# Hodoscope Stuff: Selection/Layer Pairing/ECal Matching...for use in Positron Tracking Efficiency

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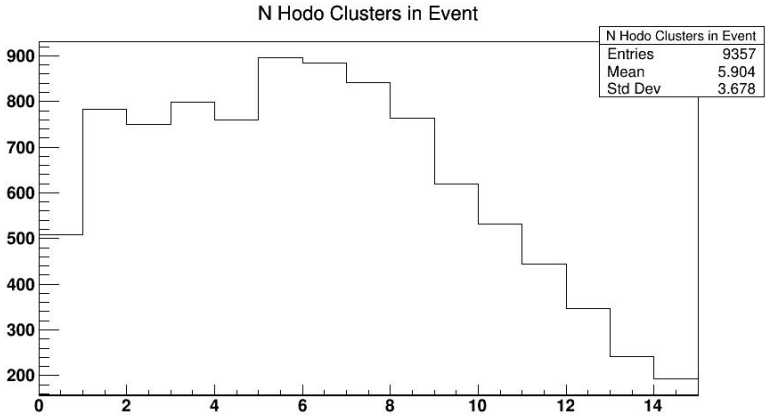
October 15, 2019 Software Meeting

# Overview

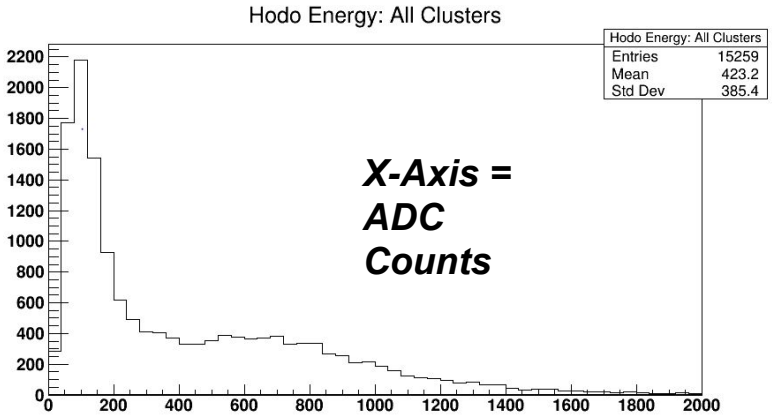
- Now that we have a hodoscope, we can use it+ecal to tag positrons and get a tracking efficiency.
  - Still have to use 2-cluster+positron track for electrons...before hodoscope we couldn't extract positron efficiency due to massive WAB contamination.
- I've started a DQM driver (iss-604) to do this analysis...still a ways to go
  - I've added a number of helper classes and methods to org.hps.ecal.recon.HodoUtils.java to make the hodoscope data more accessible
    - Wrappers for "Clusters" and L0/L1 layer pairs, maps for the L0/L1 neighbors, things like that
- What I'll show today is mostly the start of selecting good hodoscope clusters, pairs, and ecal-hodoscope matches
- Everything here is from a small sample (10k events) of run 10030 data (mostly singles-2)

