

# ADC STATUS REPORT, BCM1F

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> DRAFT



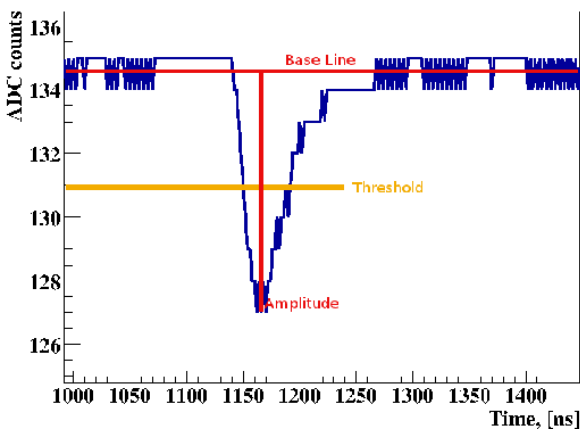
# Structure

- > Baseline method
- > Signal processing and Amplitude spectra
- > Baseline Tool
- > Bunch structure repetition as in TDC
- > Intrinsic time distribution
- > Radiation Aging
- > Lumi problems -> Dead time - missing now

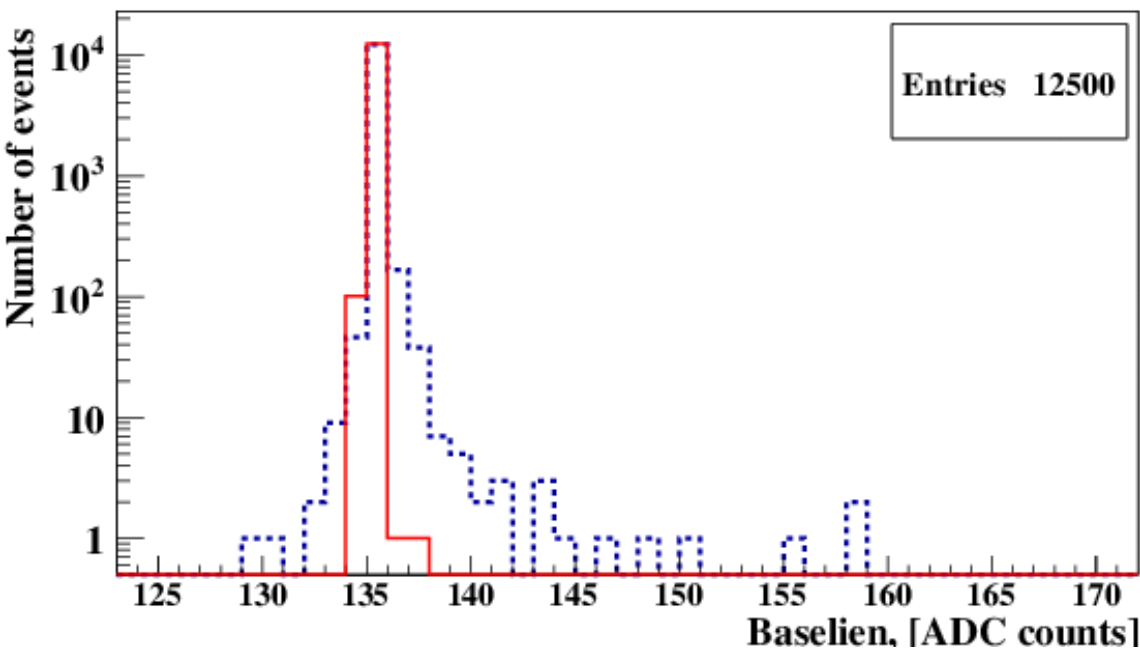


# Baseline Calculation

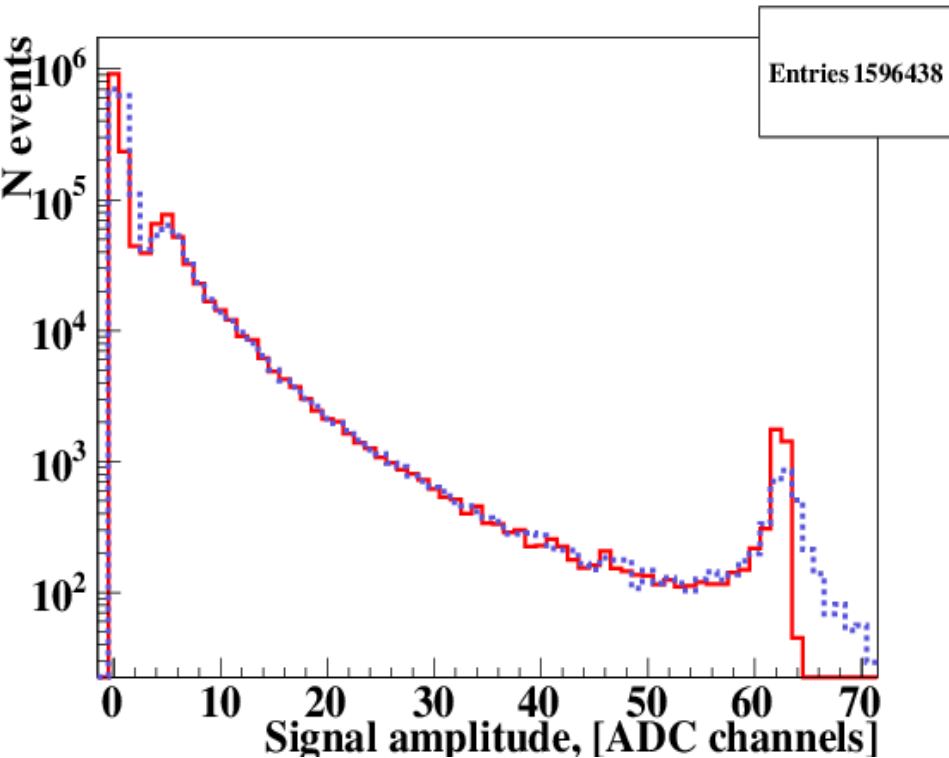
Event on 22 Jul 2011, 17:51 --> Channel 7



