

Evaluating fixes in the cone algorithms

- Result of tuning the parameters in 1st and 2nd cone algorithm
- More general and quantitative scans for deficiencies in the PFA

Tuning

- Cut A in the 1st cone algorithm,
impact parameter < distance - A
- Going back way B with cone vertex from shower point
in 1st cone algorithm
- Cut C in 2nd cone algorithm,
impact parameter < C

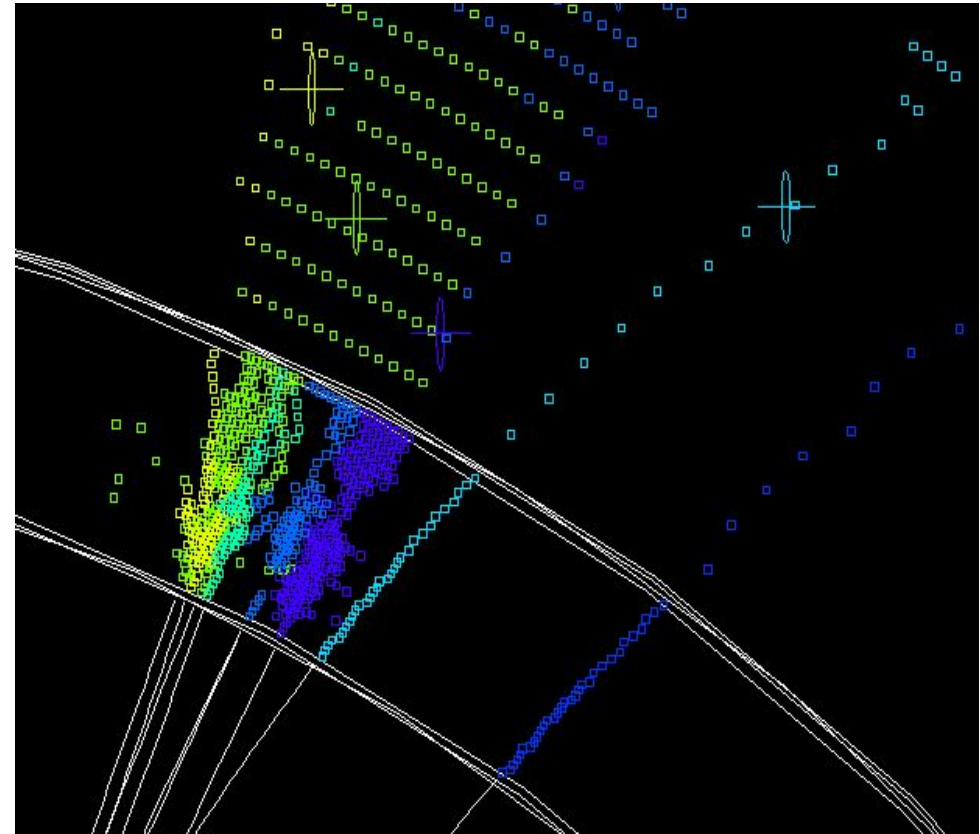
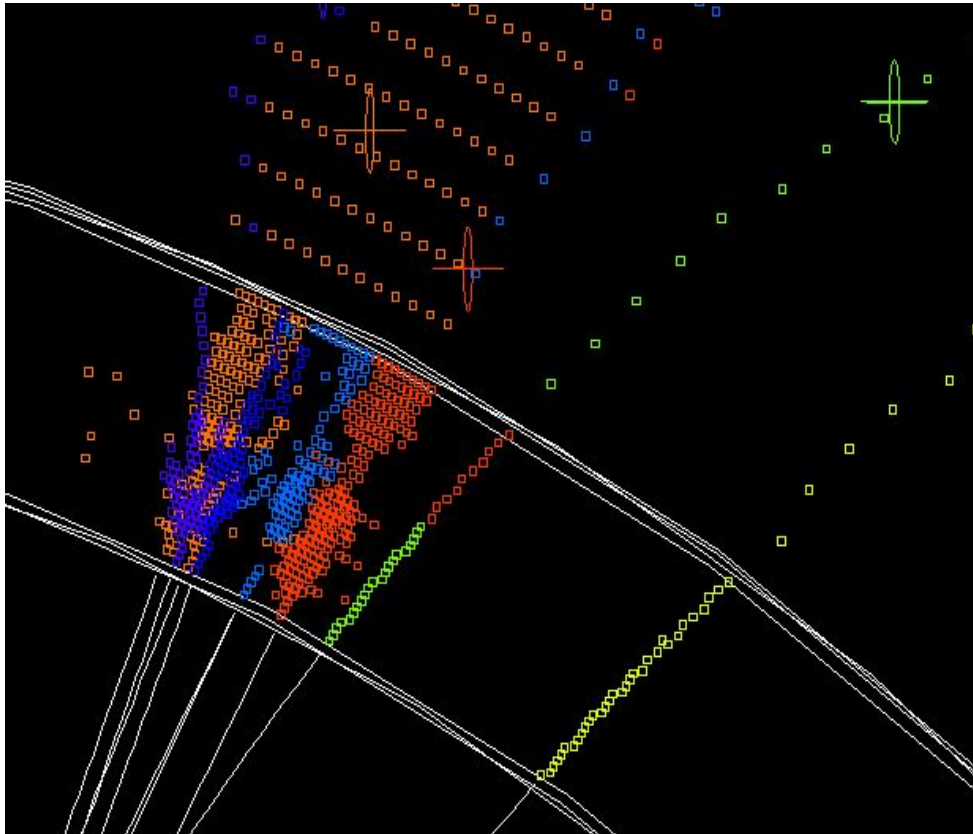
=> weak dependence of resolution on these parameters, best values:

A = 0mm, B = 800mm; i.e. no change

C = 960mm; very “conservative”

old algorithm vs. new algorithm

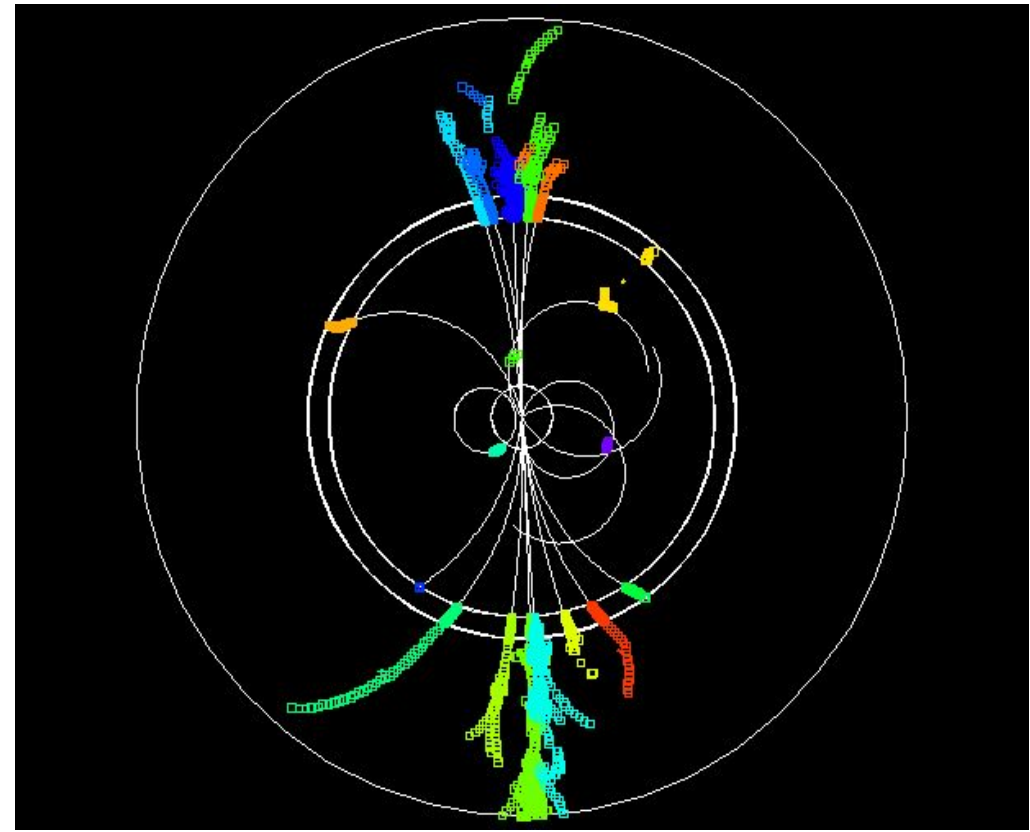
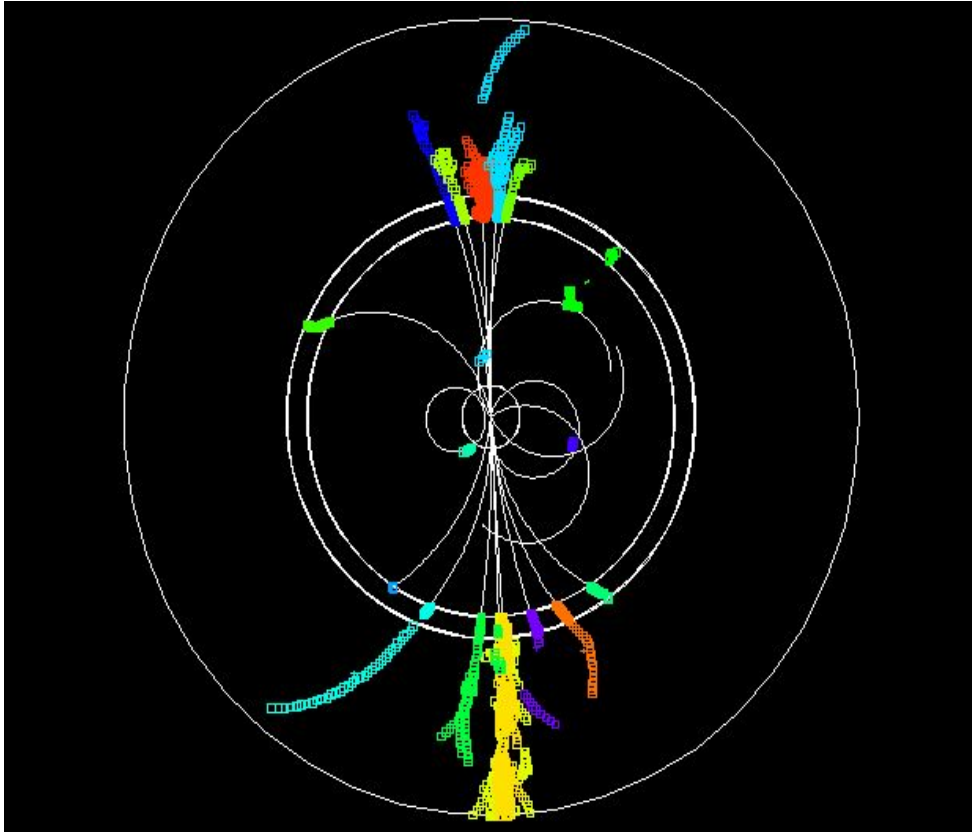
500GeV qq, event 1



Preshower mip fixed

old algorithm vs. new algorithm

500GeV qq, event 9



Some 2nd cone problems fixed. Other problems remain.

old algorithm vs. new algorithm

Energy resolution,
500 GeV qq

Real tracking		Cheat tracking	
barrel	forward	barrel	forward
3.5%	3.3%	3.5%	3.4%

Real tracking		Cheat tracking	
barrel	forward	barrel	forward
3.41(3)%	3.26(6)%	3.43(3)%	3.24(5)%

(statistical uncertainties)

Marginal improvement.