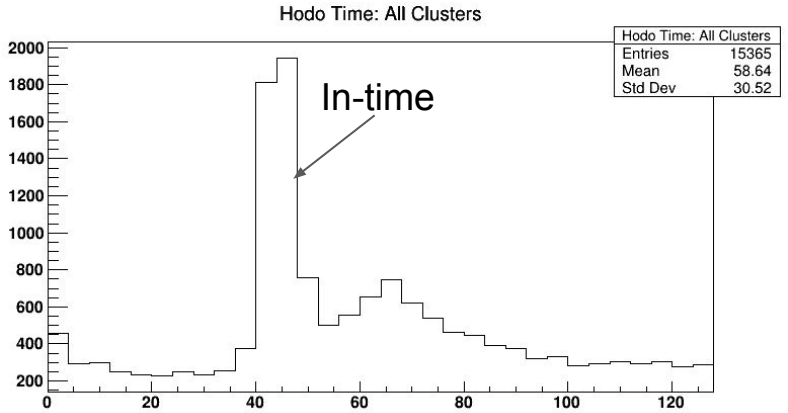
# Hodoscope Clusters from the event



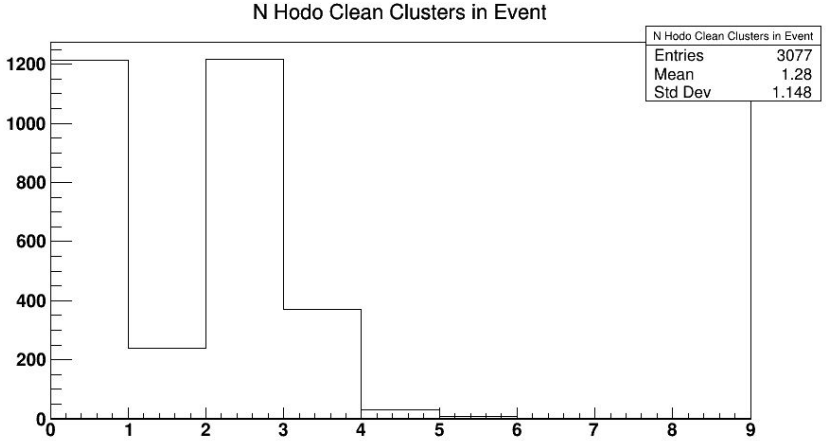

This is what you get from the SimpleGenericObject for hodoscope clusters (#, ADC counts, time)

...there are a lot of clusters! But, many of them are low-energy and/or out-of-time



