OVERVIEW OF THE WORK

TileCal Valencia Meeting

19th May 2009

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Motivation

The current optimization of topo-clusters (4,2,0) was obtained with MC and it has to revised **with real data**.

WHY?

NOISE UNCERTAINTY!!

Since all thresholds for topological clustering are relative to the expected amount of noise, both from electronics and pile-up, uncertainties in these numbers have a direct effect on the reconstruction efficiency of the clustering algorithm…

Topological Clustering

- **BASIC IDEA**

  To group into clusters neighboring cells that have significant energies compared to the expected noise.

- **THE CLUSTER MAKER&SPLITTER**

1) **Finding seeds**: Identify all cells with a signal to noise ratio above the seed threshold **tseed** (= 4 --> $|E|/\sigma>4$).
2) **Finding neighbors**: For each seed cell, its neighboring cells compared to neighbor threshold **tneighbor** (=2).
3) **Finalize**: If the signal to noise ratio is above the cell threshold, **tcell** (=0), but below tneighbor, the cell is included only in the first adjacent.

MY WORK

- Make differents topo-clusters configurations from real data in the ntuple:

3	2	0	4.5	1.5	0
3.5	2	0	4.5	2.5	0
4.5	2	0	4.5	3	0
5	2	0			
5.5	2	0	5	1.5	0
6	2	0	5	2.5	0
			5	3	0
4	1.5	0			
4	2.5	0	4	2	0.5
4	3	0	4	2	1

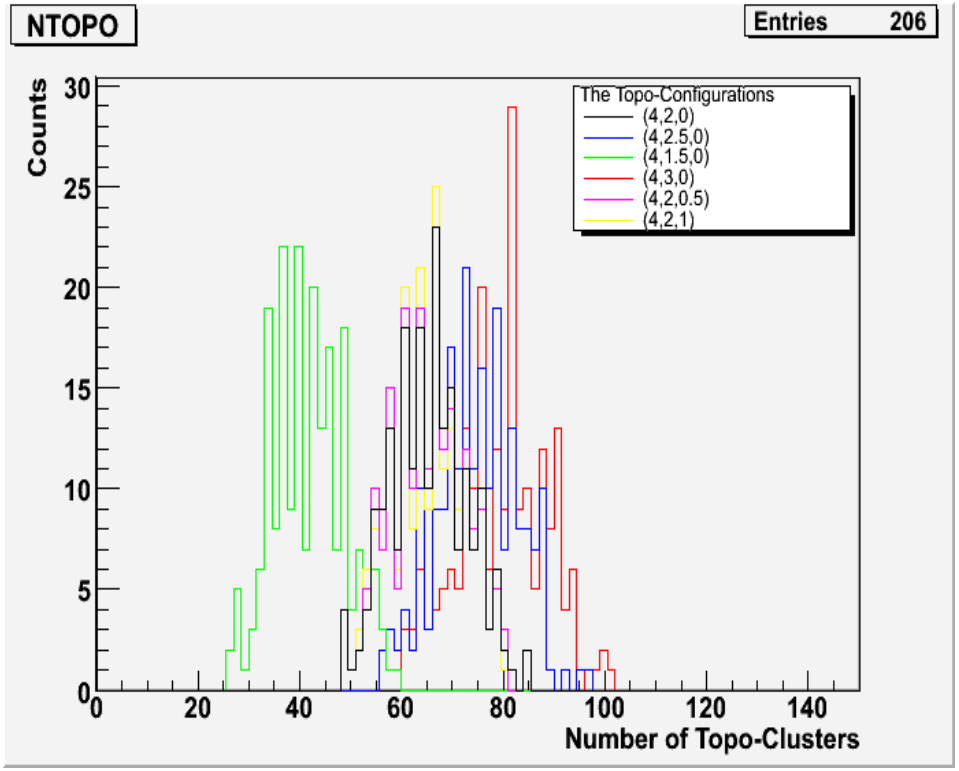
IT'S DONE!!

