

Automation of hot/dead channel finder

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Nara Women's University

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Development of the hot channel algorithm

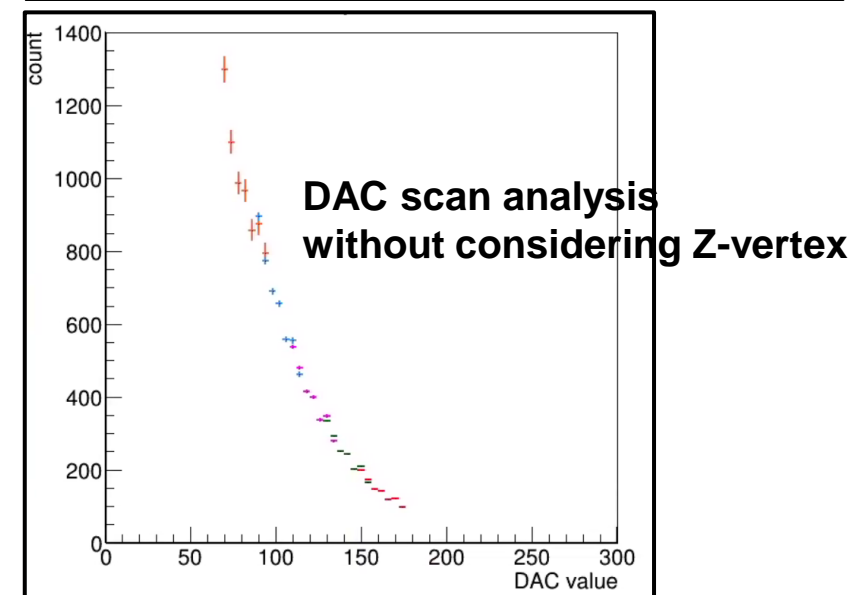
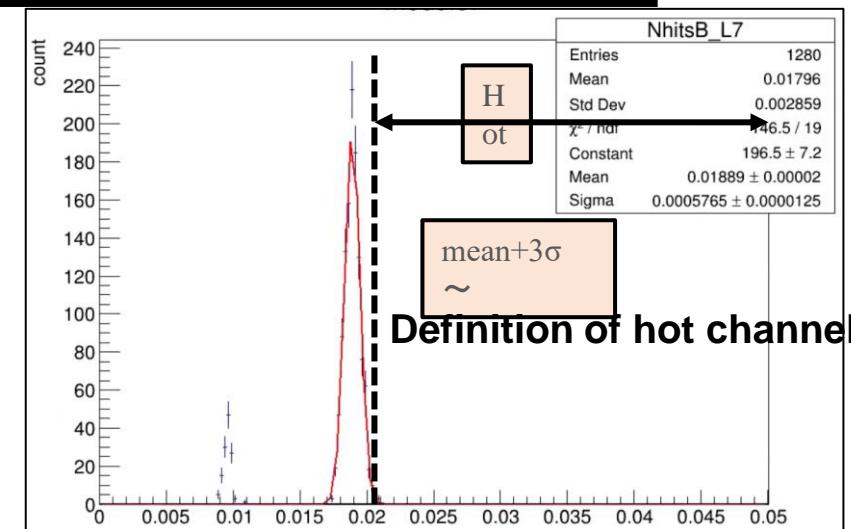
Yuka Sugiyama
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Completing hot channel analysis and proceeding MIP analysis

Goal in this workshop: [Establish hot channel algorithm for automation]

My To-Do List

- ~~Applying BCO cut in my hot channel algorithm~~
 - How many events are needed to decide the hot channel?
- ~~Comparing the hot channel list with Jaein and Joseph~~ **I'll talk today.**
 - Jaein's and my algorithm is similar, but Joseph's is different.
 - Is each hot channel list consistent?
- Discussing about hot channel algorithm
 - Whose algorithm is adopted?
- MIP peak analysis with commissioning DAC scan data
 - Considering Z-vertex

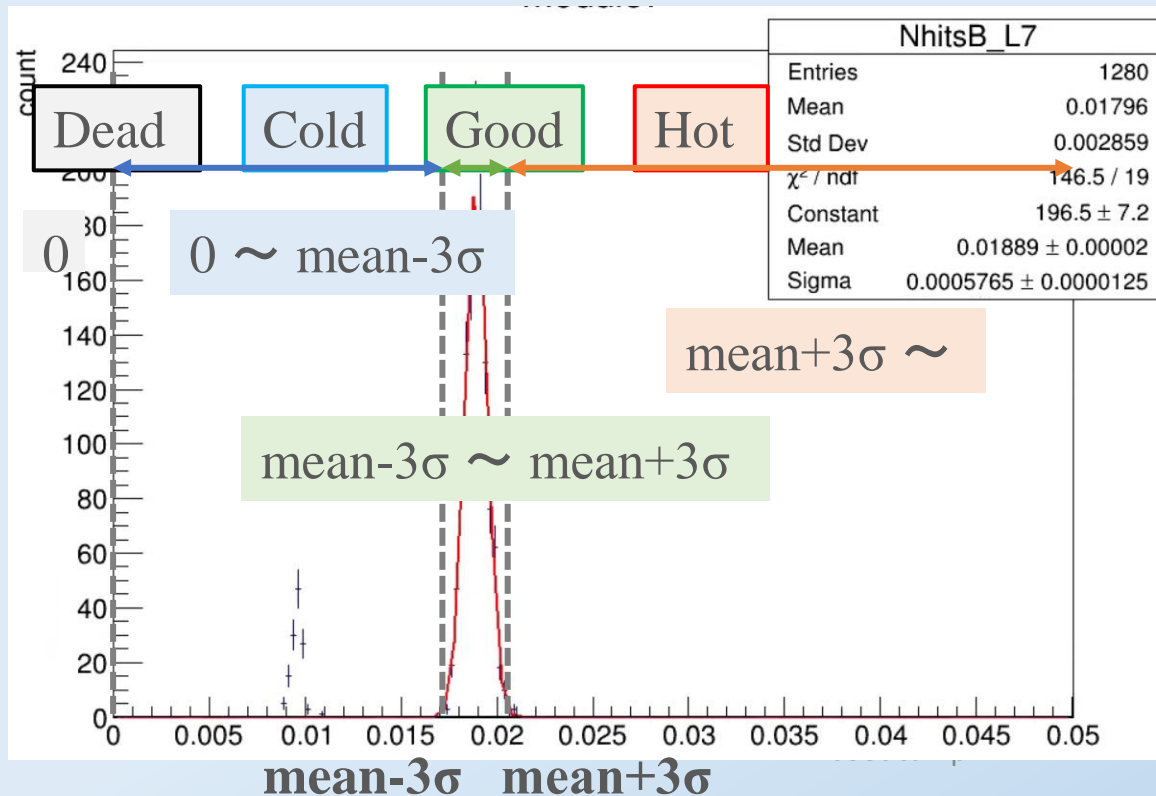


Developing of hot/dead channel algorithm

In the first flush report, I reported the following:

1. Define hot, good, cold and dead channels
2. Apply BCO cut

Today, I'll report on a comparison of Jaein's and my hot/cold channel lists.



Definition of each channels with hit rate distribution

Comparison of hot/channel channel list

I compared Jaein's and my channel lists in the same way as Jaein.

134: # of hot channels picked up by Yuka
295: # of hot channels picked up by Jaein
682: # of hot channels picked up by both of us

$$\text{ratio of mismatches} = \frac{(134+295)}{(134+295+682)} = \frac{429}{1111} \sim 0.386$$

52: # of cold channels picked up by Yuka
6907: # of cold channels picked up by Jaein
11074 : # of hot channels picked up by both of us

$$\text{ratio of mismatches} = \frac{(52+6907)}{(52+6907+11074)} = \frac{6959}{18033} \sim 0.386$$

There is high ratio that hot and cold channel lists doesn't match!

