

# Progress of QA of Clustering

2023/11/10 INTT Analysis Workshop  
NWU M1 Manami Fujiwara

# QA of Clustering

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## Checking offline clusters

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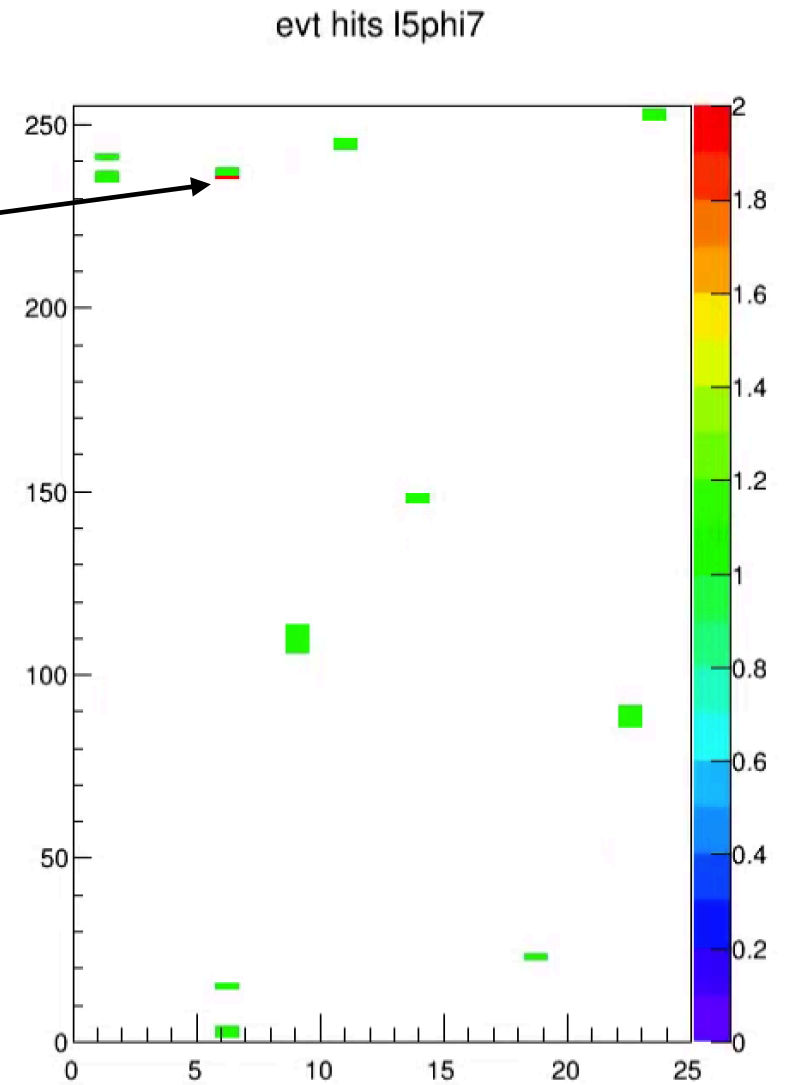
**Goal in this workshop:** Checking data, debug offline clustering process

### My To-Do List

- Checking that there is no difference between evt hit and offline hit
  - I already developed code which compare evt hit with offline hit.
  - Number of hits is difference because evt hit has clone hit. I have not found any hits that are only on evt or offline hit.
  - I checked one run. I will check the other runs.
- Checking offline cluster
  - Develop clustering code
  - Compare between offline clusters and clustering by myself