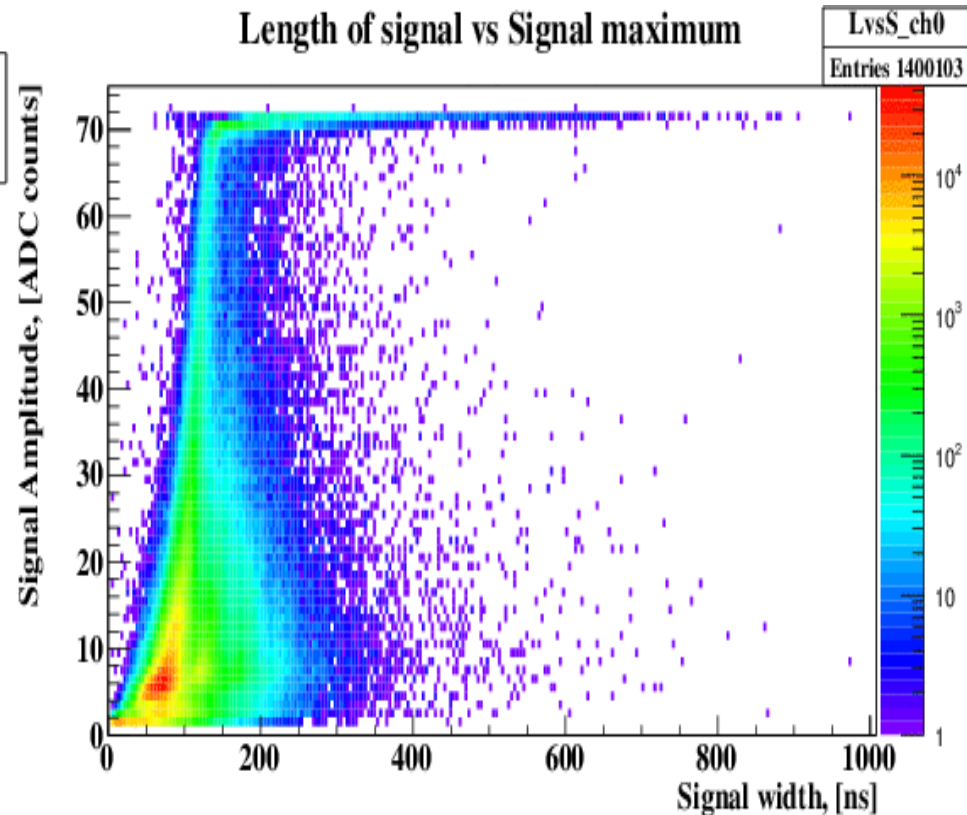
- Baseline is calculated for each single trigger within abort gap
- Baseline stability shown on the histogram with blue
- Averaging last 100 baselines for each trigger improves baseline stability – red color



# Amplitude Spectrum

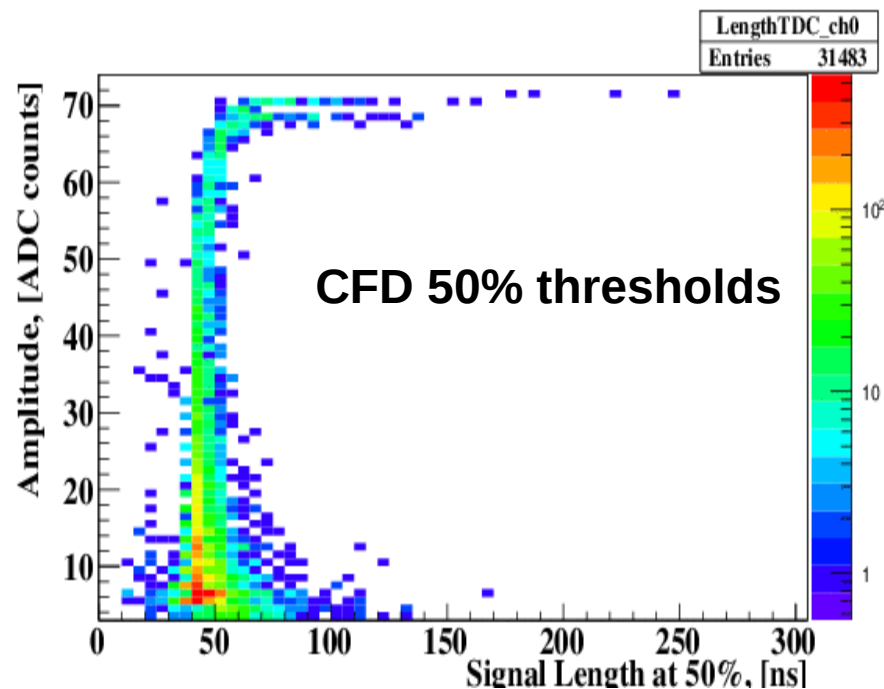
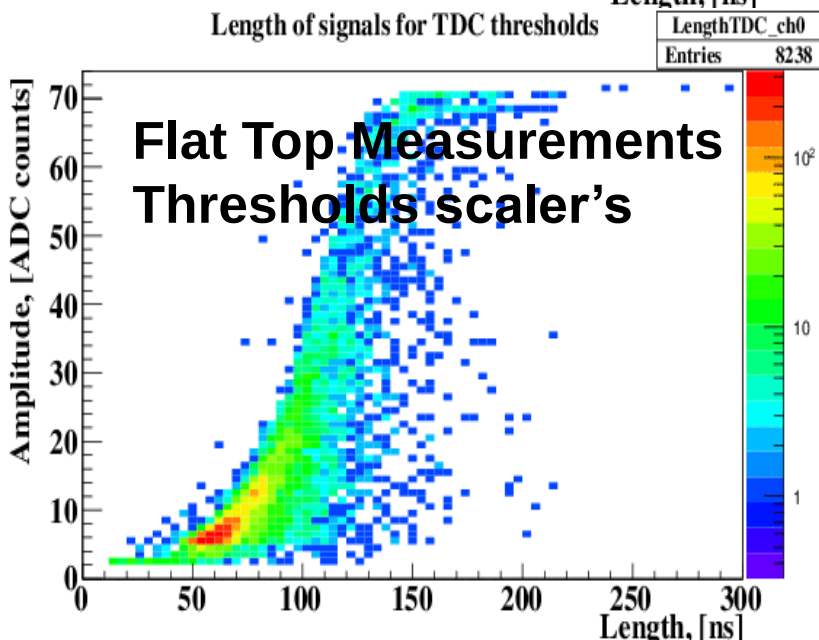
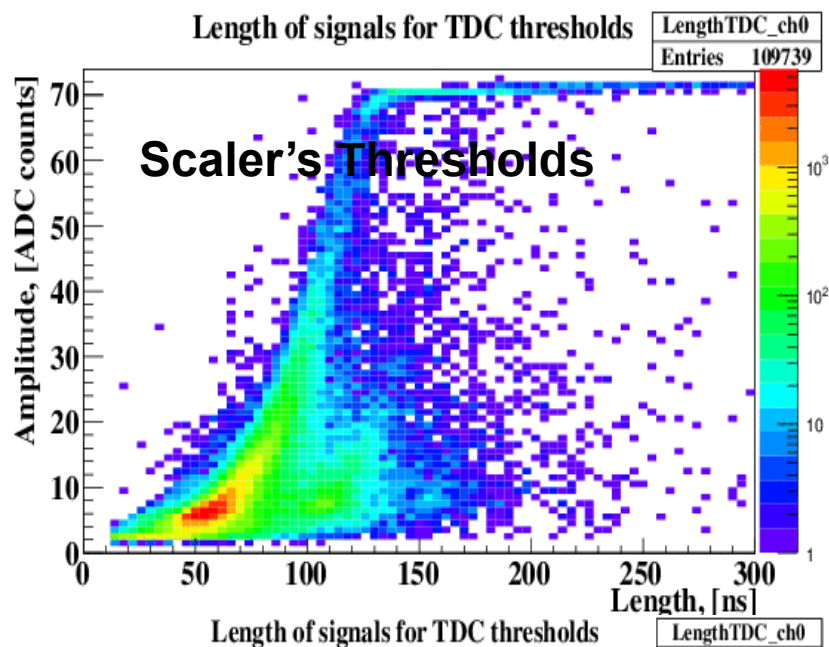


