Source test of the 180 nm chip with GLAST and CMS sensors

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On behalf of the SiLC Collaboration

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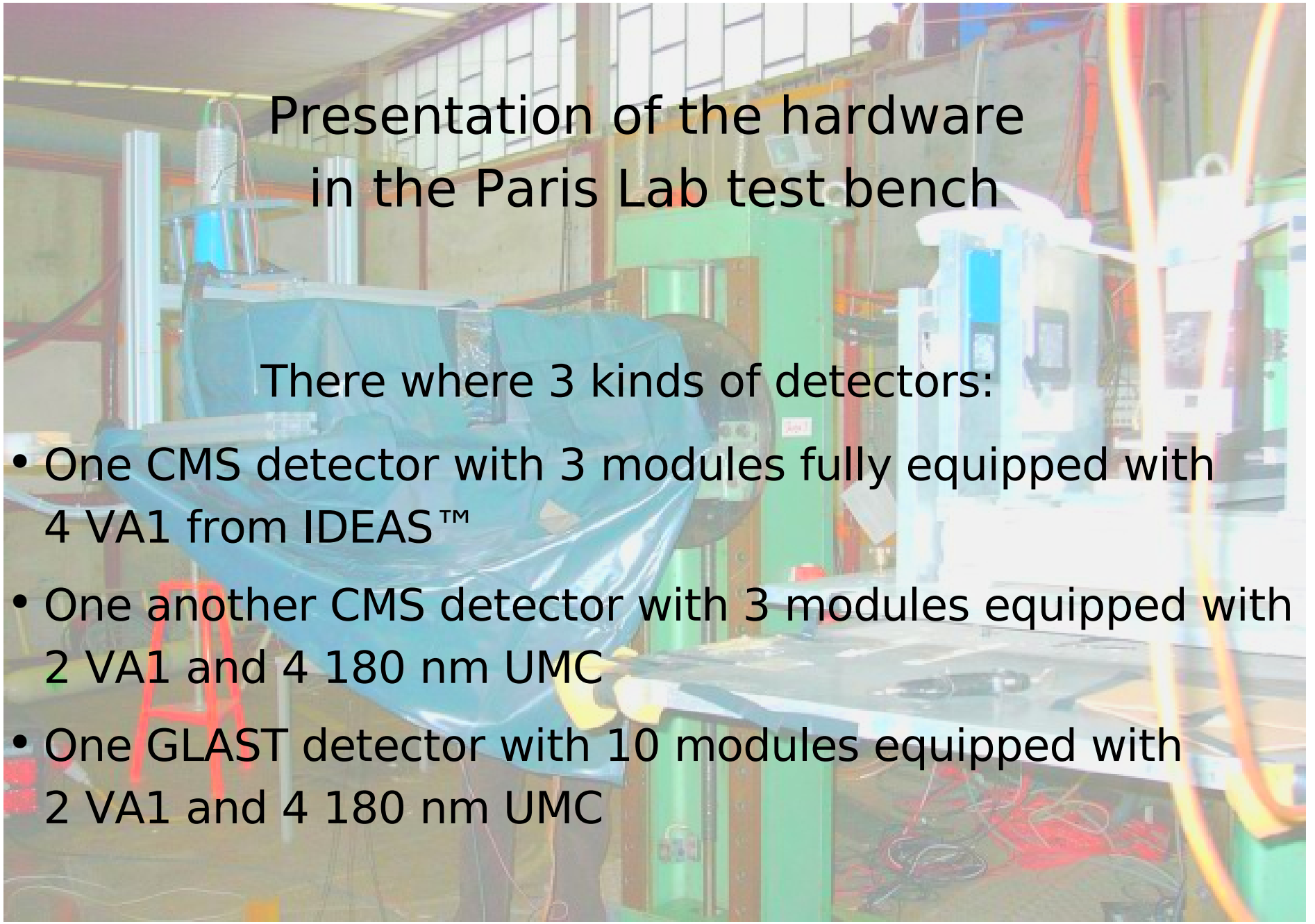
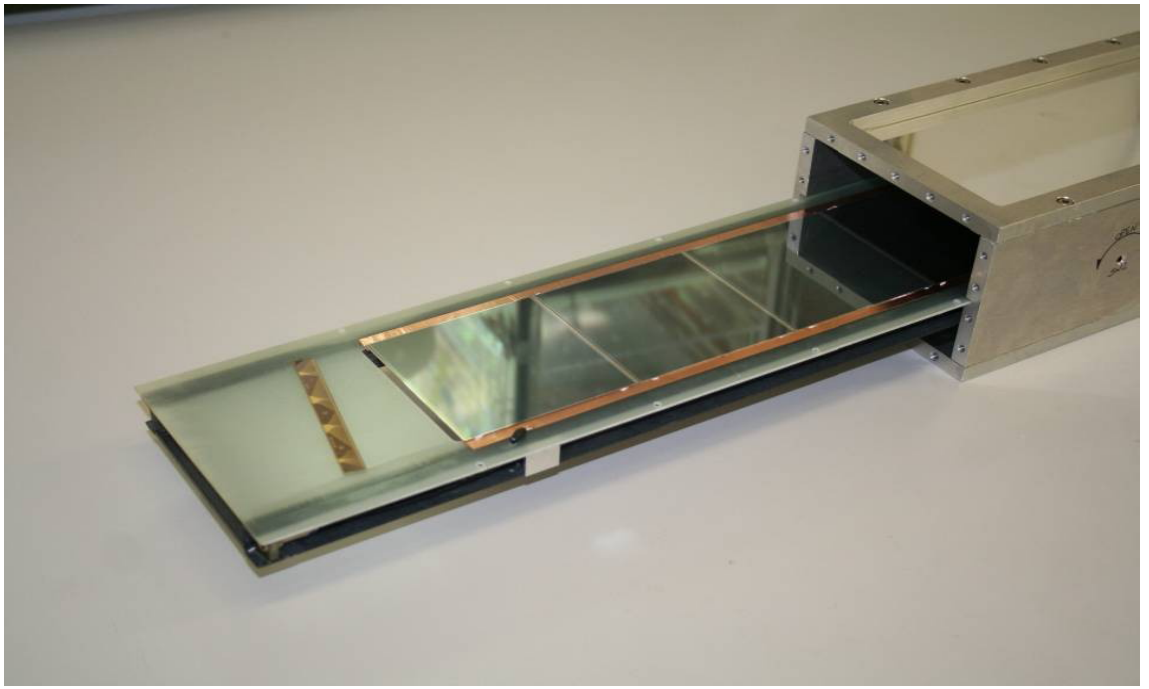


