SpacePoint Quality Indexing

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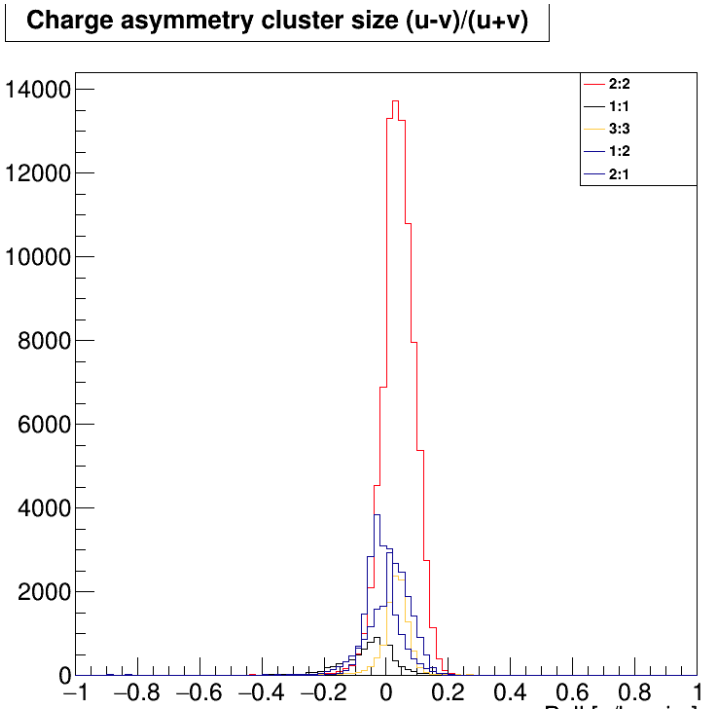
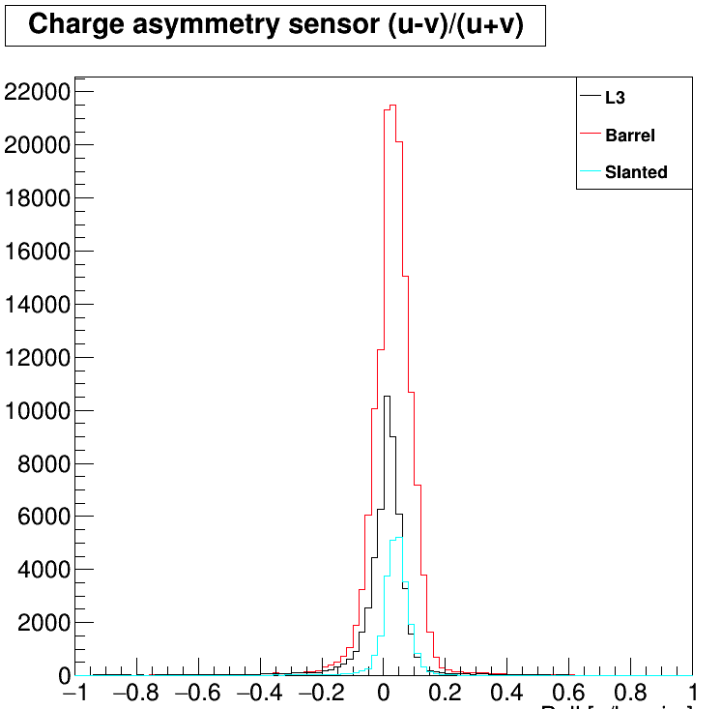
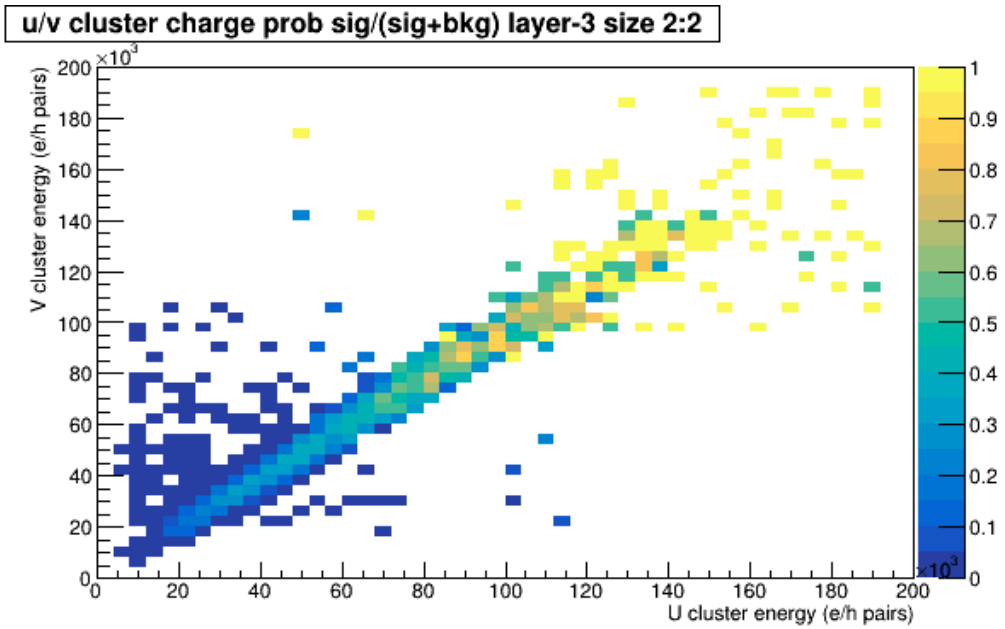
- Idea to make use of the different cluster hit times and energy characteristics to discern between signal and ghost clusters.
- In assigning a quality estimation the probability of a cluster being result of a signal hit is determined from 2d pdfs with each bin P=$\frac{sig}{sig+bkg}$
- All results obtained using CoG clusterizer.
- In each pdf sample 25k Υ(4S) generic decays have been used.