# Evt hit

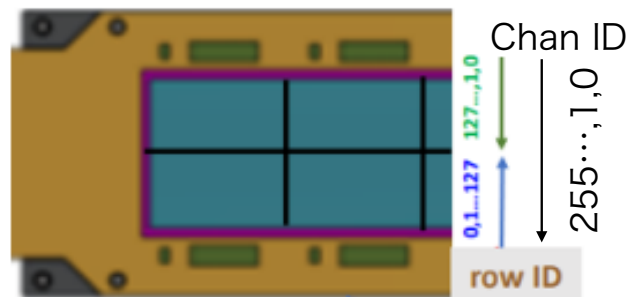
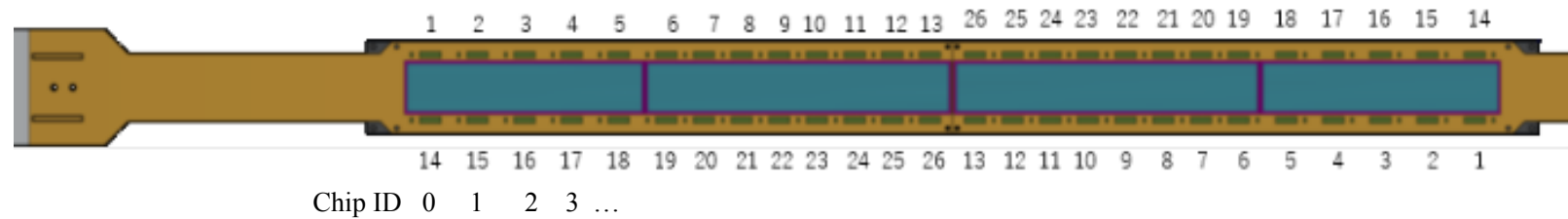
- Evt hit has clone hit
- Make all bin 1 before compare evt and offline hit
- X axis : chip
- Y axis : chan



