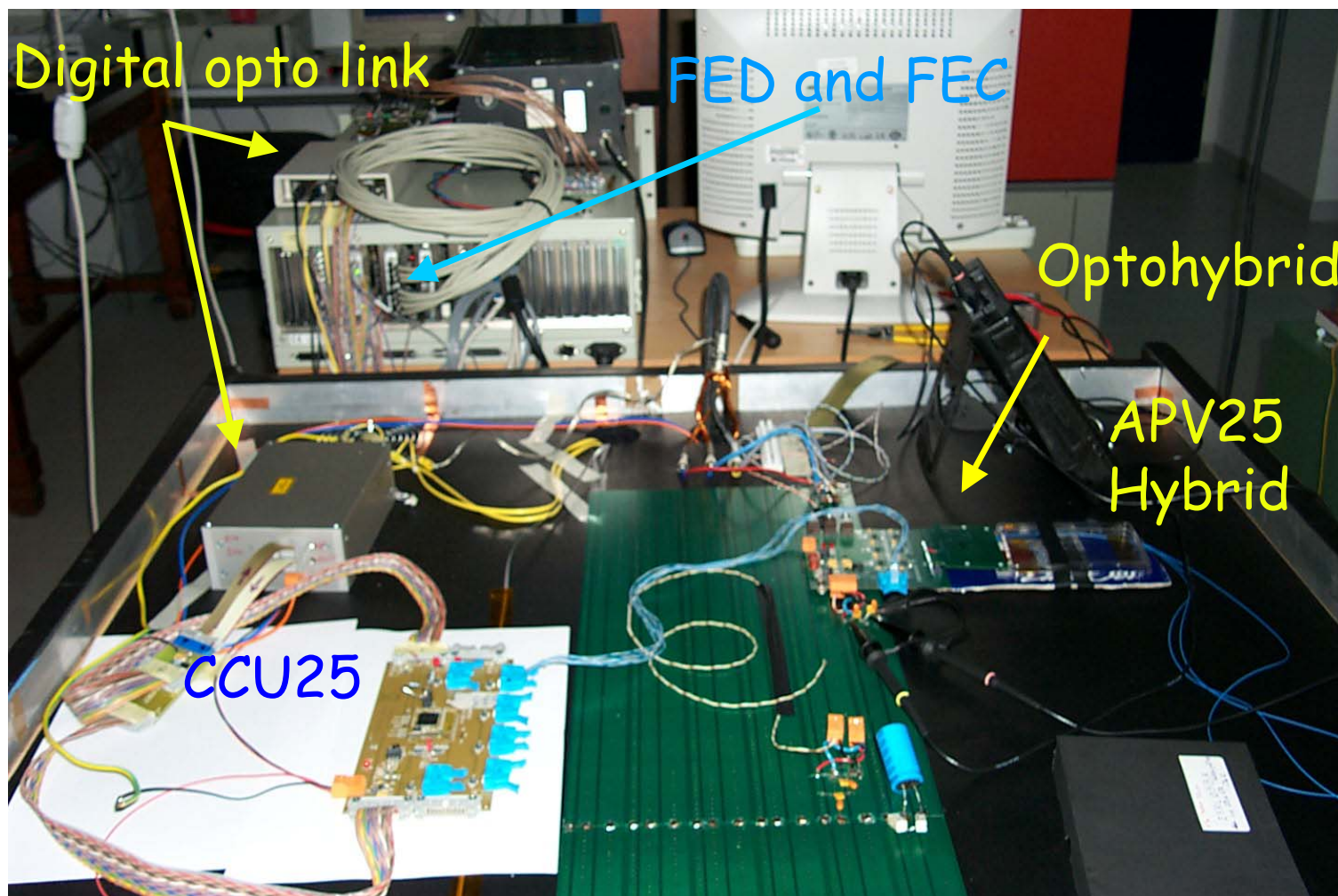
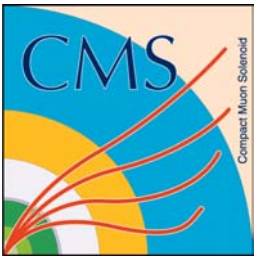


