Offline QA

Outline

- I am working for offline QA
- I made the reference plot of cluster size distribution
- The reference plot was made from gauss fitting.

- **My progress :**
  1. **Select only Physics data**
     - **Offline QA seems to show only physics run plot**
  2. **Make 2 type plots （ DAC0 = 30 or 35 ）**
  3. **Modify plots(error bar / style / fitting range)**

Followed by comments, thank you!!

How to select physics Run

In SQL database

```
phnxrc@opc0:~$ psql daq
psql (14.7)
Type "help" for help.

daq=> select * from run WHERE runtype = 'physics';
 runnumber | runtype |     brtimestamp     |     ertimestamp     | updatetimestamp | eventsinrun | marked_invalid | has_comment | qcomment
-----------+---------+---------------------+---------------------+-----------------+-------------+----------------+-------------+----------
     46040 | physics | 2024-06-19 13:15:54 | 2024-06-19 13:26:22 |                 |       16267 |             -1 |           0 |
     48801 | physics | 2024-07-20 02:08:02 | 2024-07-20 02:42:44 |                 |    19339925 |             -1 |           0 |
     44614 | physics | 2024-06-04 01:48:07 | 2024-06-04 01:49:41 |                 |      378367 |             -1 |           0 |
     43275 | physics | 2024-05-20 21:39:56 | 2024-05-20 21:47:20 |                 |     5882834 |             -1 |           0 |
     50613 | physics | 2024-08-07 05:58:29 | 2024-08-07 06:24:45 |                 |    12219895 |             -1 |           0 |
     43277 | physics | 2024-05-20 21:52:19 | 2024-05-20 22:04:32 |                 |     5122924 |             -1 |           0 |
     46042 | physics | 2024-06-19 13:39:15 | 2024-06-19 13:41:38 |                 |        2361 |             -1 |           0 |
     46041 | physics | 2024-06-19 13:27:32 | 2024-06-19 13:37:49 |                 |       15978 |             -1 |           0 |
     44615 | physics | 2024-06-04 01:51:57 | 2024-06-04 01:52:44 |                 |      286444 |             -1 |           0 |
     43279 | physics | 2024-05-20 22:11:02 | 2024-05-20 22:12:18 |                 |      200488 |             -1 |           0 |
     48802 | physics | 2024-07-20 02:45:08 | 2024-07-20 02:46:34 |                 |      865467 |             -1 |           0 |
     46044 | physics | 2024-06-19 13:54:35 | 2024-06-19 14:05:13 |                 |       10420 |             -1 |           0 |
     44616 | physics | 2024-06-04 01:54:45 | 2024-06-04 02:42:11 |                 |    20344952 |             -1 |           0 |
     46043 | physics | 2024-06-19 13:43:15 | 2024-06-19 13:53:27 |                 |       10636 |             -1 |           0 |
```

You can get text file of database in your directory using this code

```
phnxrc@opc0:~/INTT/SHISHIKURA/data$ psql -d daq -o physics_run.txt -c "SELECT runnumber FROM run WHERE runtype = 'physics' AND runnumber BETWE
N 46400 AND 48400"
phnxrc@opc0:~/INTT/SHISHIKURA/data$ ls
physics_run.txt
```

-d : select database, -o : text file name, -c : select data

Offline QA seems to show only physics run plot

Offline QA plot file (run48000~48100)

```
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048000-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048001-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048002-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048006-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048007-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048008-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048009-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048020-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048022-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048026-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048027-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048065-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048066-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048067-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048068-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048069-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048070-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048072-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048073-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048076-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048077-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048078-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048079-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048080-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048081-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048082-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048083-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048084-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048085-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048088-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048089-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048090-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048095-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048096-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048097-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p004-00048098-00001.root
HIST_DST_TRKR_CLUSTER_run2pp_new_2024p005-00048099-00001.root
```

/sphenix/data/data02/sphnxpro/clusterhist/run_48000_48100

SQL database(only physics run)

```
select runnumber from run WHERE runtype = 'physics' AND
runnumber BETWEEN 48000 AND 48100 order by runnumber ASC
```

runnumber
48000
48001
48002
48003
48004
48005
48006
48007
48008
48009
48011
48020
48022
48023
48026
48027
48028
48029
48060
48061
48062
48063
48065
48066
48067
48068
48069
48070
48072
48073
48076
48077
48078
48079
48080
48081
48082
48083
48084
48085
48086
48088
48089
48090
48091
48094
48095
48096
48097
48098
48099
48100

How to select by DAC0 value

```
phnxrc@intt0:/logdisk/phnxrc/INTT/top_pedestal$ grep -e DAC0 -e EDT top_pedestal_2024_07_*_intt1.log  | grep -v DAC4
```

```
top_pedestal_2024_07_31_intt1.log:DAC0 30 3478262240 -> 0xcf5211e0
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 01:06:24 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 30 3478262240 -> 0xcf5211e0
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 01:17:23 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 30 3478262240 -> 0xcf5211e0
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 01:45:10 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 30 3478262240 -> 0xcf5211e0
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 04:11:50 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 35 3478262320 -> 0xcf521230
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 05:47:42 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 35 3478262320 -> 0xcf521230
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 06:00:06 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 35 3478262320 -> 0xcf521230
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 06:04:20 PM EDT
```

This time is when we changed DAC0 value from 30 to 35

Genki taught me how to get information, thank you very much!

How to select by DAC0 value

This time is when we changed DAC0 value from 30 to 35

```
top_pedestal_2024_07_31_intt1.log:Wed 31 Jul 2024 04:11:50 PM EDT
top_pedestal_2024_07_31_intt1.log:DAC0 35 3478262320 -> 0xcf521230
```

I checked run number from datetime

In SQL database

```
daq=> select * from run WHERE brtimestamp BETWEEN '2024-07-31 00:00:00' AND '2024-07-31 23:59:59';
 runnumber | runtype   |     brtimestamp     |     ertimestamp     | updatetimestamp | eventsinrun | 
-----------+-----------+---------------------+---------------------+-----------------+-------------+-
     49746 | calib     | 2024-07-31 00:08:11 | 2024-07-31 00:19:11 |                 |     4975135 | 
     49747 | calib     | 2024-07-31 00:23:13 | 2024-07-31 00:33:26 |                 |     4516181 | 
     49748 | physics   | 2024-07-31 00:36:45 | 2024-07-31 00:39:08 |                 |     1204535 | 
     49749 | physics   | 2024-07-31 00:41:26 | 2024-07-31 01:42:56 |                 |    31183735 | 
     49750 | physics   | 2024-07-31 01:46:05 | 2024-07-31 01:50:04 |                 |     1811712 | 
     49751 | physics   | 2024-07-31 01:52:11 | 2024-07-31 02:47:12 |                 |    28622534 | 
     49752 | physics   | 2024-07-31 02:49:30 | 2024-07-31 02:59:48 |                 |     5495129 | 
     49753 | junk      | 2024-07-31 04:13:45 | 2024-07-31 04:13:59 |                 |        1701 | 
     49754 | junk      | 2024-07-31 04:14:53 | 2024-07-31 04:38:36 |                 |     1093416 | 
     49755 | junk      | 2024-07-31 04:40:15 | 2024-07-31 04:40:35 |                 |       83437 | 
```

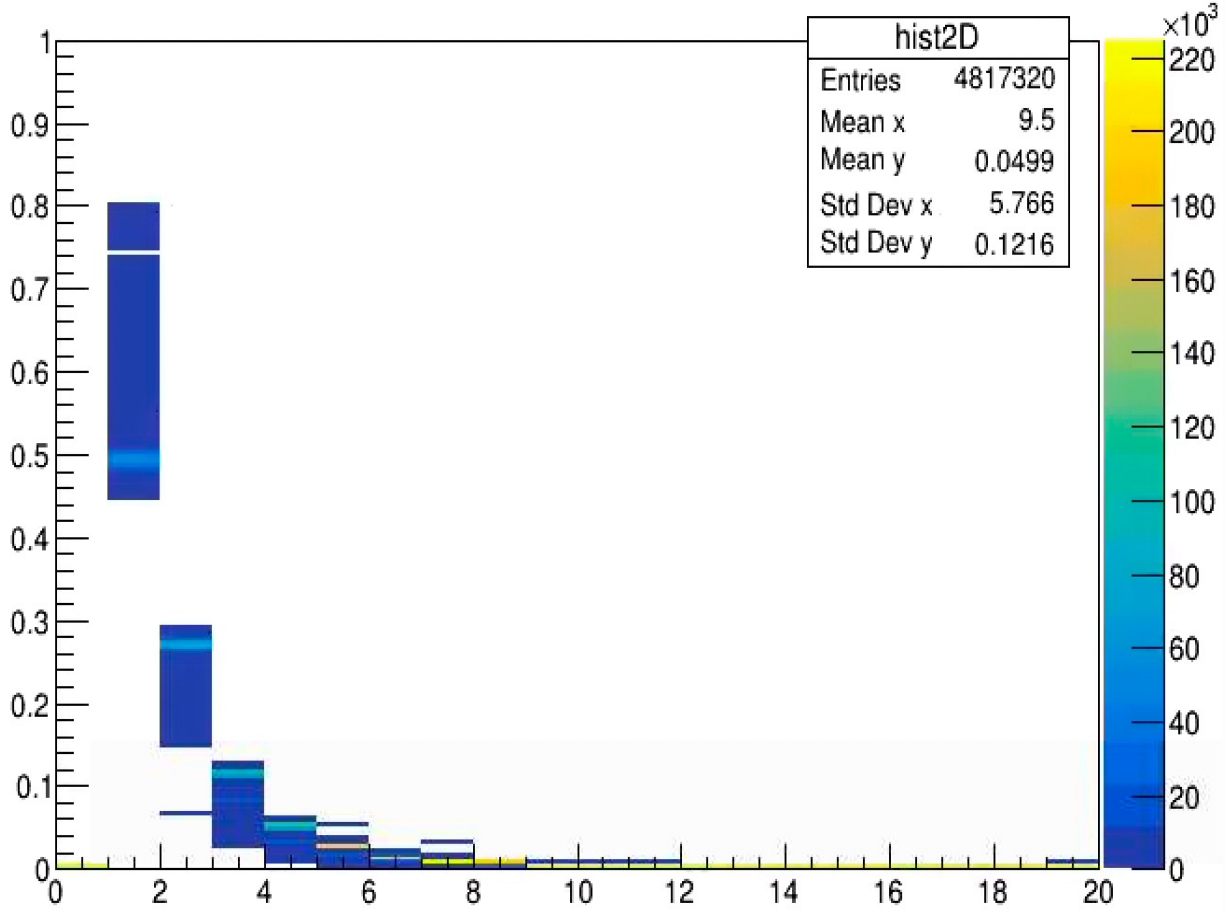
We changed DAC0 value from 30 to 35 from run49753

