



FLAME

FcaL Asic for
Multiplane rEadout

UPDATE ON FLAME TB ANALYSIS

23.02.2021

REMINDER: RUNS ANALYSED

➤ Runs used:

CONF AA
- $X_0 = 0$: 777 – 780

CONF A
- $X_0 = 1, 2, 3$: 678 – 683

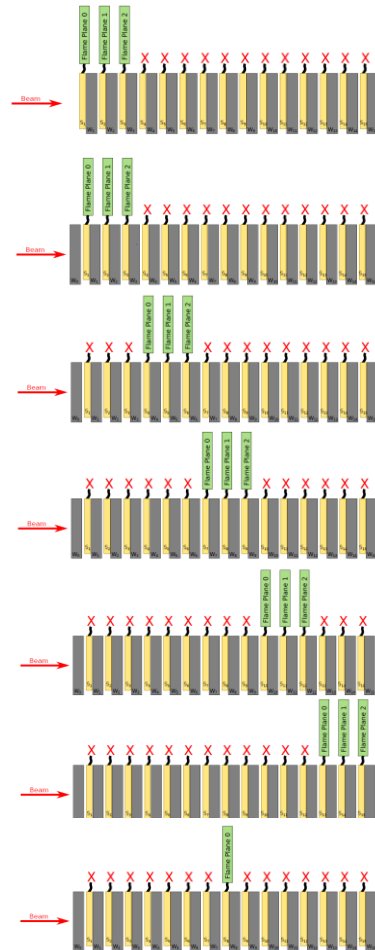
CONF B
- $X_0 = 4, 5, 6$: 696 – 701

CONF C
- $X_0 = 7, 8, 9$: 746 – 755

CONF D
- $X_0 = 10, 11, 12$: 758 – 762

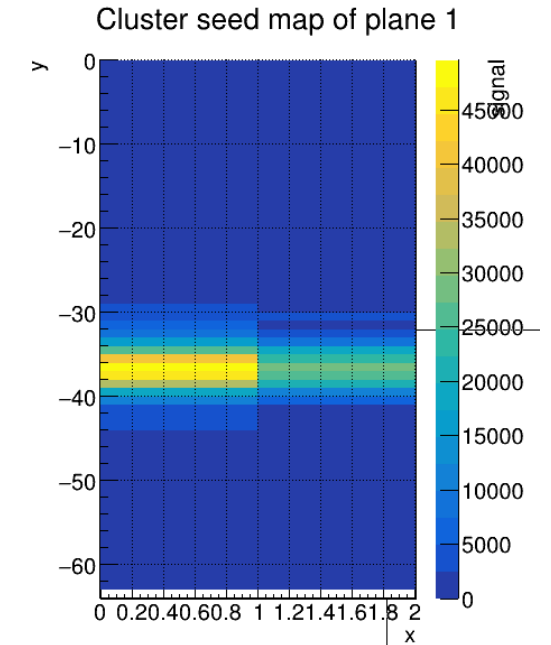
CONF E
- $X_0 = 13, 14, 15$: 869 – 873

CONF F
- $X_0 = 8$: 877 – 881



➤ 5 GeV electrons

➤ ~ center of the sensor



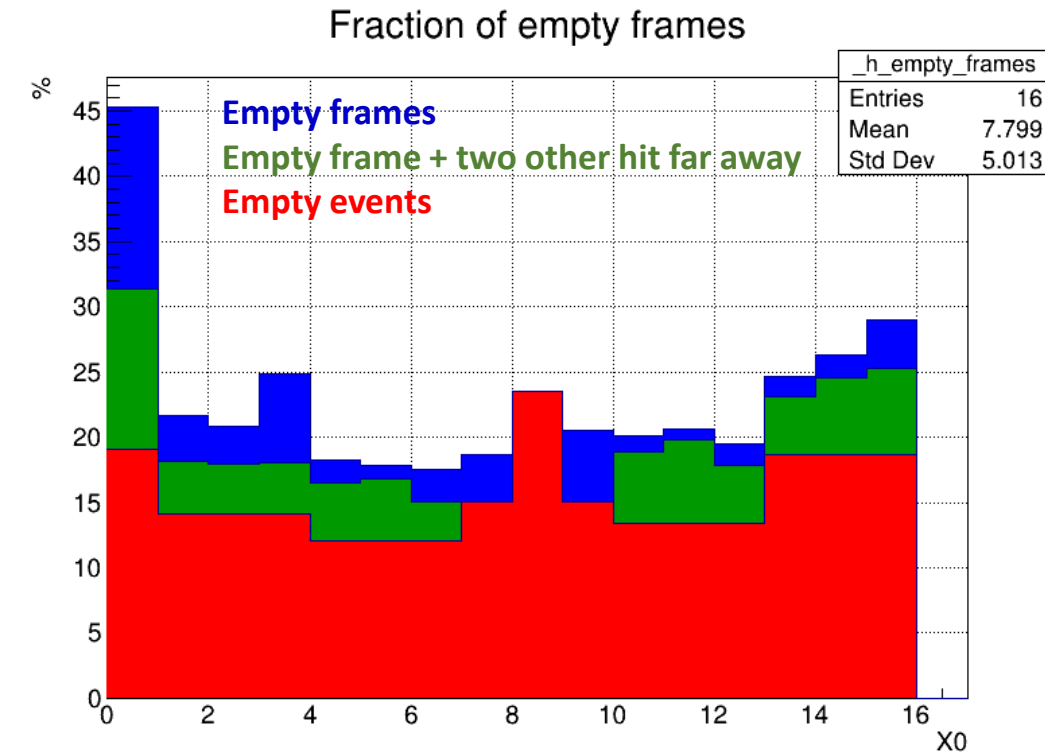
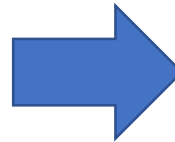
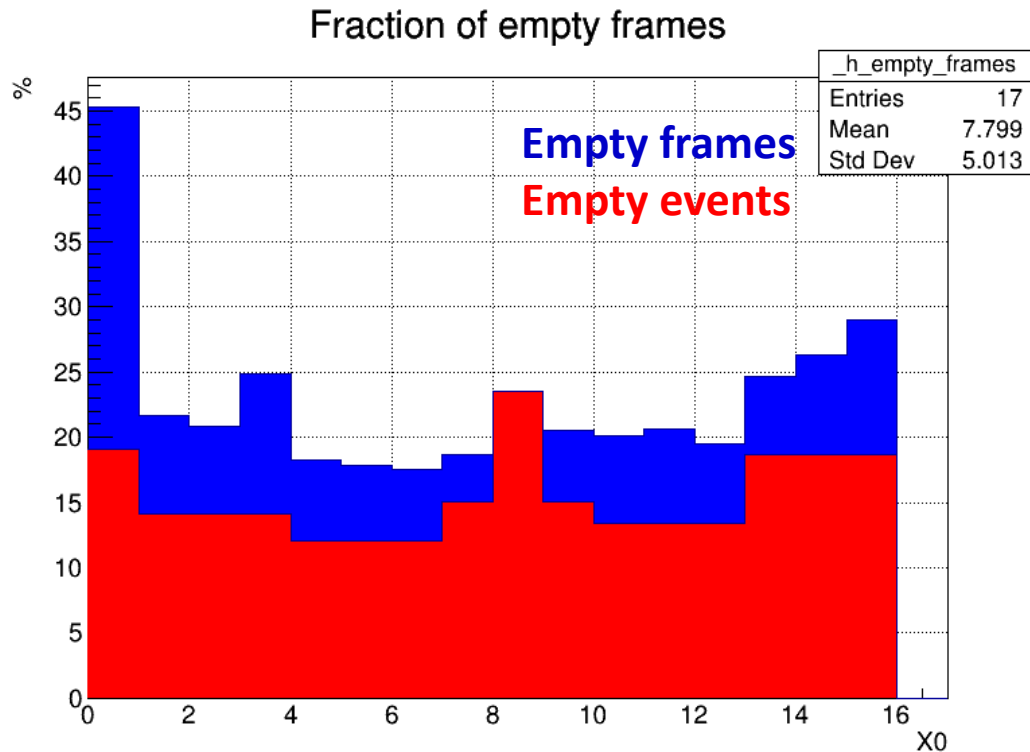
Run	Dead channels for planes 7, 8, 9 First run in configuration C (see FLAME measurement plan). Some problem with plane 8. It shows only the noise. Noise is lower than in the neighbor planes. We continue runs with this problem open	746
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➤ ADDED TO THE ANALYSIS

EMPTY FRAMES ISSUE

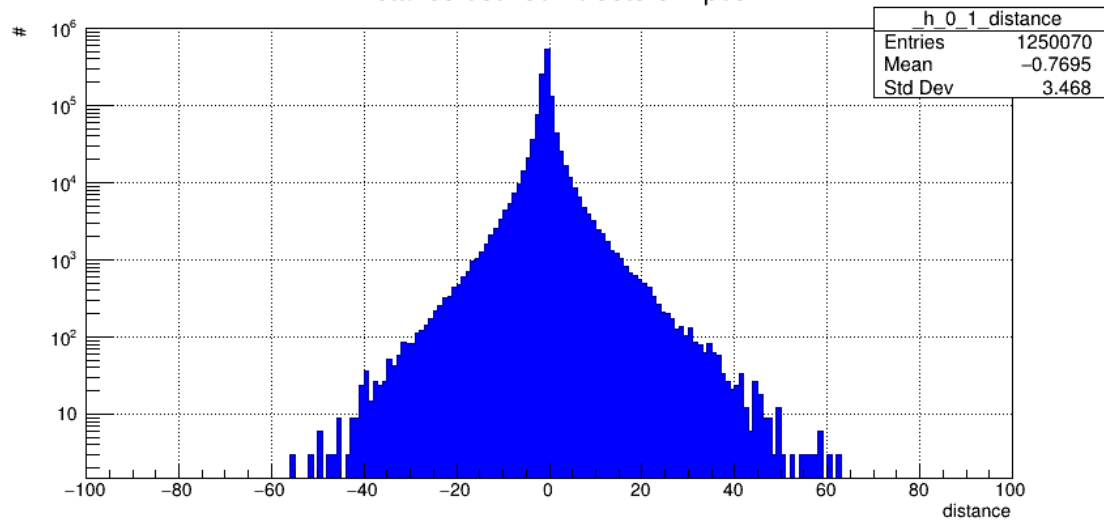
- There is a significant fraction of empty frames
- Source unknown:
 - triggers on particles out of lumical acceptance?
 - trigger synchronisation failure?

- Significant fraction of frames not correlated with particle, with some random noise hits.
- Fake triggers? -> To be confirmed with telescope data

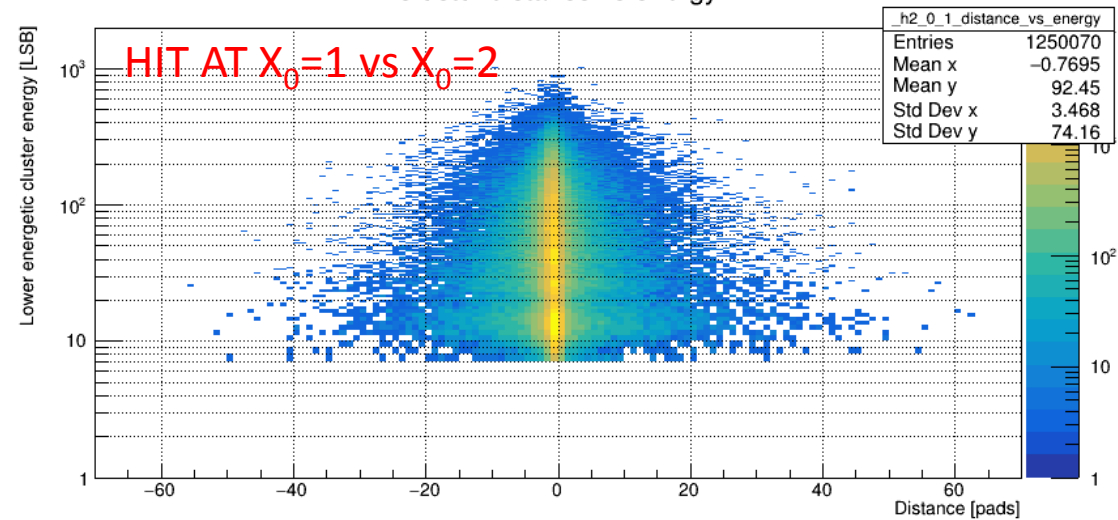


CLUSTERS DISTANCE (CONF A)