Presentation of the hardware in the Paris Lab test bench

There where 3 kinds of detectors:

- One CMS detector with 3 modules fully equipped with 4 VA1 from IDEAS™
- One another CMS detector with 3 modules equipped with 2 VA1 and 4 180 nm UMC
- One GLAST detector with 10 modules equipped with 2 VA1 and 4 180 nm UMC

Sensors

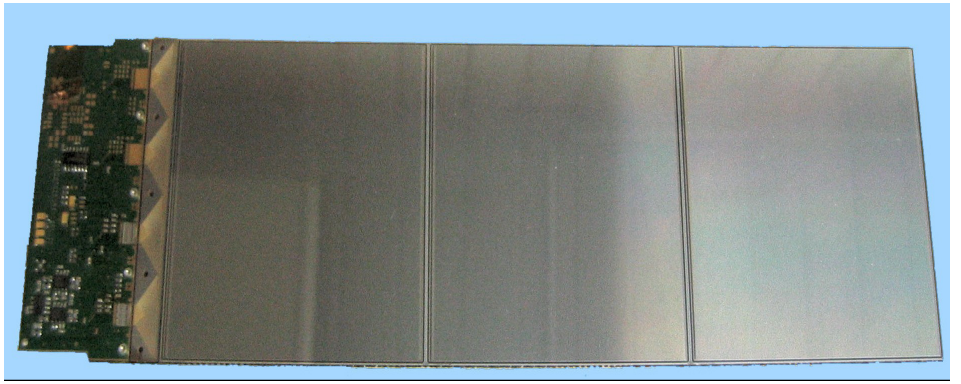


GLAST detector 10 sensors

without electronics

90 cm strip long

228 um pitch, 500 um thick



CMS detector 3 sensors

fully equipped

28 cm strip long

183 um pitch, 410 um thick

4 VA1 readout card

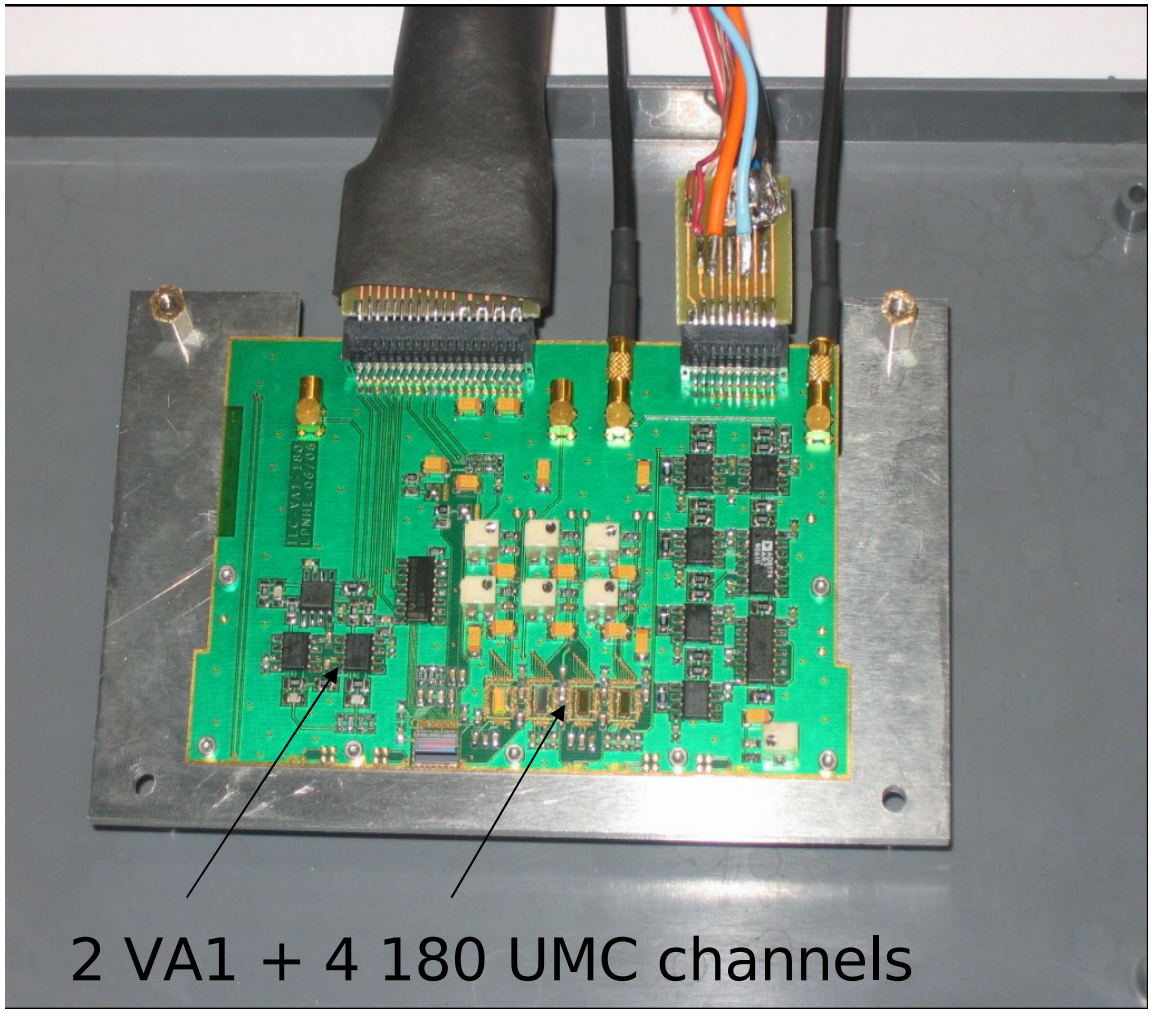
with pitch adapter

Hardware and Software in the Paris test bench

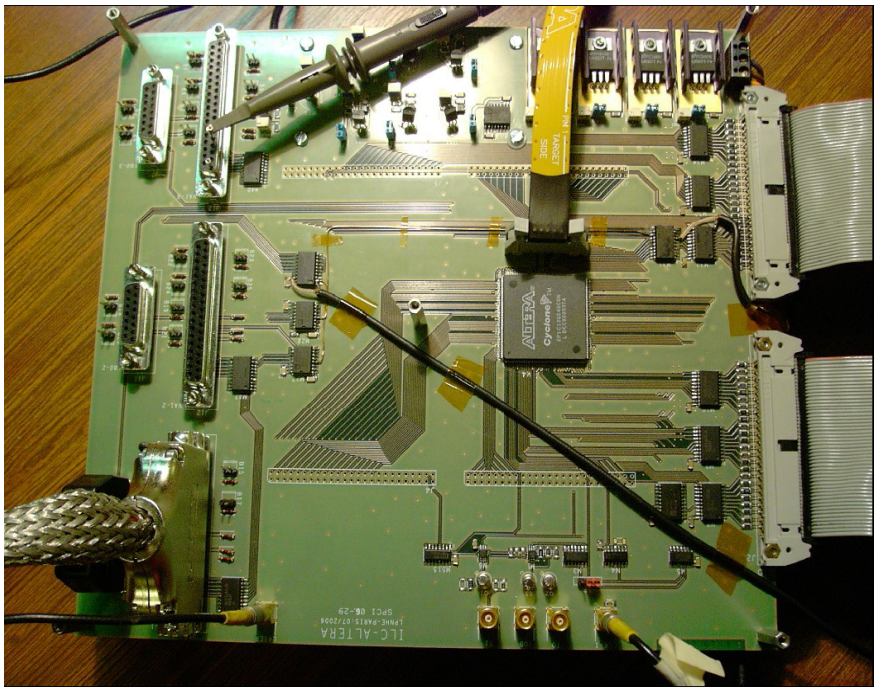
- Some low voltage power supply
- One high voltage power supply for the polarization of the detector
- One sequencer, called « Altera box », supplying all the signals needed for the smooth functioning of the preamps-shaper
- A 14 Mbq **Strontium source**
- A **trigger** based on a scintillator signal above some threshold
- One PC with
  - an ADC card for proper reading of the analog signals from the detector
  - LabView installed, for data taking and coordination of the all test bench
- One other PC with a dedicated **ROOT analysis software**

