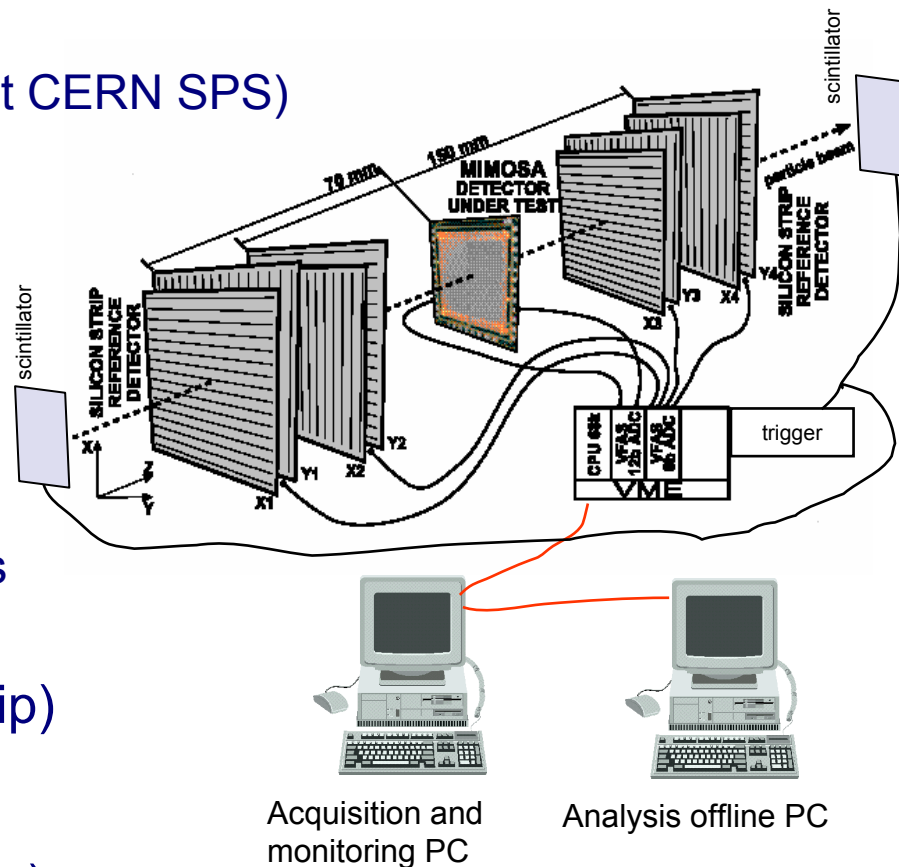


CMOS Beam Tests

- Why do we do the beam tests ?
 - The best way to have M.I.P
 - pions or muons ~ 120 GeV/c (at CERN SPS)
 - We can investigate:
 - Charge collection
 - Detection efficiency
 - Single point resolution
 - We can do this for :
 - Different temperatures (cooling system)
 - Different beam incidence angles

- Telescope :
 - 8 reference detectors (silicon strip)
 - 4 in x direction
 - 4 in y direction
 - 2 coincidence scintillators (trigger)