I'M WORKING ON THIS POINT

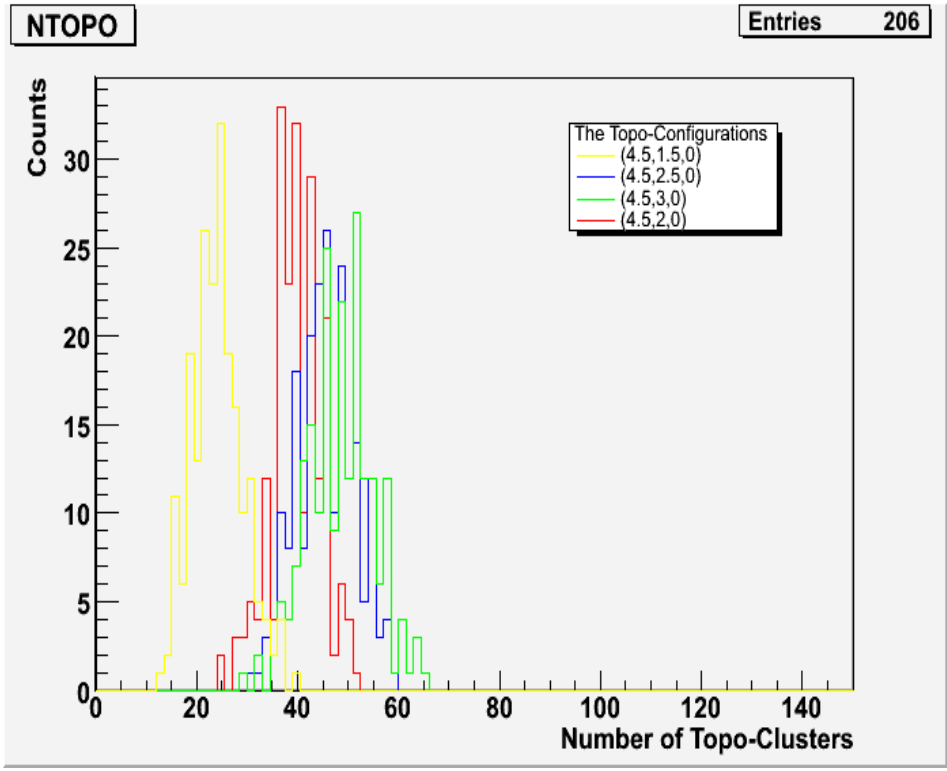
- I'm investigating about the best Topo-Cluster configuration with the athena's **release 14.5.0 and the run 90275**

Number of Topo-Clusters

$t_{neighbor}$ -> [1.5, 3]; t_{seed} =4; t_{cell} -> [0, 1]



$t_{neighbor}$ ->[1.5, 3]; t_{seed} = 4.5; t_{cell} = 0

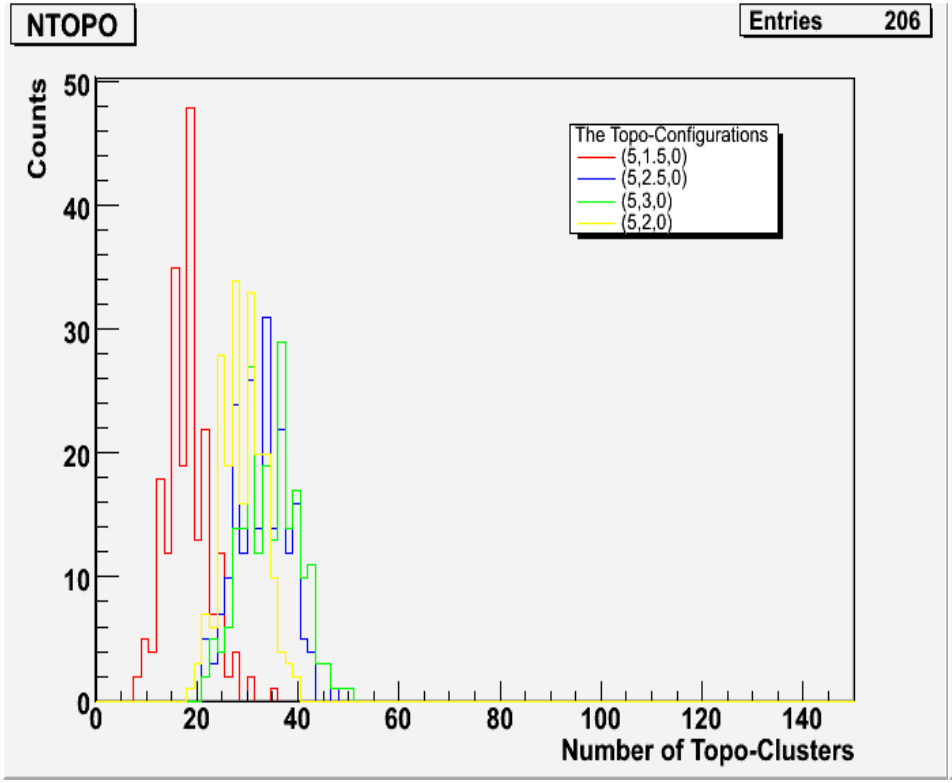


- The number of Topo-Clusters increases when the $t_{neighbor}$ increase.