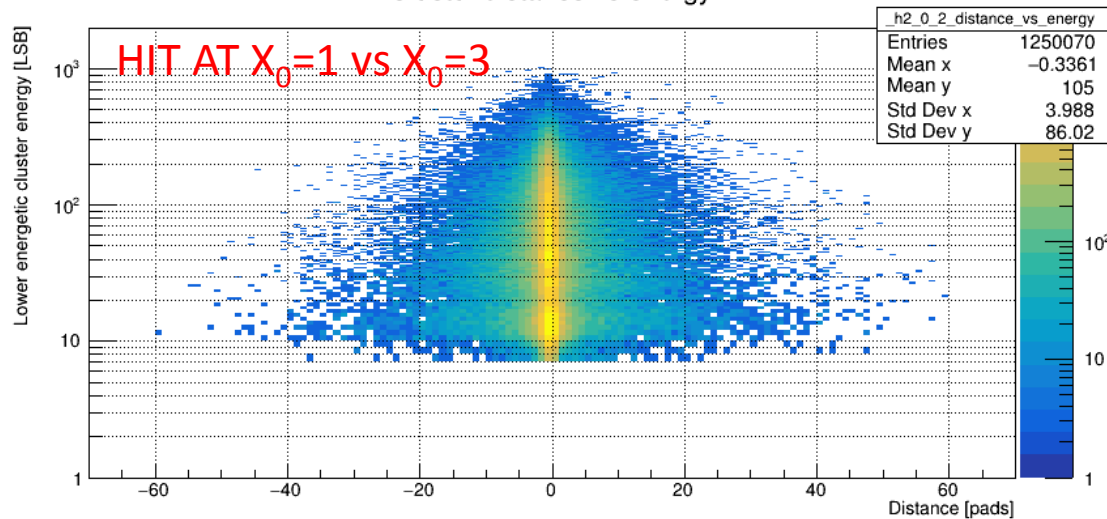
Distance between clusters Y pos



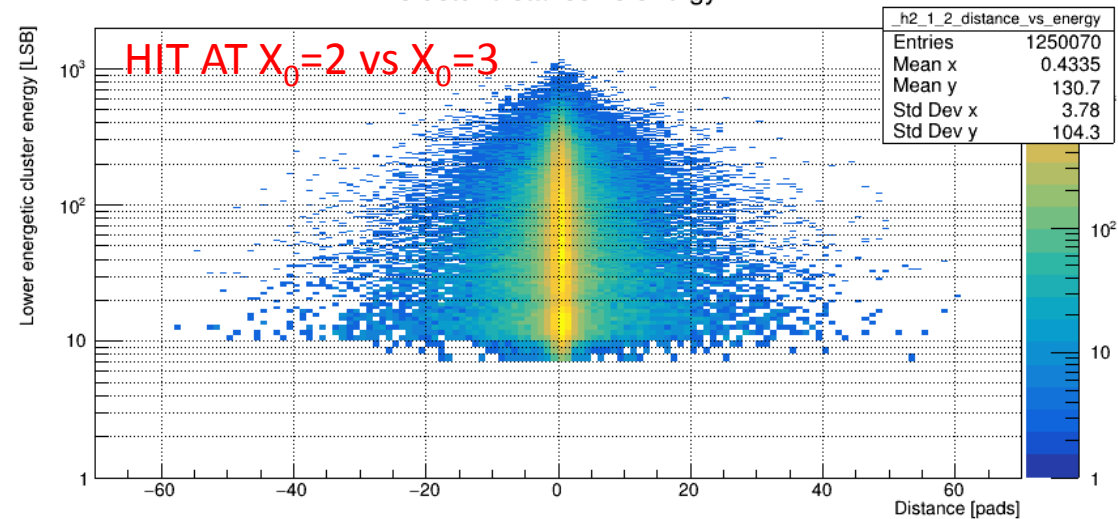
Cluster distance vs energy



Cluster distance vs energy

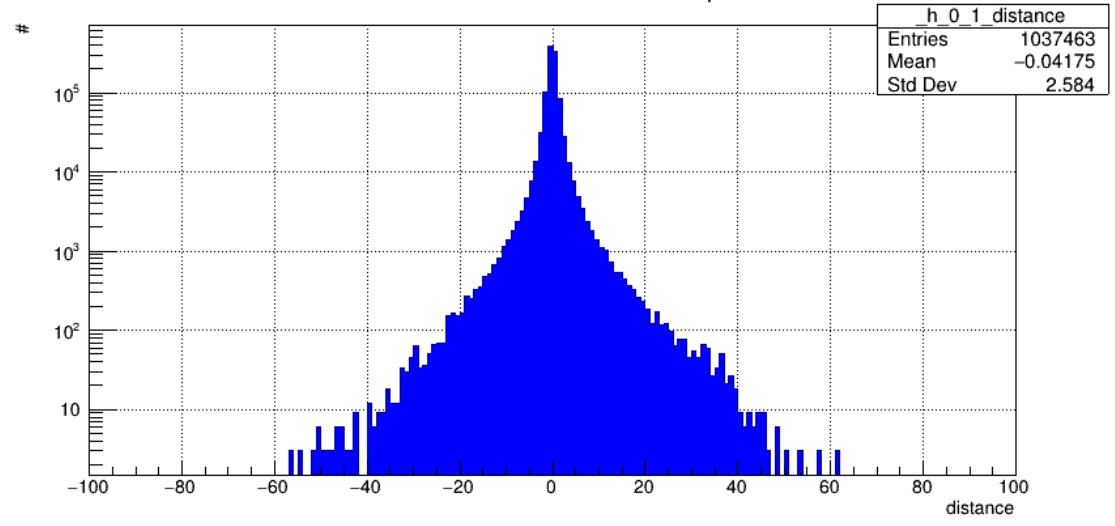


Cluster distance vs energy

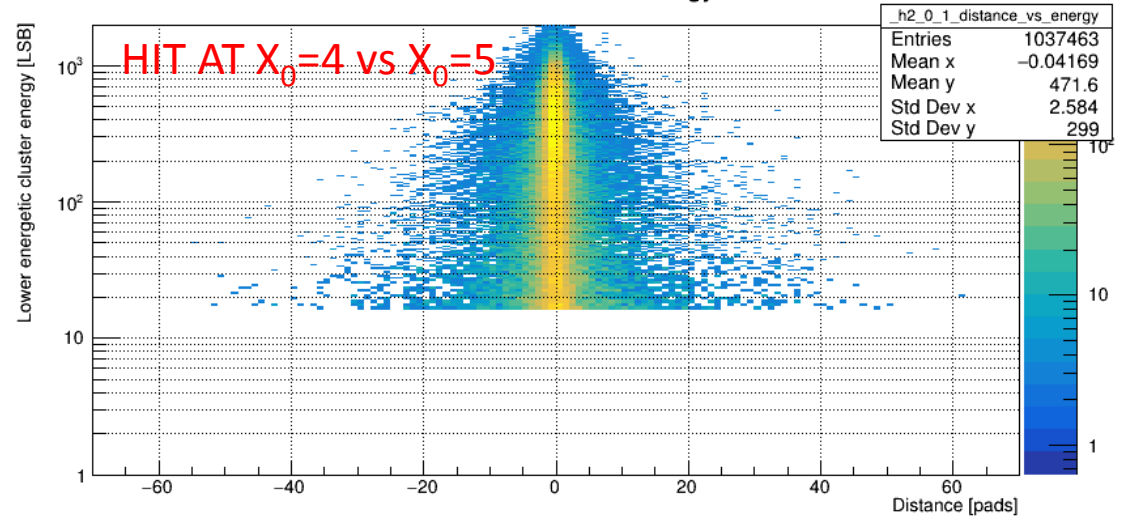


CLUSTERS DISTANCE (CONF B)

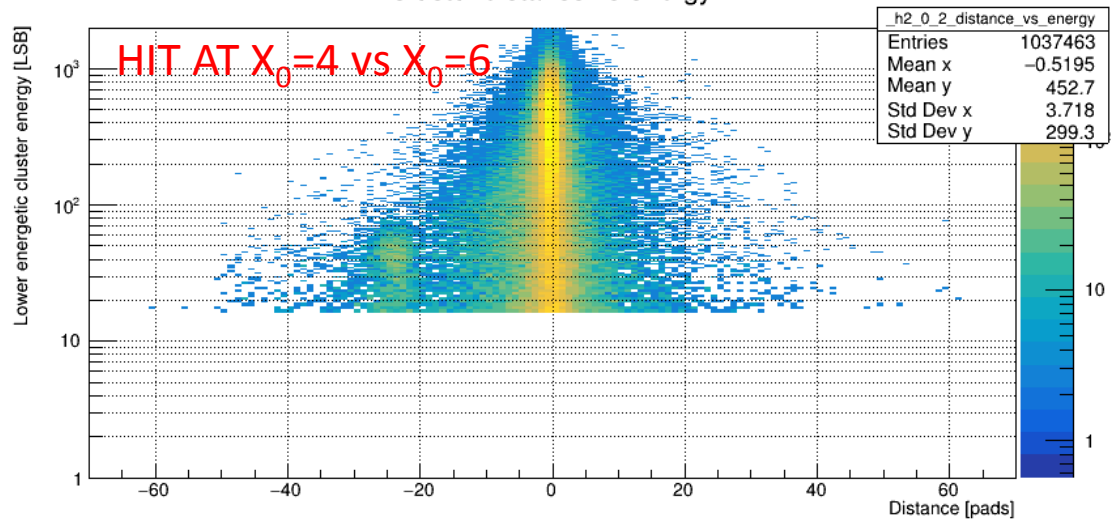
Distance between clusters Y pos



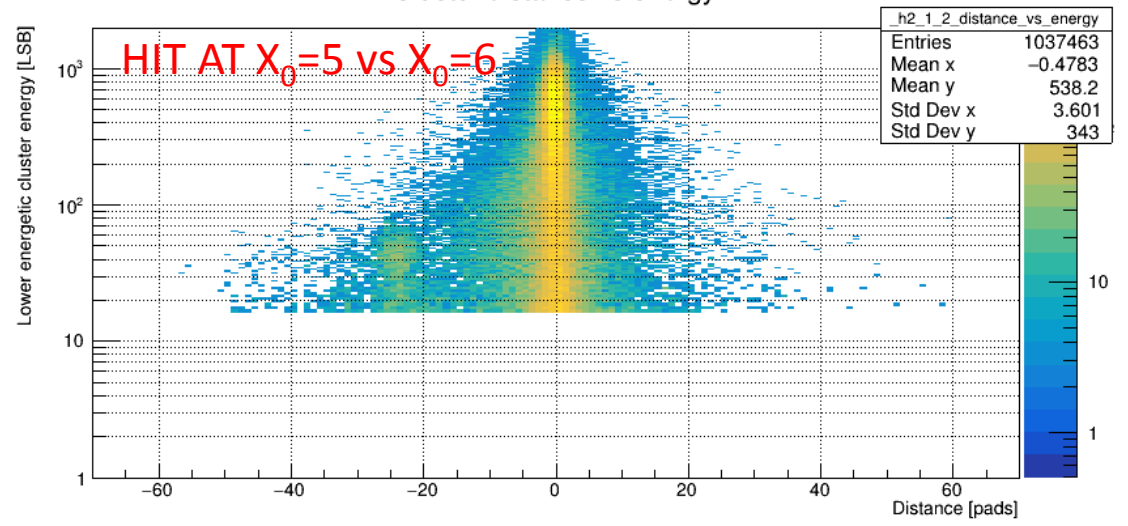
Cluster distance vs energy



Cluster distance vs energy

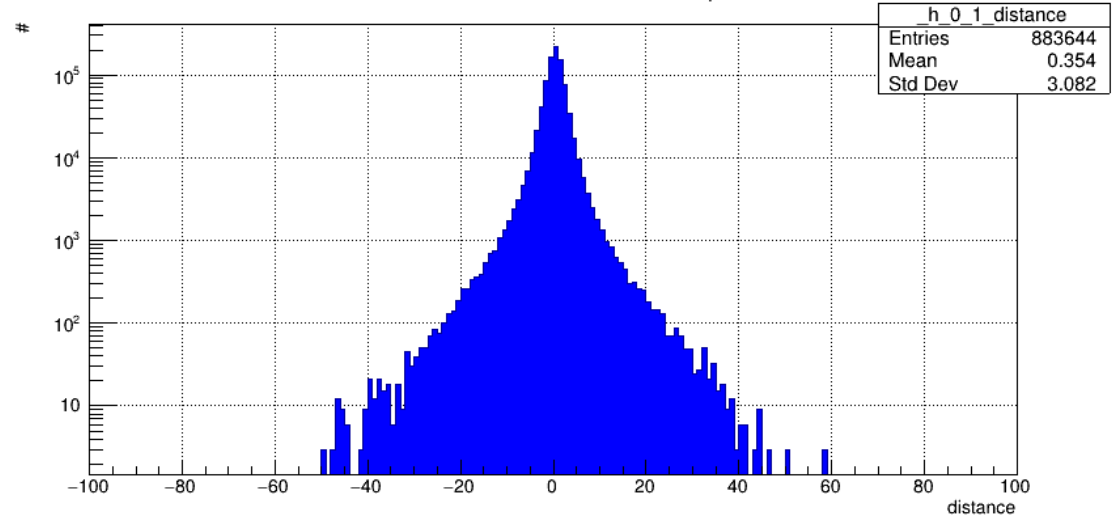


Cluster distance vs energy

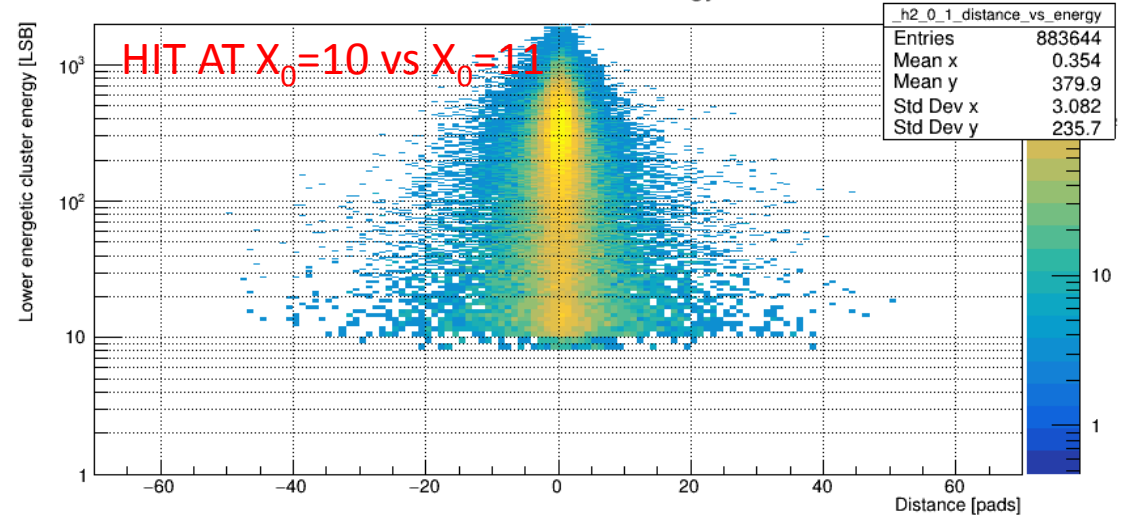


CLUSTERS DISTANCE (CONF D)

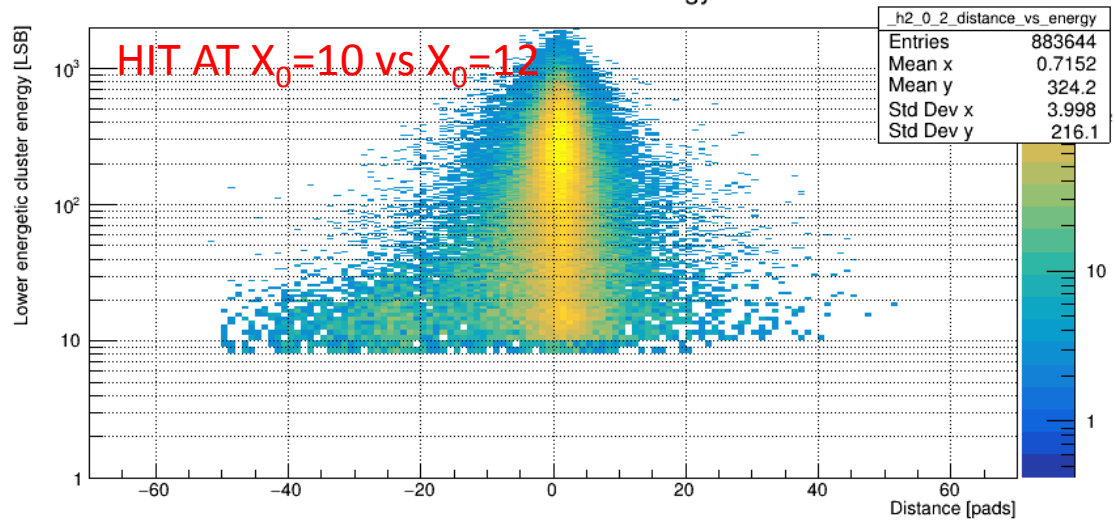
Distance between clusters Y pos



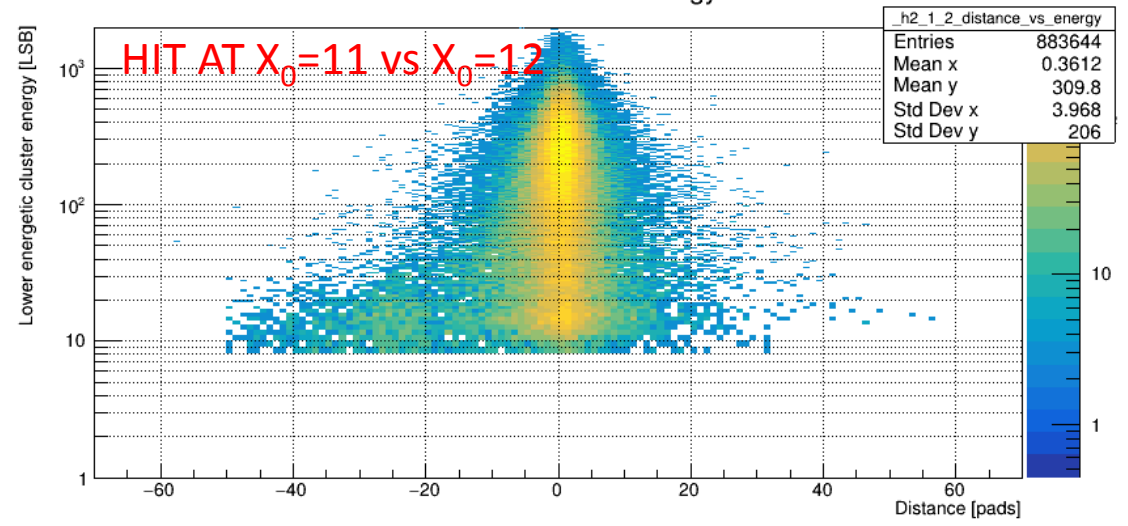
Cluster distance vs energy



Cluster distance vs energy

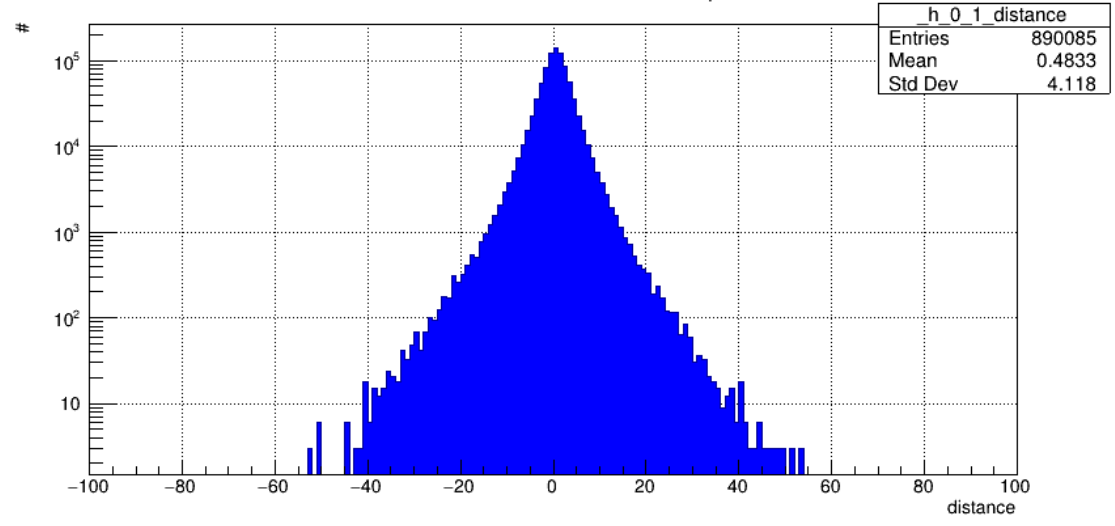


Cluster distance vs energy

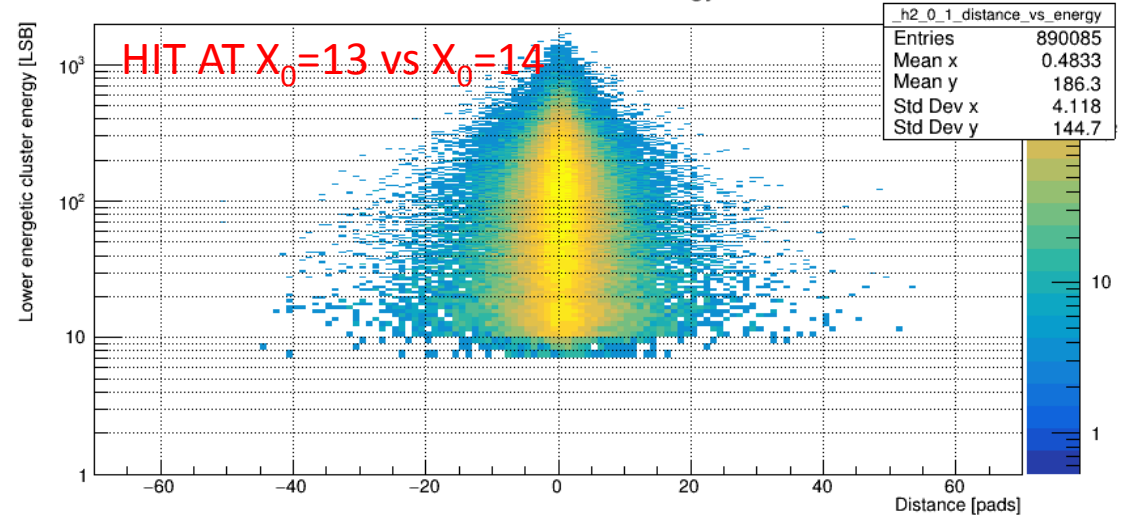


CLUSTERS DISTANCE (CONF E)