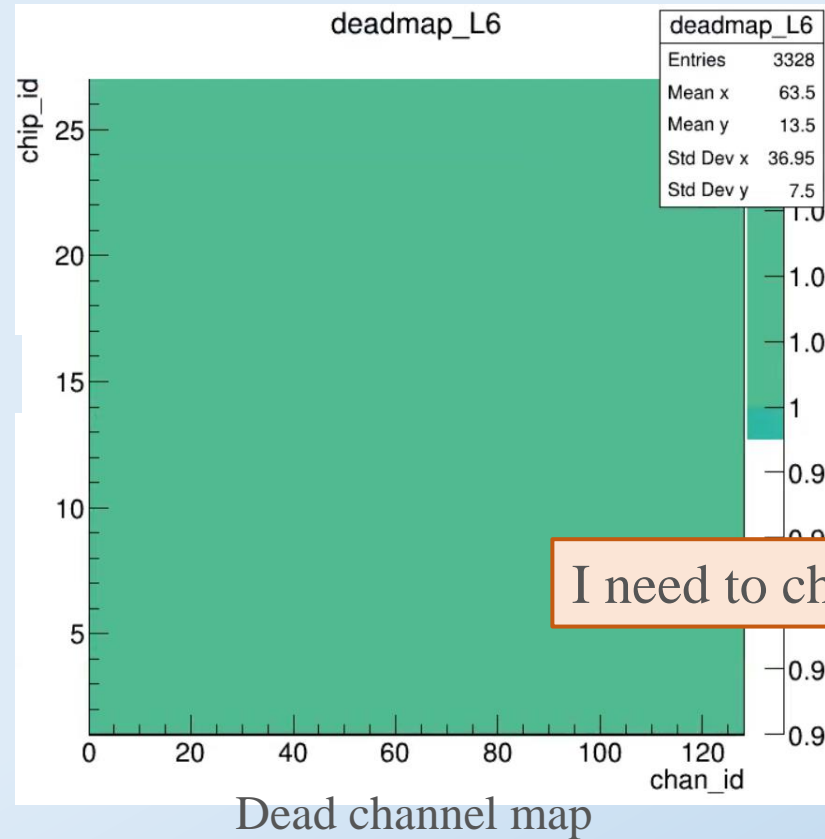
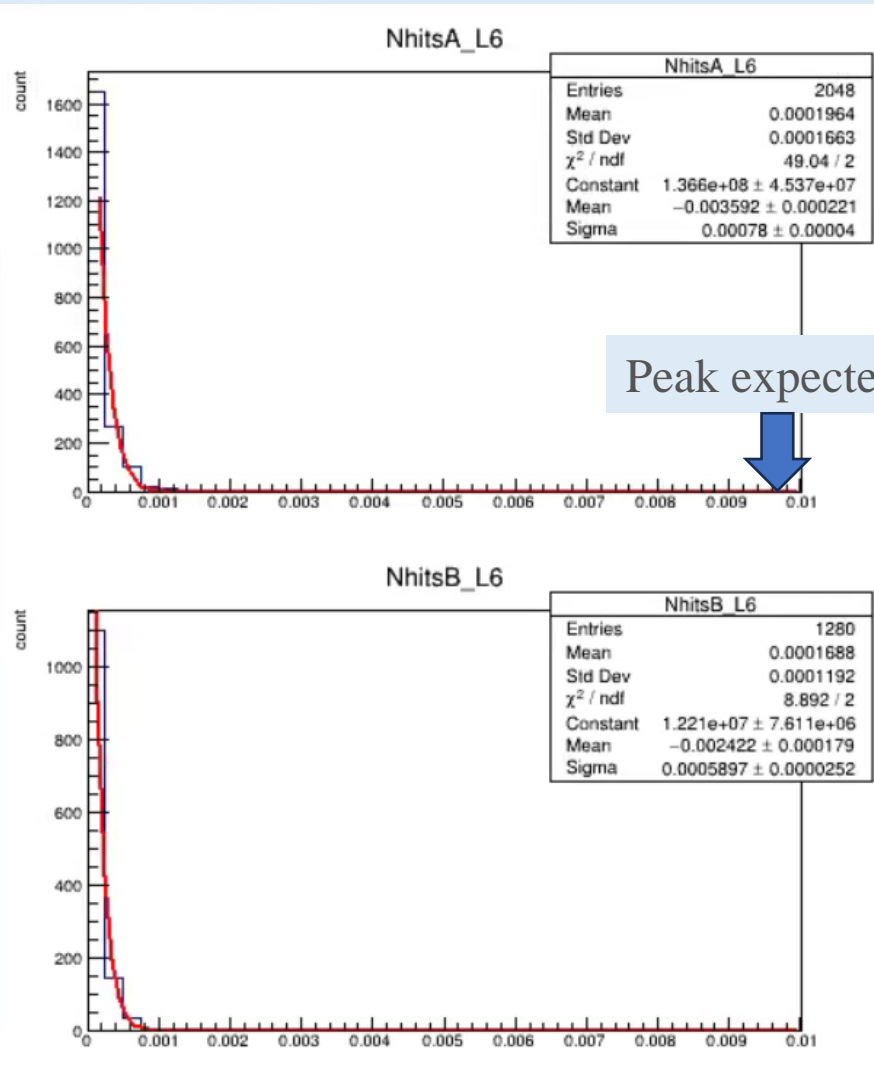
I'll talk about the reasons on the next page. (The hot channel lists are under investigation.)

Problem of cold channel list(module 6 of Felix 0)

Run 20869

In this module, there are few entries in the entire module.

While Jaein defined it as a cold channel, I mistakenly defined it as a dead channel.



```
Felix0 module6  
hot channel by Yuka: 0  
hot channel by Jaein: 0  
hot channel by both: 0  
  
cold channel by Yuka: 0  
cold channel by Jaein: 2194  
cold channel by both: 0
```

I need to change each channel definition.

Hit rate distribution(Type-A and B)

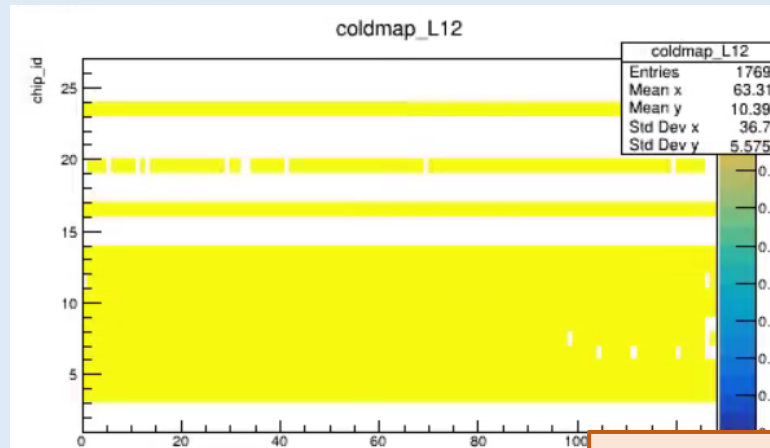
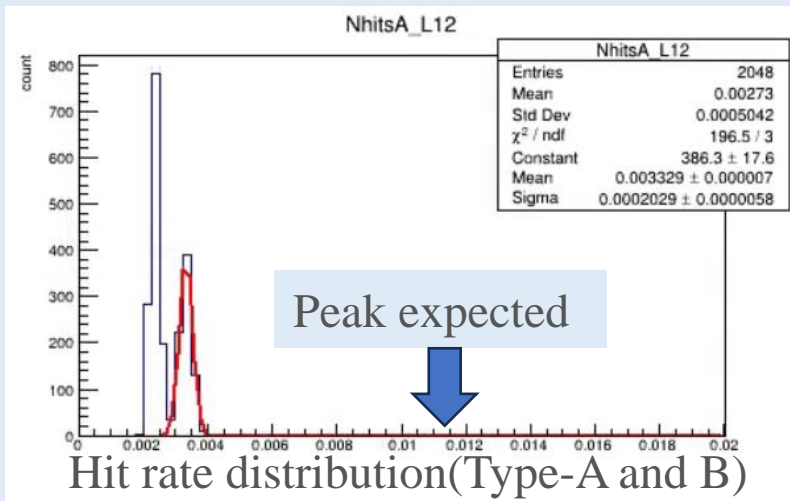
Problem of cold channel list(module 12 of Felix 2)

Run 20869

There is no good channel in this module, and all channels should be classified as cold channels.

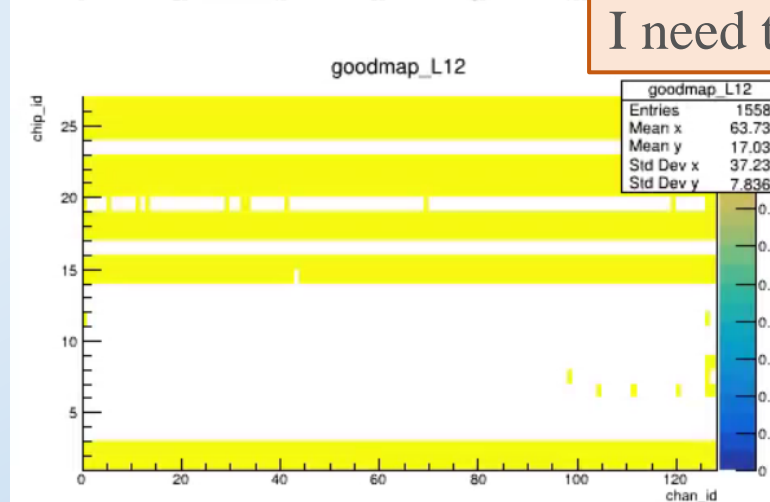
However, I mistakenly defined some channels as good channels.

(That's because I defined it as a cold channel when hit rate is $0 \sim \text{mean} - 3\sigma$.)



```
Felix2 module12
hot channel by Yuka: 1
hot channel by Jaein: 0
hot channel by both: 0

cold channel by Yuka: 0
cold channel by Jaein: 1431
cold channel by both: 1769
```



I need to change each channel definition.

Summary/To do list

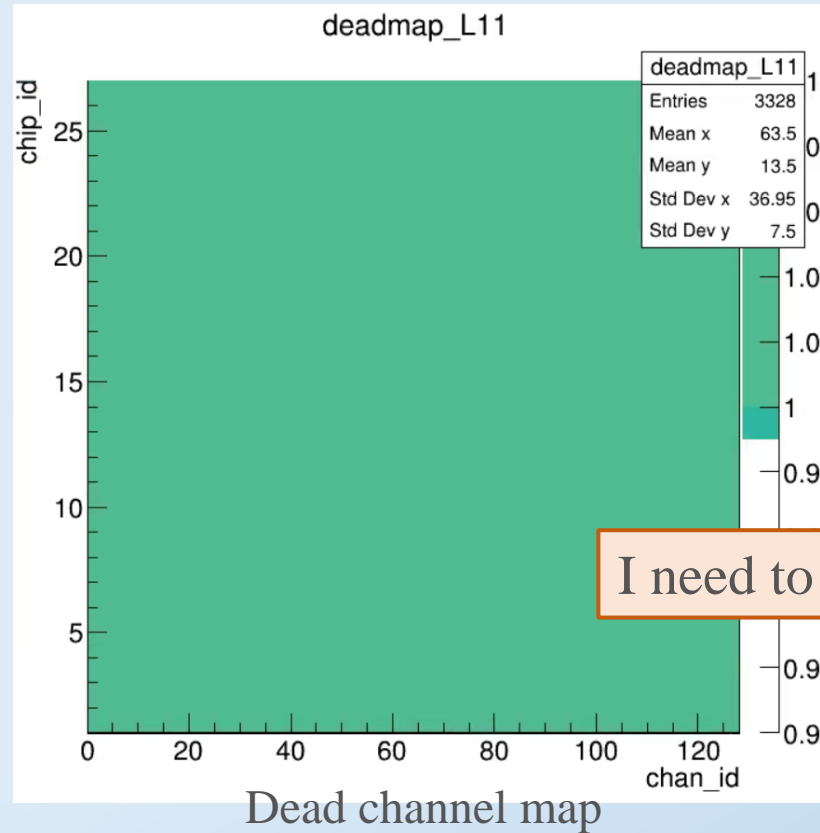
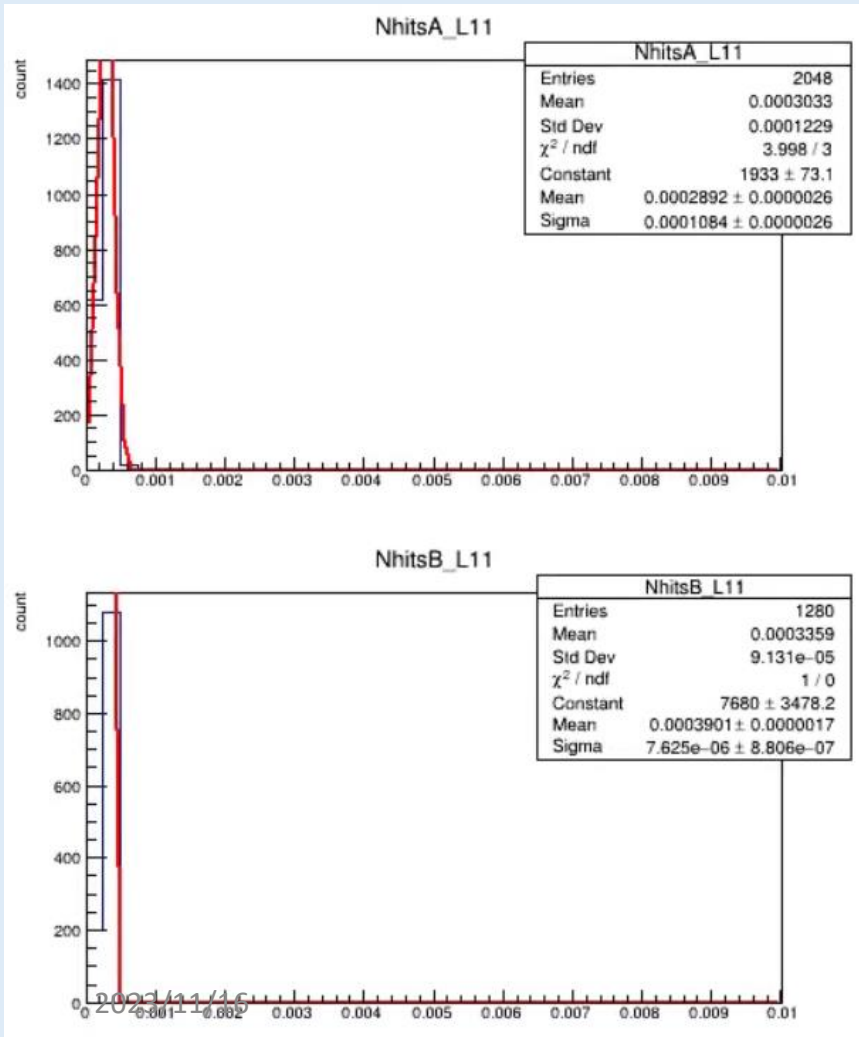
- The ratio that channel list did not match between Jaein's and mine was high.
→That's because I mistakenly defined a cold channel as a dead channel or a good channel.
→Investigating the hot channel list is ongoing.
- Change the definition of each channel
- Compare channel lists and discuss which algorithms should be adopted.