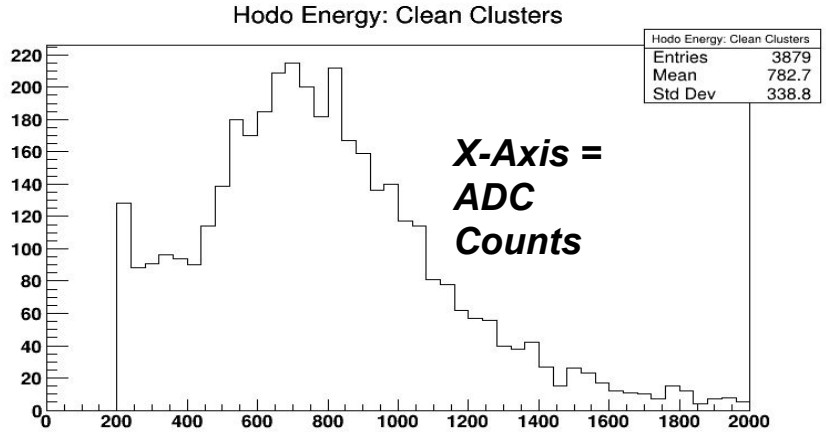



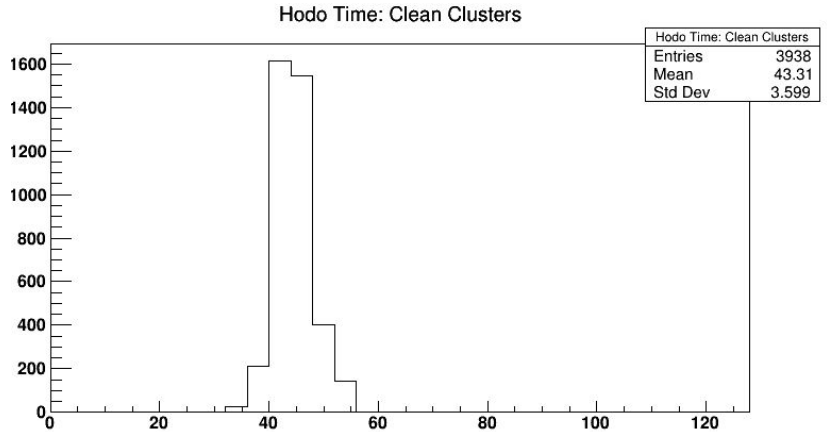
# “Clean” Hodoscope Clusters



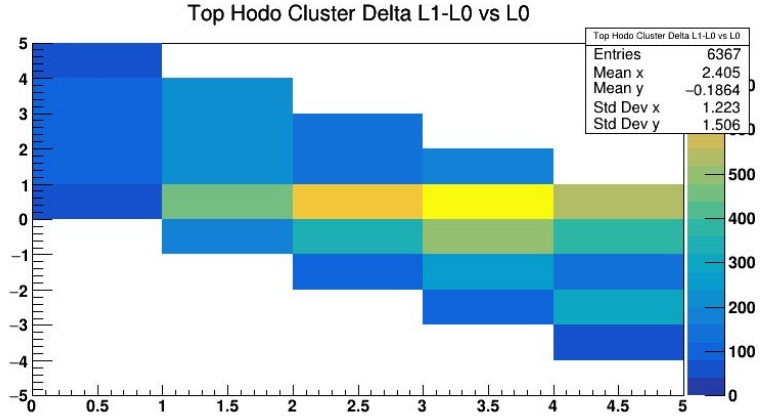

Made simple cuts:
ADC > 200 counts
|time-43|<10ns