# Renumbering Chip ID

- Renumber chip id for plot
- Channel id is same as offline strip y

Hardware definition ChipID

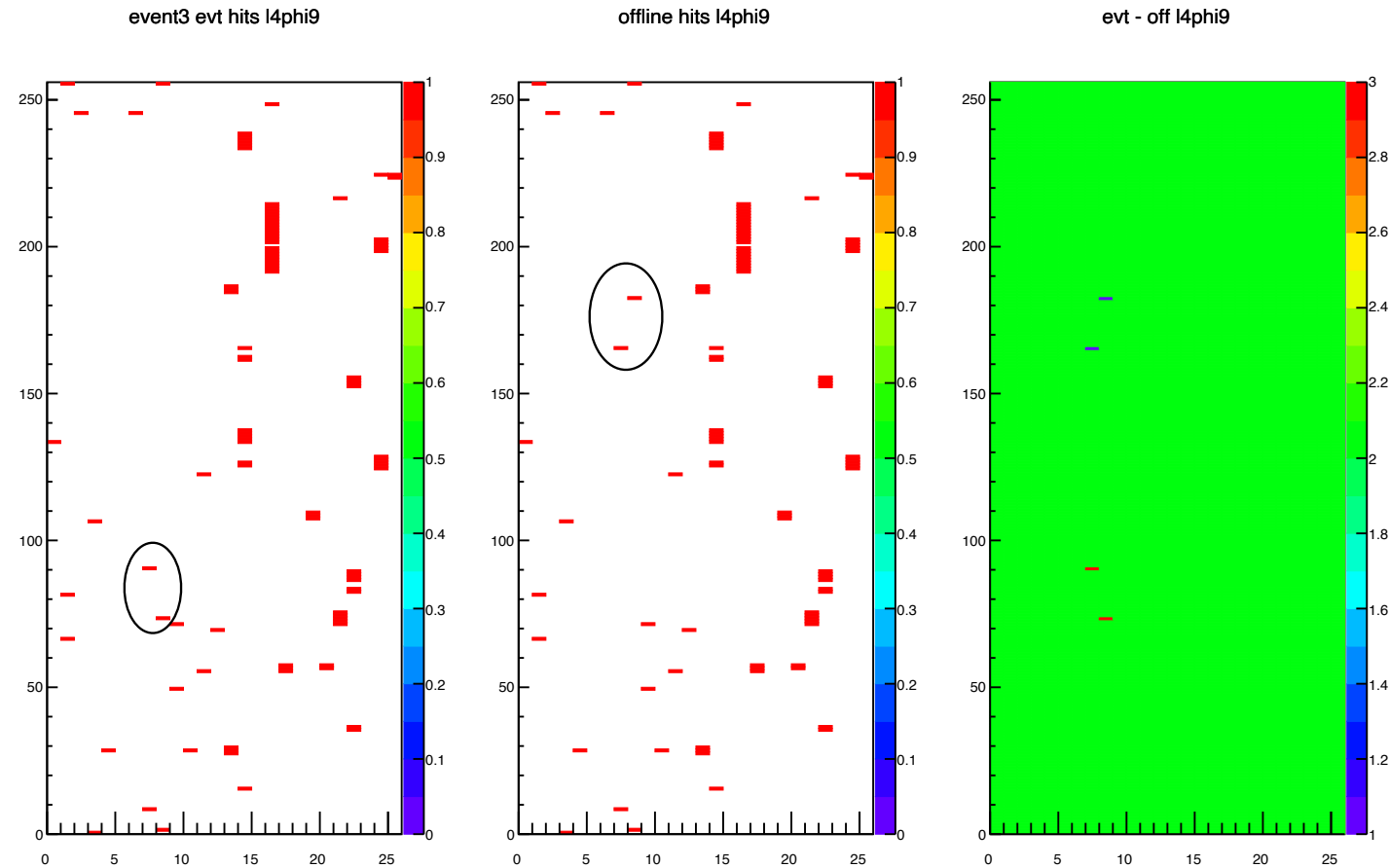


- ChipID starts from 1.
- Channel ID is as it is.

# Compare with Evt and offline hit

- It is sometime different evt between offline hit.
- X axis : chip
- Y axis : chan
- Run20869
- Event number : 3

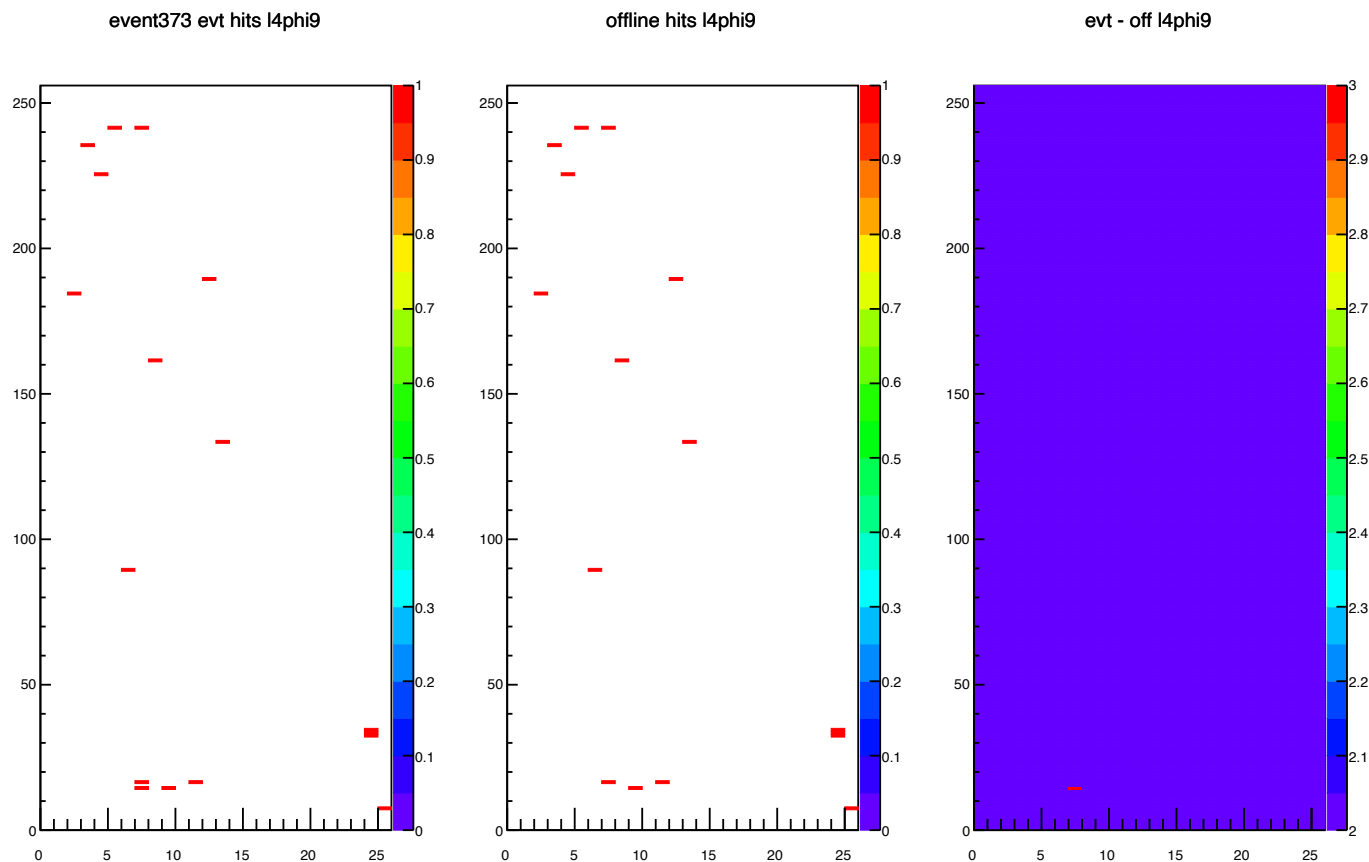
Note: All bin of evt -offline hist added 2



