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AHCAL MIP Calibration

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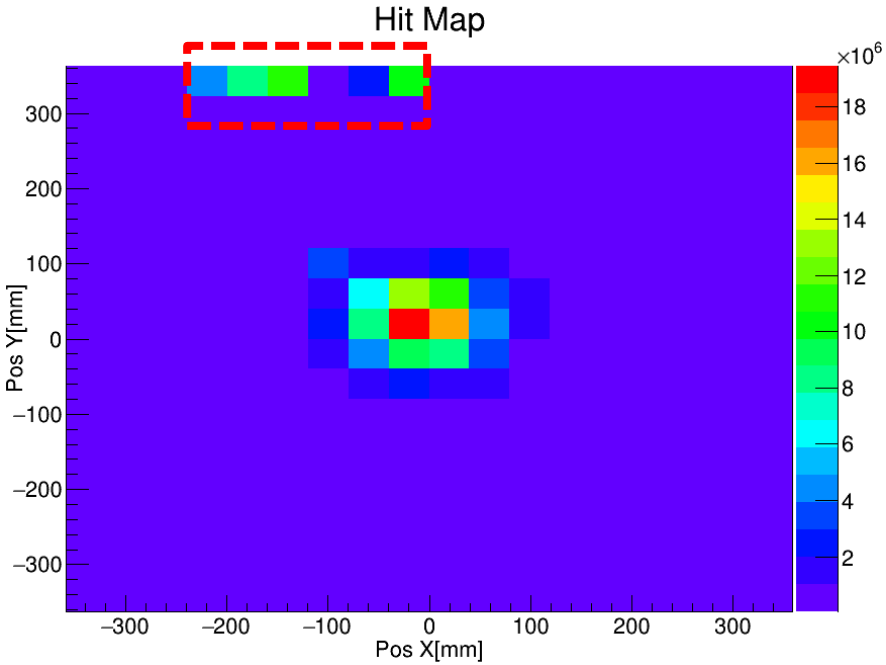
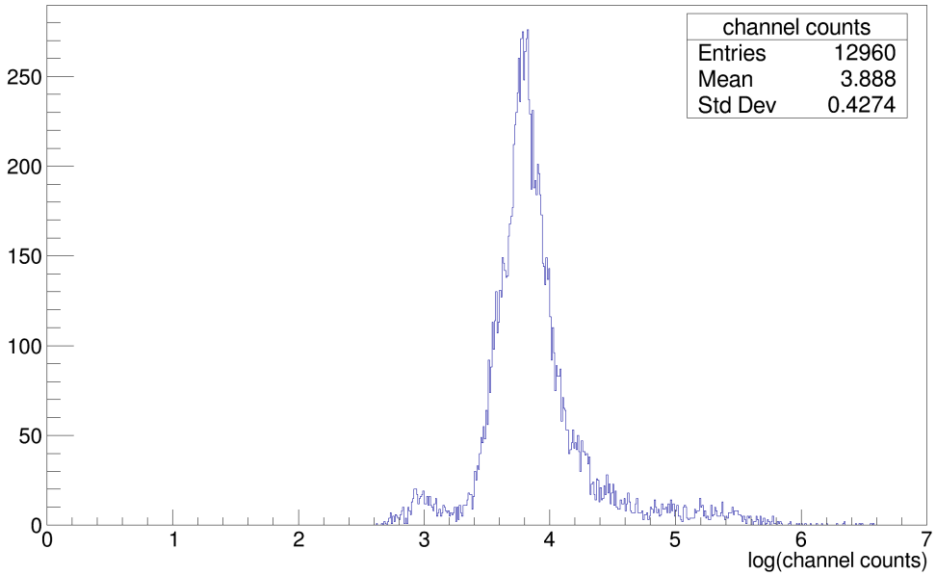
Motivation and strategy

- Use MIP data and Simulation information to do energy calibration
- Analyse HCAL and ECAL+HCAL muon data separately
  - HCAL: muon beam position fixed
  - ECAL+HCAL: muon beam position scanned
- First do fit on chip level
  - for channels with adequate counts, do fit on channel level
  - for channels without enough statistics, use chip results as itself parameter

Statistics overview

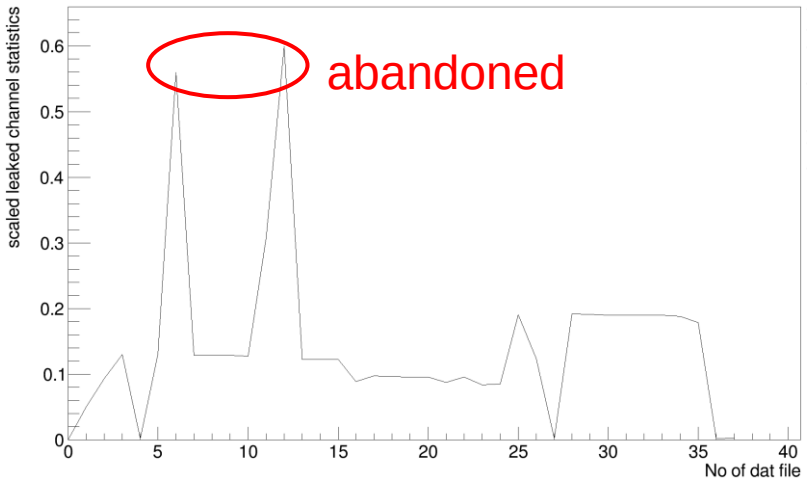
- HCAL alone statistics
  - There are channels with light leakage
  - Most of the channel's statistics are around 10^4