Make text file by database

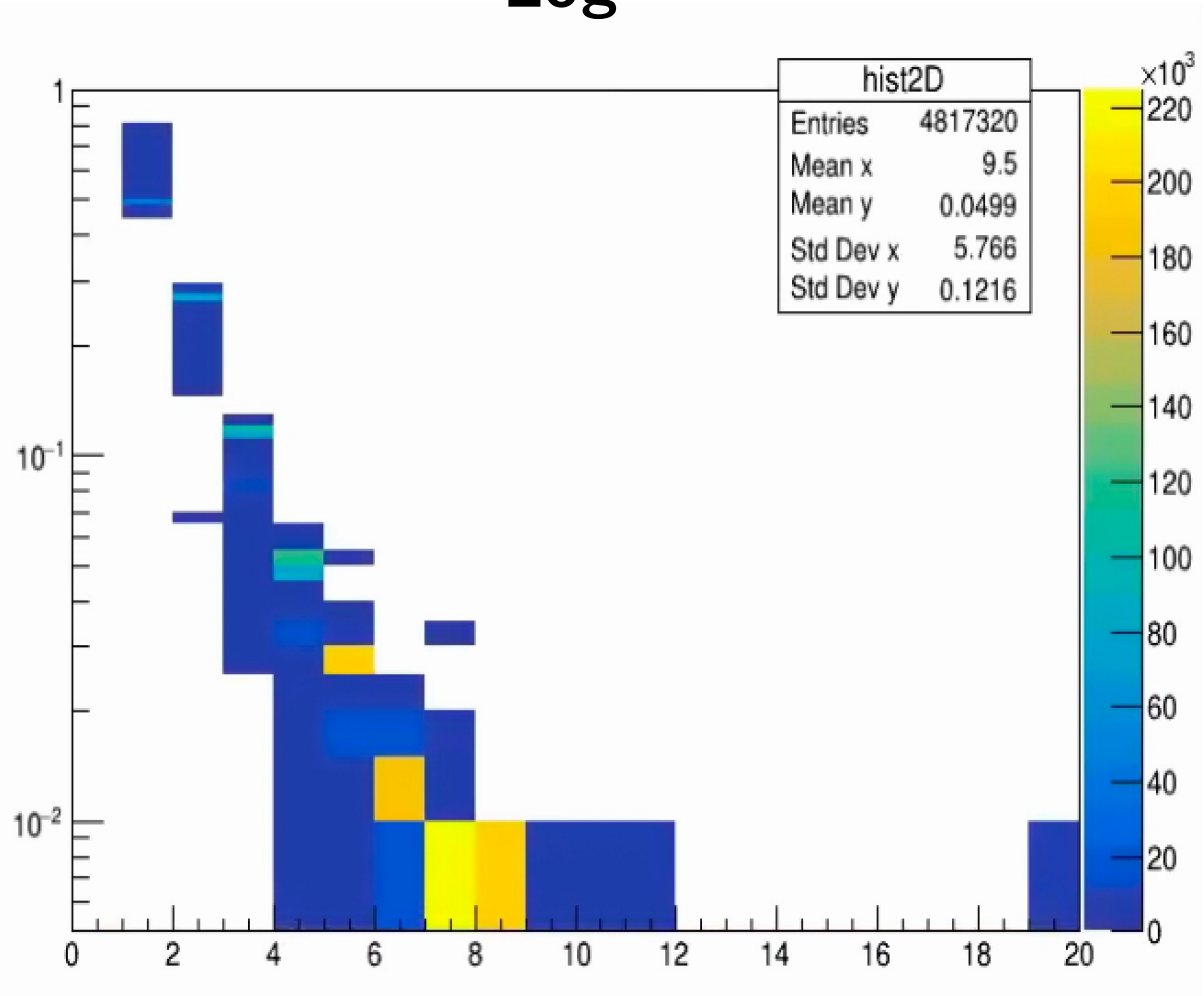
```
psql -d daq -o physics_run.txt -c "SELECT runnumber FROM run WHERE runtype = 'physics' AND runnumber BETWEEN 49753 AND 51700"
```

Cluster size (DAC0=30) Run46400~48400 – total 4817320 files

Linear



Log



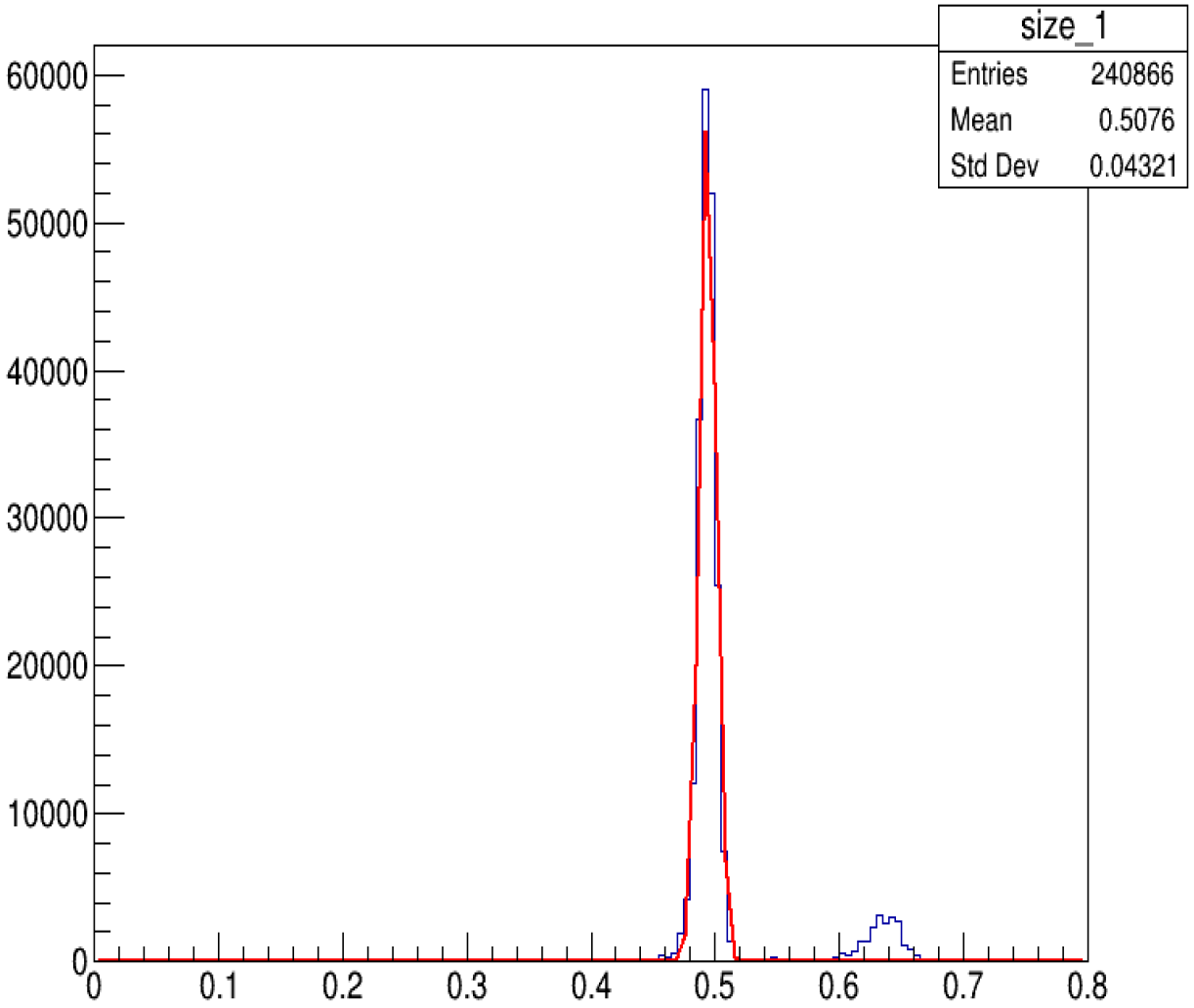
Y ：Fraction=(Entries/ all Entries)

