Automation of Hot channel removal

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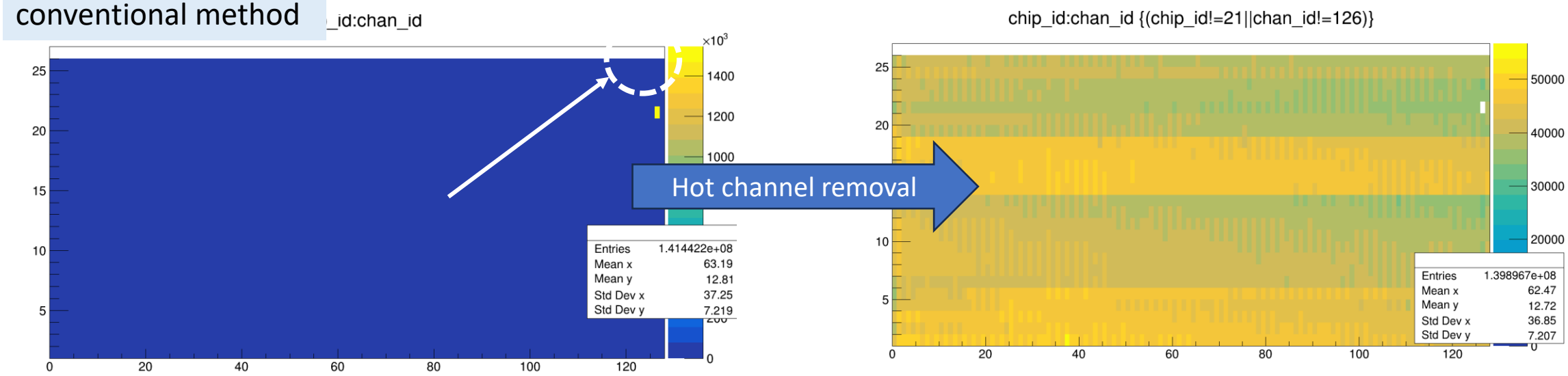
Automation of Hot channel removal

When number of entries in a certain channel is much larger than others, the channel is called as Hot channel.

I used to remove entries in Hot channel by hand. In detail, I made chip vs. channel distribution and I regarded number of entries in a certain channel is much larger than others as Hot channel.

However, it takes time and effort to find Hot channel in all ladders. Then I try to automate the Hot channel removal.

