

Reassignment

To remind you

- There are clusters which are not assigned to any track due to E/p fail.
- We want to recover those clusters by adding it to track.
- We tried to define several shapes as searching area for reassignment.
- But none of them showed significantly better result than simple cone.
(Simple cone is the cone with 60 degrees from intercept point)
- If go back 800 mm along the tangent vector for the cone start point, we can get a little better result than simple cone. But it doesn't help much.

Another approach

- Signal is defined as matching cluster with track in MC truth
- Background is defined as not matching cluster with track
- Which variable will discriminate signal from background?
- Hard to find single variable (angle, cluster energy, ...) with good separation from nearby background (same jet)
-> Try to use information from whole shower...

Score distribution

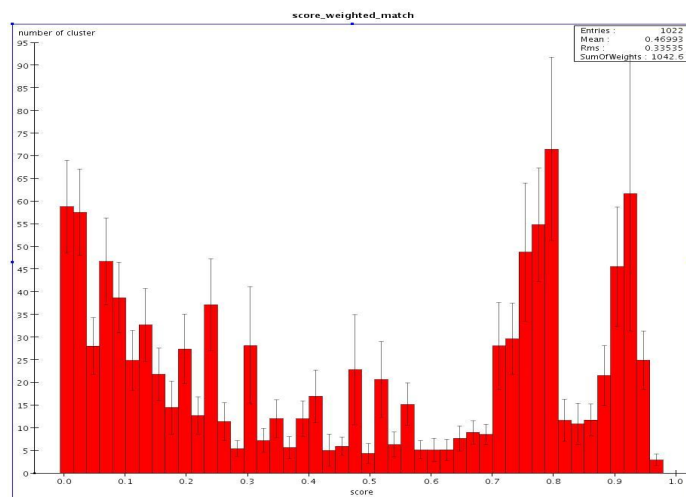
Score makes difference between signal and background?

- Score is defined as geometric quantity from 0 to 1 between clusters.
- Matching cluster tends to go higher score (peak around high score)
- Not matching cluster tends to go lower score (peak around 0)
- But still peak around 0 from matching clusters.

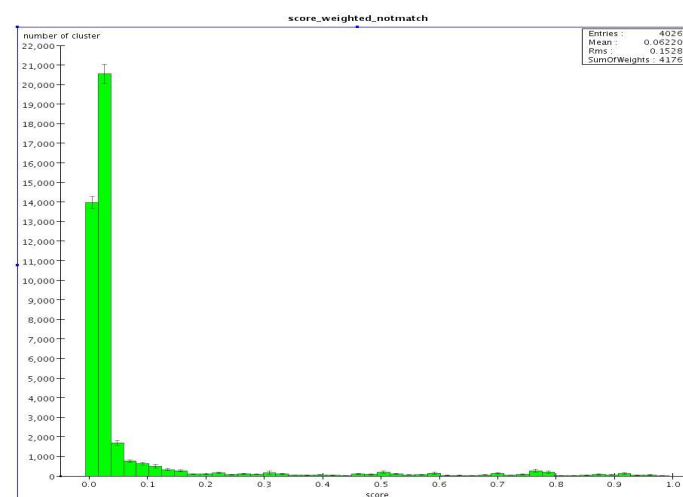
How to solve?

- We can cut off below 0.1 (for example) for reassignment.
- We need to give larger score to matching clusters without increasing background scores too

Energy weighted plot for signal and background as a function of score



20% of signal below 0.1



92% of background below 0.1

New Score

1. Require score 0.1

- It helped a little bit but not significant.
- So tried to find solution before reassignment

2. Give higher score to lower score matching clusters and require score 0.1

- By changing the way how to give score in Cone algorithm.
- which is now starting at 800 mm back from showering point
- It gives high score to clusters within cone ($\cos\theta > 0.9$)
- So we can give higher score to even backscattering matching clusters.

	Detector	Sid01 (rpc)	Sid01 (scint)
Before	Mean90±Rms90 (GeV)	1.30±4.01	0.42±3.58
After	Mean90±Rms90 (GeV)	0.47±3.94	-0.65±3.39

- Mass resolution is obtained with ZZ events in barrel region.

Conclusion

- New scoring helps in main reconstruction AND in reassignment.
- It is hard to tell which part would affect the result in a positive way.
- This improvement is obtained from the combination of 1 and 2.