2003 $e^{\pm}$ Test Beam Analysis Update

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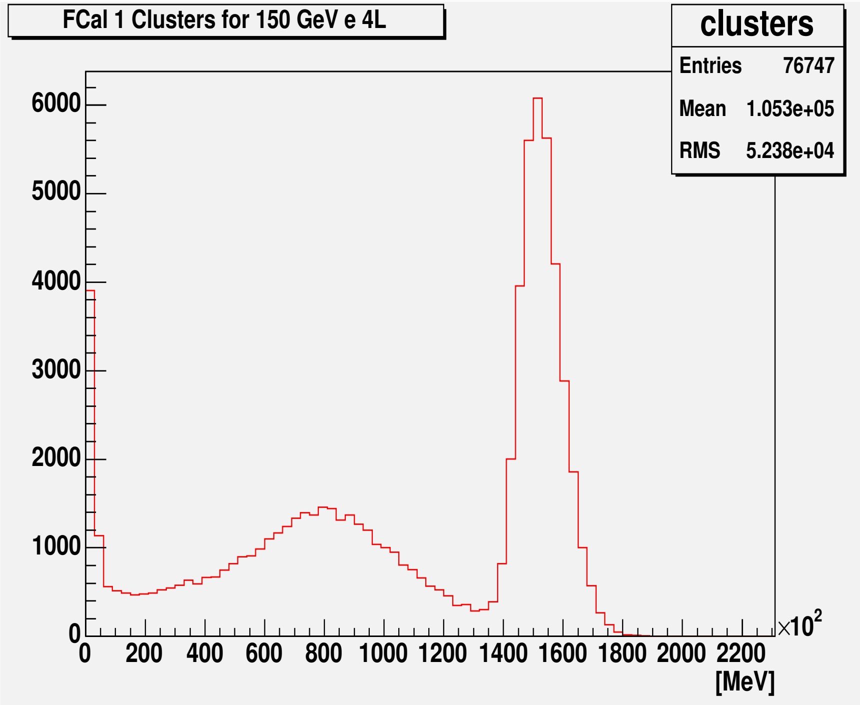
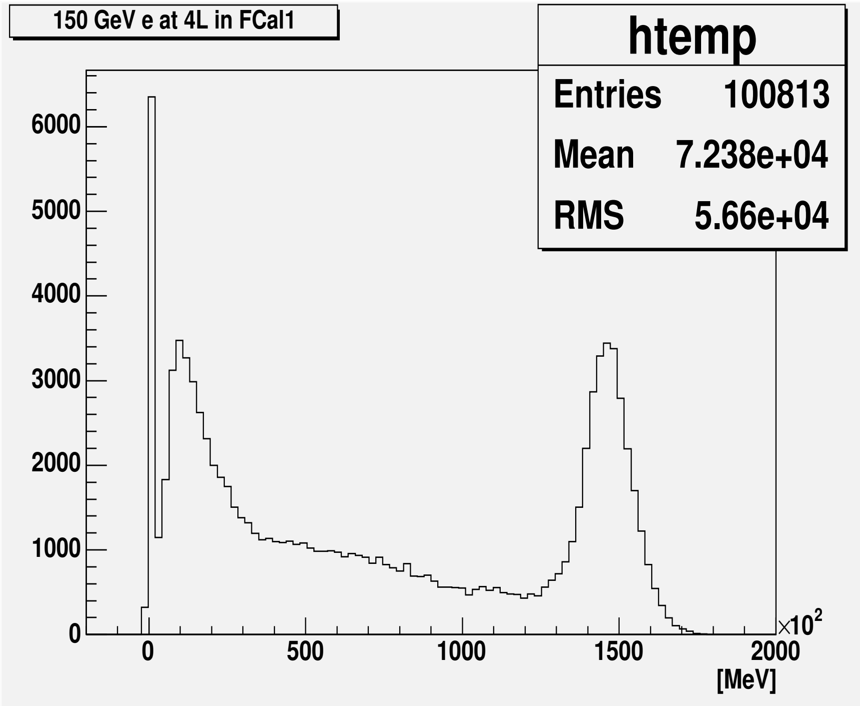
Comparing Clustering Methods

Problem: Clustering methods give distributions that differ drastically...





