

About efficiency of TDR algorithms (GSI 2003 beam test)

(preliminary results)

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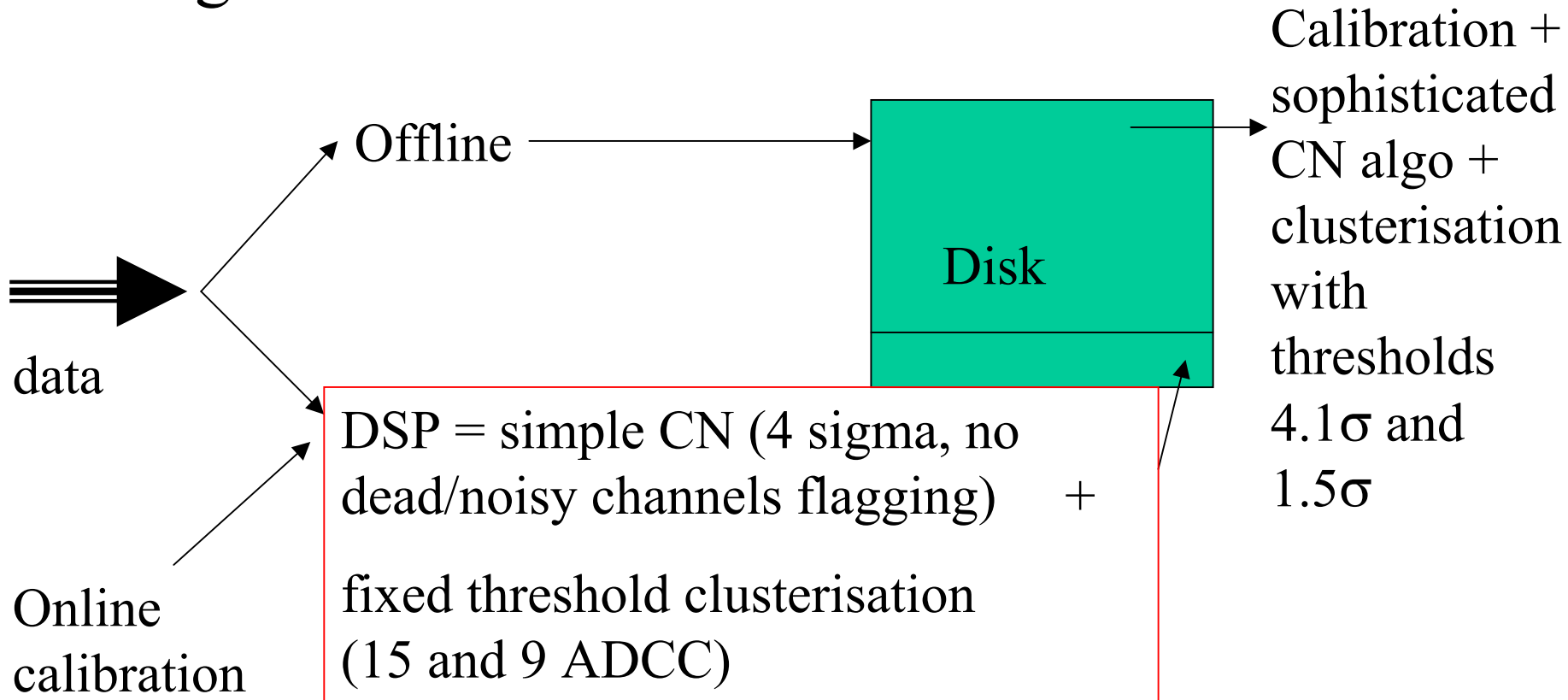
Somewhere near Montpellier, June 22nd, 2004

Outlook

- The goal and scheme
- Definition of good events
- Clusters in Offline and DSP
- Channels in Offline and DSP
- Clusters found **ONLY IN** Offline
- Clusters found only in DSP
- Summary