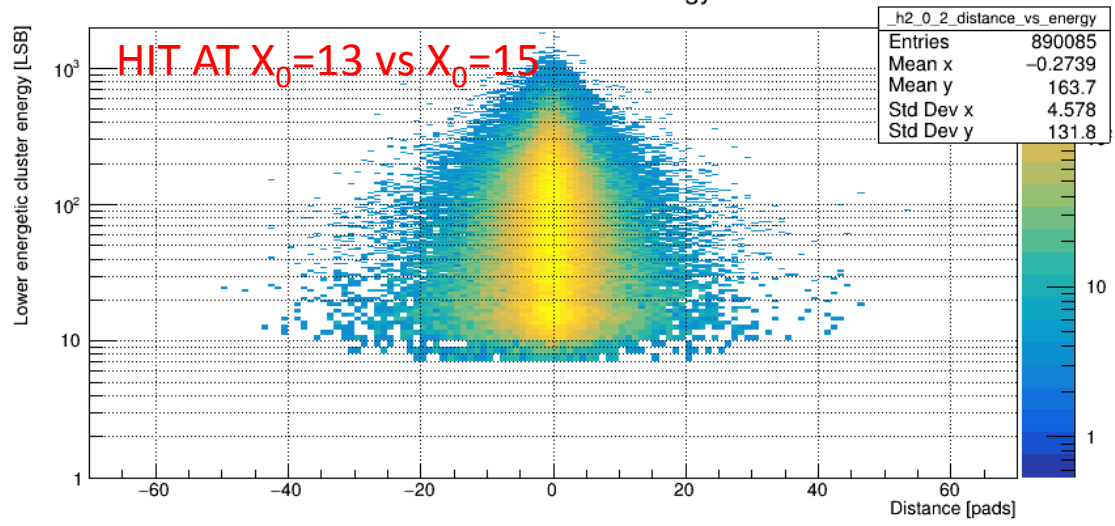
Distance between clusters Y pos



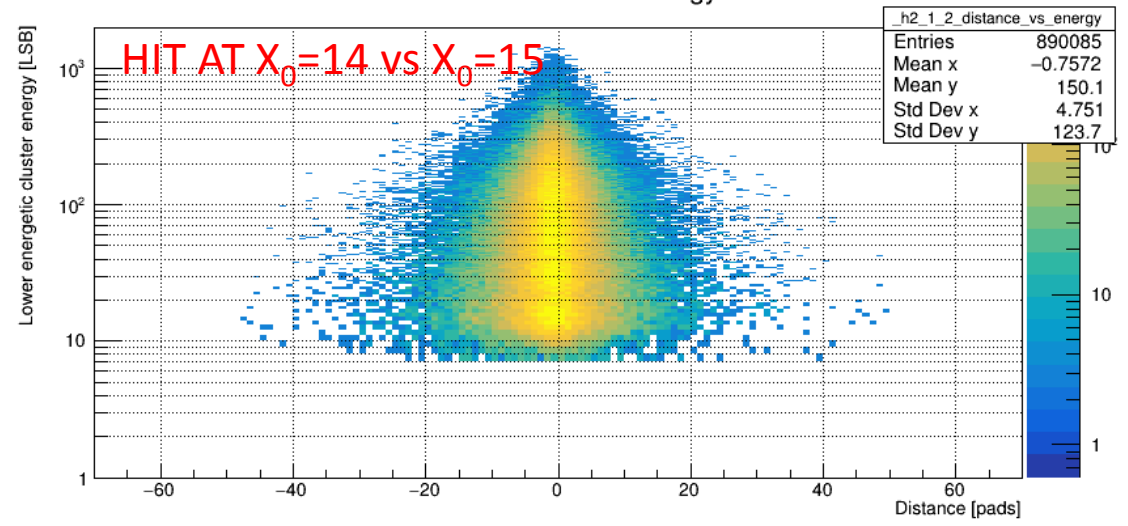
Cluster distance vs energy



Cluster distance vs energy



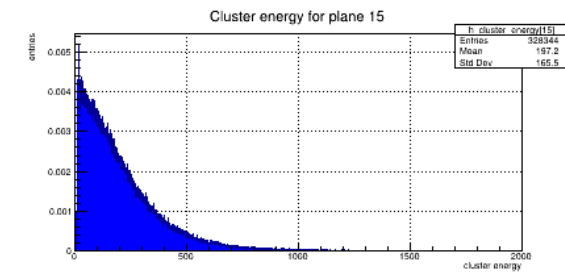
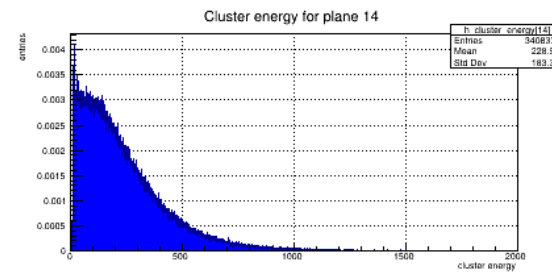
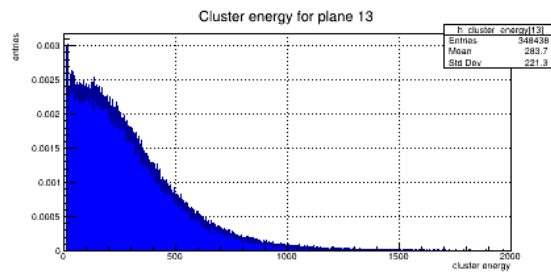
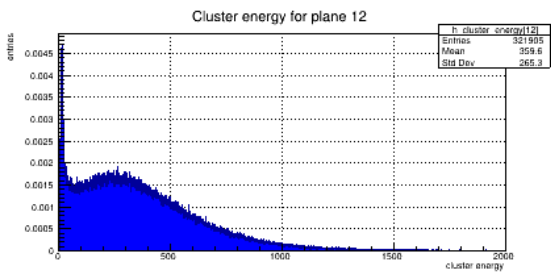
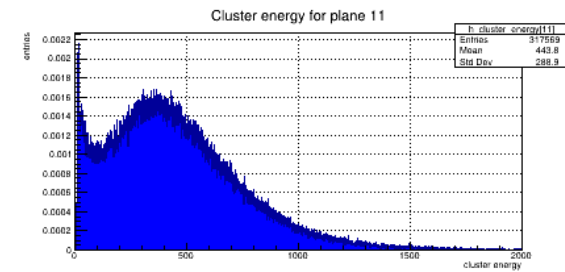
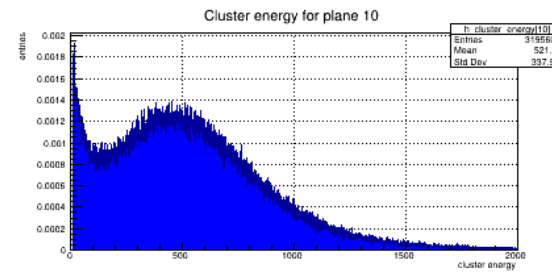
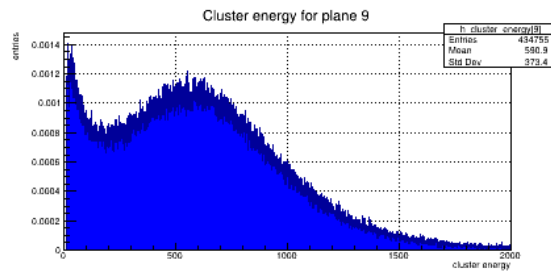
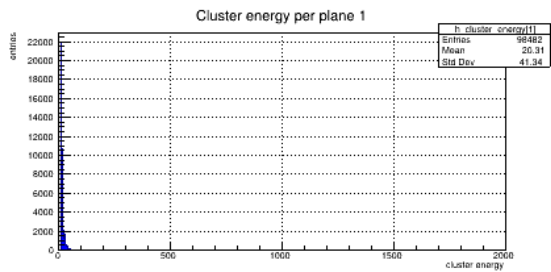
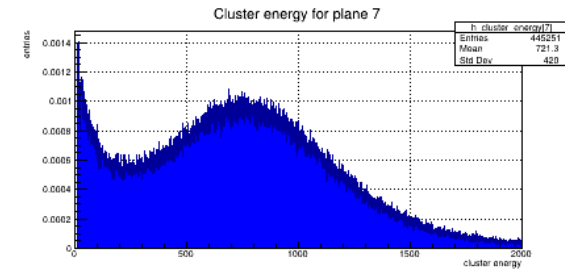
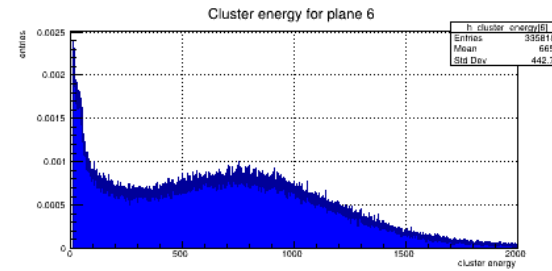
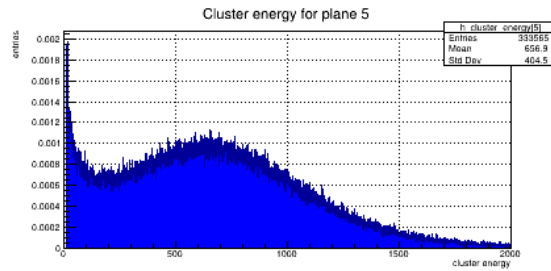
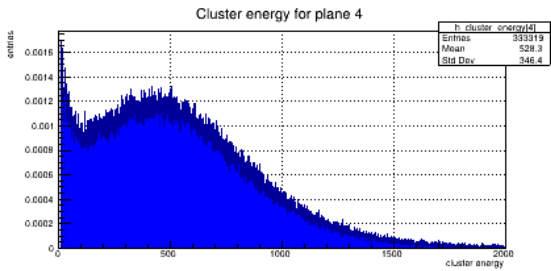
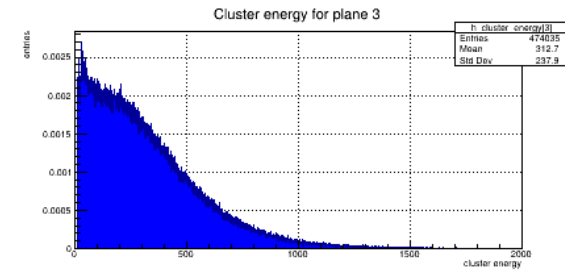
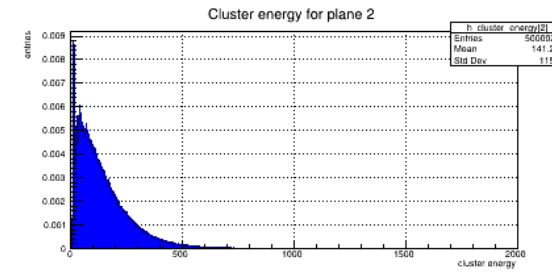
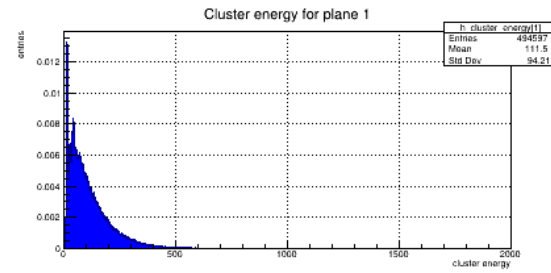
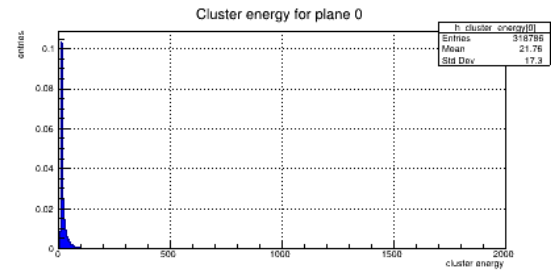
Cluster distance vs energy