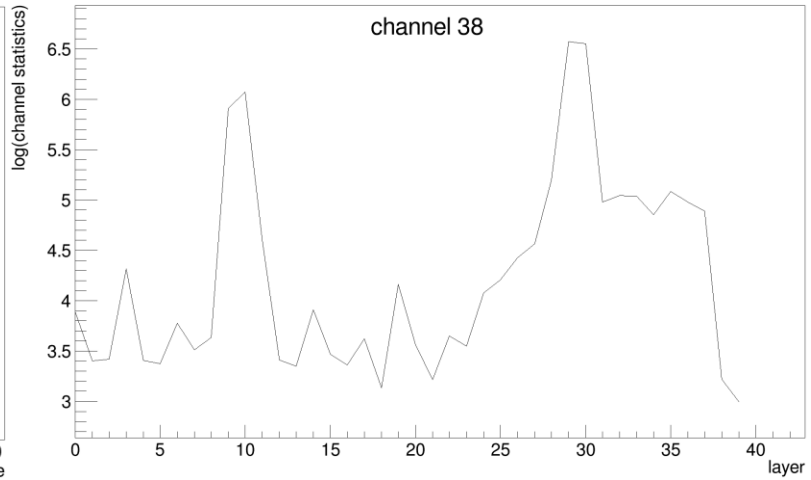


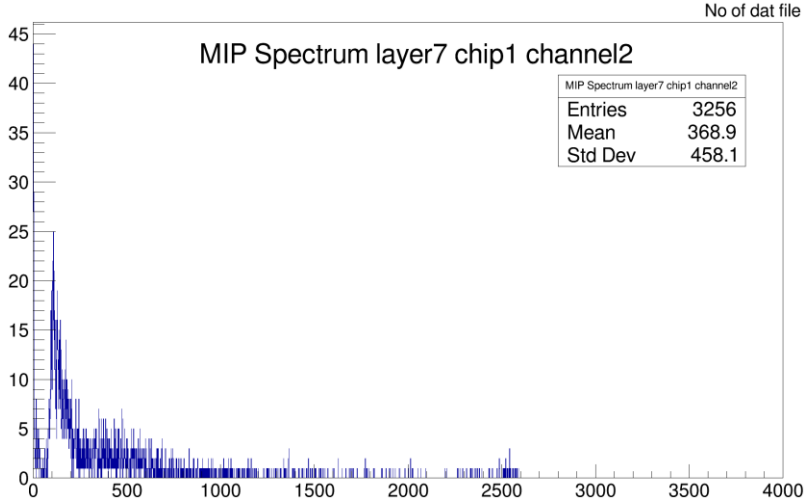


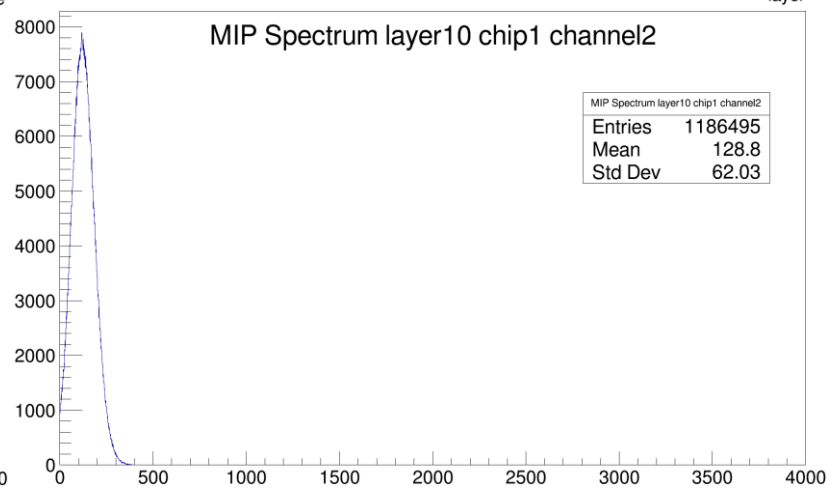
Statistics overview

- HCAL alone leaked channels
  - No obvious time dependence
  - Abandon channels with > 10^4 counts