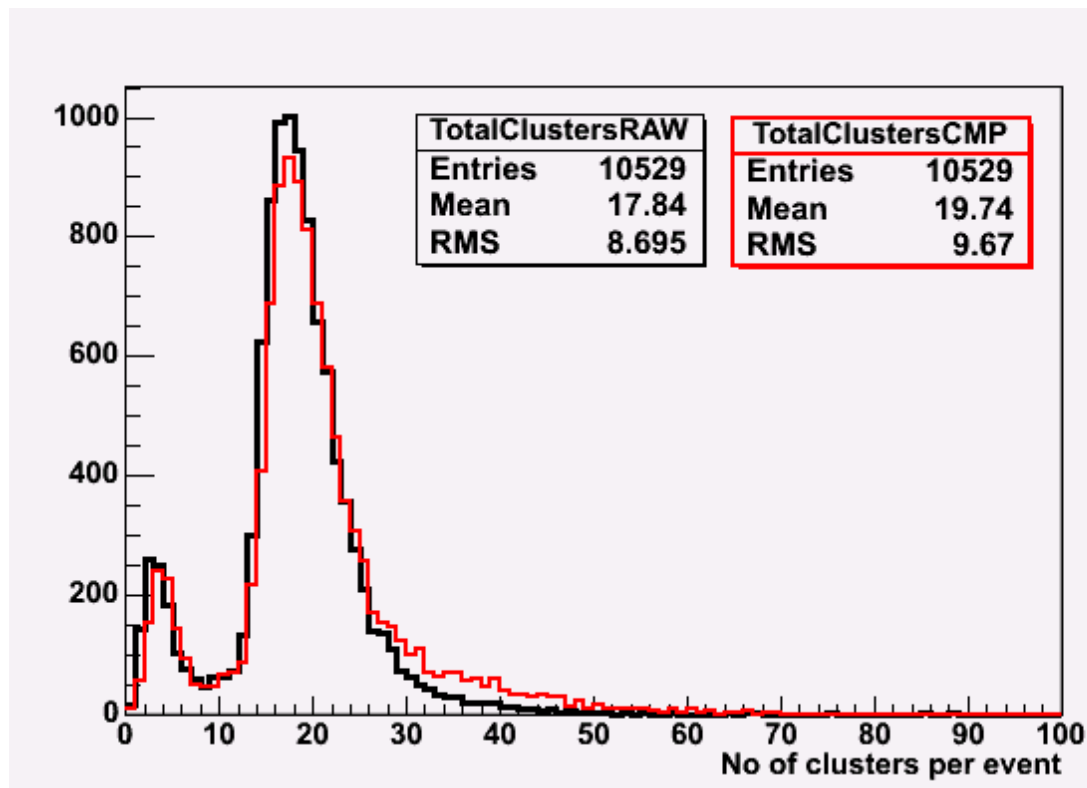
The goal

Compare efficiencies of the online and offline algorithms of data reduction



Difficult to reconstruct DSP algorithm Offline

Run 256
- boron



Simulation of
the DSP
clusterisation
algorithm

We have not
stored
information
about value
of CN
calculated in
DSP

What events we have?

We got some trash in events

(like events with no clusters)

→ trigger from external scintillators
sometimes did not work too good.

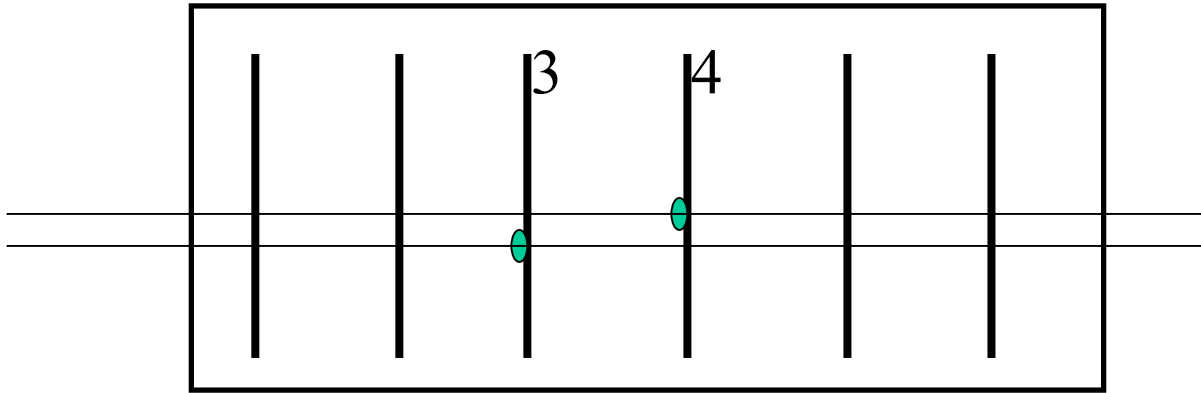
How to choose good events?