- Baseline stability is important for amplitude spectra
- Blue – single baseline determination
- Red – 100 BL averaging
- Improves pedestal & saturation peak



- Length of signal over threshold as a function of signal amplitude.
- Most of long signals are in saturation
- Low threshold 0.1 ADC counts leads to overlapping of signals and shows double and triple peaks

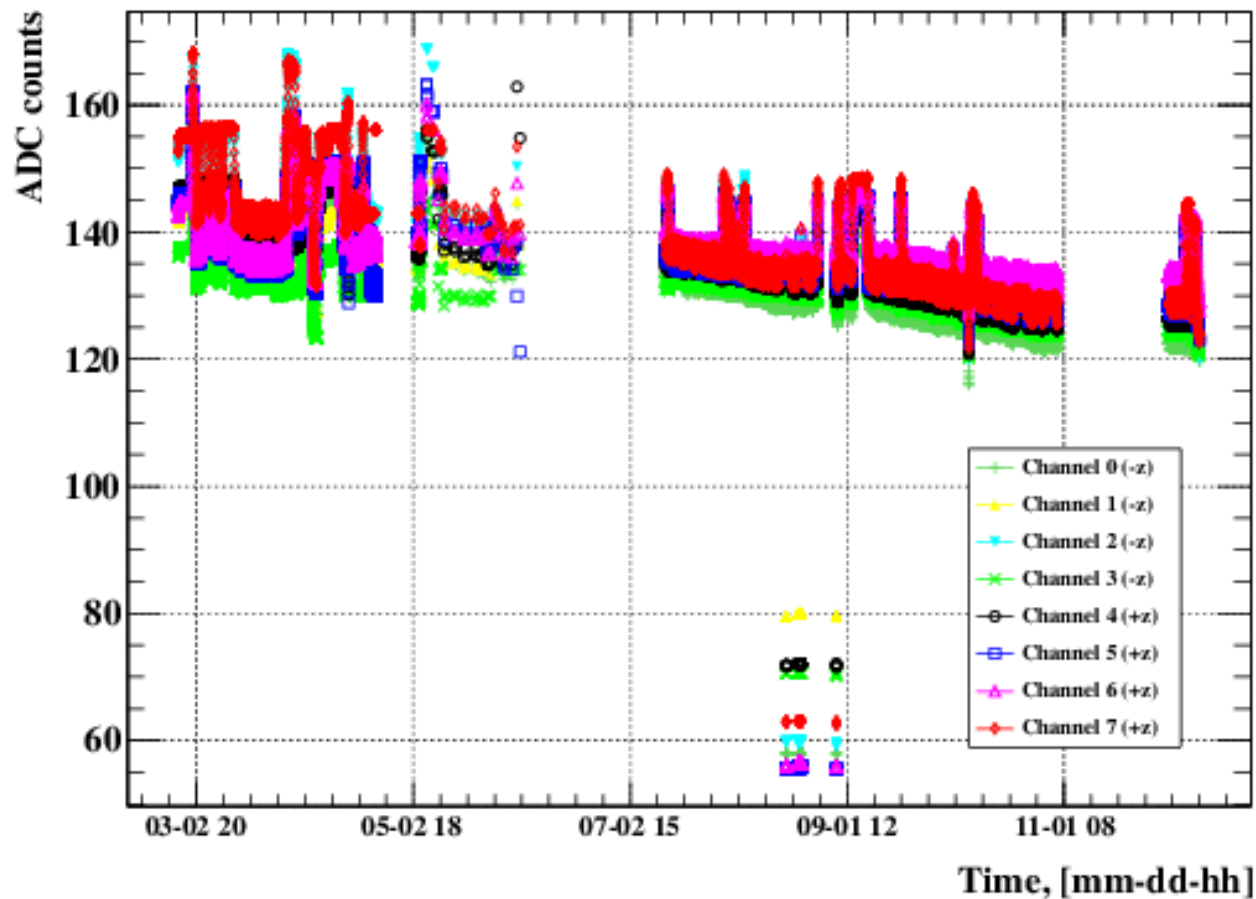




By setting fixed threshold arriving time distribution has a jitter  
Constant Fraction Discrimination – CFD  
Time over threshold  $\sim 40\text{ns}$  for 50% of amplitude.