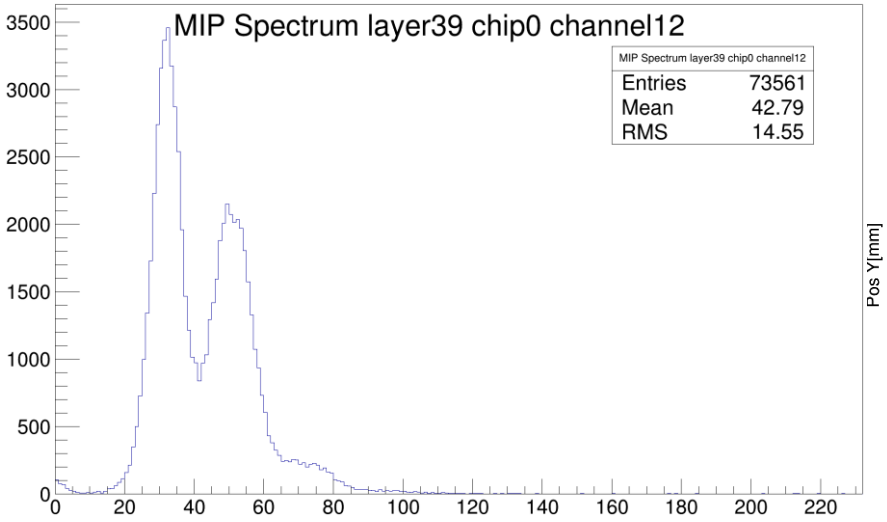




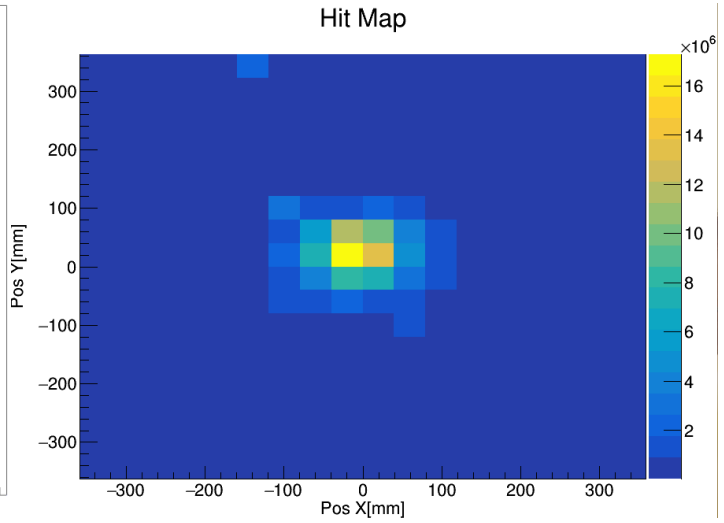


Statistics overview

- Some abnormal NDL channels
- Selection criteria:
  - More than 10^4 counts & Mean value < 250
  - 90 channels(0.4%) are abandoned