First proposition:

at least one track in RAW data

→ we reject events with $N_{clusters} < 2$

Track - definition



if($\text{abs}(\text{CoG}(3) - \text{CoG}(4)) < 2$ channels)

if(clusterA and clusterB does not belong to any track)

create new track

else

join clusterB (or A) to track containing clusterA (or B)

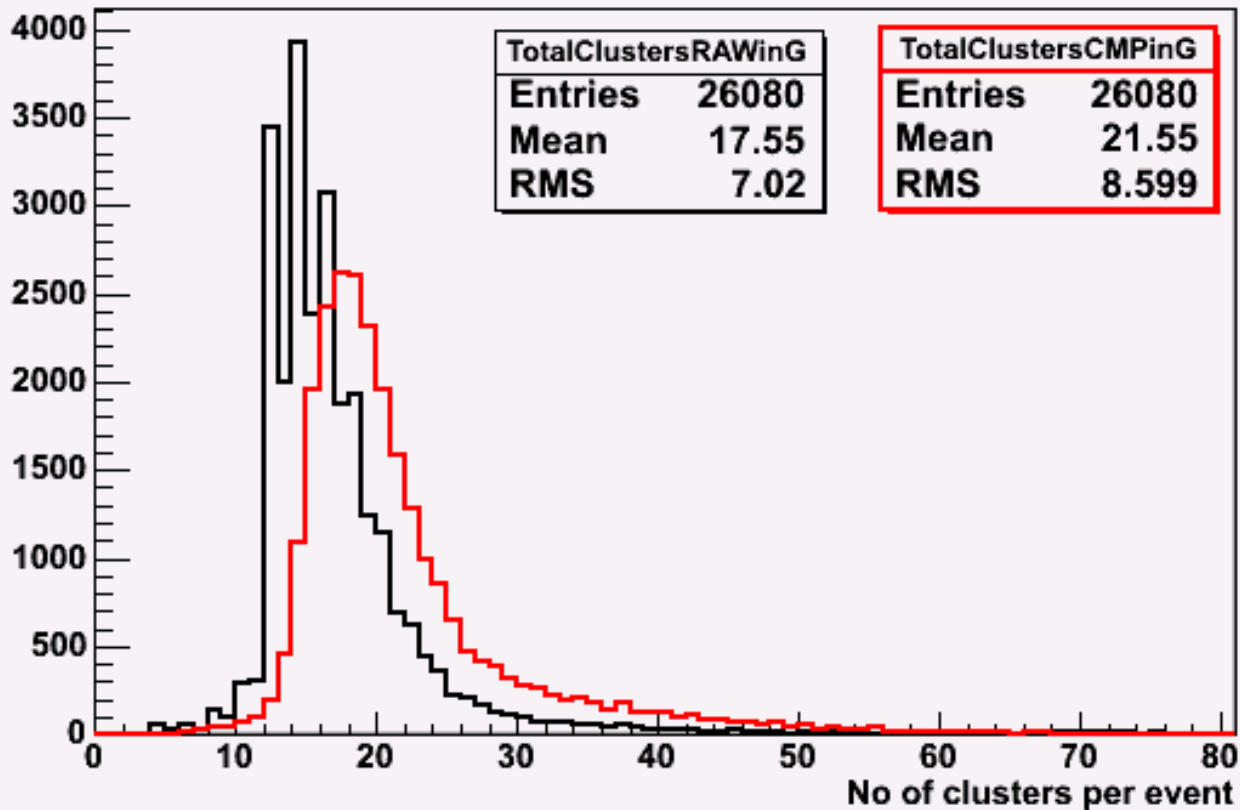
Clusters

In average

Offline sees: 17.6 clusters per event
and DSP sees: 21.6 clusters per event

This difference is mainly due to clusterisation algorithm (not due to lack of dead channel flagging in DSP algorithm)

