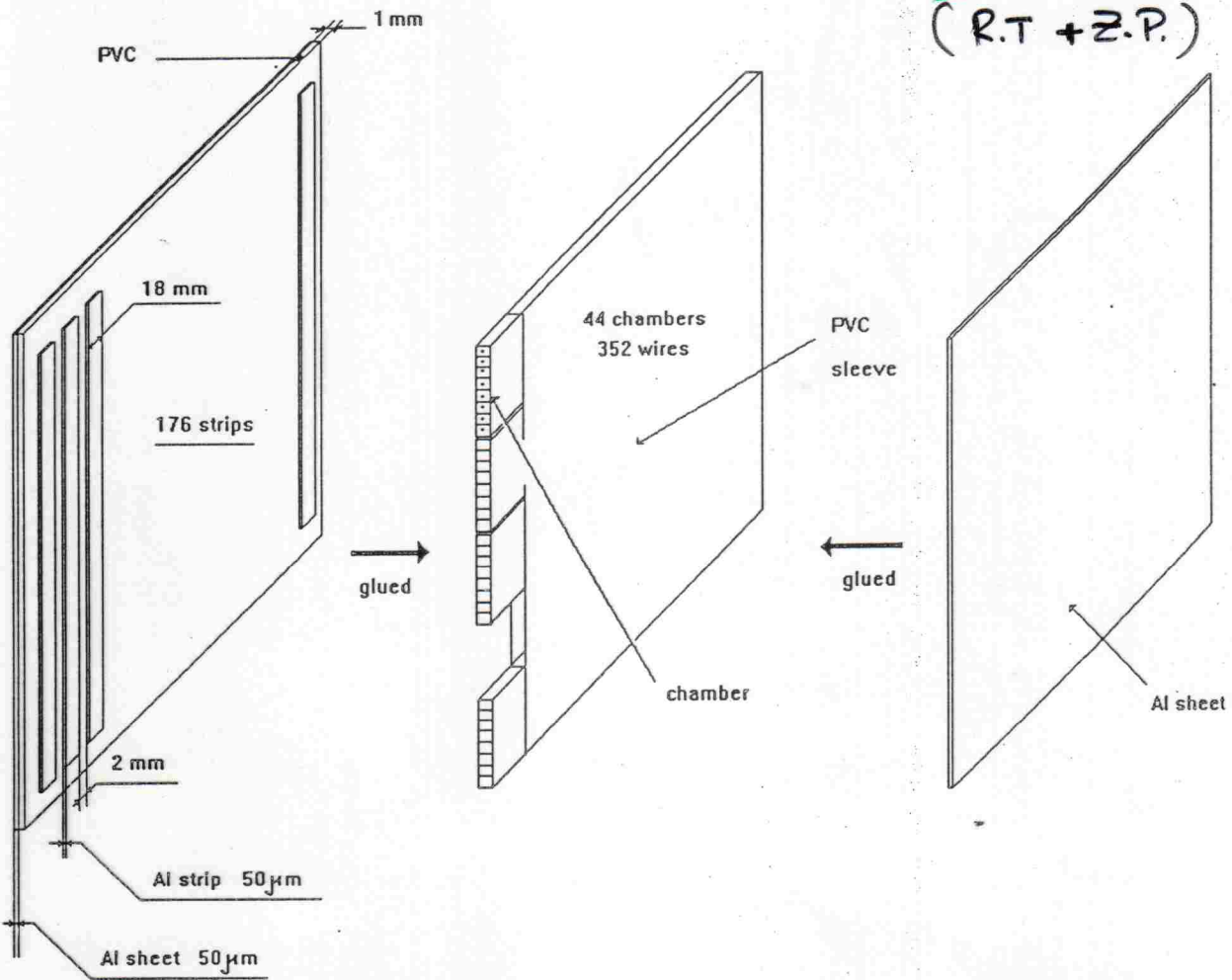


Analog system of μ -SPEC

(R.T + Z.P.)