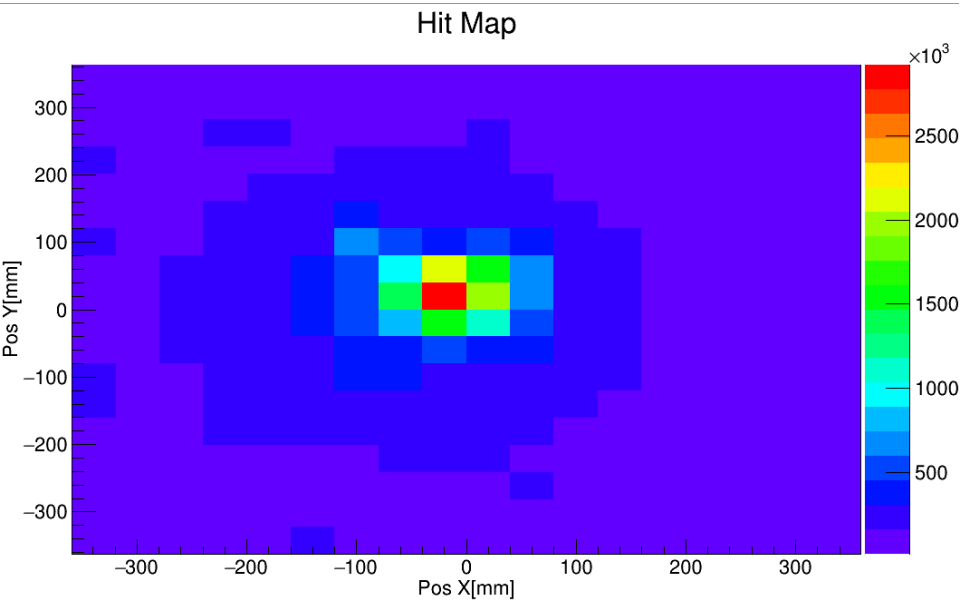
Abnormal NDL channel

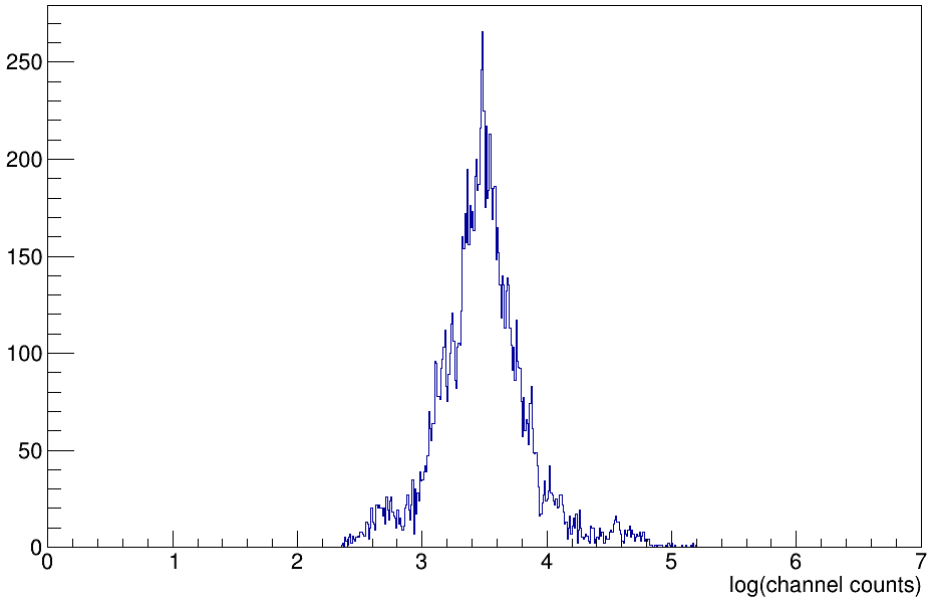


Hit Map after selection

Statistics overview

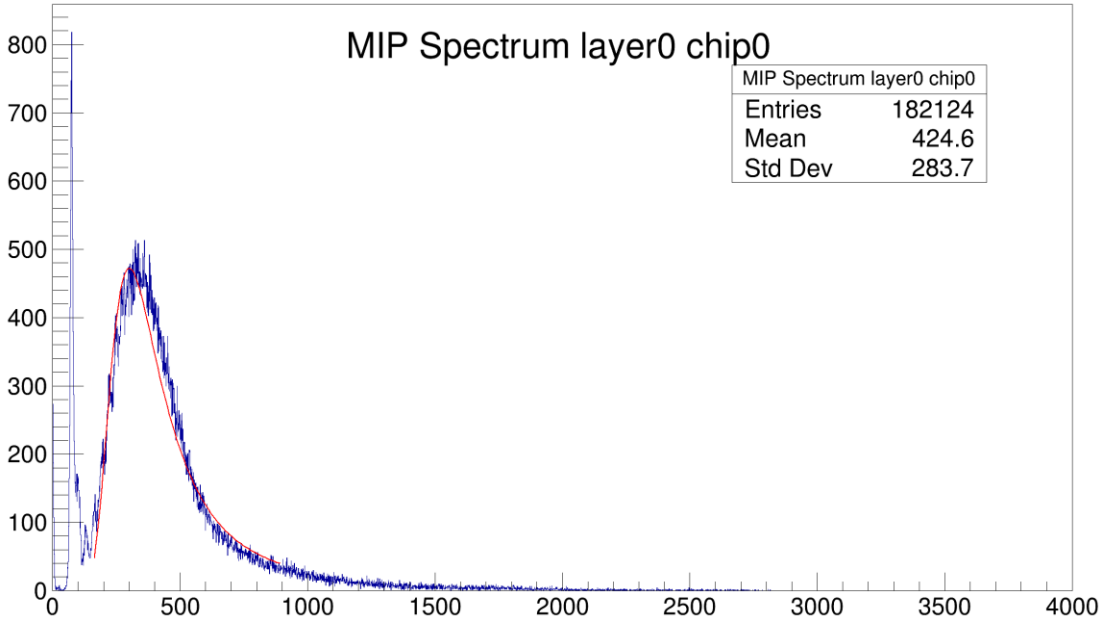
- Data in the ECAL+HCAL run
  - The light leakage has been fixed
  - NDL layers still have abnormal channels
  - The statistics is not enough for fittng at channel level