Back up

cold channel list(module 11 of Felix 2) Run 20869

In this module, there are few entries in the entire module.

While Jaein defined it as a cold channel, I mistakenly defined it as a dead channel.



```
Felix2 module11
hot channel by Yuka: 0
hot channel by Jaein: 0
hot channel by both: 0

cold channel by Yuka: 0
cold channel by Jaein: 3198
cold channel by both: 0
```

I need to change each channel definition.

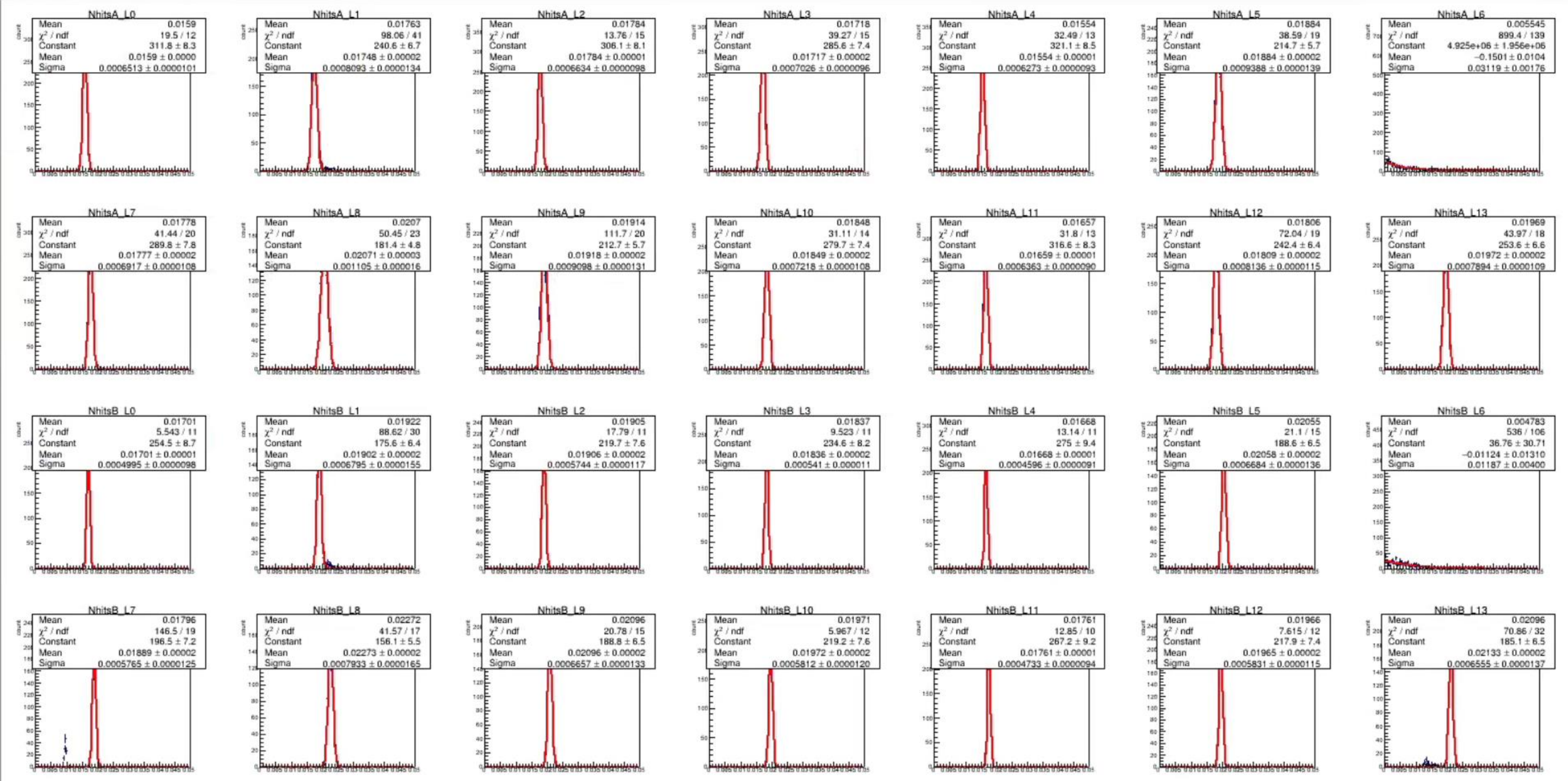
Hit rate distribution(Type-A and B)