Design of streamer plane



$$56 \text{ planes} \times 176 \text{ strips} = 9856 \text{ strips}$$

• Front-end electronics:

* 22 strips \Rightarrow transistor card (+5V)

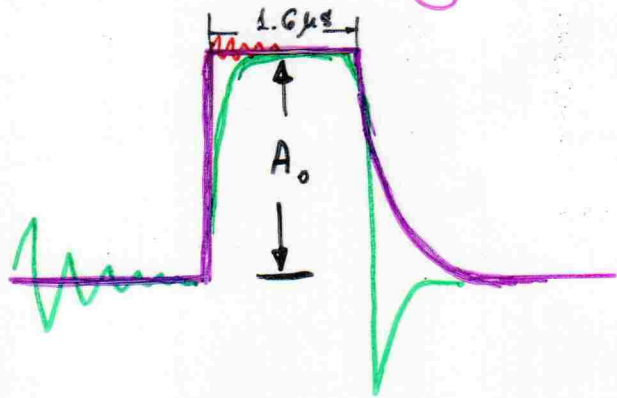
(8 transistor cards per plane \times 56 = 448)
(there are only 420 of them)

* analog card : amplifier + peak detector ($\pm 12V$)
(11 channels in a card) \Rightarrow 840 cards

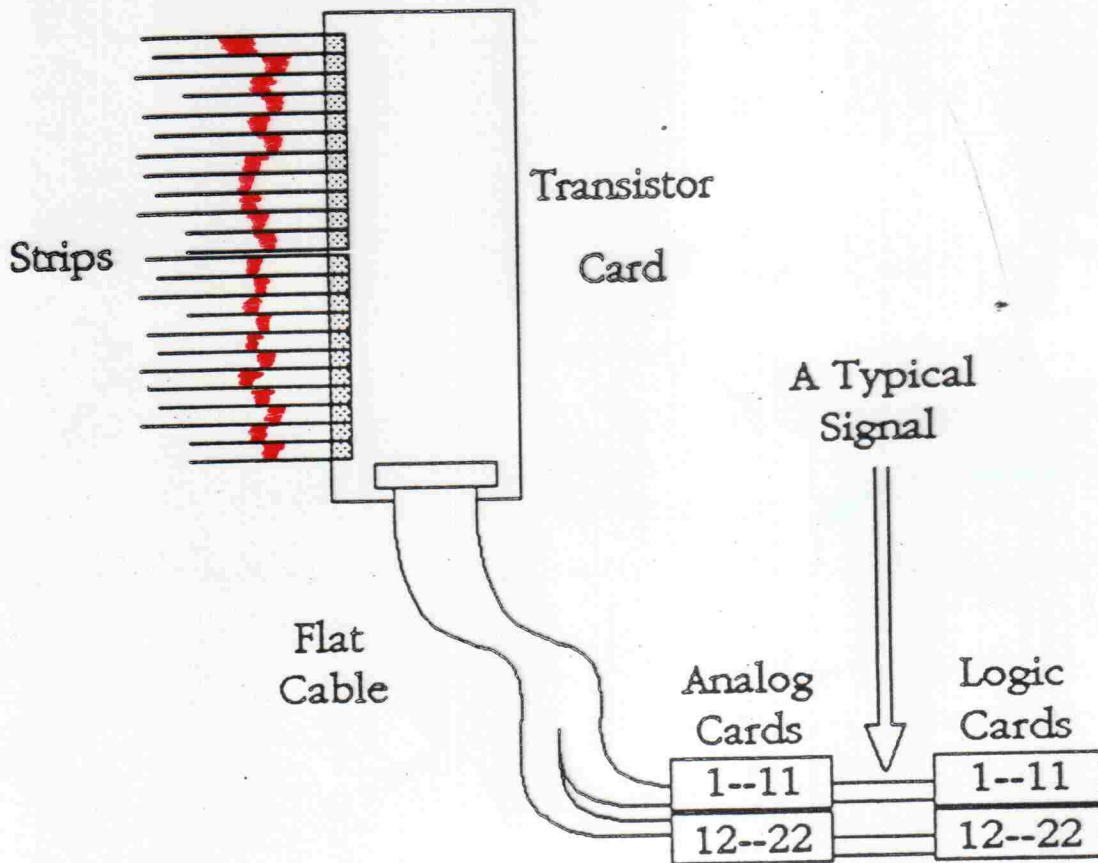
* logic card : flash ADC ; 8-bit ; high/low sensit.