# Baseline Tool

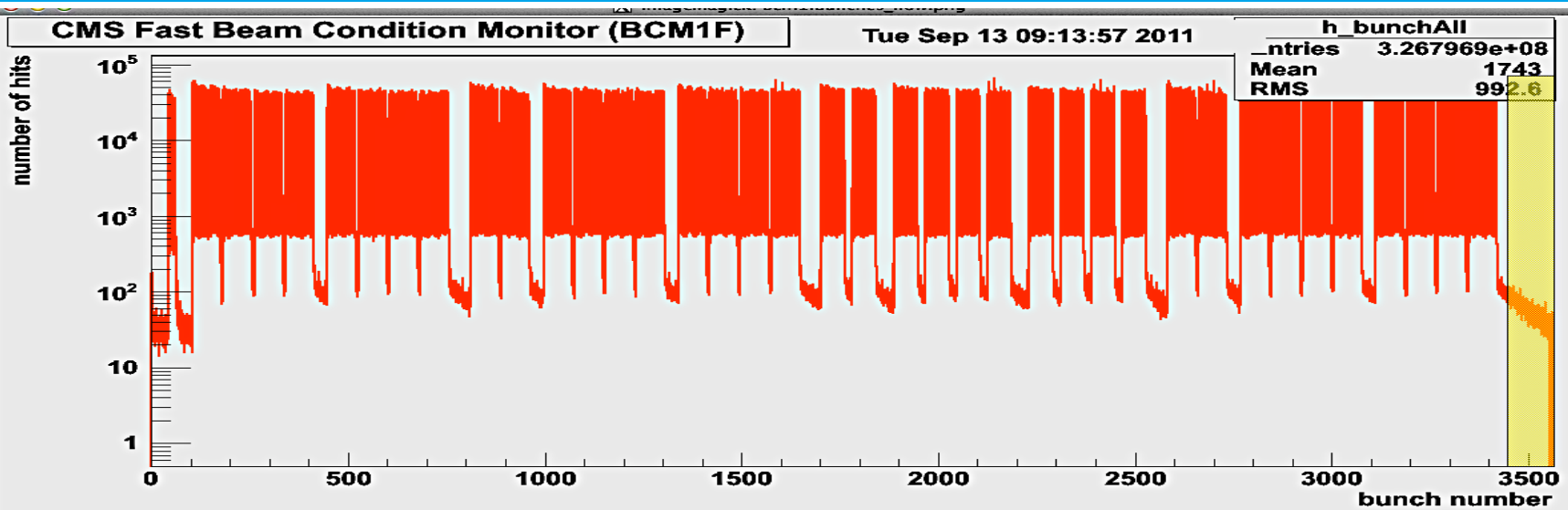
Baseline Over Time in 2011



- Full 2011 baseline tool for BCM1F was operated
- BL moved down in ~10ADC counts
- Low values are corresponding switched off HV