Opto Hybrid Test in Florence

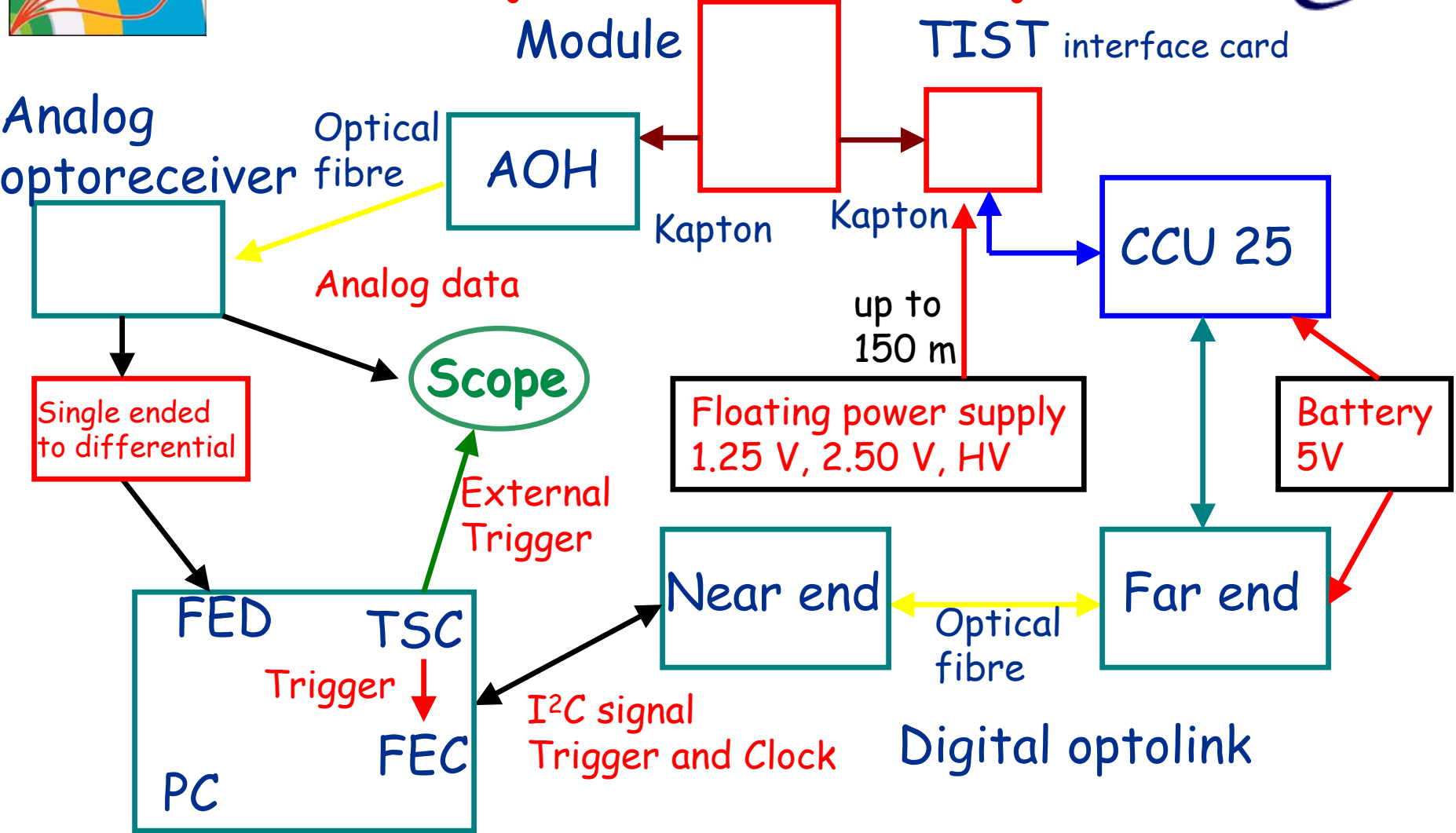
Cristiano Marchettini
INFN Firenze

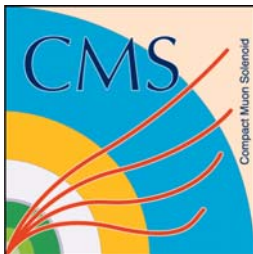
System Setup





System Setup

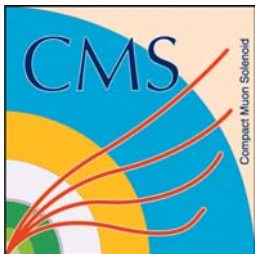




Software Used



- Laurent Mirabito's software for module test (no XDAQ) downloaded from CERN cvs
- On this, we made several changes:
 - Enabled the use of the CCU 25 in Fec kernel module and in FecServer
 - Laserdriver version 2 implemented in optosetter.cxx
 - Dialogs set to Florence addresses defaults and Raymond's APV25 User Guide defaults

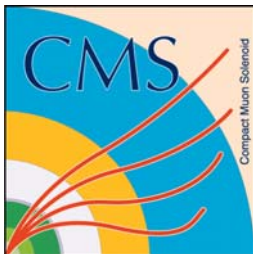


Test Procedures



We investigated several configurations, varying:

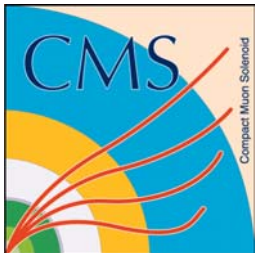
- The Optohybrid gain
 - 4 possible values: 5, 7.5, 10, 12.5 mS
- The Multiplexer gain (8 switchable parallel resistors on APV hybrid, each of 400 Ohm)
 - 50 or 100 Ohm
- The Optohybrid input impedance (single ended)
 - 50, 100 and 1000 Ohm



Test Conditions



- Measurements done with several modules
- The humidity and the temperature of the room were quite stable but not absolutely controlled
- Internal calibration pulse of the APV25:
ICAL = 80
- 1 MIP corresponds to ICAL = 29 in a silicon detector of 300 μm thickness
- Optohybrid bias values between 16 and 22