\Rightarrow 84 CAMAC crates in 21 racks

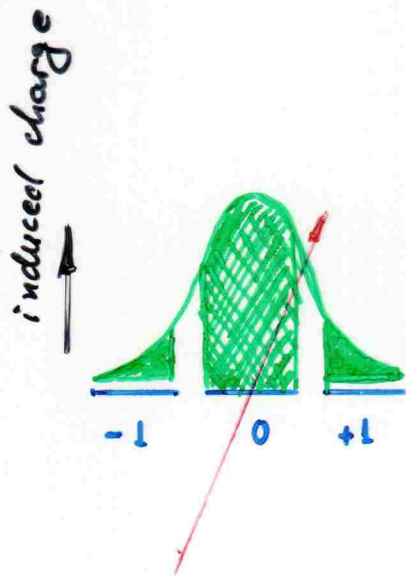
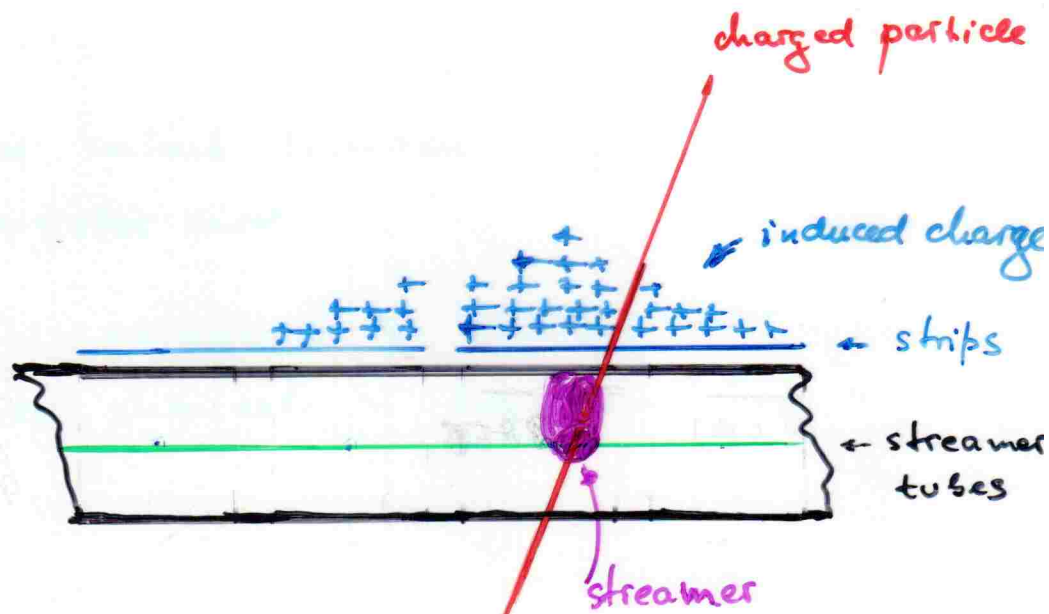
Typical (distorted) signal after PD



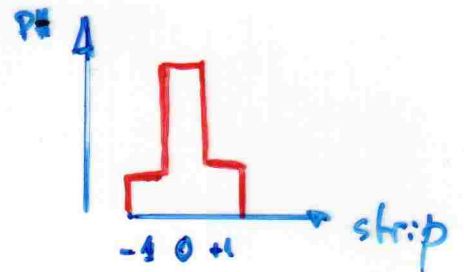
$A_0 \sim$ charge induced on the strip



Calibration of strips



calibration
⇒



$\Delta x = 18 \text{ mm}$ strip width

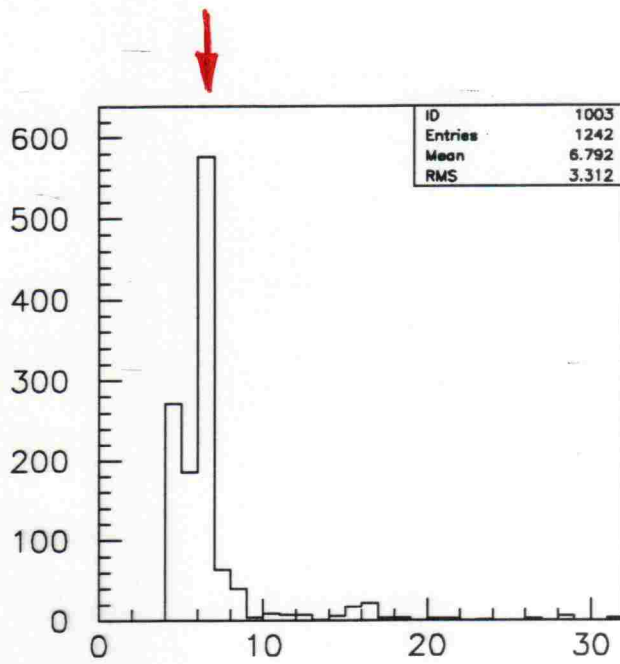
Expected resolution: $\sigma \approx \frac{\Delta x}{\sqrt{12}} \cdot \frac{1}{\sqrt{\langle n \rangle}} \approx 2-3 \text{ mm}$