Electronics

- Amplifiers-shapers

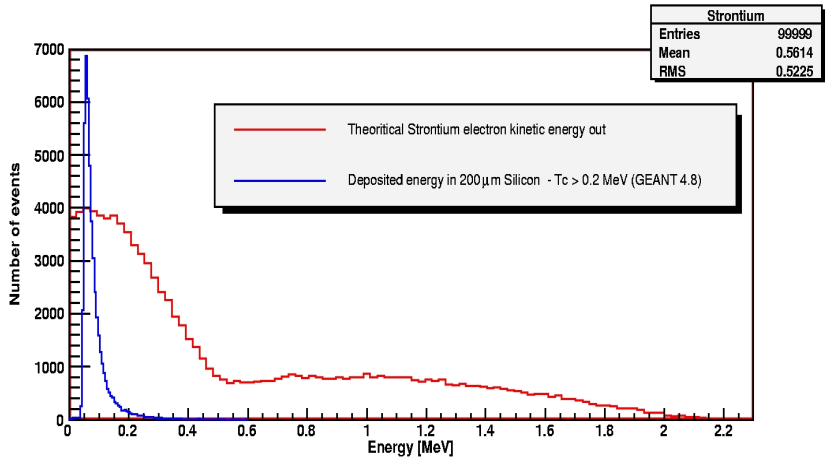


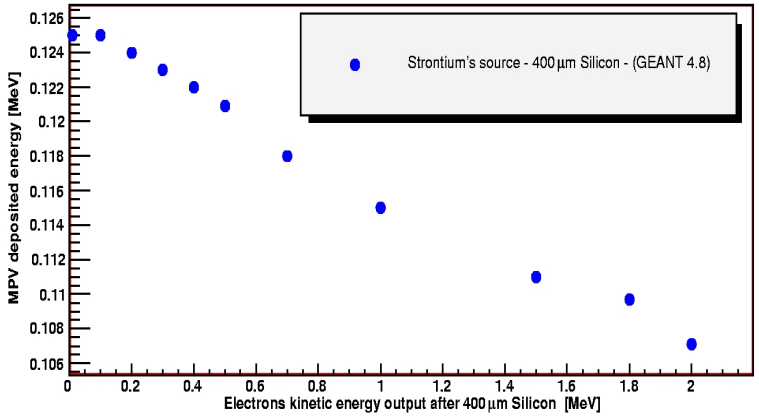
- Sequencer and low voltage supplies



4 VA1-CMS

Source of Strontium 90

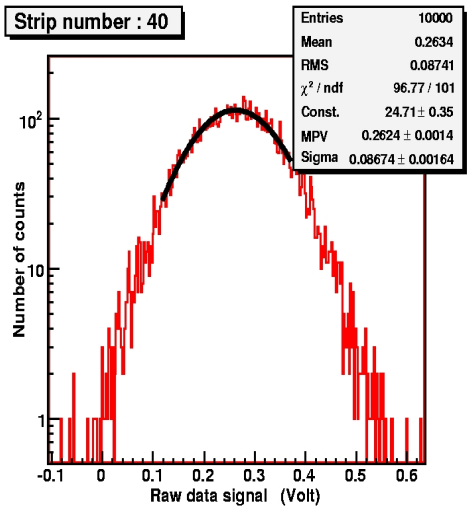


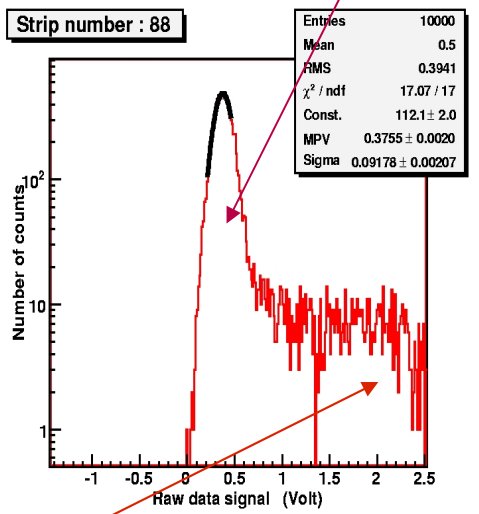


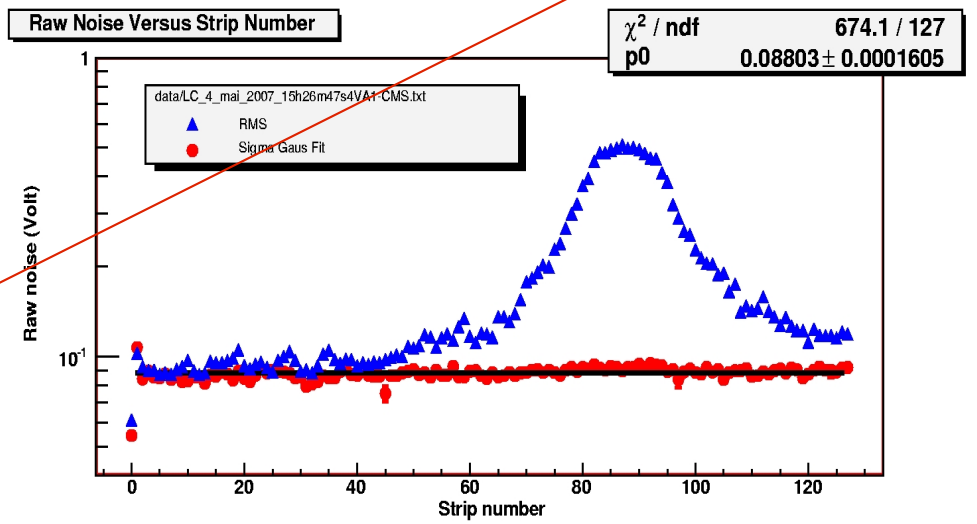
Pedestal estimate = gaussian fitted mean