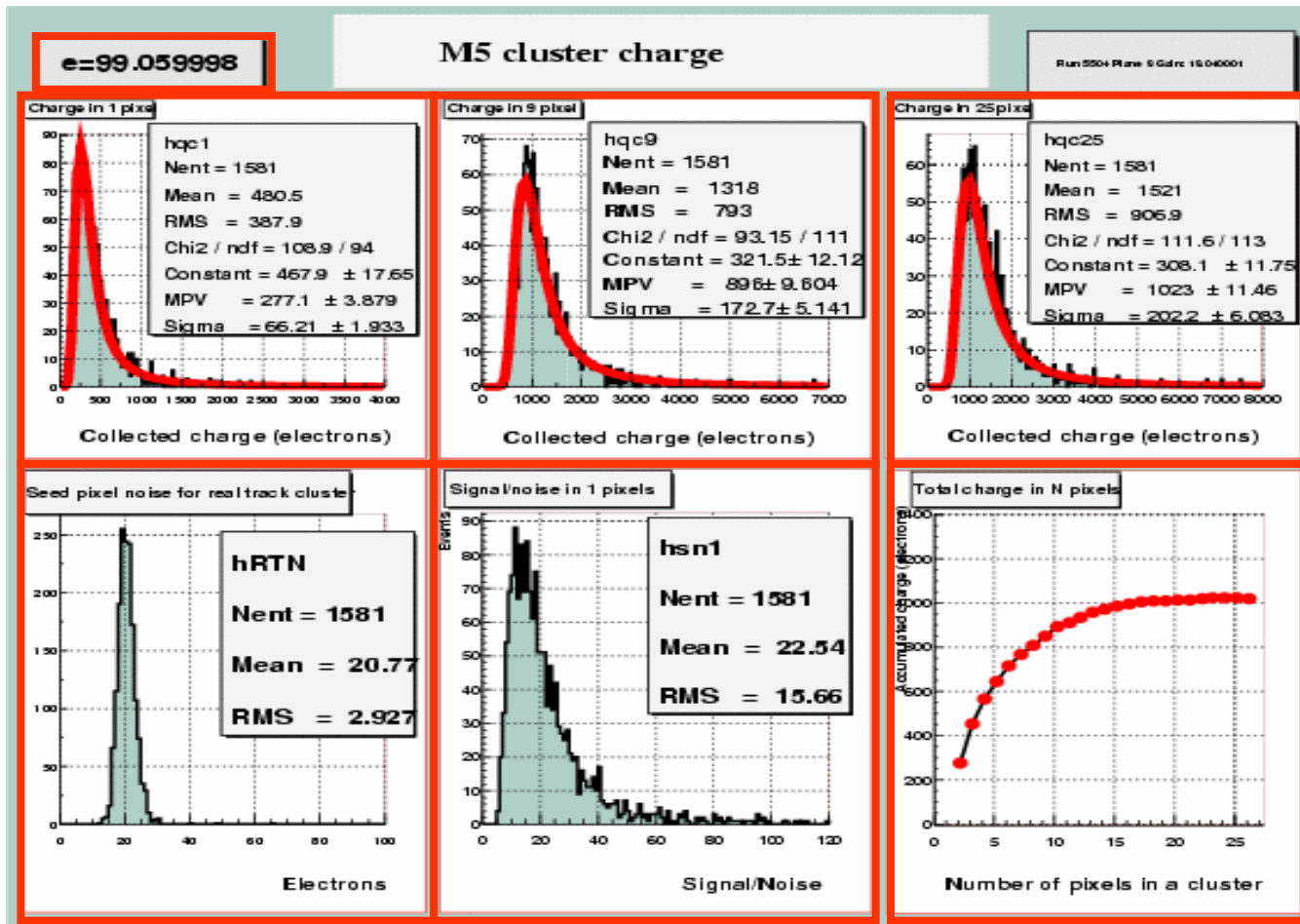


VME acquisition system

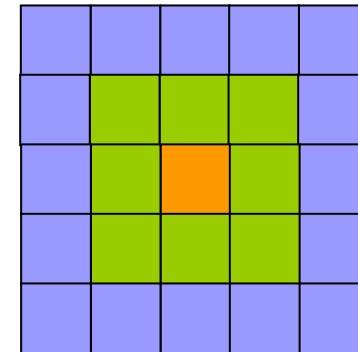
- Data acquisition
 - 2 ADC boards :
 - 12 bits for mimosa (4 channels)
 - We take only 2 by 2 channels
 - 8 bits for reference detectors
 - Different kinds of data format :
 - Small chip (limited by transmission rate)
 - Frame 0 (12 bits) ,frame 1 (12bits), CDS (8bits) on board
 - Big chip (limited by readout speed)
 - CDS (12 bits) on board
 - Acquisition faster and data size smaller
 - Time to take run
 - Big chip : 9h / 20 000 evts
 - Small chip : 3h / 150 000 evts
- ADC board configurations via LabView
- Monitoring via Root
 - Reference detectors
 - Raw data
 - Beam profil
 - Signal histogram (Landau)
 - Mimosa chip
 - Raw data
 - Signal histogram (Landau)
 - Plots of 2D or 3D matrices after CDS
- Users :
 - IReS – LEPSI
 - RD 42 (CERN)

