

# Compton run#65080 Data Analysis

## PrimeX-II weekly meeting

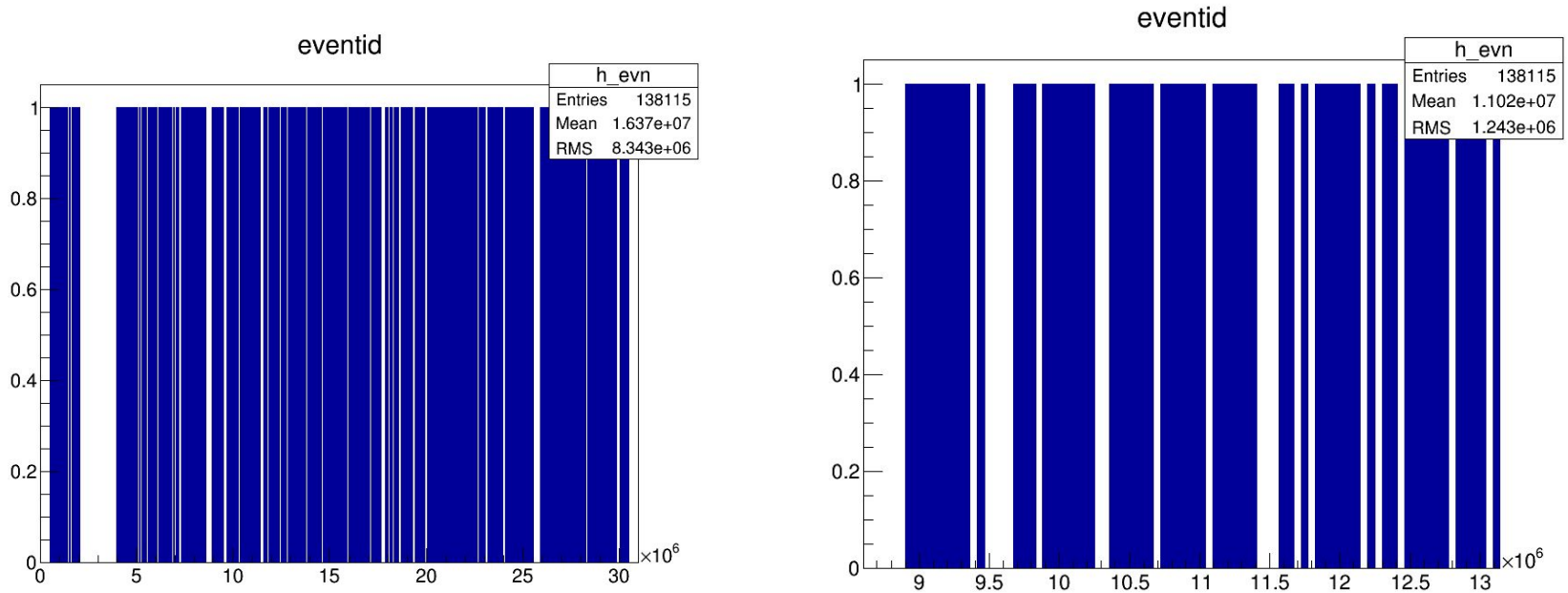
Li Ye

Mississippi State University

2015-10-30

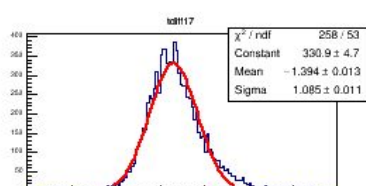
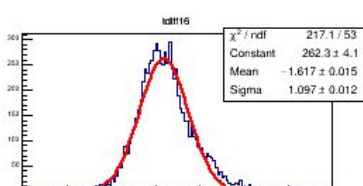
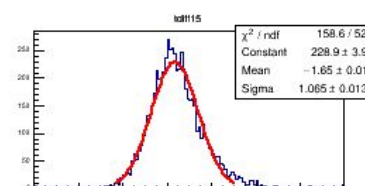
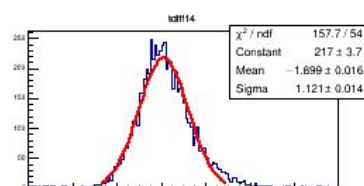
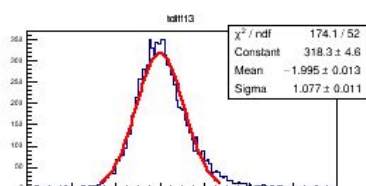
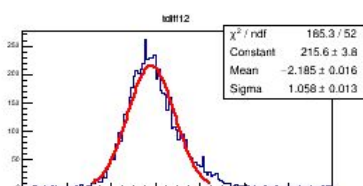
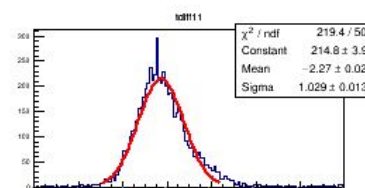
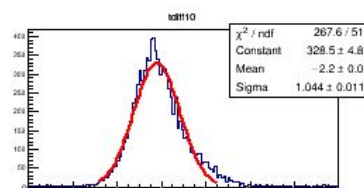
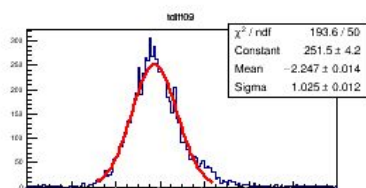
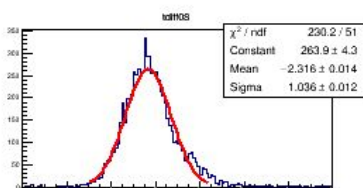
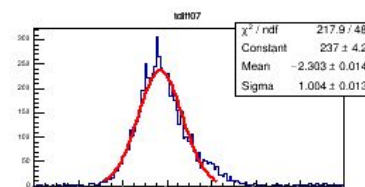
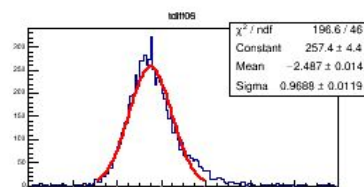
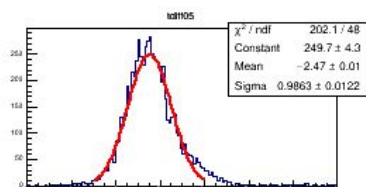
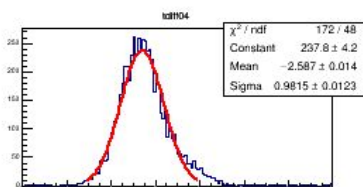
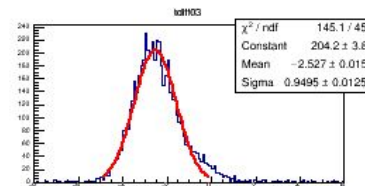
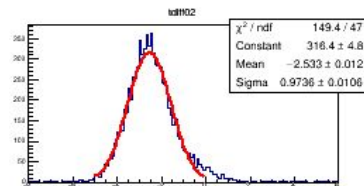
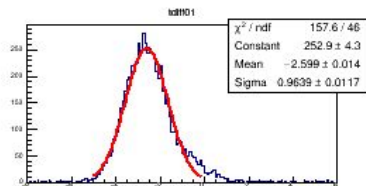
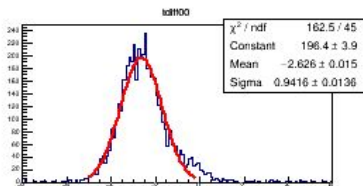
# event id cut

sometimes due to the beam trip , the events are not useful ,  
because no flux calculation



