

GSI beamtest : some results concerning data reduction

Mariusz Sapinski

Outlook

- Channel status - examples
- Common Noise calculation methods
- Tracks

Channel status quality flag

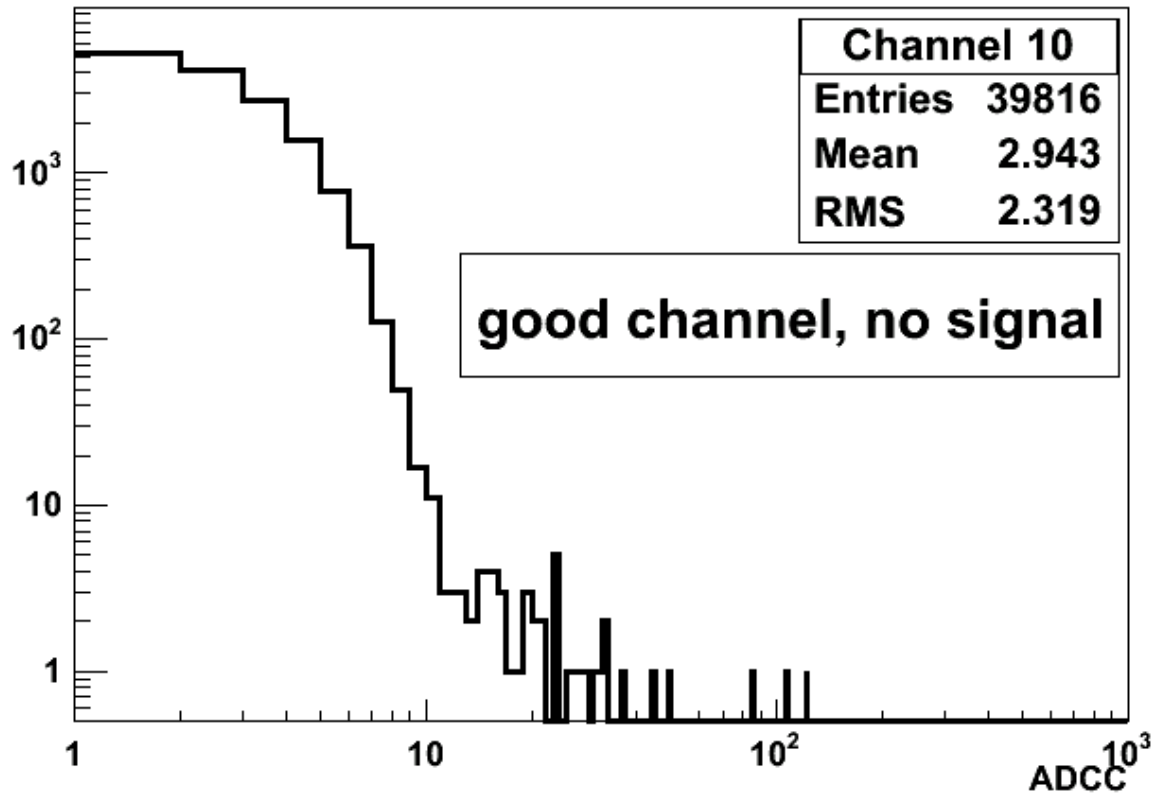
- Bit 0 : $\sigma_{\text{raw}} < \sigma_{\text{thr1}}$
- Bit 1 : $\sigma_{\text{raw}} > \sigma_{\text{thr1}}$
- Bit 2 : $\sigma_{\text{final}} < \sigma_{\text{thr}}$
- Bit 3 : $\sigma_{\text{final}} > \sigma_{\text{thr}}$
- Bit 4 : $\text{Pedestal} - 3 * \sigma_{\text{raw}} < 5$
- Bit 5 : $\text{Pedestal} + 3 * \sigma_{\text{raw}} > 4090$
- Bit 7 : NonGaussian

Offline calibration

- Calibration is performed on 640 events
- Ev 1-129: first estimation of pedestals and sigma
- Ev 130-257: compute pedestals
- Ev 258-385: compute sigma raw + flag bits: 0,1,4,5
- Ev 386-513: compute sigma final + flag bits:2,3
- Ev 514-640: find nonGaussian (bit 7)

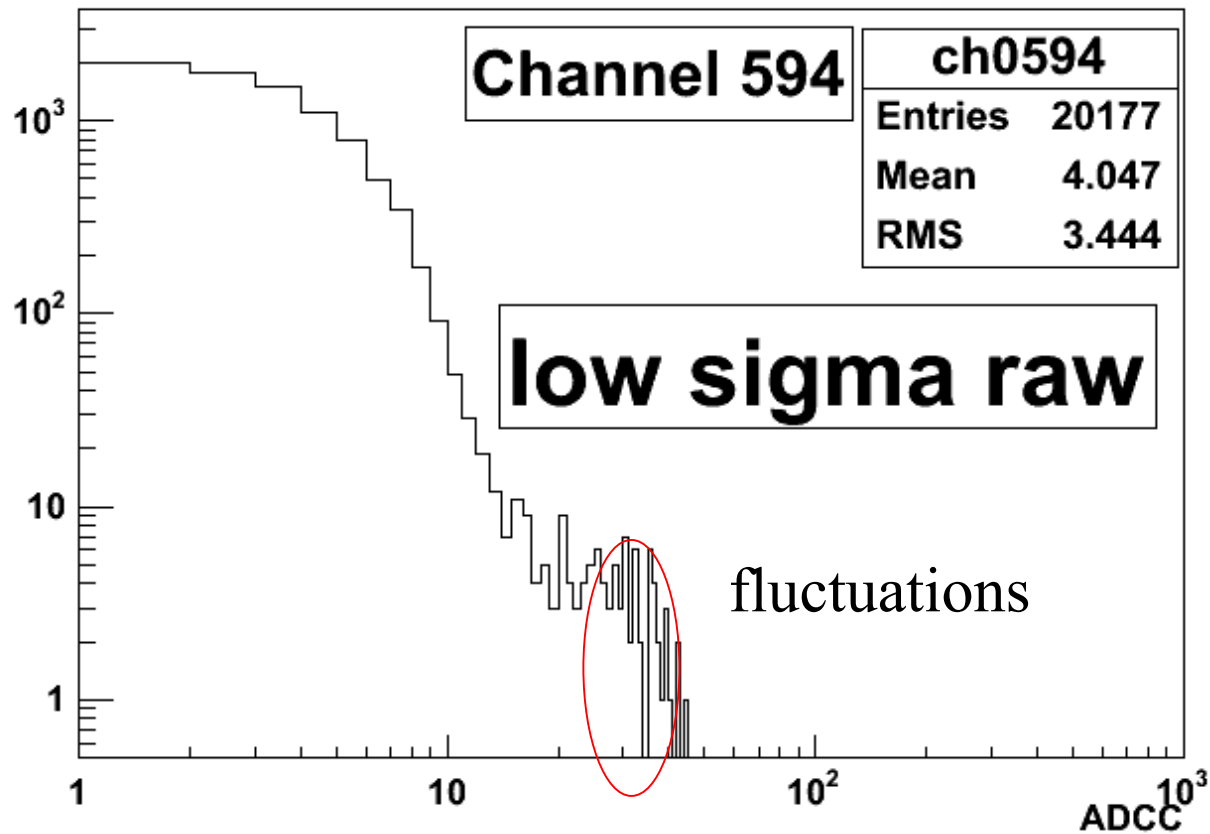
Calibration is performed at the beginning and every time there are off-spill events in the data file