X ：cluster size

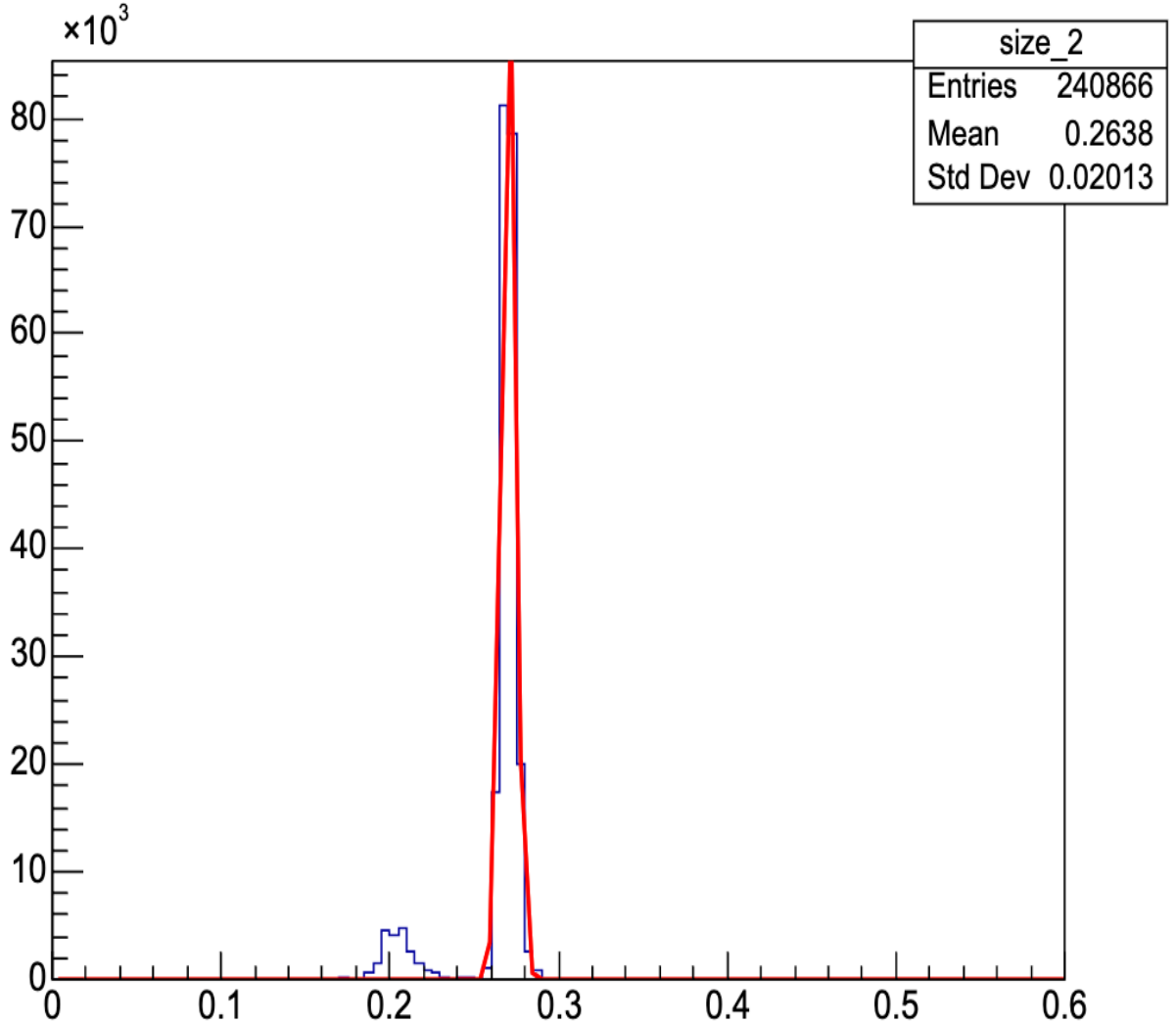
DAC0 = 30

Only Physics Run

Fitting size by size

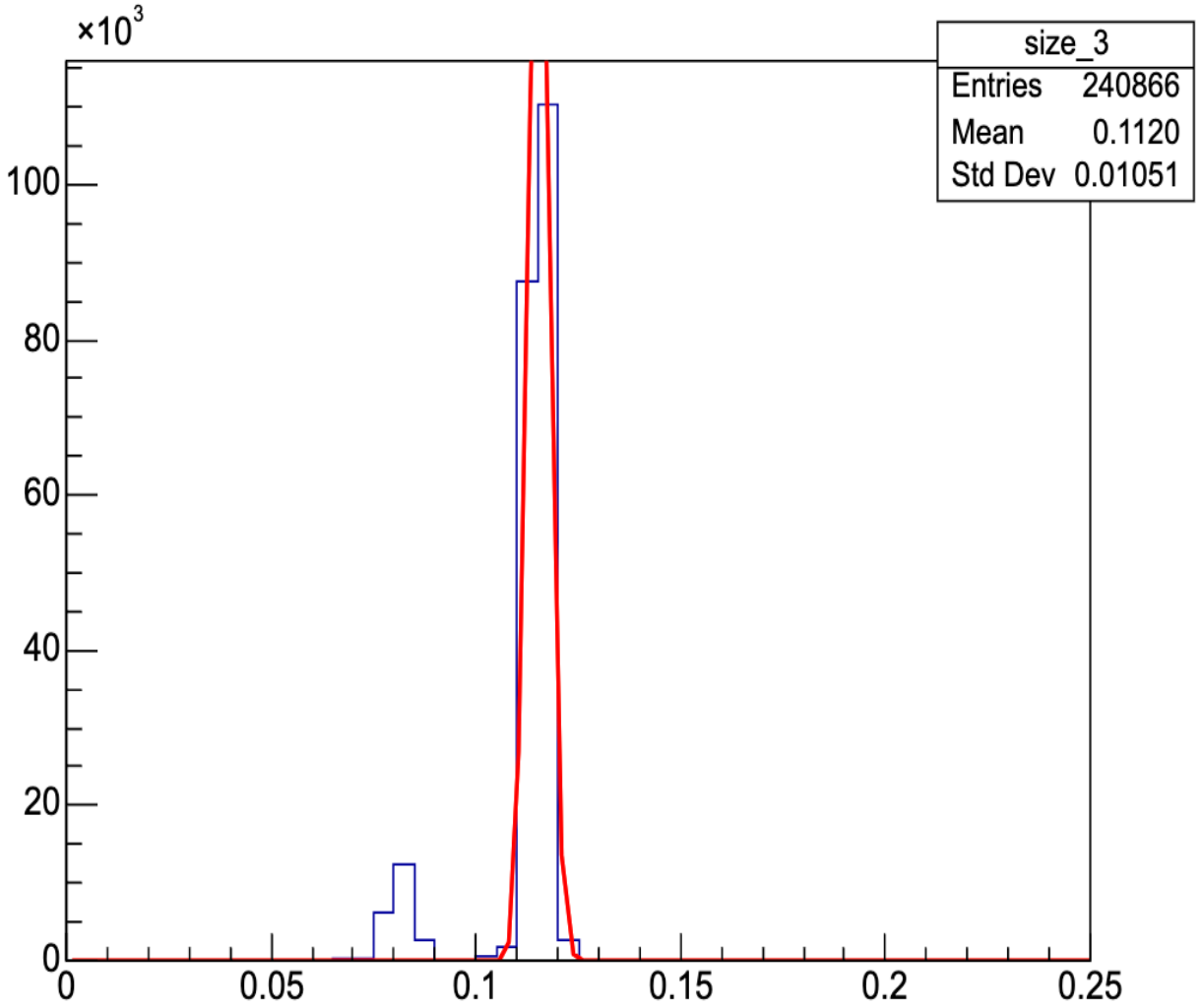


size1

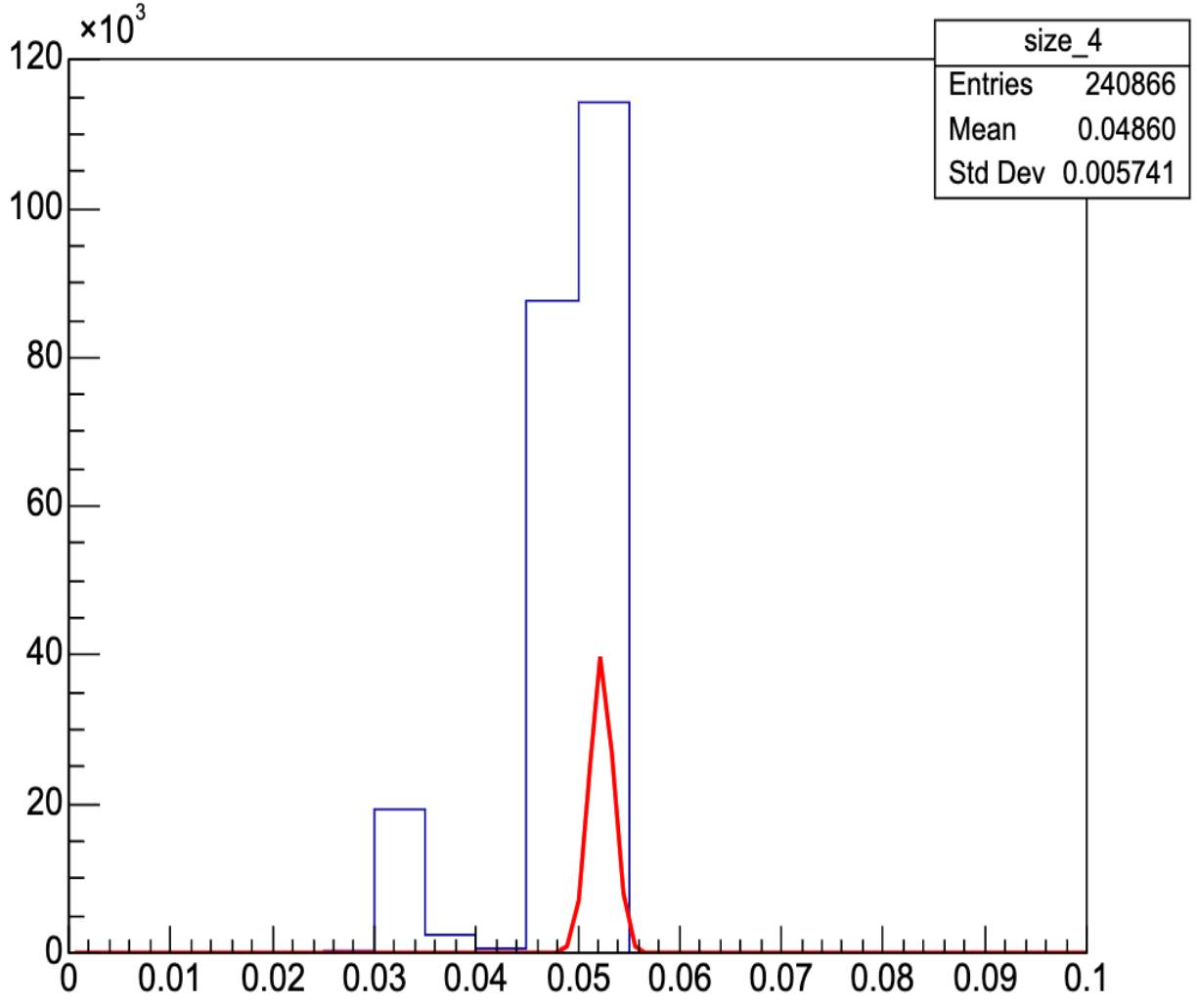


size2

Fitting size by size