after cut for #65078 cut off ~20% entries

# Tdiff Alignment

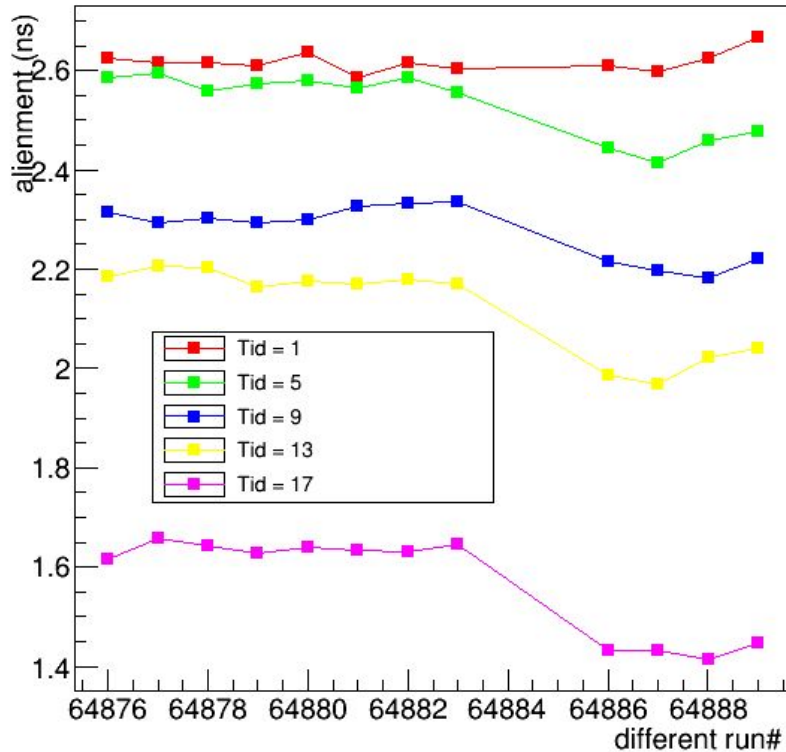


# Tdiff Alignment

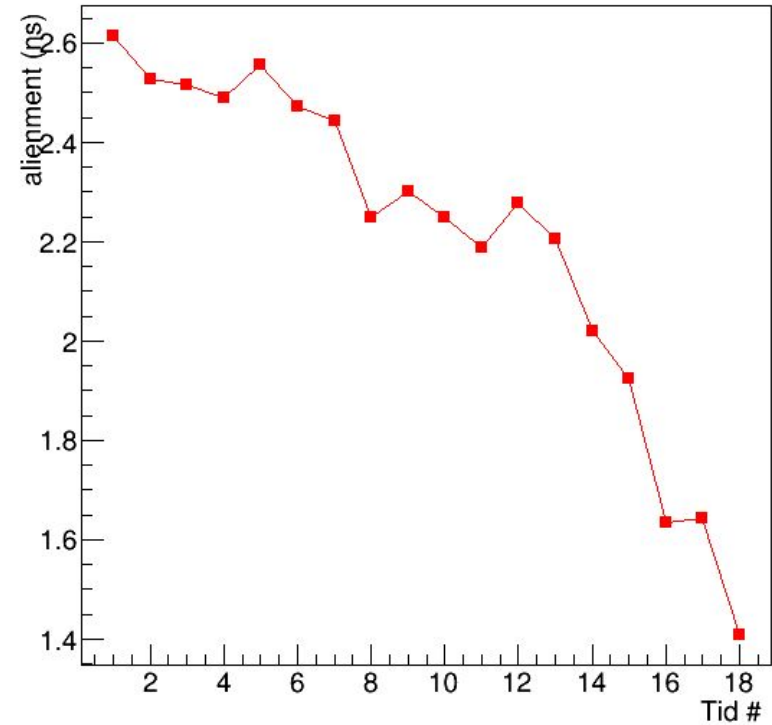
channe l	64876	64877	64878	64879	64880	64881	64882	64883	65077	65078	65079	65080	64876_883/ 8	65077^8 0/4
1	2.626	2.616	2.615	2.611	2.638	2.587	2.617	2.605	2.611	2.599	2.625	2.668	2.614375	2.62575
2	2.599	2.597	2.528	2.525	2.582	2.563	2.554	2.593	2.59	2.583	2.535	2.564	2.567625	2.568
3	2.533	2.521	2.515	2.531	2.53	2.535	2.539	2.517	2.454	2.486	2.519	2.532	2.527625	2.49775
4	2.527	2.49	2.49	2.55	2.545	2.507	2.506	2.505	2.386	2.434	2.425	2.444	2.515	2.42225
5	2.587	2.594	2.557	2.573	2.581	2.566	2.587	2.554	2.444	2.415	2.46	2.478	2.574875	2.44925
6	2.47	2.481	2.472	2.488	2.464	2.479	2.486	2.479	2.307	2.334	2.323	2.342	2.477375	2.3265
7	2.487	2.482	2.444	2.466	2.454	2.467	2.474	2.482	2.337	2.336	2.353	2.349	2.4695	2.34375
8	2.303	2.271	2.25	2.272	2.276	2.309	2.274	2.294	2.176	2.148	2.189	2.167	2.281125	2.17
9	2.316	2.294	2.302	2.294	2.299	2.326	2.302	2.335	2.215	2.197	2.182	2.22	2.3085	2.2035
10	2.247	2.281	2.249	2.242	2.241	2.26	2.263	2.281	2.063	2.129	2.043	2.162	2.258	2.09925
11	2.2	2.209	2.188	2.21	2.2	2.204	2.186	2.212	2.04	2.035	2.101	2.087	2.201125	2.06575
12	2.27	2.28	2.278	2.287	2.288	2.32	2.295	2.285	2.14	2.138	2.149	2.201	2.287875	2.157
13	2.185	2.205	2.204	2.183	2.175	2.17	2.18	2.171	1.985	1.957	2.022	2.039	2.184125	2.00075
14	1.995	1.999	2.019	2.003	1.999	1.989	1.987	1.986	1.819	1.871	1.812	1.887	1.997125	1.84725
15	1.899	1.921	1.925	1.953	1.923	1.929	1.942	1.91	1.718	1.717	1.77	1.611	1.92525	1.704
16	1.65	1.695	1.634	1.682	1.655	1.622	1.642	1.655	1.415	1.434	1.544	1.489	1.654375	1.4705
17	1.617	1.659	1.642	1.628	1.639	1.635	1.63	1.646	1.433	1.431	1.413	1.446	1.637	1.43075
18	1.394	1.464	1.407	1.442	1.411	1.411	1.409	1.411	1.208	1.202	1.178	1.237	1.418625	1.20625