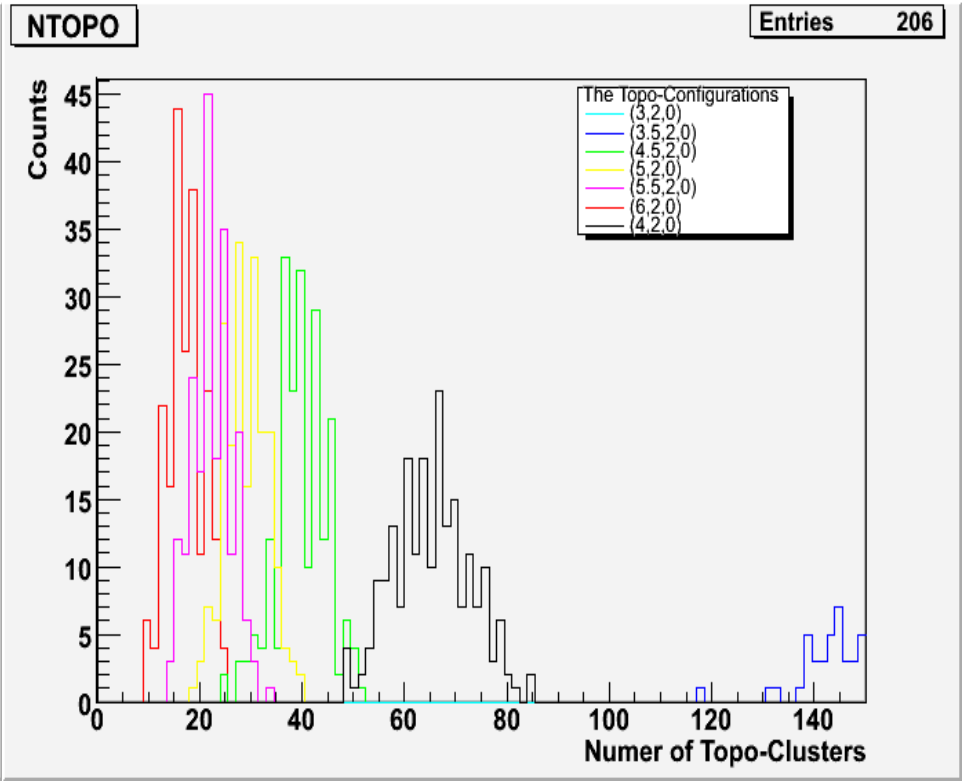
<< $t_{neighbor}$ -> The nearest Topos could be **merged** and then:
The number of Topo-Cluster dicrease .

Number of Topo-Clusters

$t_{neighbor}$ -> [1.5, 3]; t_{seed} =5; t_{cell} = 0



$t_{neighbor}$ = 2; t_{seed} -> [3, 6]; t_{cell} = 0



- The number of Topo-Clusters dicrease when the t_{seed} increase

Energy of the Topo-Clusters

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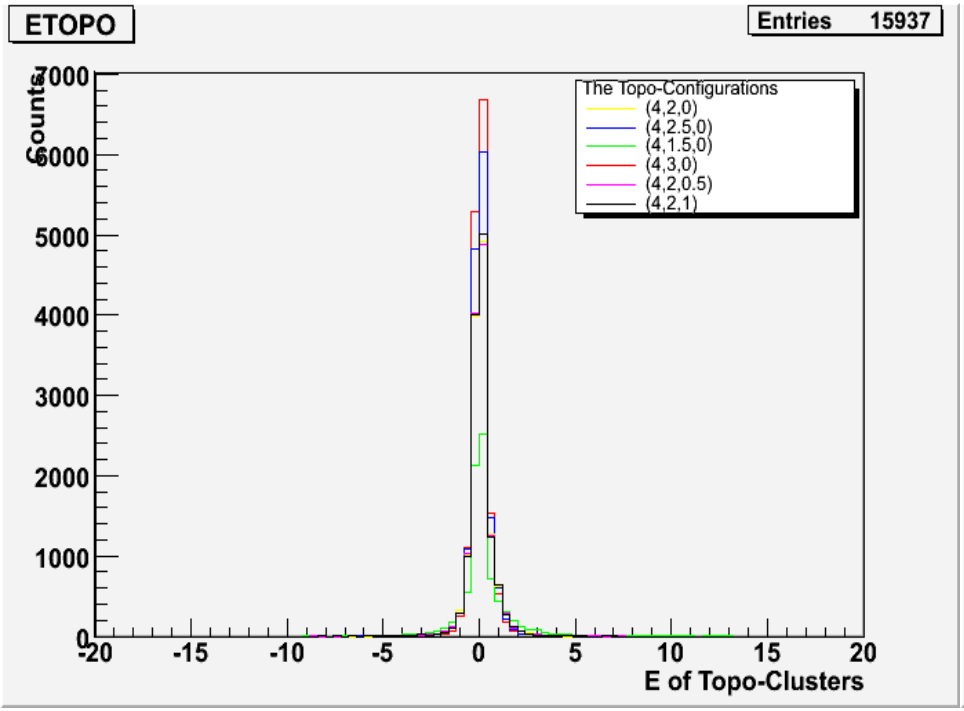