Good channel

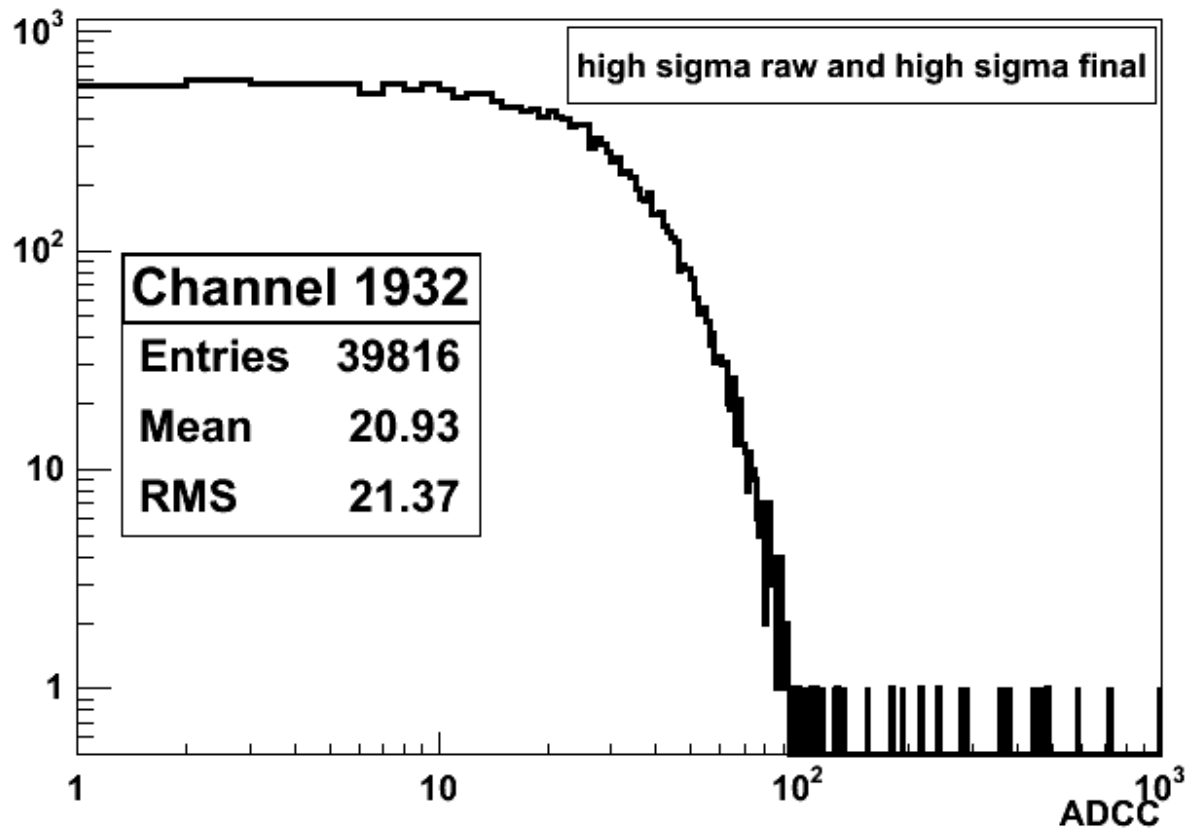


Signal after pedestal and common noise subtraction

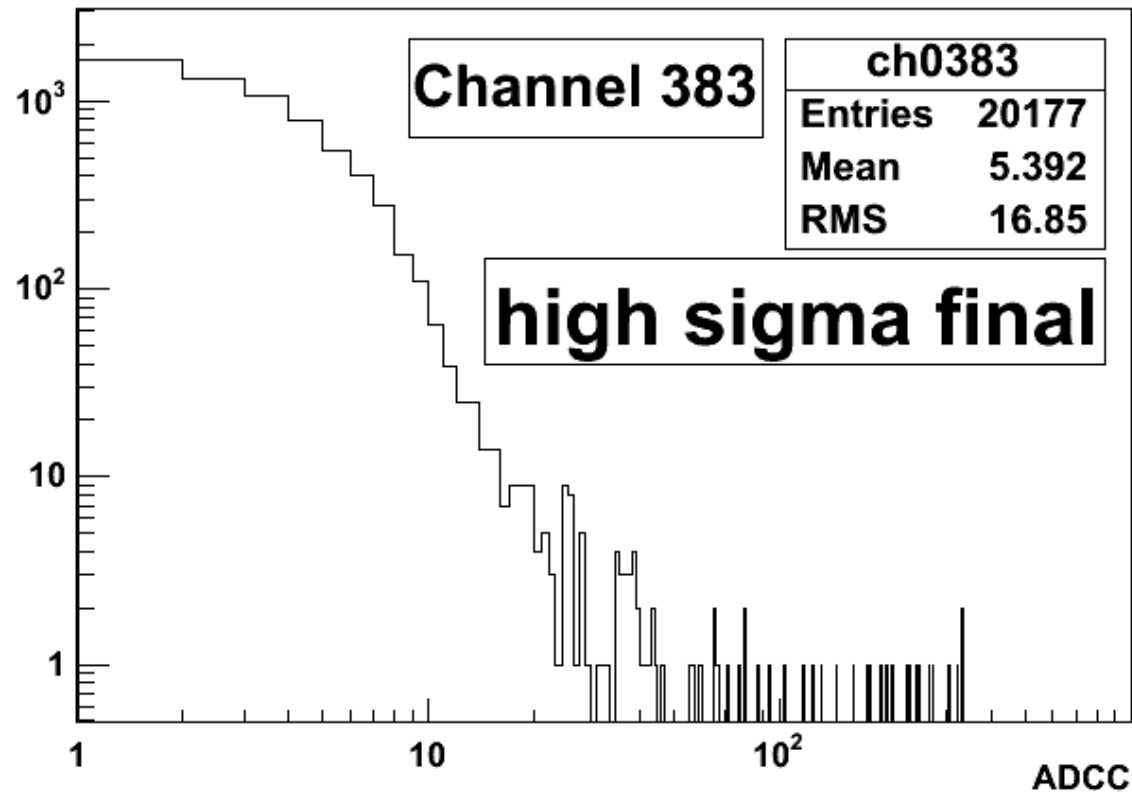
Bit 0



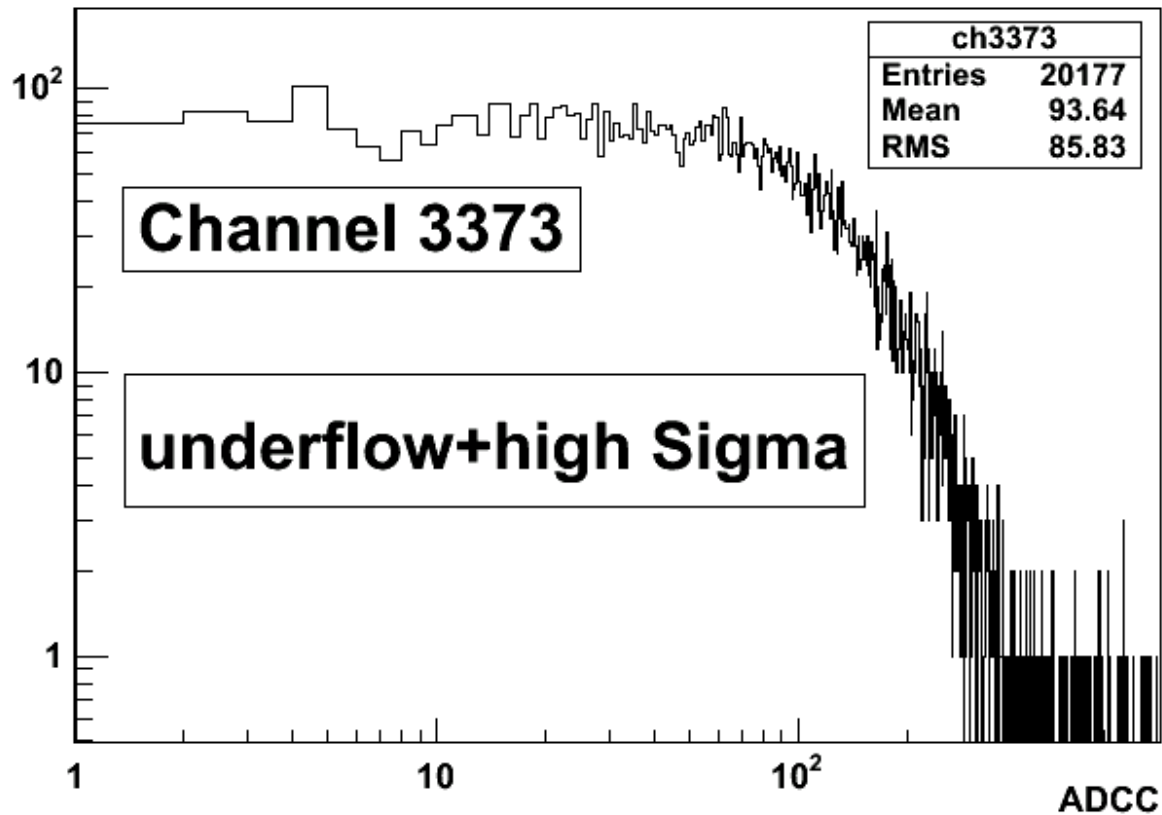