# Tdiff Alignment

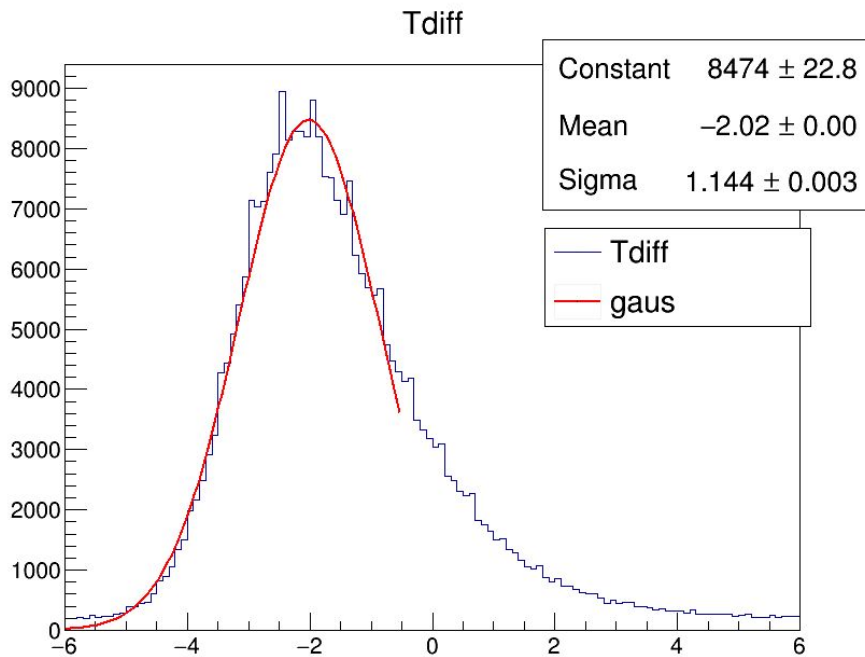
T-counter tdiff alienment



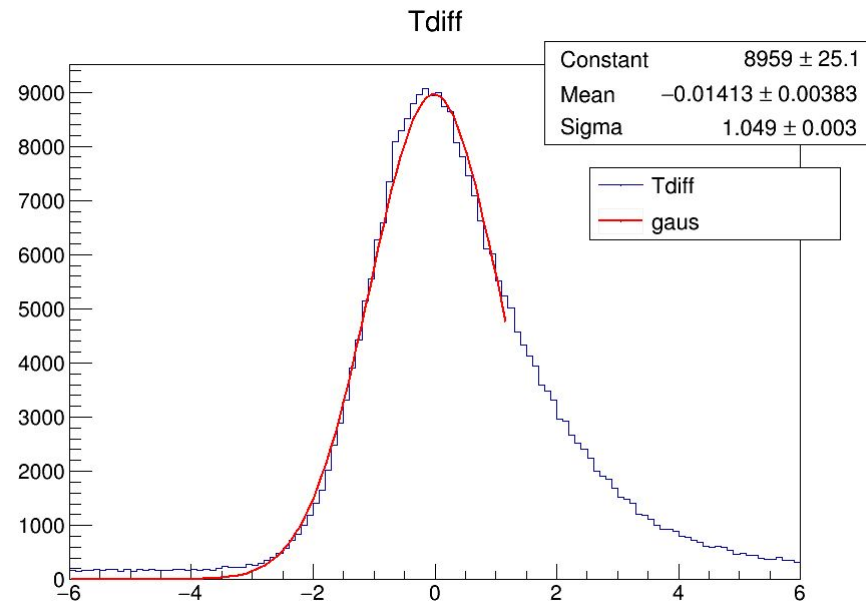
T-counter tdiff alienment #64878



# Tdiff Alignment



#65078 before the alignment

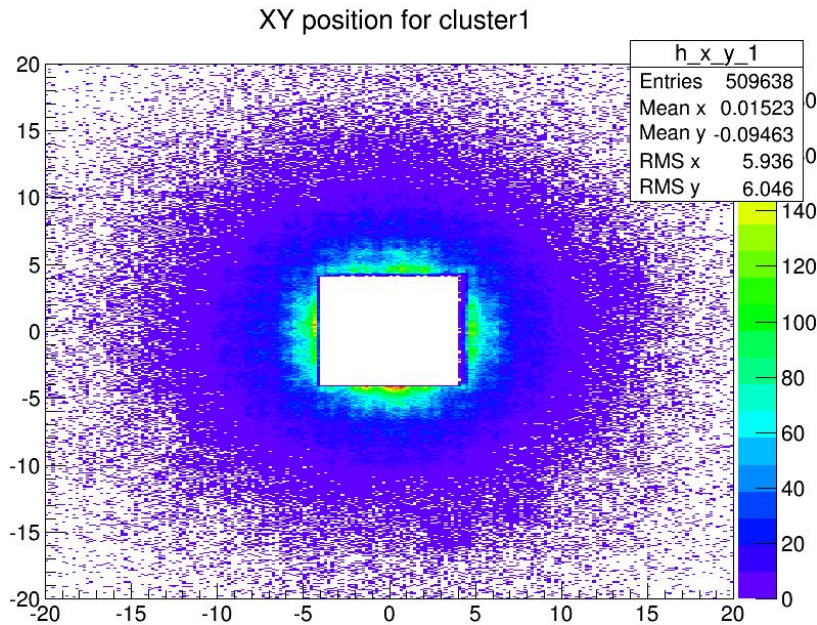


#65078 after the alignment

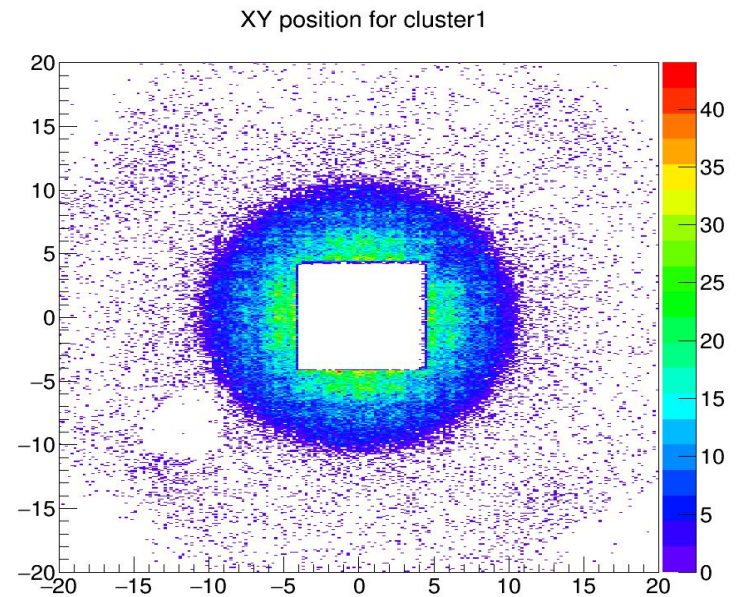
# XY position cut

use x1&x2 y1&y2 info. cut out the inner layer modules

cut :  $\text{abs}(x1,x2,y1,y2) < 4.153$



data #65080



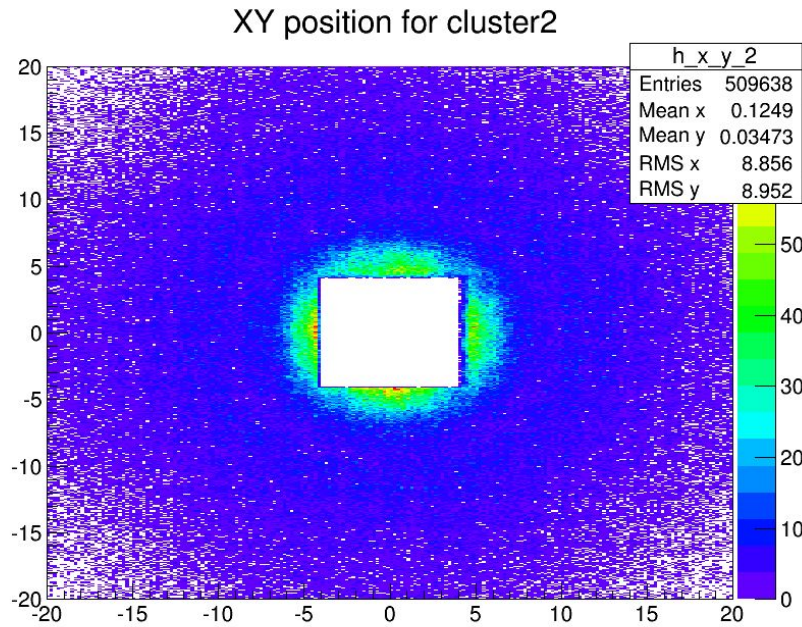
MC #65080



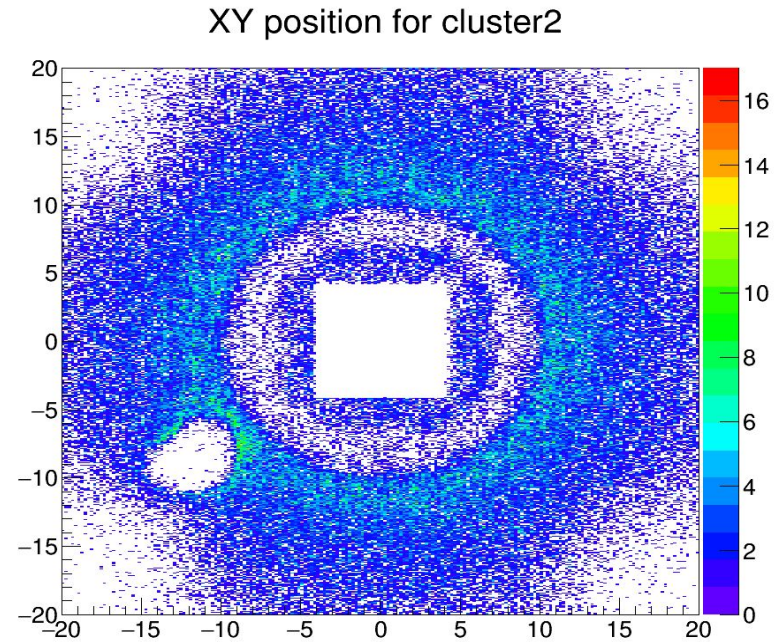
# XY position cut

use x1&x2 y1&y2 info. cut out the inner layer modules

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data #65080

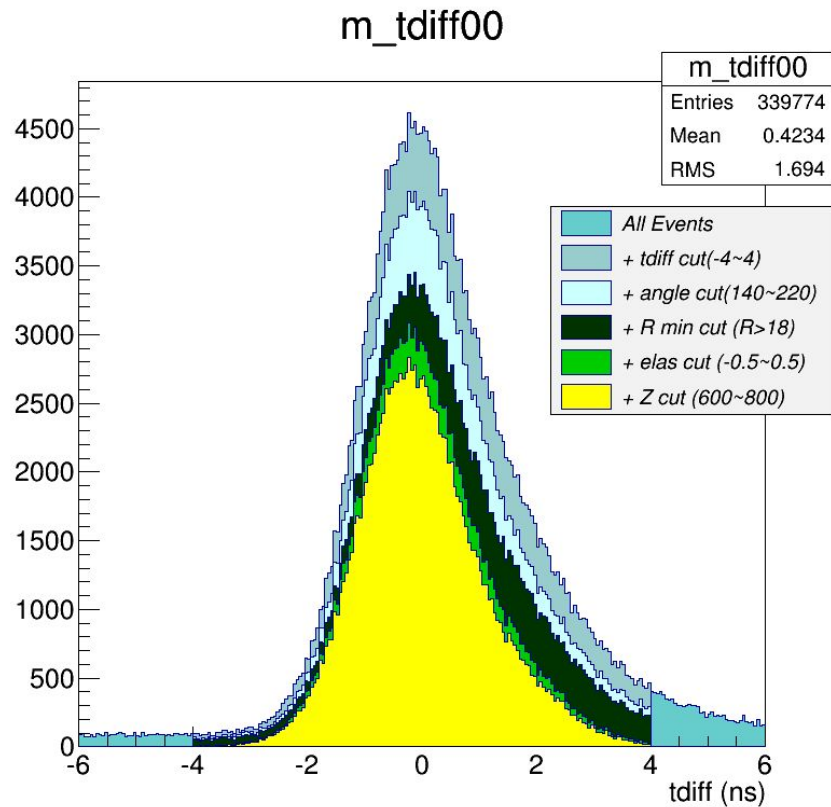


MC #65080



# Tdiff cut

apply energy cut  $e1 > 0.5$   $e2 > 0.5$   
cut (  $tdiff < -4.$  ||  $tdiff > 4.$ )