Cylinder Clustering:

80 mm

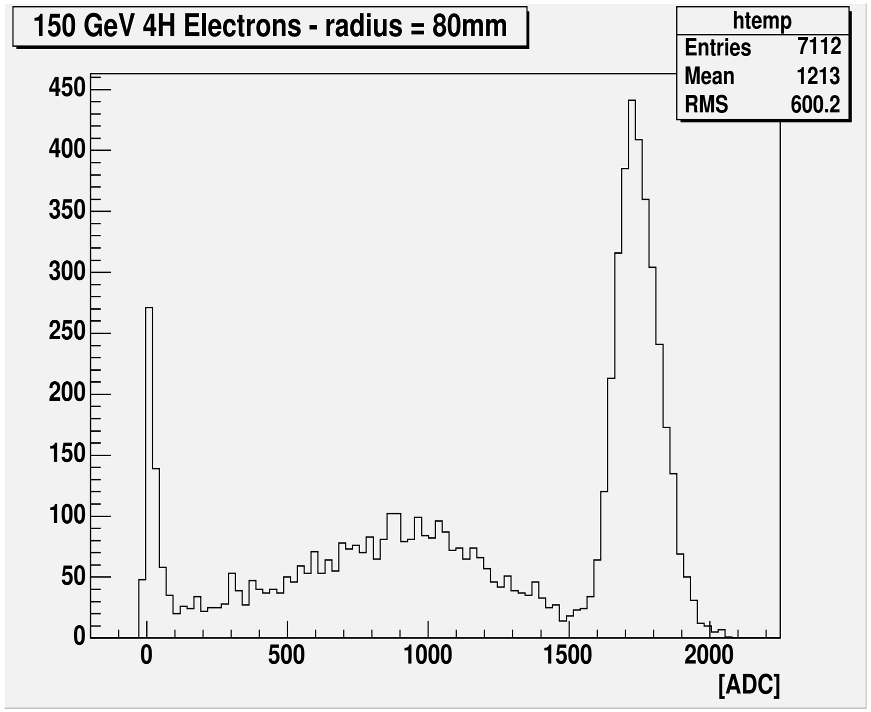
Topological Clustering:

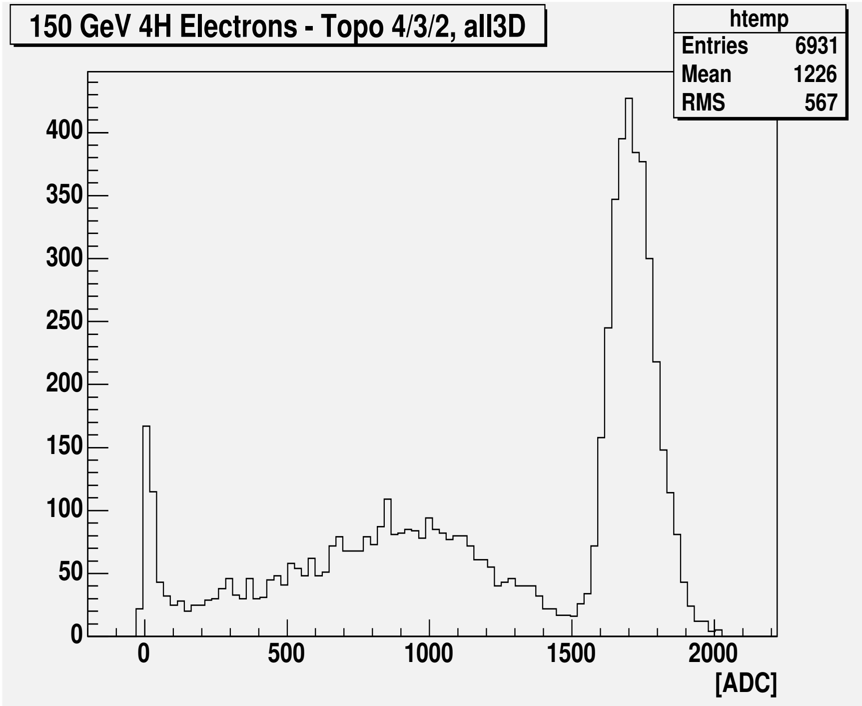
4/3/2, all3D, fixed noise

Comparing Clustering Methods

Cause of discrepancy is not the clustering algorithm, but the way the NTuples/histograms were filled...

- Modifying CBNT_CaloCluster:

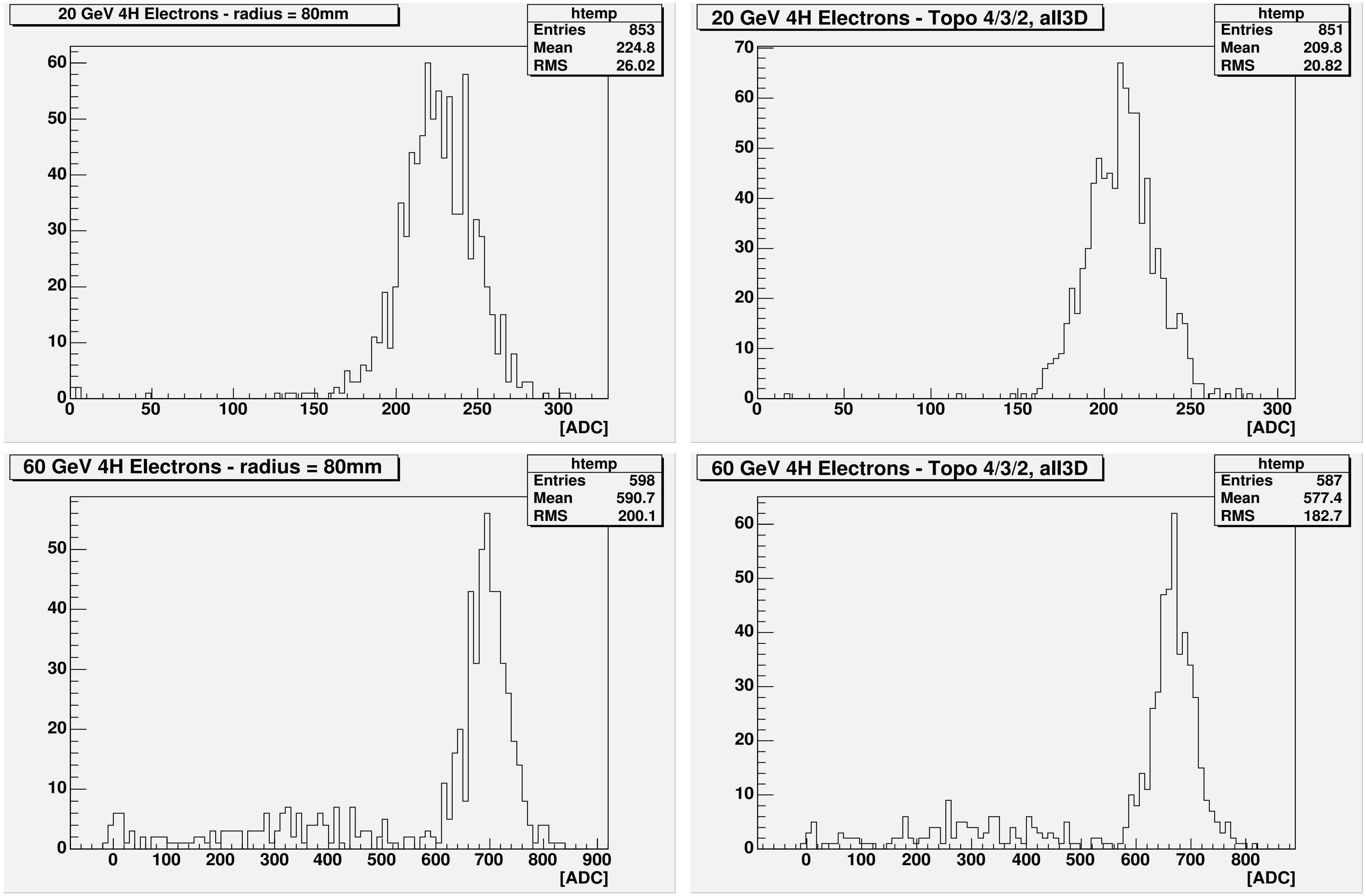




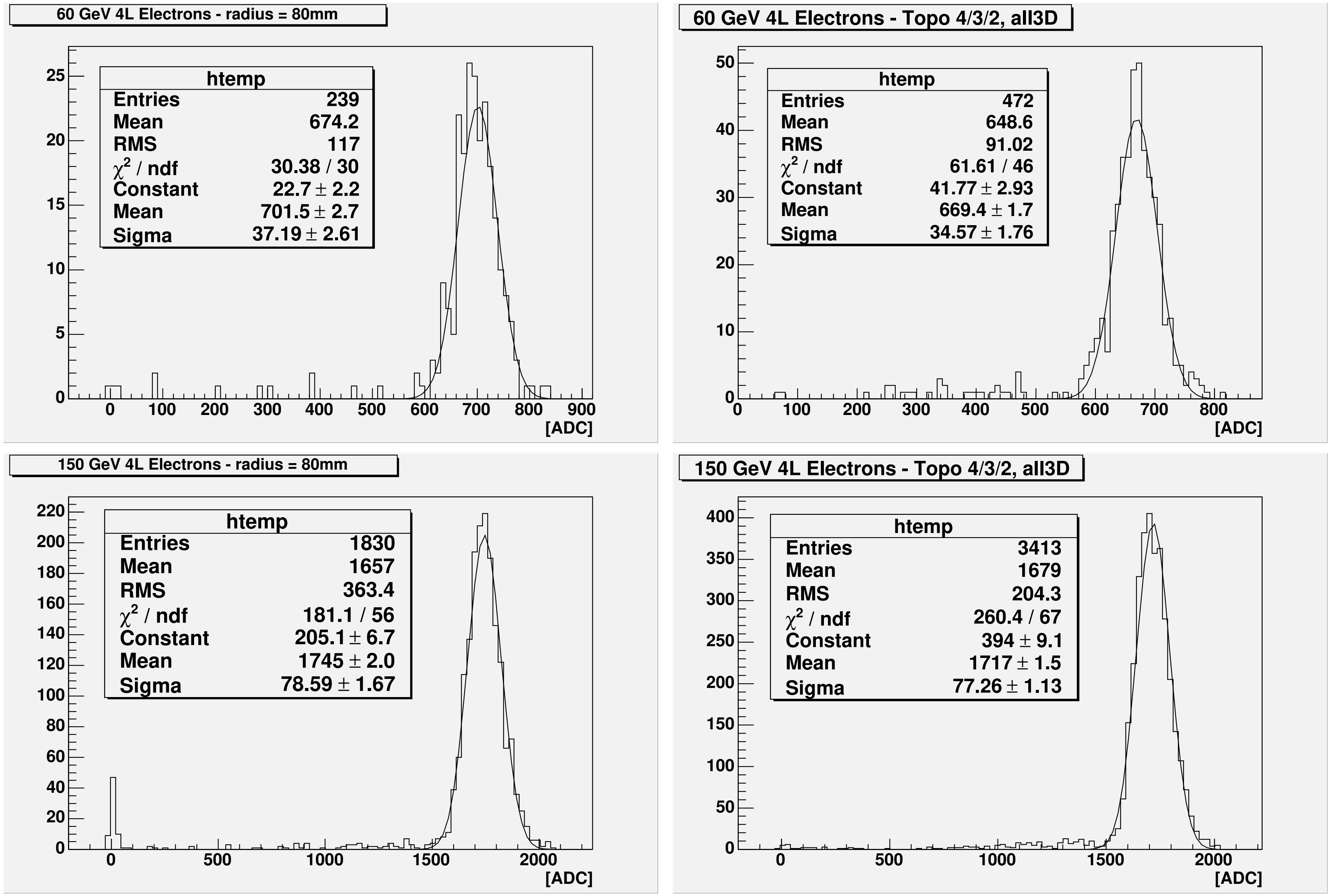
Cylinder Clustering

Topological Clustering

More Example Plots

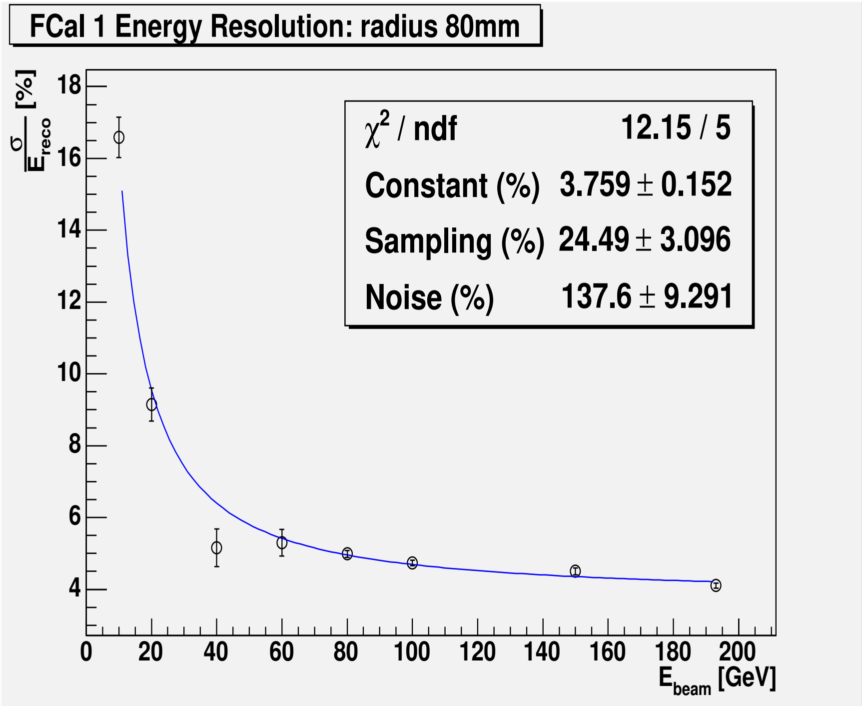


Ratio Cut: $E_{FCal2} + E_{FCal3} \leq 0$