Bit 1 and 3



Bit 3



Bit 4 and 3 and 1



Definition of nonGaussian

If

during the last phase of calibration

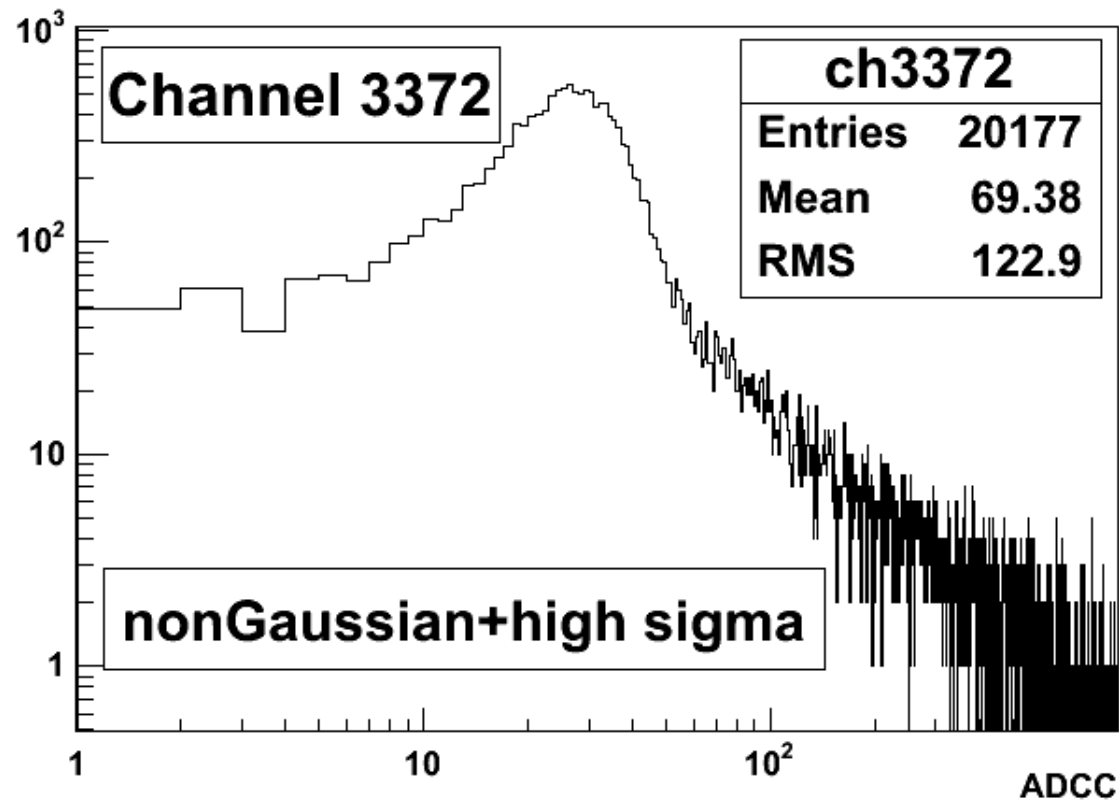
for more than 5% of events:

$$\text{ADC-Pedestal-CN} > 3 \cdot \sigma_{\text{raw}}$$

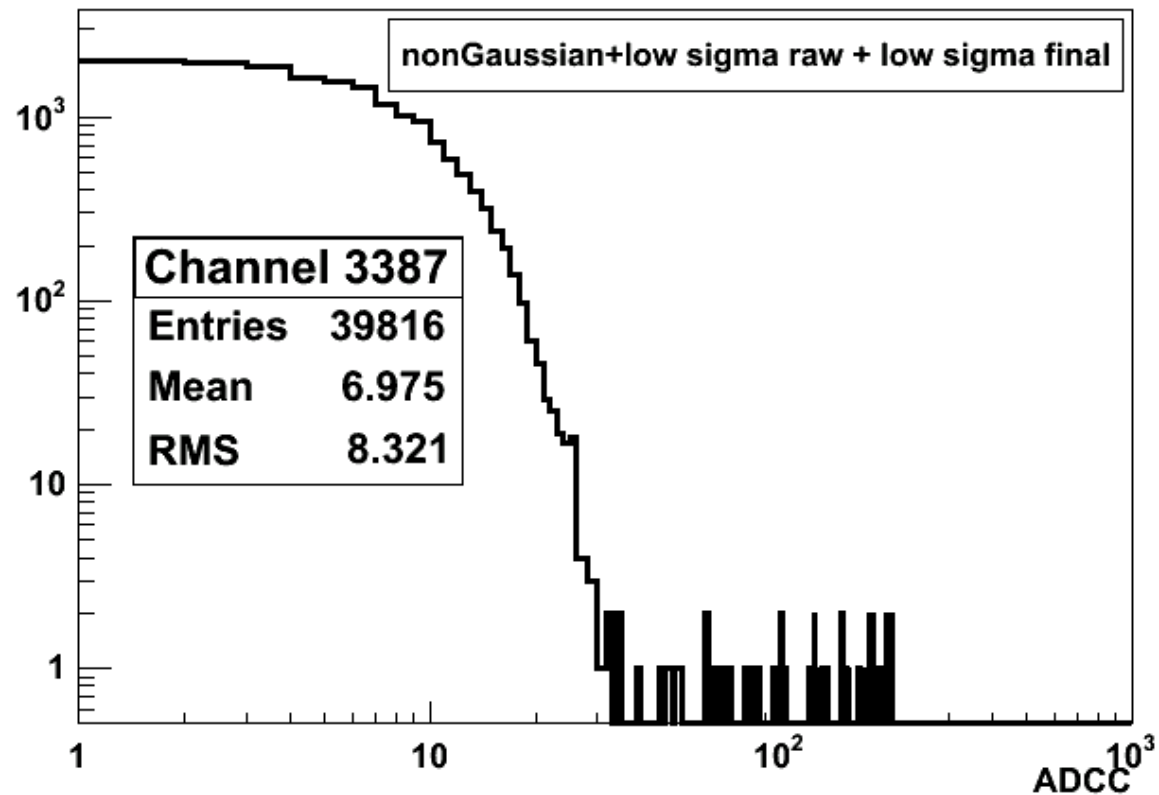
than

channel is marked as **nonGaussian (bit 7)**

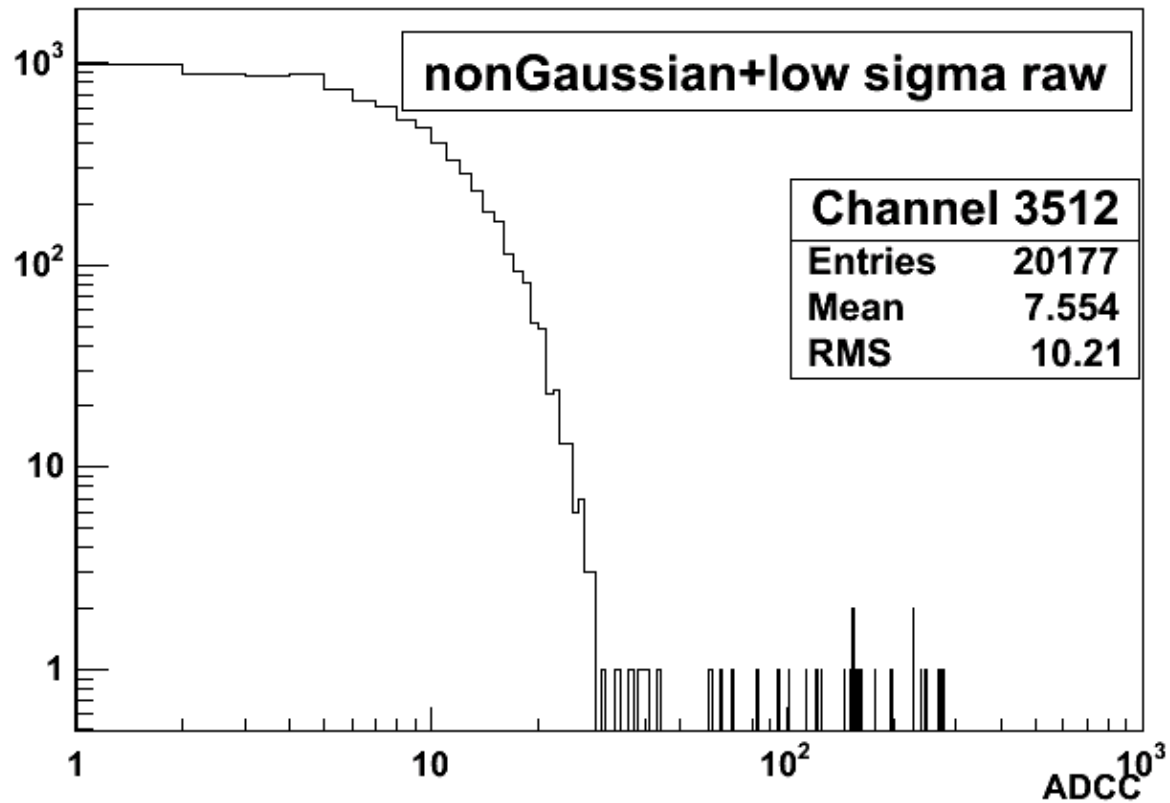
Bit 7 and 1 and 3



Bit 7 and 0 and 3

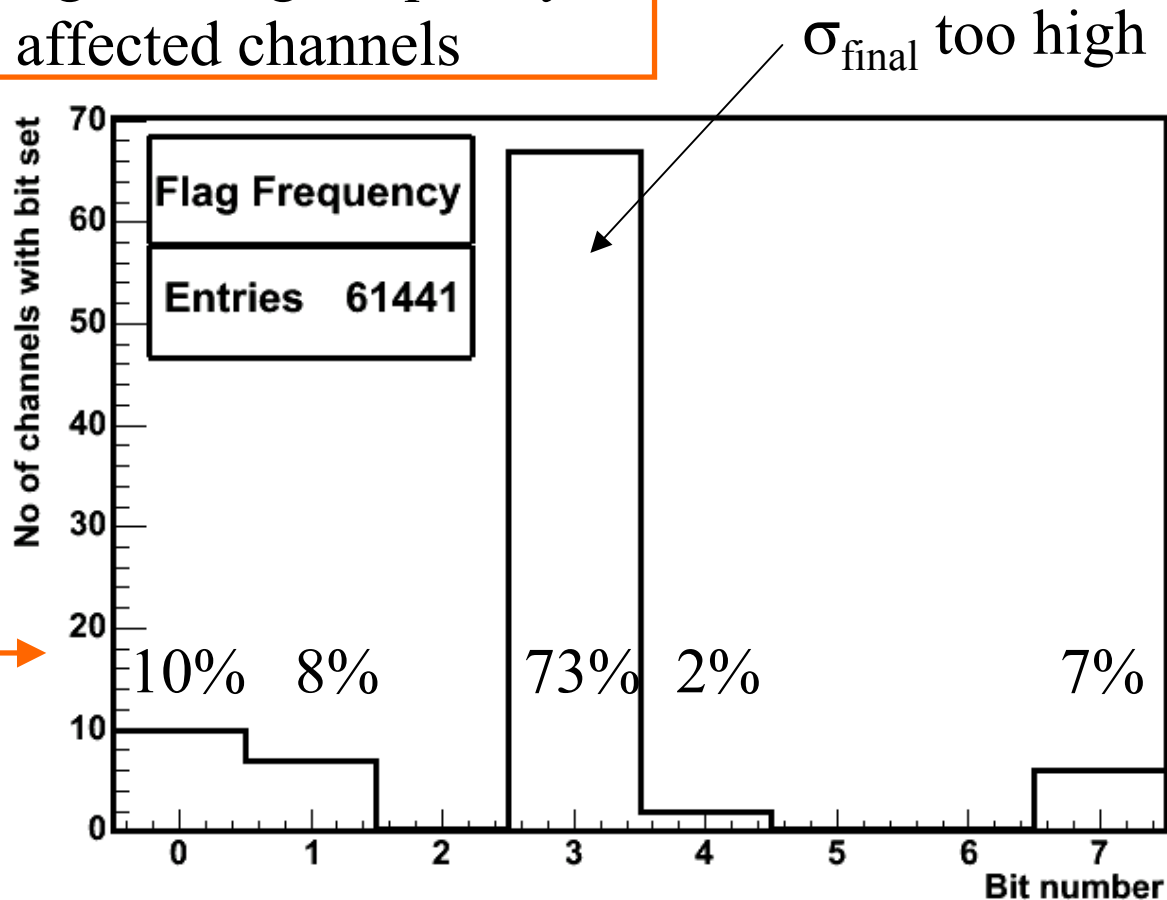