Felix0 comparison

1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

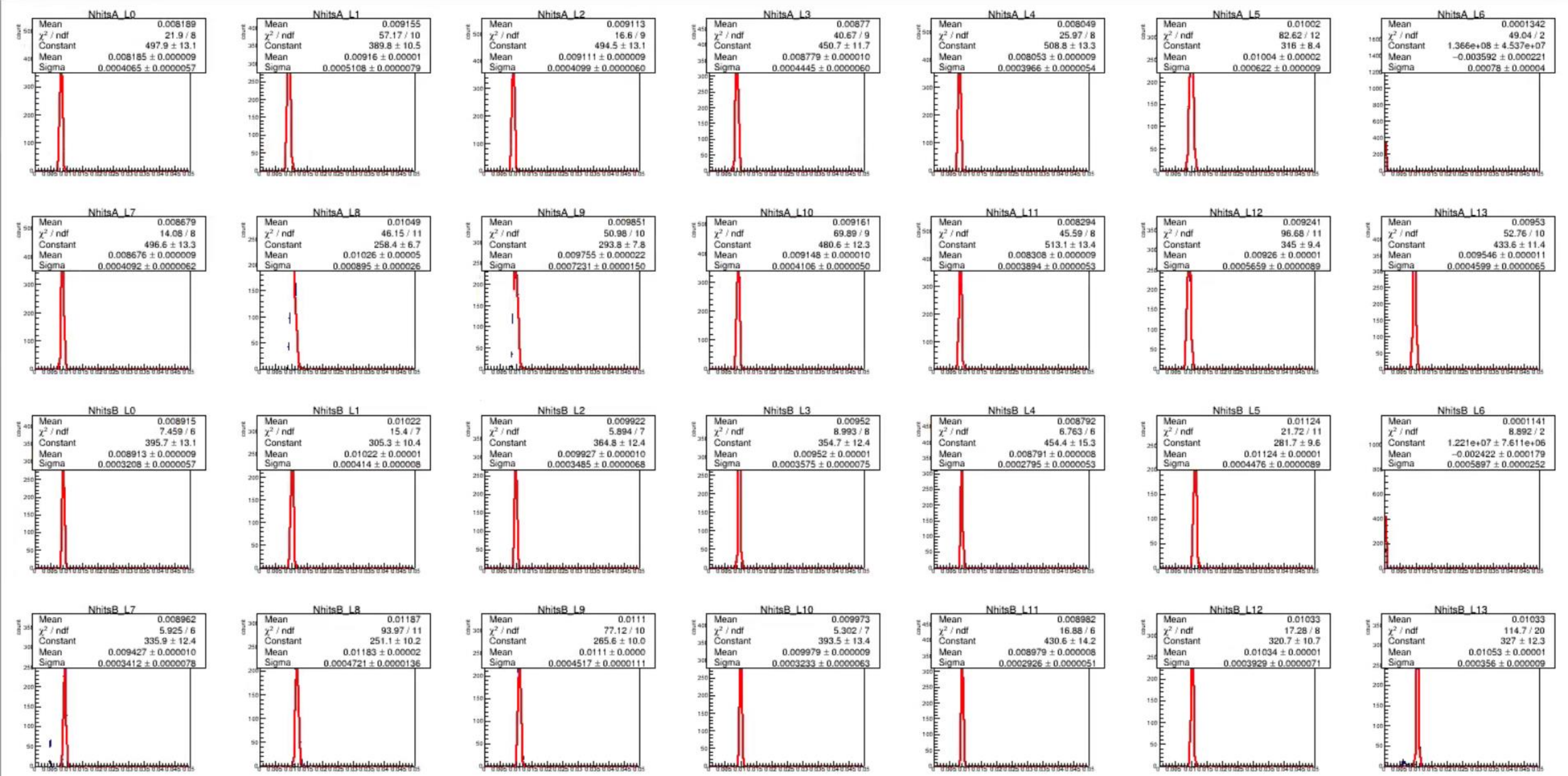
No BCO cut

felix0



BCO (peak-1)~(peak+1) cut

felix0



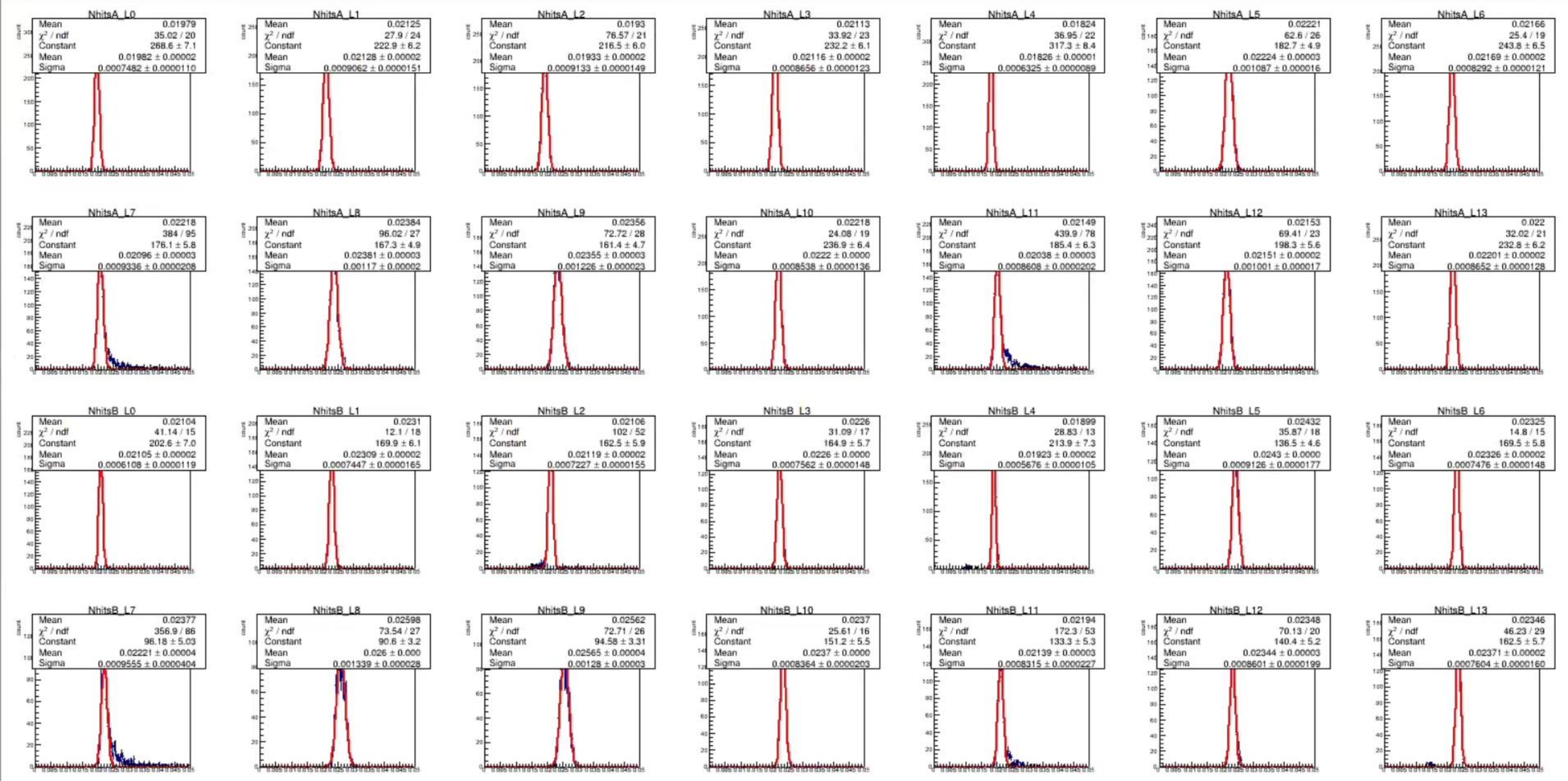
Felix1 comparison

1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

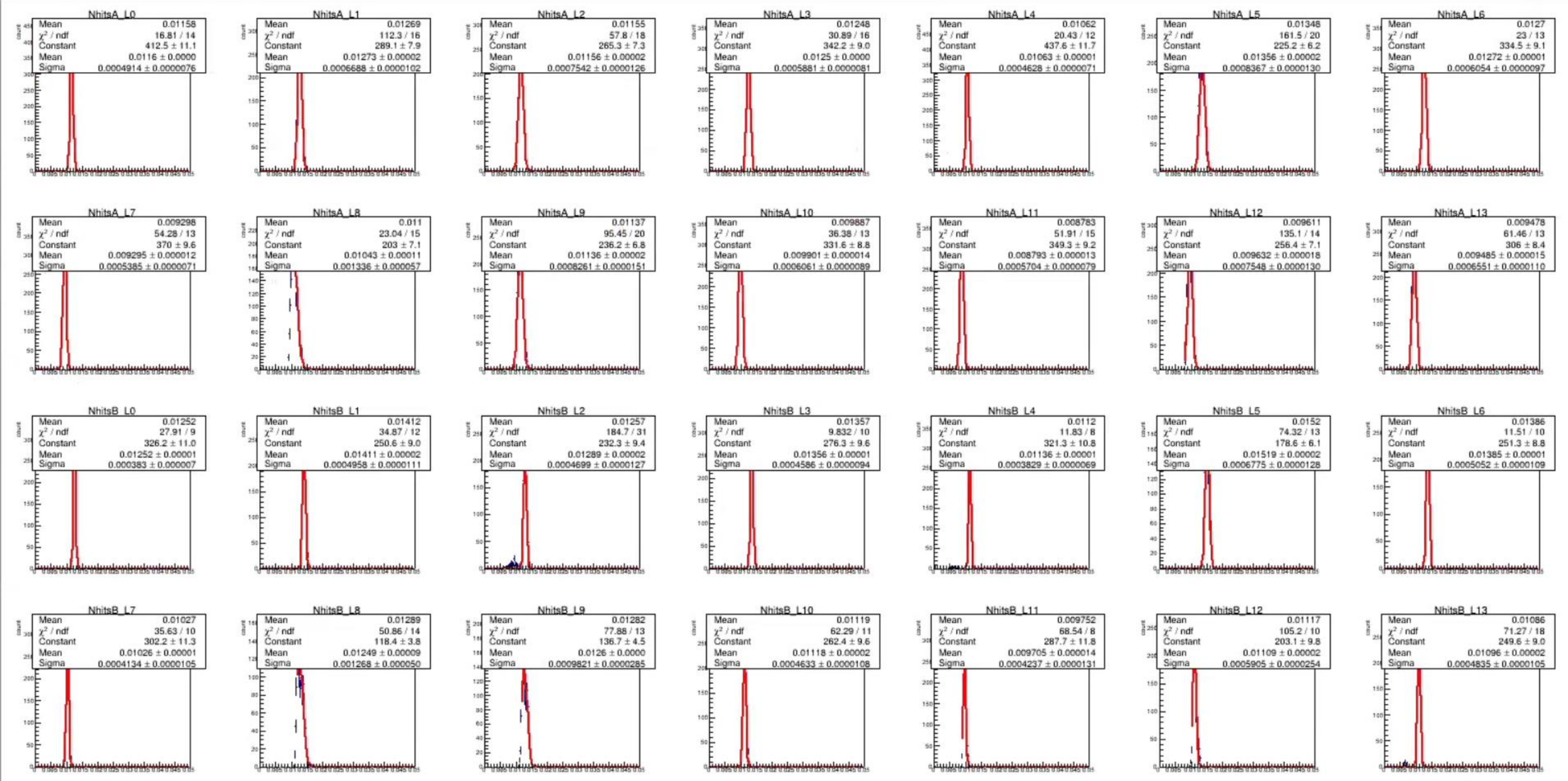
felix1

Help



BCO (peak-1)~(peak+1) cut

felix1



Felix2 comparison

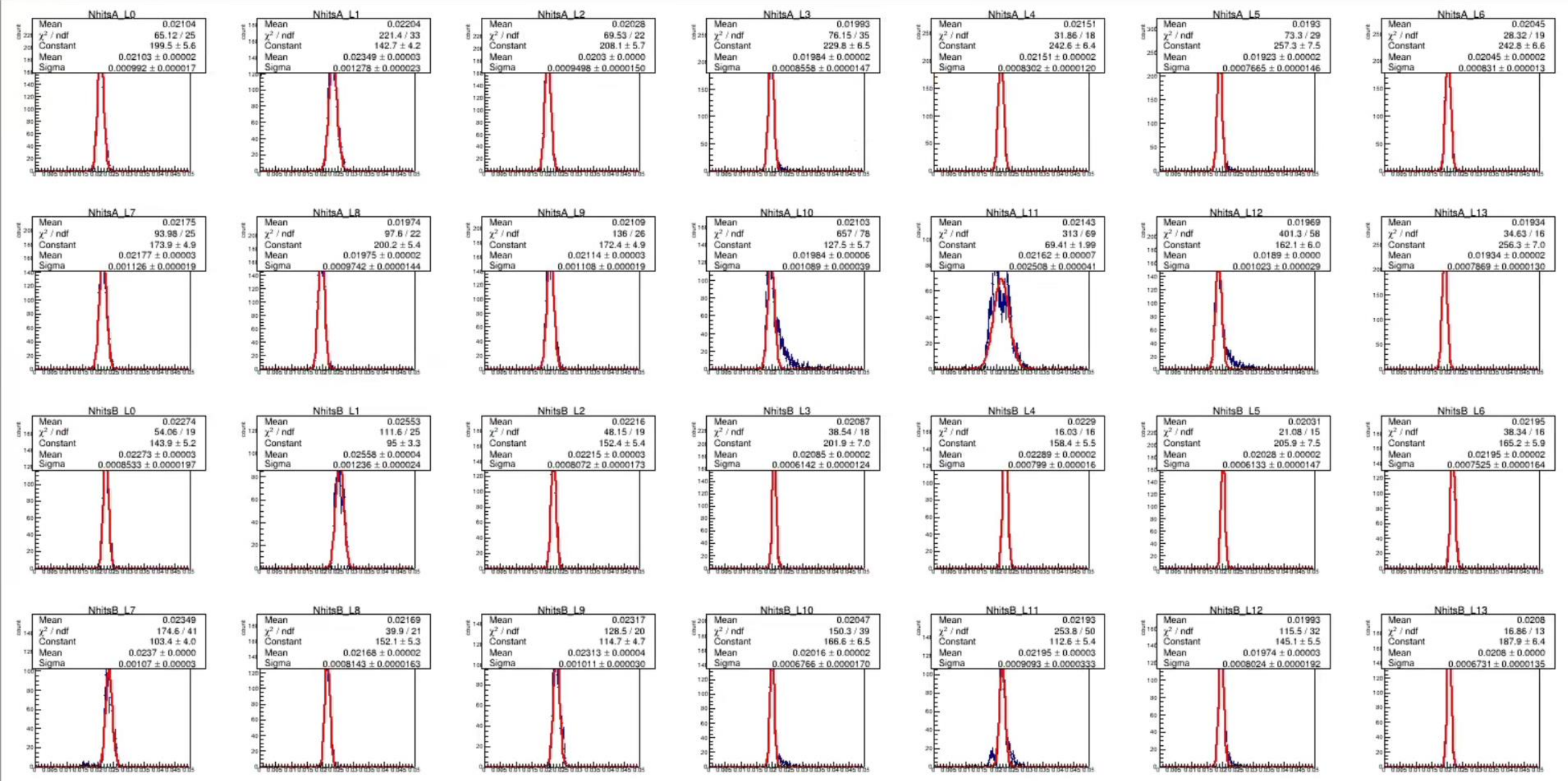
1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