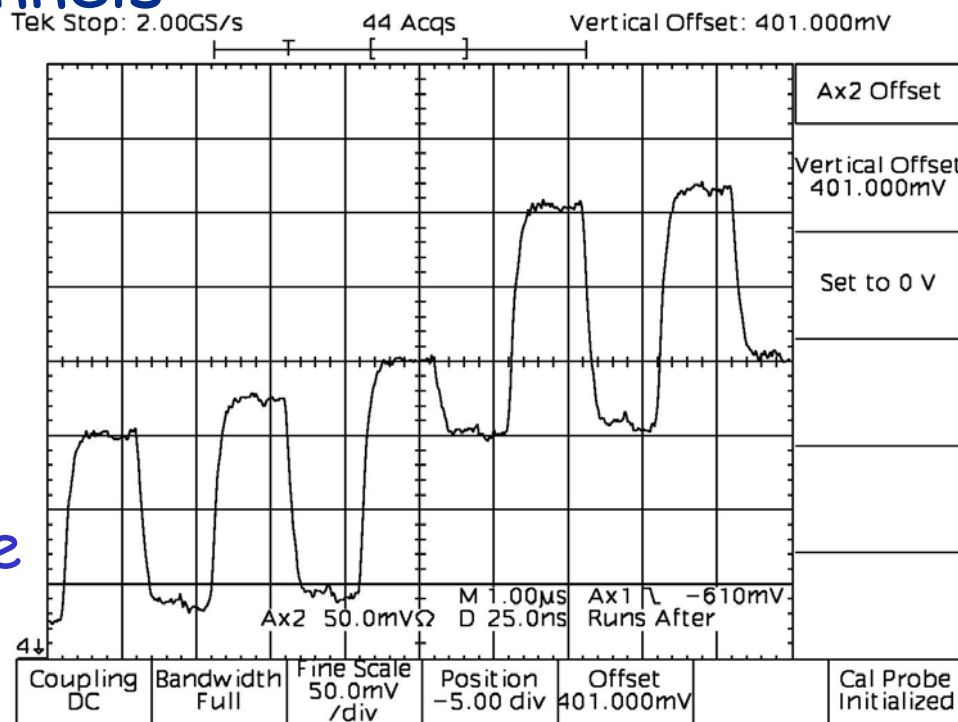
1000 Ohm

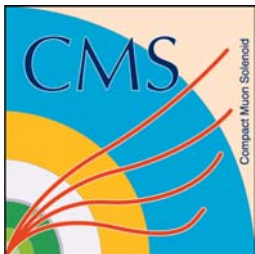


- Gain 3, Mux 255 (50 Ohm)
- S/N = 68.7
- Noise = 2.14 ADC channels

The signal is clean and flat-top in this case

Scope picture
ICAL = 80





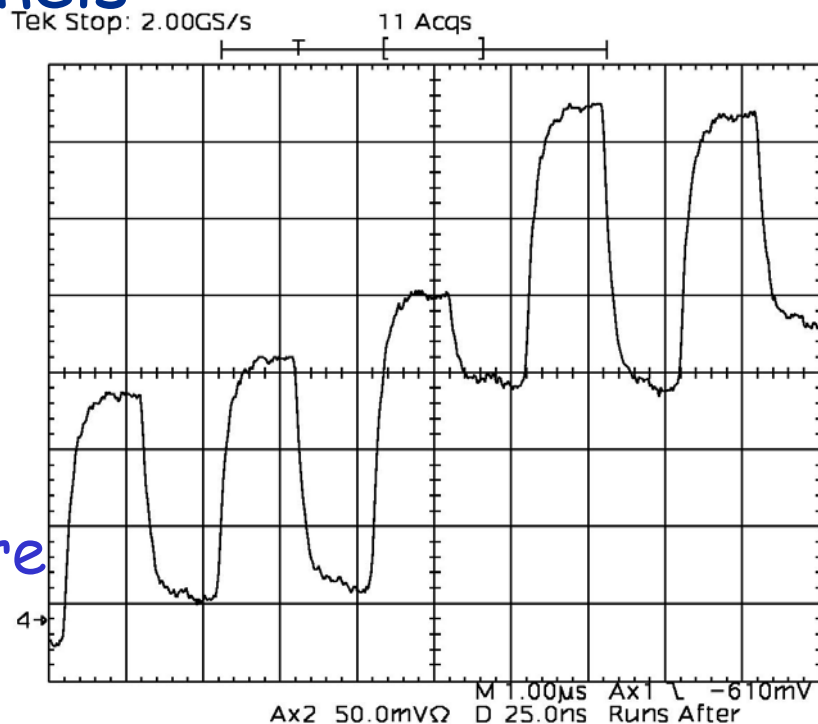
1000 Ohm



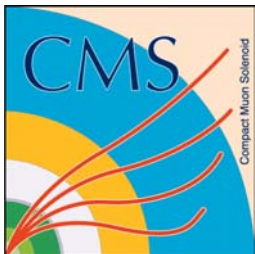
- Gain 1, Mux 15 (100 Ohm)
- S/N = 74.6
- Noise = 2.28 ADC channels

In both cases the AOH saturates at about 4 MIPs

Scope picture
(ICAL = 80)