Cleans things up, with spikes at 0 and 2 clusters (this is over both top+bottom and L0/L1)

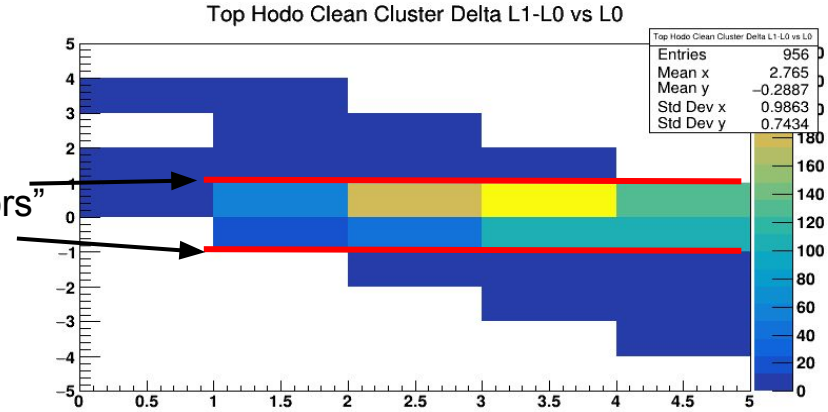


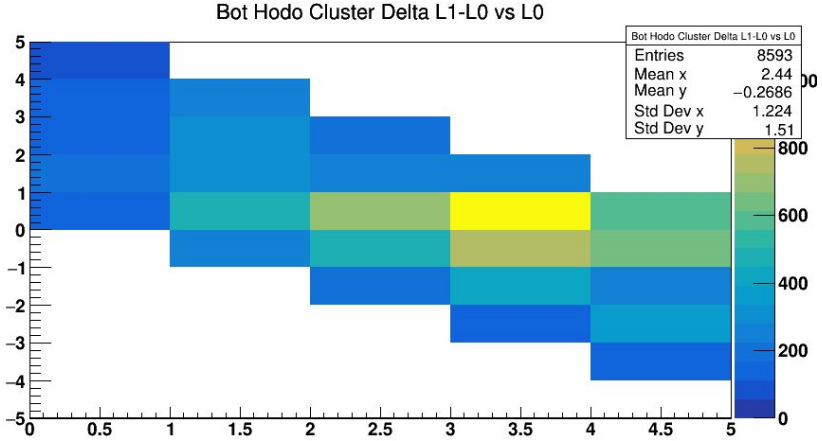



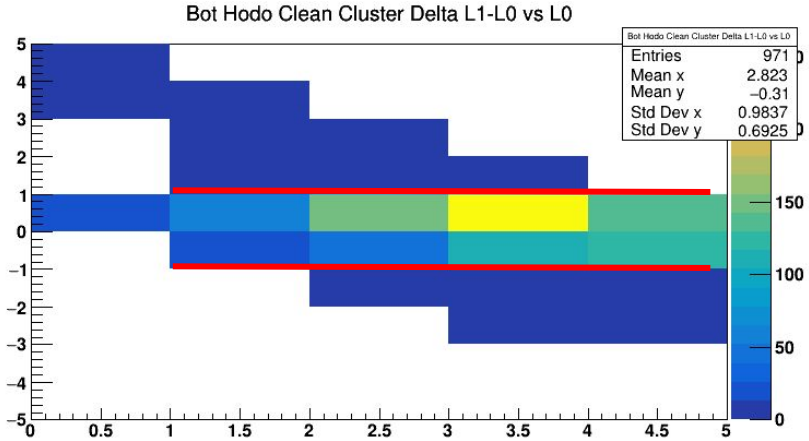
# L1-L0 Delta(Tile) before & after “clean”