felix2

Help

File Edit View Options Tools

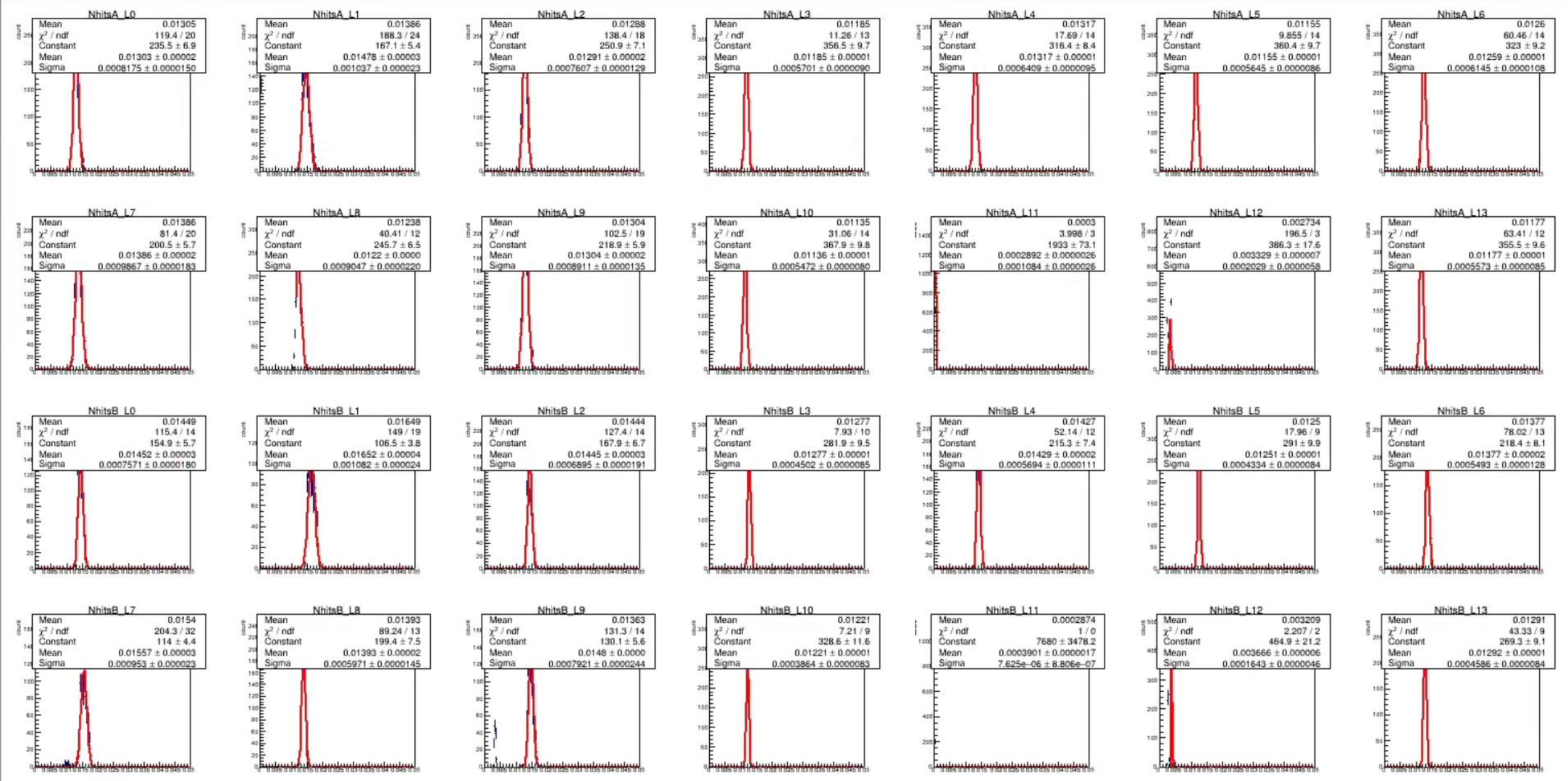


BCO (peak-1)~(peak+1) cut

felix2

Help

File Edit View Options Tools



Felix3 comparison

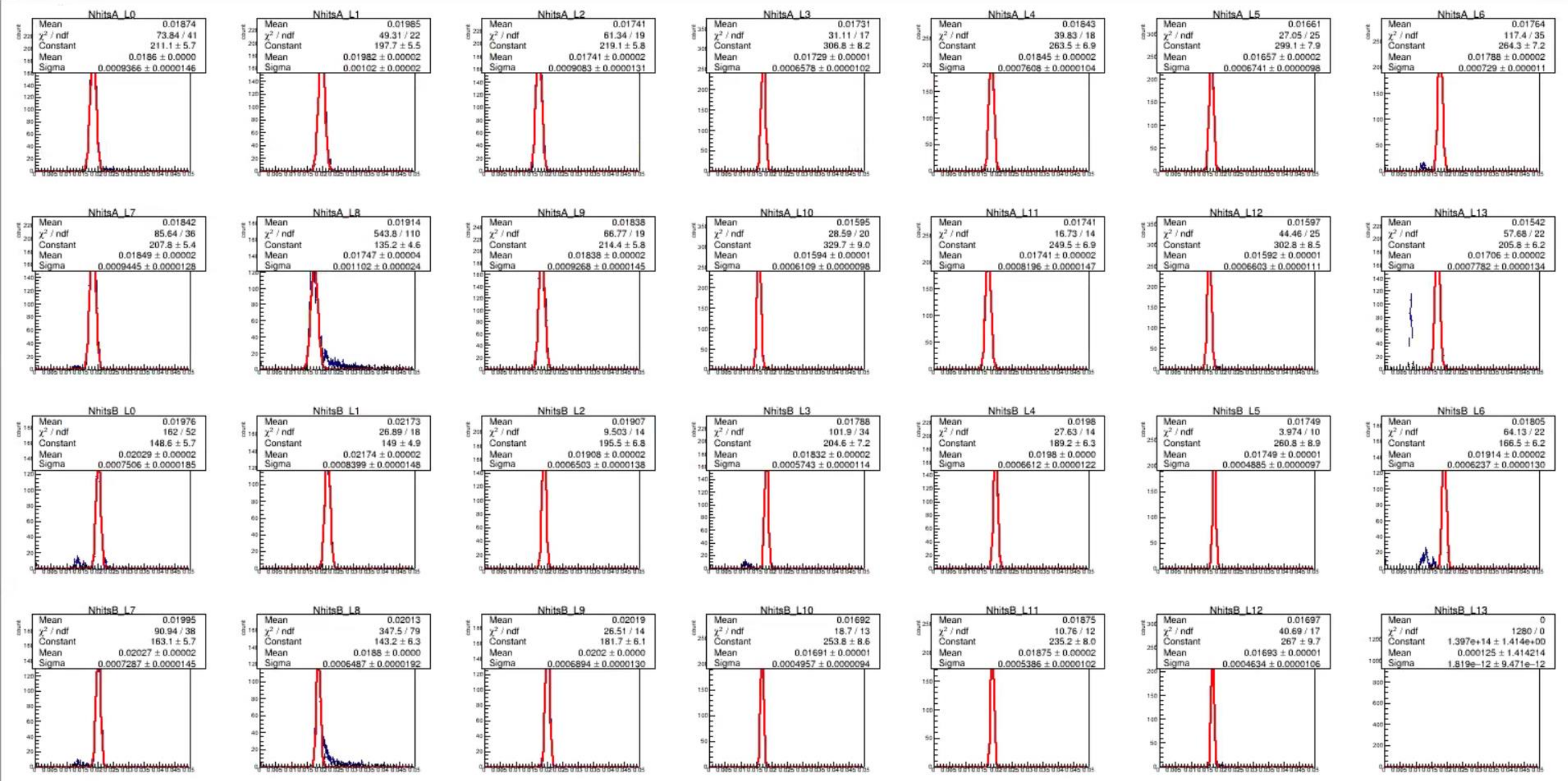
1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