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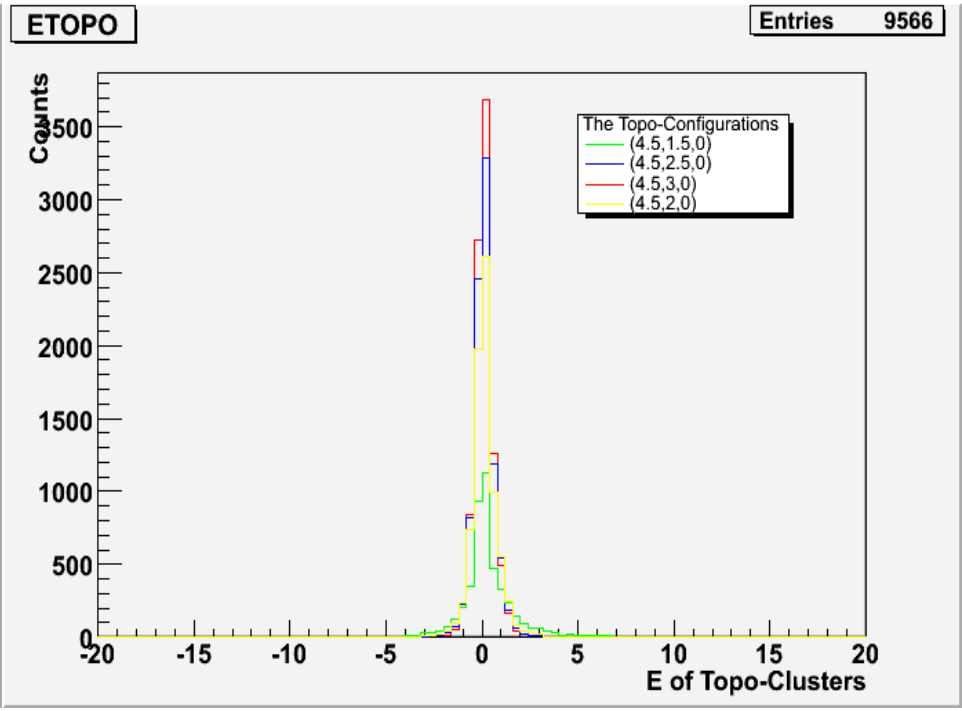

It looks like the sigma of the **distributions with >> tneighbor broadens**, but…

Energy of the Topo-Clusters

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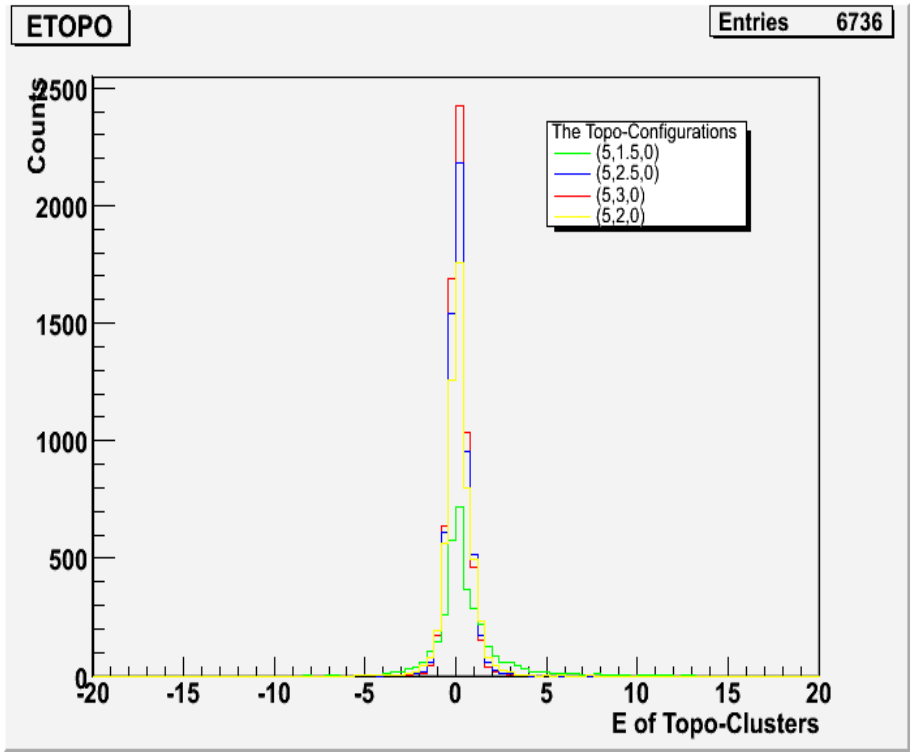