Total number of clusters



DSP always finds more clusters than Offline

Channels

In average

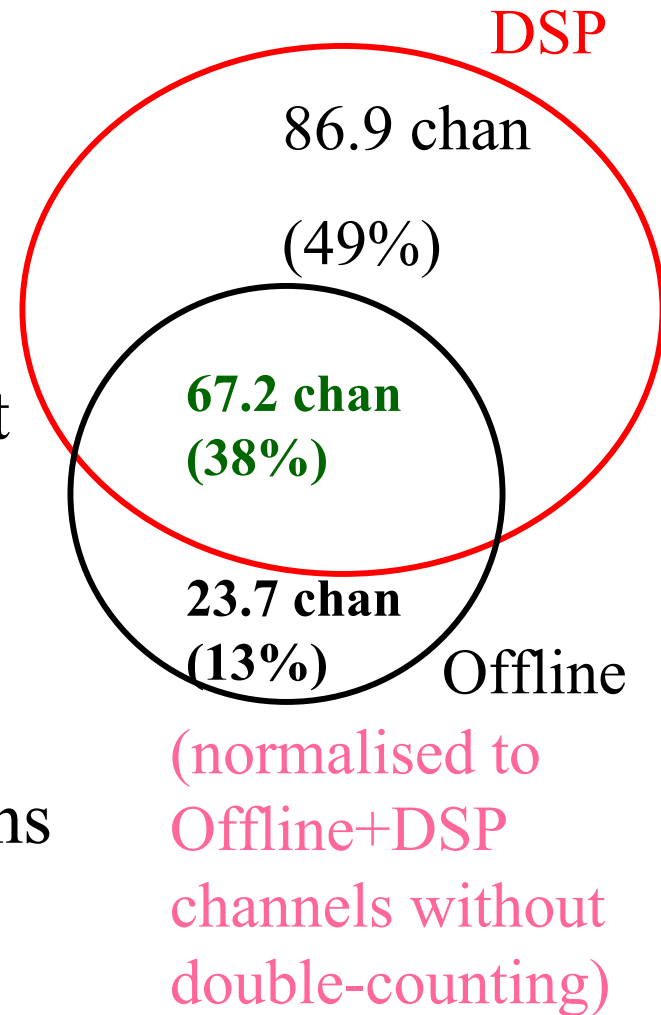
DSP sees: 154.1 channels per event

Offline sees: 90.9 channels per event

in each event there are in average

67.2 channels registered in both chains

So there are 23.7 channels chosen by Offline but not chosen by DSP. **WHERE ARE THEY?**



Channels -> Clusters

If we emulate the DSP clusterisation algorithm in Offline, the amount of channels

picked by Offline but not picked by DSP

decreases to 4.4 per event

→ So it is mainly fault of the clusterisation algorithm

For each event we have:

- 1.2 clusters found by only Offline (7.7% of all Offline clusters)
- 5.6 clusters found only in DSP (mainly because of too low CN estimation in DSP)
- 3.8 exactly the same clusters
- 11.8 clusters overlapping in Offline and DSP but not exactly the same

Channels -> Clusters

If we emulate the DSP clusterisation algorithm in Offline, the amount of channels

picked by Offline but not picked by DSP

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For each event we have:

- 1.2 clusters found by only Offline (7.7% of all Offline clusters) → Potential lost of information
- 5.6 clusters found only in DSP (mainly because of too low CN estimation in DSP) → fake
- 3.8 exactly the same clusters → OK → to be investigated
- 11.8 clusters overlapping in Offline and DSP but not exactly the same