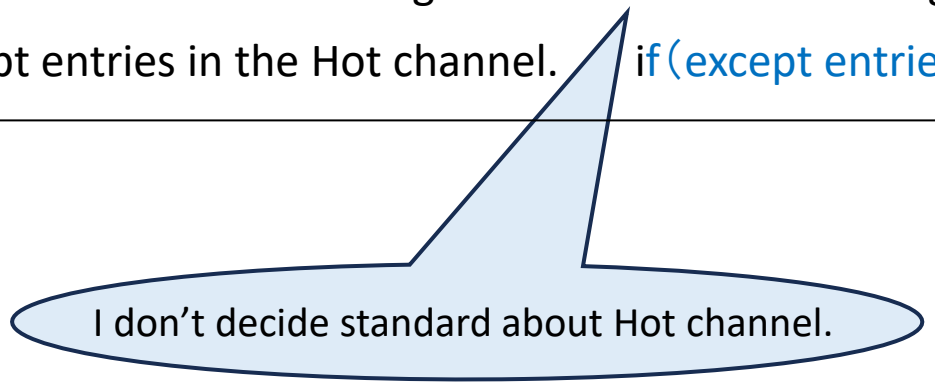
conventional method



Automation of Hot channel removal

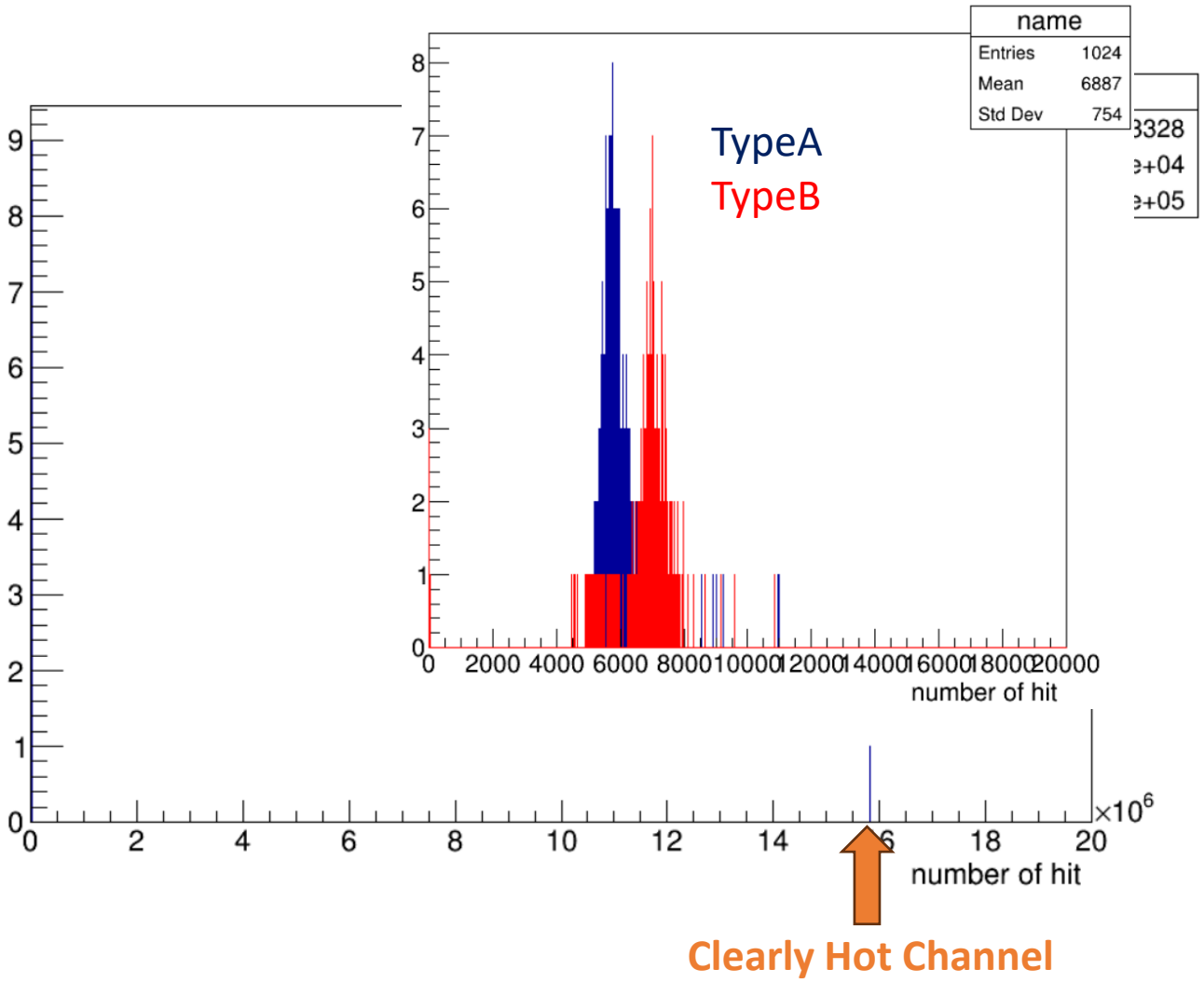
Analysis code flow

1. I filled information about chip_id and chan_id. `h1->Fill(chan_id, chip_id);`
2. I calculate sum of number of entries in all channel. `count = count + h1->GetBinContent(a + 1, b + 1);`
3. I calculate average of number of entries in each channel. `average = count / (26 * 128);`
4. If number of entries in a certain channel is larger than “constant × average” , I regarded the channel as Hot channel.
5. I read out the data except entries in the Hot channel. `if(except entries in the Hot channel)vector(chip_id); ….`

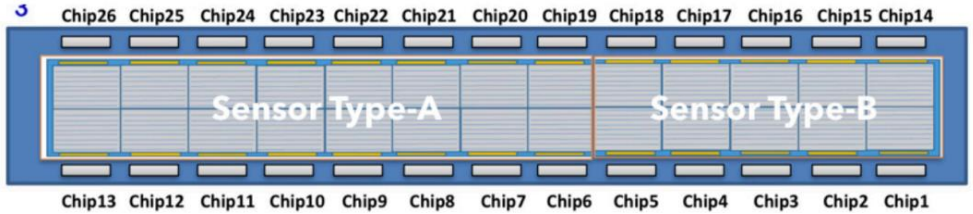


I analysised module0 in Run21537(hit-base).

Verification of Hot channel standard.



One dimension histogram with horizontal axis as each channel.