CLUSTER ENERGY

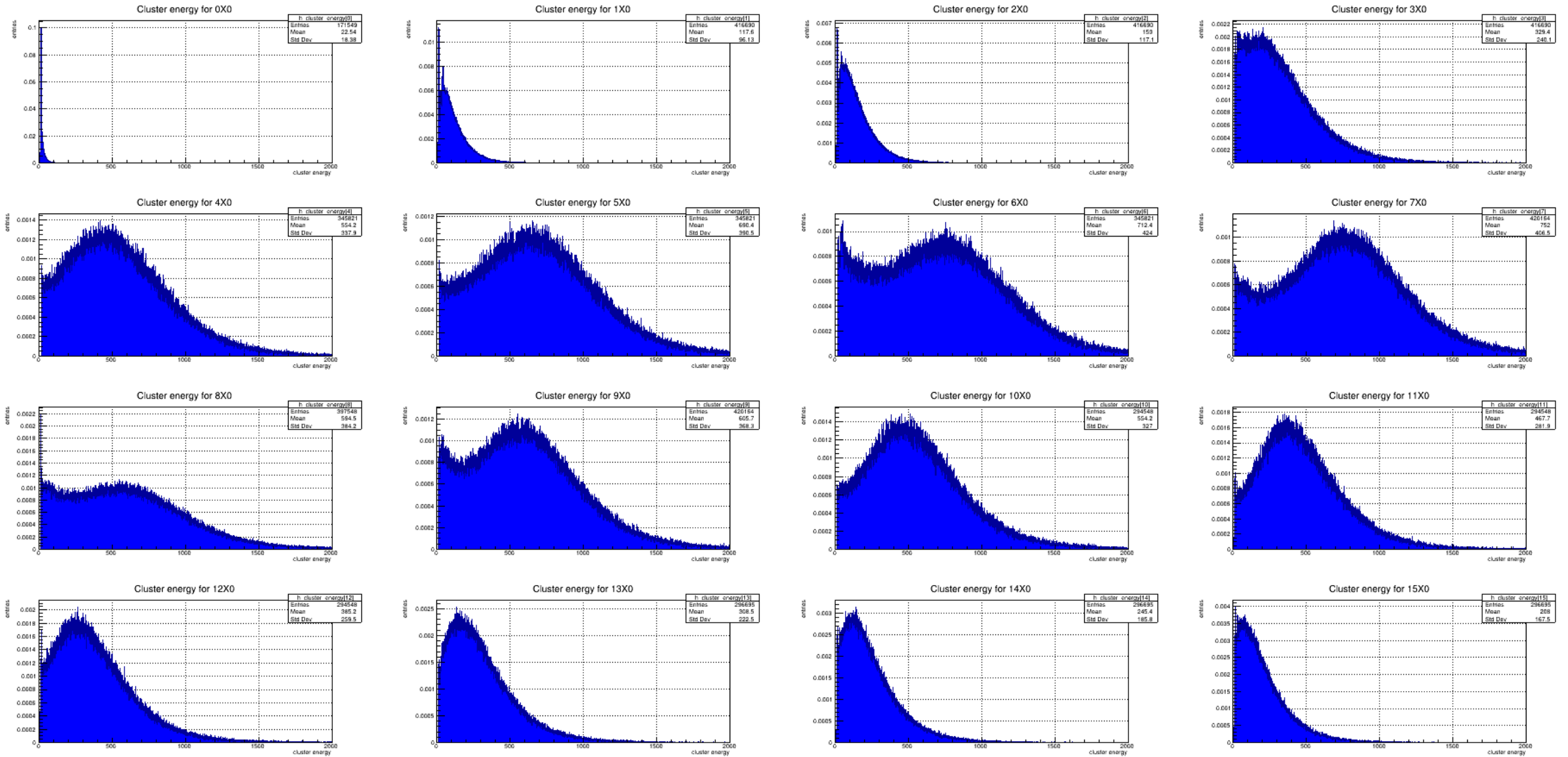
Cuts: No cuts

CLUSTER ENERGY ANALYSIS



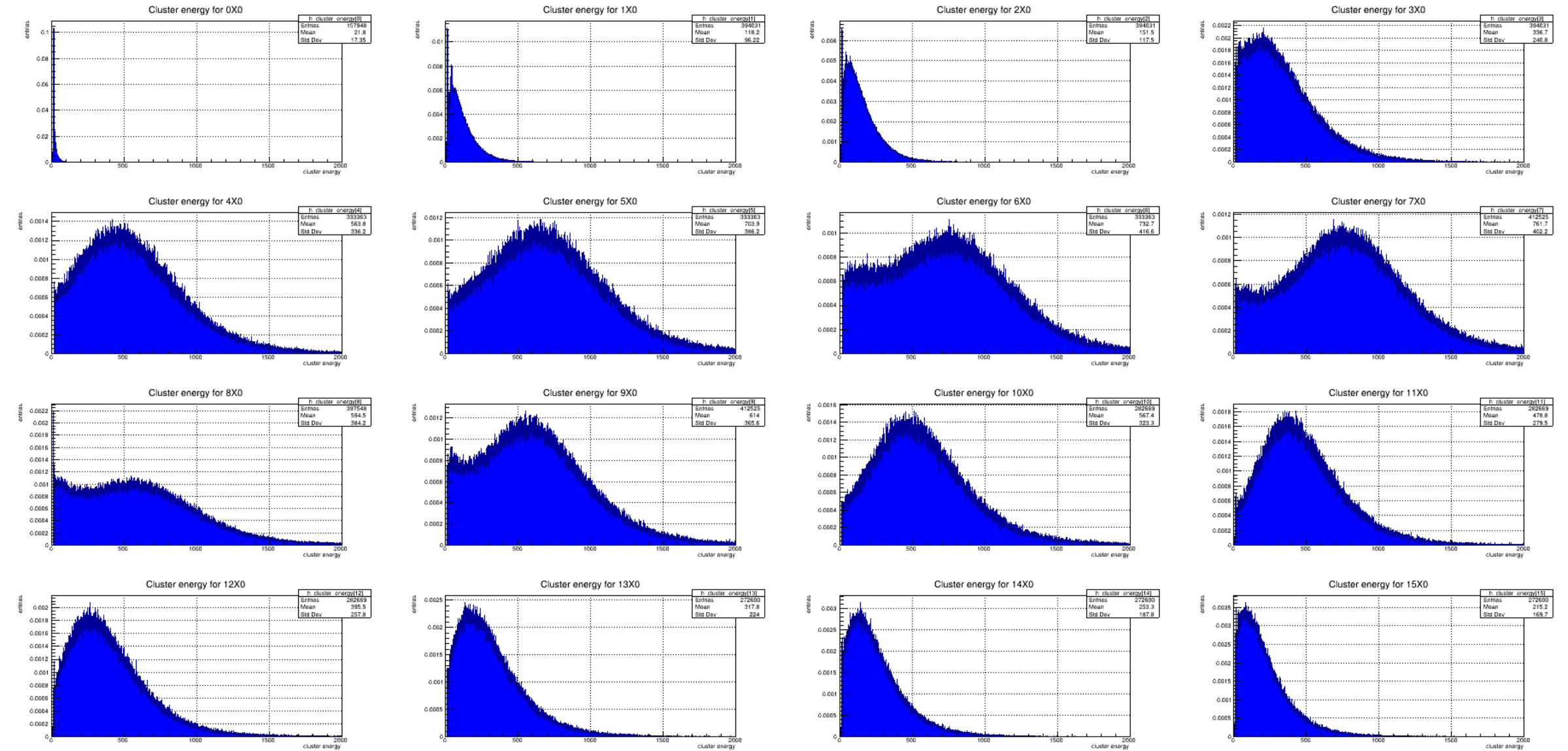
Cuts: - Full events only

CLUSTER ENERGY ANALYSIS



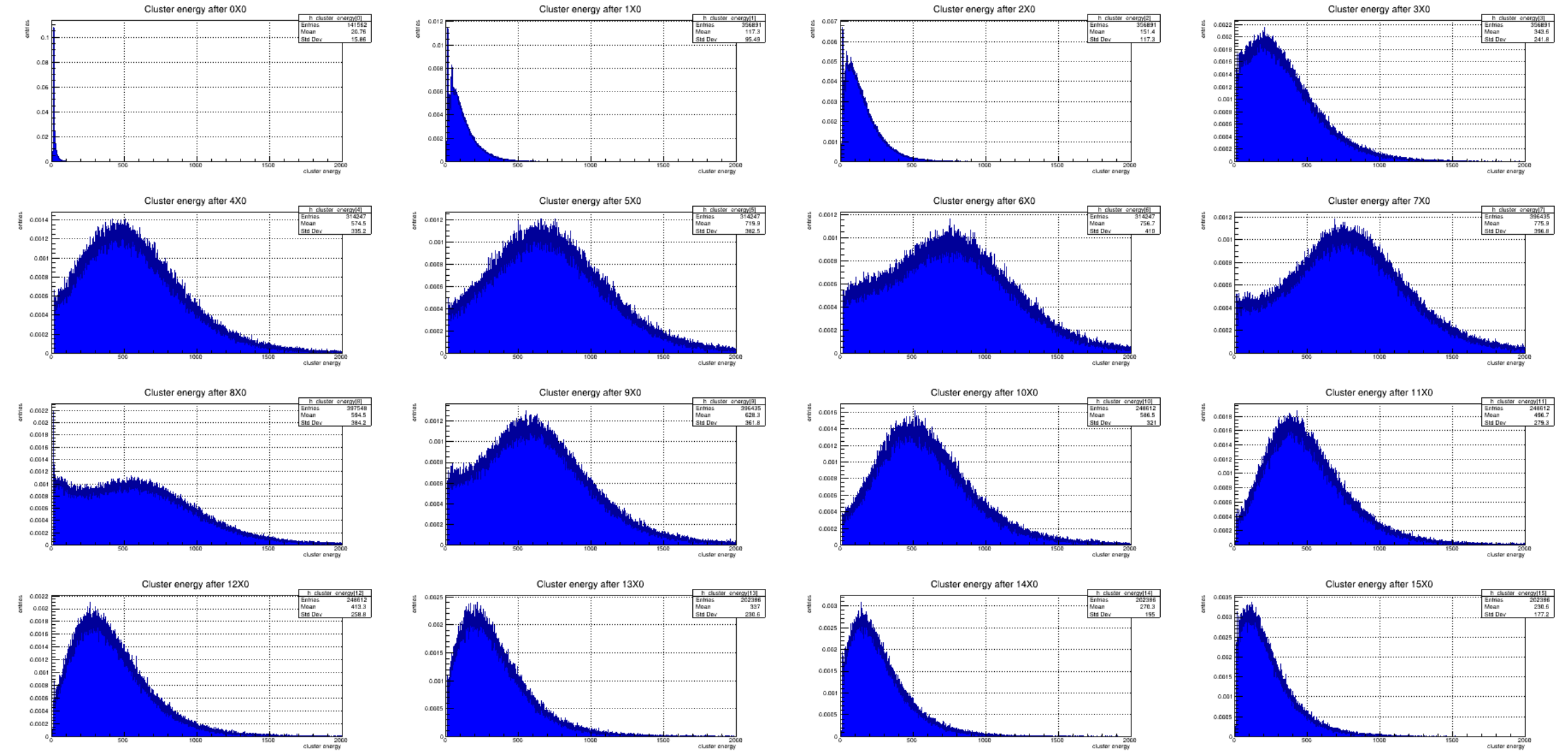
Cuts: - Full events only - Distance: $D_y < 10$ pads

CLUSTER ENERGY ANALYSIS



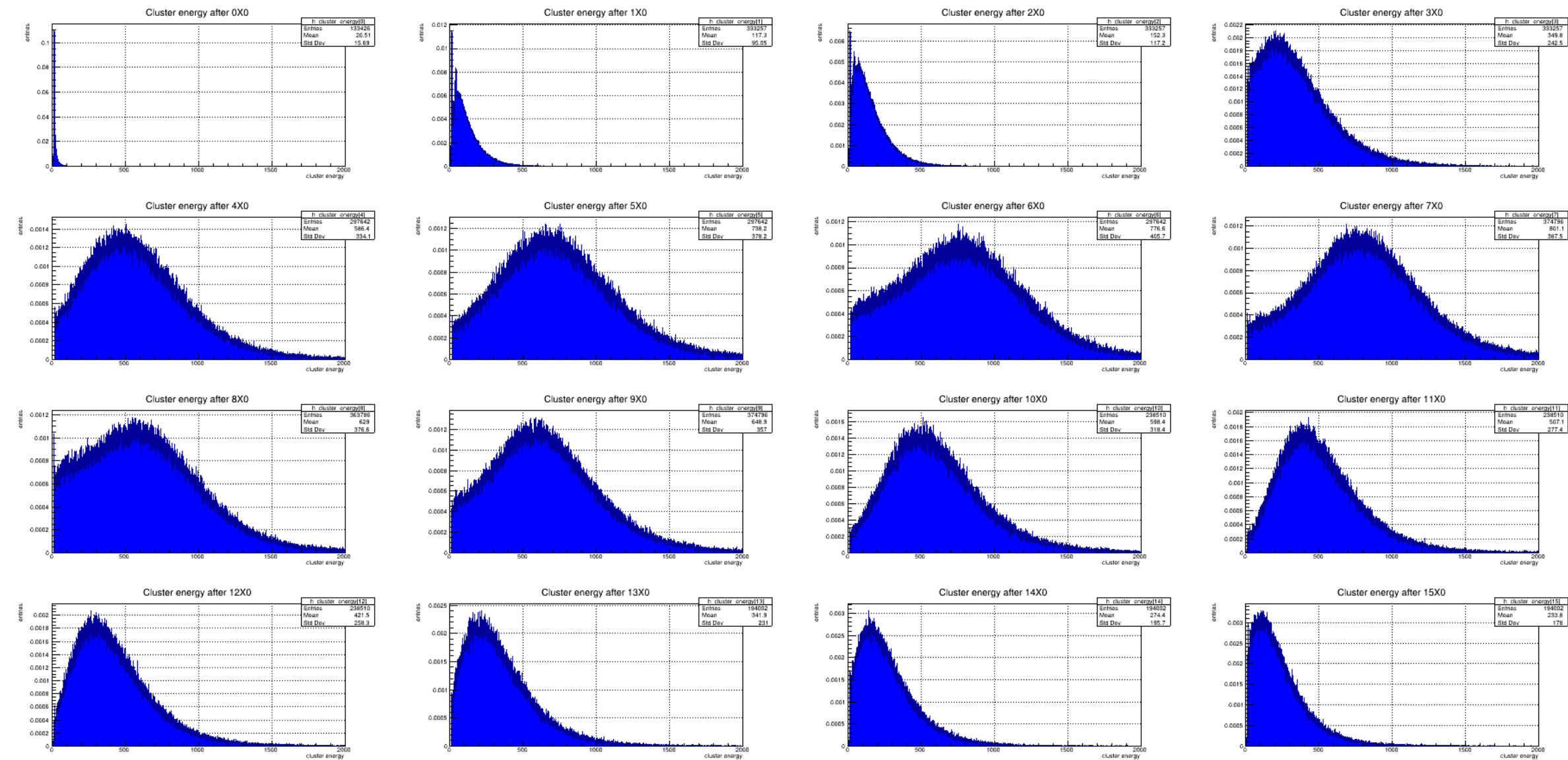
Cuts: - Full events only - Distance: $D_y < 5$ pads

CLUSTER ENERGY ANALYSIS



CLUSTER ENERGY ANALYSIS

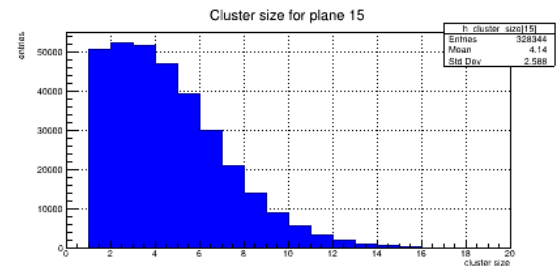
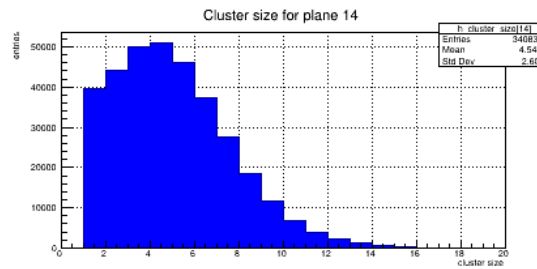
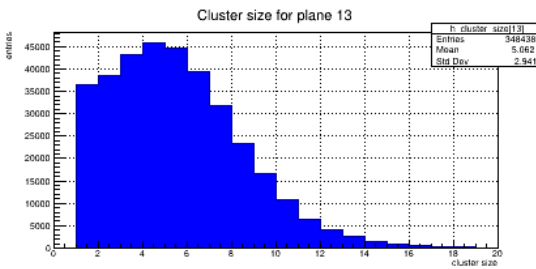
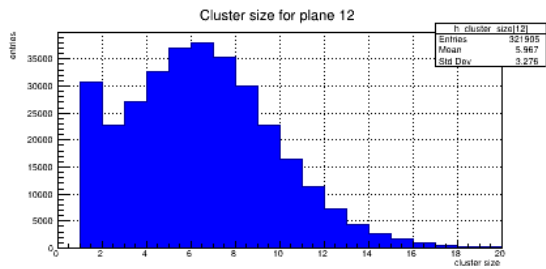
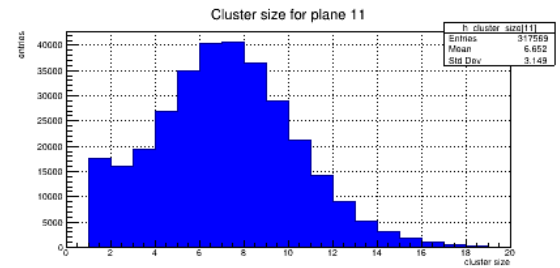
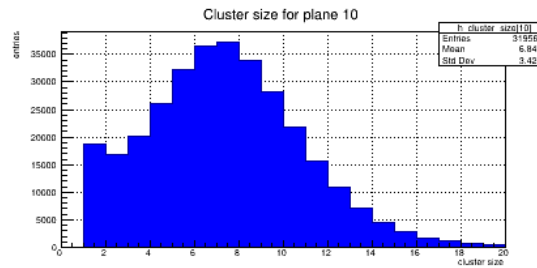
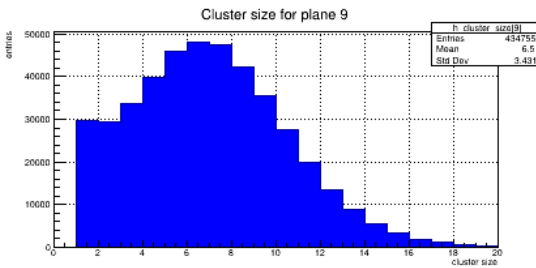
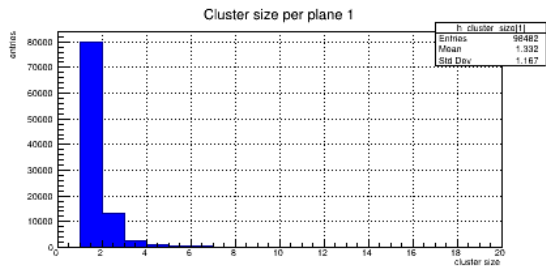
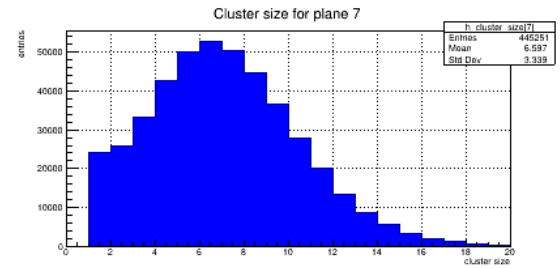
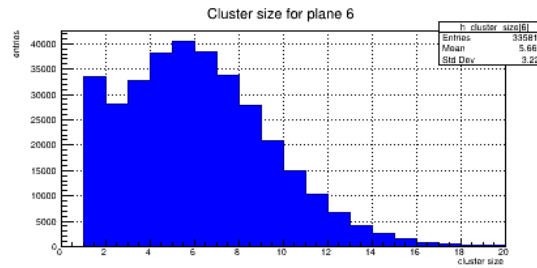
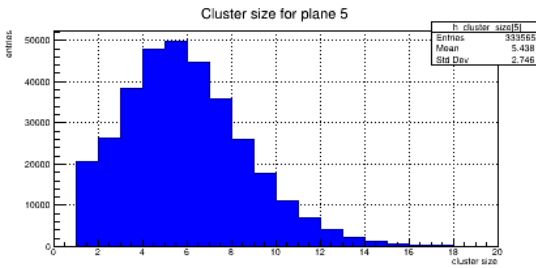
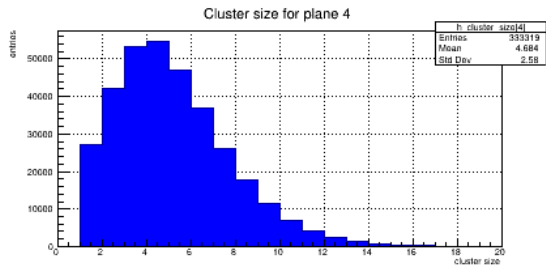
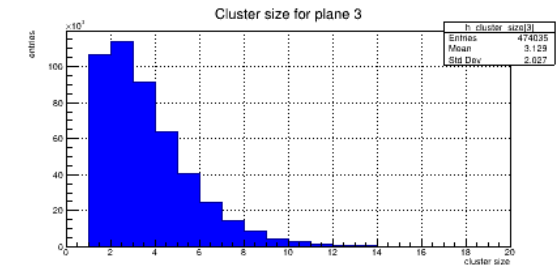
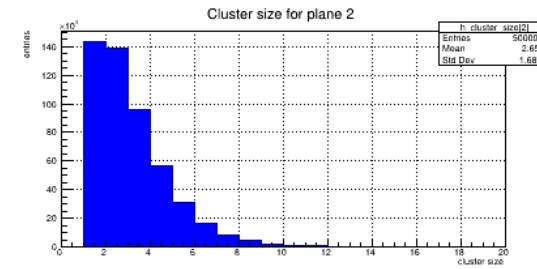
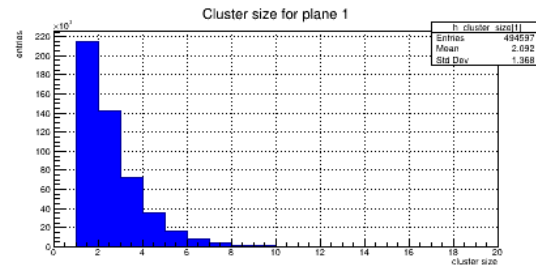
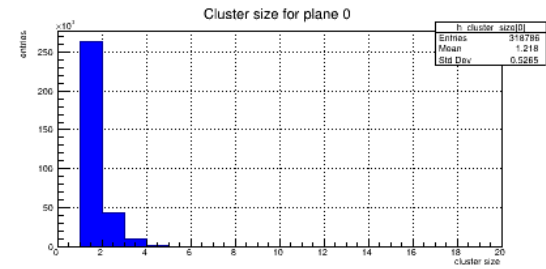
Cuts: - Full events only - Distance: $D_y < 5$ pads
 - Position: $-45 < Y < -28$



