

ETD and ECAL

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ETD installed immediately in front of endcap ECAL

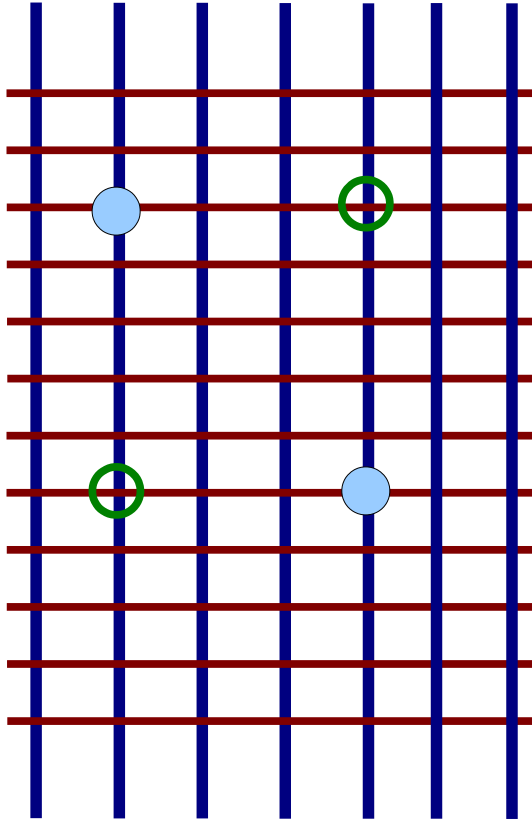
- Improve momentum resolution of high momentum tracks
- Match tracks to ECAL (multiple scattering in TPC endplate)

ETD design (LoI):

3-layers XUV of single sided micro-strips, 7 micron resolution

Question:

Are 2 ETD layers enough? - multiplexing ambiguities in dense jets
Can first ECAL layer (5mm pixels) resolve ambiguities of XY strips?



Cannot distinguish these two cases
of nearby tracks with ETD alone

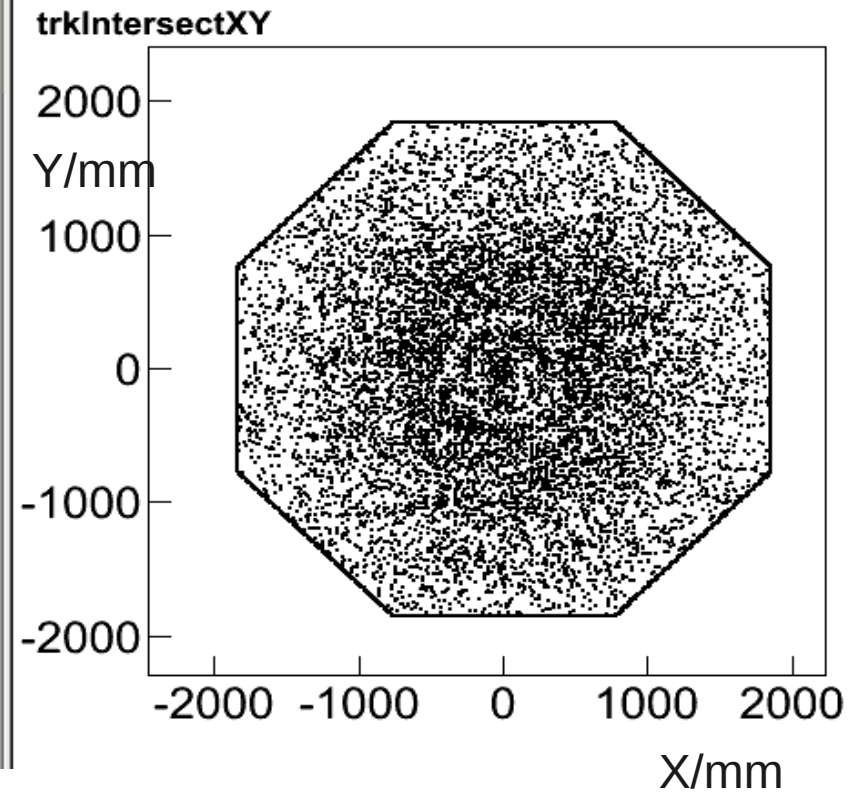
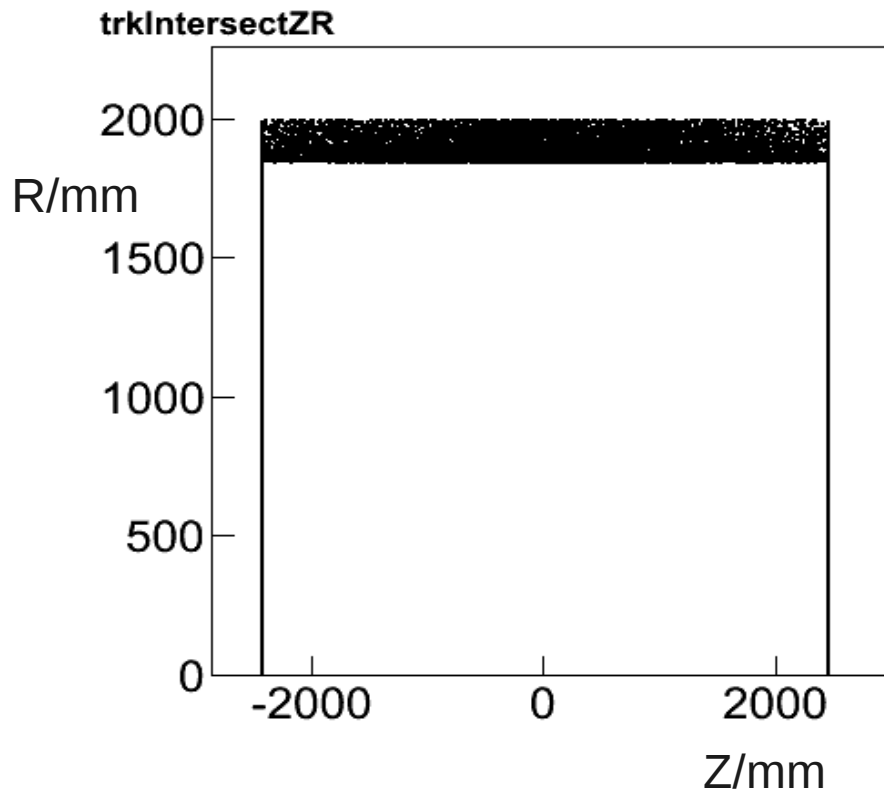
If they are not too close ($\sim 5\text{mm}$), the first
layer of ECAL can distinguish