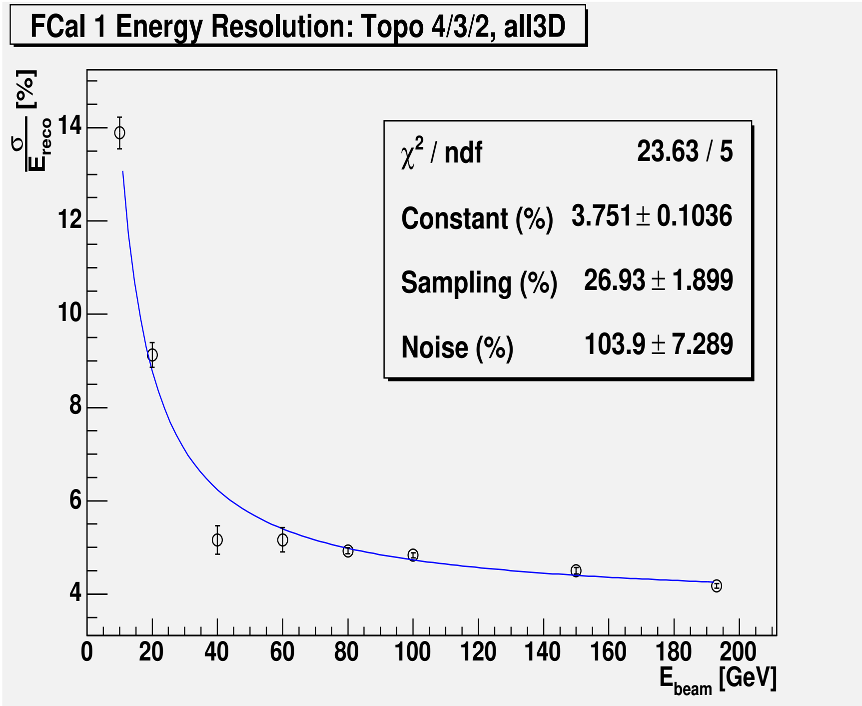


Energy Resolution

$$\frac{\sigma}{E} = a \oplus \frac{b}{\sqrt{E}} \oplus \frac{c}{E}$$



Cylinder Clustering



Topological Clustering

Energy Resolution