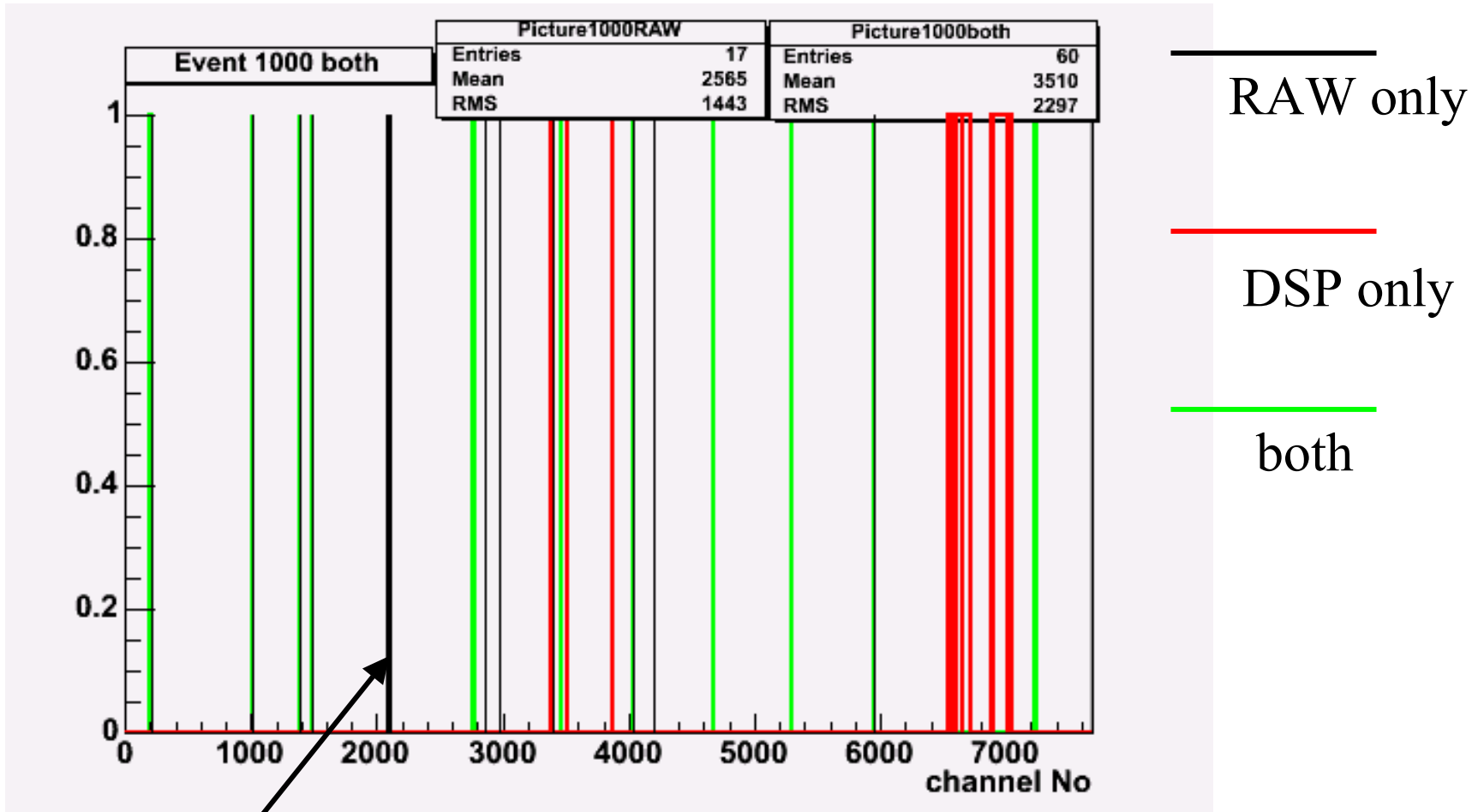
Cluster/channel budget

	channels Number / %	clusters Number / %
DSP-only	86.9 / 49%	5.6 / 25%
Offline-only	23.7 / 13%	1.2 / 5%
common	67.2 / 38%	15.6 / 70%
		(3.8 / 17%)