Charge Asymmetry

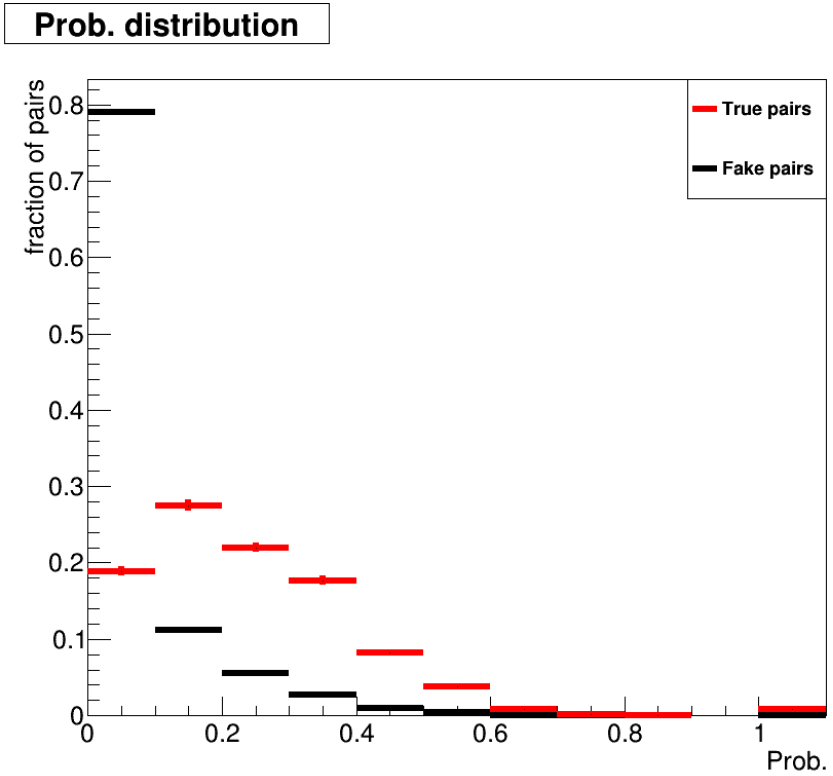




- Sensor topology and size of cluster play part in charge asymmetry.
- Pull = $\frac{u-v}{u+v}$
- Separate pdfs defined for each sensor type and u/v cluster size.