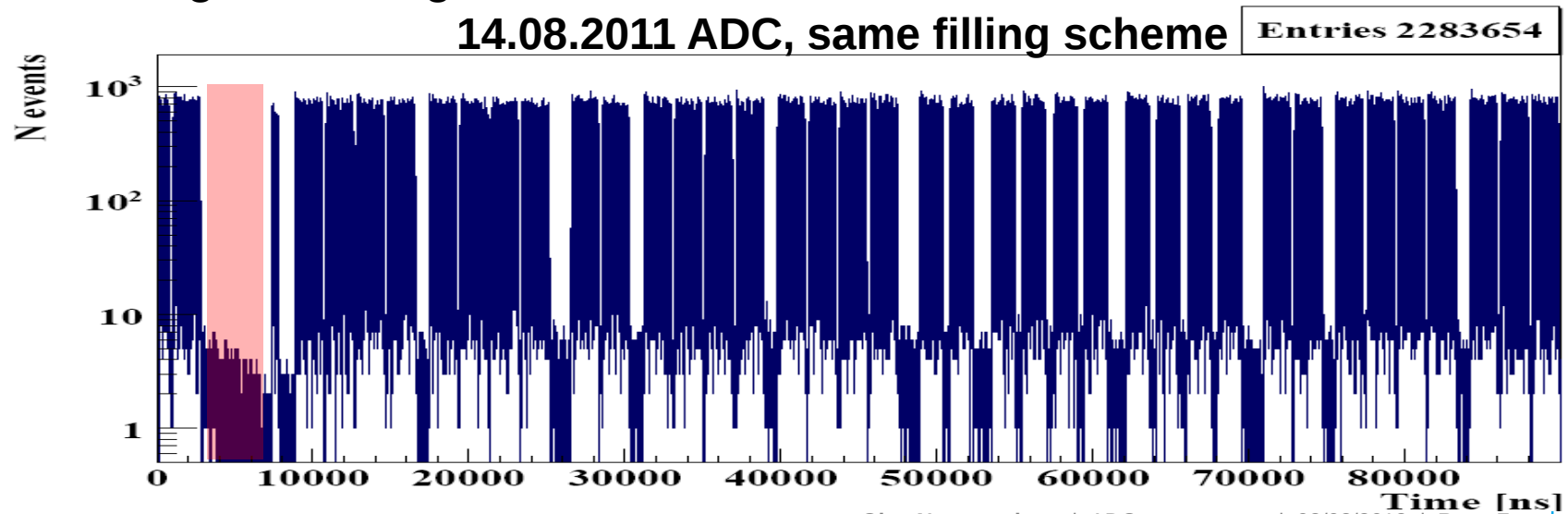


# Bunch structure repetition as in TDC

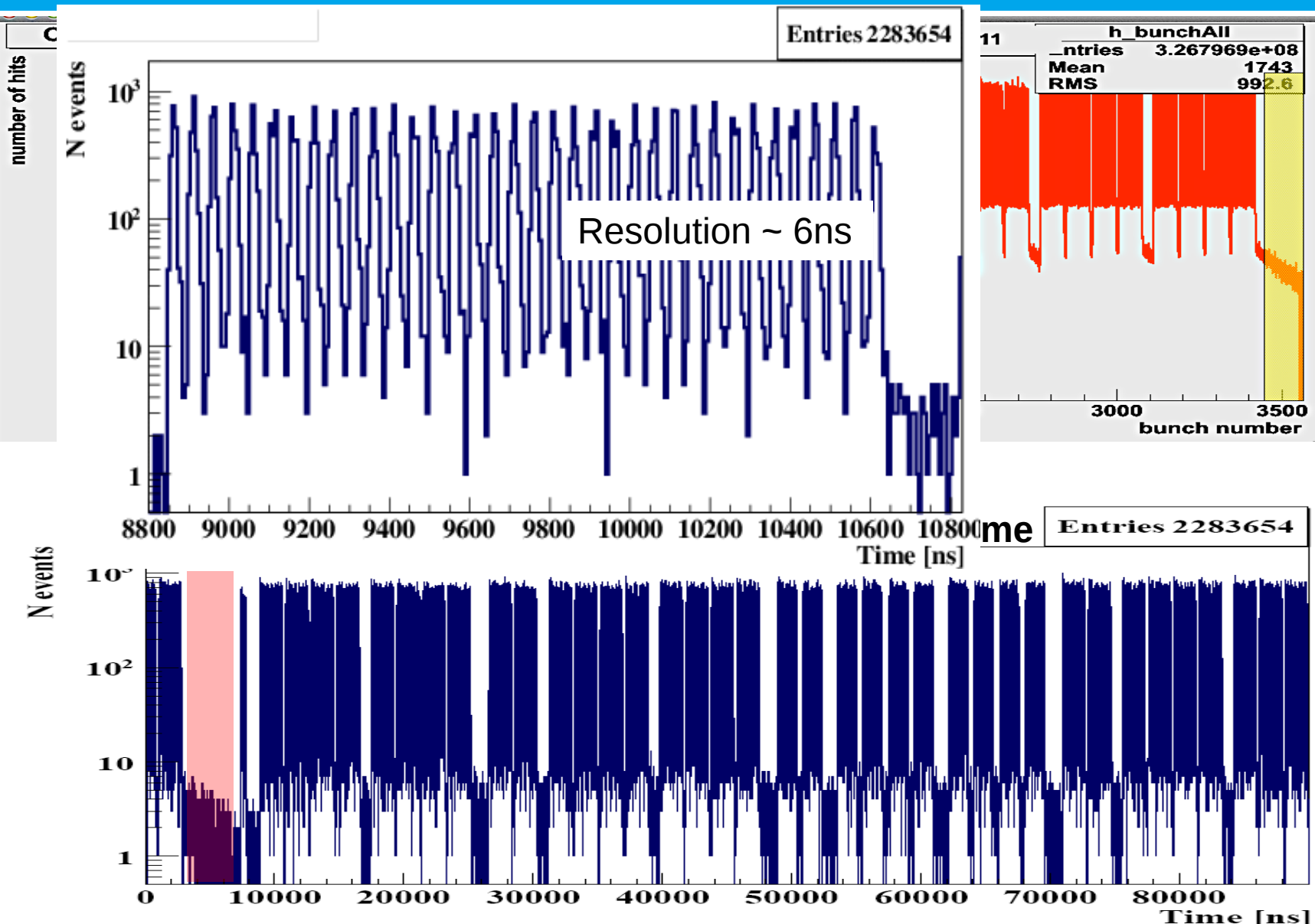


## Finding of ADC signals with fixed threshold

14.08.2011 ADC, same filling scheme



# Bunch structure repetition as in TDC

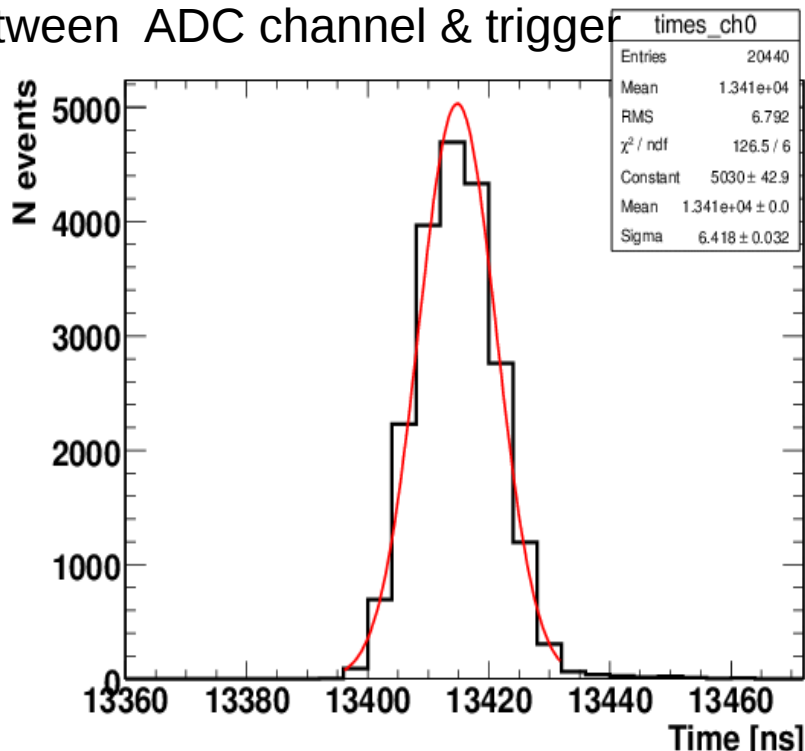