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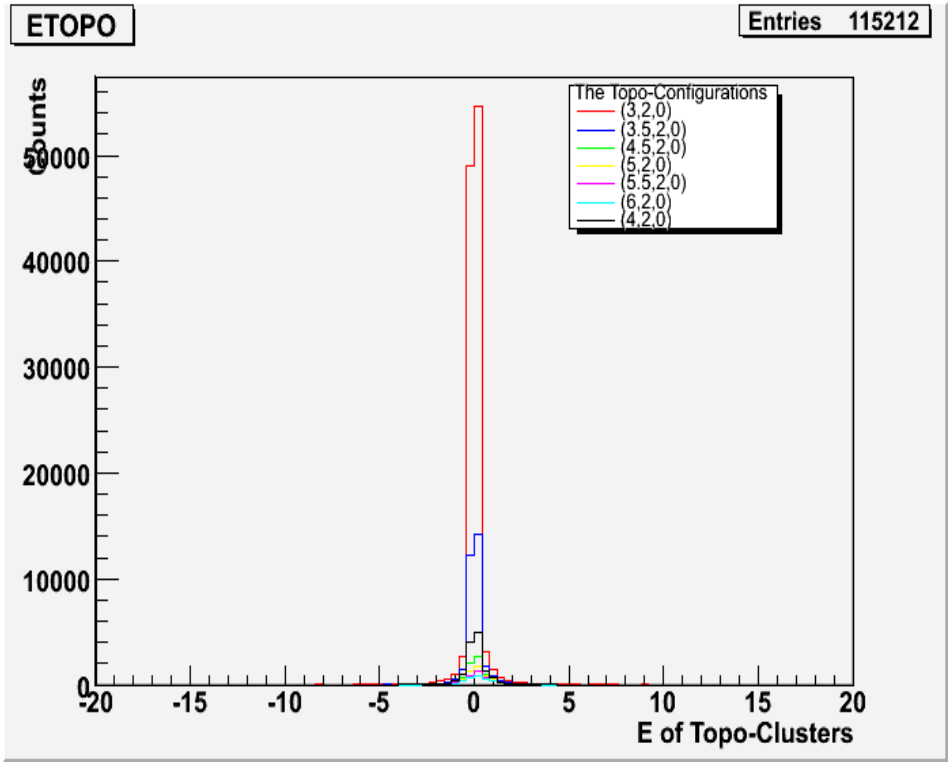

More stadistics is needed!!

Et of Topo-Clusters

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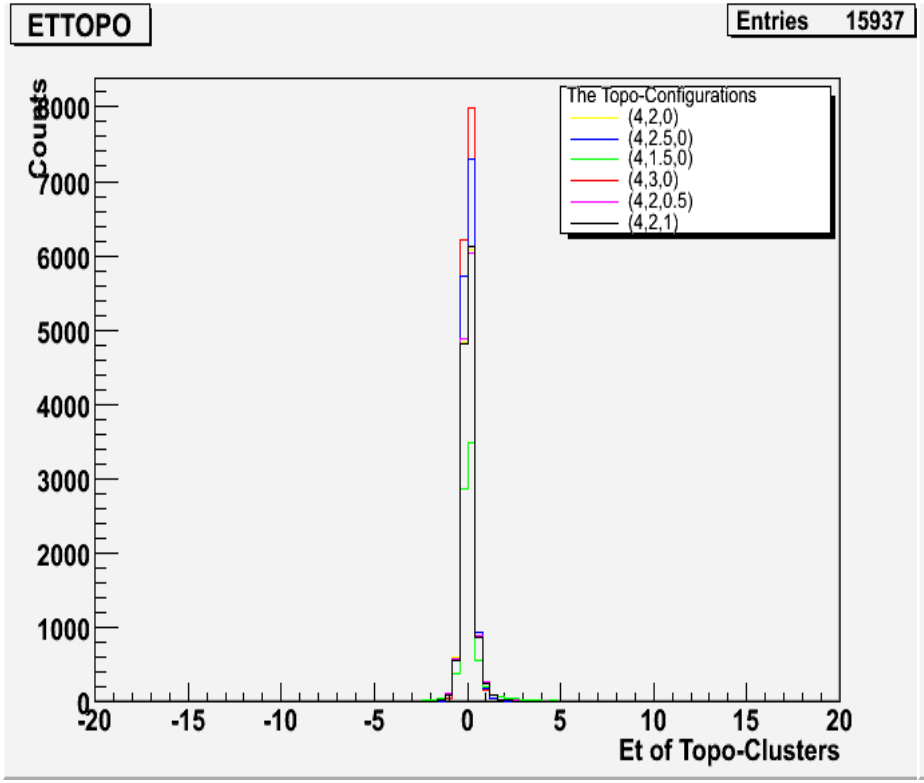

