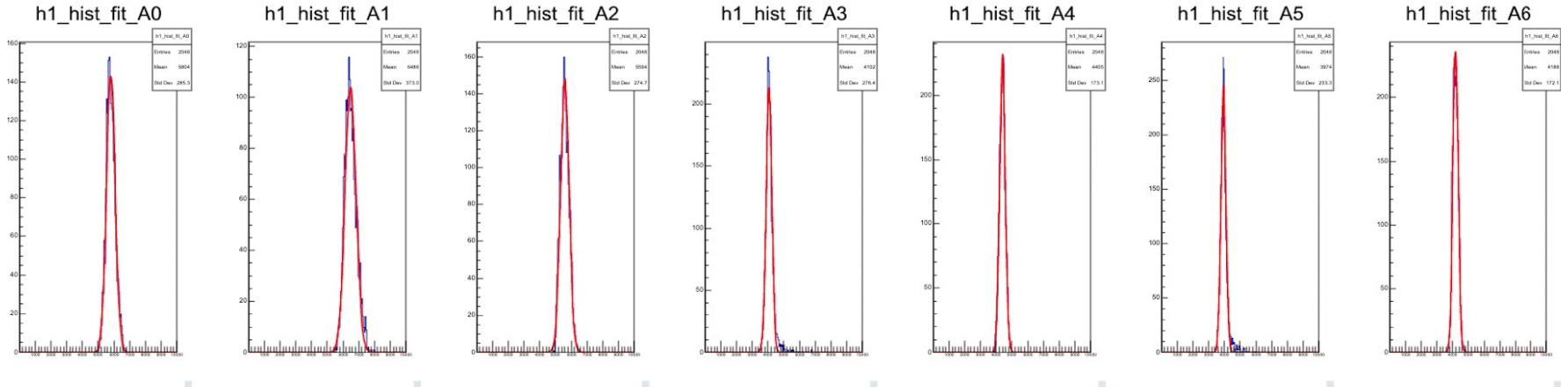
normalized # hits > $\mu + 3\sigma$



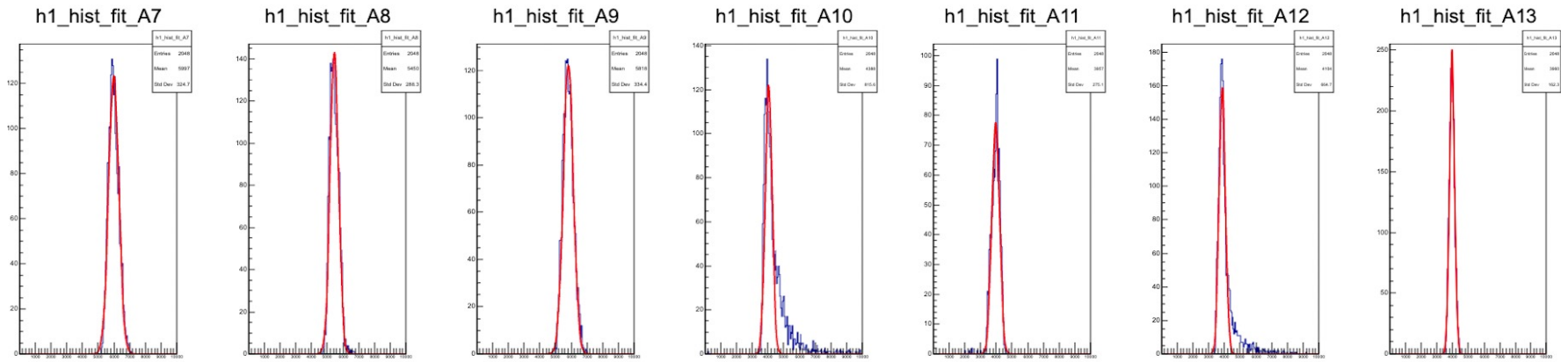
Hot Channel Finder(3)

I made hot channel list of Run 20869 for cross-check Yuka's result.