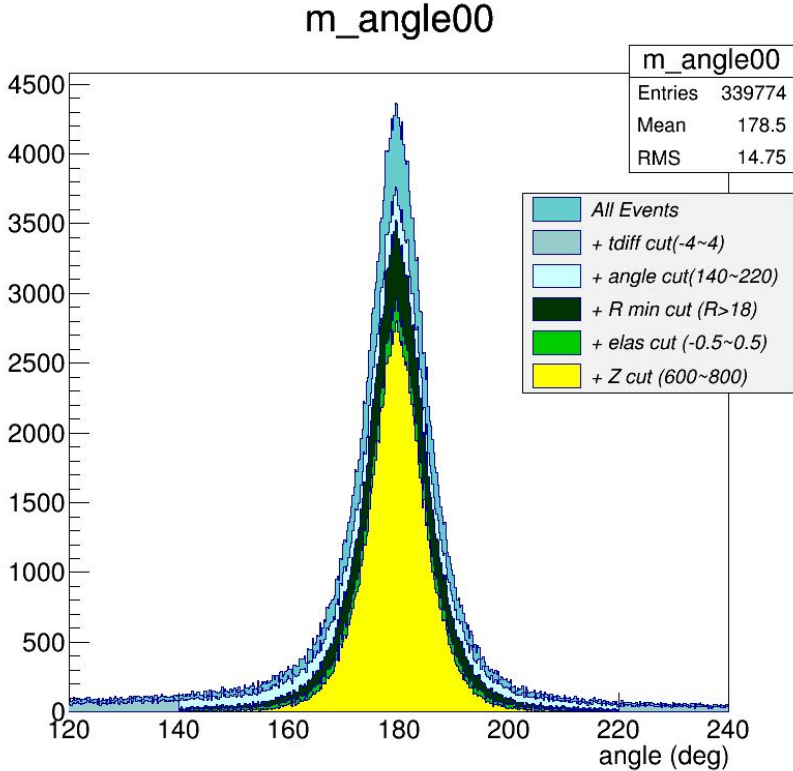


data #65080

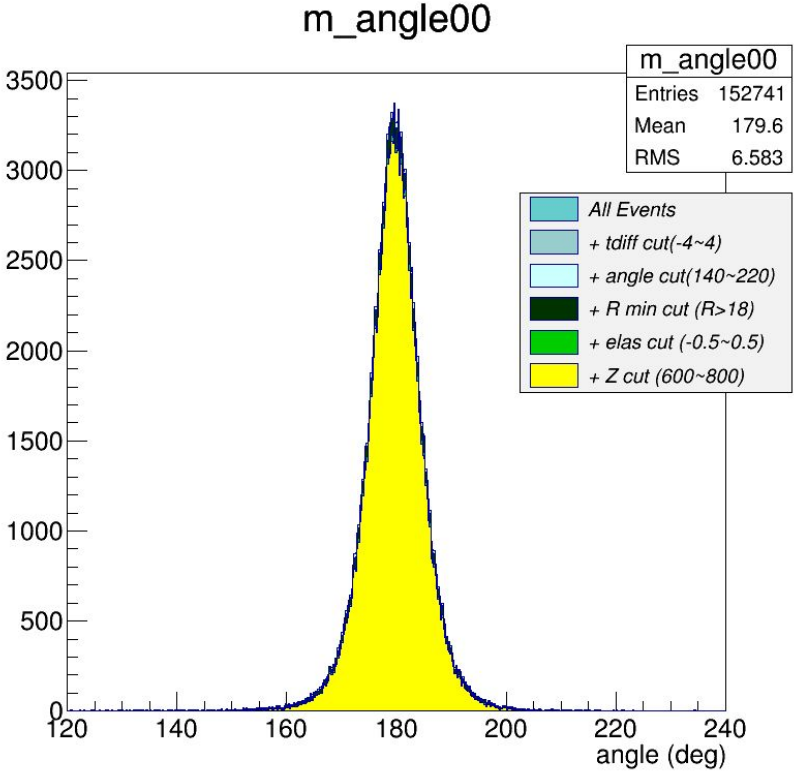
MC #65080

# Azimuthal Angle diff cut

cut ( angle > 220 || angle < 140 )



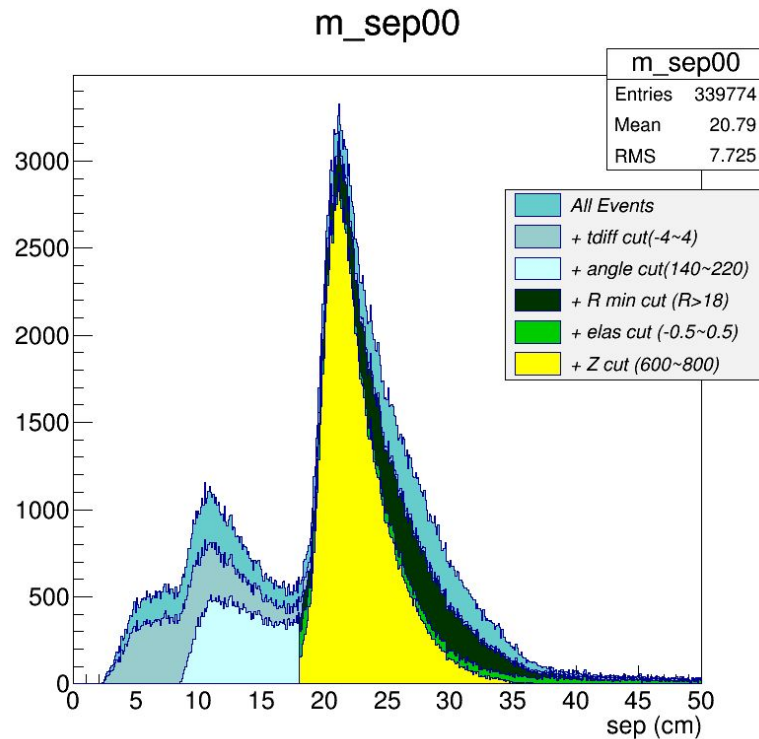
data #65080



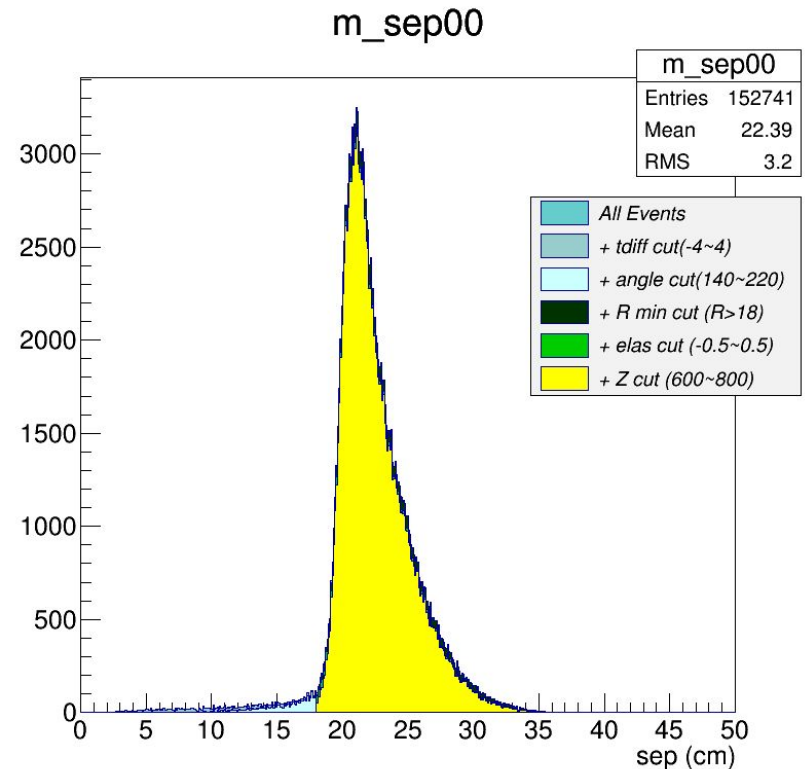
MC #65080

# Cluster Separation cut

is the distance between two clusters :  $\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$   
cut (  $R < 18$  cm )