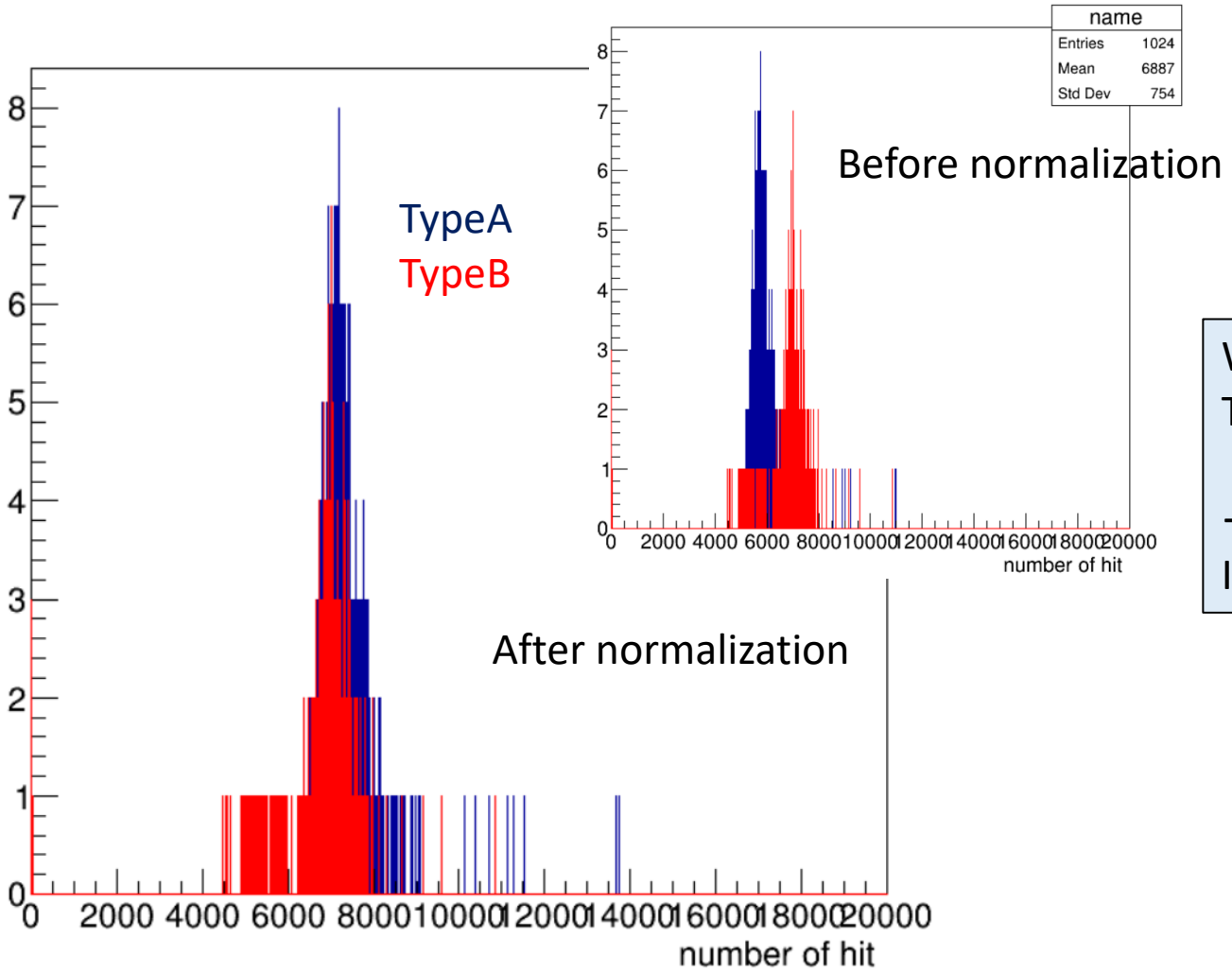


What we can find from the plot

- The channel which has 16 million entries is regarded clearly as Hot channel.
- According to difference of ladder area(TypeA and B), peak position is different respectively.

→The result of normalization by ladder area is shown on the next page.

Verification of Hot channel standard.



When I normalized the plot by ladder area, the peak in Type A and B is roughly matched.

→I need to decide Hot channel standard. For that reason, I plan to similarly verify the other ladders.

One dimension histogram with horizontal axis as each channel.

Summary

Automation of Hot channel removal

- I try to automate removal of entries in Hot channel.
- According to difference of ladder area(Type A and B), peak position in number of entries distribution is different respectively. By normalization, the peak is roughly matched.
- I need to decide Hot channel standard.