felix3

Help

File Edit View Options Tools

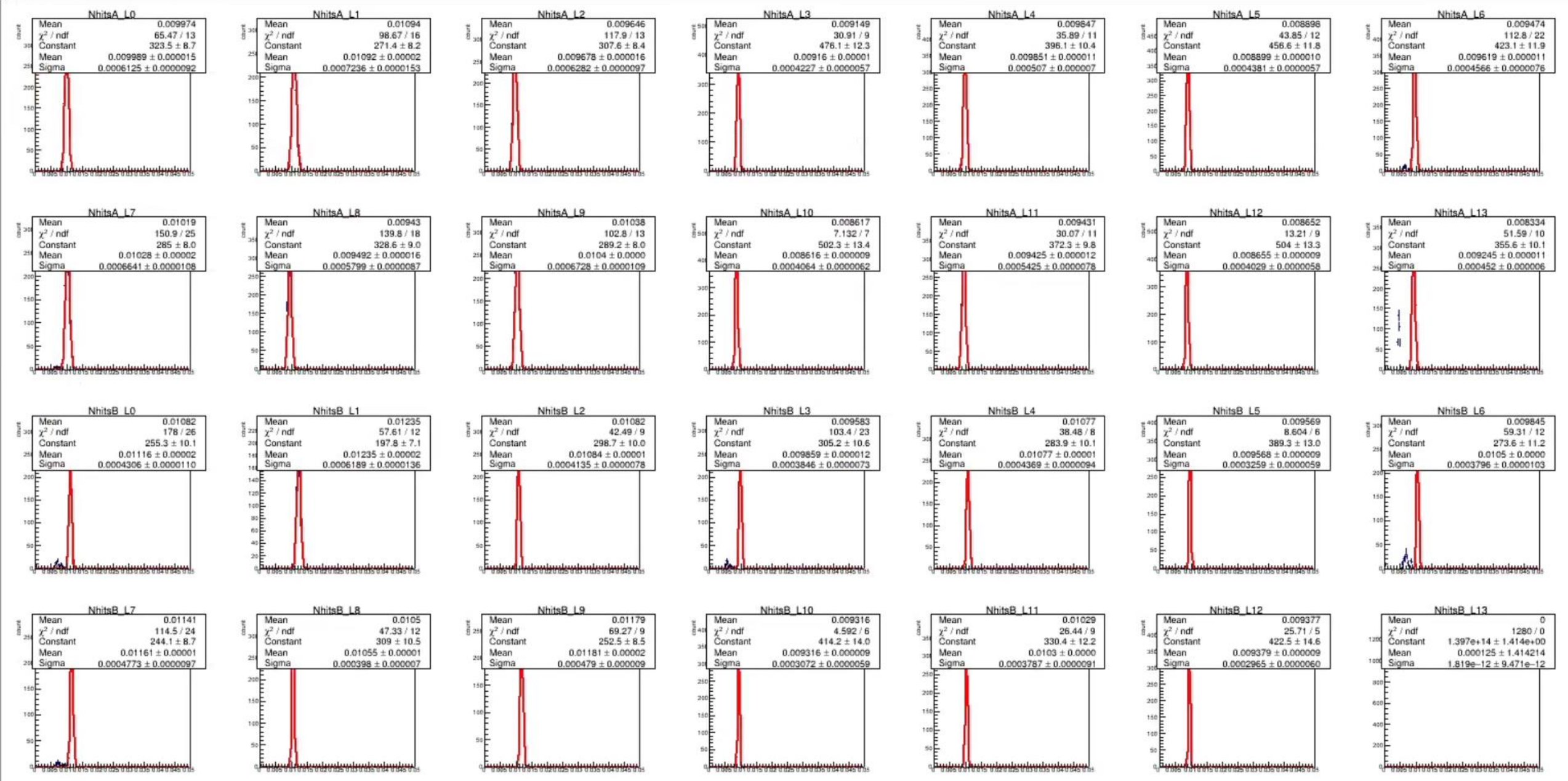


BCO (peak-1)~(peak+1) cut

felix3

Help

File Edit View Options Tools



Felix4 comparison

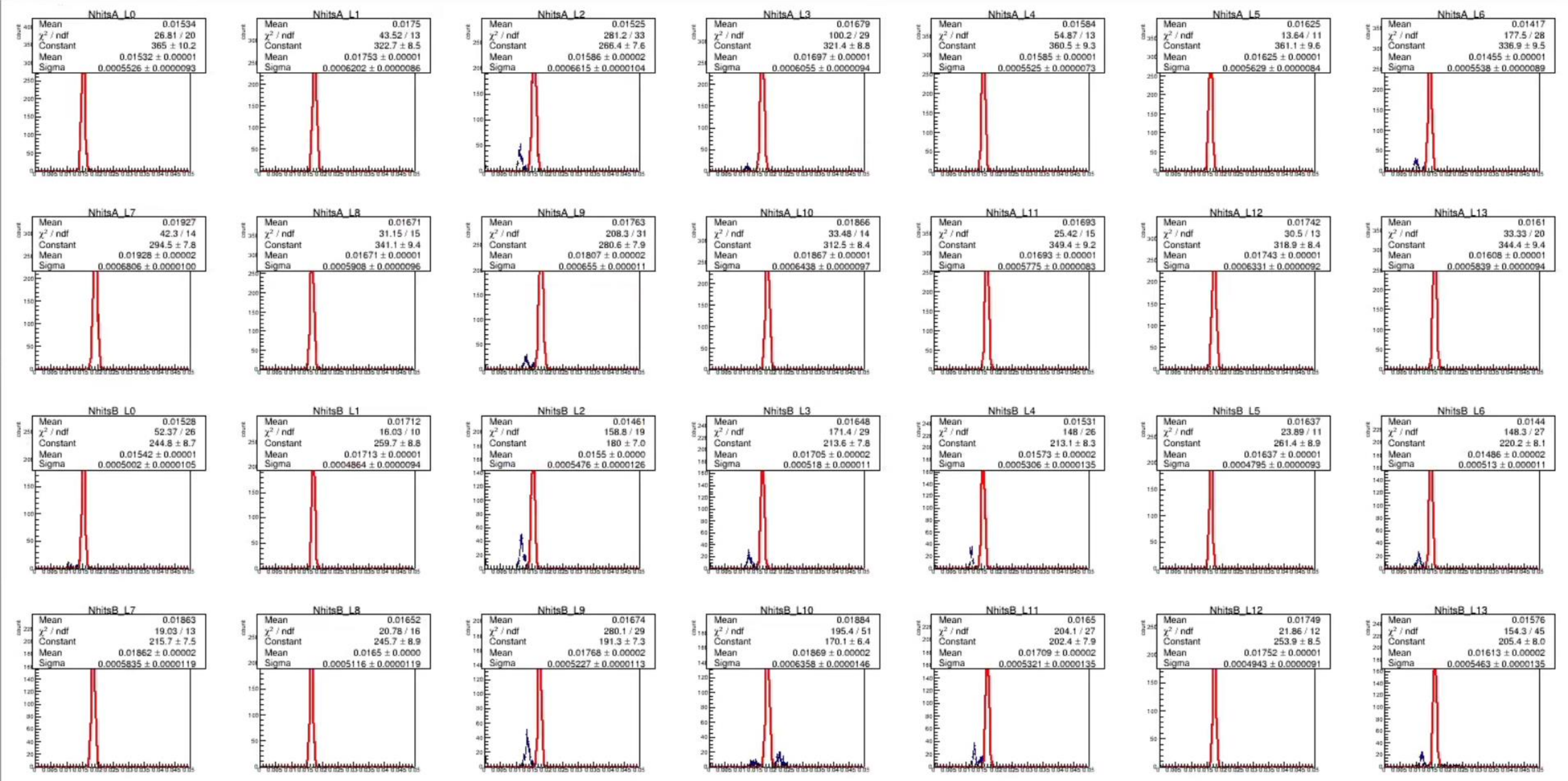
1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