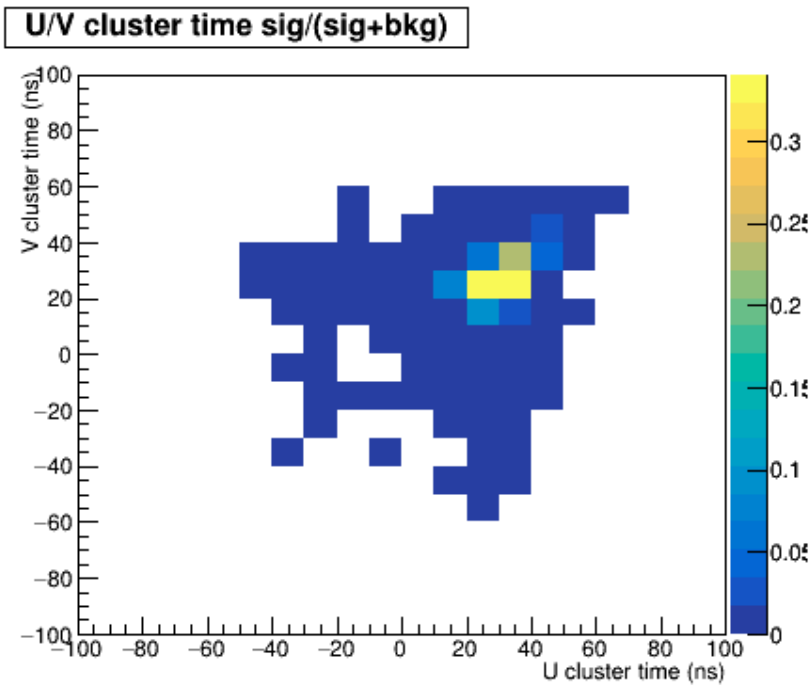


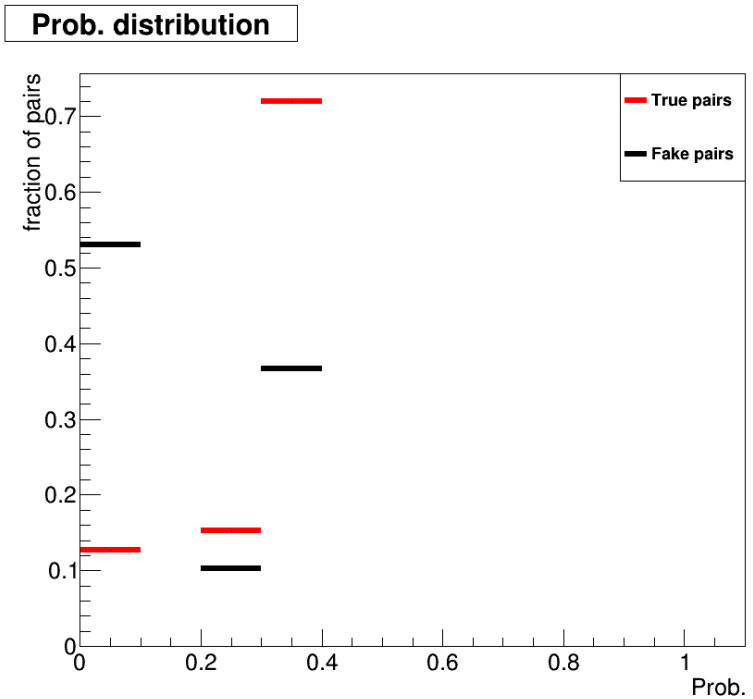
- Prob of clusters being correlated determined by pdfs.
- Each bin representing the probability of a pair coming from a signal hit. $\frac{sig}{sig+bkg}$



- Result limited to clusters of size 2 or 3 on layer-3 due to limited statistics
- Distribution of Q.I assigned to Spacepoints (True pairs and mismatch/background pairs)