Scanning for deficiencies in the algorithm

Up to know:

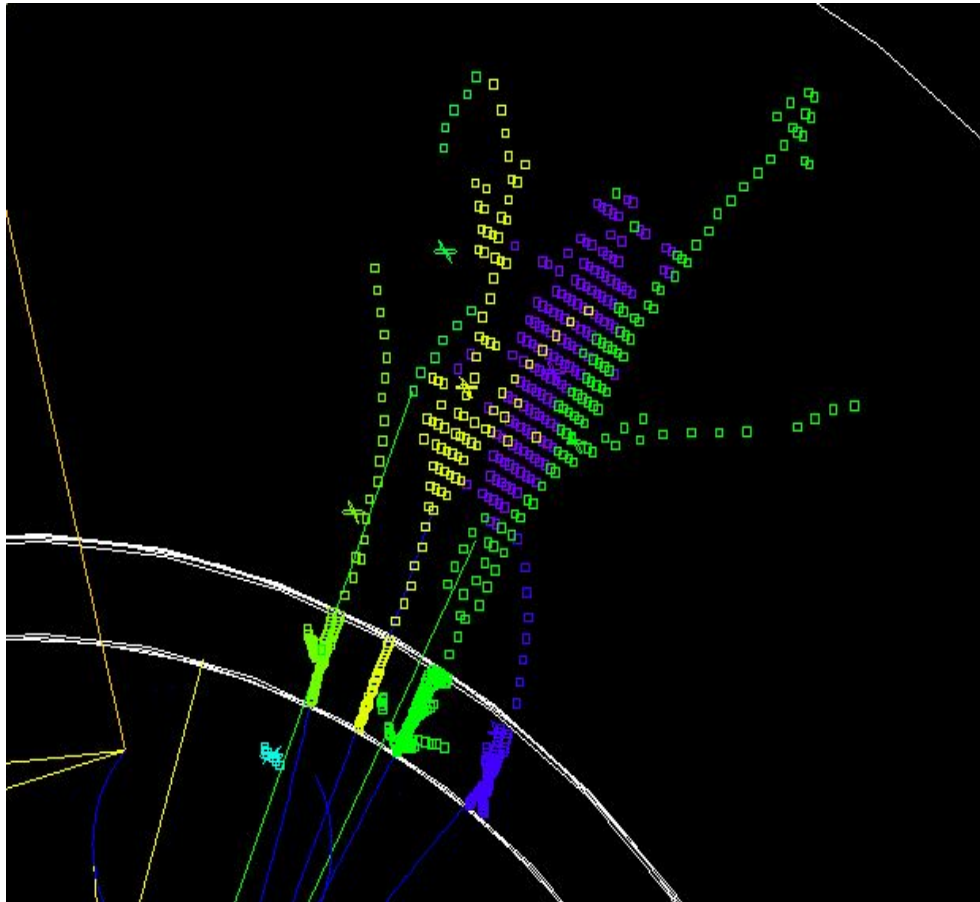
- 1) Mainly based on “TrackToShowerComponents”, i.e. clusters associated to charged particles
- 2) Scanning for worst values of calorimeter efficiency and -purity: Same events found problematic. But: Efficiency, purity only implemented for charged particles.

More general and quantitative scan:

- 3) Looking for events with strongest deviating reconstructed energy (within cuts). Events found by 1), 2) are quite ok. Different events found very problematic.