Look at $e^+e^- \rightarrow u\bar{u}$ @ 500 GeV

Reject returns to Z

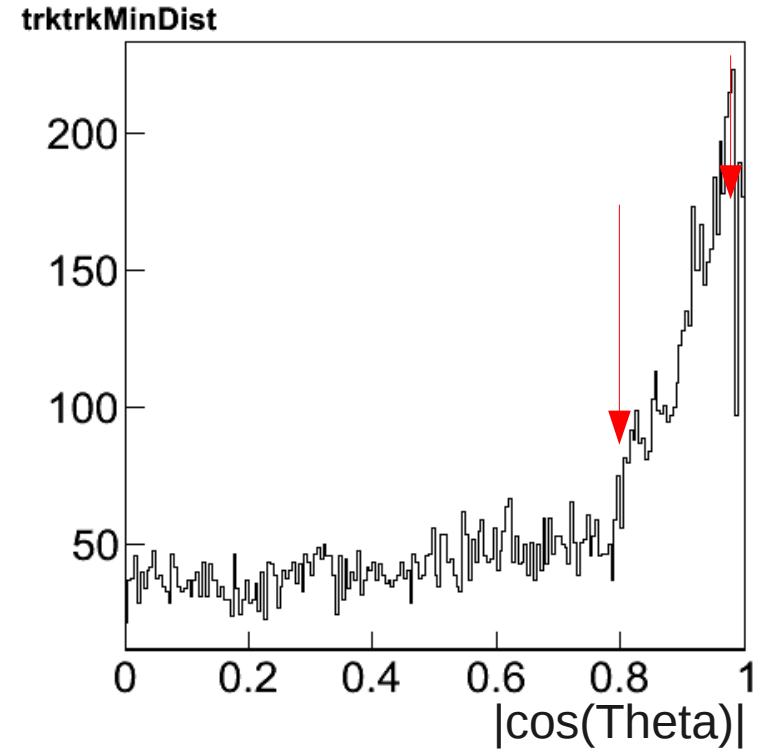
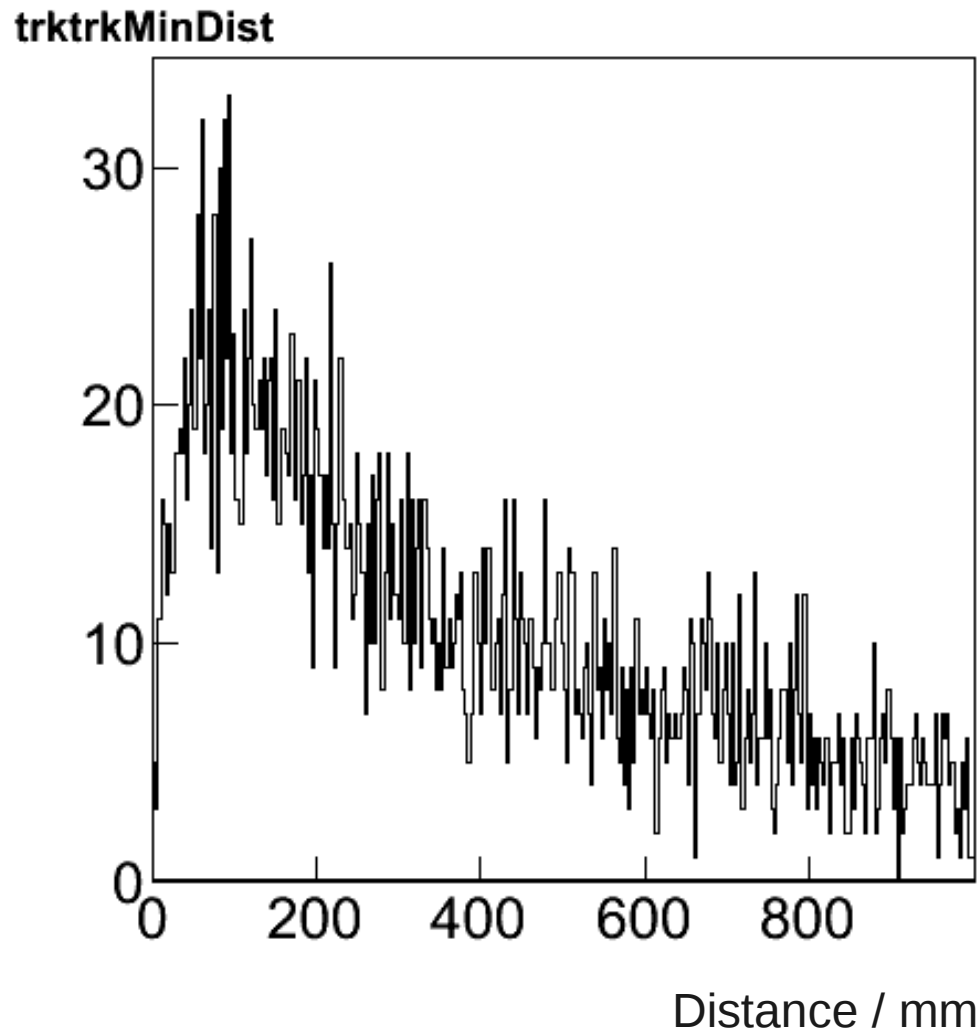
Select reconstructed tracks (LDCTracks) which have last hit not too far from ECAL
extrapolate to ECAL surface

Intersection point:



$e^+e^- \rightarrow u\bar{u}$ @ 500 GeV

distance to nearest track intersection for
LDCtracks in ETD acceptance:
 $0.799 < |\text{CosTheta}| < 0.985$



827 events (after cutting Z return)

24k tracks

4.8k tracks in ETD fiducial region

8 tracks < 5mm to next LDCtrack

So ambiguity of $< 2 \cdot 10^{-3}$ tracks will not
be resolvable by ECAL

Conclusion

If 5mm pixel ECAL is used in conjunction with 2-layer (XY) ETD:
remaining ambiguities are at level of 10^{-3} even in most challenging jets
(n.b. point resolution of ETD not affected (to 1st order))

(the momentum resolution is anyway not crucial for tracks inside jets
- it's important for isolated muons in HZ events
to precisely measure the recoil mass)

2-layer ETD is significantly simpler from a mechanical point of view:

smaller:

material budget,
cooling and power needs,
barrel-endcap gap...

Suggest change of baseline to 2-layer ETD