HIT TIME



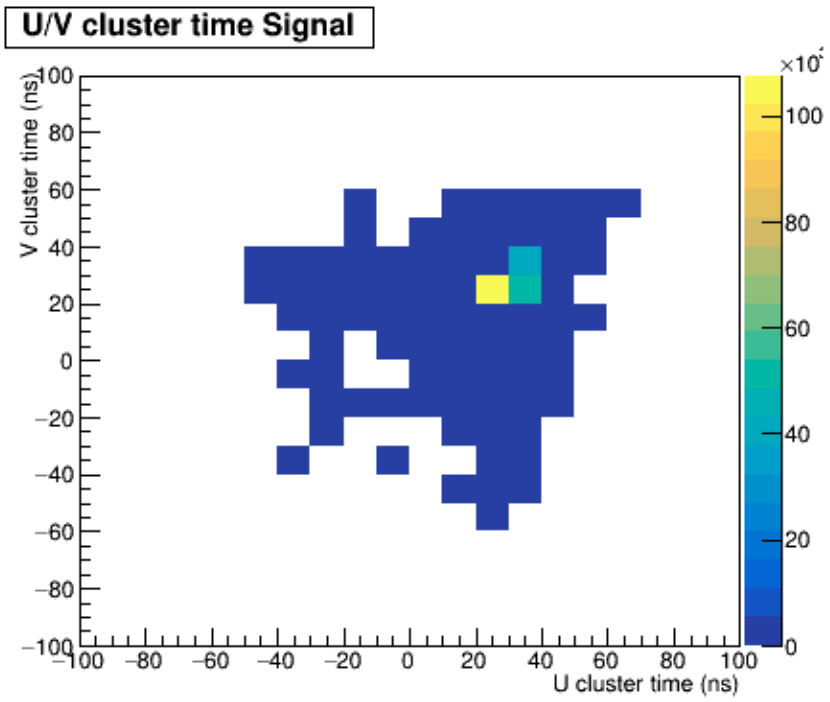


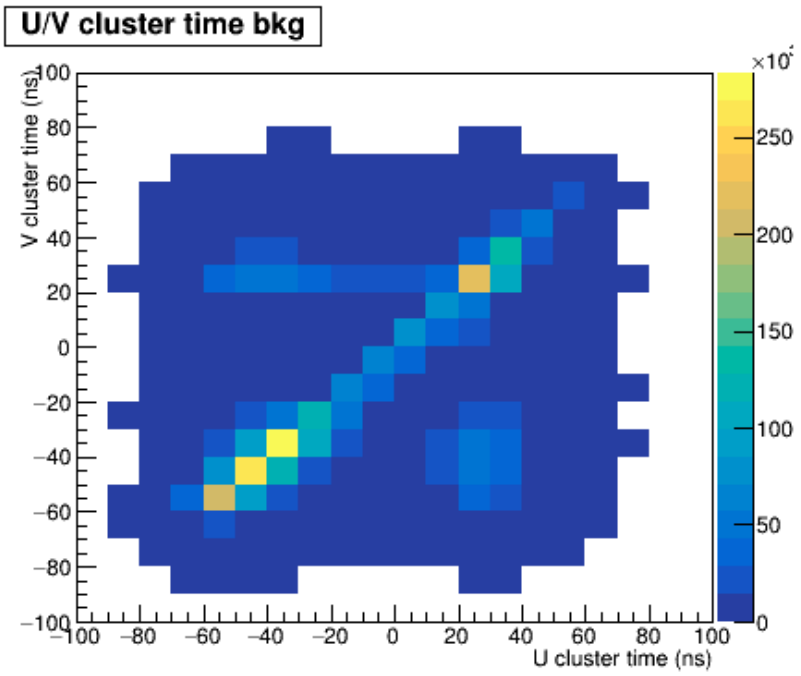
- A hit time correlation Q.I can also be used to discriminate true pairs from ghost pairs.

Summary

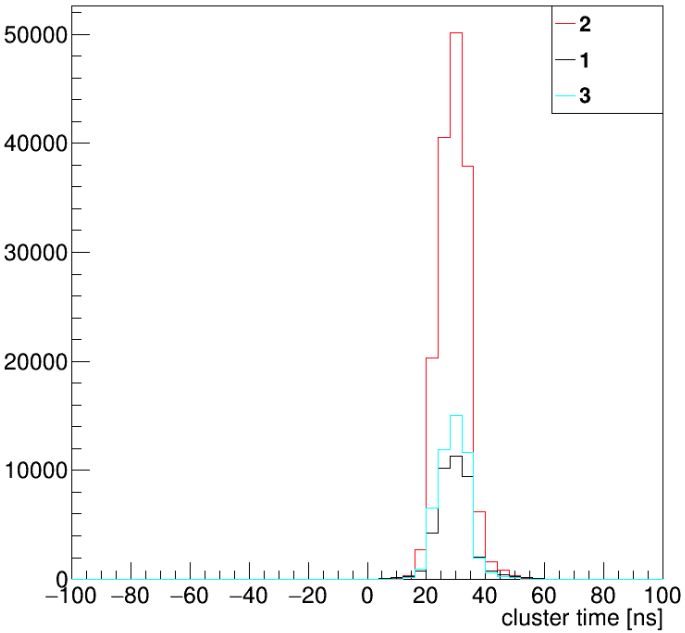
- We have the ability to provide Q.I values based on the cluster and hit time correlations when pairing clusters during spacepoint creation.
- Q.I from timing having more impact in discrimination of ghost hits.