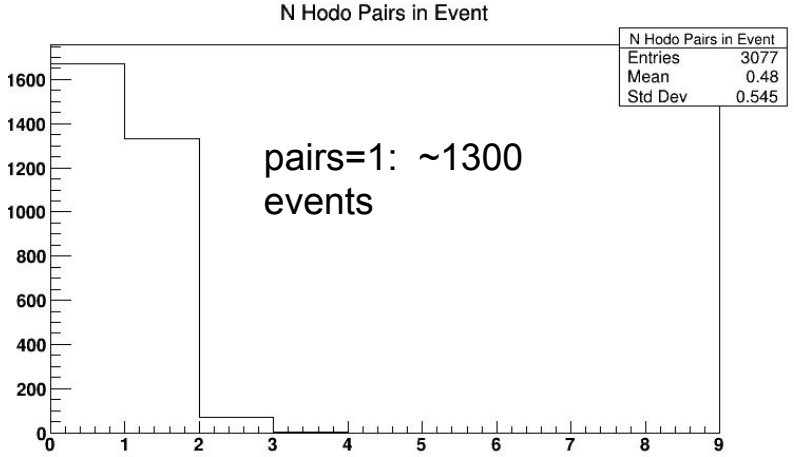

“neighbors”

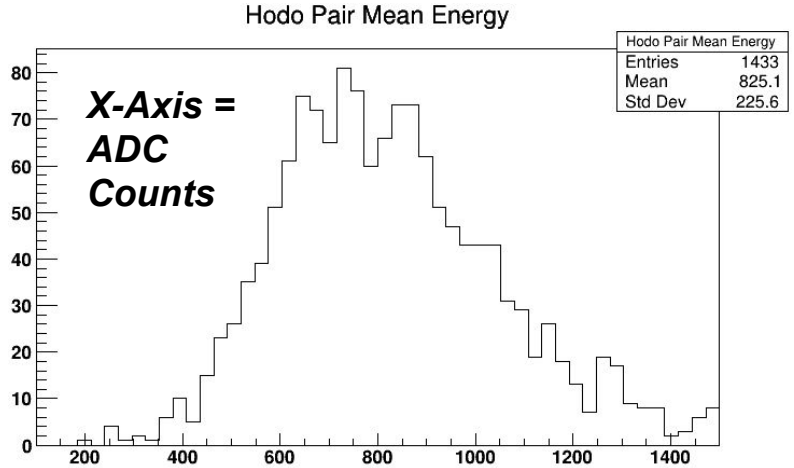


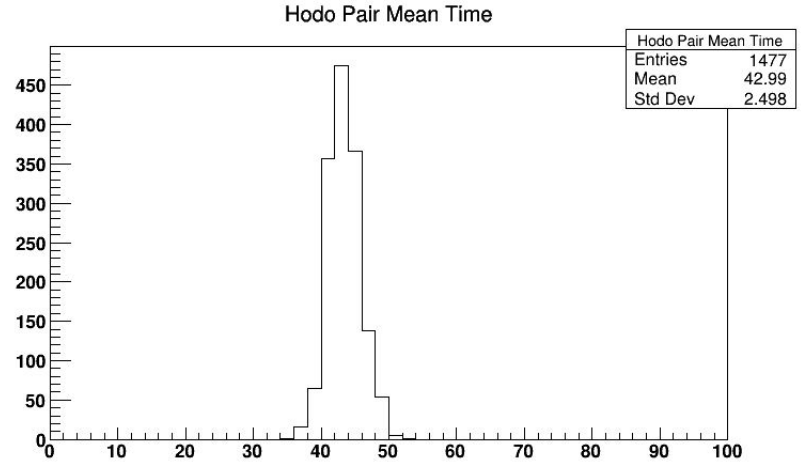



# Hodoscope L0-L1 Pairs

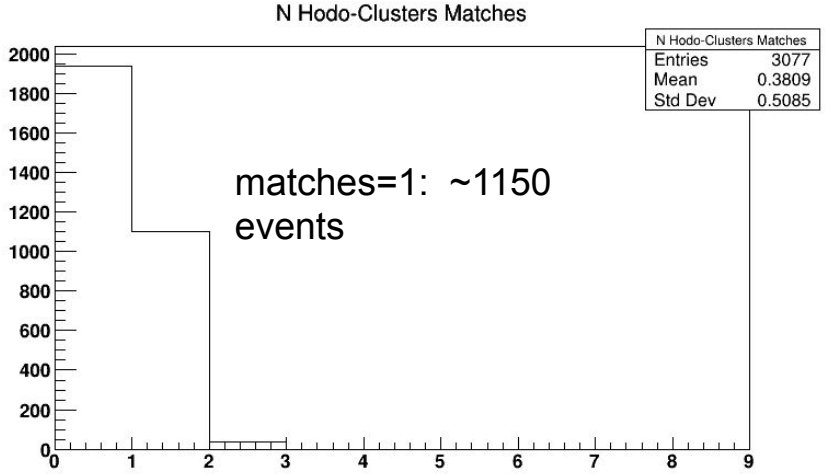


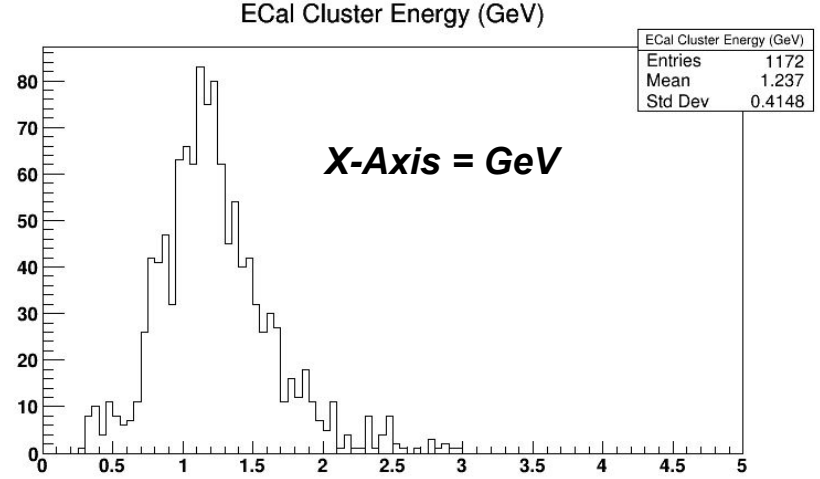




To make an L0/L1 pair, loop over clean L0 clusters and match with clean neighboring L1 cluster; if two L1 neighboring clusters exist, just pick the one with the highest ADC counts (kludge).