felix4

Help

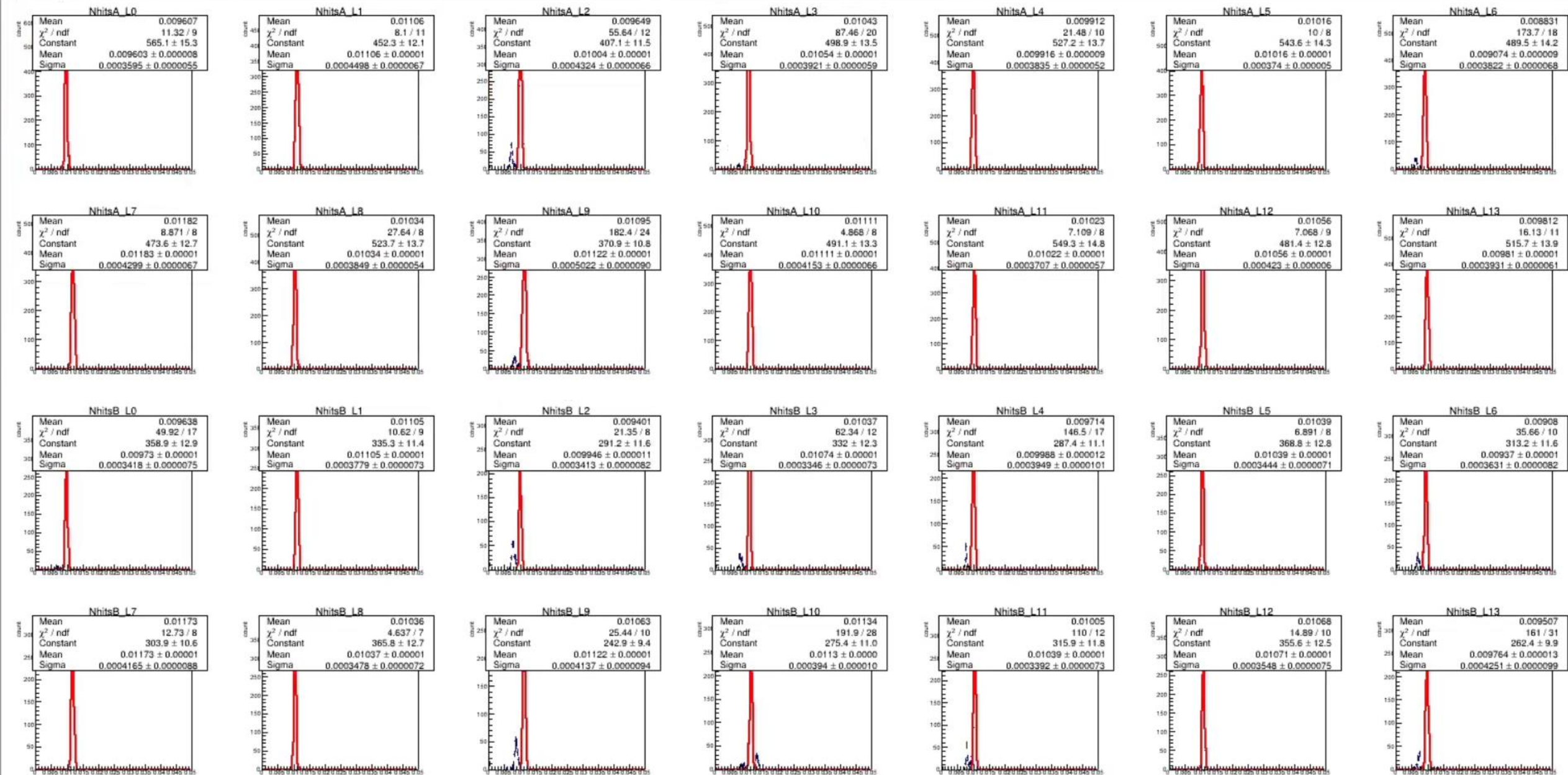
File Edit View Options Tools



BCO (peak-1)~(peak+1) cut

felix4

Help

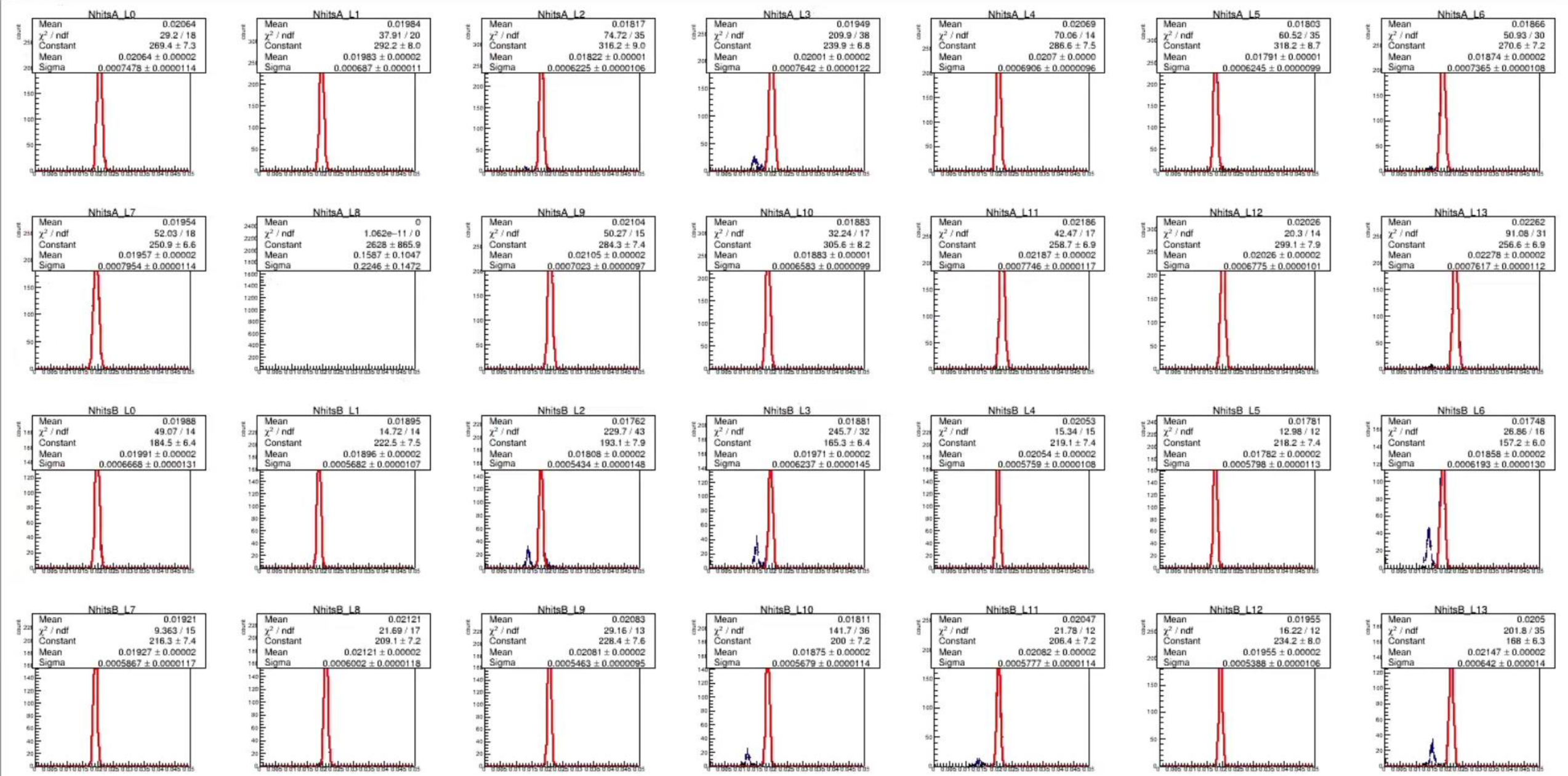


Felix5 comparison

1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

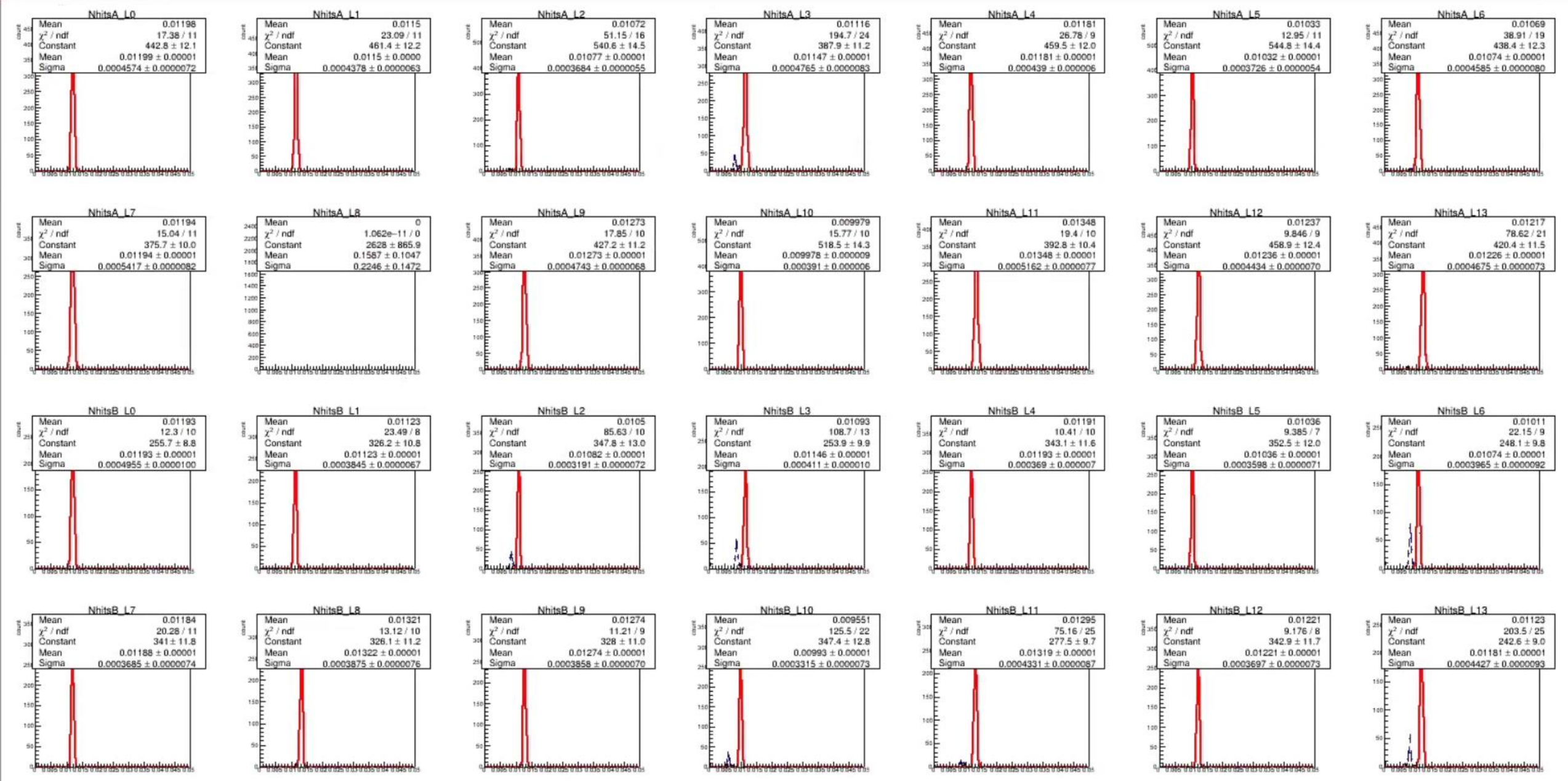
felix5



BCO (peak-1)~(peak+1) cut

felix5

Help

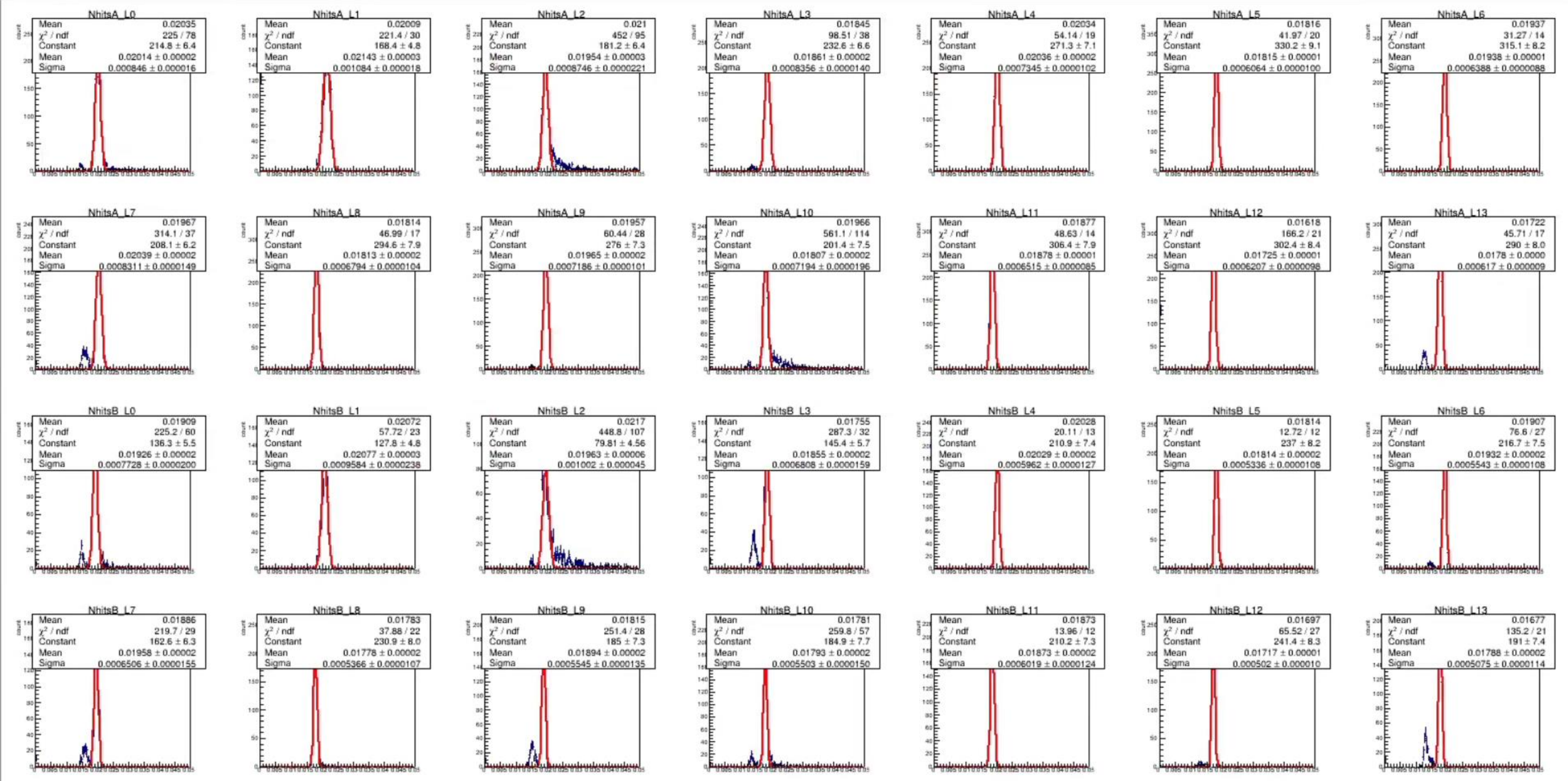


Felix6 comparison