# Time Resolution with Test Pulses

**Arriving Time Resolution** – in respect to ADC trigger (Test pulses were feed to ADC trigger in and 1ADC channel)

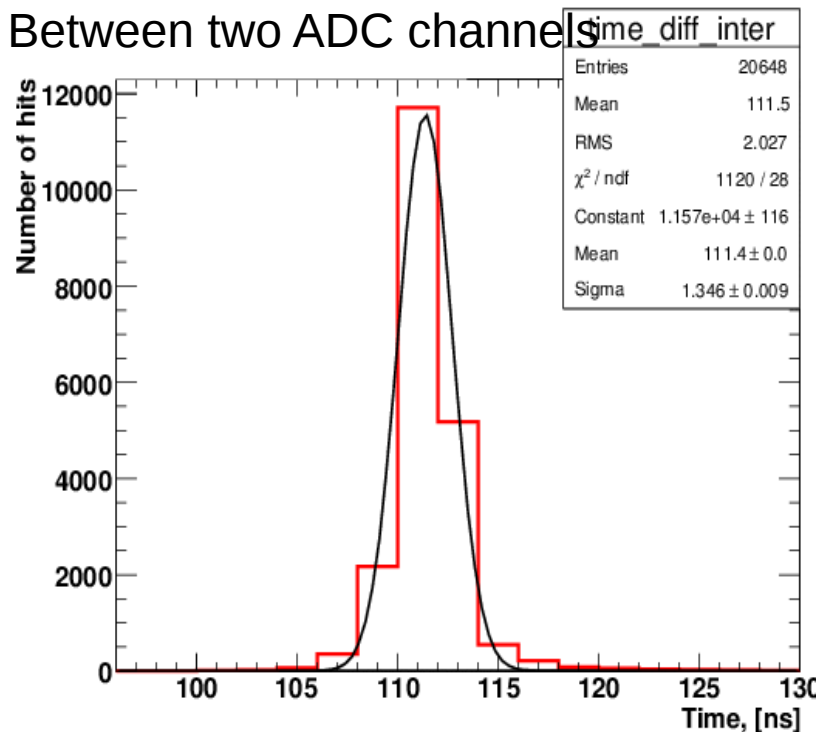
**Jitter due to ADC trigger chock – can be up to 16 ns**

Between ADC channel & trigger

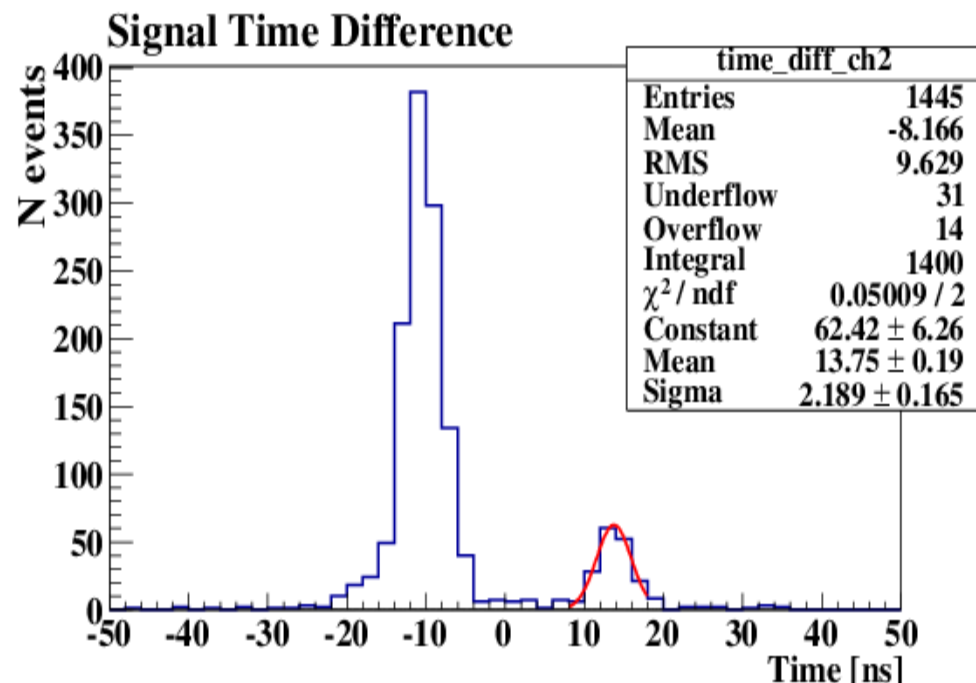
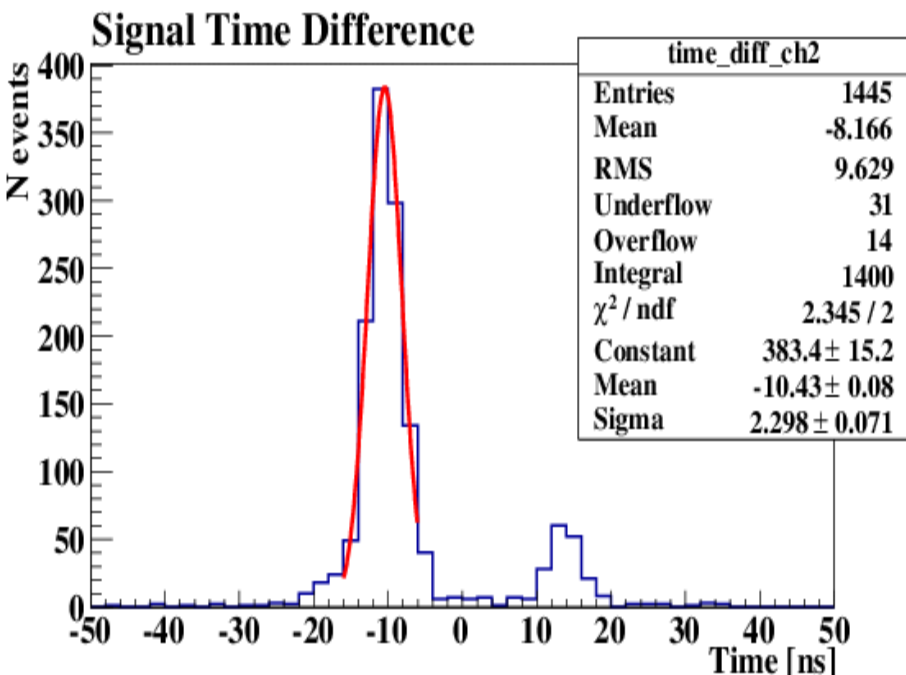