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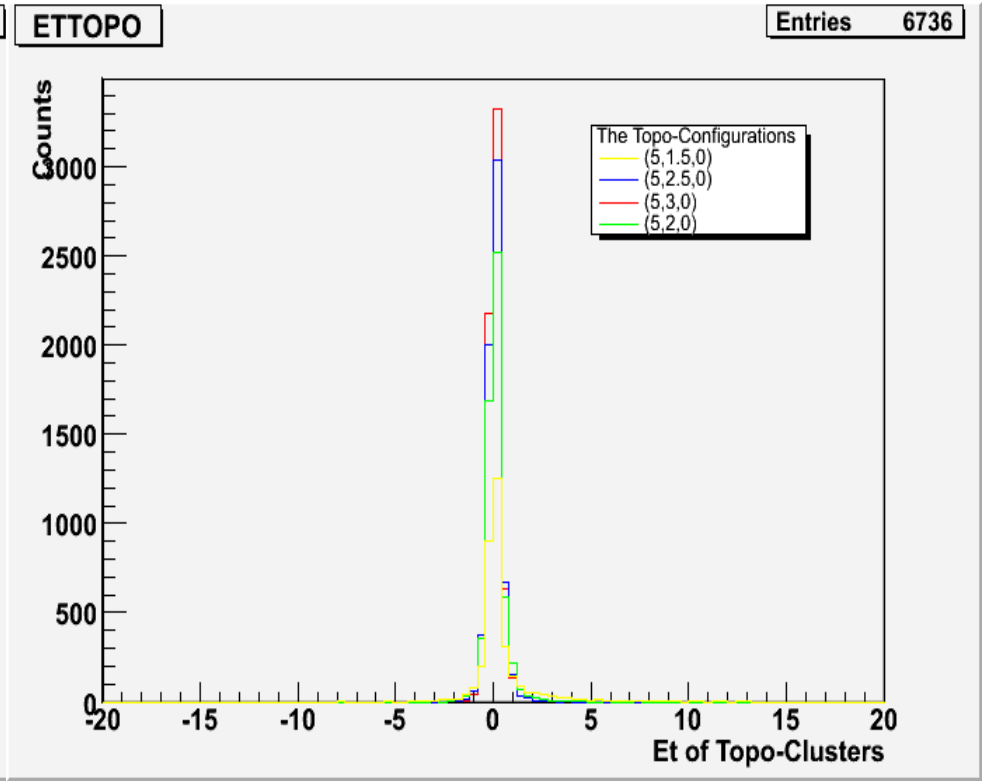

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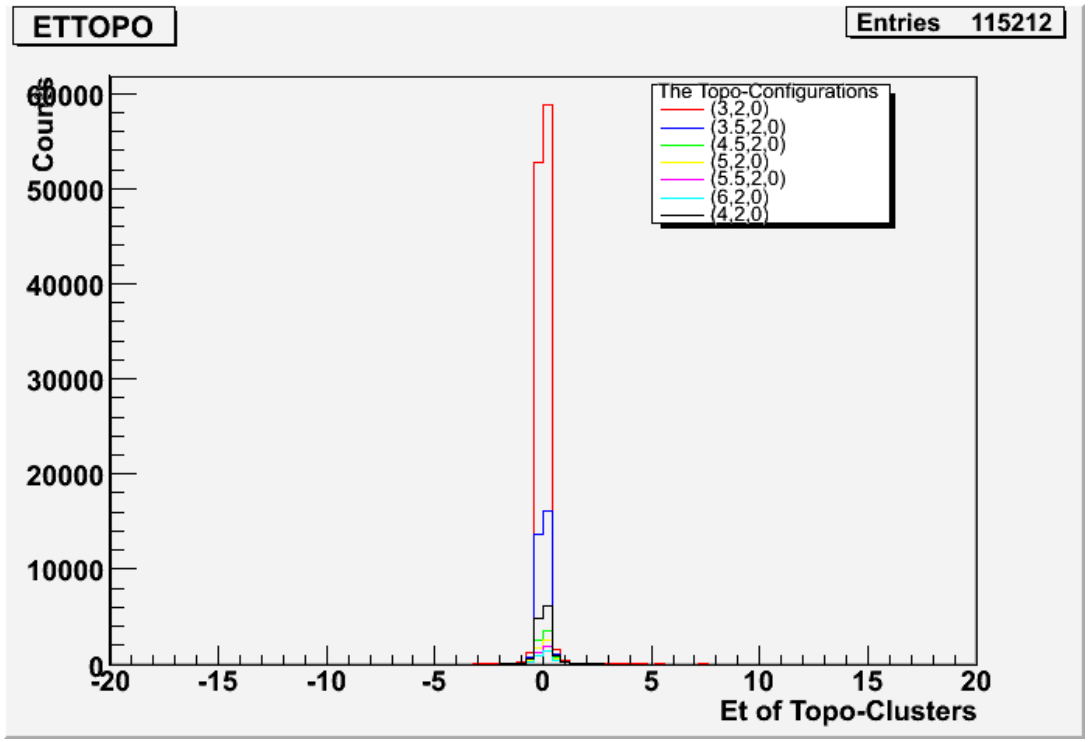