8 Jul 2002
16:51:52



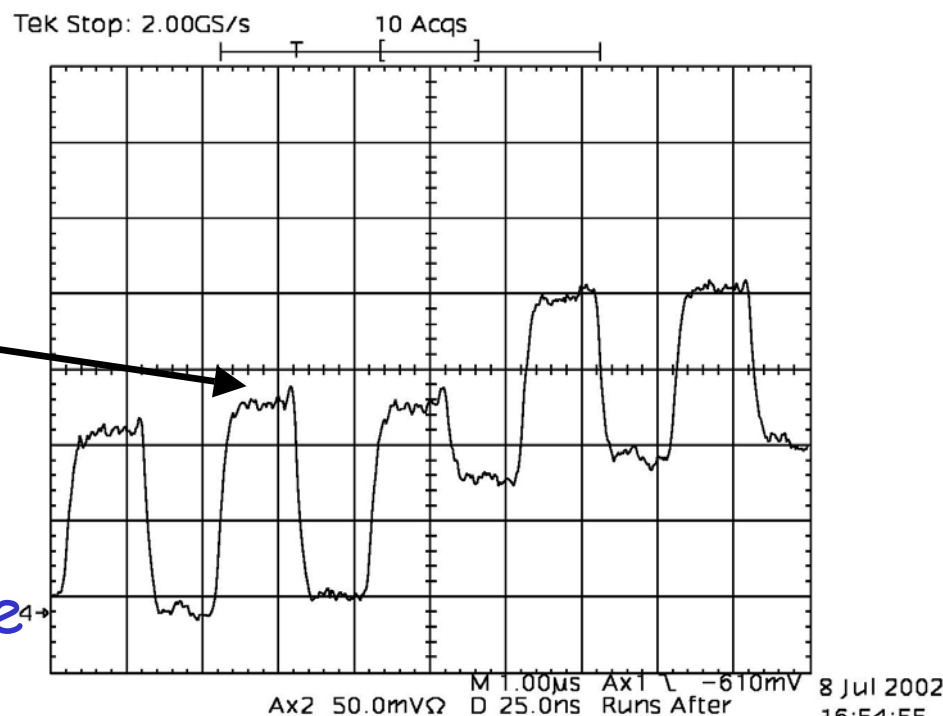
100 Ohm



- Gain 3, Mux 255 (50 Ohm)
- S/N = 68.1
- Noise = 1.37 ADC channels

Small spike
Flat signal

Scope picture

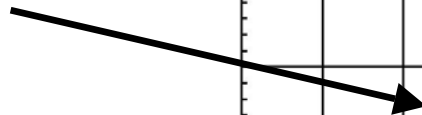




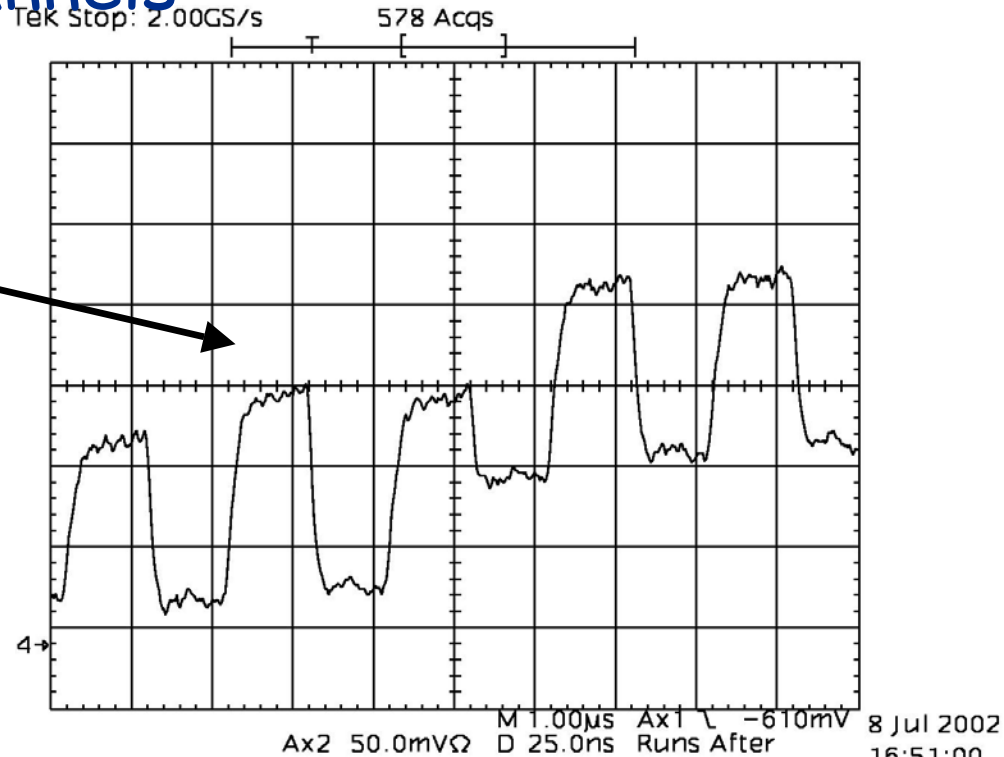
100 Ohm

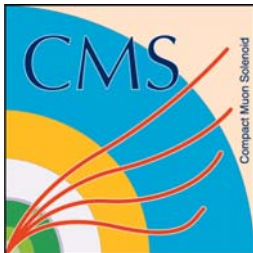
- Gain 1, Mux 15 (100 Ohm)
- S/N = 68.7
- Noise = 1.33 ADC channels