**Intrinsic Time Resolution** – two ADC channels in respect to each other (Test pulses were feed to 2ADC channels)

Between two ADC channels



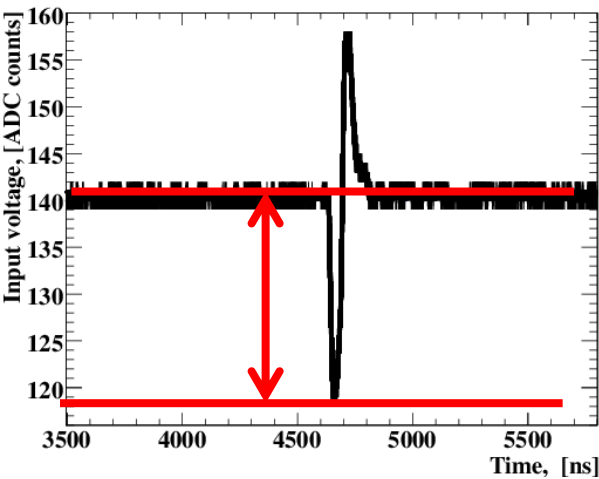
# Intrinsic Time Resolution, CFD FlatTop measurements



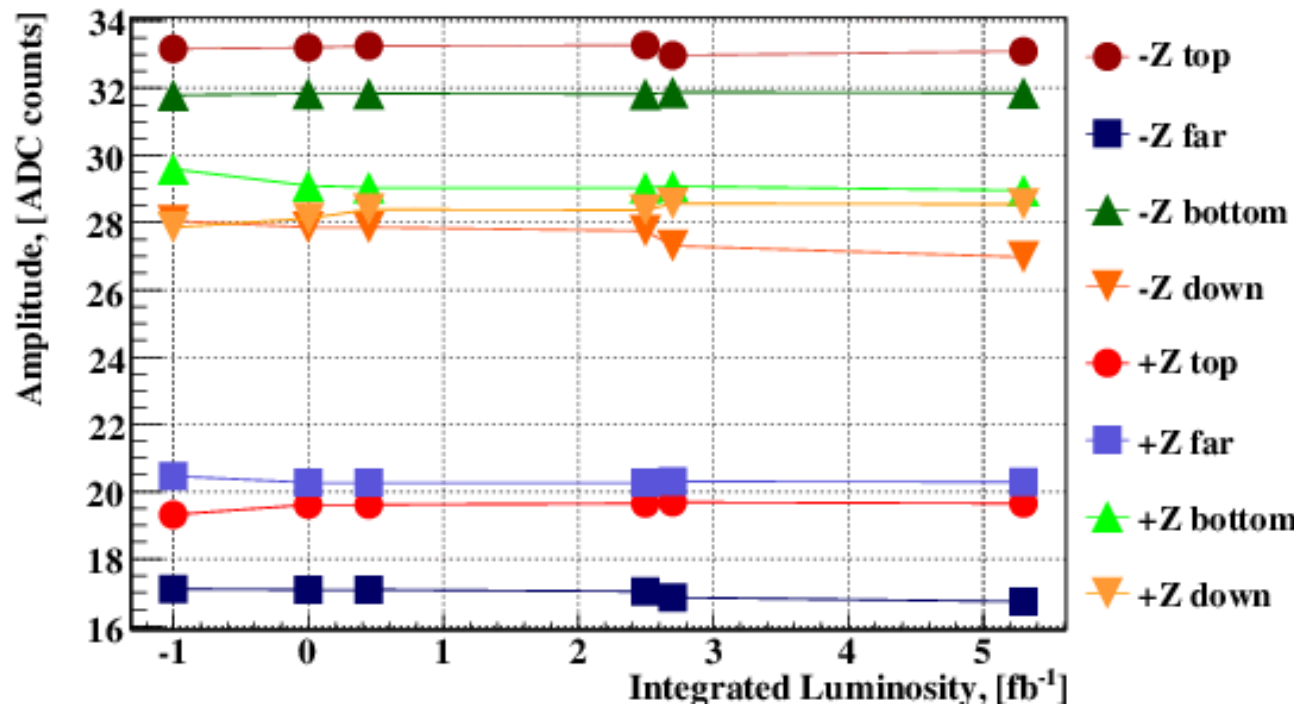
Over several Fills at Flat Top stage ADC data was recorded  
Coincidence of two signals in two ADC channels are taken  
Time over threshold is calculated as 50% of amplitude with CFD method  
Difference between channel  $\sim 12$  ns  
ITR =  $2.18 \pm 0.16$   
Previous result was 1,8 ns (Ringo Schmidt 2009)