$\langle n \rangle \approx 2.5$ - mean strip multiplicity
in a cluster

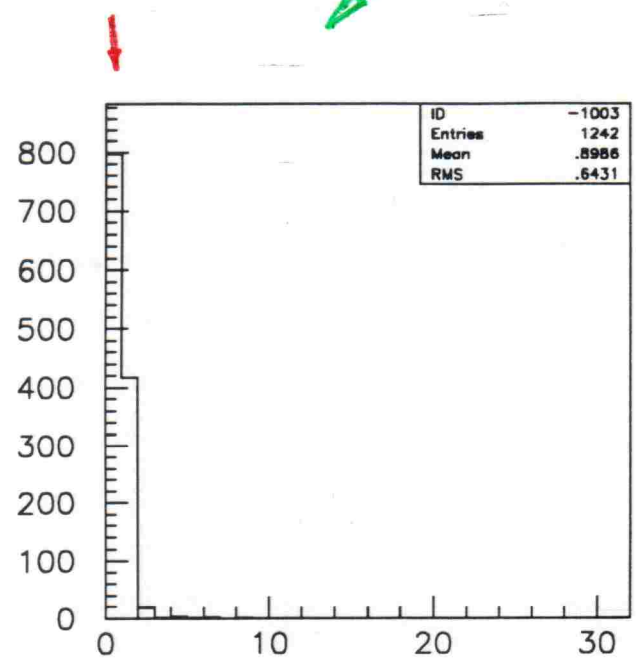
"Pedestals" \leftrightarrow induced signals, noise

"pedestal"

noise (?)

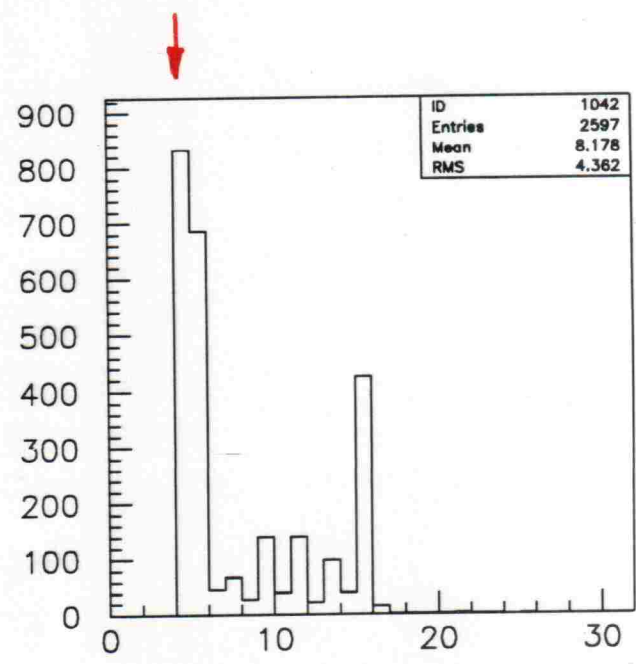


PH strip 94 - HIGH

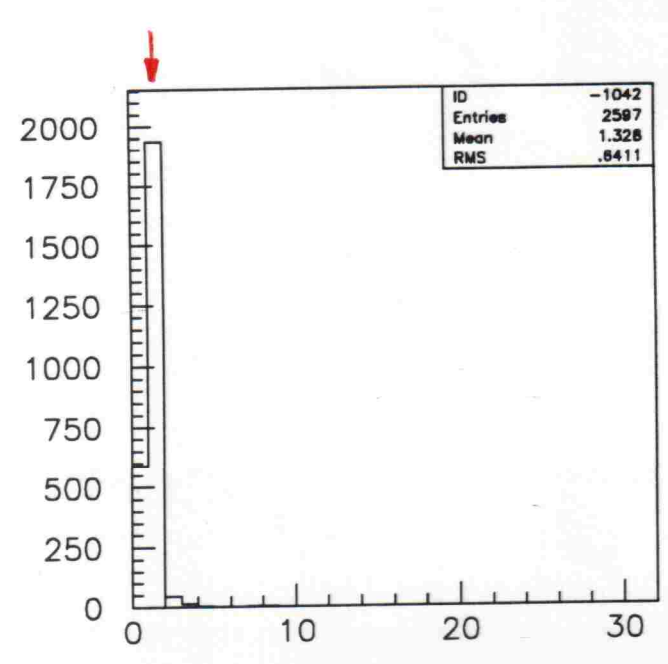


PH strip 94 - LOW

induced signal (?)