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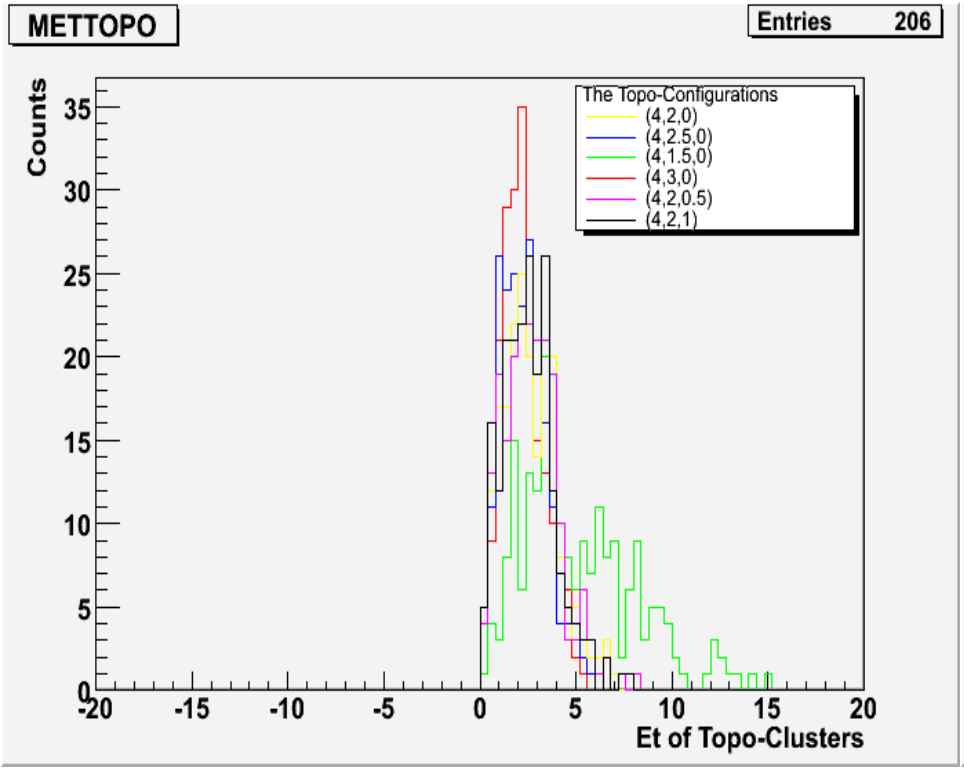

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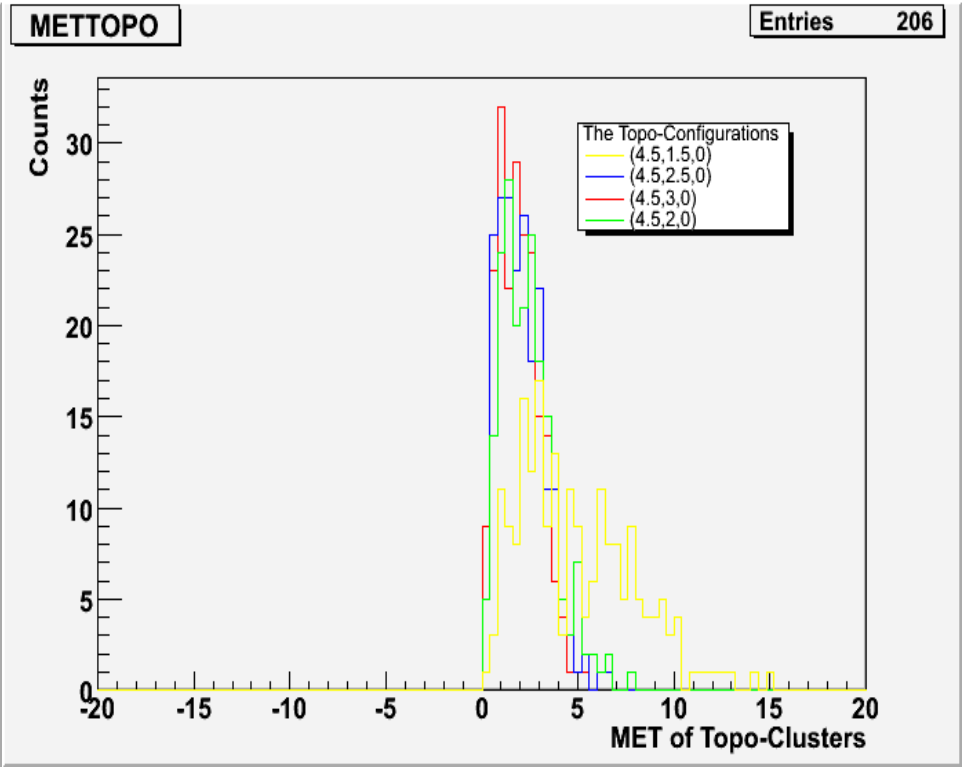