Fitting at Chip level

- Use HCAL alone Data
- The fitting and result check is going on



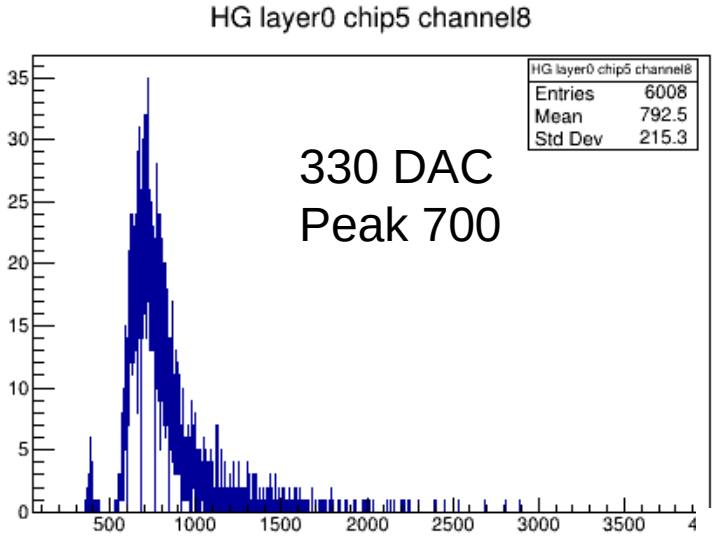
Summary and plan

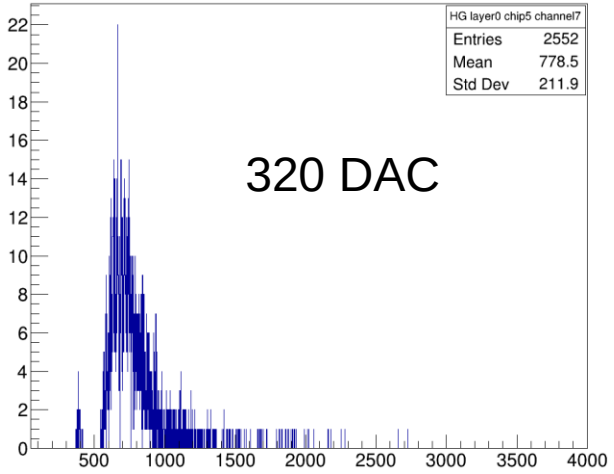
- The data selection will be iterated for better extraction of bad channels
- The fit at chip level is going on
- Fit at channel level will be done according to statistics and parameters from chip fitting results