PH strip 94 - HIGH



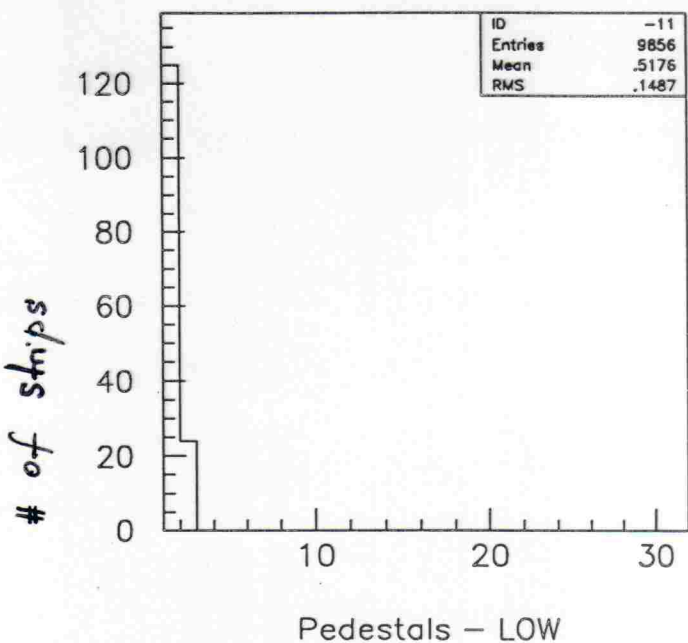
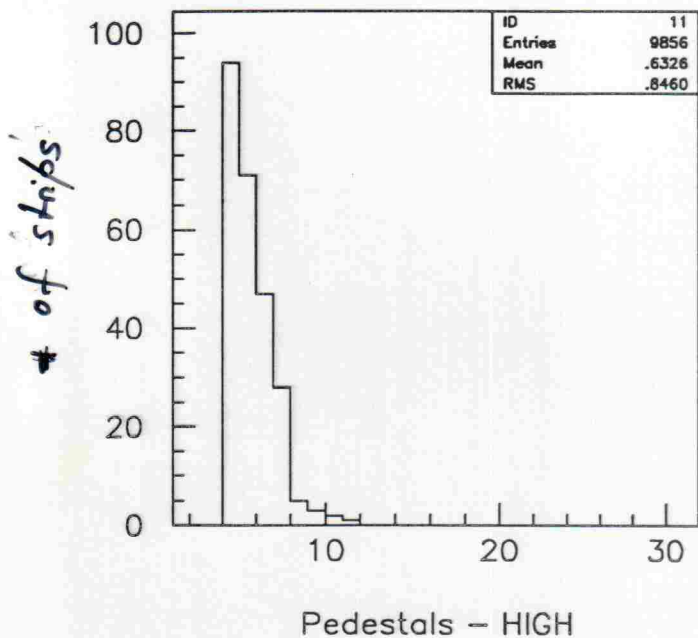
PH strip 94 - LOW

Threshold for writing on tape:
> 3 High ADC counts

"Pedestals" $\neq 0$

251 strips (2.5%)

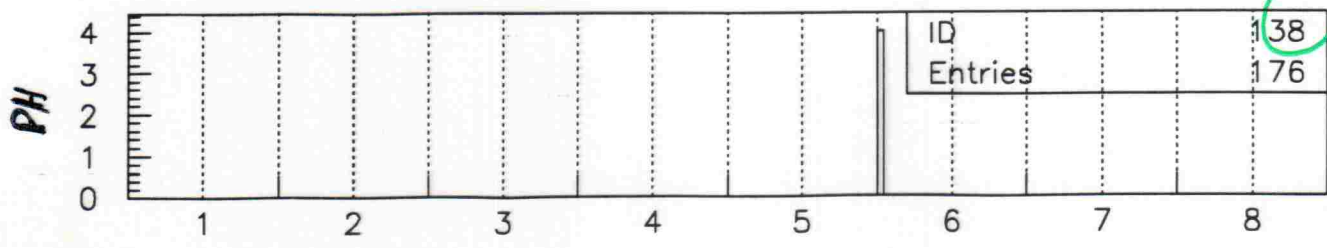
mean value: 5.2 High ADC counts



149 strips (1.5%)