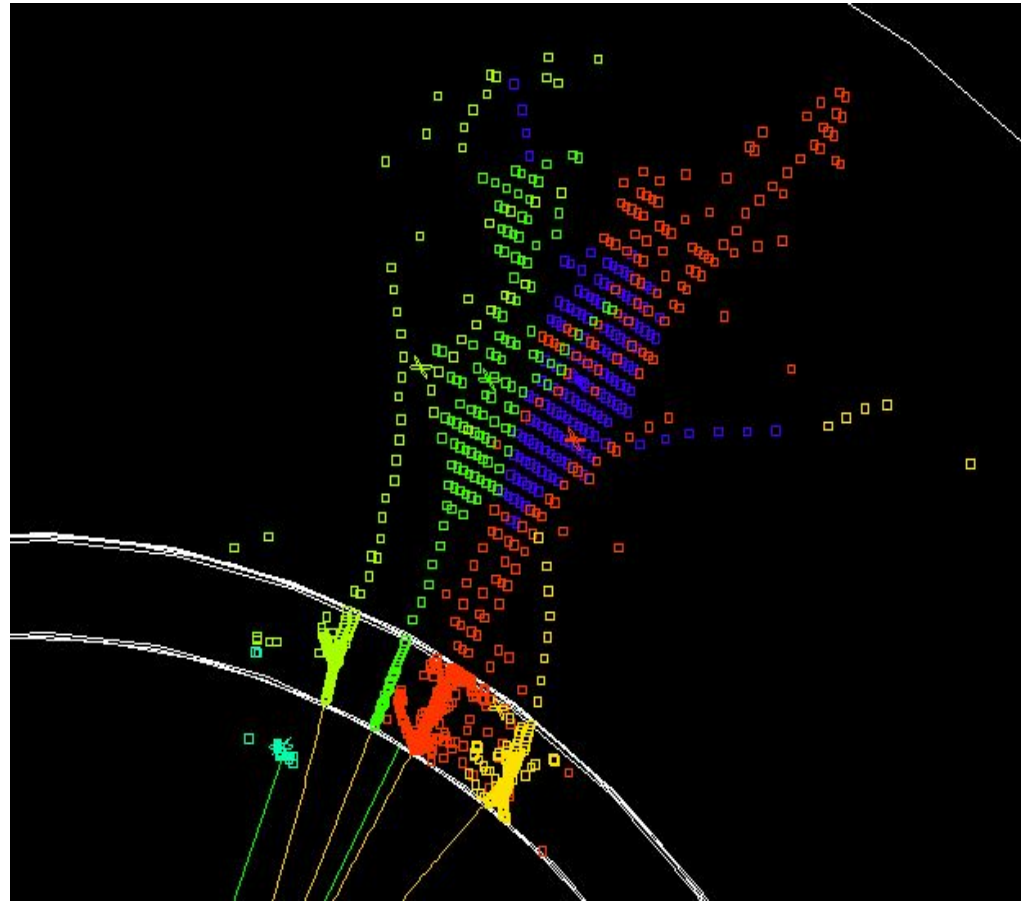
Deviating energy scan

500GeV qq, event 291/315



neutral hadron: 167 GeV

Monte Carlo



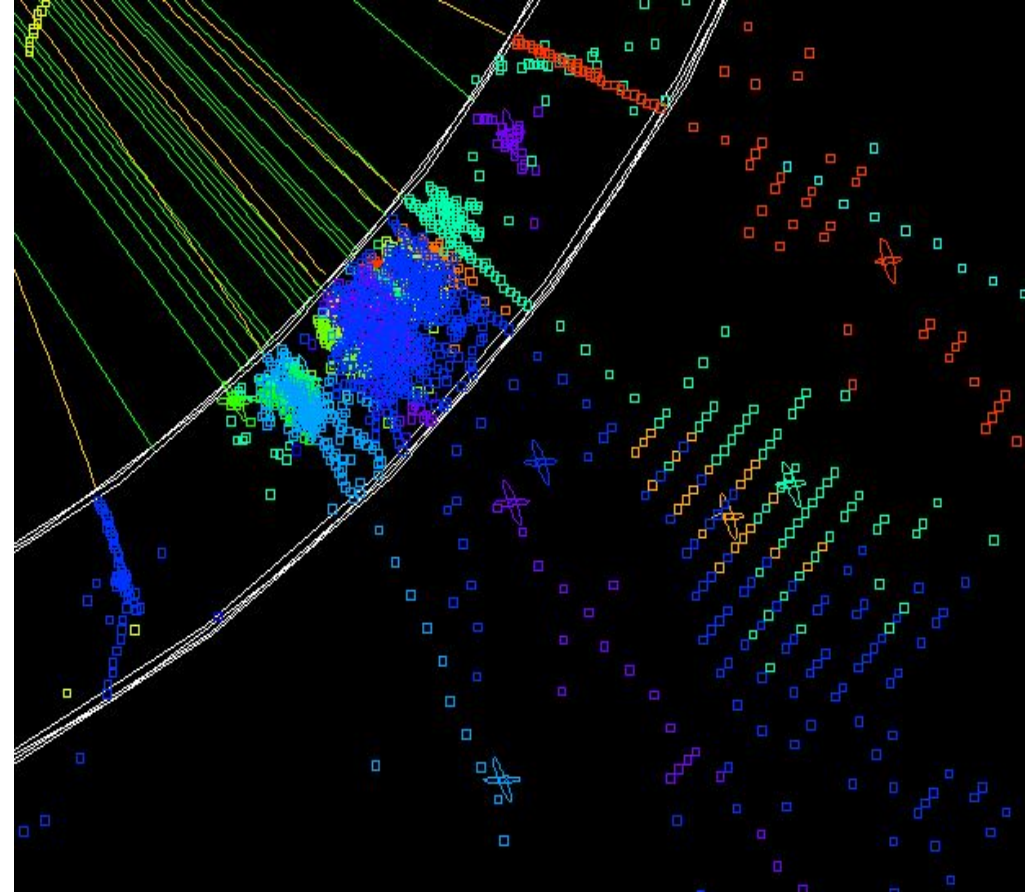
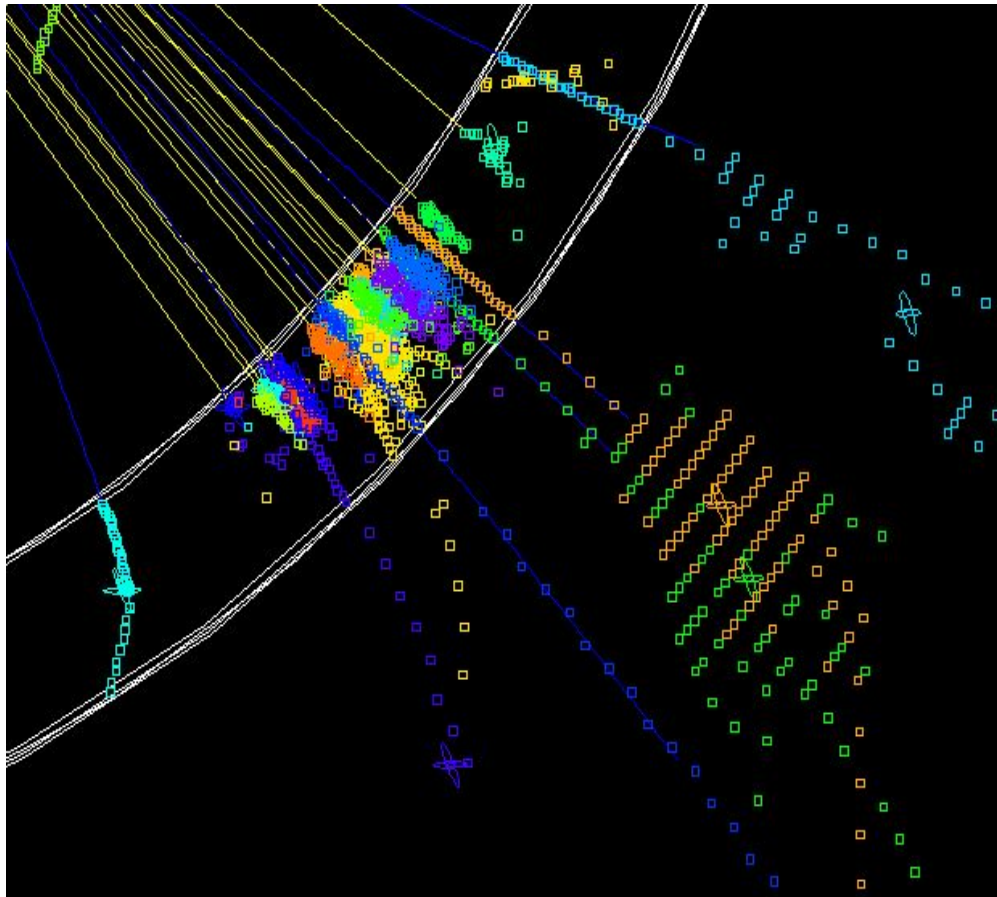
84 GeV

reconstructed (FlushedDTreeClusters):

$E = (500 - \mathbf{108}) \text{ GeV}$

Deviating energy scan

500GeV qq, event 418/456



Monte Carlo

reconstructed (FlushedDTreeClusters):

$$E = (500 + \mathbf{161}) \text{ GeV}$$

Conclusion

- Preshower mip problems resolved
- Some 2nd cone problems resolved
- Resolution improved marginally

Plans

- Understand problems more quantitatively, *then* revisit wrong associations
- Also study $Z(qq)Z(vv)$ and other processes