# Compare with Evt and offline hit

- X axis : chip
- Y axis : chan
- Run20869
- Event number : 487

Note: All bin of evt -offline  
hist added 2

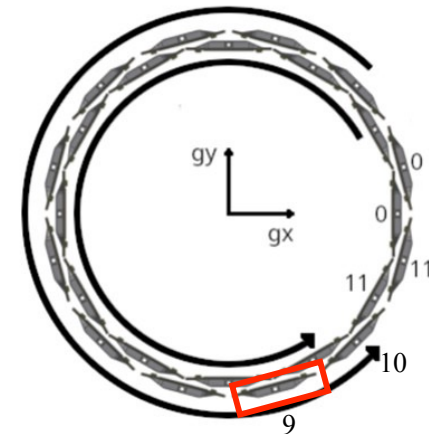


# Bug occurring ratio

- This bug occurred only a ladder which layer =4, lad\_phi =9.
- This bug occurred 5837/10000 events

Event number	Ladder Layer	Phi			
856	4	9	1	-1	0
857	4	9	1	-1	1
859	4	9	1	-1	-1
863	4	9	1	-1	0
864	4	9	1	-1	0
871	4	9	1	-1	0
874	4	9	1	-1	0
876	4	9	1	-1	1
877	4	9	1	-1	0
879	4	9	1	-1	0
880	4	9	1	-1	0
881	4	9	1	-1	0
883	4	9	1	-1	1
884	4	9	1	-1	0
885	4	9	1	-1	0

Ladder\_phi (Layers 3 & 4)