Small spike



Scope picture





50 Ohm



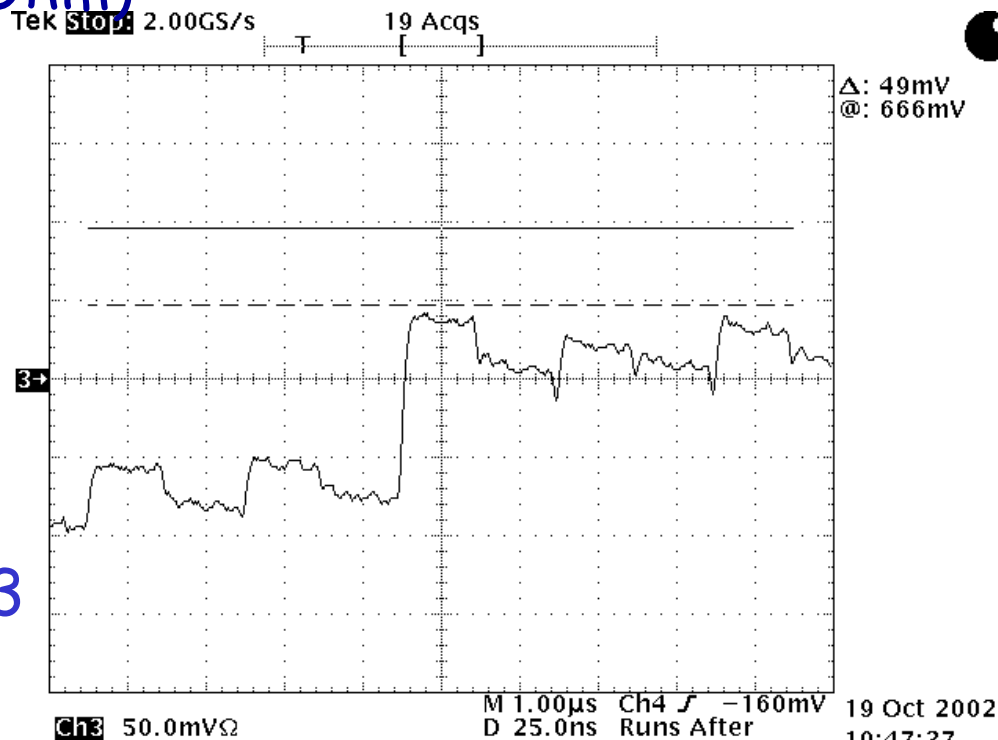
In all these cases

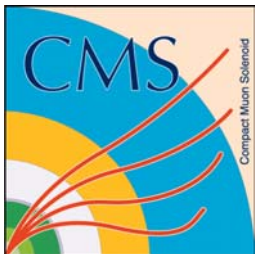
- Gain 1, Mux 255 (50 Ohm)
- Gain 3, Mux 255
- Gain 1, Mux 15 (100 Ohm)