All strips are read for each trigger -> mainly pedestals

Raw Data Noise Studies : 4VA1-CMS



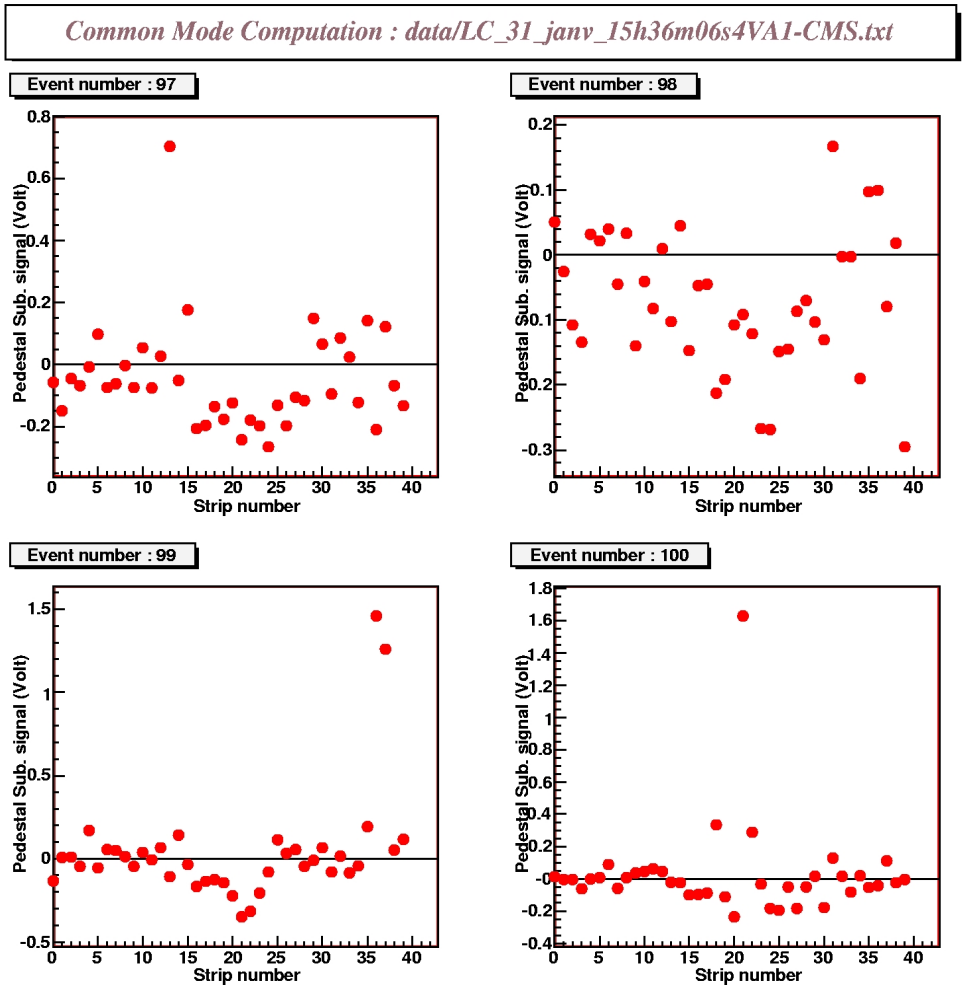


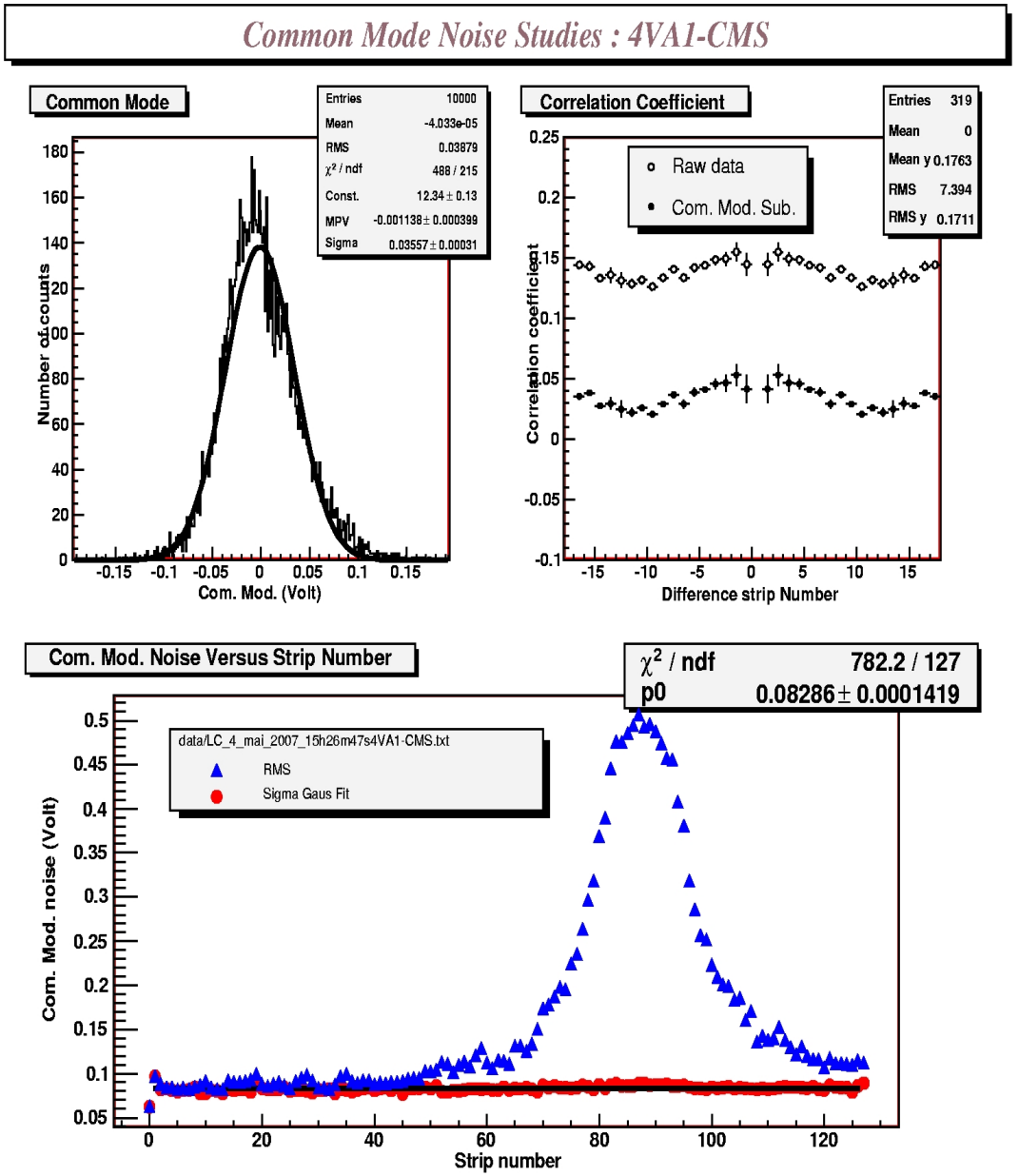


Raw data = noise + common mode
+pedestal + physical signal

Raw data noise estimate =gaussian fitted sigma