CLUSTER SIZE

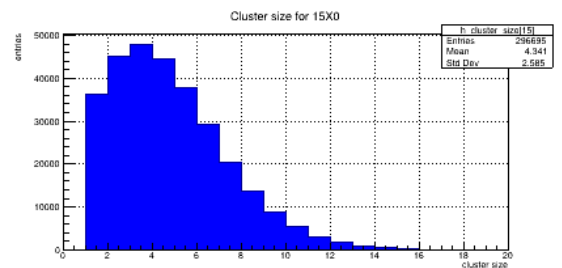
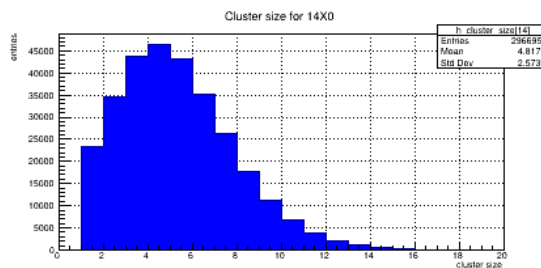
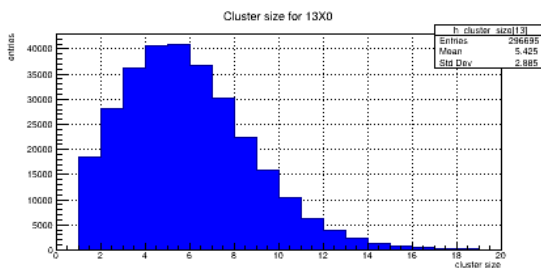
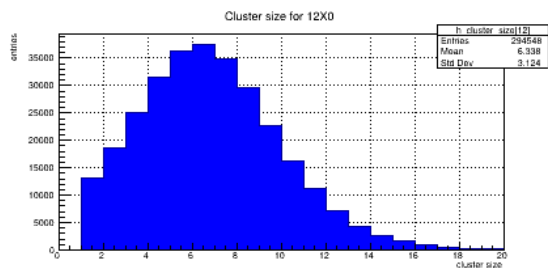
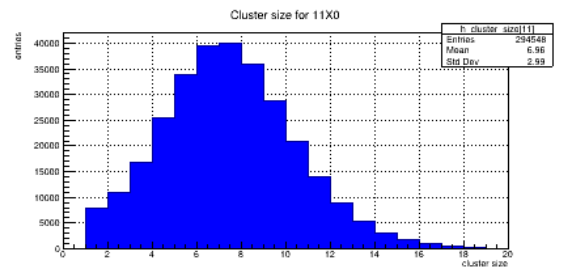
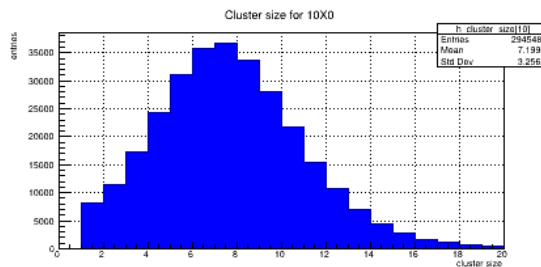
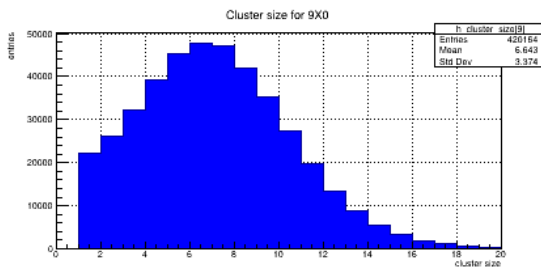
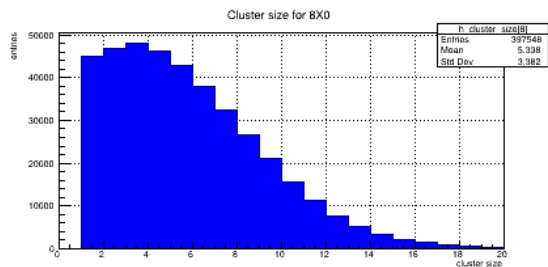
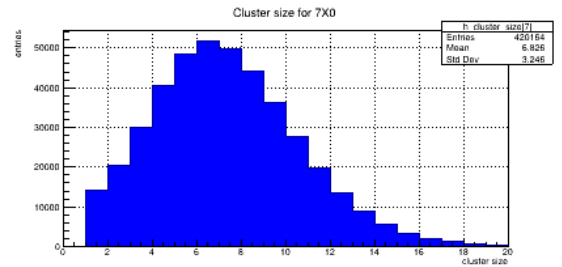
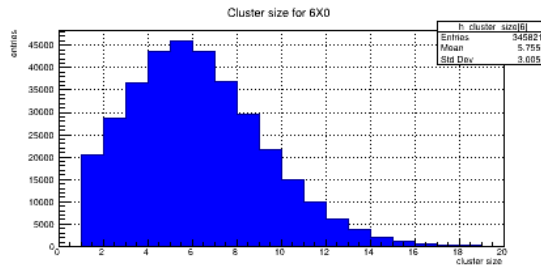
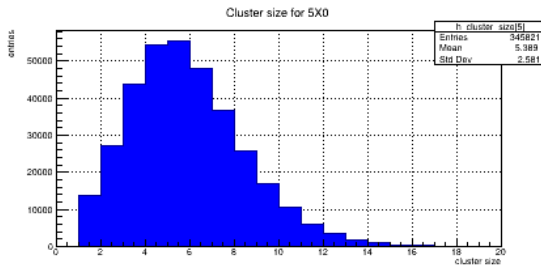
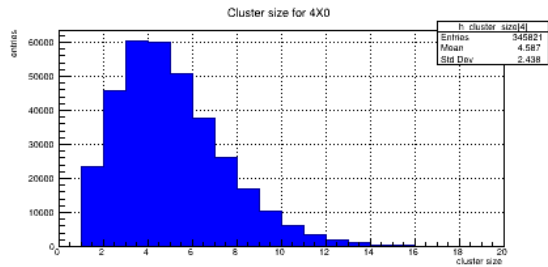
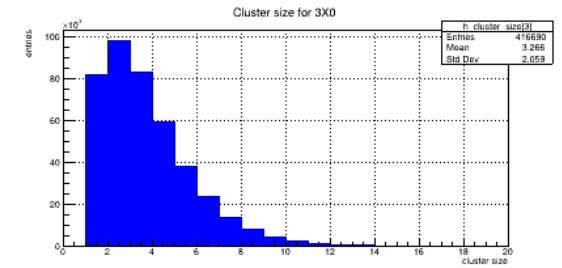
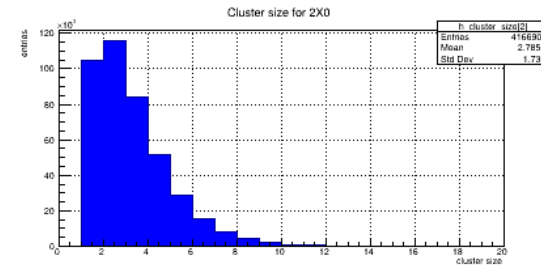
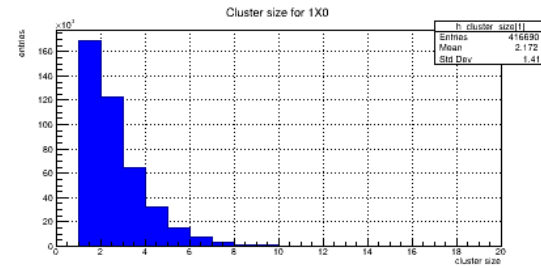
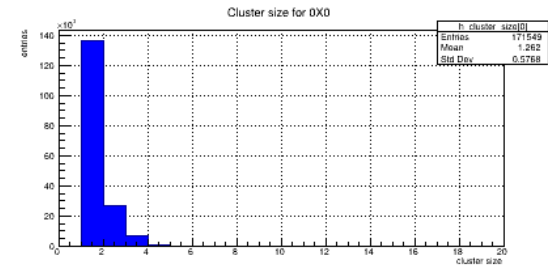
Cuts: No cuts

CLUSTER SIZE ANALYSIS



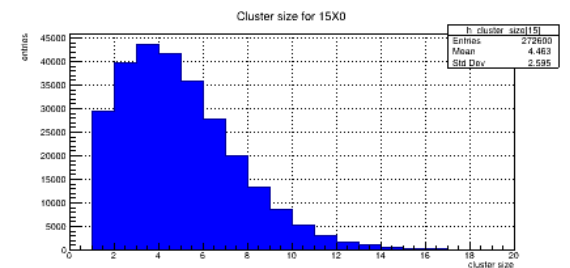
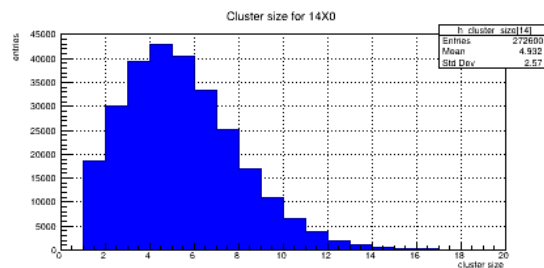
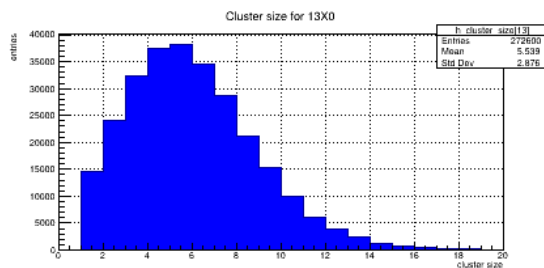
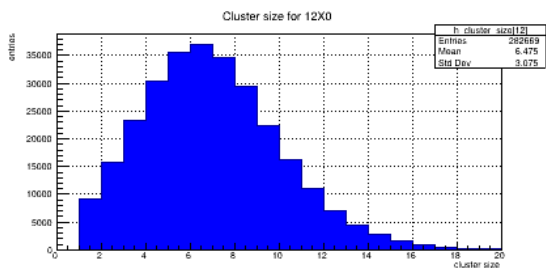
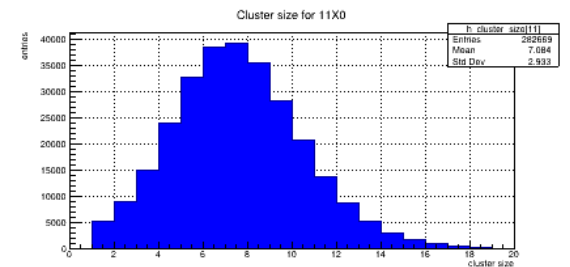
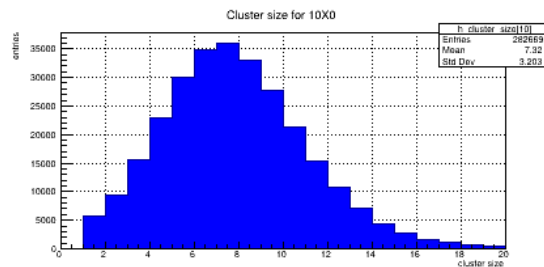
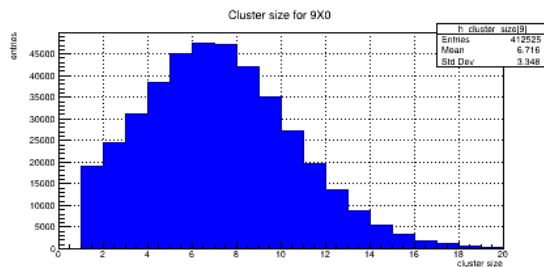
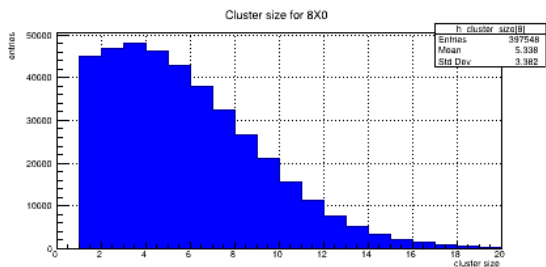
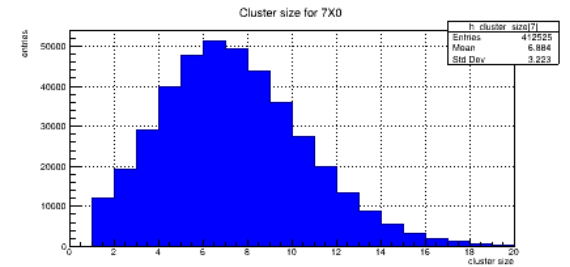
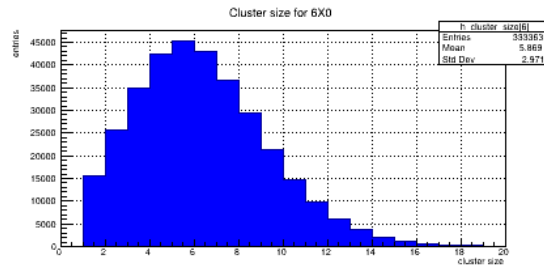
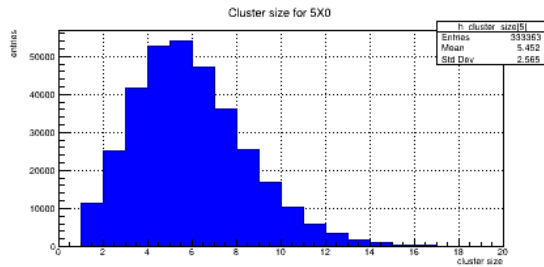
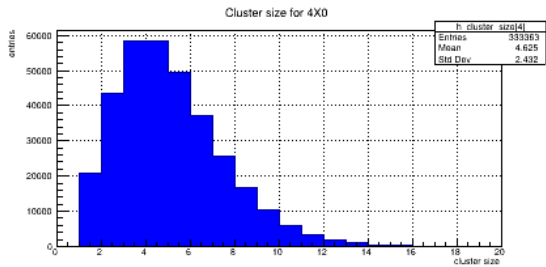
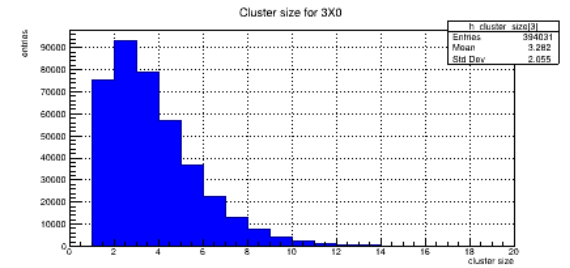
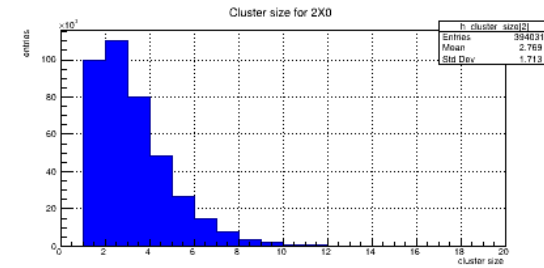
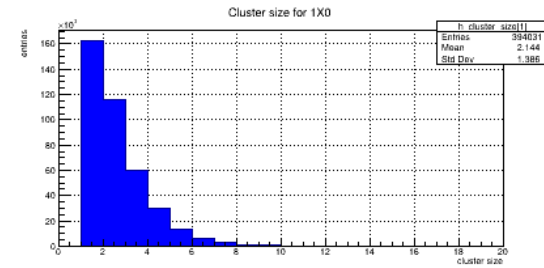
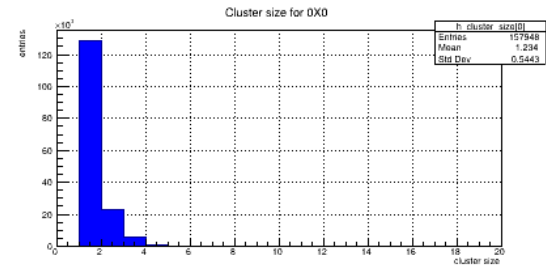
Cuts: - Full events only