mean value: 2.16 Low ADC counts

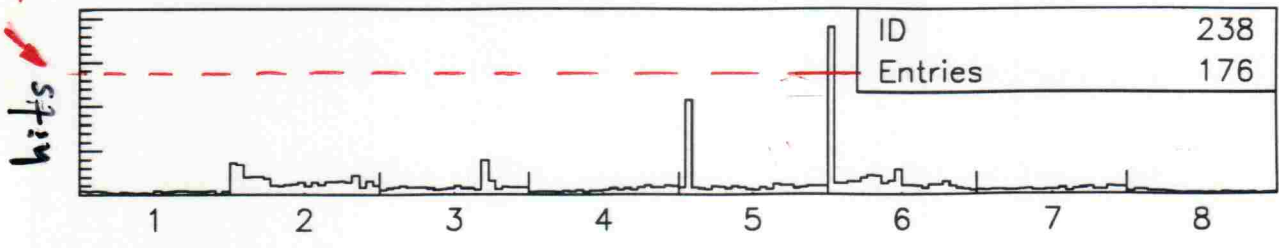
plane No.



tr. cad No.

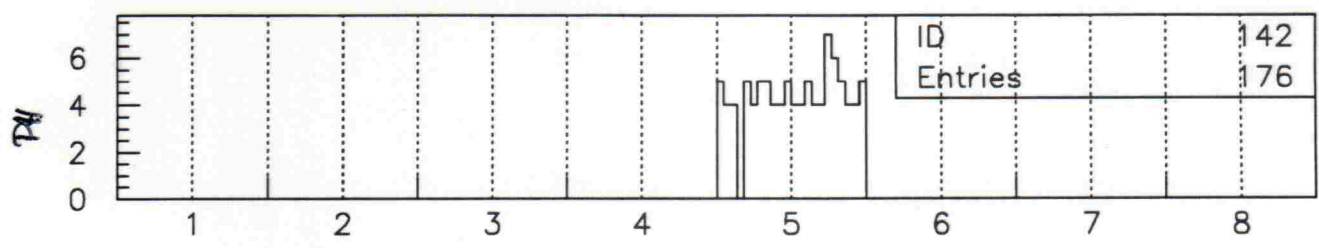
5% of events

Pedestals HIGH



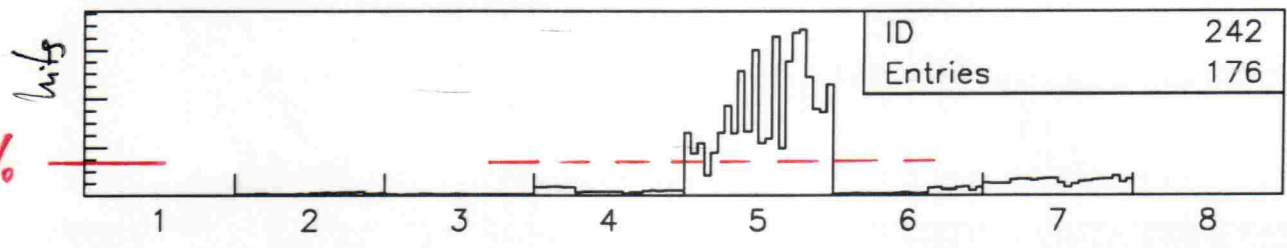
Entries HIGH

Entries HIGH

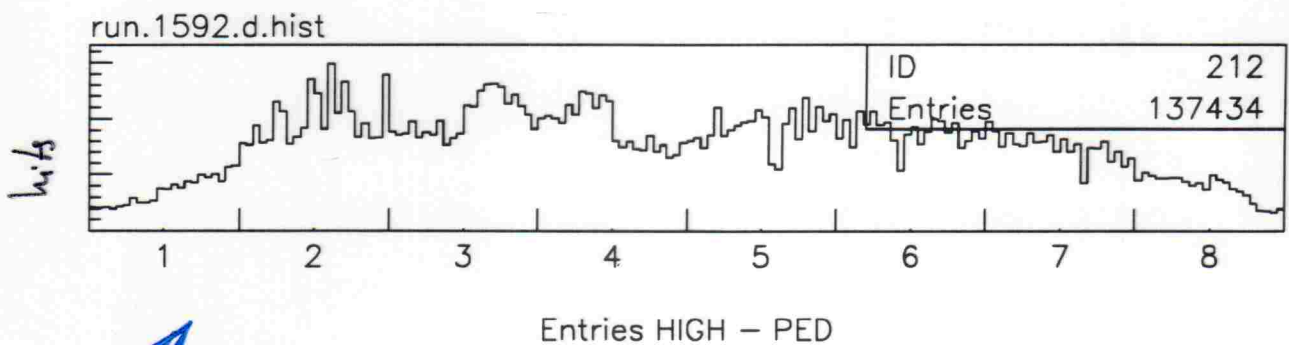