Run 20869
Felix 2
module 0~6
Type A



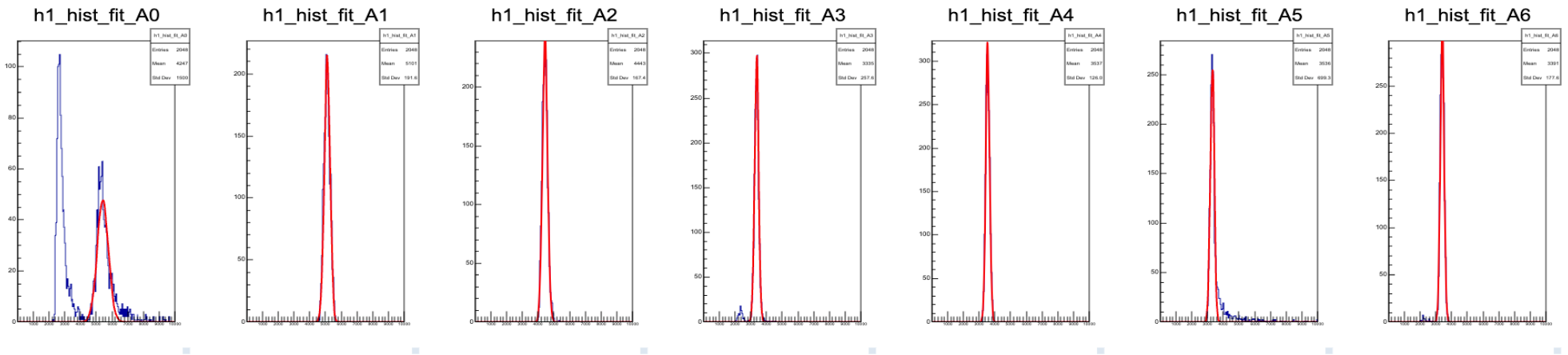
Run 20869
Felix 2
module 7~13
Type A



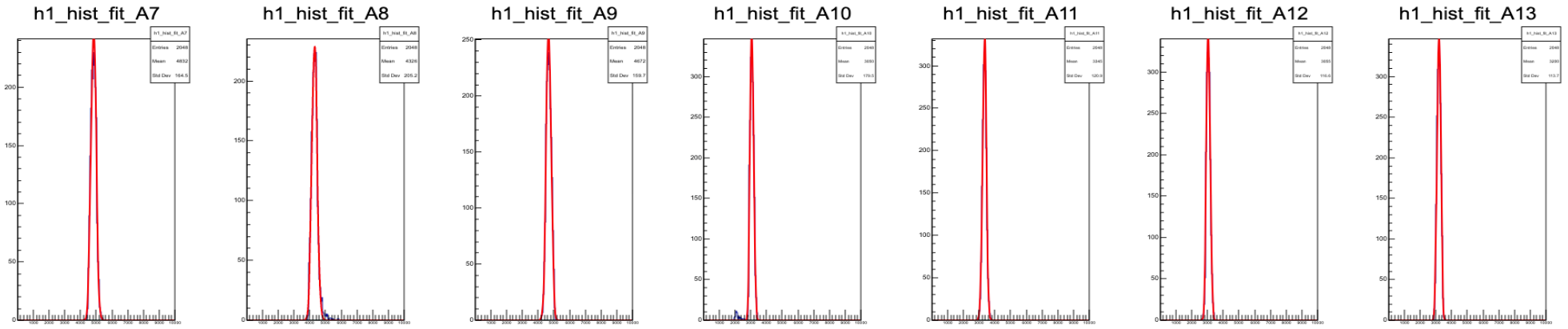
Expected trouble

Hot channel list changed run by run, and also sometimes you could see unexpected hit distribution . EX)