CLUSTER SIZE ANALYSIS



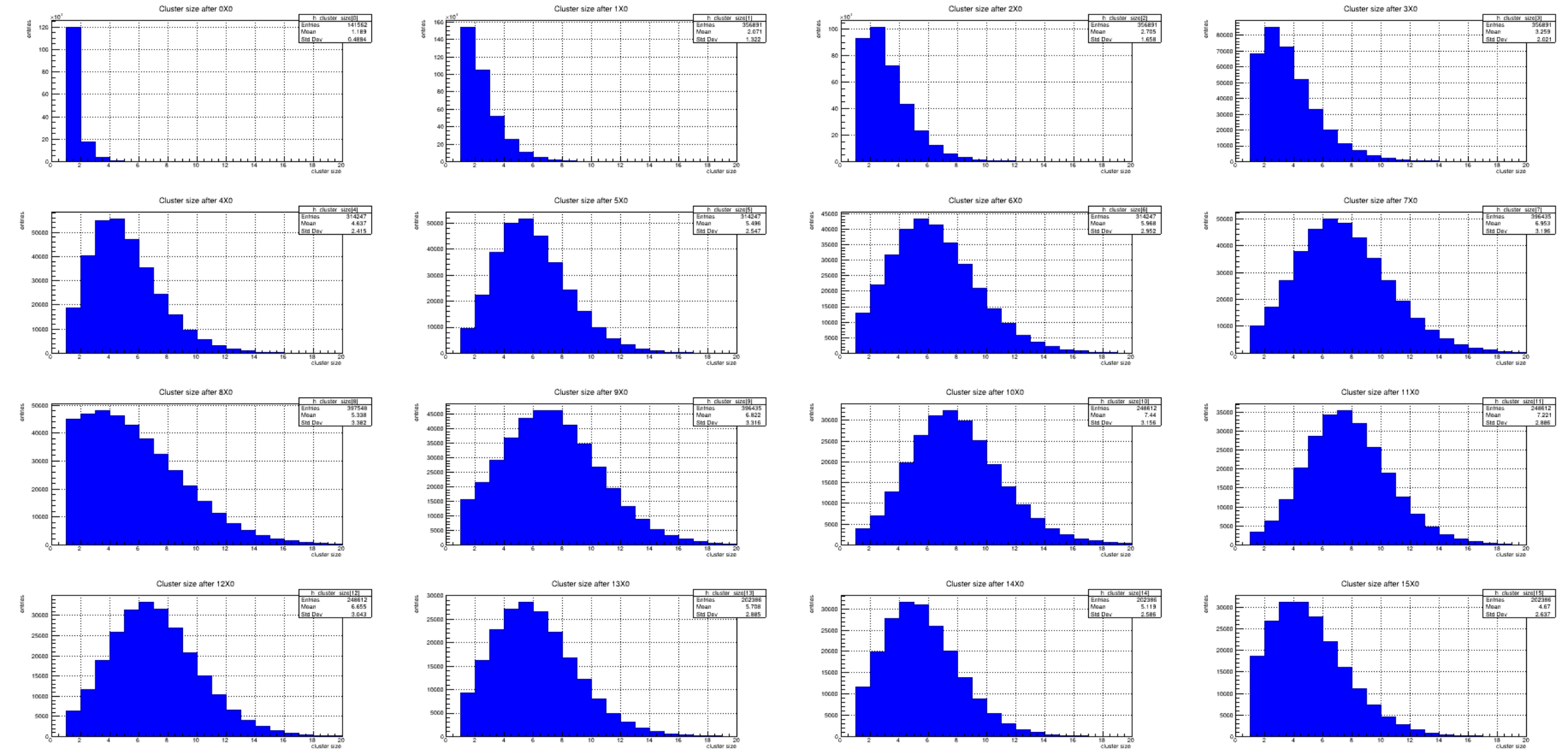
Cuts: - Full events only - Distance: $D_y < 10$ pads

CLUSTER SIZE ANALYSIS



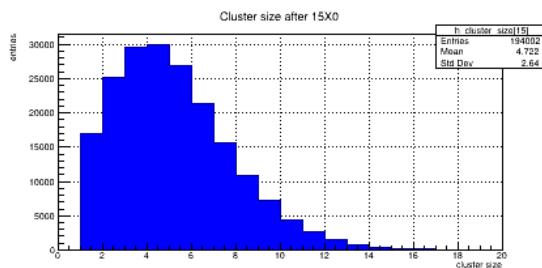
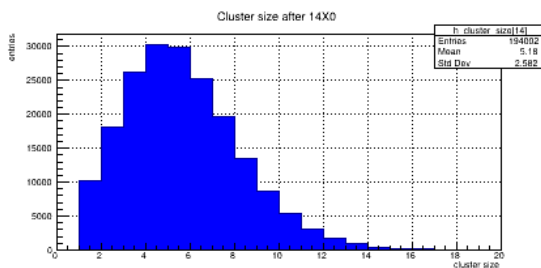
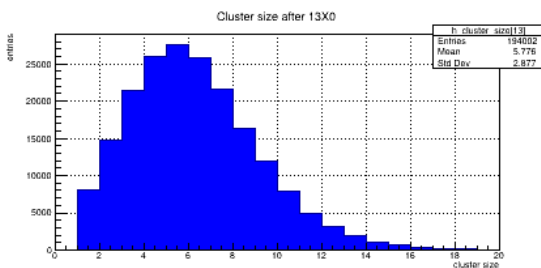
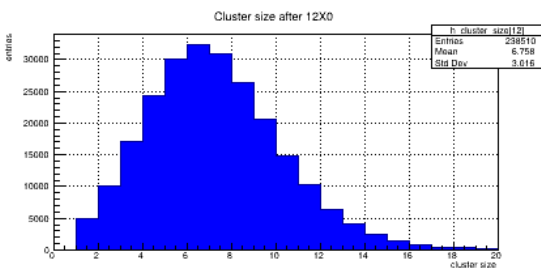
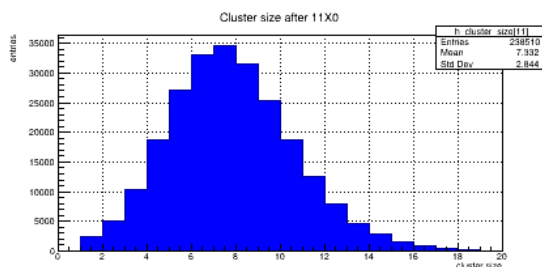
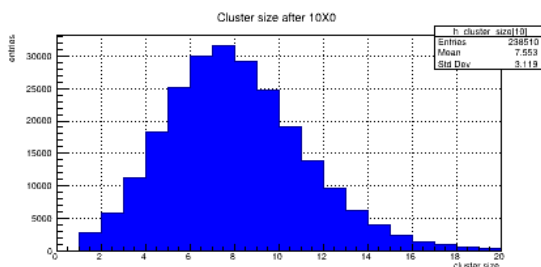
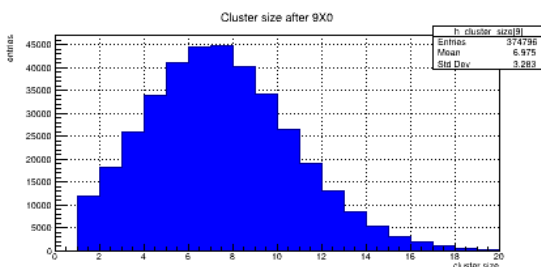
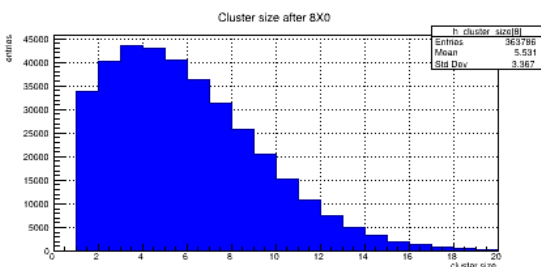
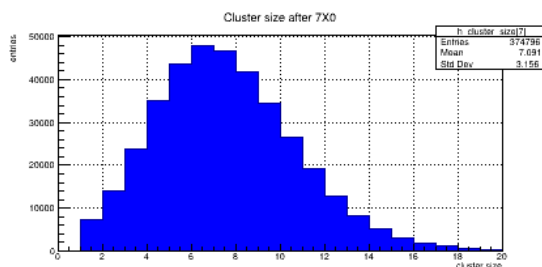
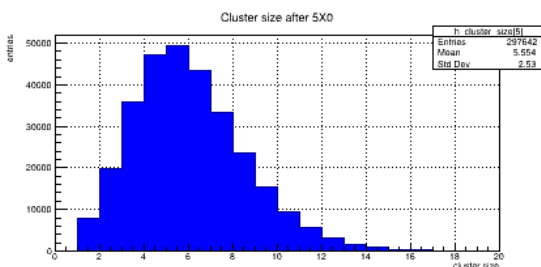
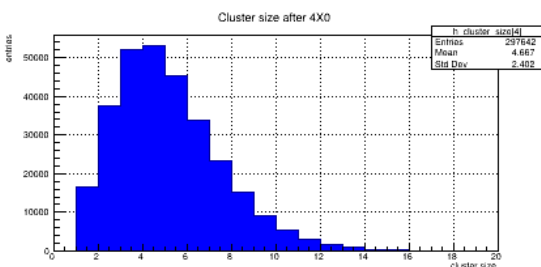
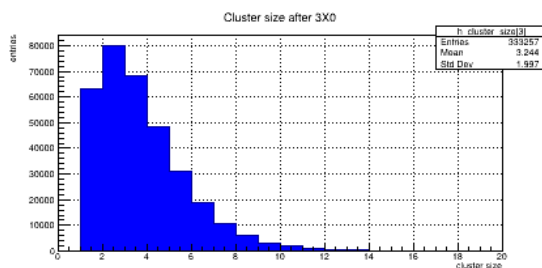
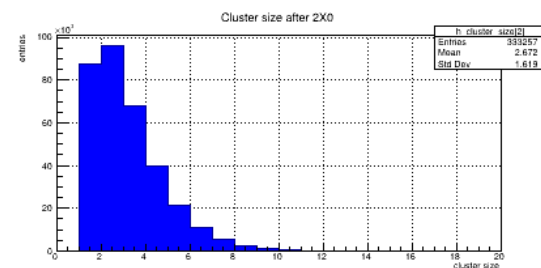
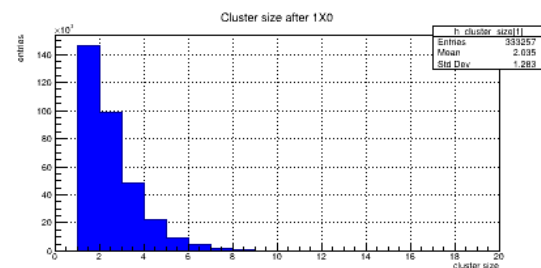
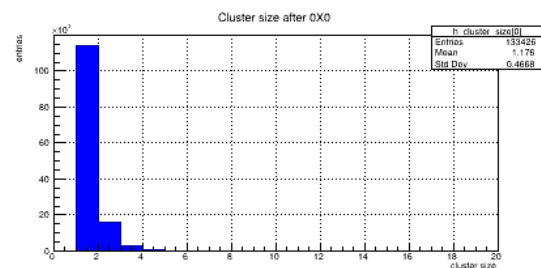
Cuts: - Full events only - Distance: $D_y < 5$ pads