identical

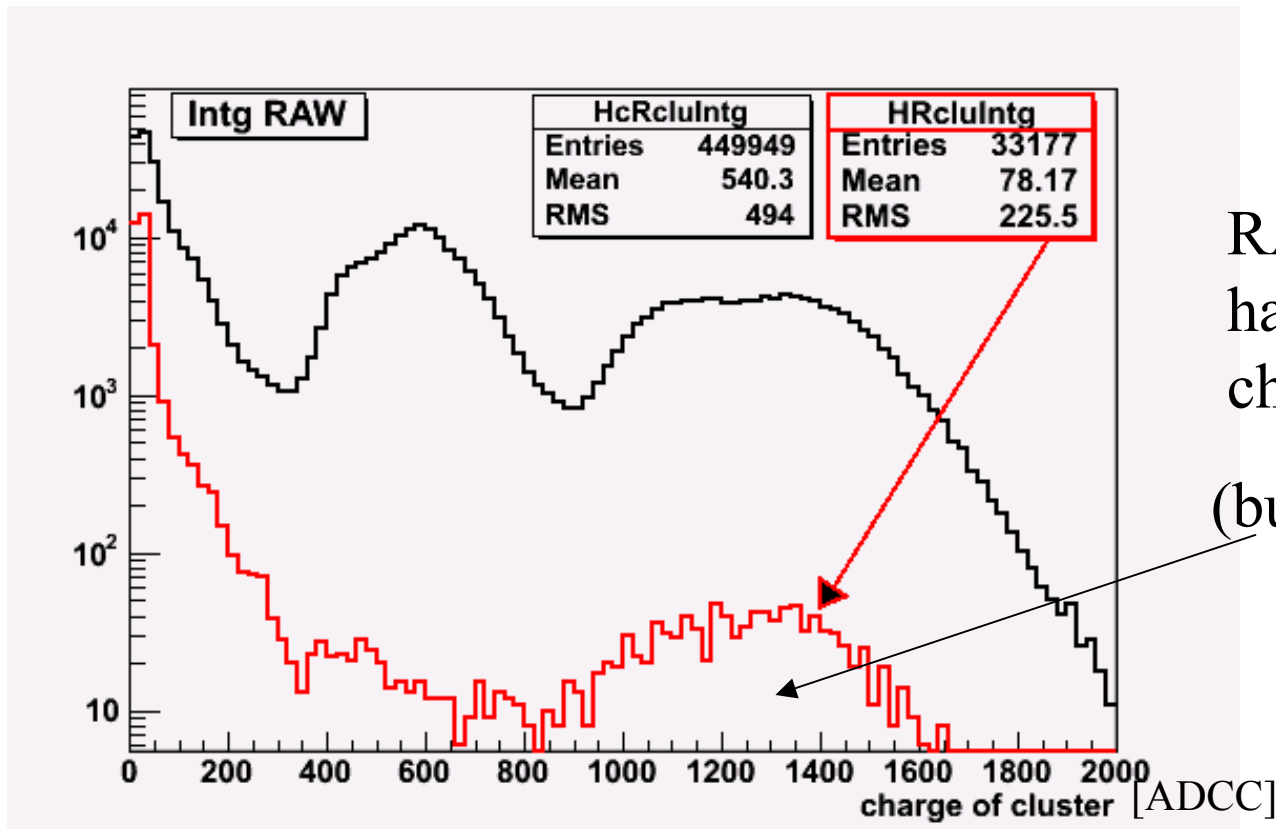


Example: event No 1000



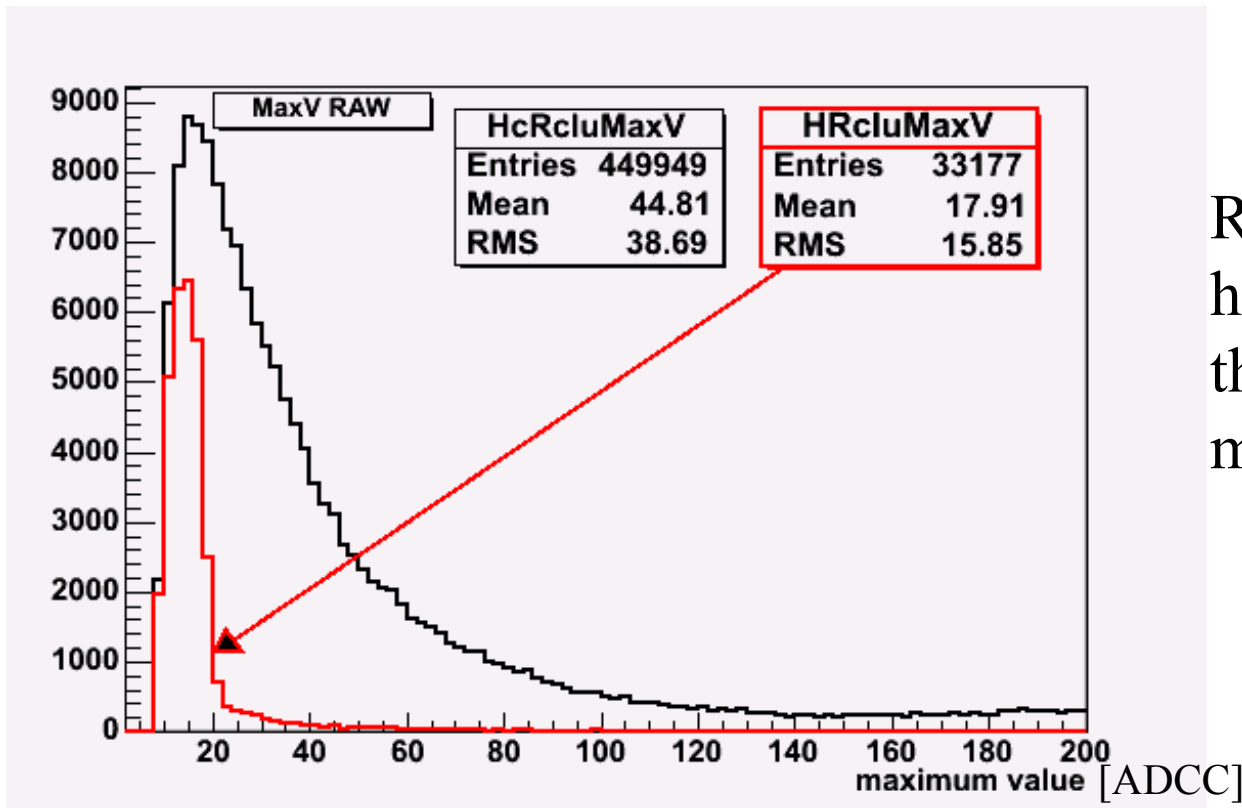
RAW-only
cluster