Run 20869
Felix 7
module 0~6
Type A

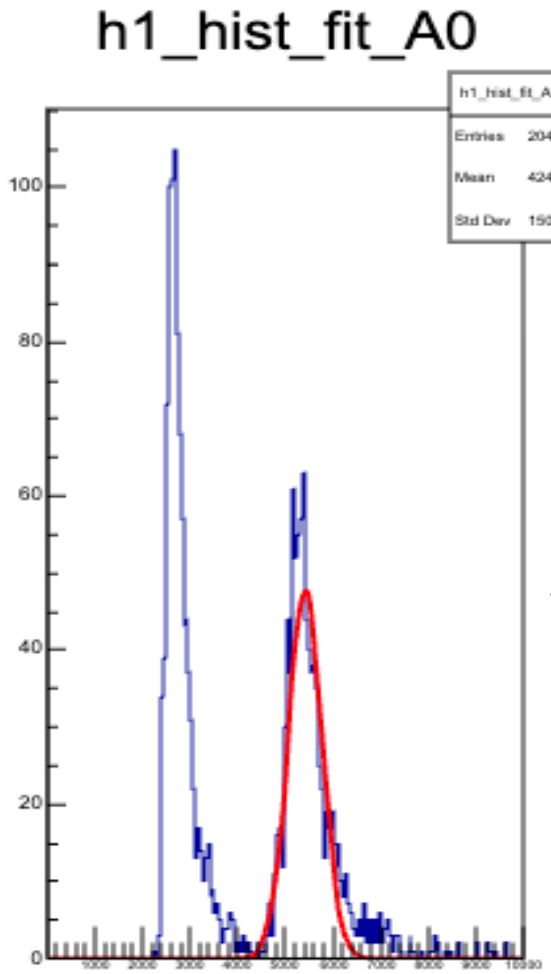


Run 20869
Felix 7
module 7~13
Type A

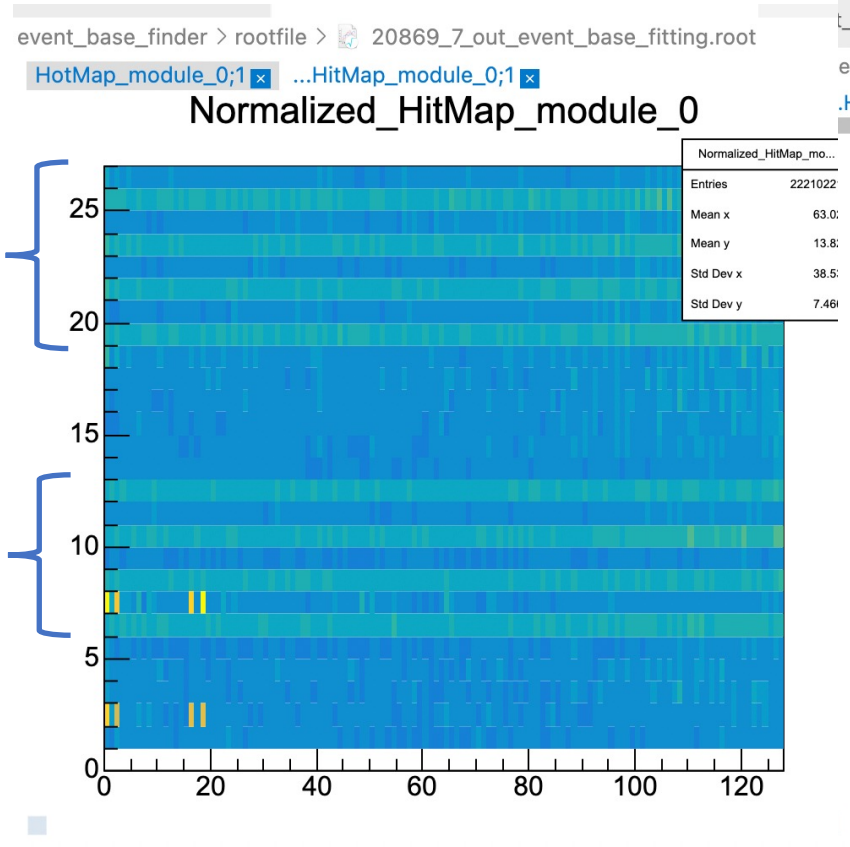


Expected trouble

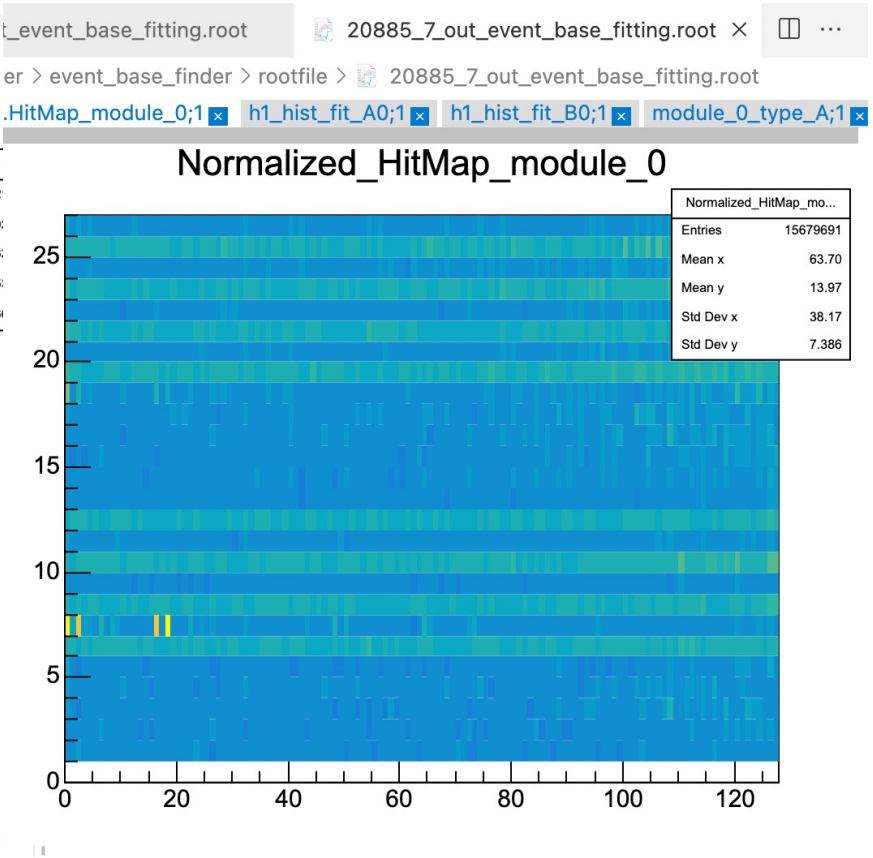
Investigation is ongoing



Run 20869
Felix 7



Run 20885
Felix 7



Type A

Type A

But, for now, I did the fitting with 2nd peak to estimate hot channel,
Now, I successfully established hot channel list for Run 20869, 20885

To do list

- # of hits depends on run time.
  For automatic gaussian fitting, we need to normalize by # of events.

  (done – confirmation is ongoing)
- Comparison to Joseph's algorithm
- Developing the fitting algorithm to handle some exceptional cases (ongoing)

  Ex) multi-Gaussian fitting