$$\frac{\sigma}{E} = a \oplus \frac{b}{\sqrt{E}} \oplus \frac{c}{E}$$

4L beam:

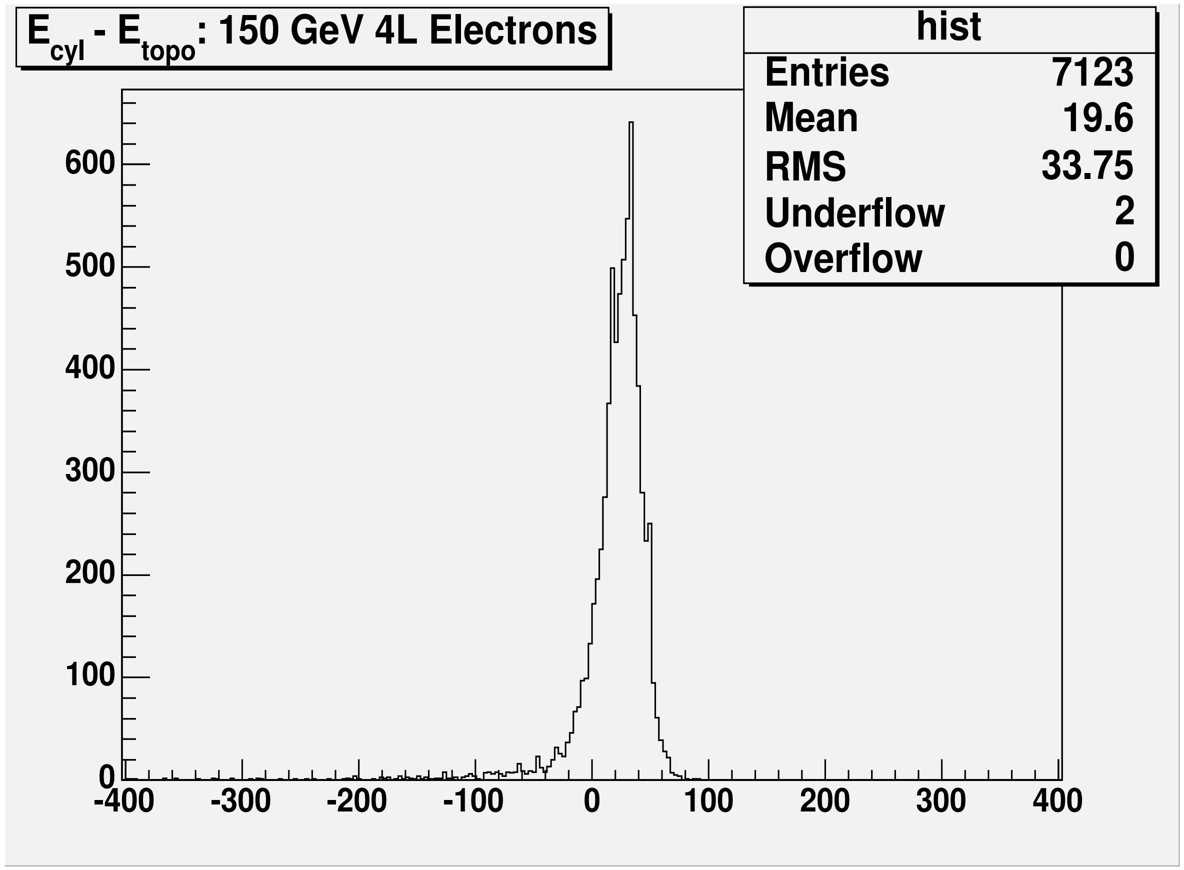
method	a	b	c
cyl 80 mm	3.76 ± 0.15	24.49 ± 3.10	137.6 ± 9.29
topo 4/3/2	3.75 ± 0.10	26.93 ± 1.90	103.9 ± 7.29