What features of the Offline-only clusters makes them invisible in DSP? (1)



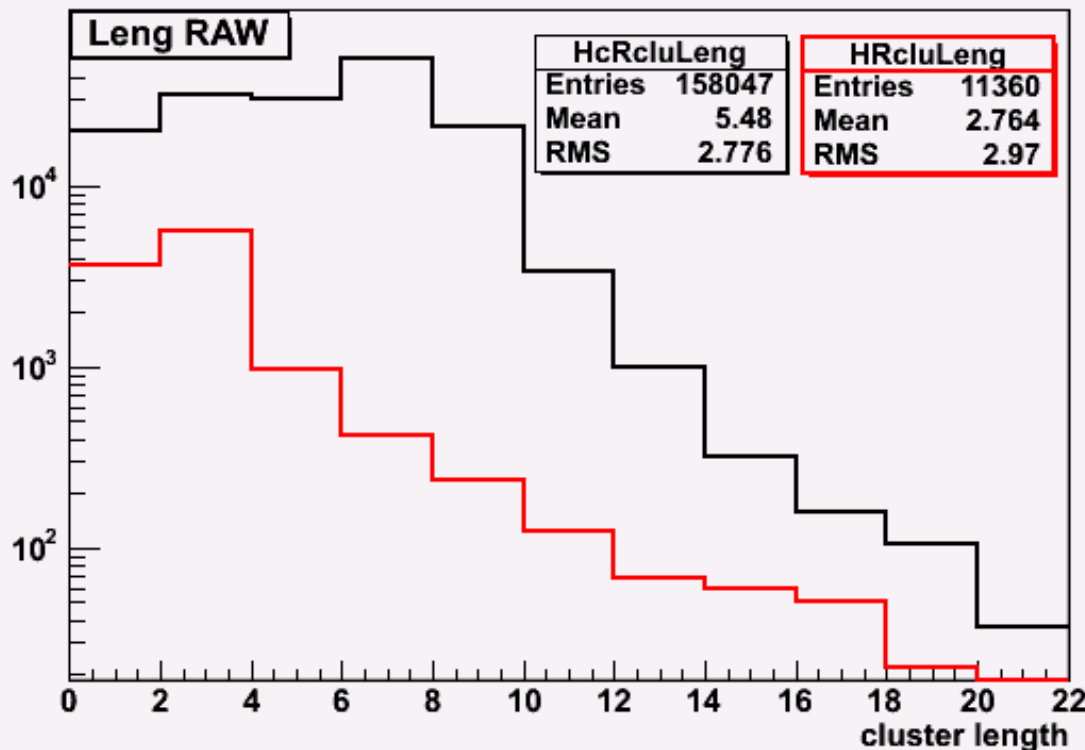
RAW-only clusters
have small integrated
charge
(but not all)