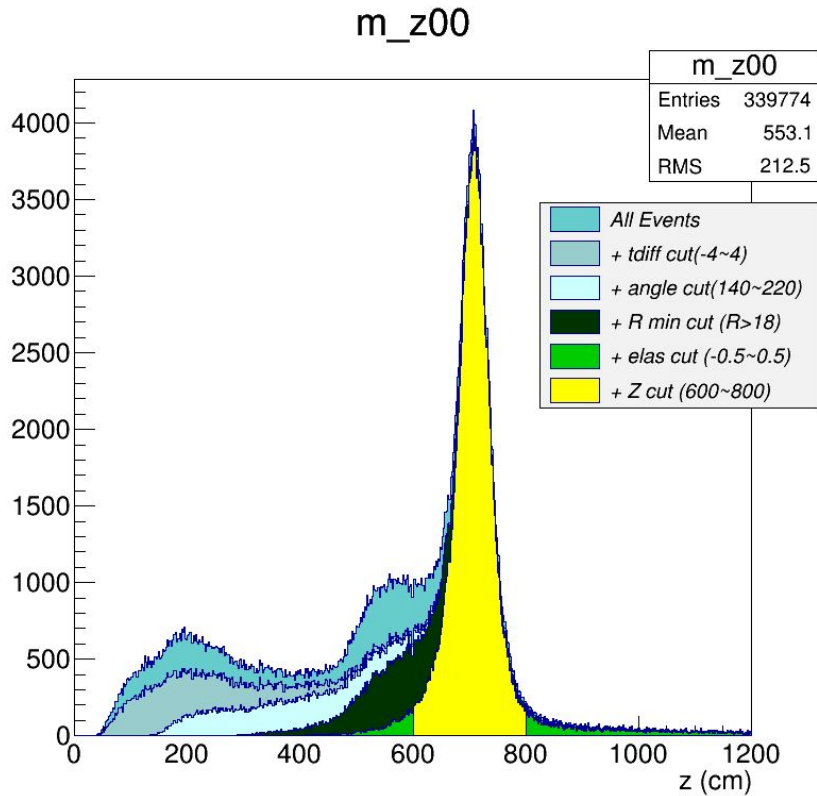
data #65080



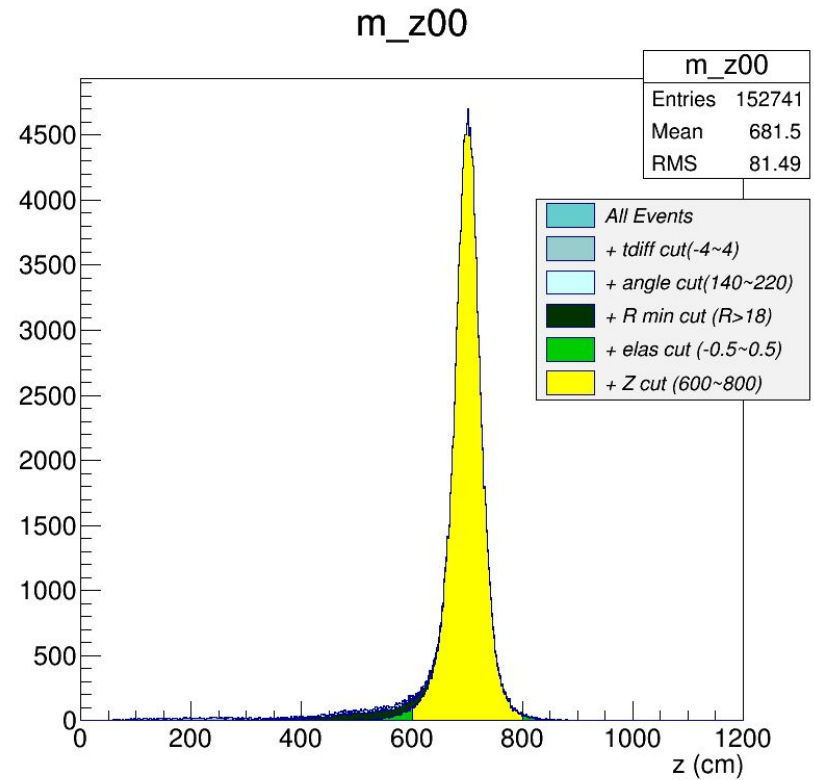
MC #65080

# Z reconstruction

$z$  cut ( $z > 800 \parallel z < 600$ )