there are a few spikes
switching between APVs

Gain 1, Mux 255
S/N = 60.2
Noise = 0.67

Mux 255 Gain 3
scope picture

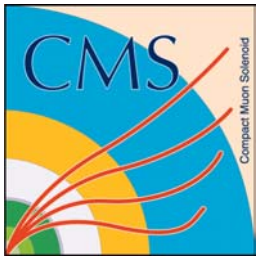




Linearity



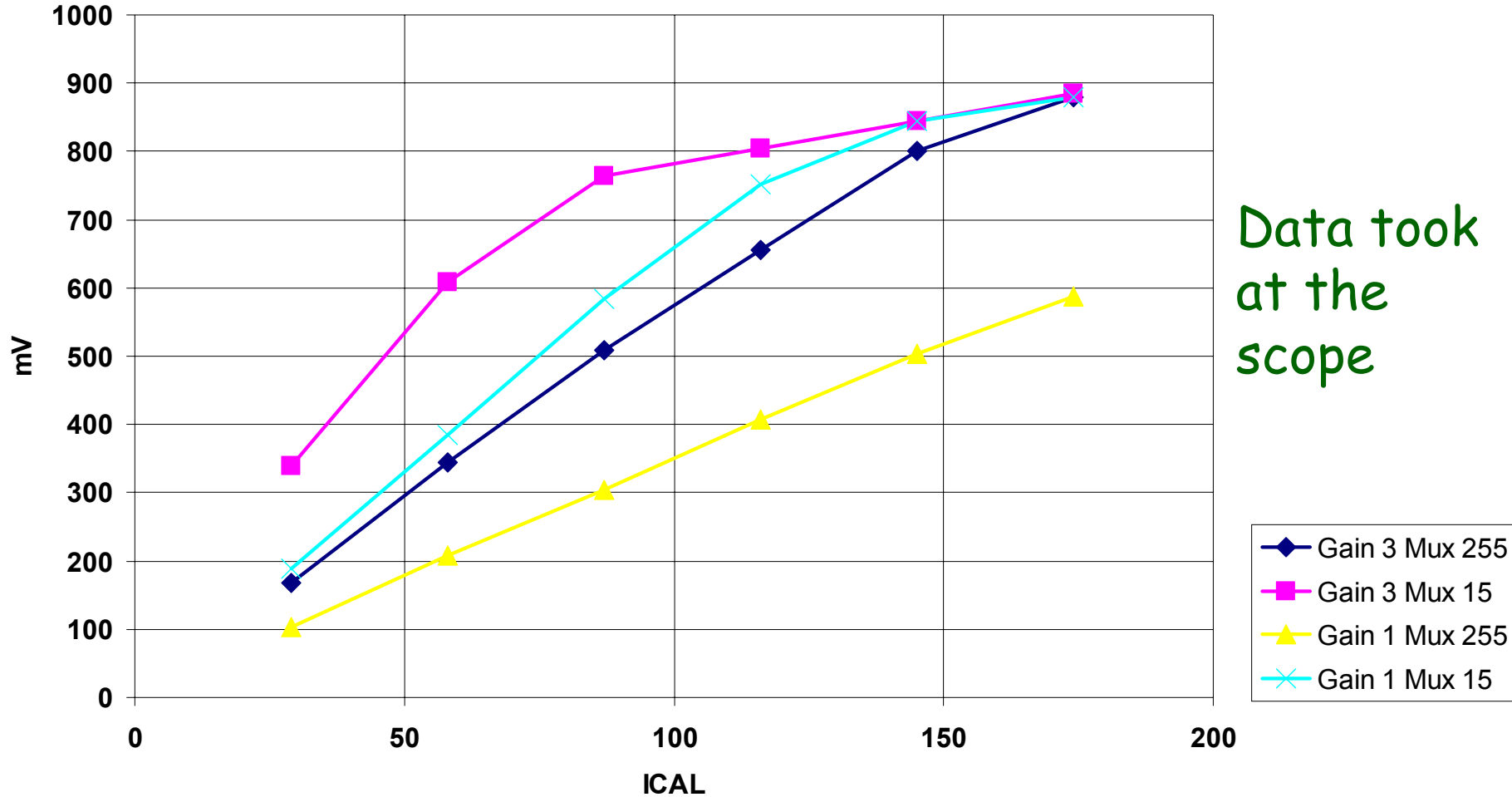
- Measurements are made connecting the scope on one output of the optoreceiver
- All the tests (1000, 100 and 50 Ohm) show a linearity of the analog optohybrid up to about 600 mV