What features of the Offline-only clusters makes them invisible in DSP? (2)



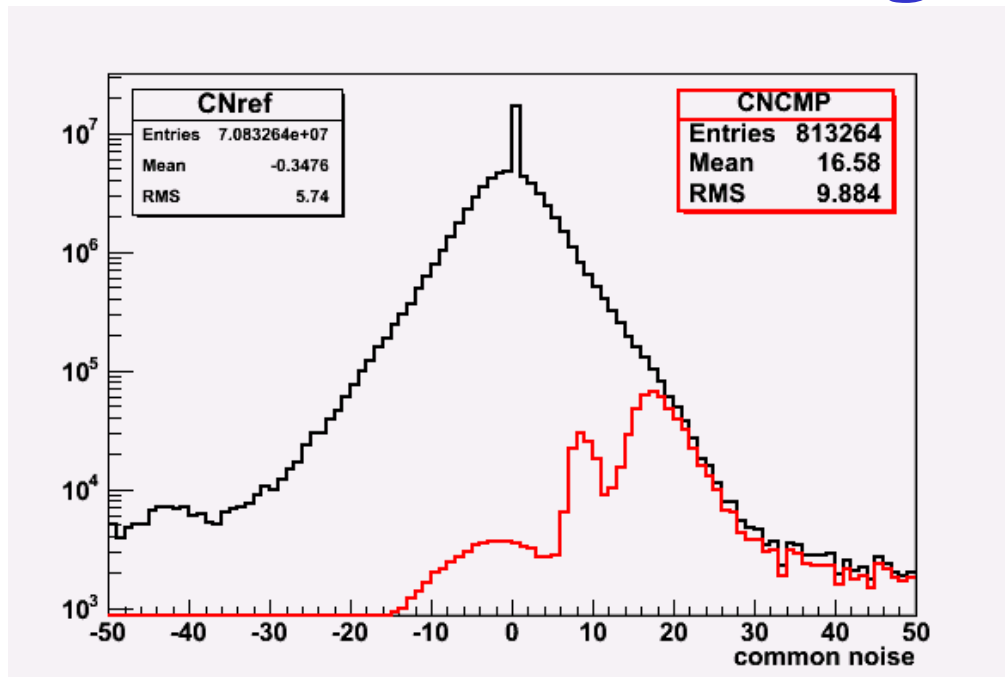
RAW-only clusters have small signal in the channel with maximum value

What features of the Offline-only clusters makes them invisible in DSP? (3)



RAW-only clusters are shorter

What features of the DSP clusterisation algorithm makes some clusters not detectable by Offline algorithm?



These fake clusters come mainly from high-CN VAs; DSP algorithm as it is, underestimates CN

Conclusions

1. DSP algorithm is good in first approximation
2. The clusters we loose in DSP algorithm (average 1.2 per event) are small and have low value of channel with maximal value
3. There are channels at the ends of clusters which are lost in DSP algorithm (further studies)
4. The fake clusters come mainly from high-CN VAs where DSP algorithm underestimates CN