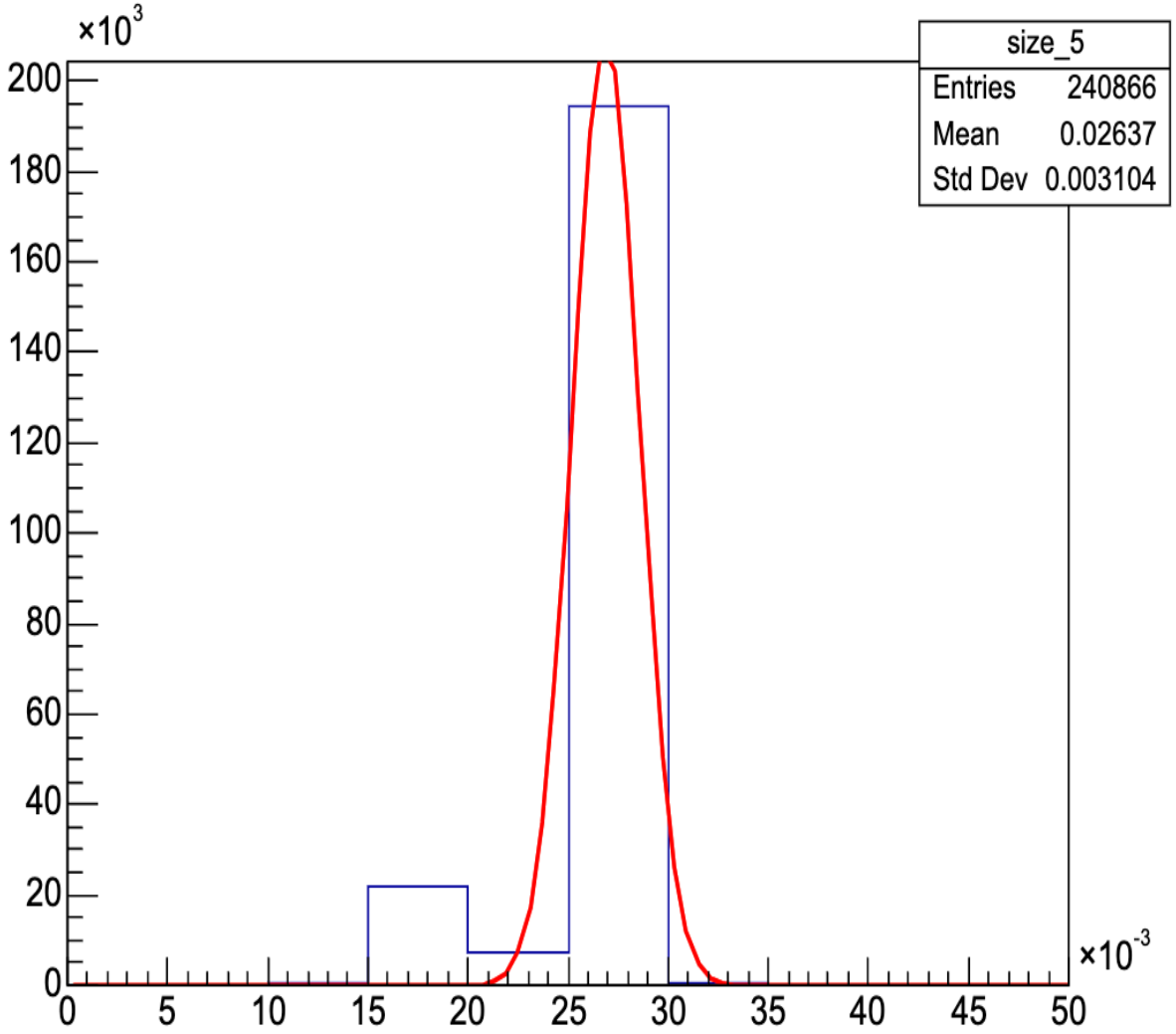


size3

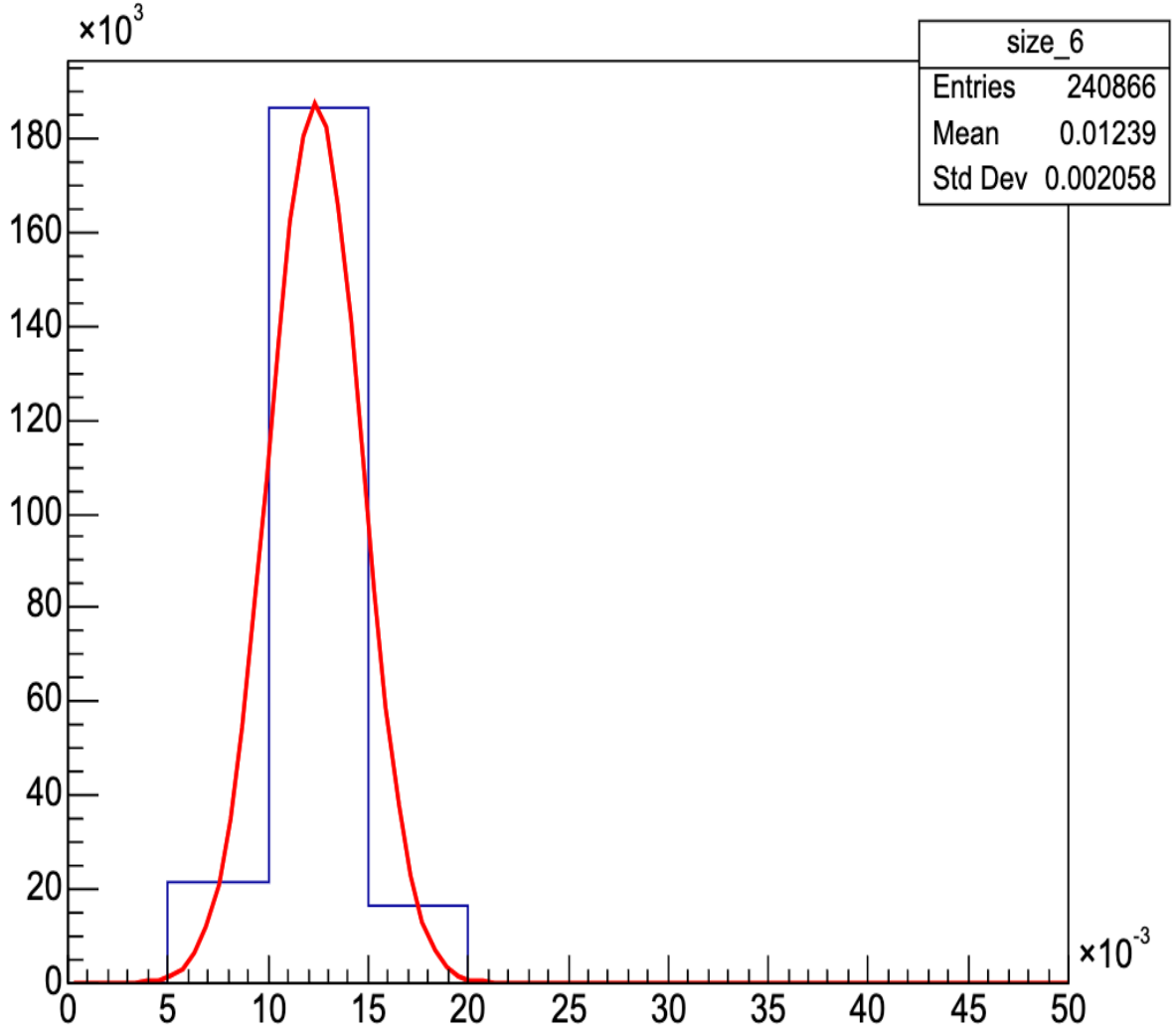


size4

Fitting size by size



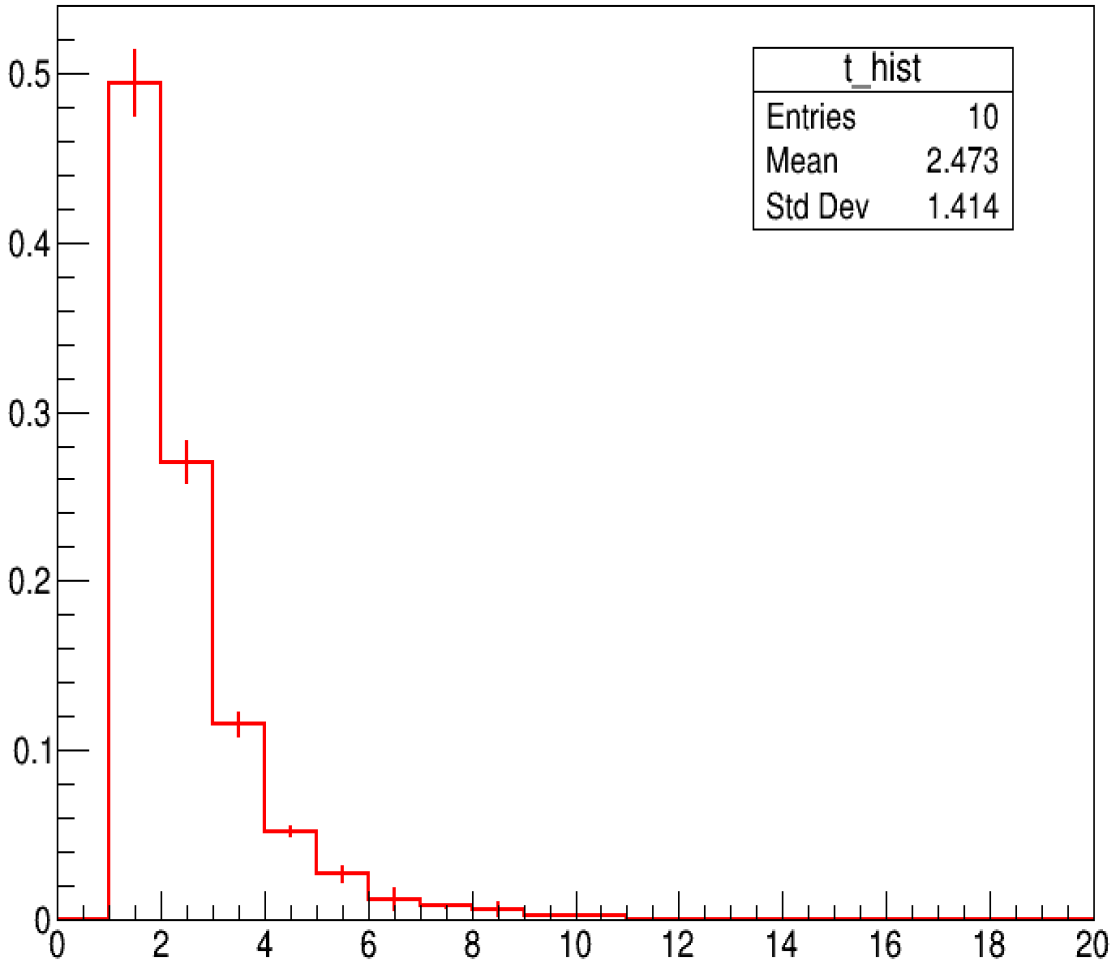
size5



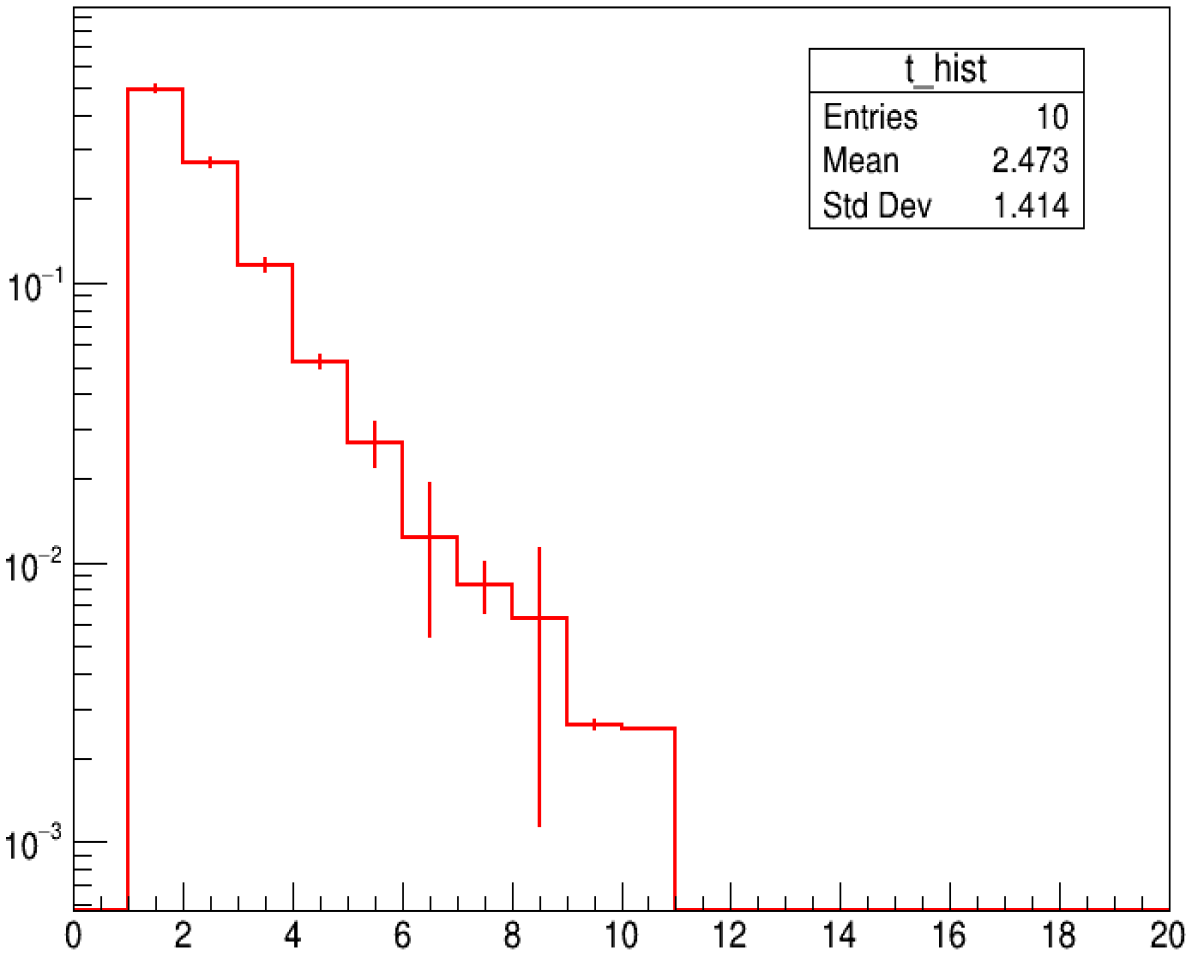
size6