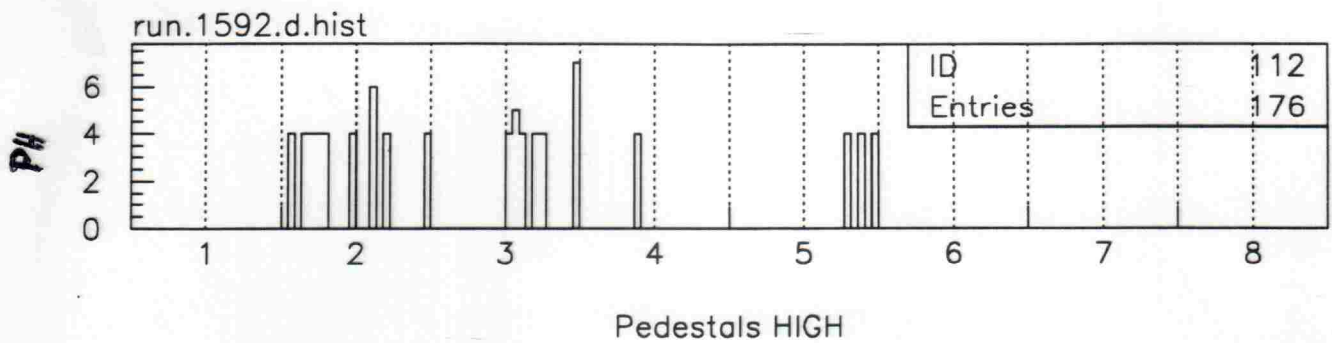
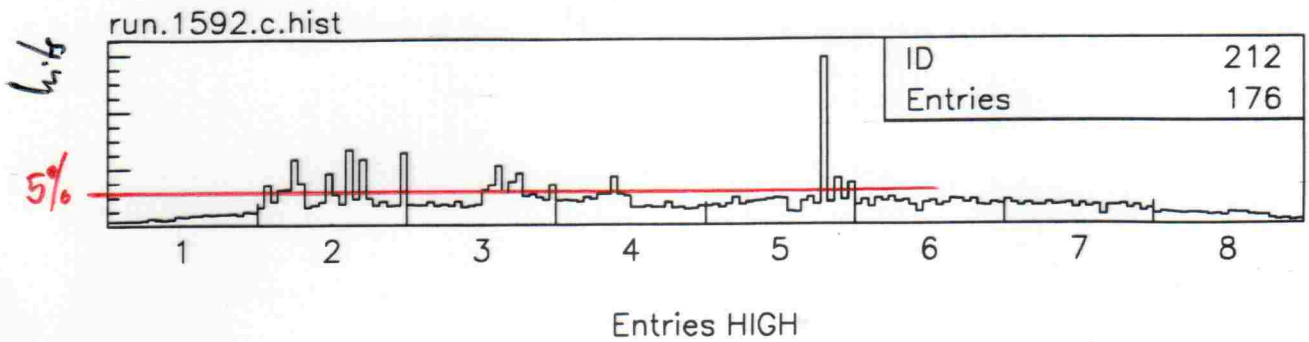


Pedestals HIGH

5%



Entries HIGH

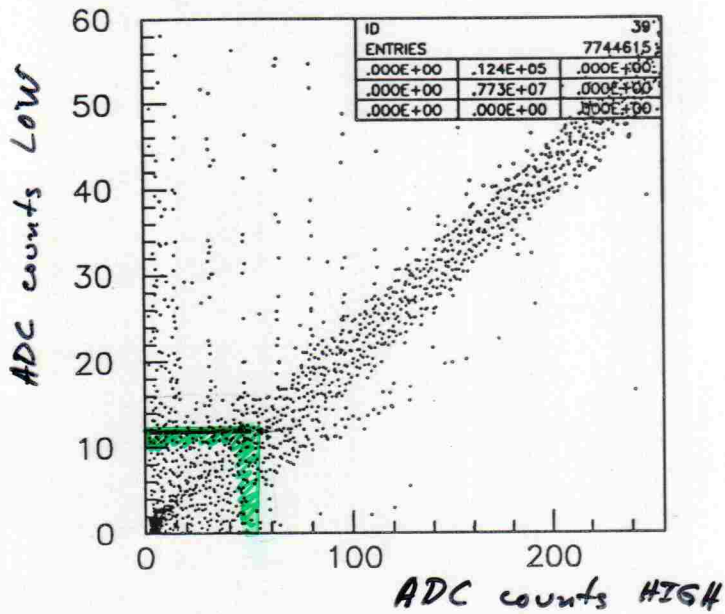


Result of "pedestals" subtracting \Rightarrow

* smoother hit distributions

* help in using strip information for track finding and fitting (?...)