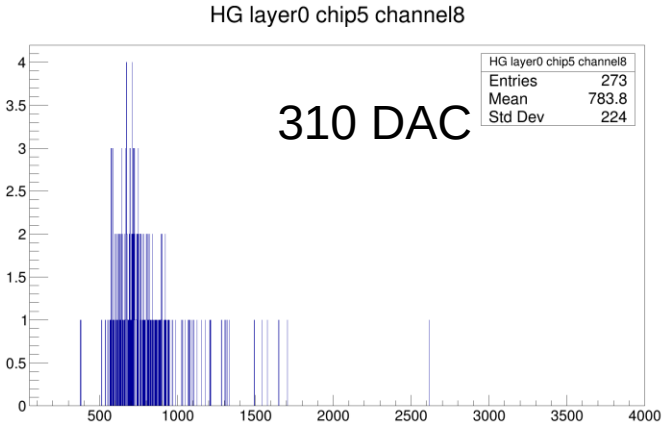
- backup

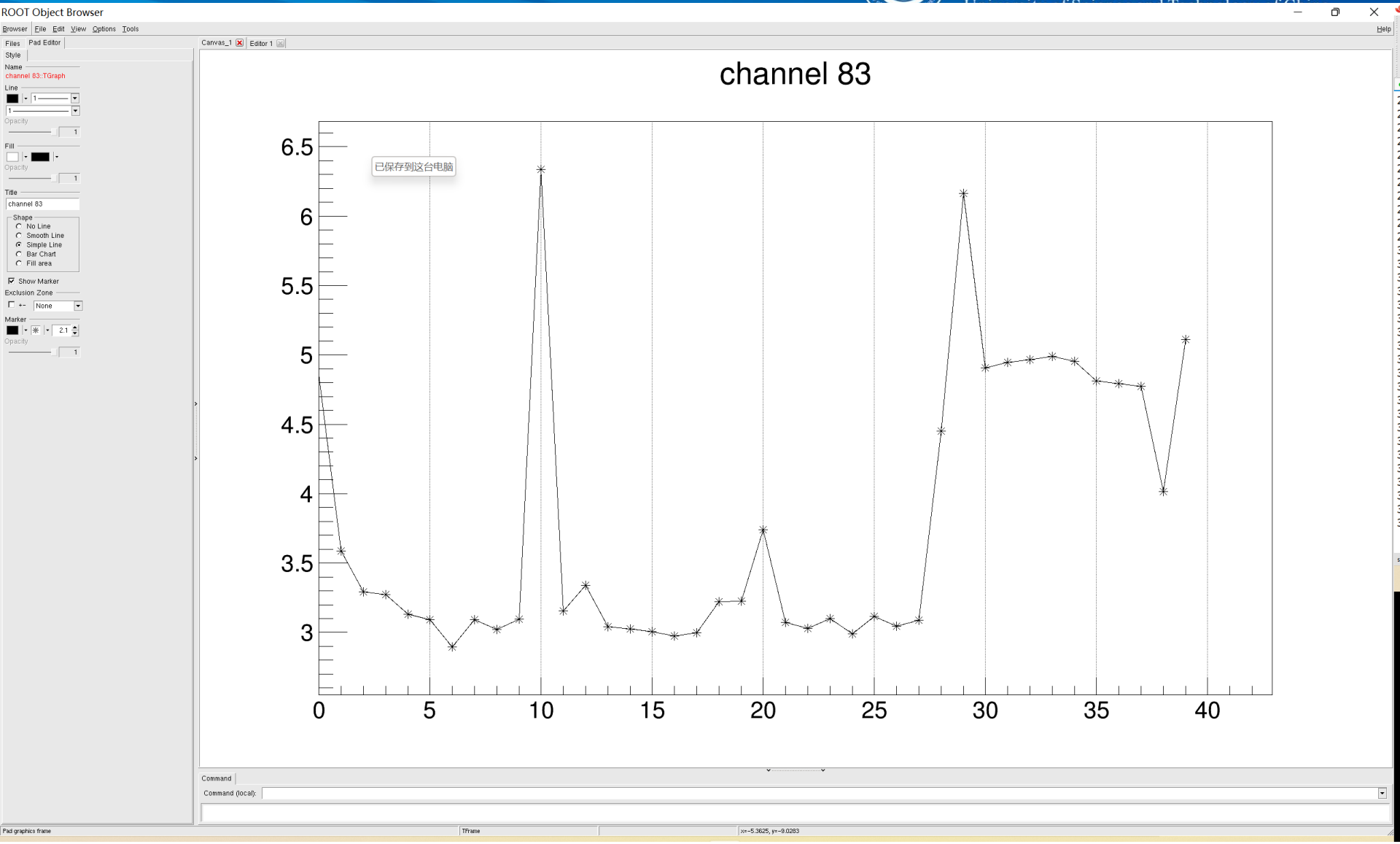
Different threshold

- Muon beam








ROOT Object Browser
Browser File Edit View Options Tools Help
Files Pad Editor
Style
Name
channel 83::TGraph
Line
Opacity
Fill
Title
channel 83
Shape
No Line
Smooth Line
Simple Line
Bar Chart
Fill area
Show Marker
Exclusion Zone
None
Marker
Canvas_1
Editor 1
channel 83
已保存到这台电脑
6.5
6
5.5
5
4.5
4
3.5
3
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40
Command
Command (local):
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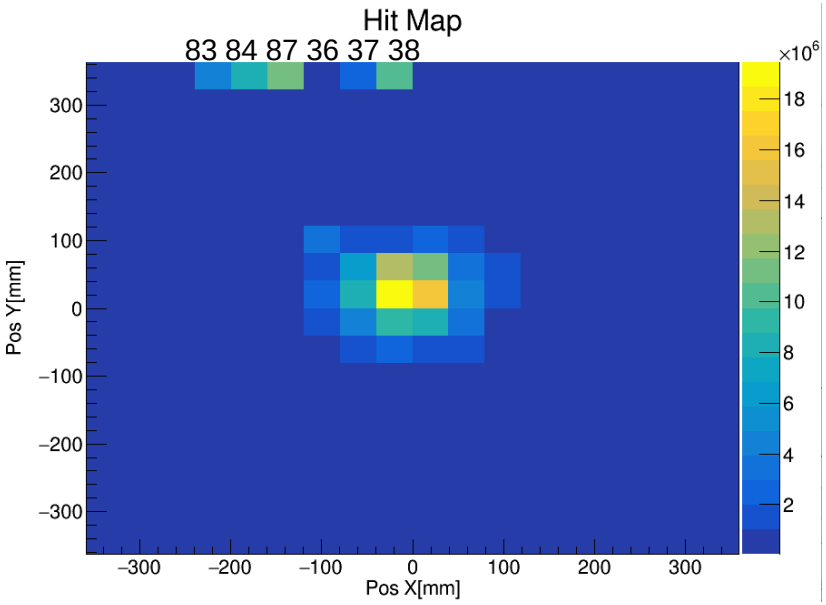
TFrame