Typical results /1

Charge collection

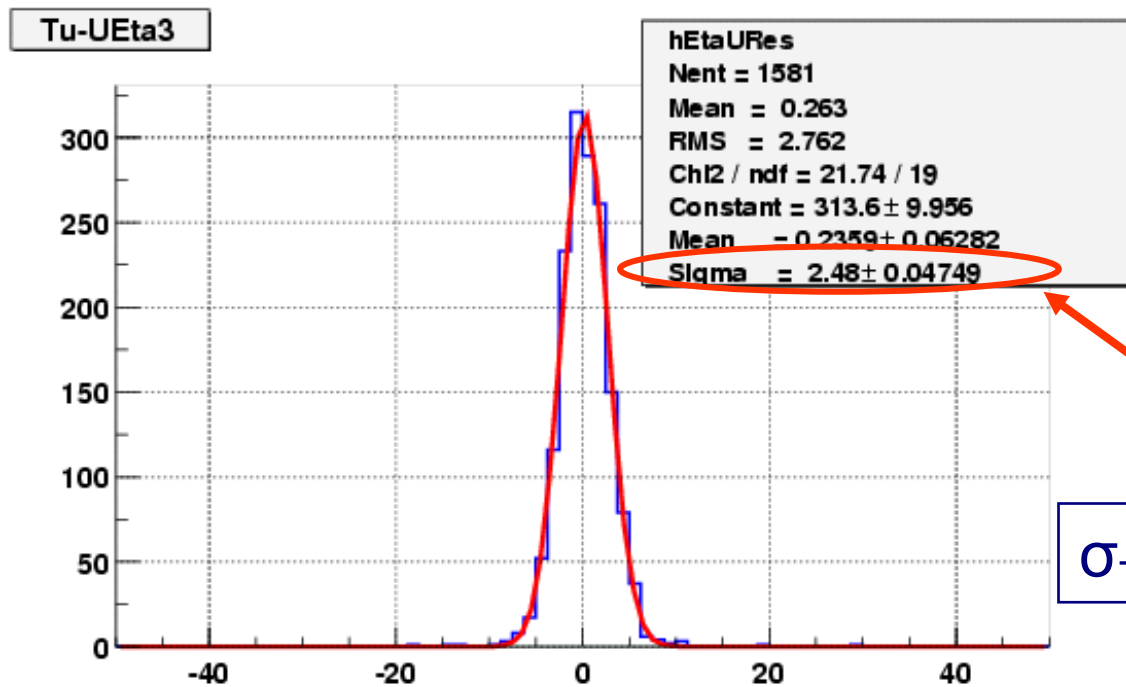


Cluster



Typical results /2

Single point resolution



$$\sigma_{\text{Tot}} = (\sigma_{\text{tel}}^2 + \sigma_{\text{mim}}^2)^{1/2}$$

$$\sigma_{\text{tel}} \sim 1 \mu\text{m}$$

Beam test program

- 2004 (SPS CERN):
 - Mimosa 5b (big chip 1M pixels 2×2 cm²)
 - Mimosa 9 (small chip technology opto)
 - Mimosa 7 (small CP chip photoFET)
 - MimoStar 1 (small chip proto for STAR upgrade)
 - About 50 days from May 10th to November 2nd, 2004
 - Most of the time in parasitic mode (LHCB velo, RD 42)
- 2005 (DESY ?):
 - CP chip (Mimosa 8)
 - Mimosa 10
 - MimoStar 2
- 2006 (DESY ?) :
 - 3 different chips