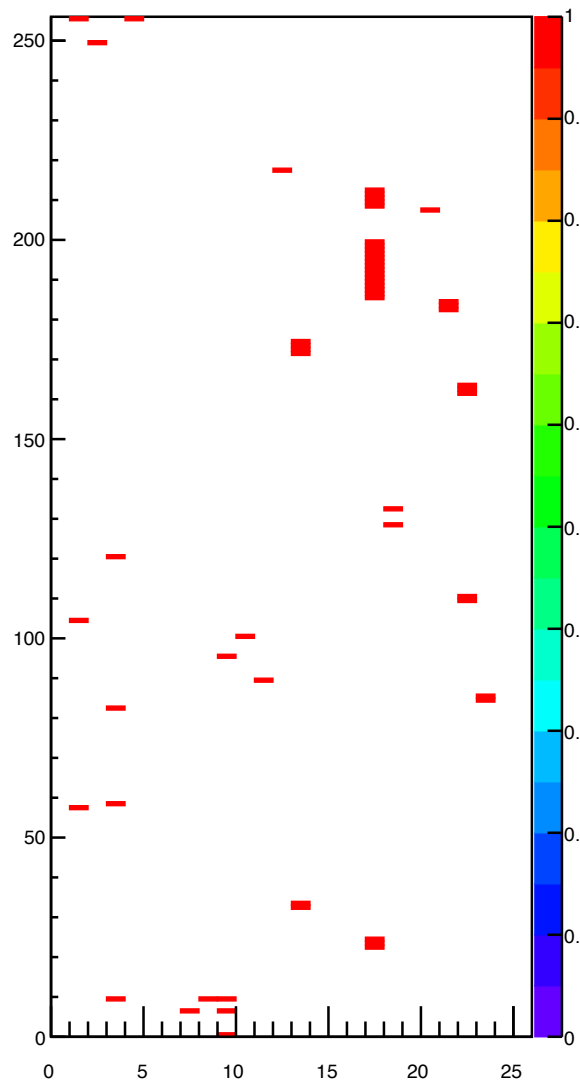
# Summery

- The decoder has a bug, some hits are removed and appears.
- The bug occurred only in one ladder.
- The probability of the bug happens is about 60%.