Hit Map
83 84 87 36 37 38
×10^6
Pos Y[mm]
Pos X[mm]
300
200
100
0
−100
−200
−300
−300
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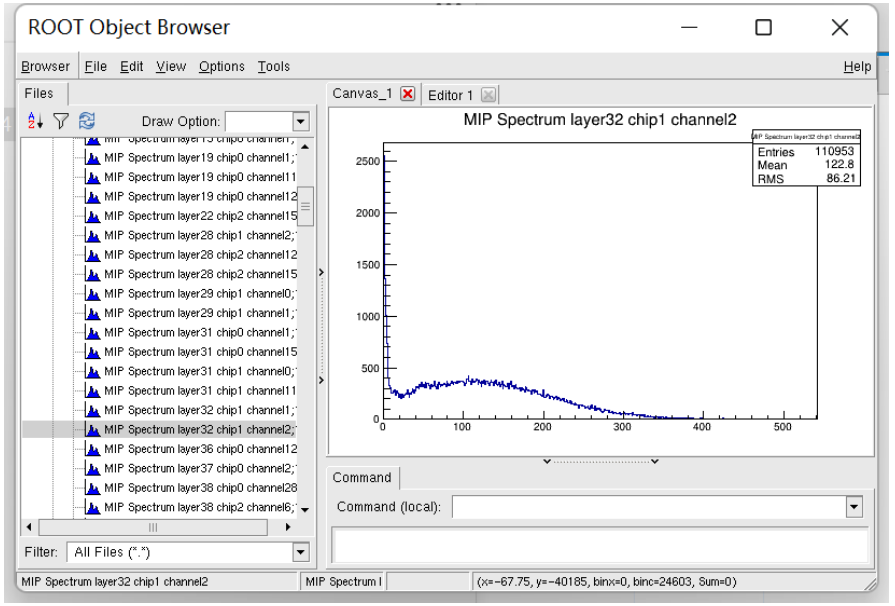
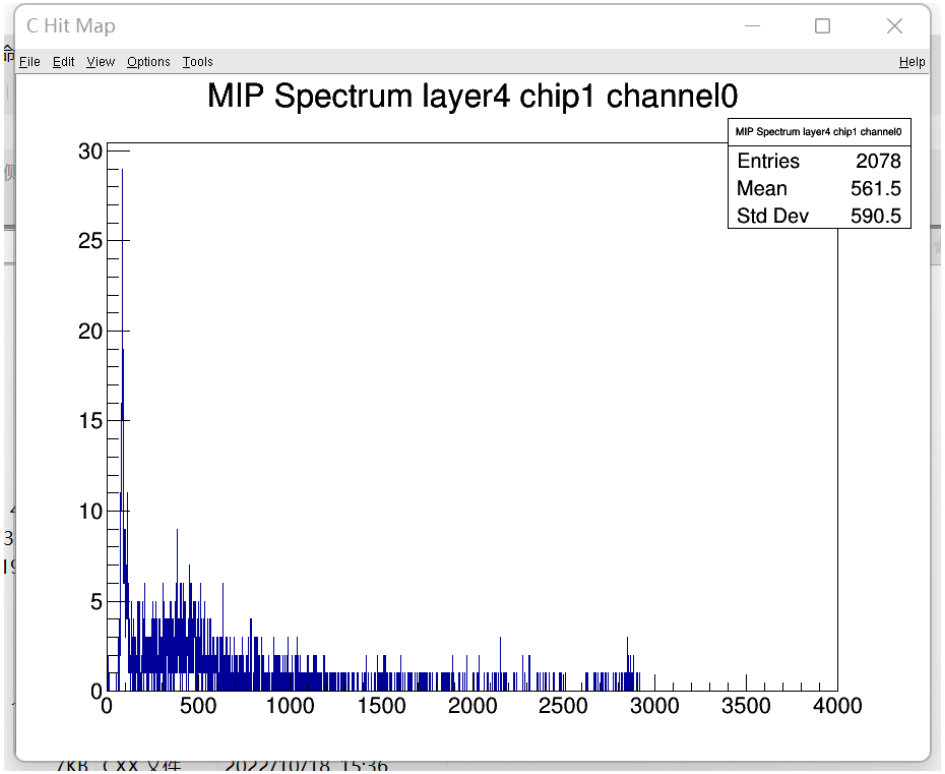
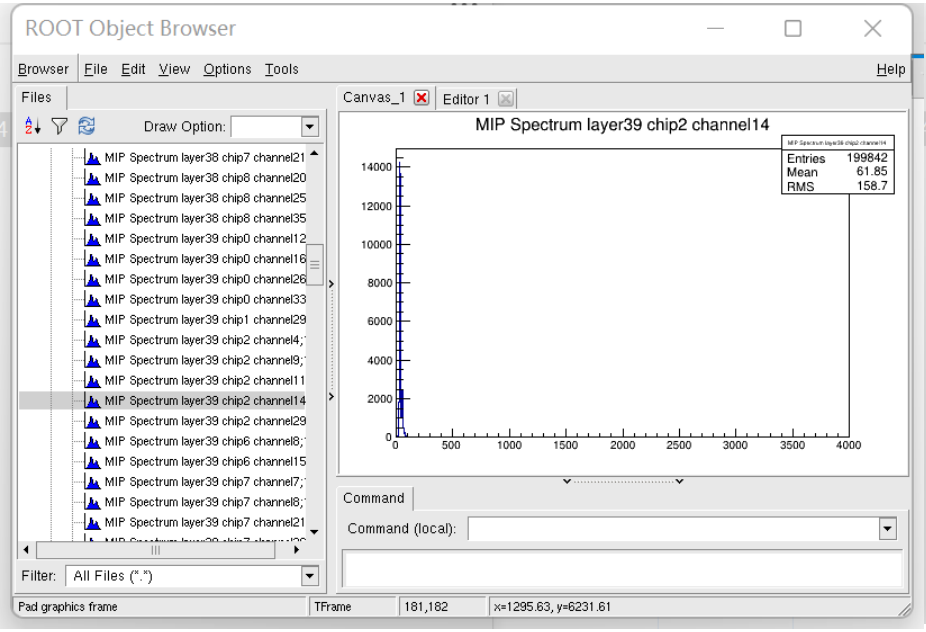
100
200
300
18
16
14
12
10
8
6
4
2