Bit 7 and 0



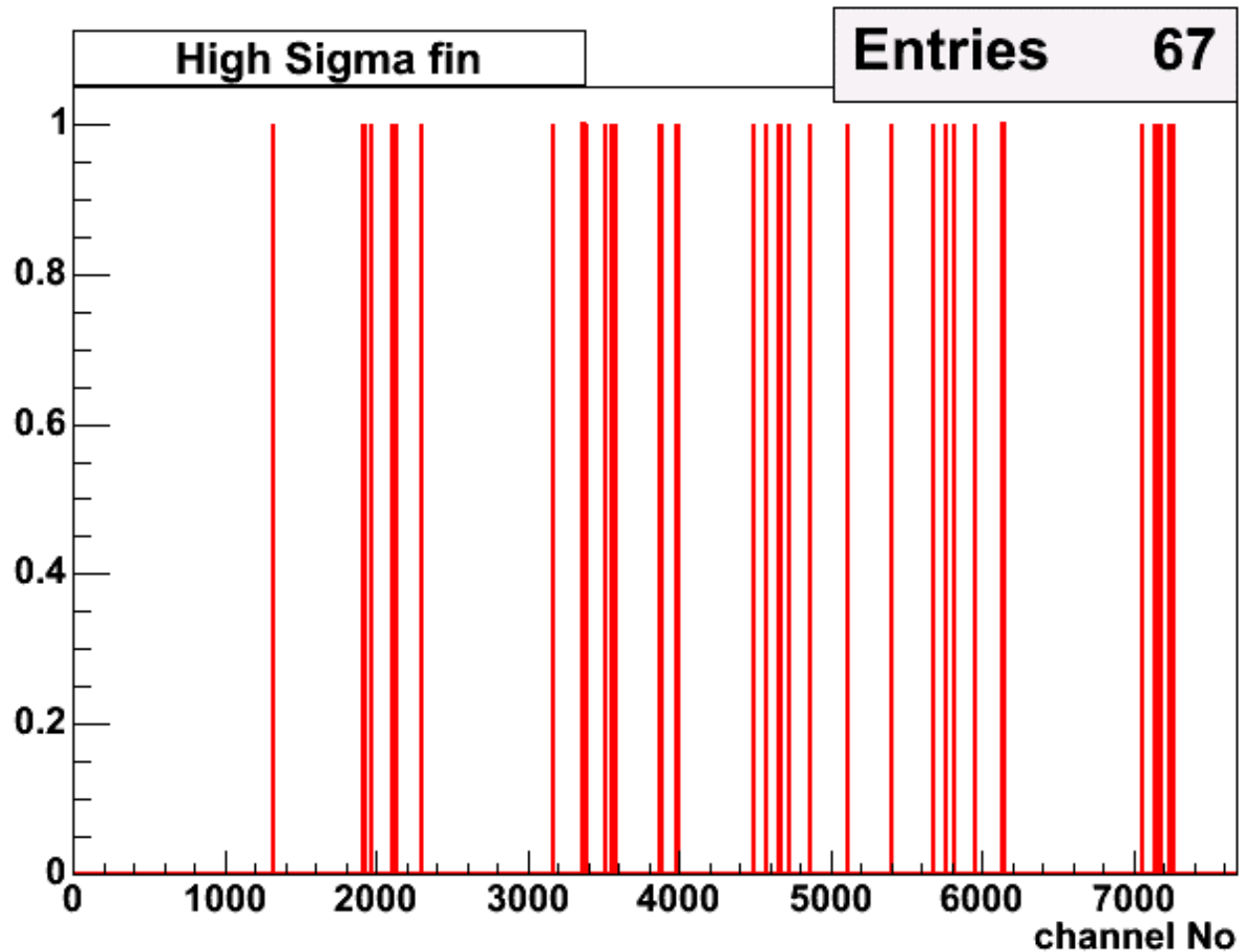
Flag frequency

percentage of flag frequency in affected channels



1% of all channels have status non-0

Distribution of affected channels

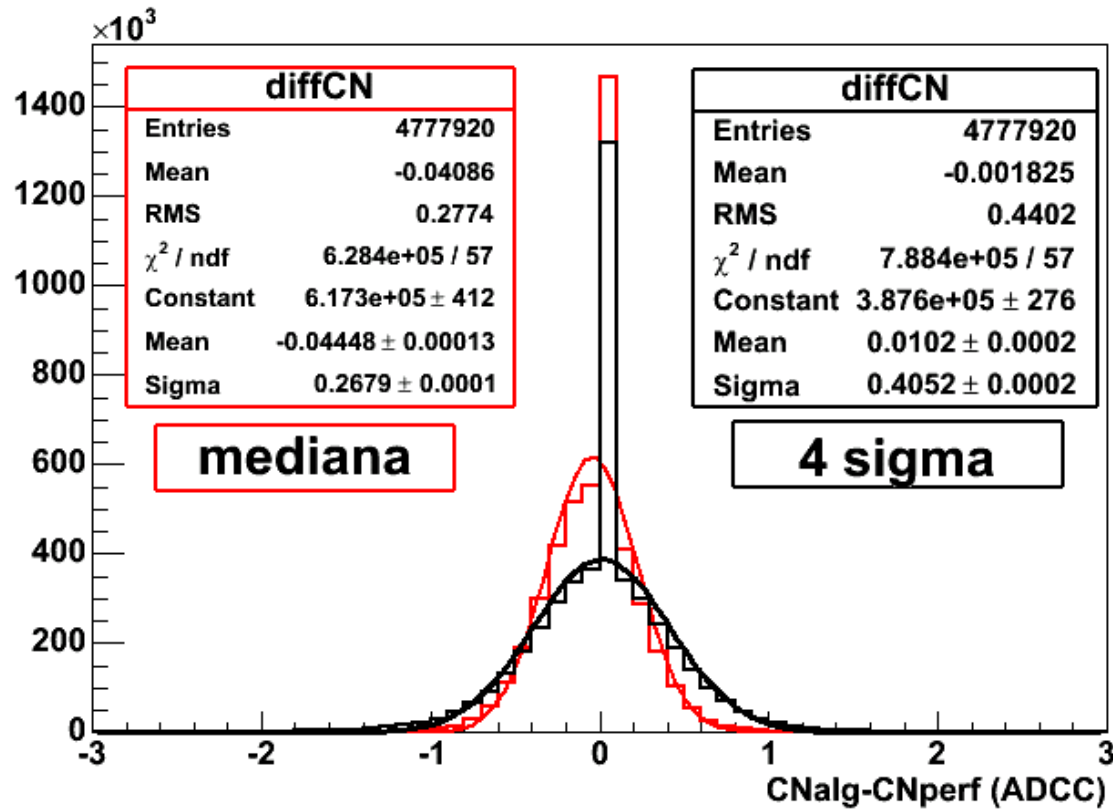


Bit 3

CN algorithms

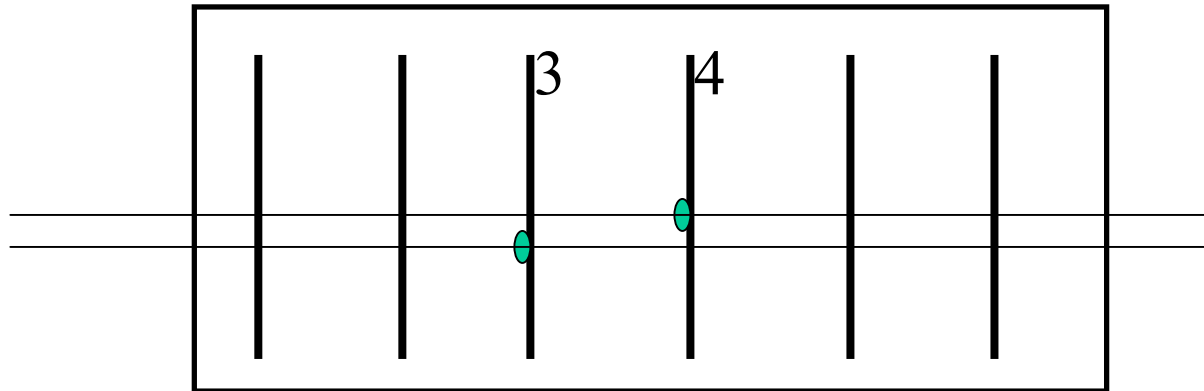