BACKUP SLIDES

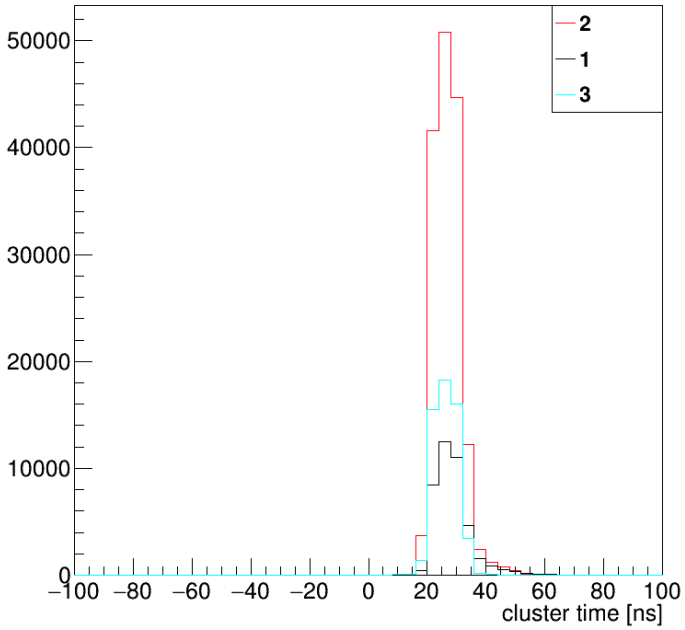


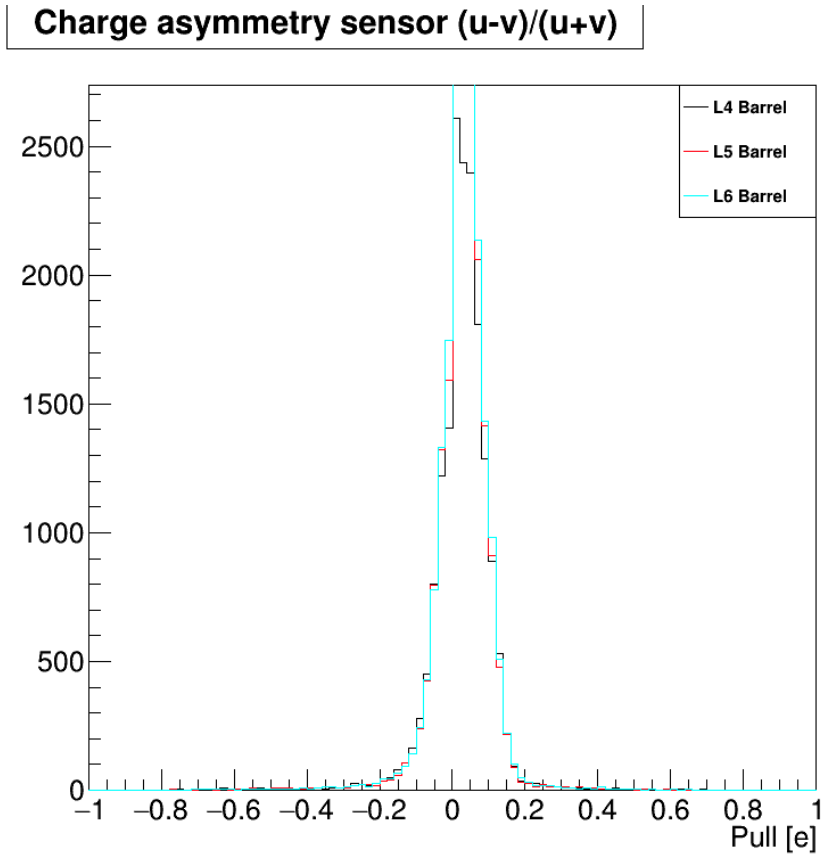


Signal time/charge u-clusters



Signal time/charge v-clusters




Charge asymmetry sensor (u-v)/(u+v)
L4 Barrel
L5 Barrel
L6 Barrel
2500
2000
1500
1000
500
0
−1
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
Pull [e]