Reference plot (DAC0=30)

Linear



Log



Y ：Fraction=(Entries/ all Entries)　error Y = 3 σ

X ：cluster size

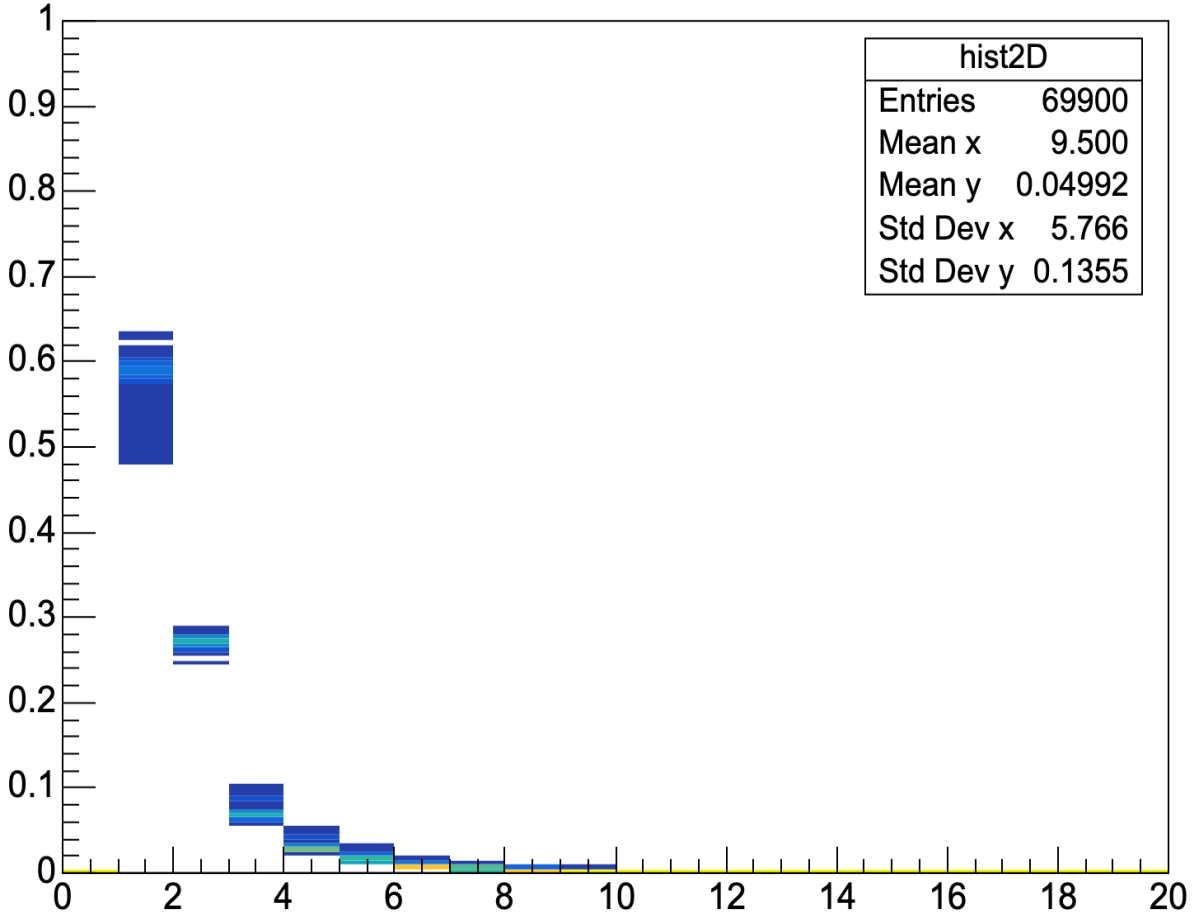
DAC0 = 30

Only Physics Run

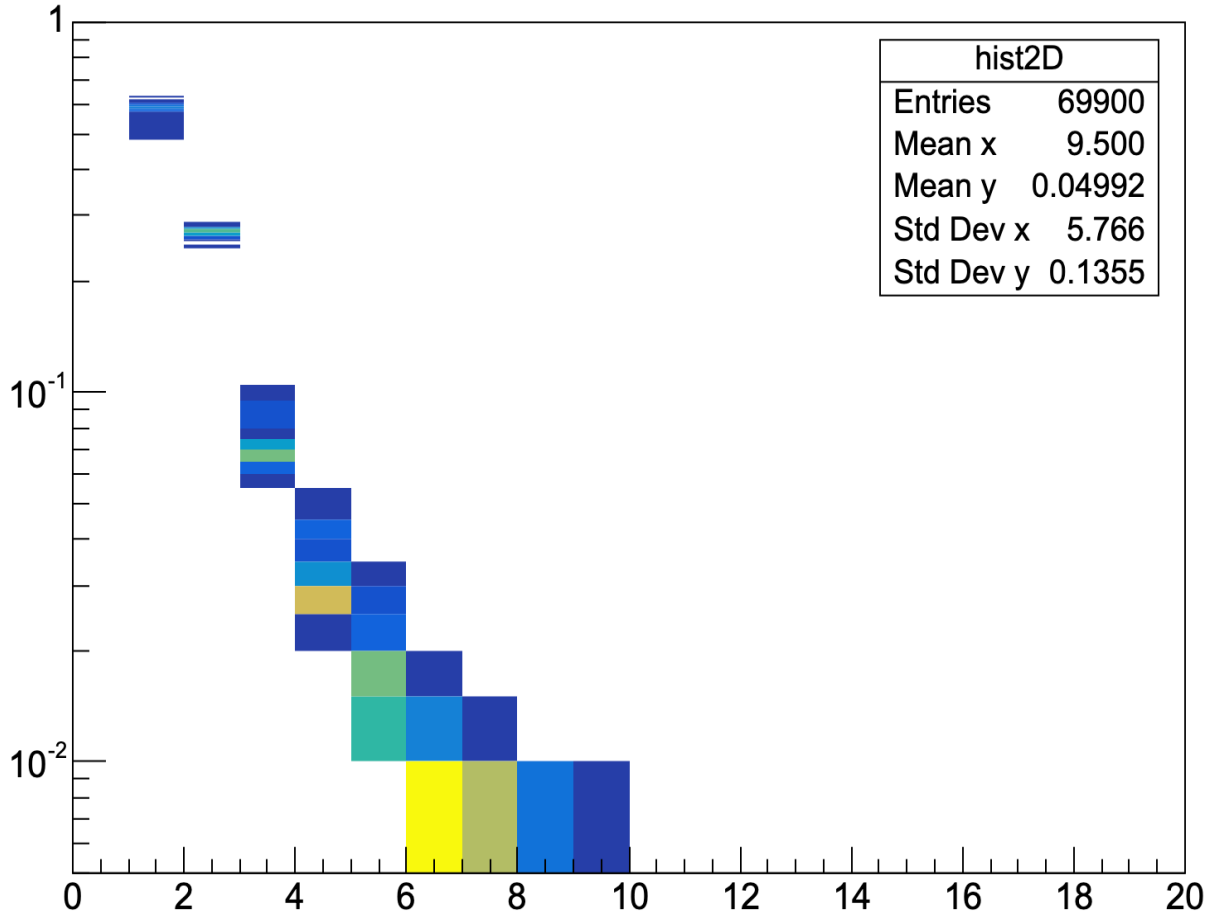
Cluster size (DAC0=35)