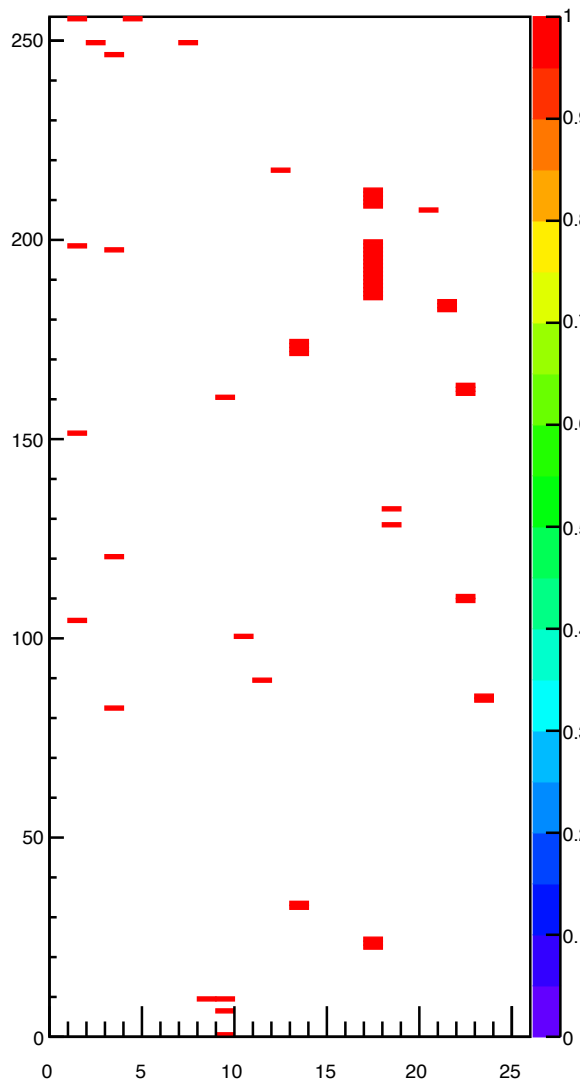


Back Up

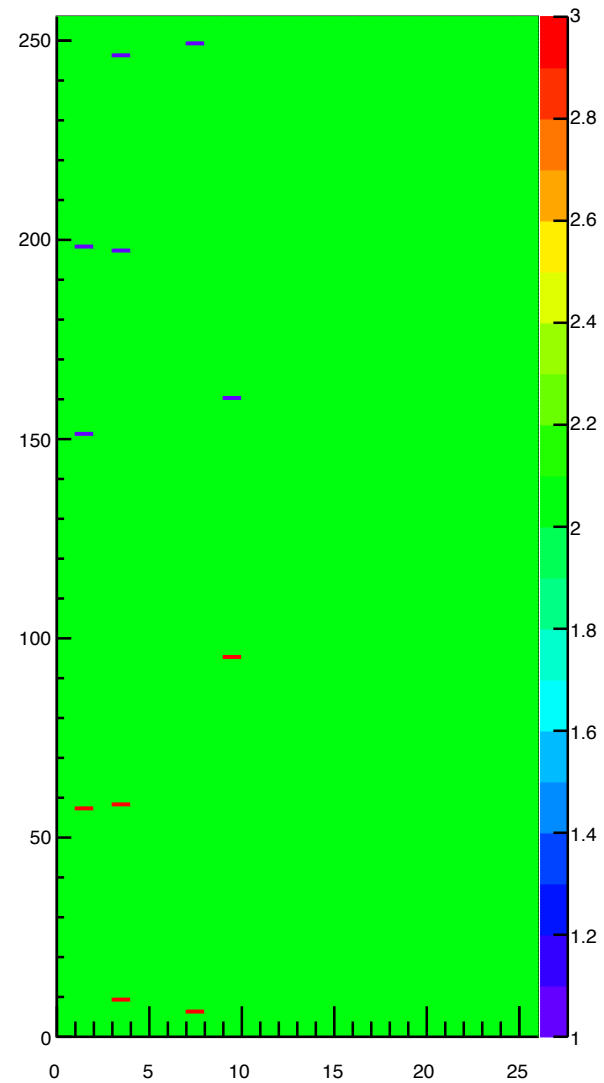
event5 evt hits l4phi9



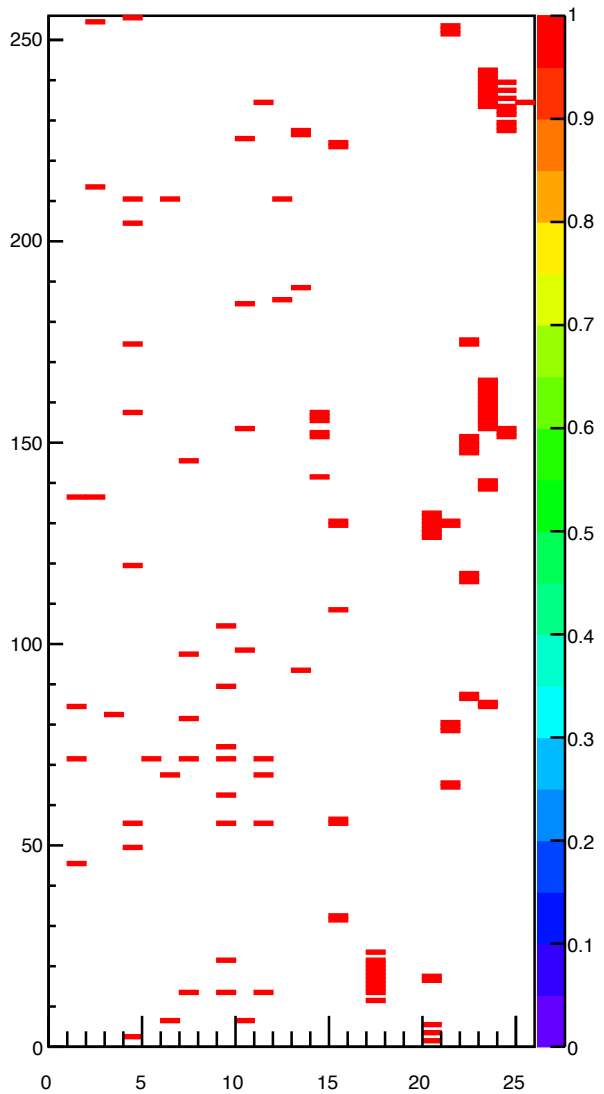
offline hits l4phi9



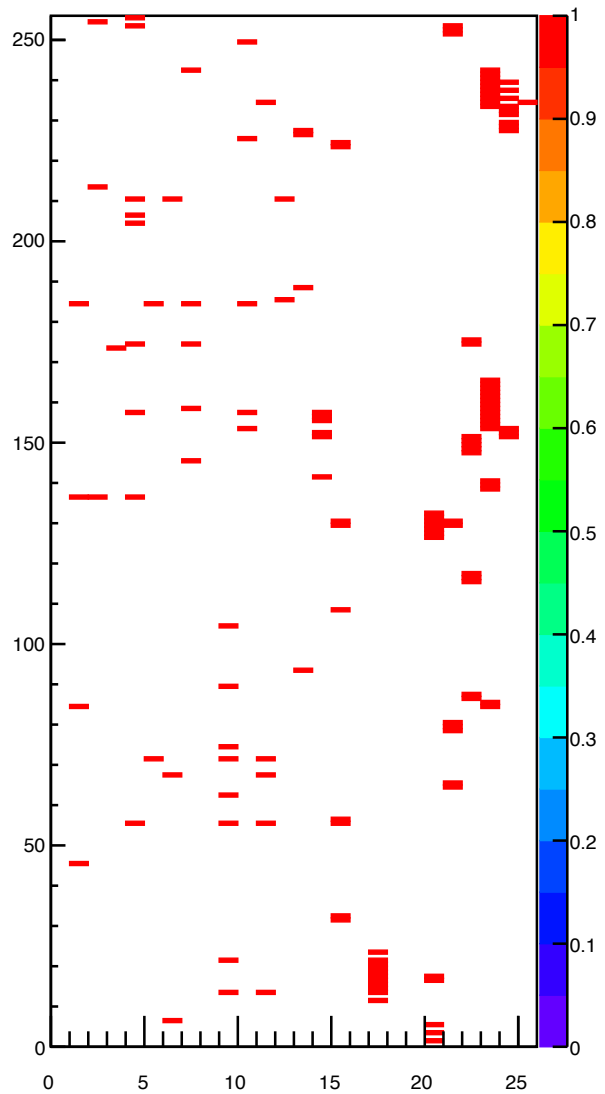
evt - off l4phi9



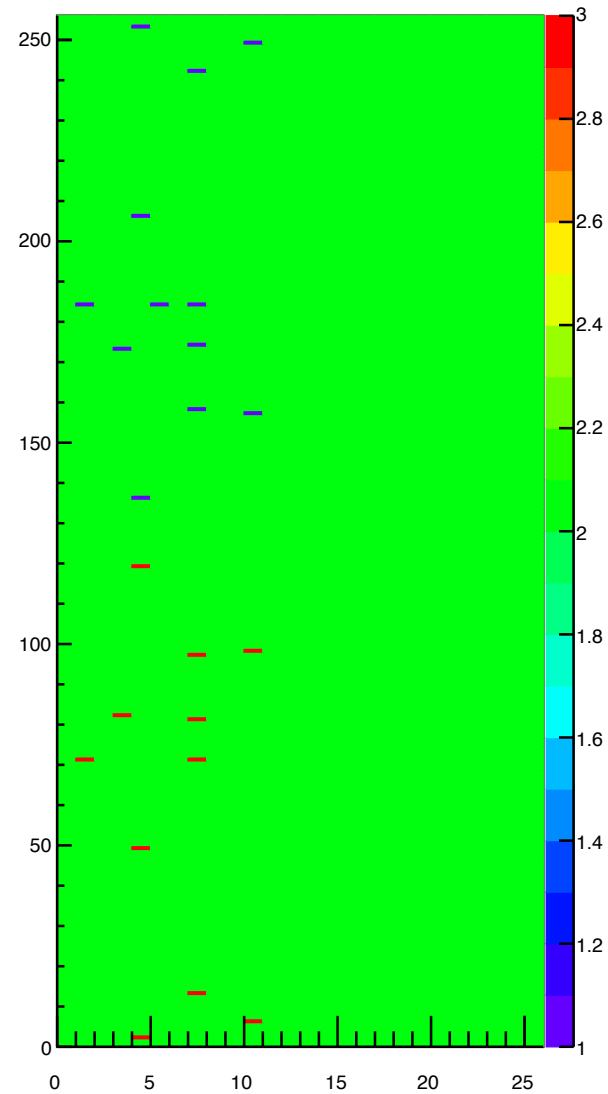
event4 evt hits l4phi9



offline hits l4phi9

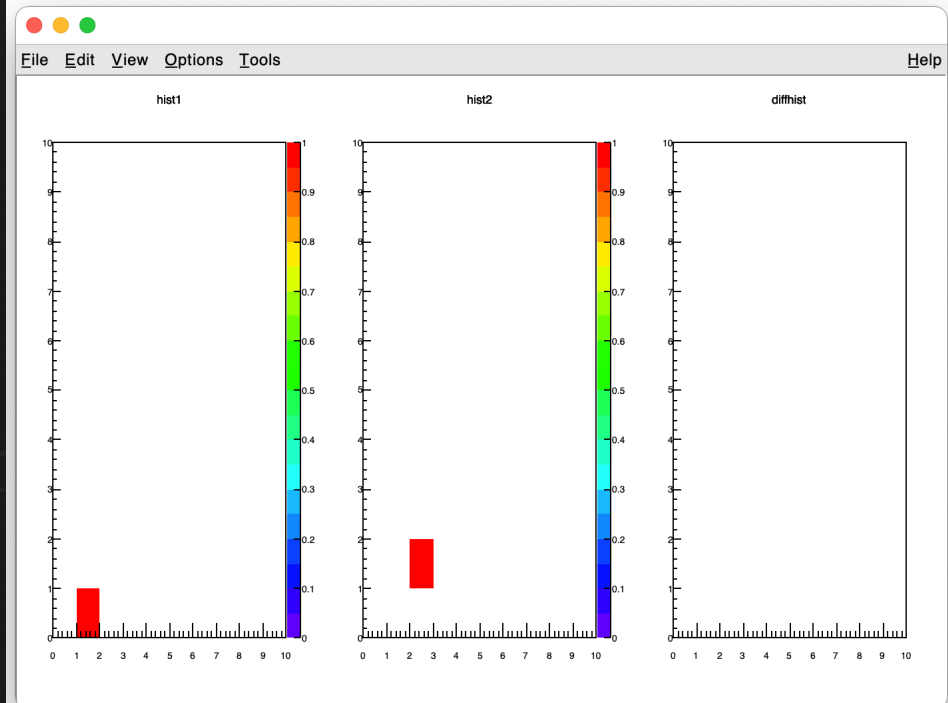


evt - off l4phi9



# Bug of root th2s subtract

```
void testTH2S()  
{  
  gStyle->SetOptStat(0);  
  // gROOT->SetStyle("Plain");  
  gStyle->SetPalette(1);  