4 VA1-CMS

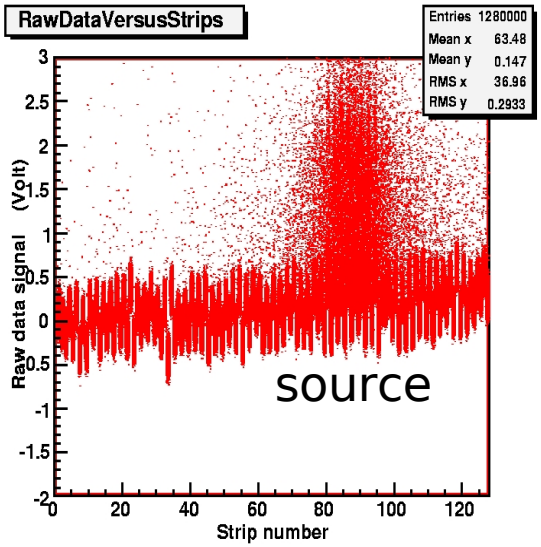


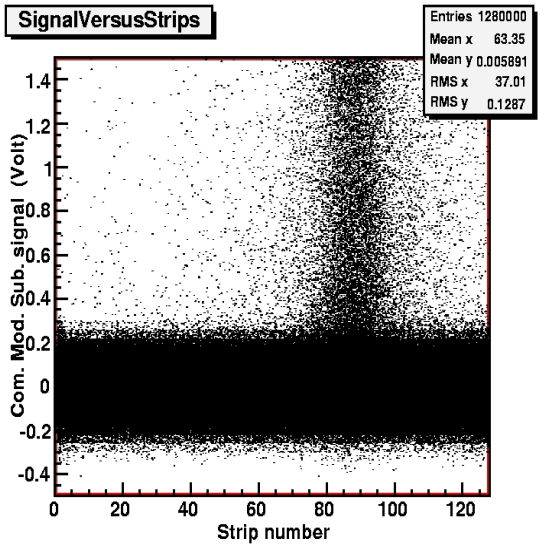


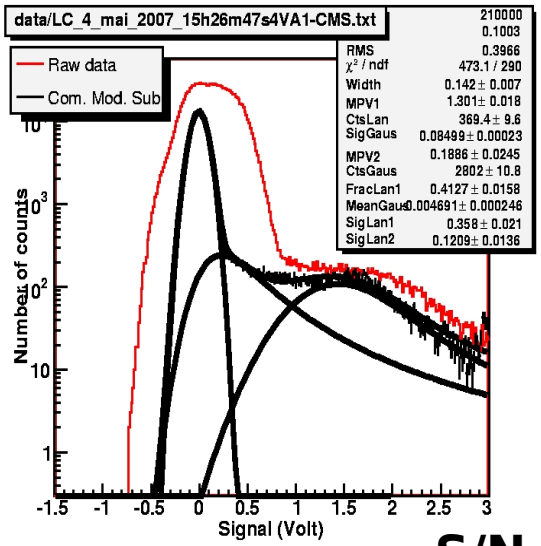
Common mode estimate =
strip averaged pedestal subtracted raw data
(excluding the highest raw data signal strip)