Run46400~48400 – total 4817320 files

Linear



Log



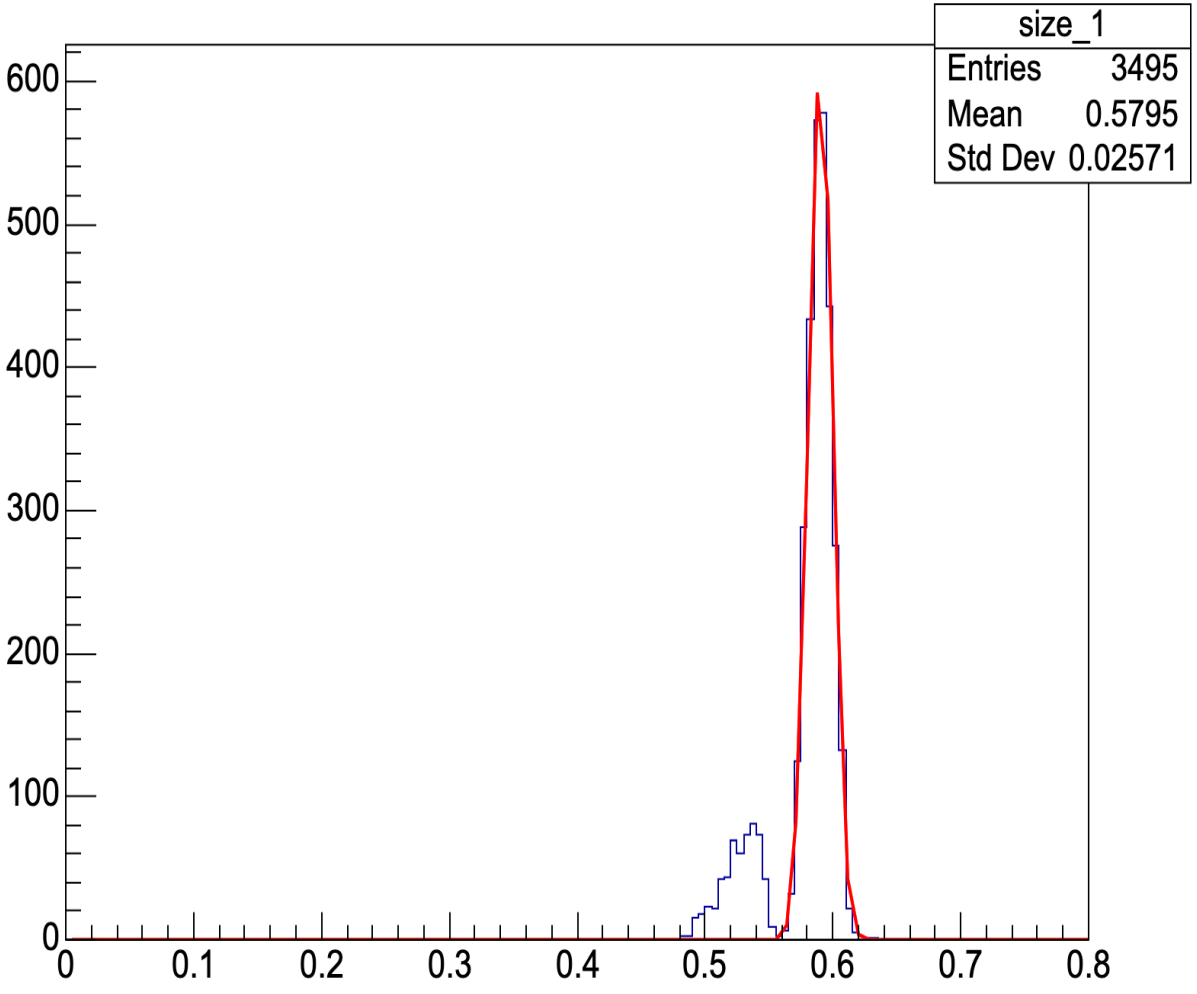
Y ：Fraction=(Entries/ all Entries)