  TH2S *hist1 = new TH2S("", "hist1", 10, 0, 10, 10, 0, 10);  
  TH2S *hist2 = new TH2S("", "hist2", 10, 0, 10, 10, 0, 10);  
  TH2S *diffhist = new TH2S("", "diffhist", 10, 0, 10, 10, 0, 10);  
  
  hist1->Fill(1,0);  
  hist2->Fill(2,1);  
  //hist2->Fill(2,3);  
  
  diffhist->Add(hist1,hist2,1,-1);  
  TCanvas*c =new TCanvas("", "");  
  c->Divide(3,1);  
  c->cd(1);  
  hist1->Draw("COLZ");  
  c->cd(2);  
  hist2->Draw("COLZ");  
  c->cd(3);  
  diffhist->Draw("COLZ");  
}
```



```

void testTH2S()
{
    gStyle->SetOptStat(0);
    // gROOT->SetStyle("Plain");
    gStyle->SetPalette(1);
    TH2S *hist1 = new TH2S("", "hist1", 10, 0, 10, 10, 0, 10);
    TH2S *hist2 = new TH2S("", "hist2", 10, 0, 10, 10, 0, 10);
    TH2S *diffhist = new TH2S("", "diffhist", 10, 0, 10, 10, 0, 10);

    hist1->Fill(1,0);
    hist2->Fill(2,1);
    //hist2->Fill(2,3); ← remove this comment out

    diffhist->Add(hist1,hist2,1,-1);
    TCanvas*c =new TCanvas("", "");
    c->Divide(3,1);
    c->cd(1);
    hist1->Draw("COLZ");
    c->cd(2);
    hist2->Draw("COLZ");
    c->cd(3);
    diffhist->Draw("COLZ");
}

```