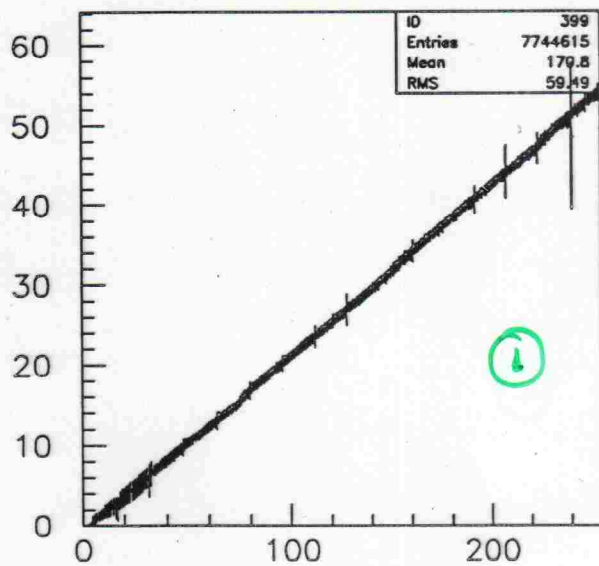
Low / High Ratio



$$\text{ADC count LOW} = A * \text{ADC count HIGH} + B$$

- (1) • all signals
- (2) • all (signals - pedestals)
- (3) • all signals with $P_{\text{HIGH}} \geq 50$
- OR • $P_{\text{LOW}} \geq 12$

- (4) • as (3) but with pedestals subtraction

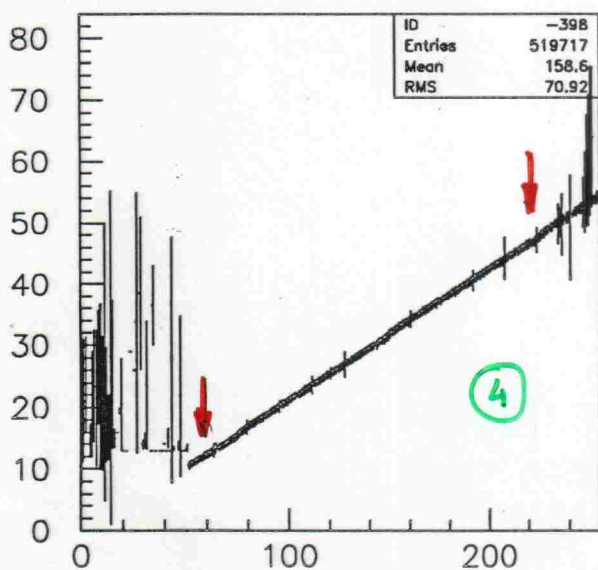


$$A = 0.215 \pm 0.001$$

$$B = 0.2 \pm 0.1$$

Designed value: 0.2

(HIGH / LOW = 5)



x-HIGH, y-LOW ampli-PED(50,12)

Maintenance of the analog system

± At the beginning of the run \Rightarrow $\sim 3\%$ dead channels

Reasons: ± Bad contact between strip and transistor card

± Bad channel in analog card

± Dead channel in logic card (very few)

Actions: ± All transistor cards' contacts have been passed by sand paper

± 56 analog cards replaced and repaired (poor design)

± 4 logic cards " "


± 19 transistor cards replaced.

± 3 flat cables replaced

± every day checking of the system and "shaking" transistor cards with channels lost contact
($1 \div 3$ per day)

Question: We have (1) 11 coordinate measurements per gap by drift time measurement (3+8) and (2) 8 by wire number and (3) 8 by strips

Spatial

Resolution: (1) : ~ 0.8 mm
(2) : ~ 1.5 mm
(3) : ~ 2.5 mm  seems abundant.

(1) and (2) have very compact read-out electronics, while (3) \Rightarrow 84 crates, 84 12V PS, 5V PS etc.
 \Rightarrow manpower and resources consuming...