X ：cluster size

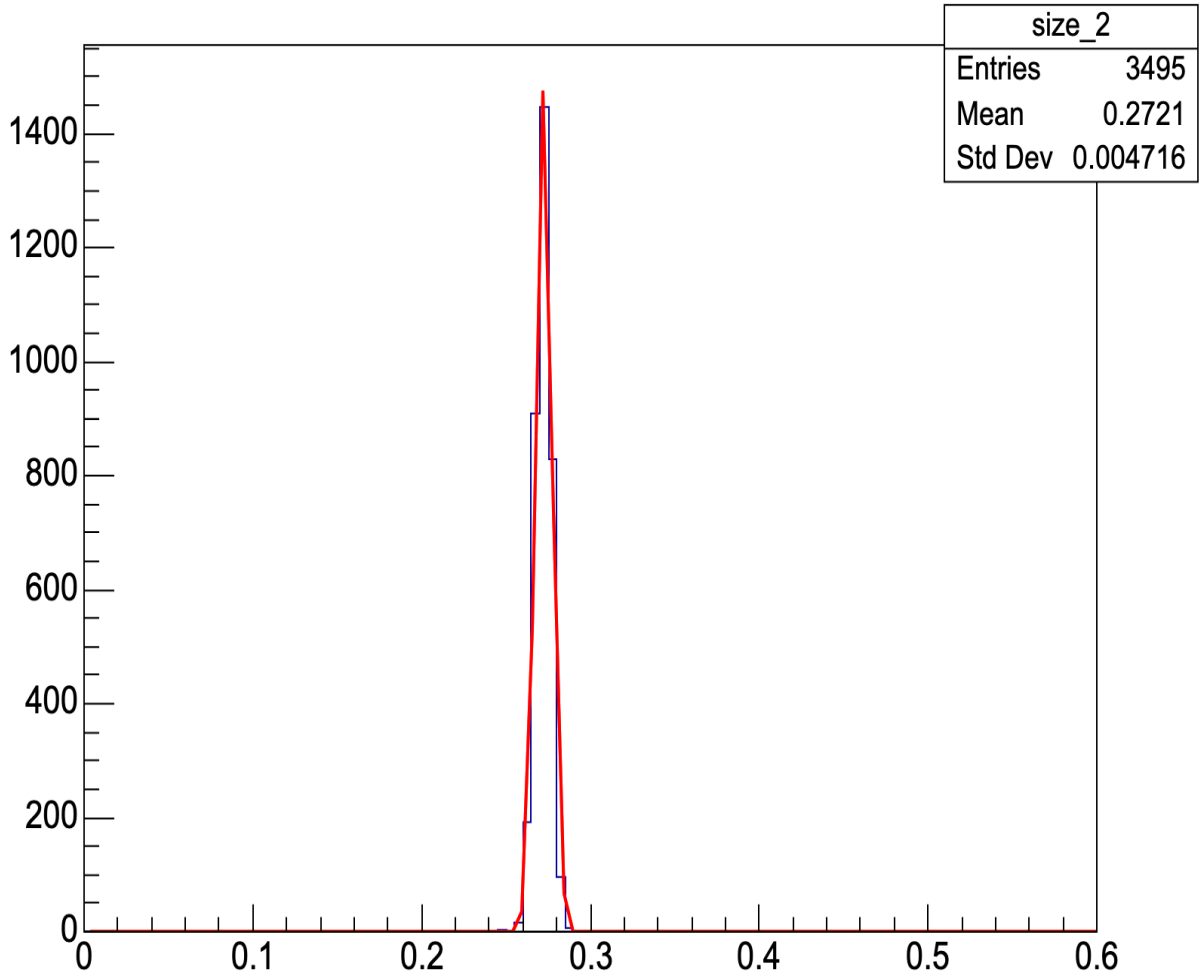
DAC0 = 35

Only Physics Run

Fitting size by size

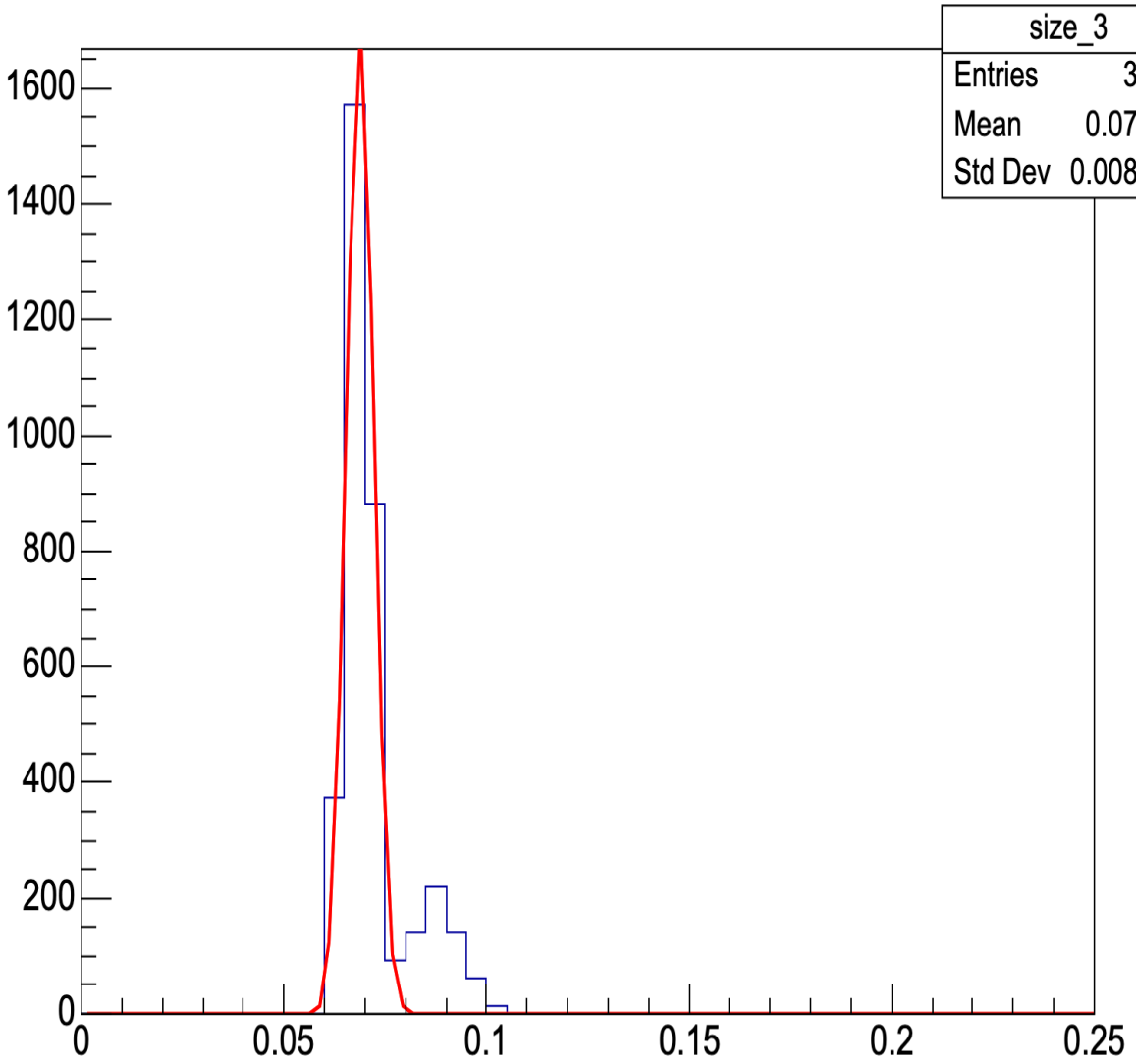


size1

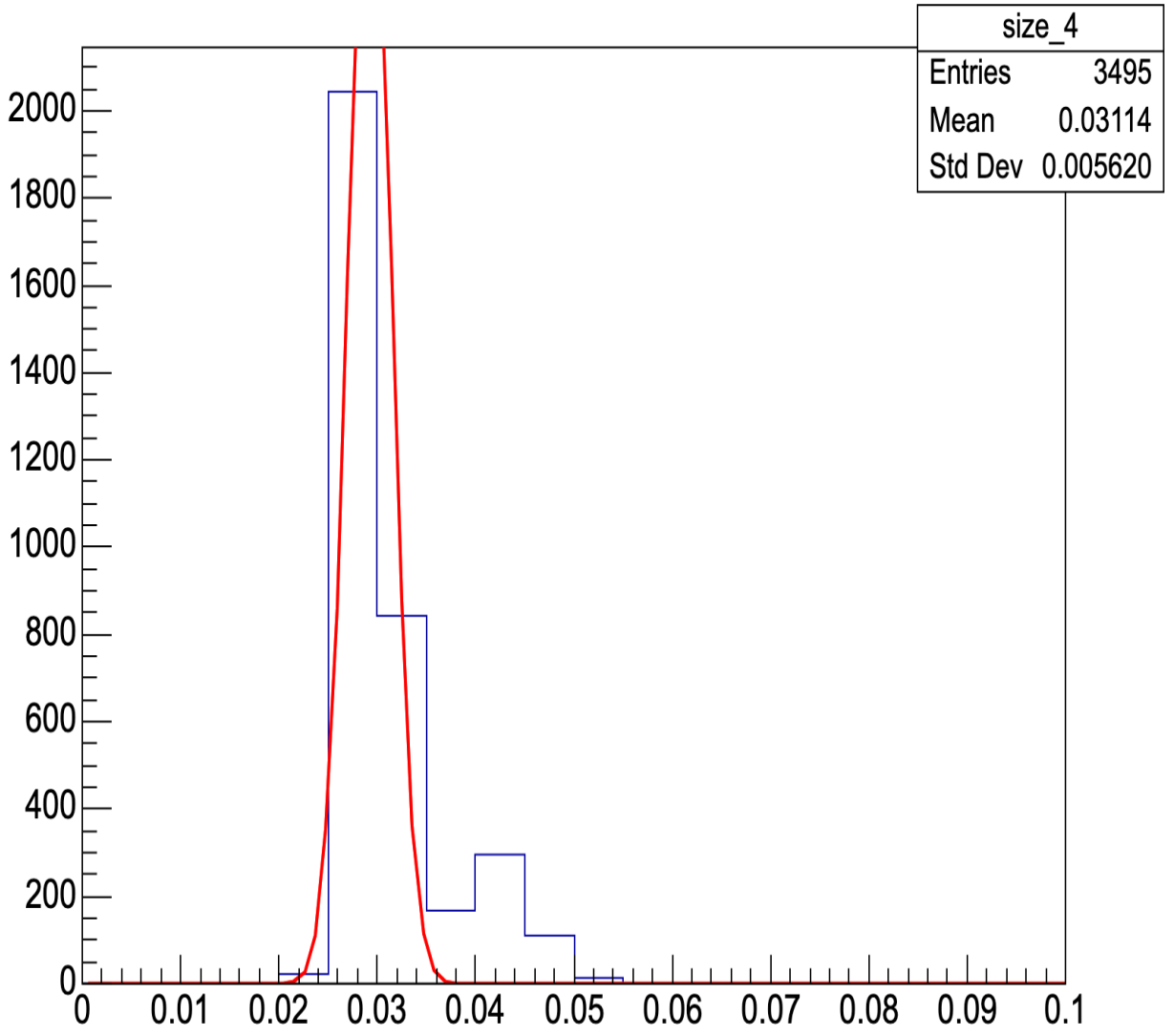


size2

Fitting size by size

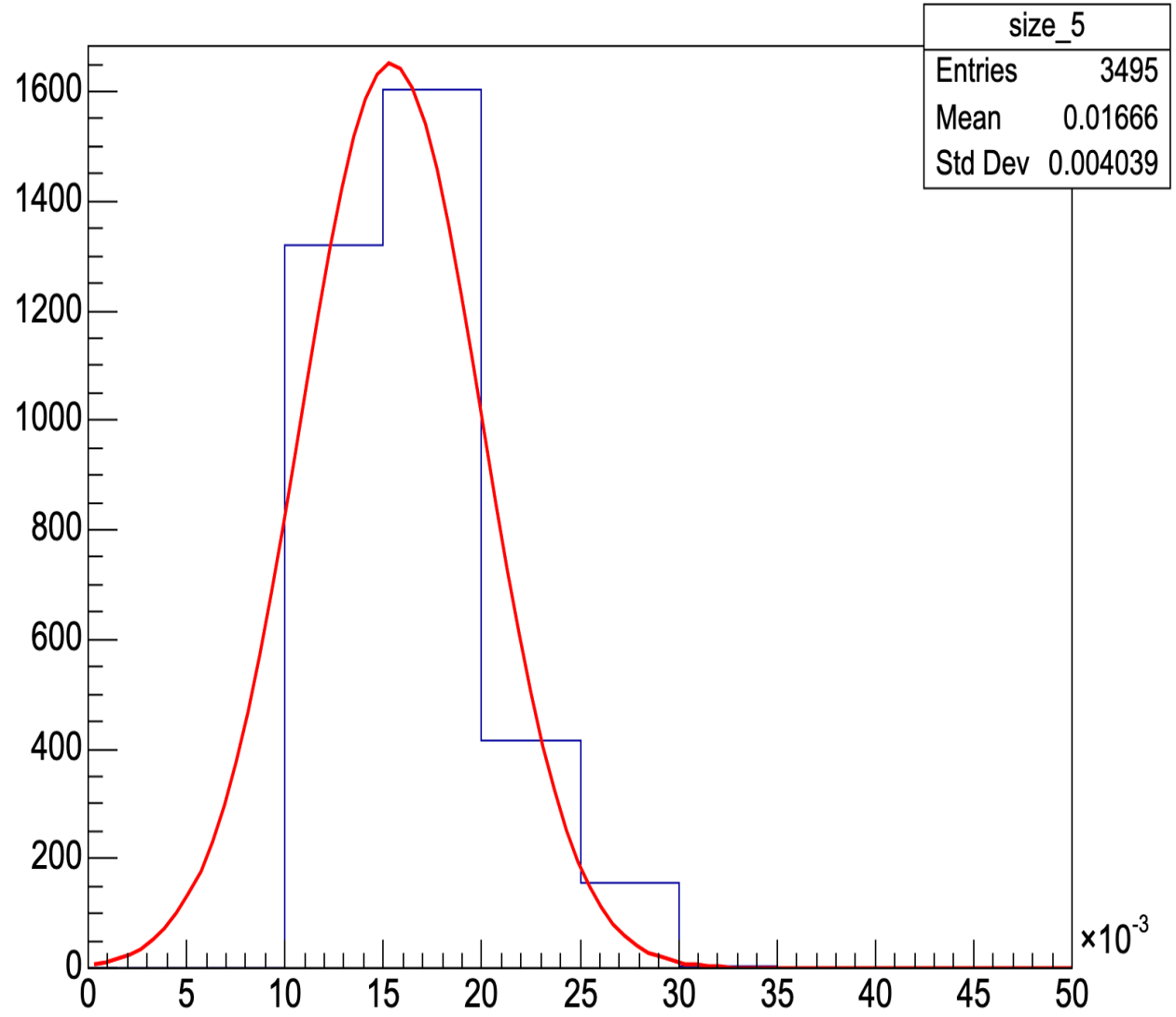


size3

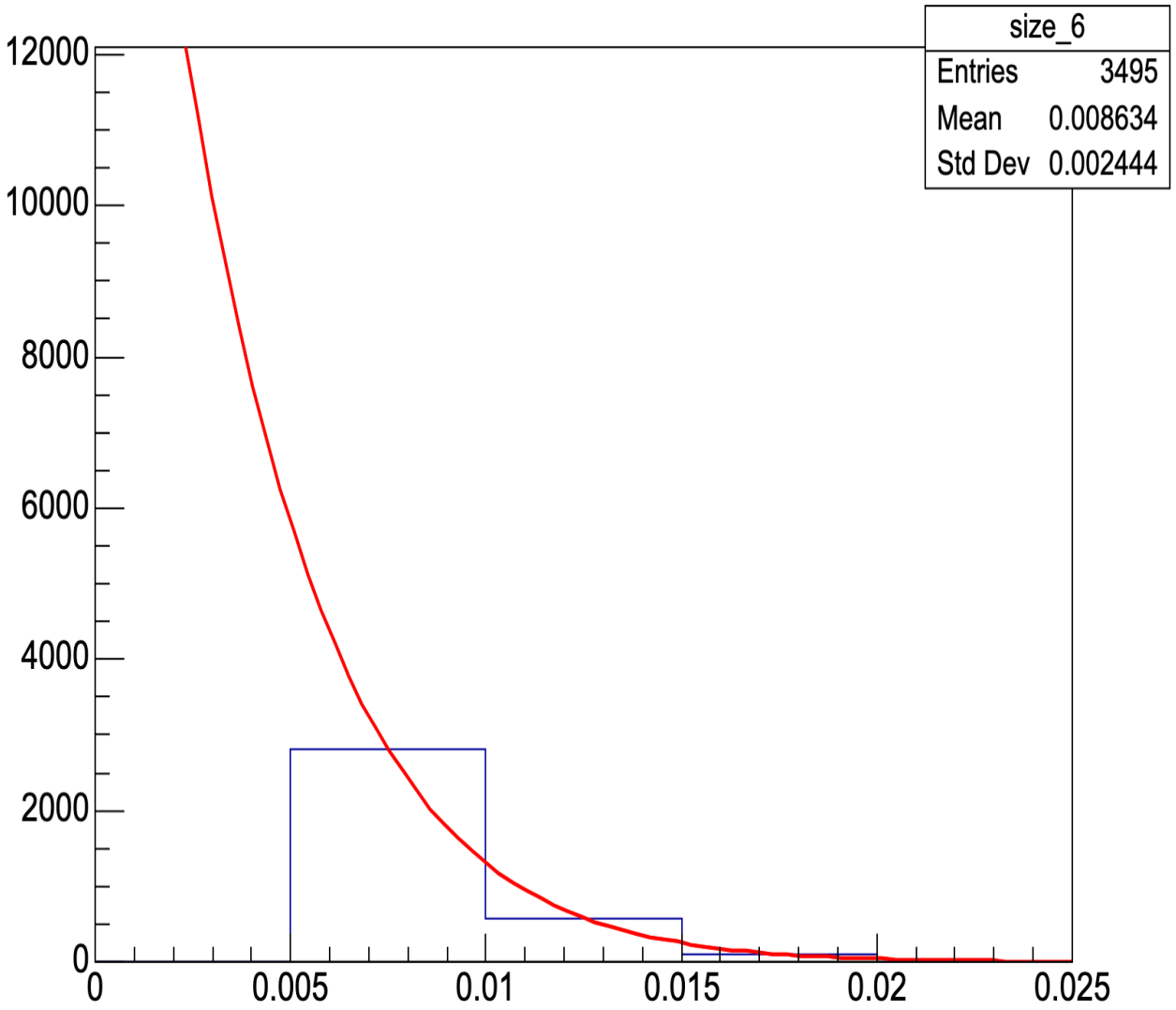


size4

Fitting size by size



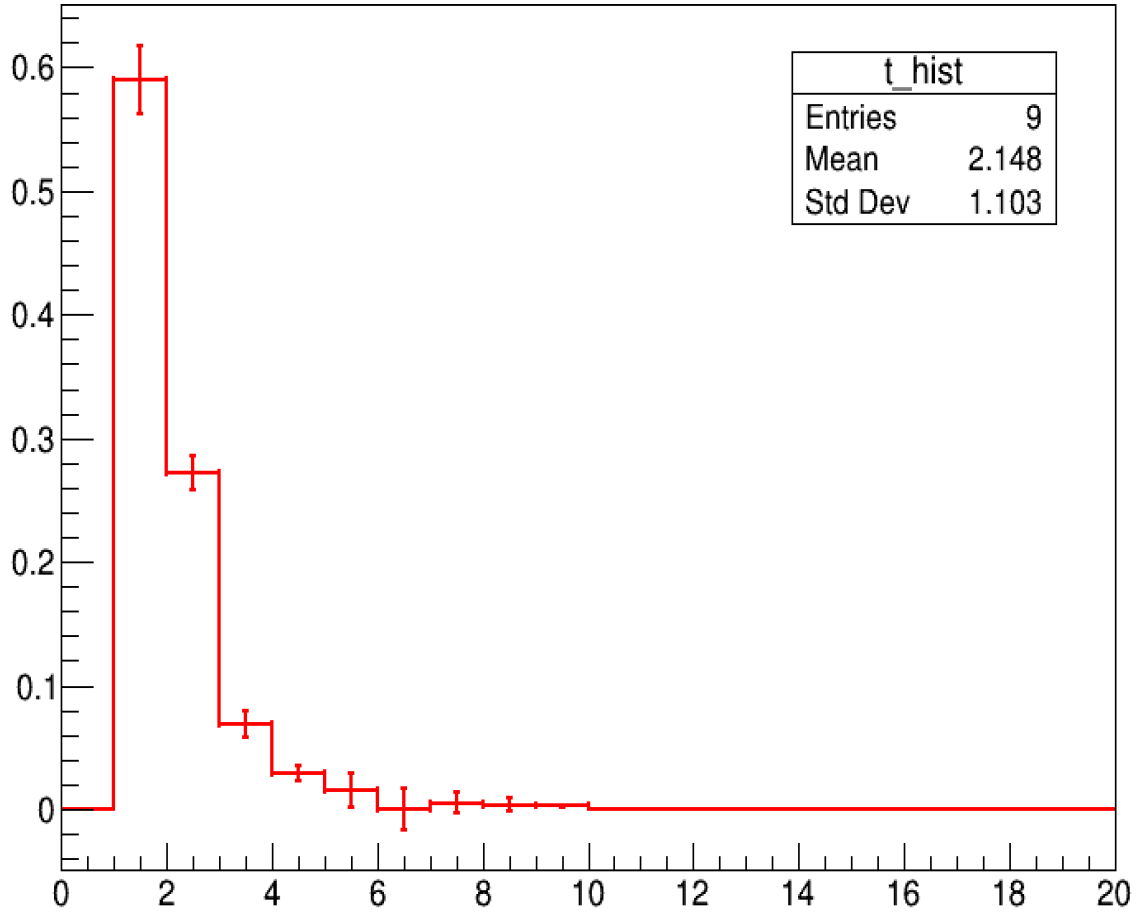
size5



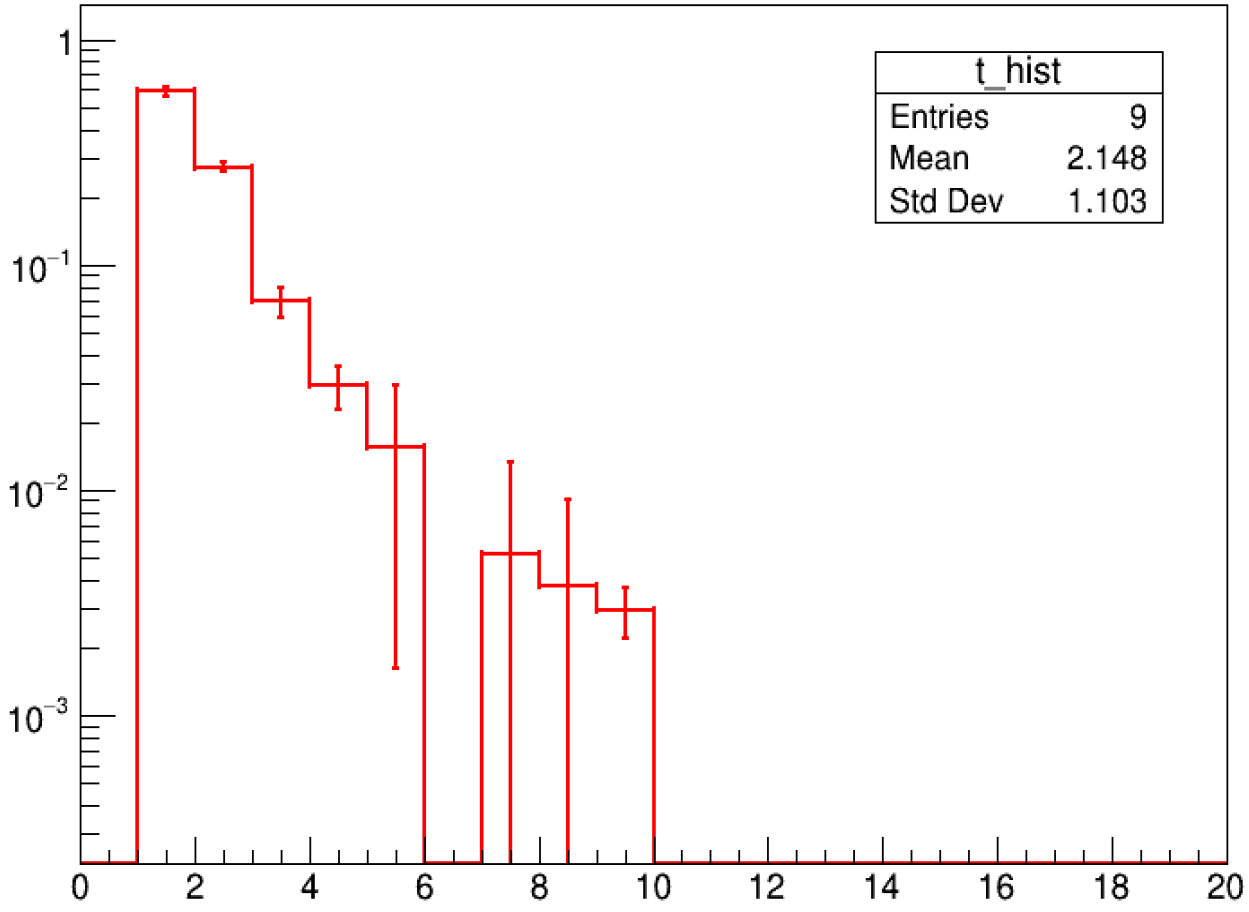
size6

Reference plot (DAC0=35)

Linear



Log



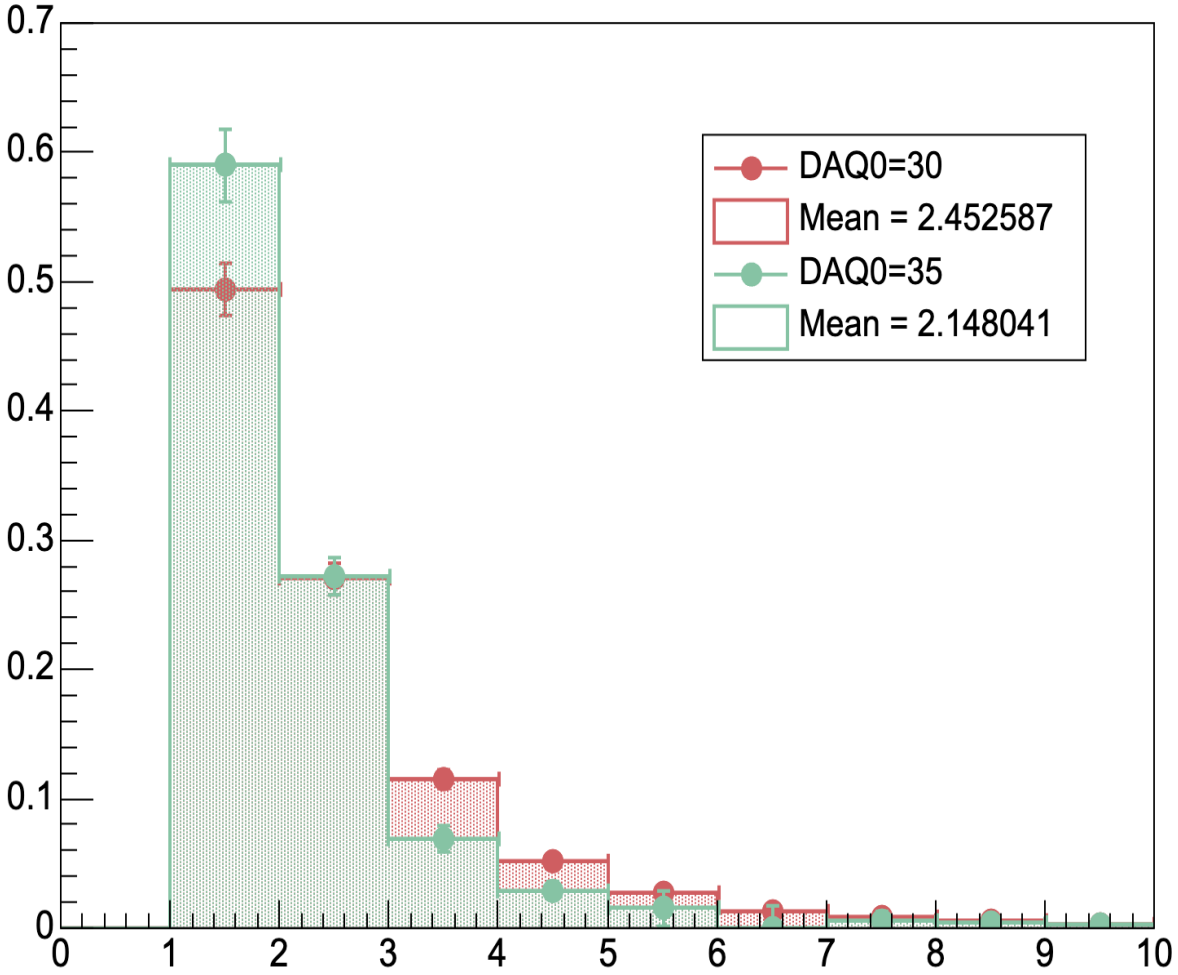
Y ：Fraction=(Entries/ all Entries)　error Y = 3 σ

X ：cluster size

DAC0 = 35

Only Physics Run

Compare between DAC0=30 and 35



Y ：**Fraction=(Entries/ all Entries)**

X ：**cluster size**

- The plot shows **different** distribution between DAC0 = 30 and 35

It is necessary to change the reference plot to be added depending on the DAC0 value.

Summary

- I modified the reference plot
- Cluster distribution is different between DAC0=30 and 35
- Need to change the reference plot depending on the DAC0 value.
- I think modifying plot is done, so I will go to the next step

Next step

- **Adding the reference plot to offline QA website is ongoing.**
- I can do it this week because of same timing of shift as Xudong