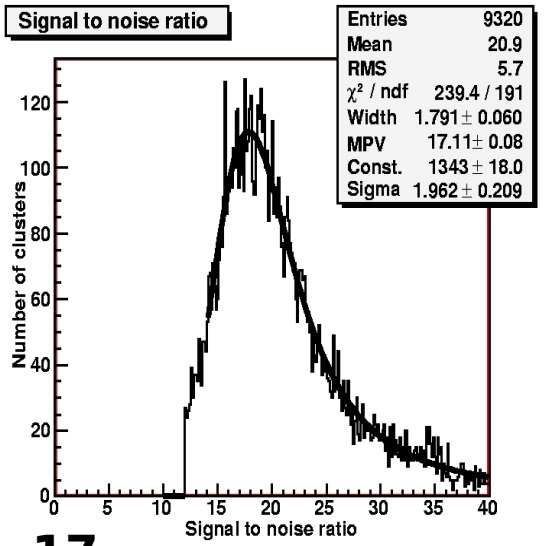
Preliminary results

Signal Studies : 4VA1-CMS



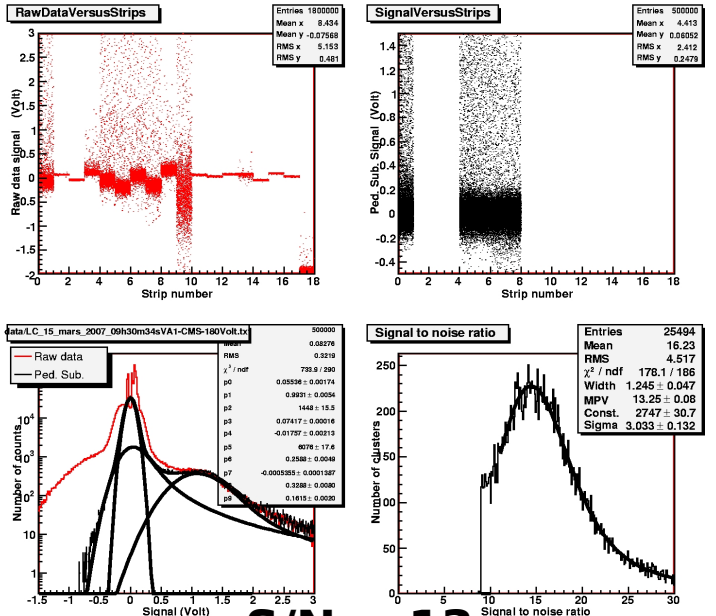






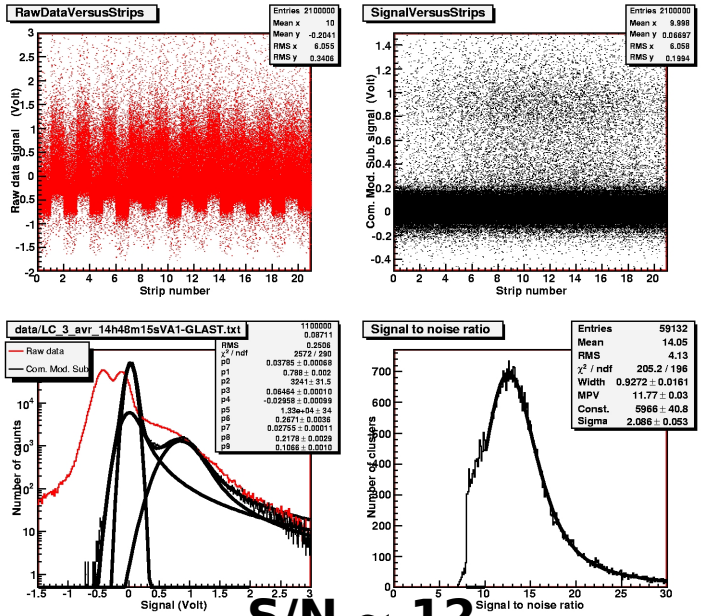
S/N ~ 17

Signal Studies : VA1-CMS



S/N ~ 13

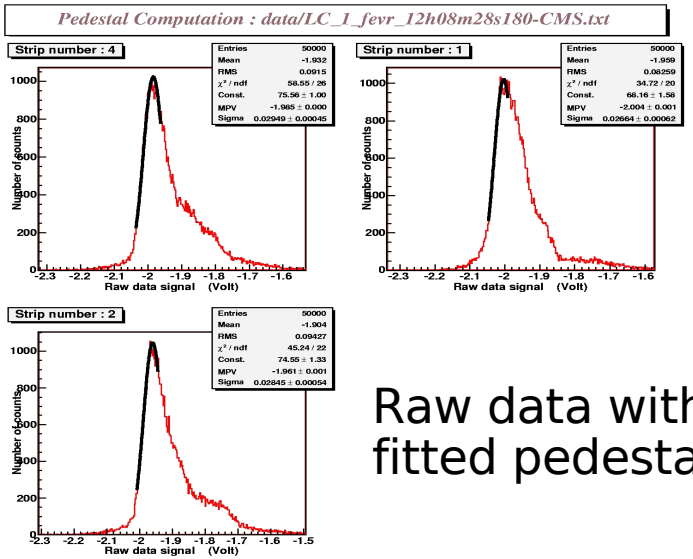
Signal Studies : VA1-GLAST



S/N ~ 12

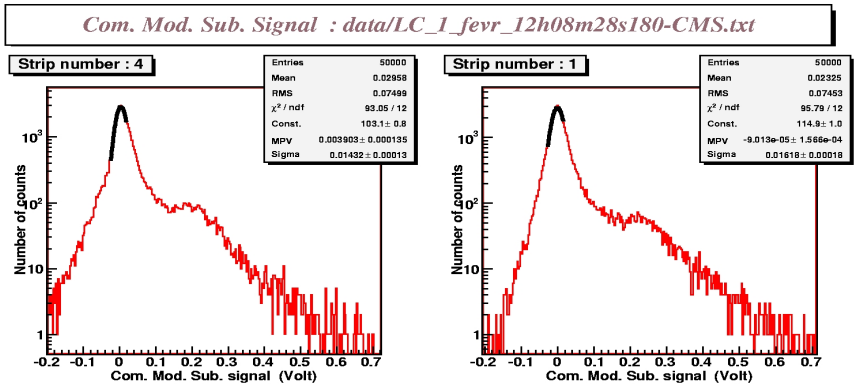
The 180 nm chip : first measurement

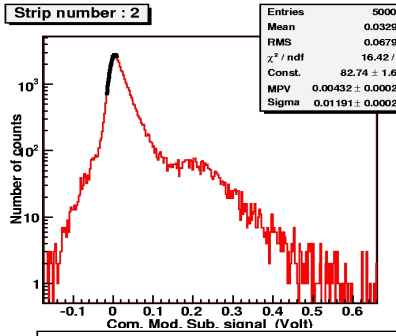
Signal estimated as for the VA1