data #65080

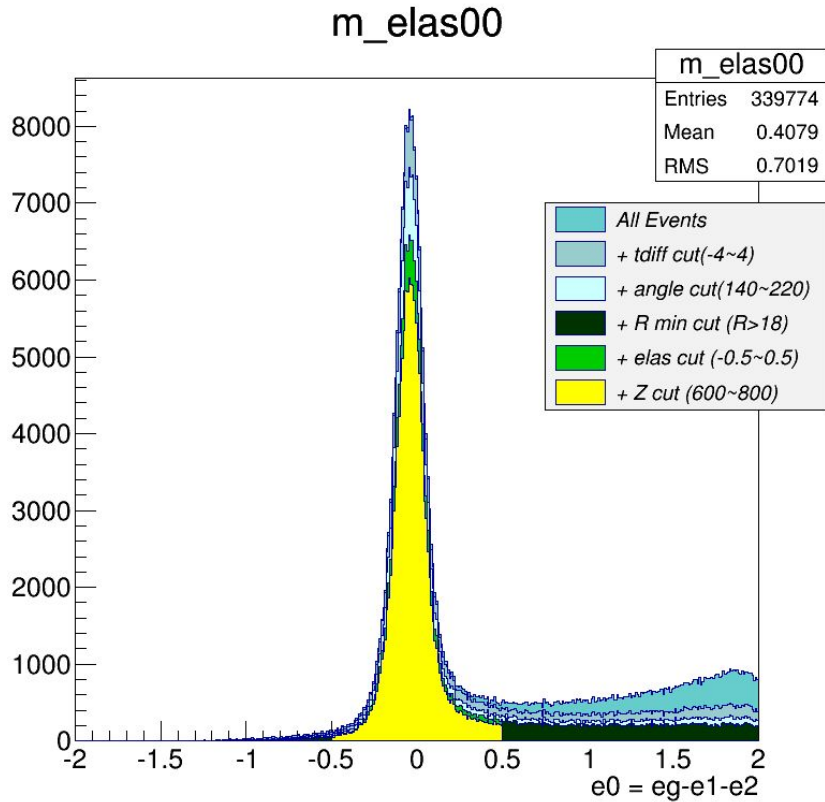


MC #65080

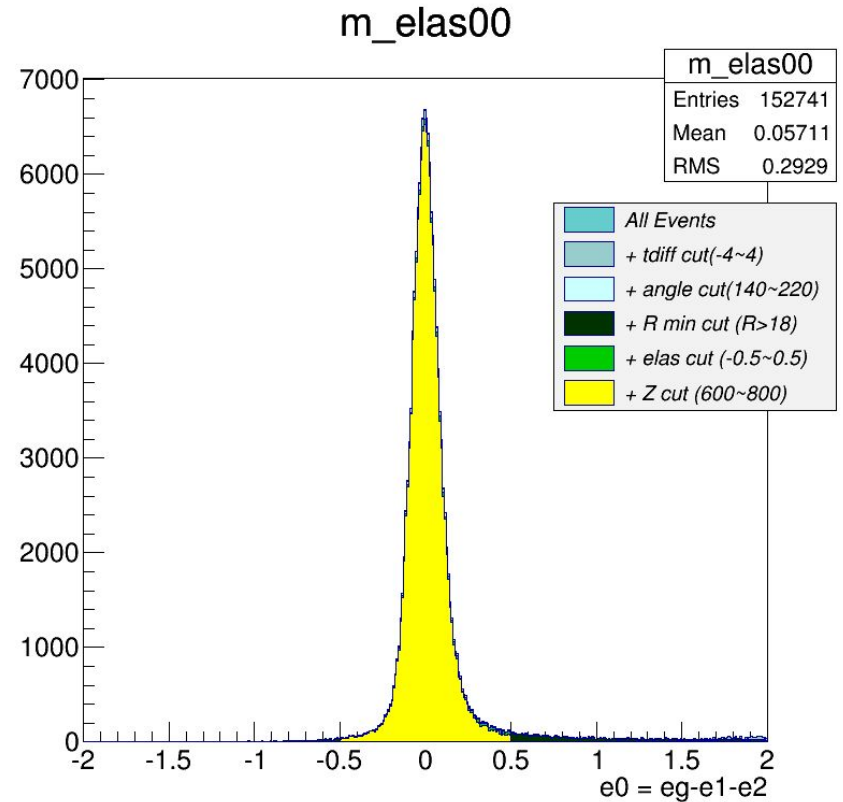
# Energy conservation

$$E0 = eg - (e1 + e2)$$

$$\text{cut} (\text{abs}(e0)) > 0.5 \text{ GeV}$$



data #65080



MC #65080

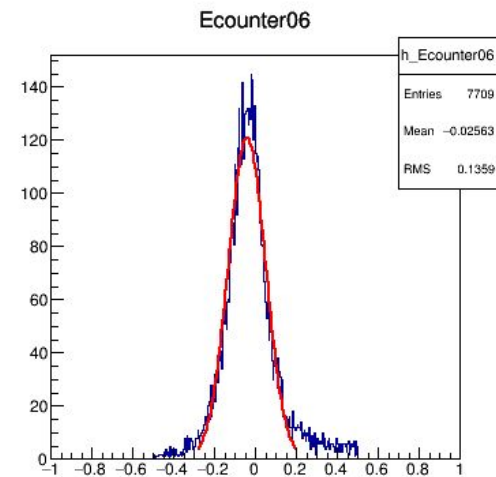
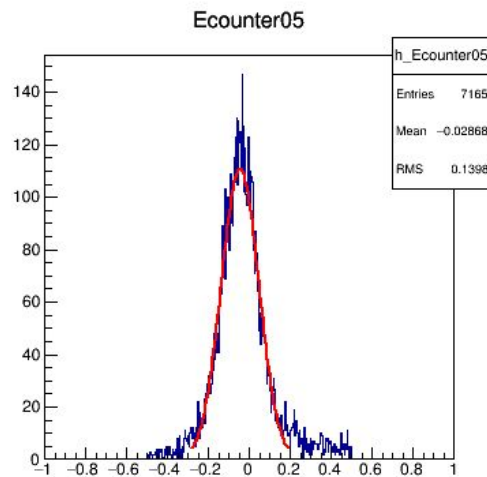
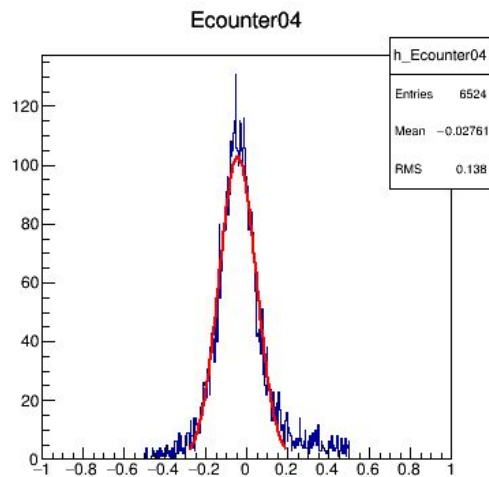
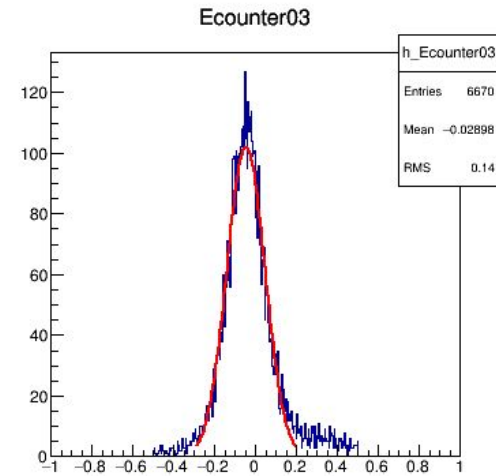
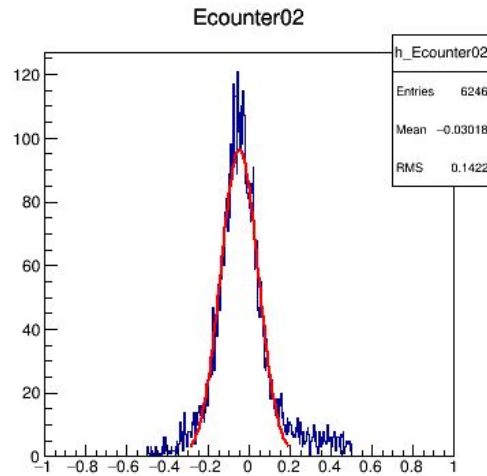
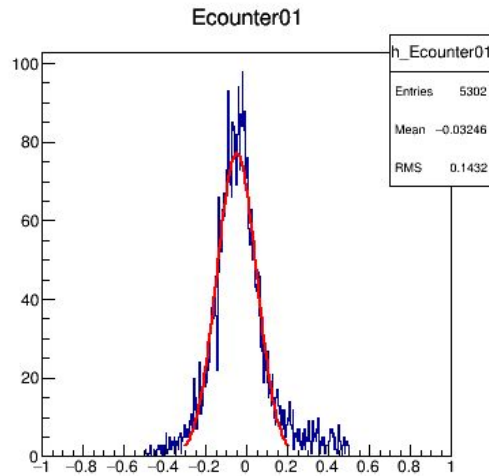
## all cuts applied

- evenid cut
- $e1, e2 < 0.5$  GeV cut
- XY position cut ( $< 4.153$ cm)
- Tdiff cut ( $-4 \sim 4$  ns)
- Azimuthal Angle diff cut ( $140 \sim 220$  deg)
- Cluster Separation cut ( $> 18$ cm)
- interaction vertex cut ( $600 \sim 800$  cm)
- energy conservation cut ( $-0.5 \sim 0.5$  GeV)



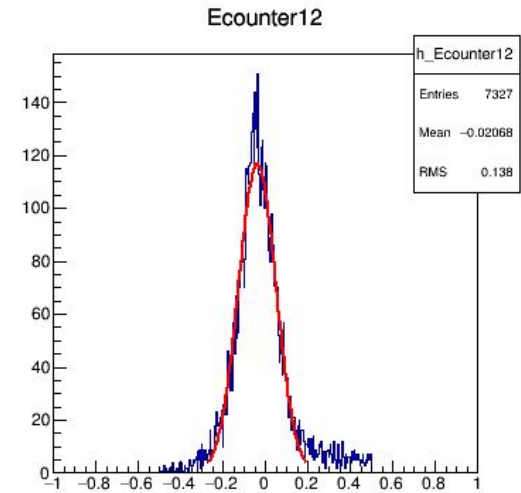
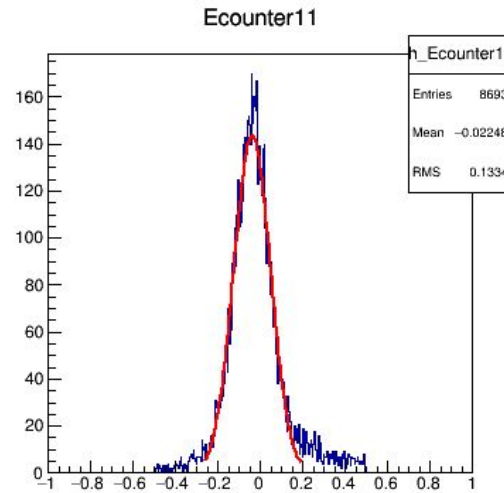
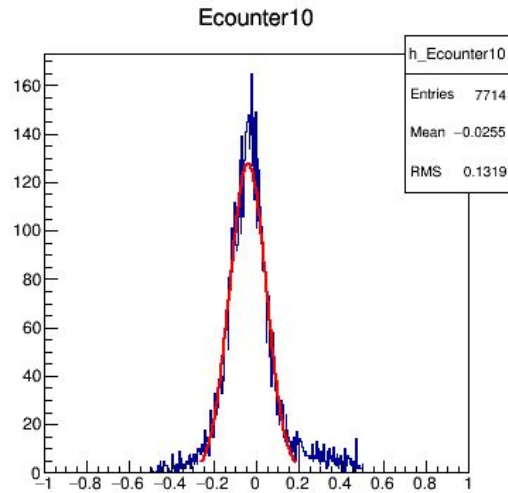
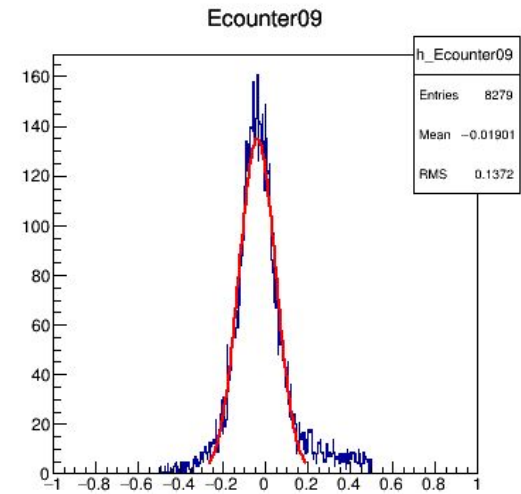
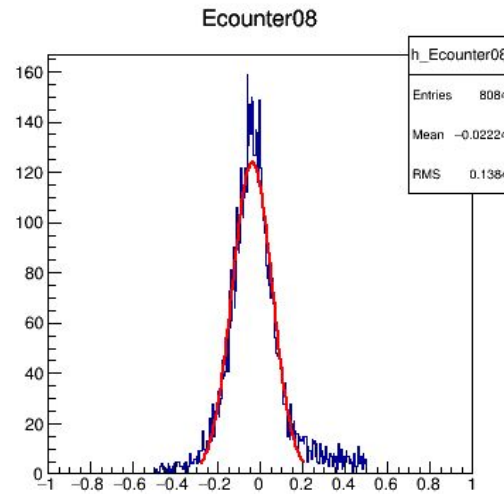
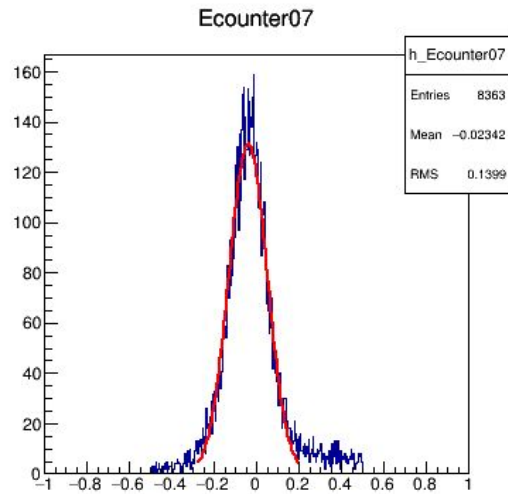
# E-counter yield