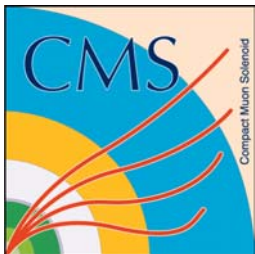
1000 Ohm



Peak mode, not inverting



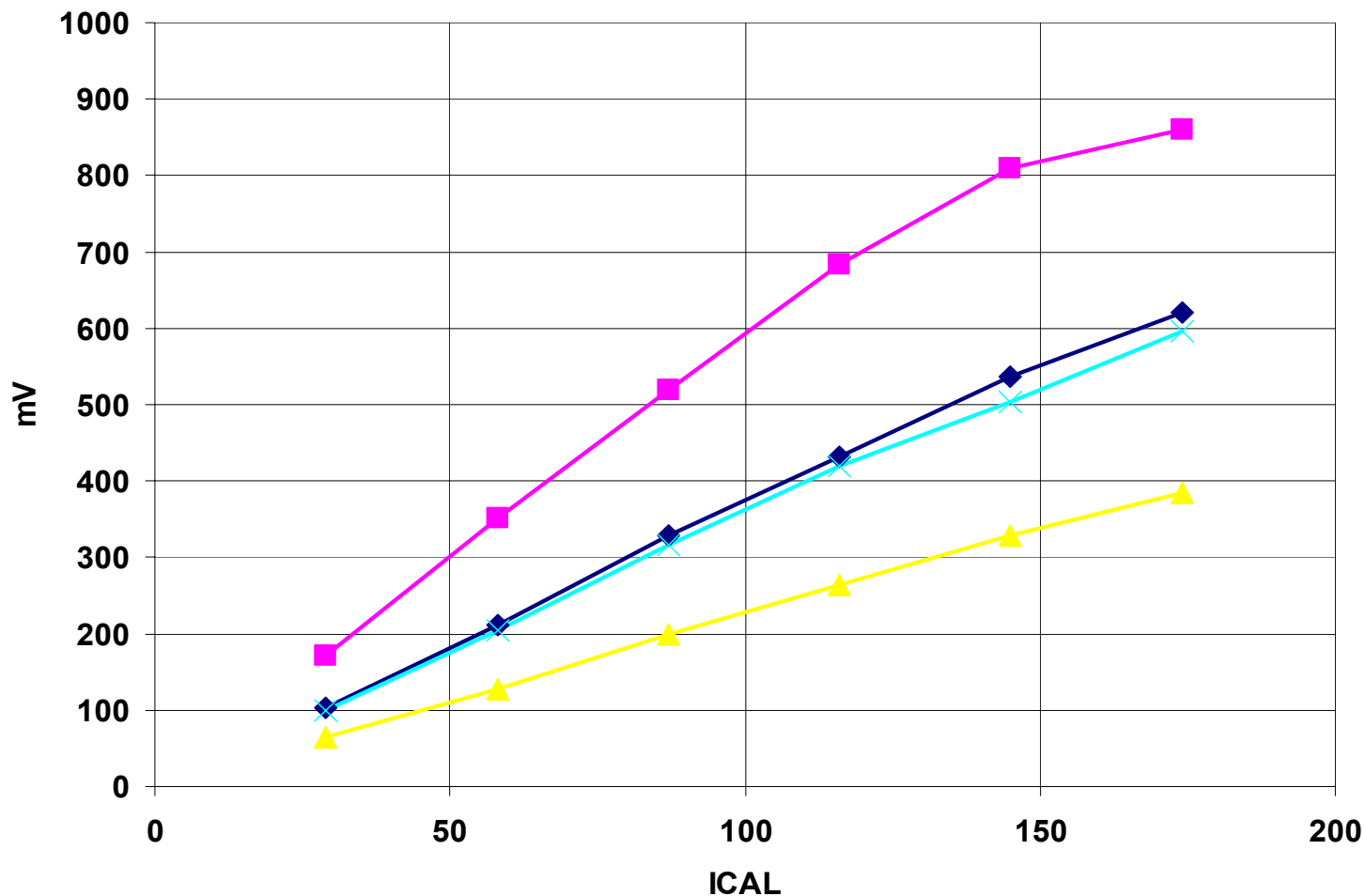
Data took at the scope



100 Ohm

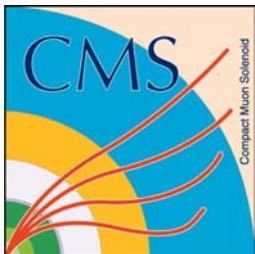


Peak mode, not inverting



Data took at the scope

- Gain 3 Mux 255
- Gain 3 Mux 15
- Gain 1 Mux 255
- Gain 1 Mux 15



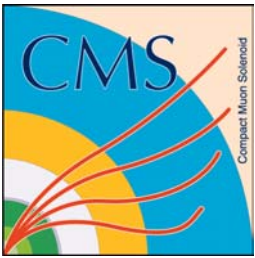
Reproducibility



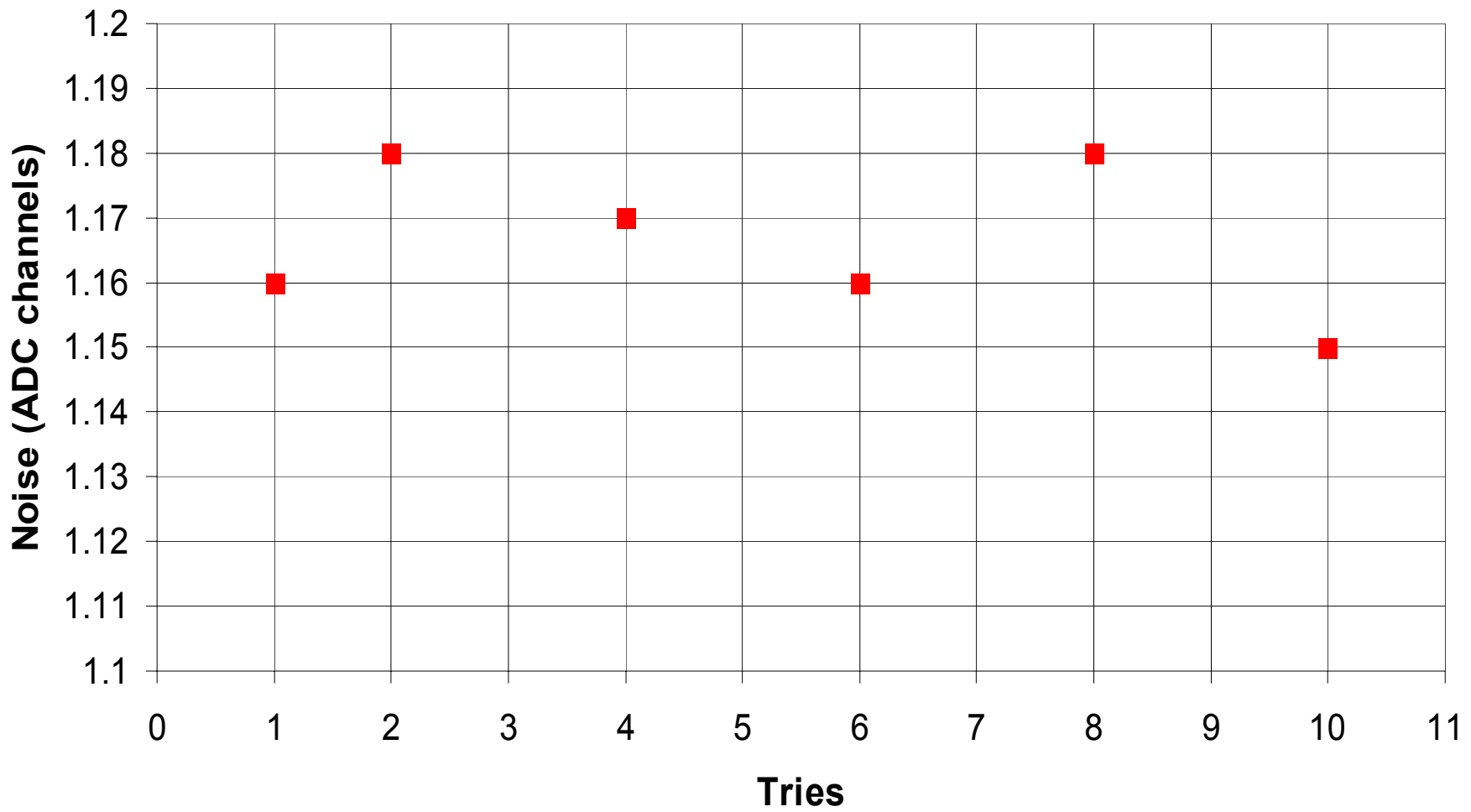
Connecting and disconnecting several times the optical fibres doesn't show any important change in results