Raw data with fitted pedestal

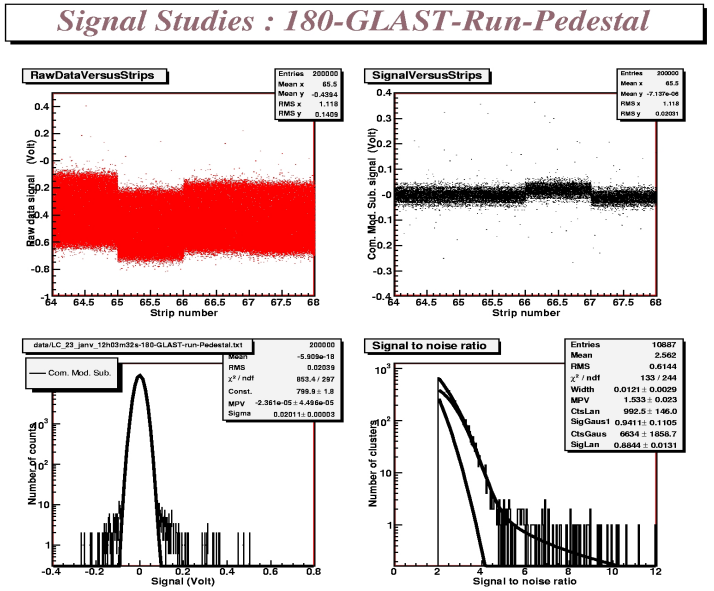
CMS



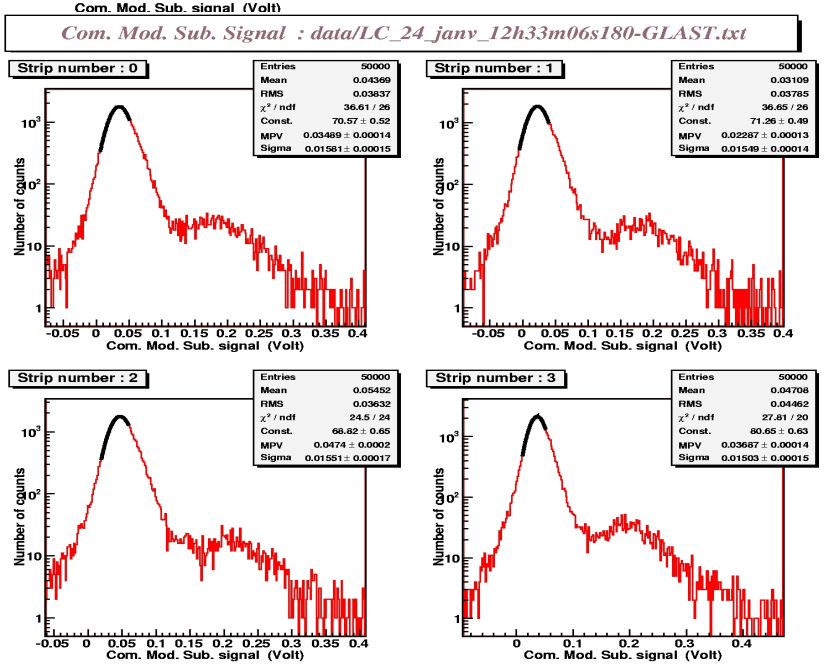


C.M. and Pedestal subtracted

Noise estimated using a pedestal run



GLAST



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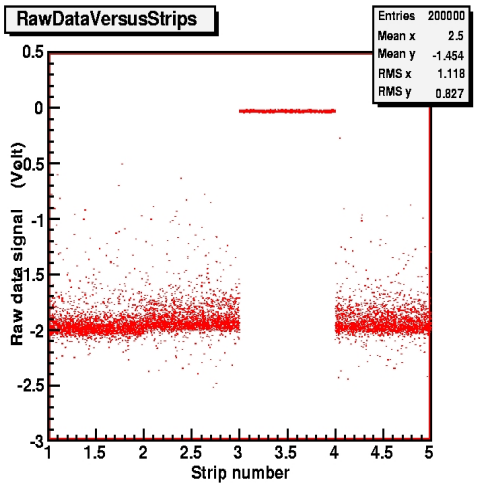
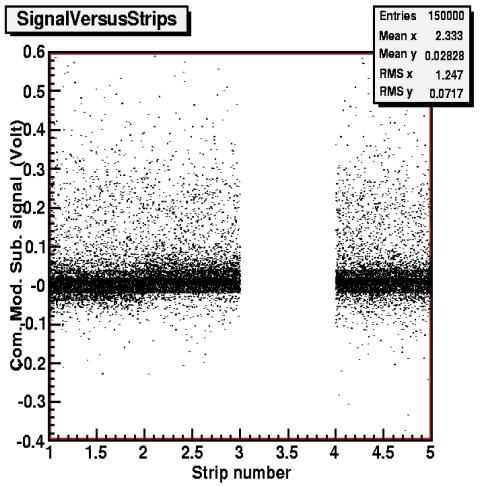
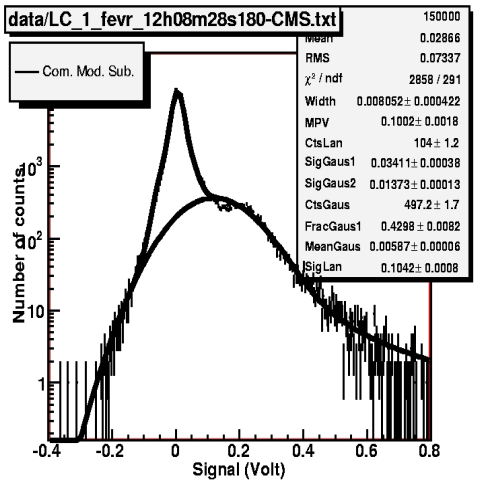
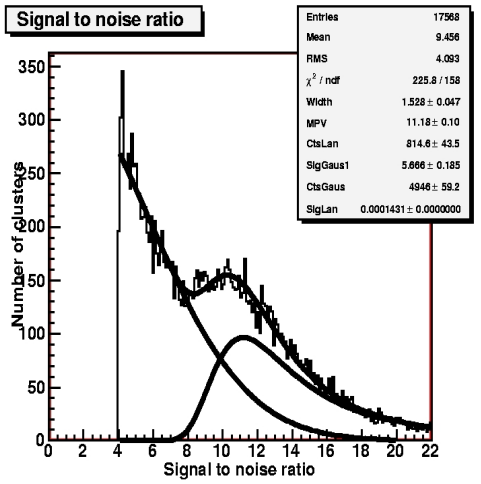
180 nm : the first preliminary results