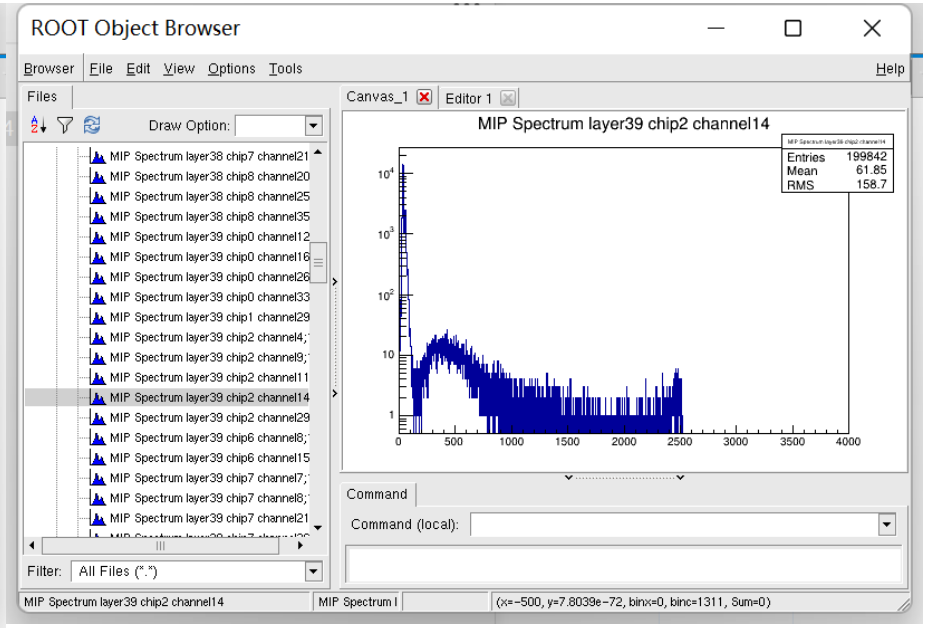

ROOT Object Browser
Browser
File
Edit
View
Options
Tools
Help
Files
Draw Option:
MIP Spectrum layer19 chip0 channel1;
MIP Spectrum layer19 chip0 channel11
MIP Spectrum layer19 chip0 channel12
MIP Spectrum layer22 chip2 channel15
MIP Spectrum layer28 chip1 channel2;
MIP Spectrum layer28 chip2 channel12
MIP Spectrum layer28 chip2 channel15
MIP Spectrum layer29 chip1 channel0;
MIP Spectrum layer29 chip1 channel1;
MIP Spectrum layer31 chip0 channel1;
MIP Spectrum layer31 chip0 channel15
MIP Spectrum layer31 chip1 channel0;
MIP Spectrum layer31 chip1 channel11
MIP Spectrum layer32 chip1 channel1;
MIP Spectrum layer32 chip1 channel2;
MIP Spectrum layer36 chip0 channel12
MIP Spectrum layer37 chip0 channel2;
MIP Spectrum layer38 chip0 channel28
MIP Spectrum layer38 chip2 channel6;
Filter:
All Files (*.*)
Canvas_1
Editor 1
MIP Spectrum layer32 chip1 channel2
Entries 110953
Mean 122.8
RMS 86.21
2500
2000
1500
1000
500
0
0
100
200
300
400
500
Command
Command (local):
MIP Spectrum layer32 chip1 channel2
MIP Spectrum l
(x=-67.75, y=-40185, binx=0, binc=24603, Sum=0)

漏光通道


C Hit Map
File Edit View Options Tools Help
MIP Spectrum layer4 chip1 channel0
MIP Spectrum layer4 chip1 channel0
Entries 2078
Mean 561.5
Std Dev 590.5
30
25
20
15
10
5
0
0 500 1000 1500 2000 2500 3000 3500 4000

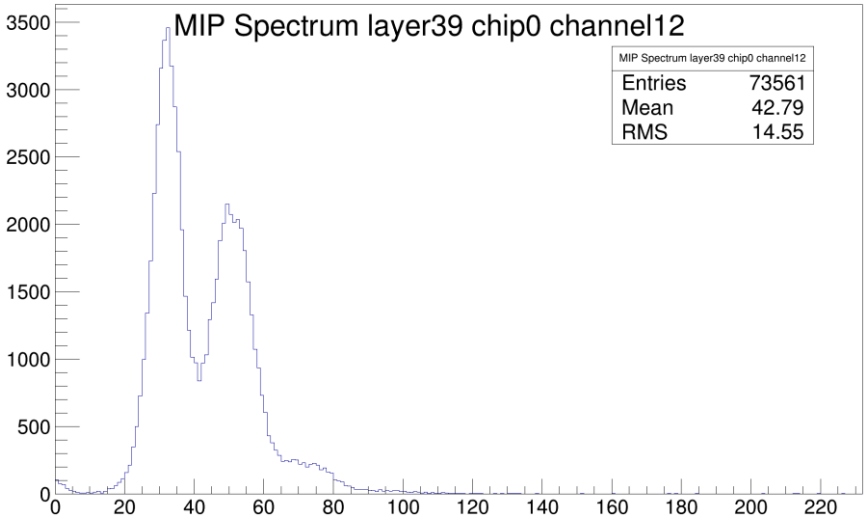
- 39 38 layer被误去除一部分





Statistics overview

- Some abnormal NDL channels
- Selection criteria:
  - More than 10^4 counts & Mean value < 150
  - 57 channels(0.4%) are abandoned



Abnormal NDL channel