CLUSTER SIZE ANALYSIS



CLUSTER SIZE ANALYSIS

Cuts: - Full events only - Distance: $D_y < 5$ pads
 - Position: $-45 < Y < -28$

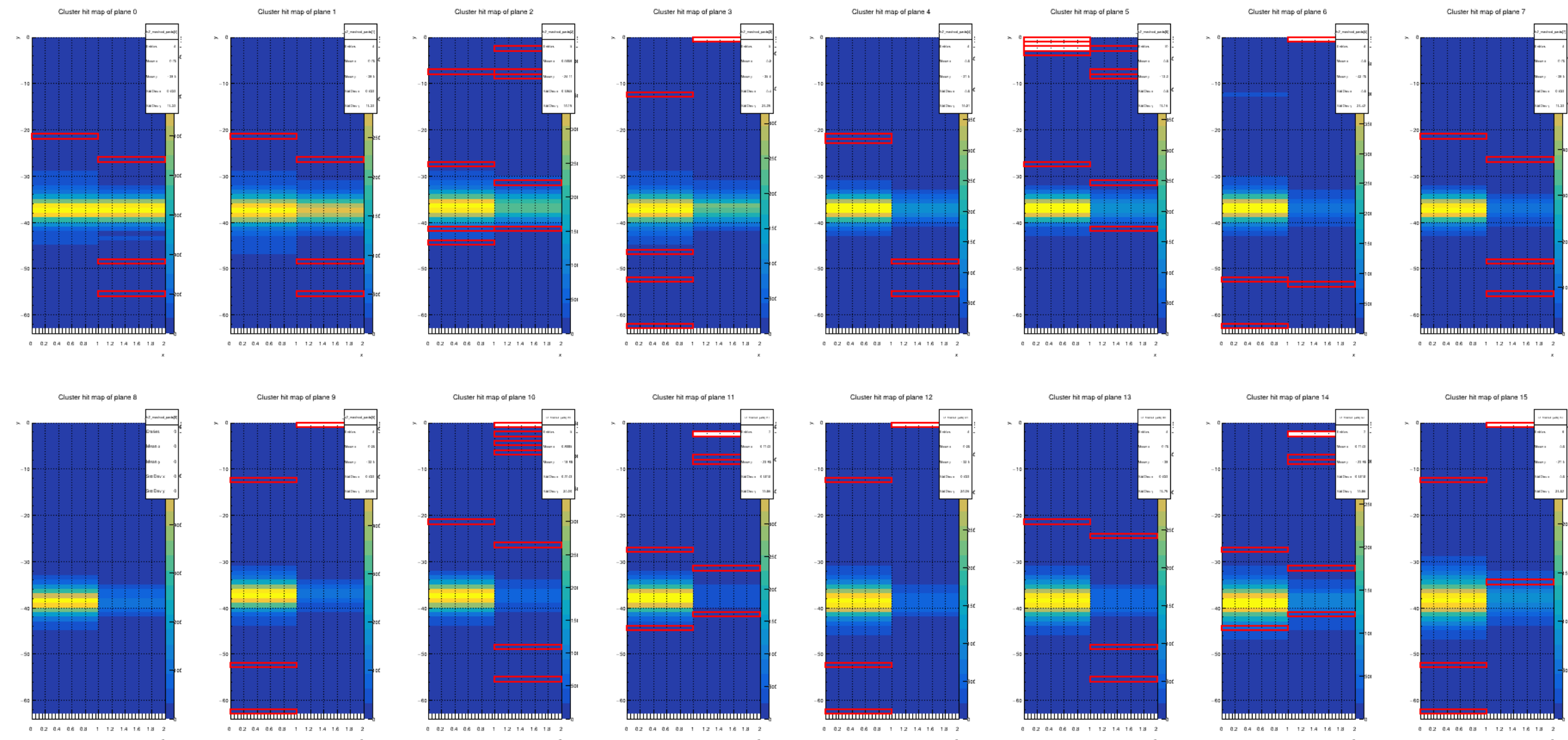


CLUSTER POSITION

CLUSTER POSITION PER PLANE

Before cuts

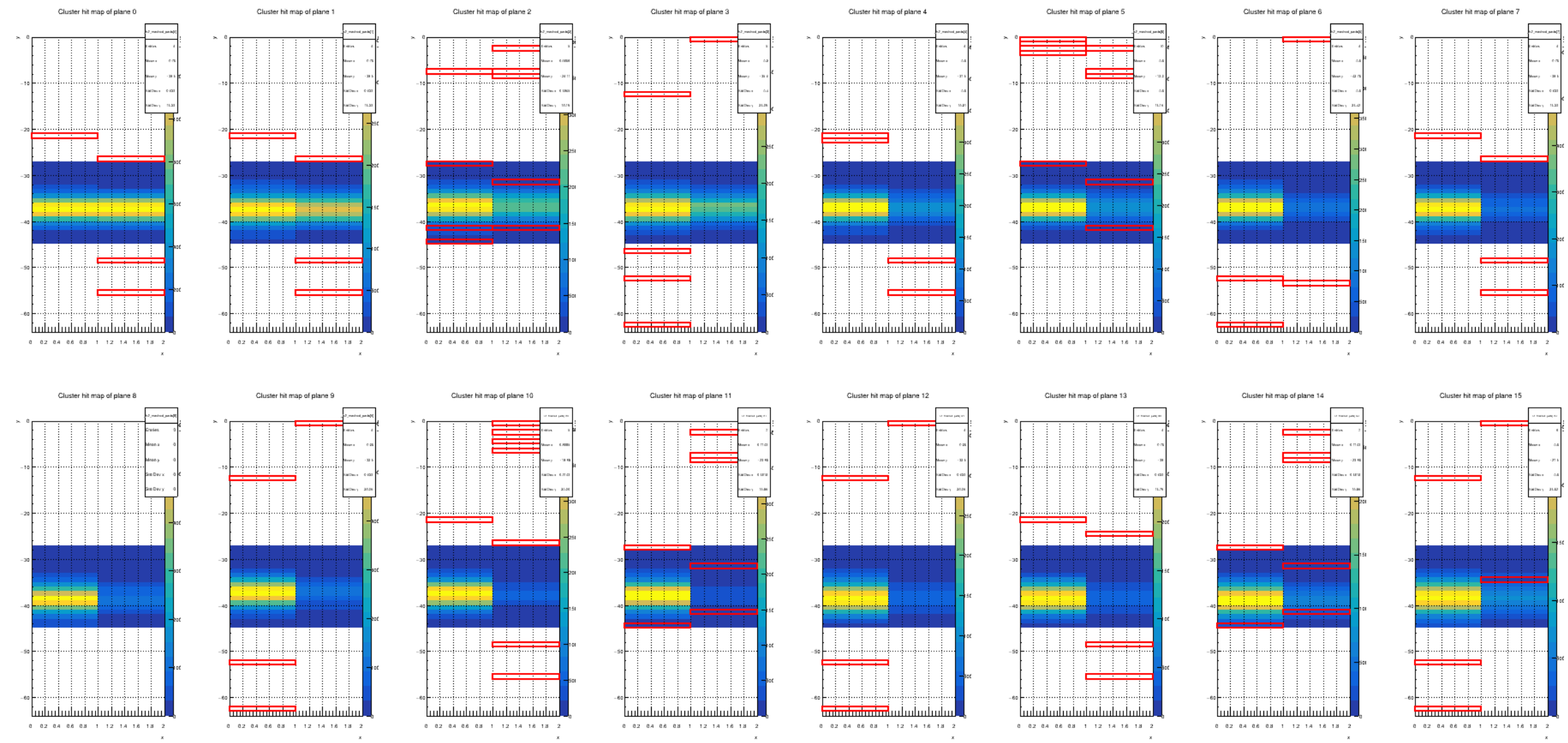
 = Masked pads



CLUSTER POSITION PER PLANE

After cuts

 = Masked pads



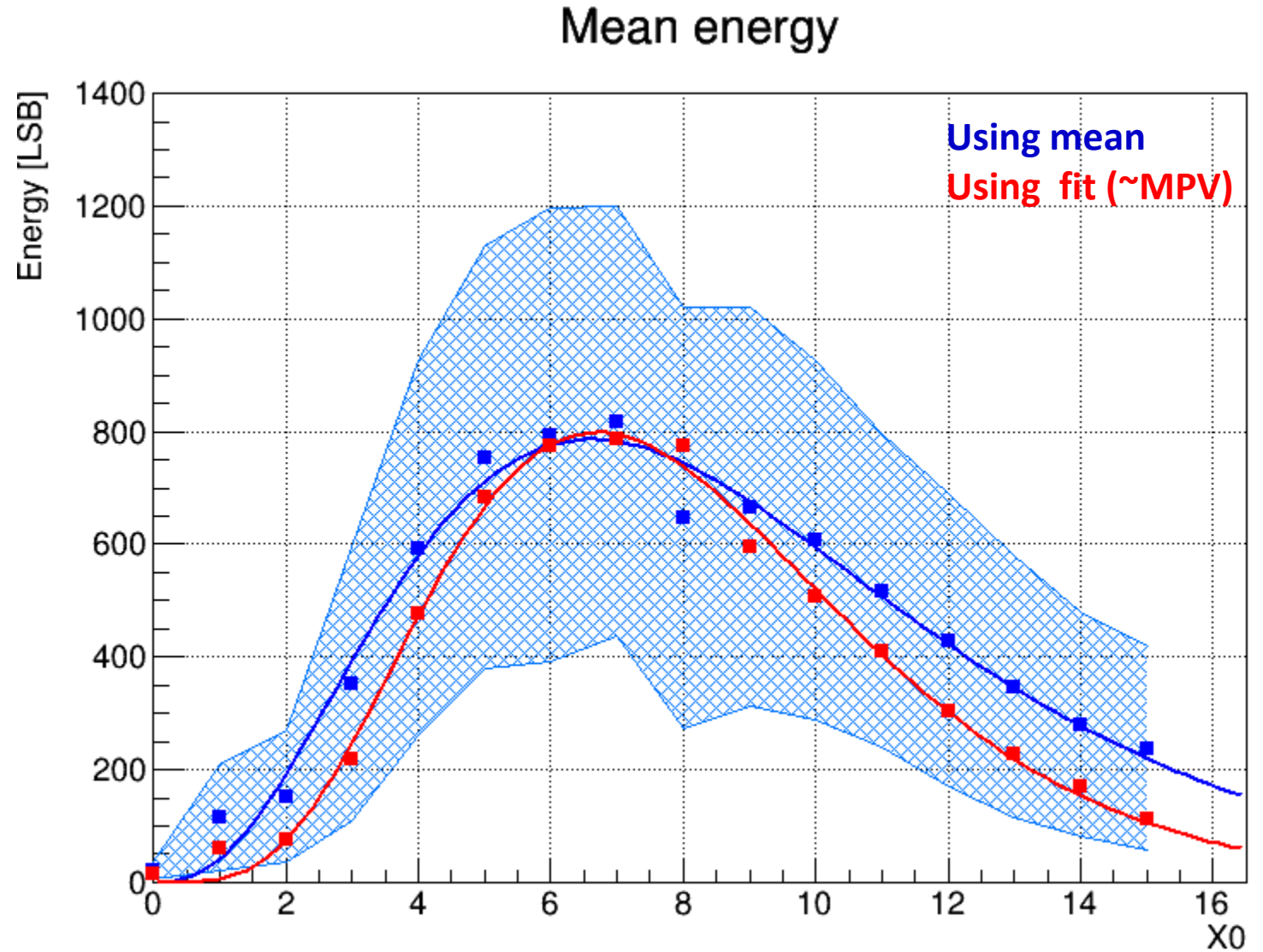
CLUSTER ENERGY ANALYSIS

➤ Updated longitudinal energy distribution → no major difference

➤ The maximum energy deposition for 5 GeV electrons at around $7X_0$
→ as expected

➤
$$\frac{dE}{dt} = E_0 t^\alpha \exp(-\beta t)$$

where $t = x/X_0$



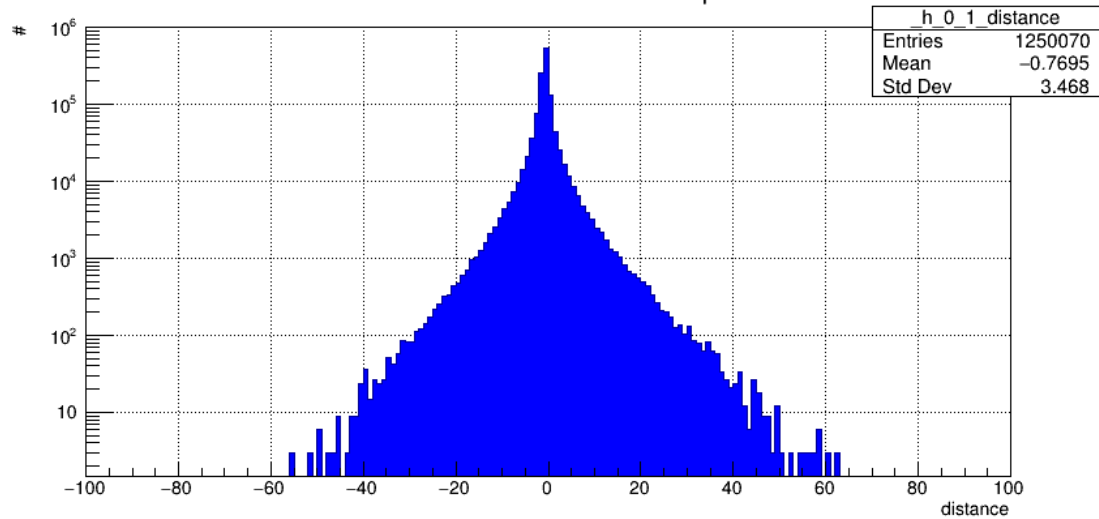
CONCLUSIONS

- **Origin of the empty frames should be investigated further**
- **Current set of cuts cleans well the sample and at the same time do not bias the sample**
- **Exact cut values still can be tuned**
- **What next ?**
 - other energies
 - Molière radius
 - ????

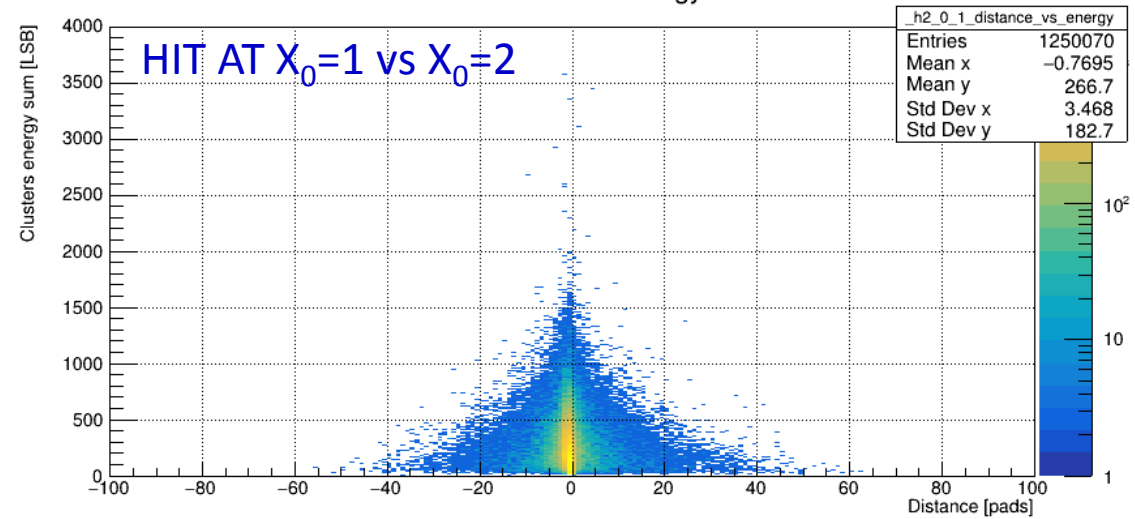
THANK YOU FOR ATTENTION

CLUSTERS DISTANCE (CONF A)

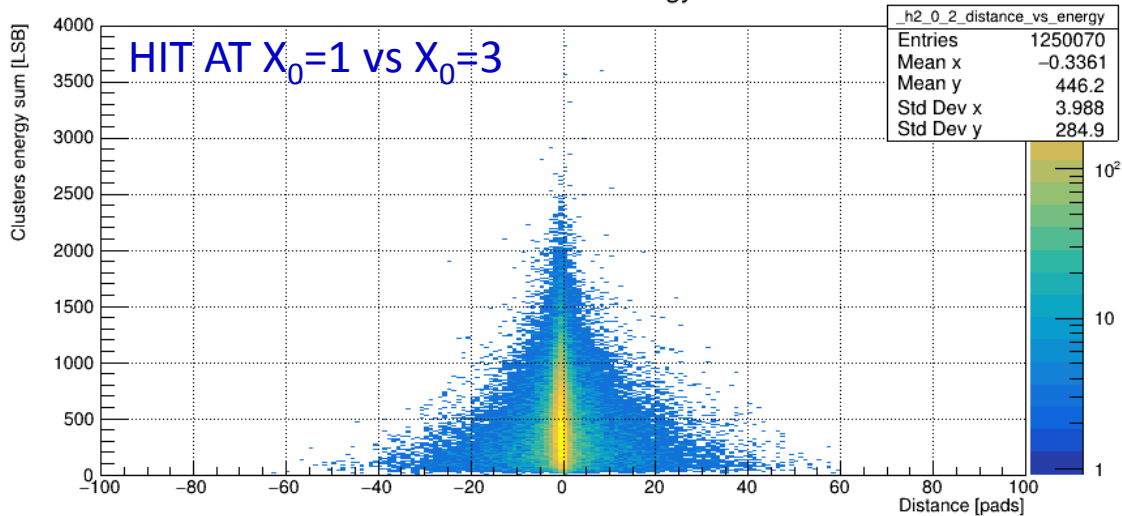
Distance between clusters Y pos



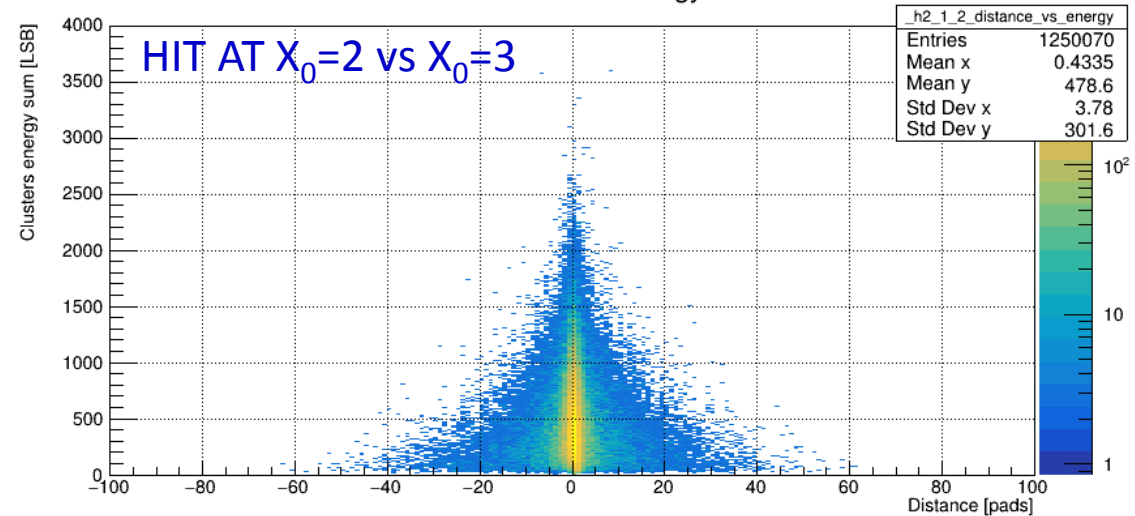
Cluster distance vs energy sum



Cluster distance vs energy sum

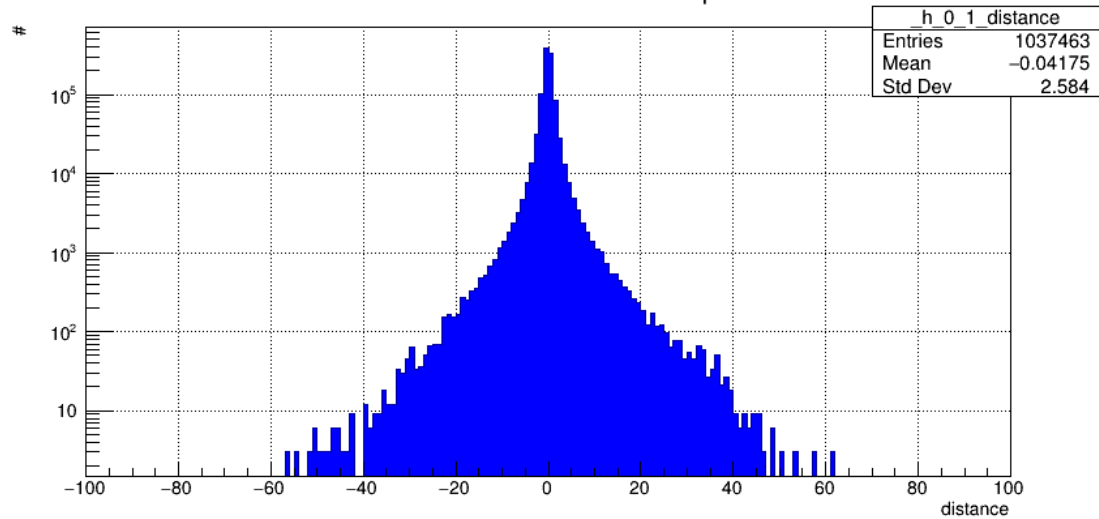


Cluster distance vs energy sum

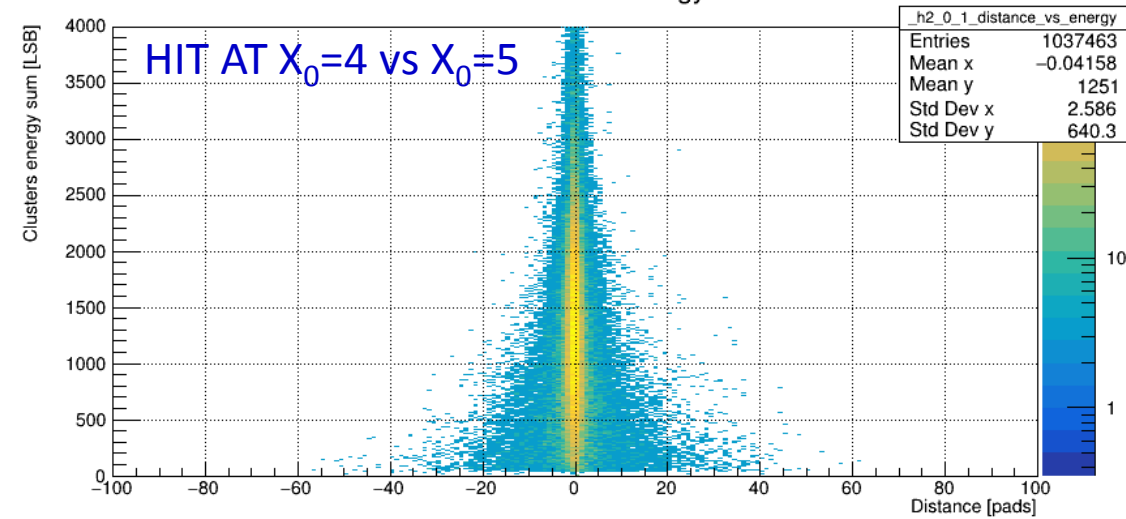


CLUSTERS DISTANCE (CONF B)