## 18 bins for 180Echannels



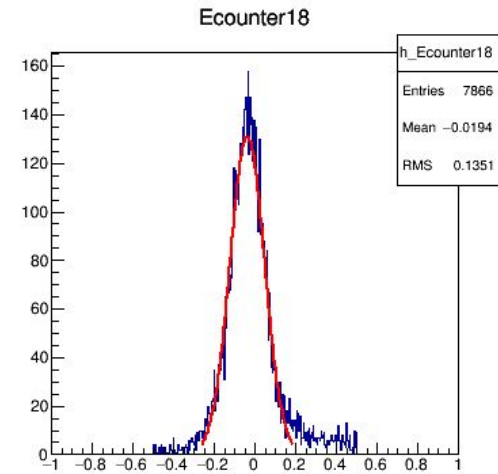
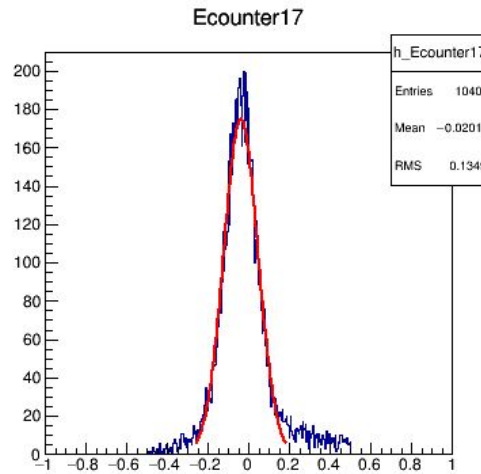
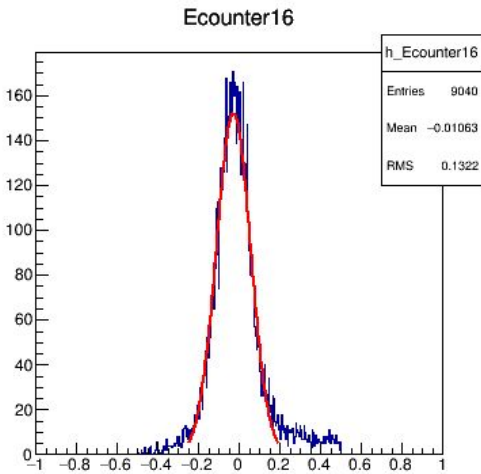
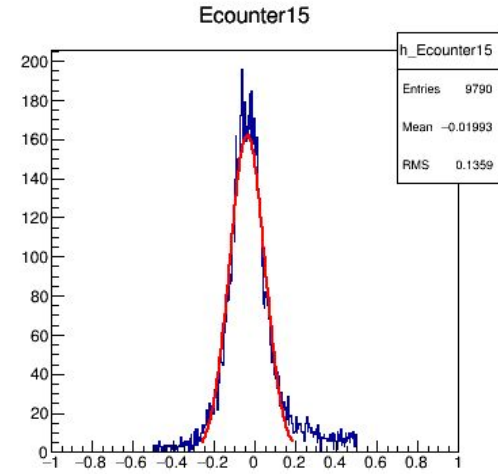
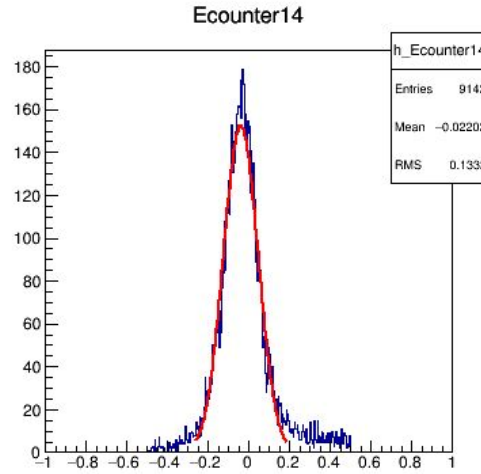
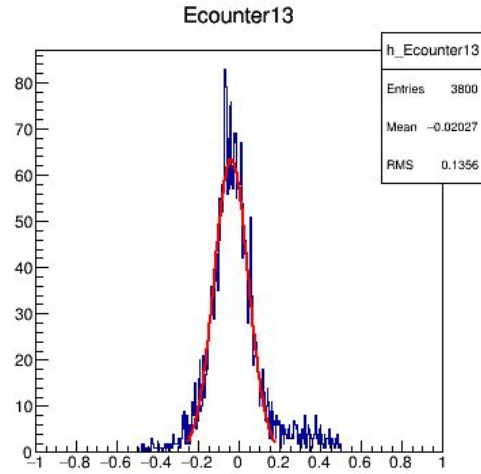
# E-counter yield