- "perfect" algorithm – the offline one
- 4sigma algorithm – on 32 channels
- mediana algorithm

CN-CN_{perfect}



This is for all VAs,
for events in spill.

Tracks - definition



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

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

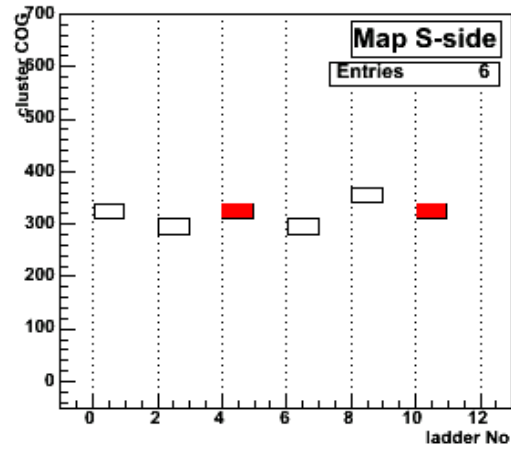
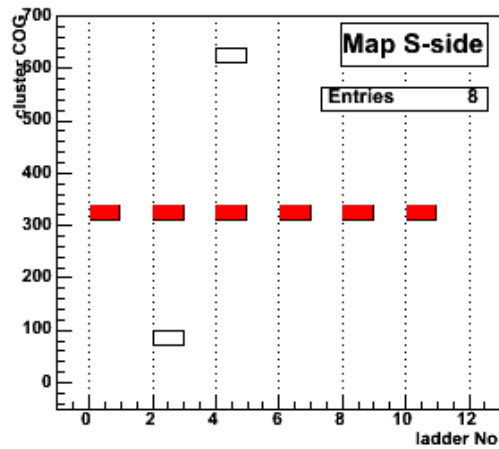
 create new track

 else

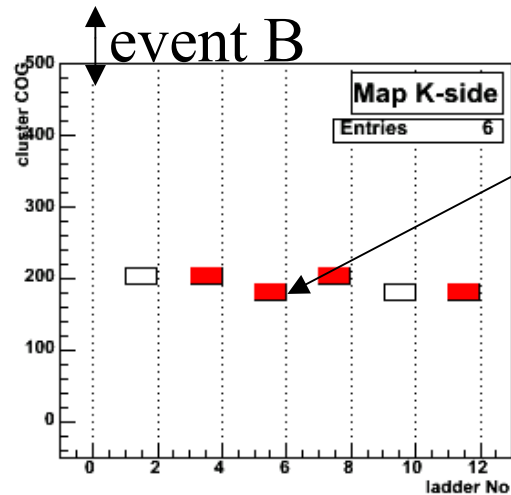
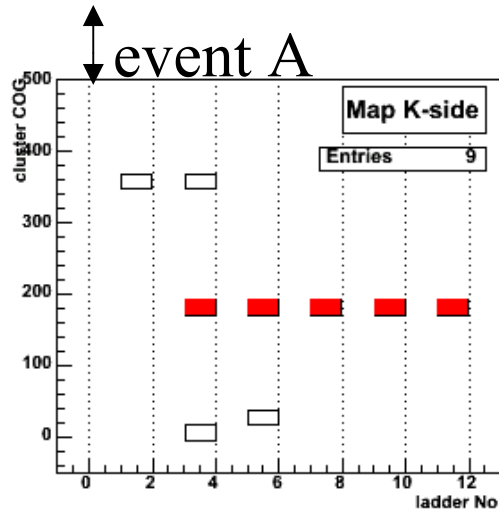
 join clusterB (or A) to track containing clusterA (or B)