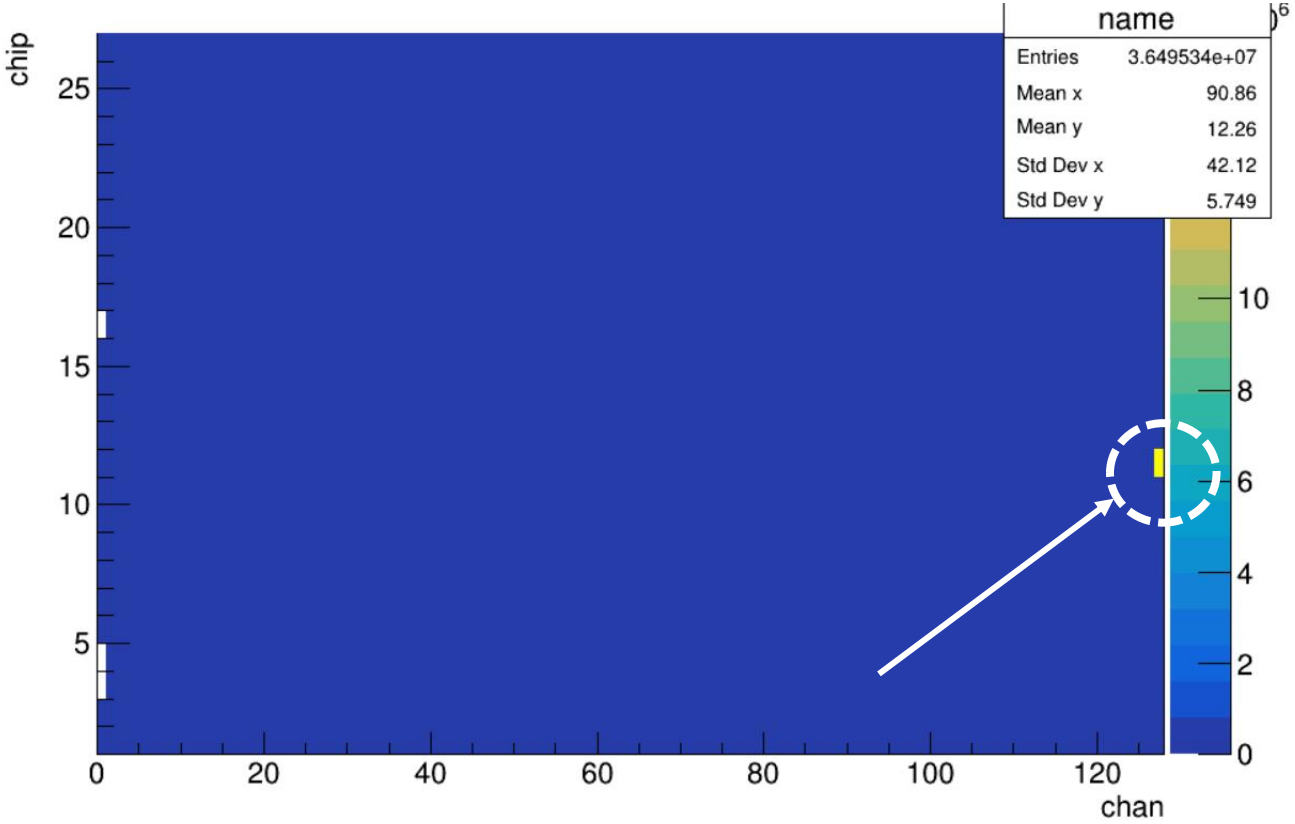
Back Up

```
int nEntry = tree->GetEntries(); //treeのEntry数を取得して代入する
for (int iEntry = 0; iEntry < nEntry; ++iEntry) { //すべてのEntryでループをまわす
  //  for (int iEntry = 0; iEntry < 100000; ++iEntry) { //すべてのEntryでループをまわす
        tree->GetEntry(iEntry);
        if (module == l[dataset]) {
          int x = 0, y = 0;
          y = chip_id;
          x = chan_id;
          h1->Fill(x, y);
        }
}
c1->cd();
h1->Draw("colz");
c2->cd();
h2->Draw("");

double count = 0, average = 0;
for (int a = 0; a < 26; a++) {
        for (int b = 0; b < 128; b++) {
                count = count + h1->GetBinContent(b+1, a + 1);
                h2->Fill(h1->GetBinContent(b+1, a + 1));
        }
}
cout<<h1->GetBinContent(128, 11)<<endl;
average= count / (26 * 128);
cout << average << endl;

for (int a = 0; a < 26; a++) {
        for (int b = 0; b < 128; b++) {
          if (h1->GetBinContent(b+1, a + 1) > (1.3*average))cout << "Chip"<< a + 1 << " Chan" << b << endl;
        }
}
```

Automation code of Hot channel.



Chip vs. Channel 2-dimension histogram

module0

I wrote analysis code added these procedure.
It enables me to automate Hot channel removal.

```
for (int a = 0; a < 26; a++) {
        for (int b = 0; b < 128; b++) {
          if (h1->GetBinContent(b+1, a + 1) > (1.3*average))cout << "Chip"<< a + 1 << " Chan" << b << endl;
        }
}
```

If (number of entries in a certain channel) > constant(In this case is 1.3)*average,
I regarded it as Hot channel.

```
Chip11 Chan127
```

Hot Channel list