## 18 bins for 180Echannels

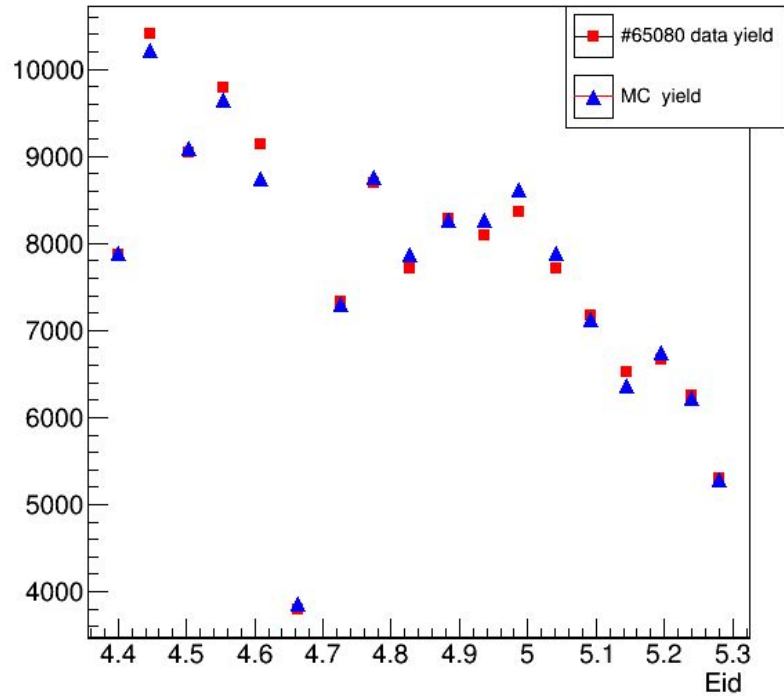


# E-counter yield

## 18 bins for 180Echannels

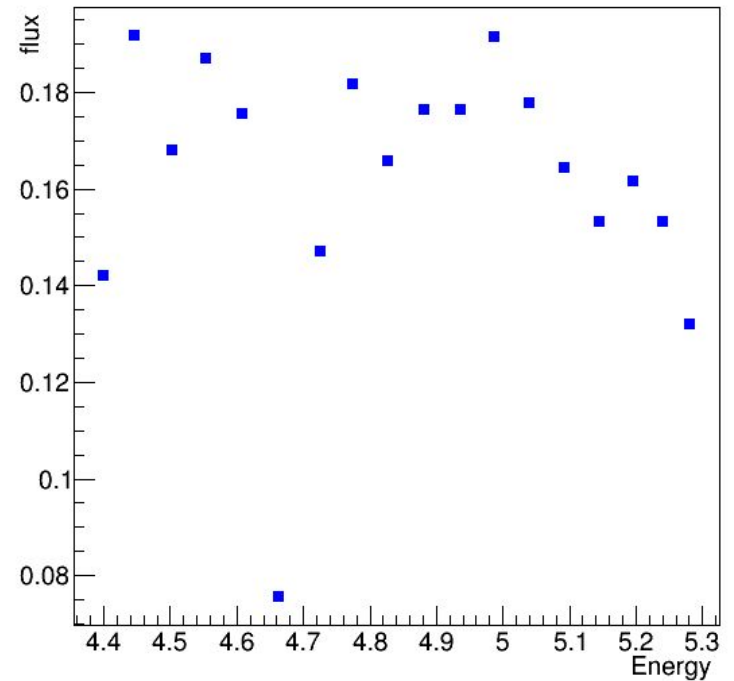


yield(#65080) / MC yield



yield for #65080

flux

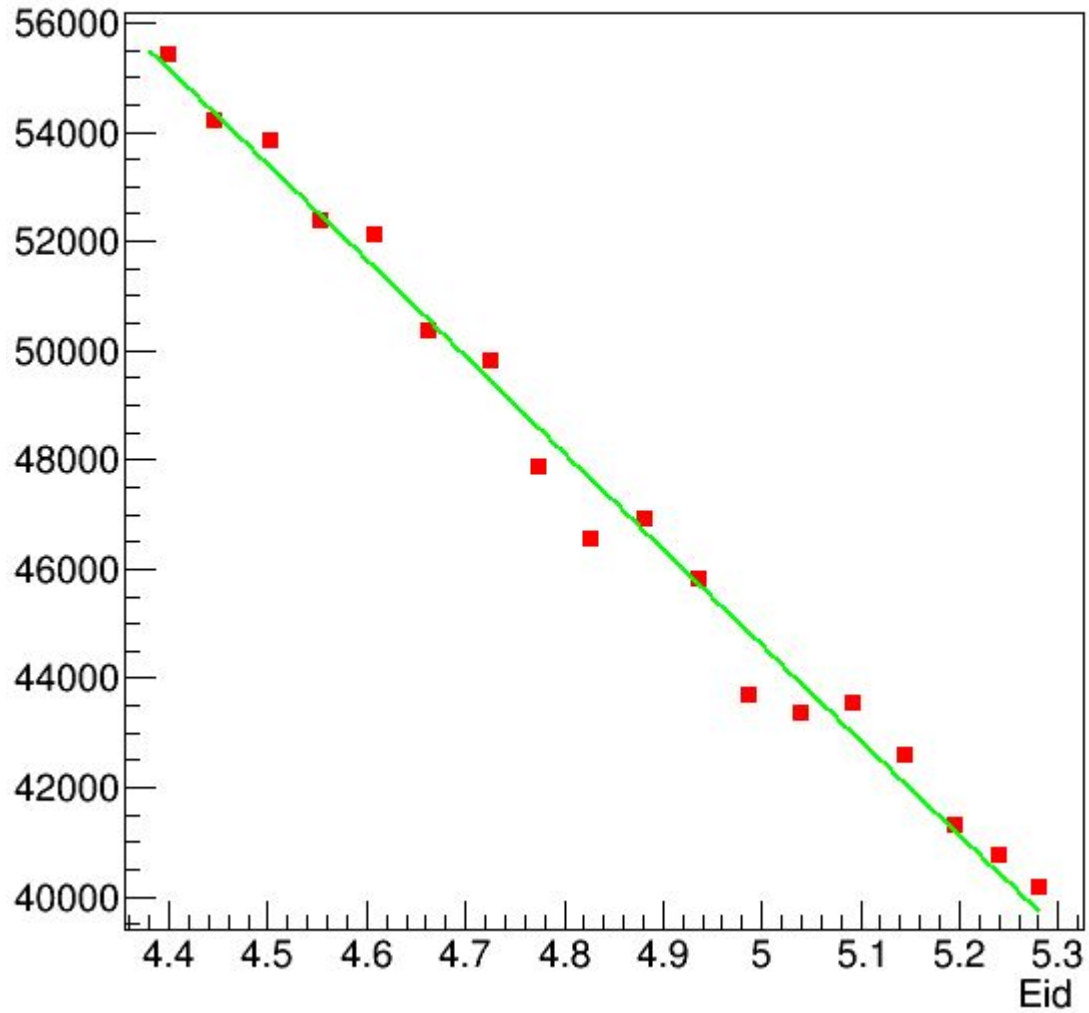


flux for #65080

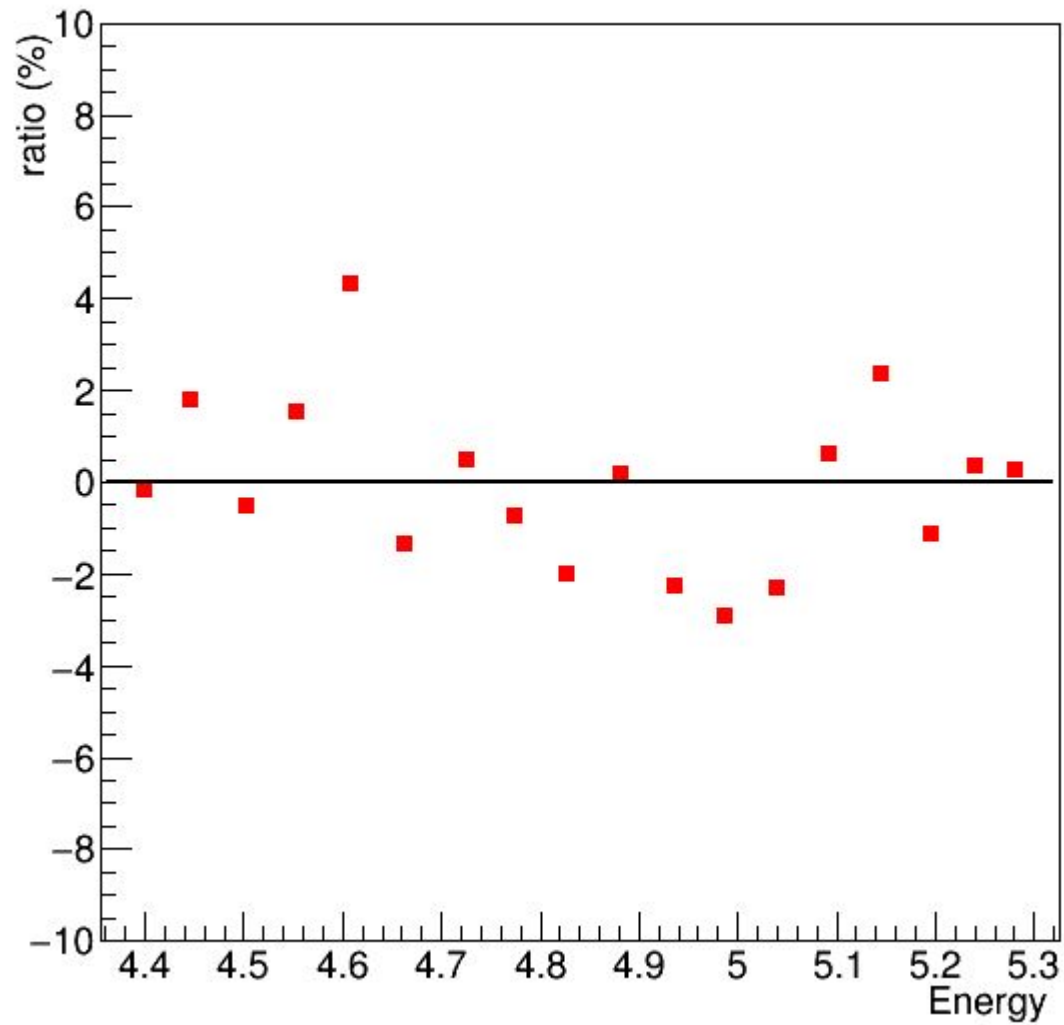
Question:

have MC data already included flux information ?

# yield/flux (#65080)



$(\text{Datayield} - \text{MCyield}) / \text{Datayield}$





# Summary

- Made the alignment for different T-counter channels
- Debug the MC code, got new MC data for run 65080
- Both yield have similar behavior with flux
- Difference between Data and MC may due to the missing module of Hycal in MC
- Will do run#64877-64883 looking for further improvement