Signal Studies : 180-CMS



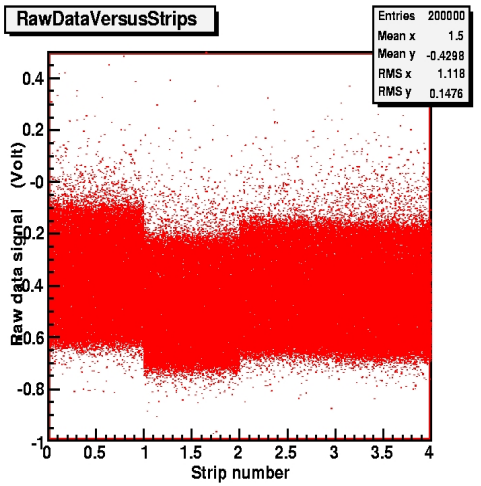


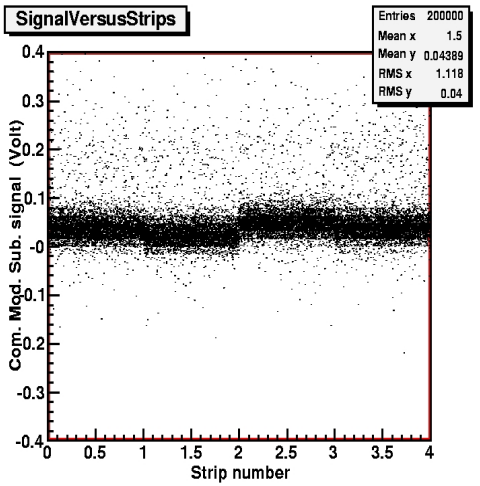


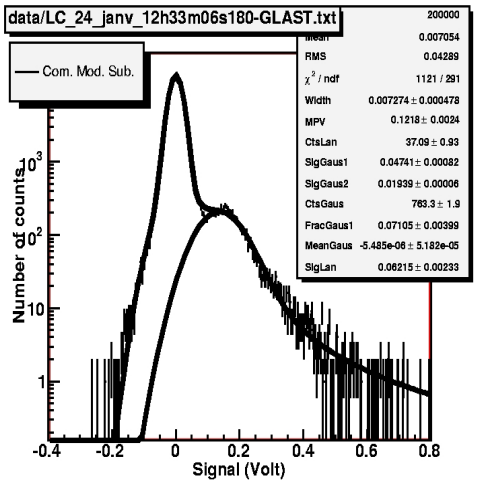


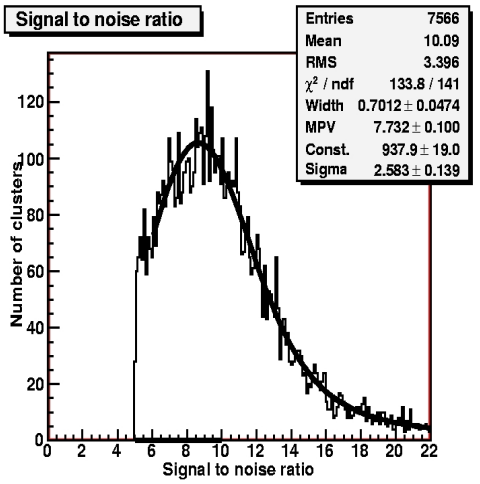
S/N ~ 11

Signal Studies : 180-GLAST



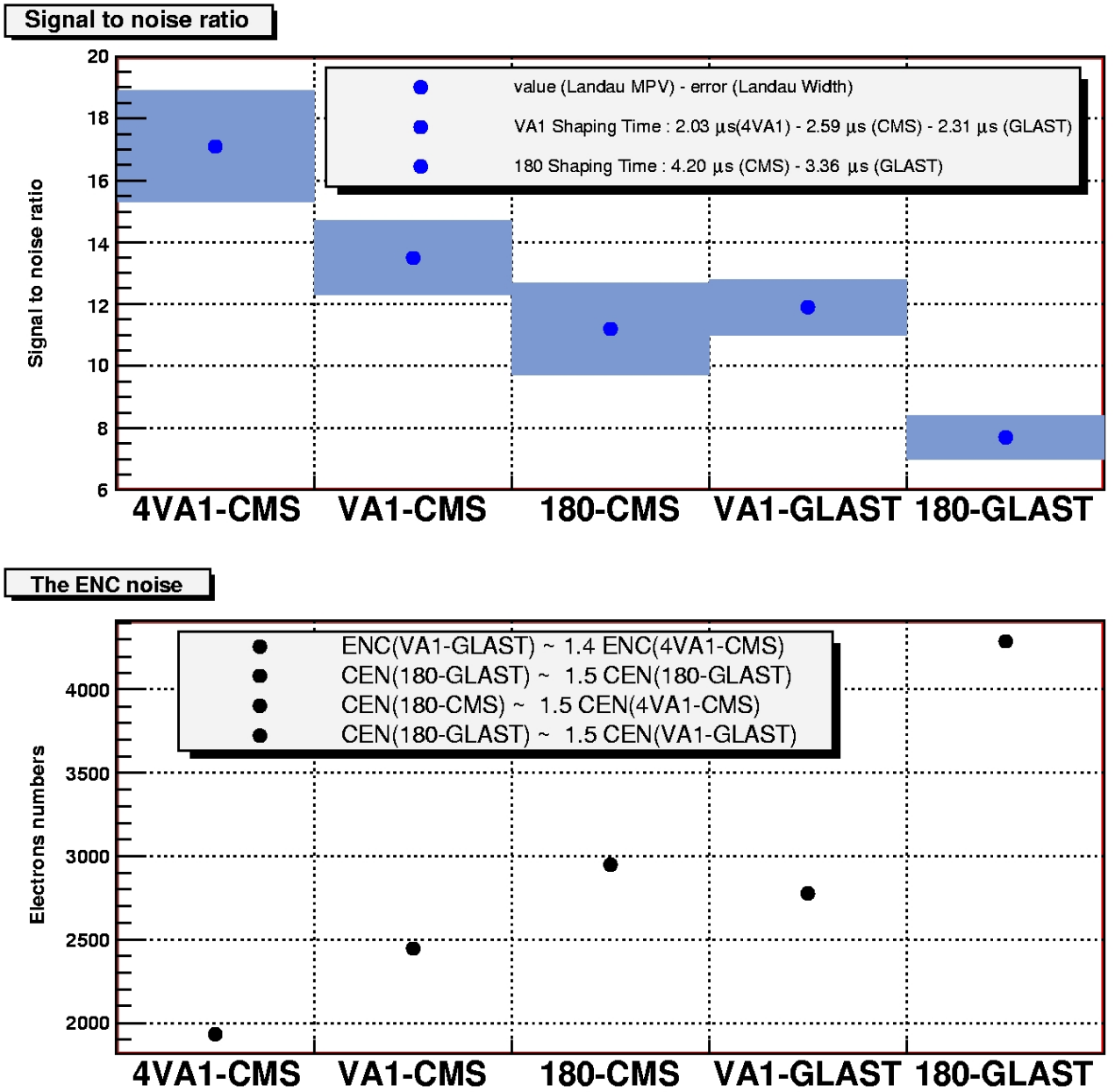






S/N ~ 8

S/N and Noise Summary



Conclusions and outlook

- The 180 nm chip is working
- The global noise should be decreased
- This source test will be followed by a beam test at DESY next week
- A step towards the use of the new built 130 nm UMC chip with analog pipeline and digital output