4H beam:

method	a	b	c
cyl 80 mm	3.74 ± 0.15	35.27 ± 2.08	137.2 ± 11.33
topo 4/3/2	3.57 ± 0.10	38.08 ± 1.17	117.8 ± 6.78

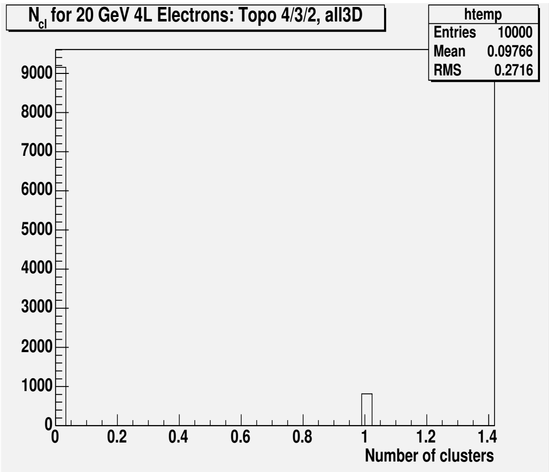
Event by Event Comparision

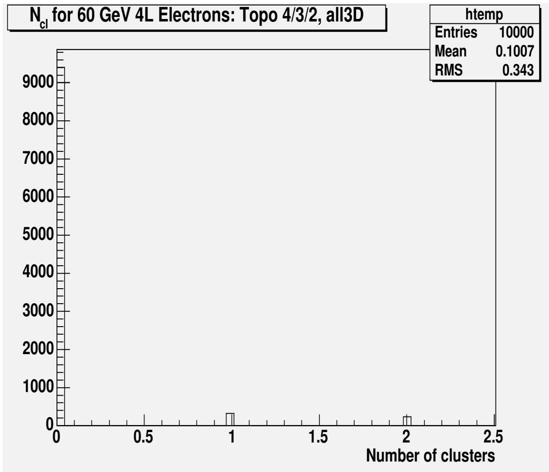
- 150 GeV electrons at 4L
- Plot of $E_{reco}^{cyl} - E_{reco}^{topo}$ for each event

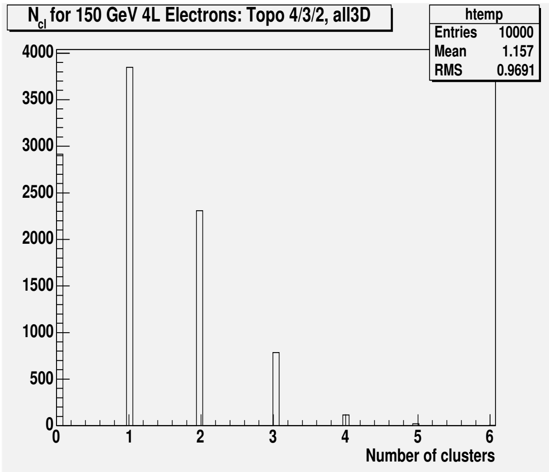


Looking Ahead

- Find $\frac{E}{\sigma}$ thresholds so that only 1 cluster forms for EM processes







- Examine correlation among the 3 terms of the energy function