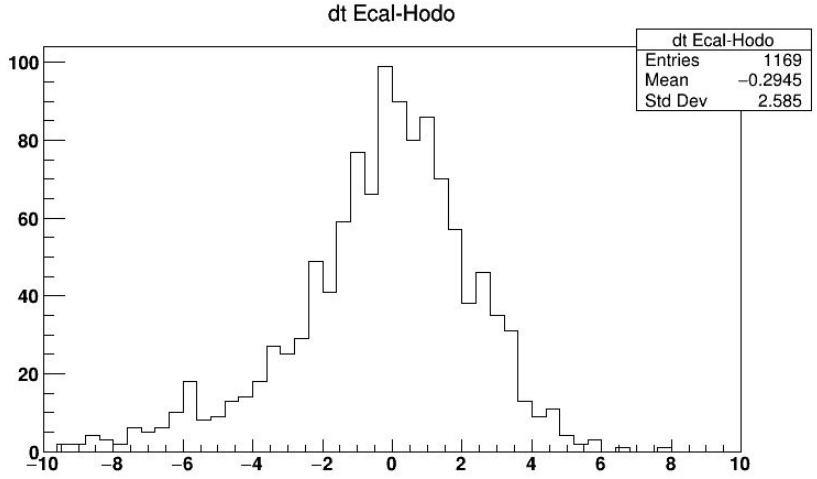
# Hodo Pair-ECal Matches



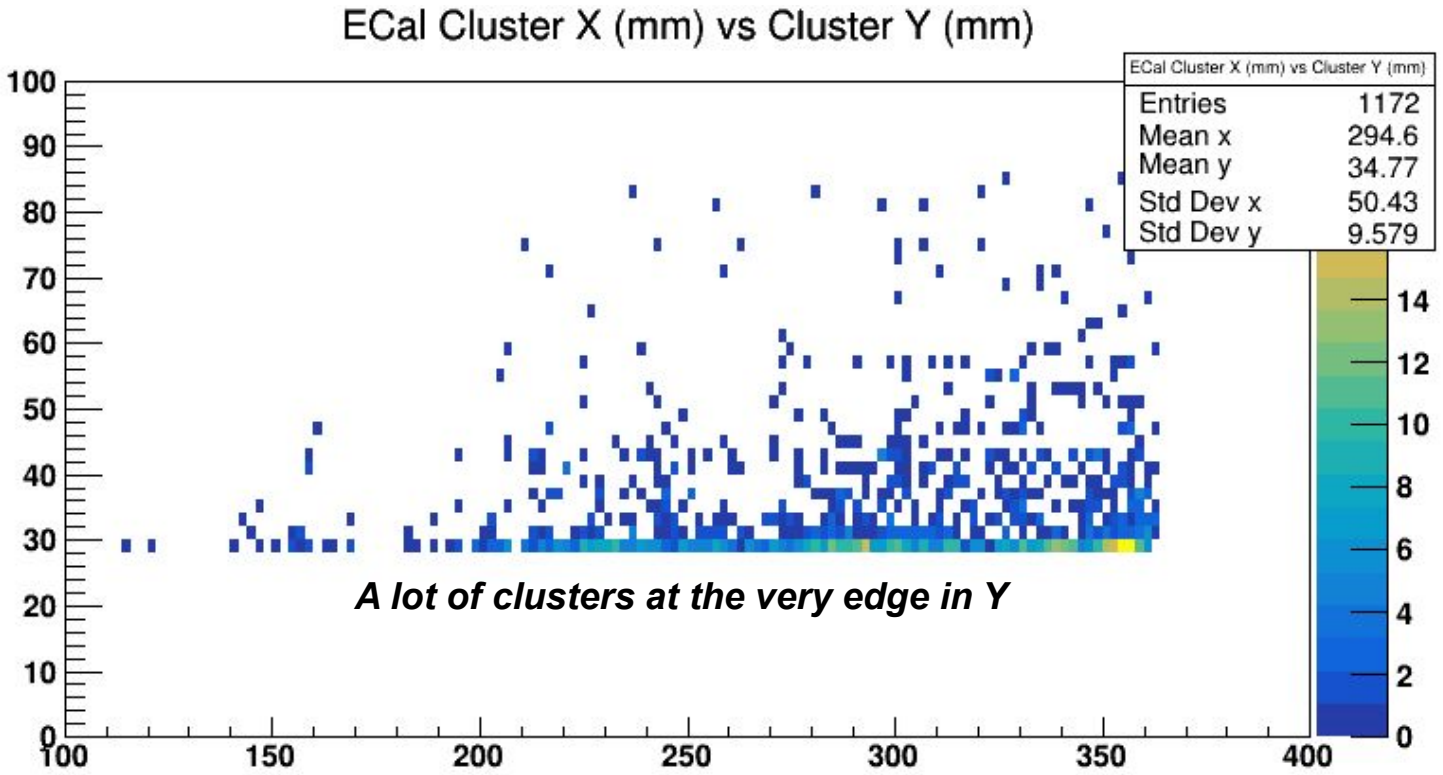




Used Rafo's existing Hodo-ECal matcher to do this matching...haven't really looked at what this does but I'm sure it's great.

From this, we see ~11% of events with 1 hodo-pair+ECal cluster match and they look pretty reasonable...should be mostly real positrons!



# Hodo-ECal Matched Cluster |Y| vs X



# The end for now

- The hodo L0+L1 + ECal seem to clean up pretty well
  - I probably want to require that just a single L0/L1 pair pass the even
  - Some of the cuts may need to be tuned as well
- I’m somewhat concerned that so many of the events have (single-hit?) clusters in the ecal layer at the gap...could be tracks showing in vacuum box and we may not find these tracks
- I’ve (of course) looked at tracks matching these (hodo+ecal) clusters but I’m not ready to show (read as: doesn’t make sense)...I think I’m seeing multiple instances of same track; need to run some disambiguation on the tracks.