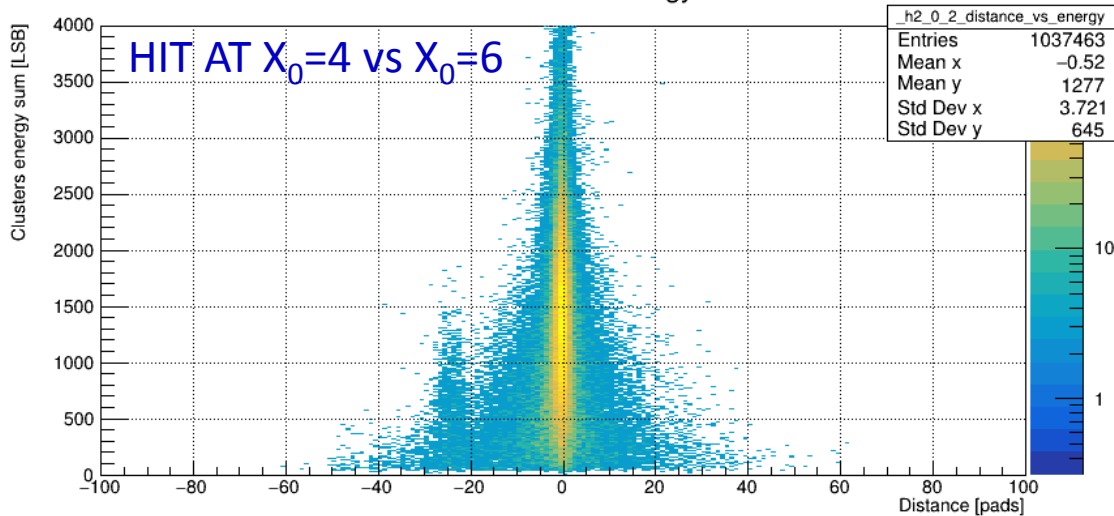
Distance between clusters Y pos



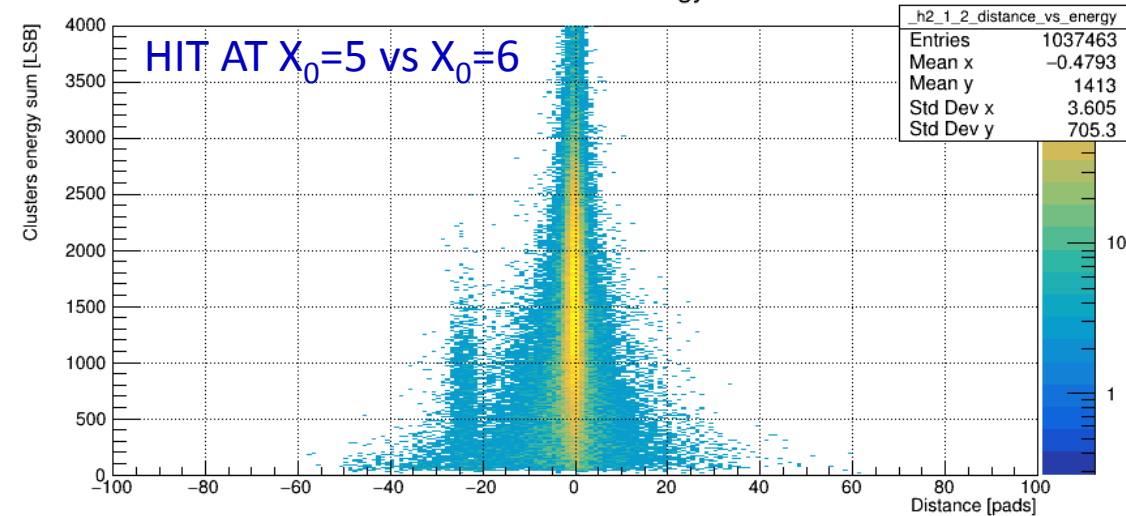
Cluster distance vs energy sum



Cluster distance vs energy sum

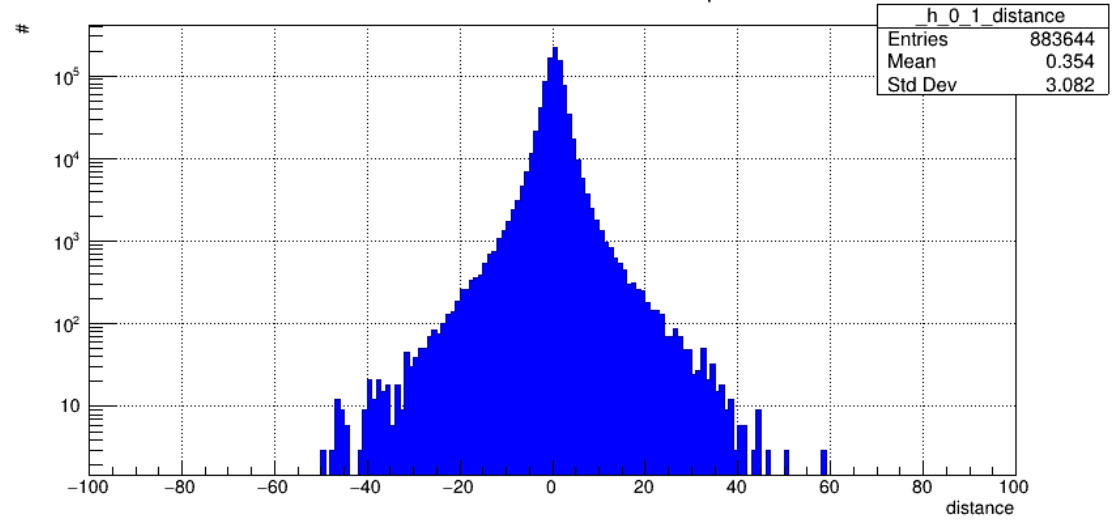


Cluster distance vs energy sum

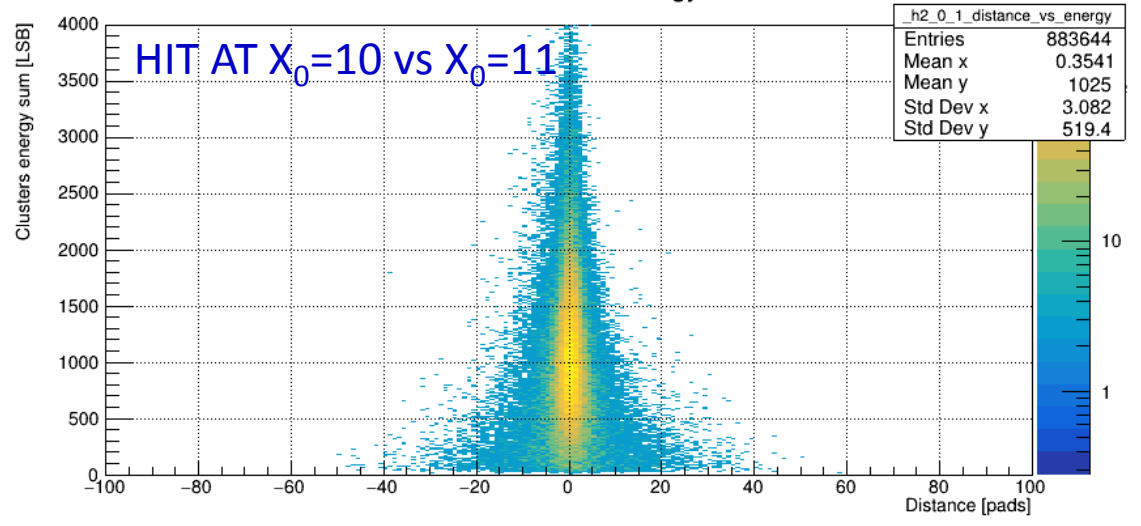


CLUSTERS DISTANCE (CONF D)

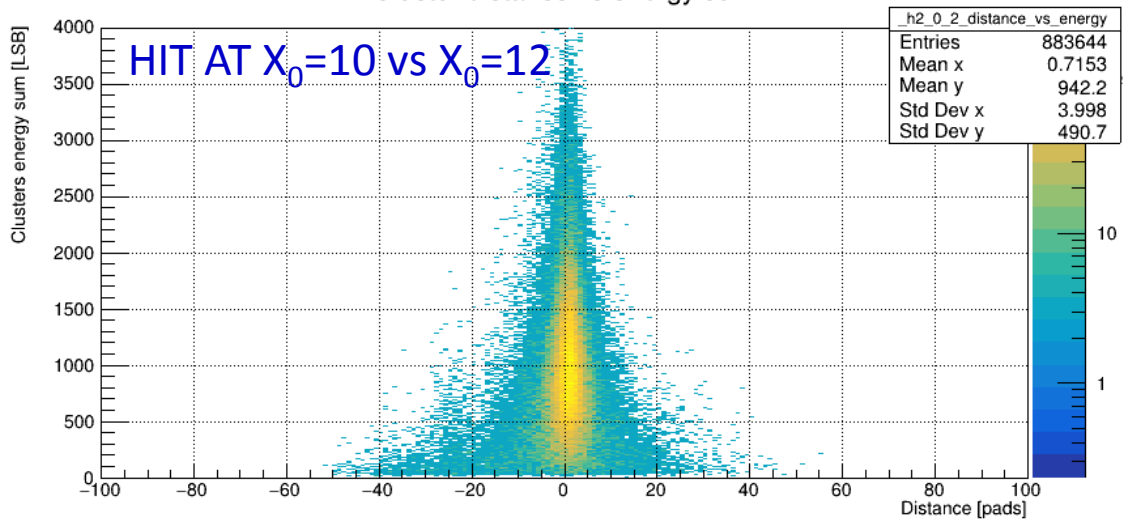
Distance between clusters Y pos



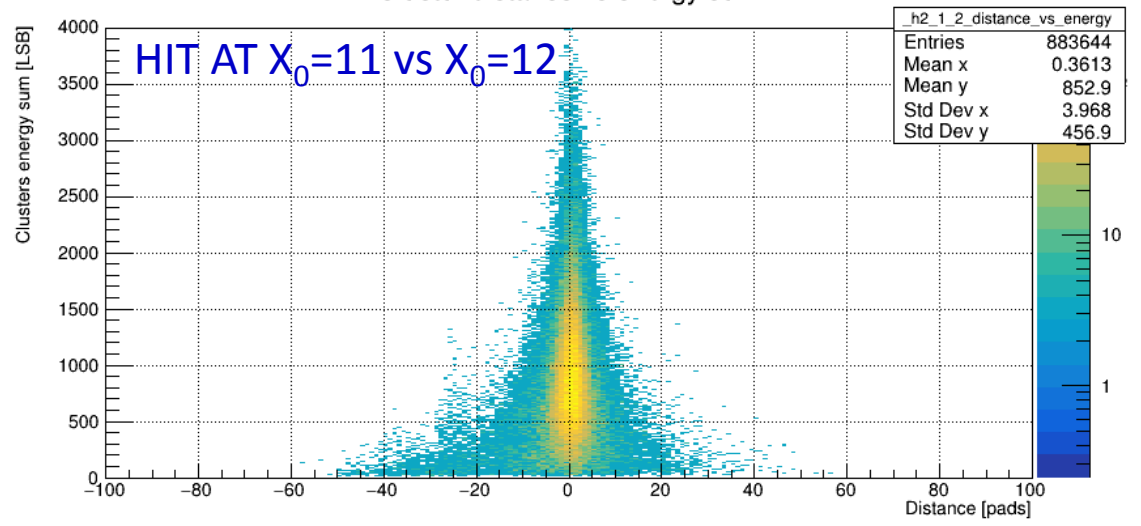
Cluster distance vs energy sum



Cluster distance vs energy sum

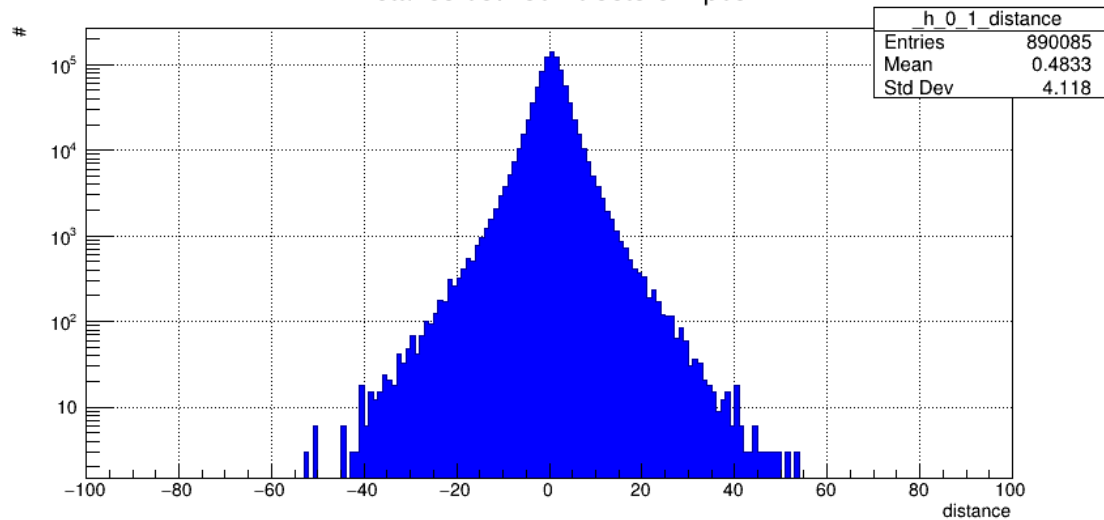


Cluster distance vs energy sum

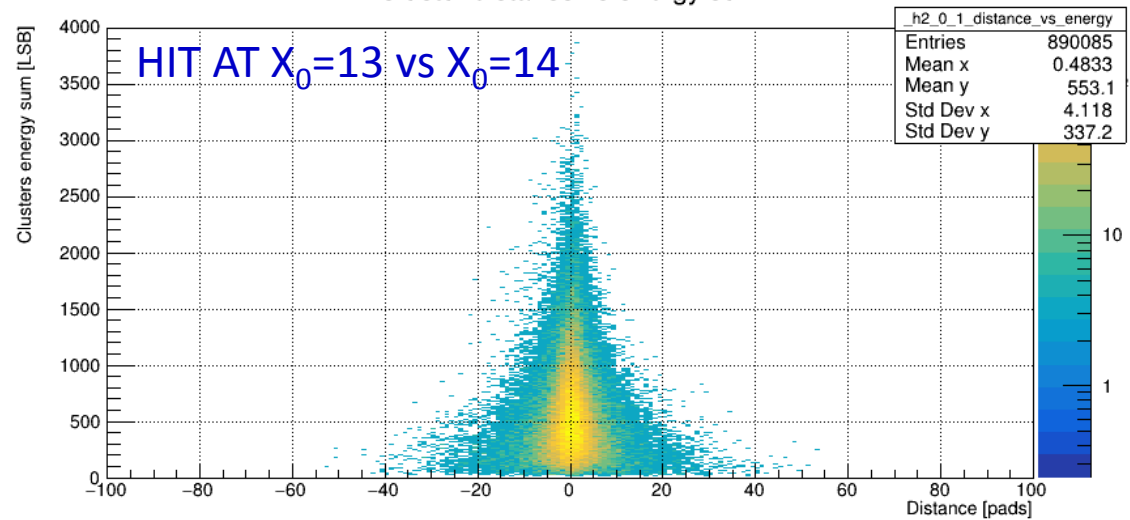


CLUSTERS DISTANCE (CONF E)

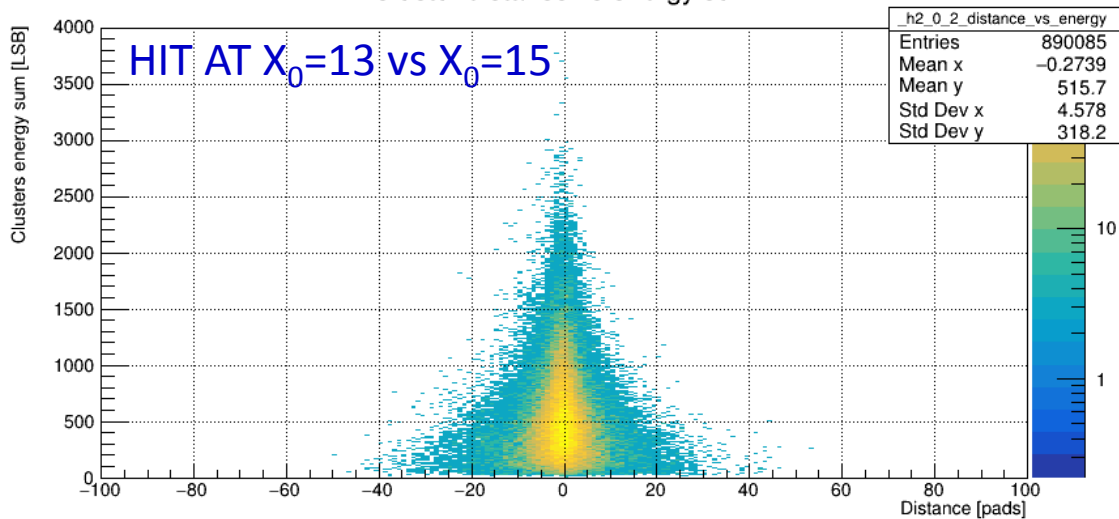
Distance between clusters Y pos



Cluster distance vs energy sum



Cluster distance vs energy sum



Cluster distance vs energy sum