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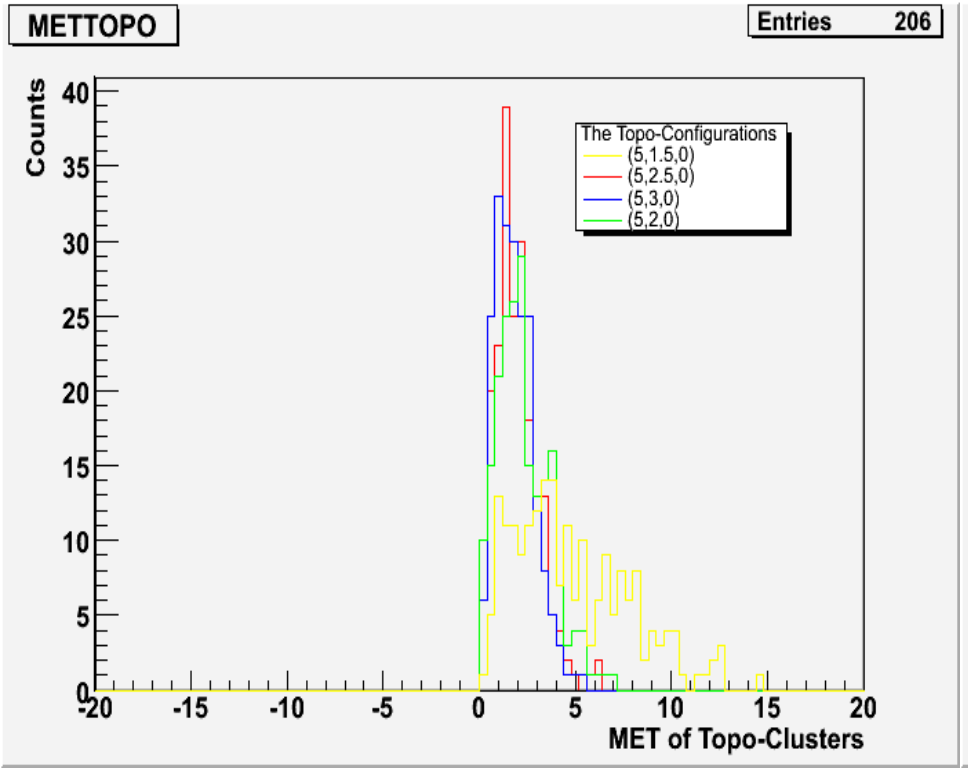

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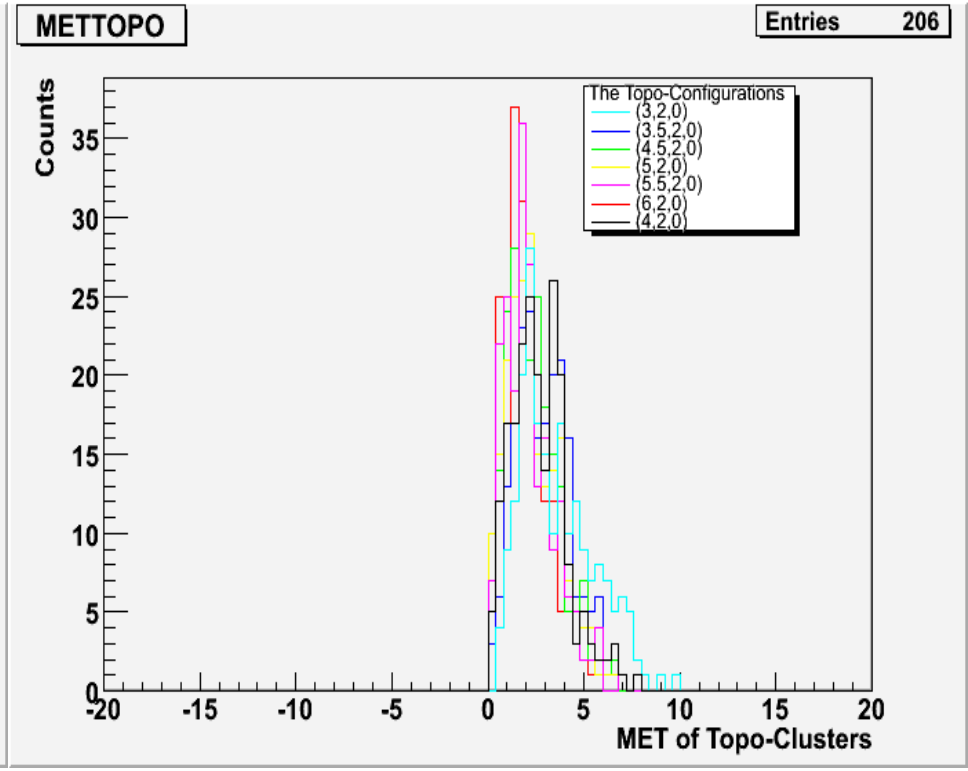

Next tasks

- Get enough stadistic with the run 91890 (more actual than 90275)
- Study the distributions for each component of the calorimeter