1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

felix6

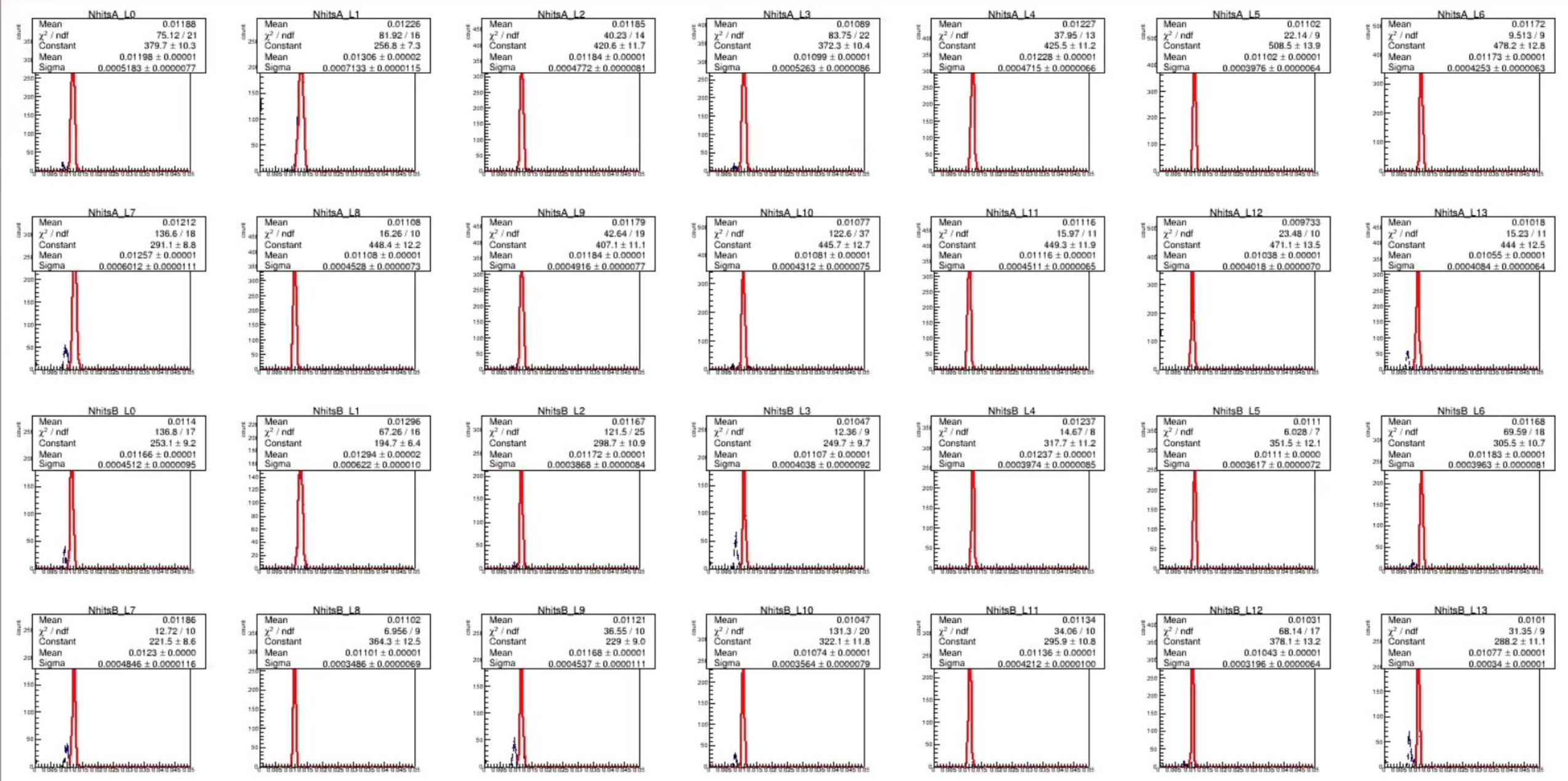


BCO (peak-1)~(peak+1) cut

felix6

Help

File Edit View Options Tools



Felix7 comparison

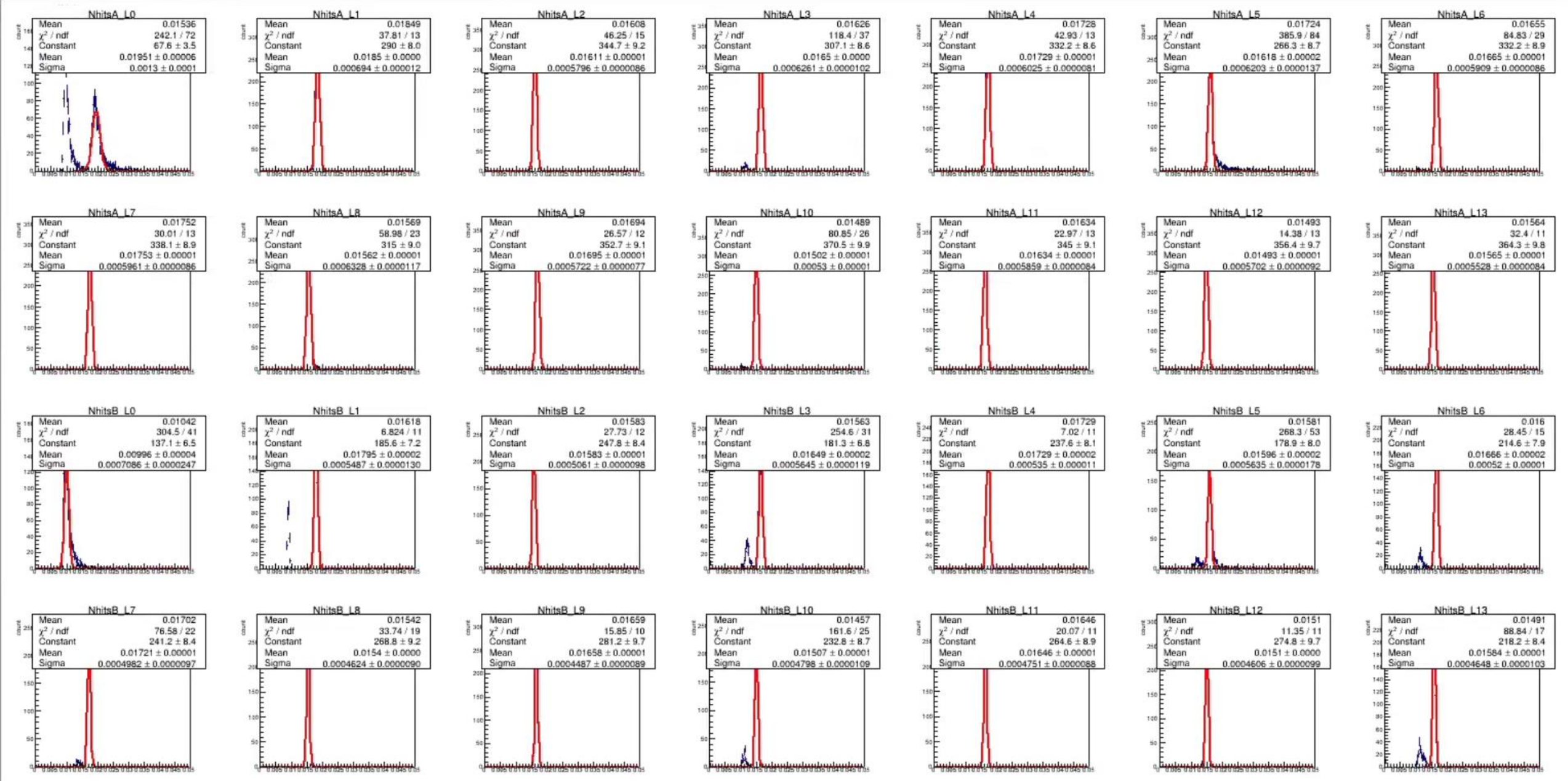
1. No BCO cut
2. Only BCO peak cut
3. BCO (peak-1)~(peak+1) cut

No BCO cut

felix7

Help

File Edit View Options Tools



BCO (peak-1)~(peak+1) cut

felix7

Help

File Edit View Options Tools