# Test Pulses Monitoring



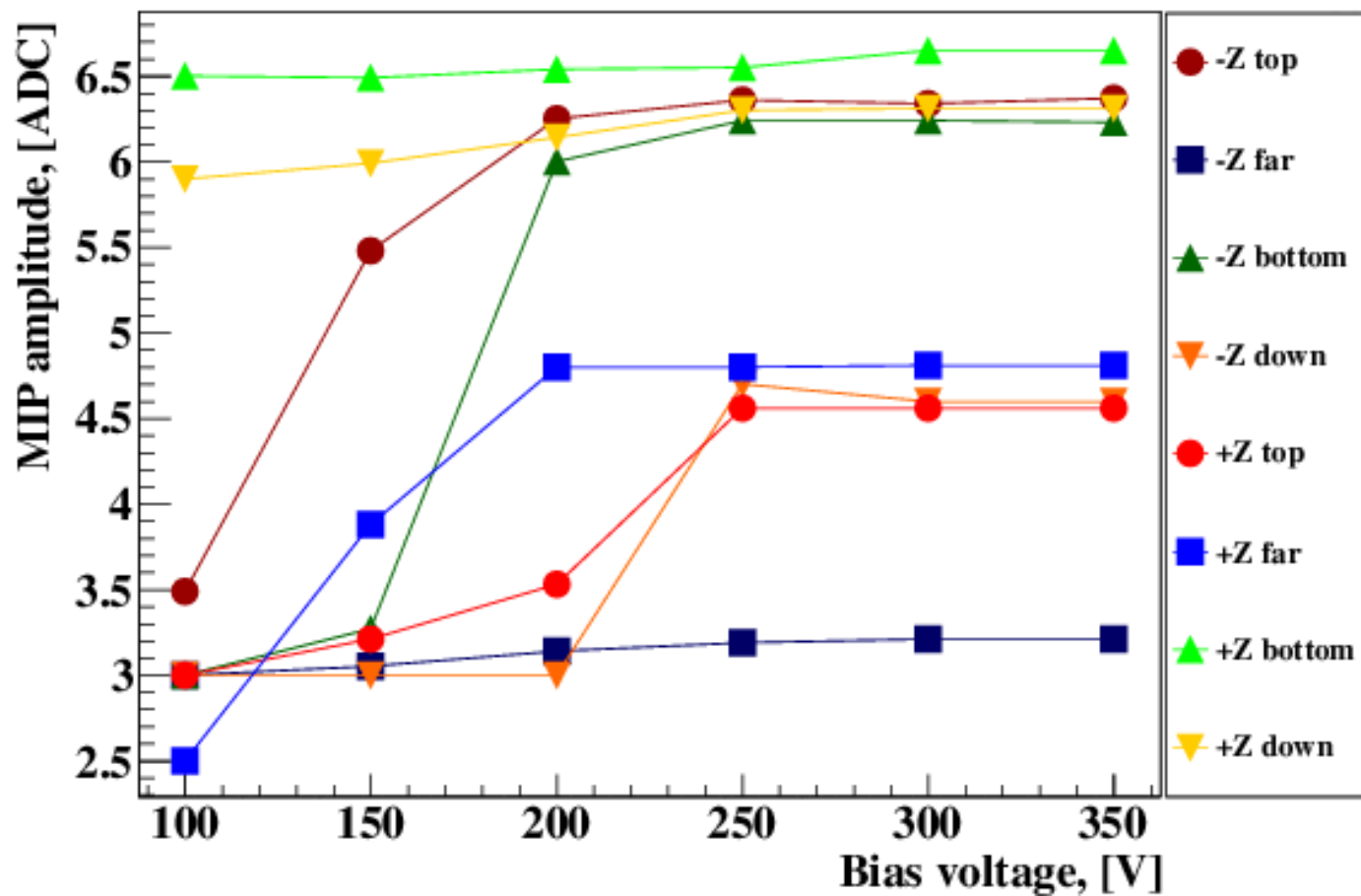
Example of test pulse



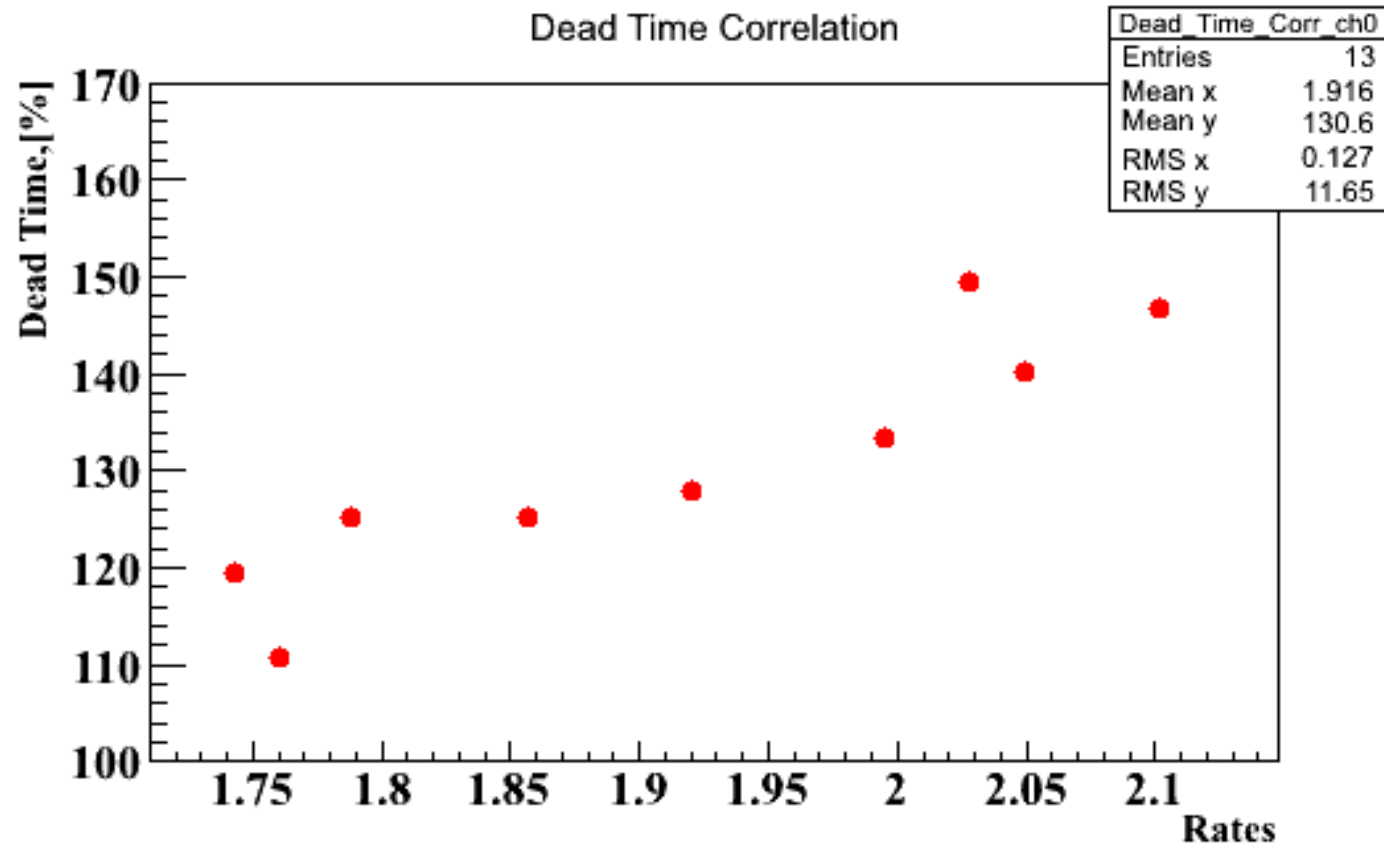
➤ Over 2011 test pulses measurements were done regularly to monitor FE-electronics degradation

➤ Dependence of test pulses amplitude in respect to baseline shown as a function of integrated luminosity. -1 point shows values of test pulses amplitudes measured in 2009.

# HV scan for BCM1F



# Dead Time Correlation with collision rates



Has to be divided by 100.

# Conclusions