Examples of events

in [channels]

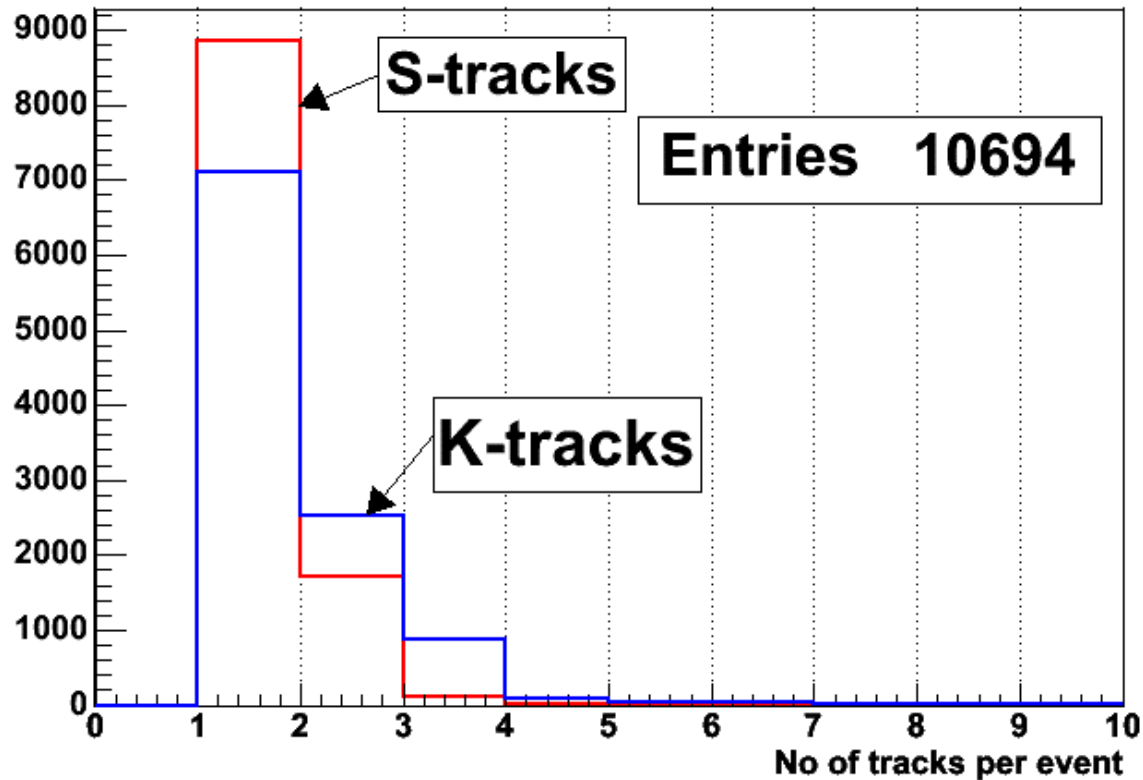


Geometrical corrections for GSI setup and for gap between 2 sensors included



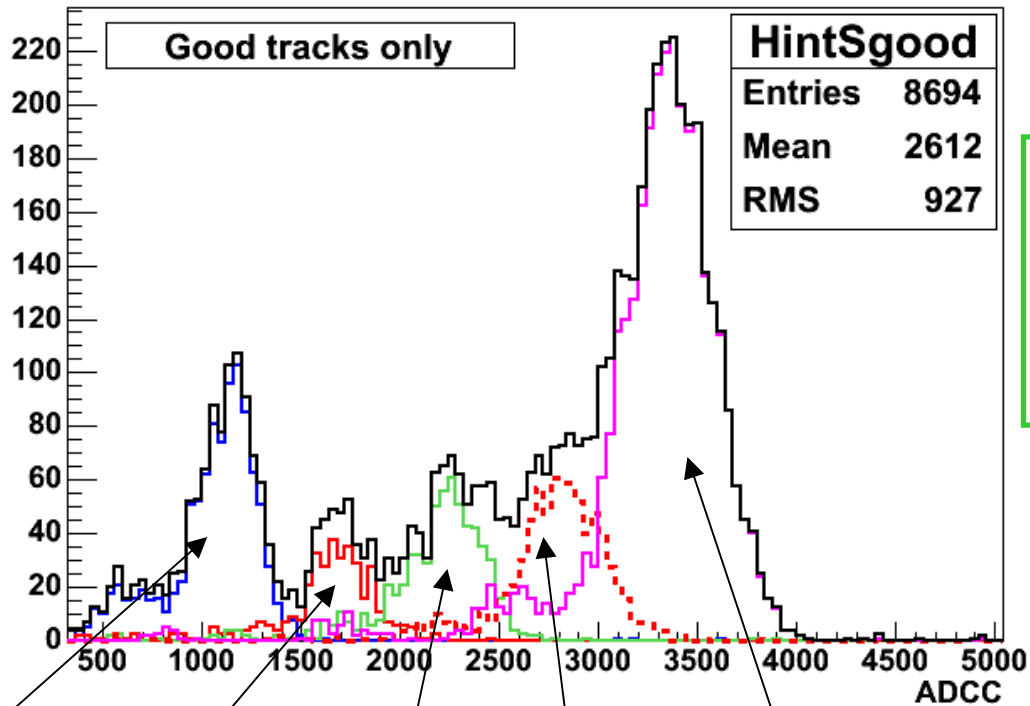
clusters contributing to tracks

Track multiplicity



Total charge on track

1700 MeV/n



Z correlated with
number of
clusters on track

clusters: 2 3 4 5 6
(on track) α Li Be B C

Summary

- There were 1% channels with some failures
 - we can safely exclude these channels from CN calculations
 - correlation between nonGaussianity and σ
- CN algorithms: mediana gives slightly better values than 4sigma (with respect to Offline algorithm)
- Tracks:
 - total charge identified with Carbon data
 - should be compared with other analysis
 - track finding algorithm will be studied