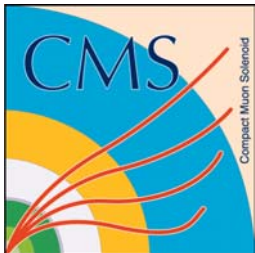
In the first measure we obtained $N = 1.16$ (ADC channels) and in the tenth $N = 1.15$ (ADC channels)

Also the height of the calibration pulse remained the same



Reproducibility



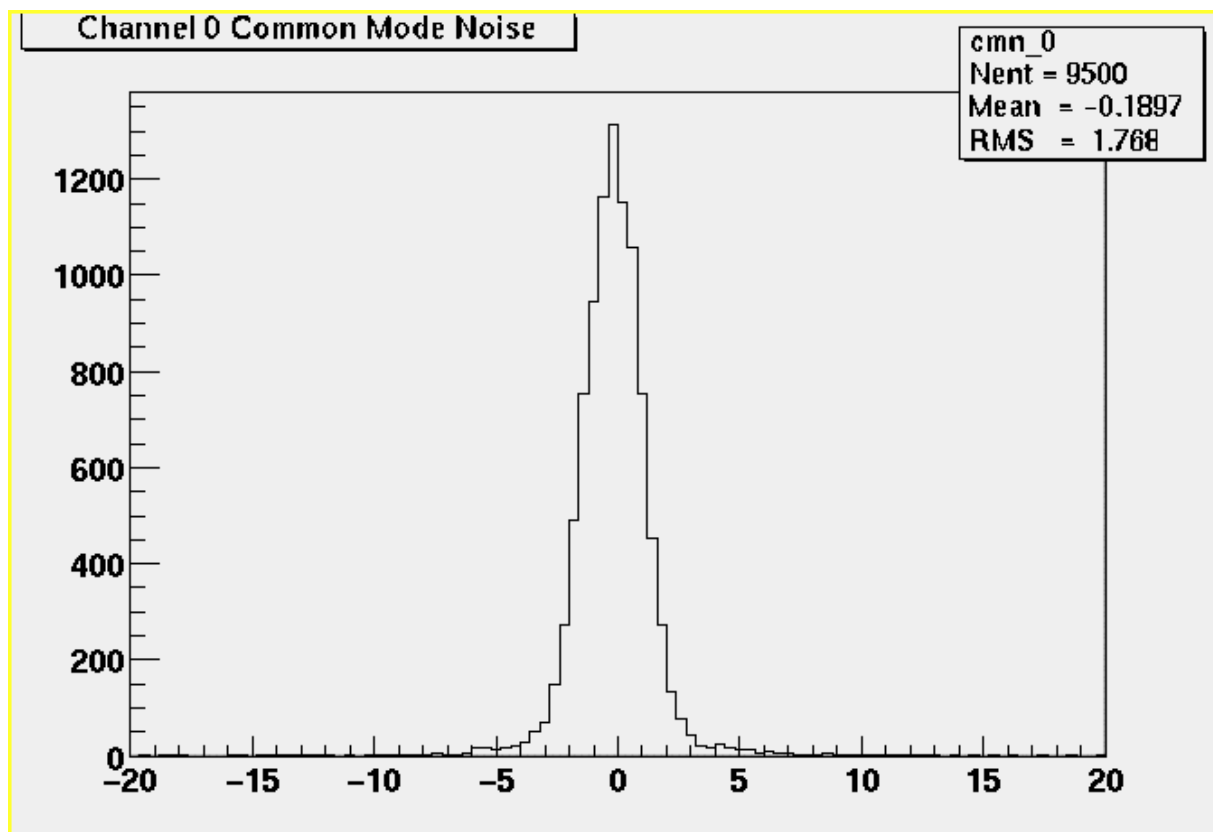


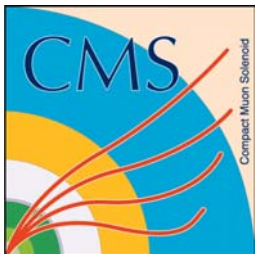
Common Mode Noise



- Peak mode, not inverting
- Raymond's default values for APV25
- 200 V bias on silicon detector
- 100 Ohm, Gain 1 Mux 15
- Floating power supply

• In this conditions
1 MIP = 33.1 ADC channels

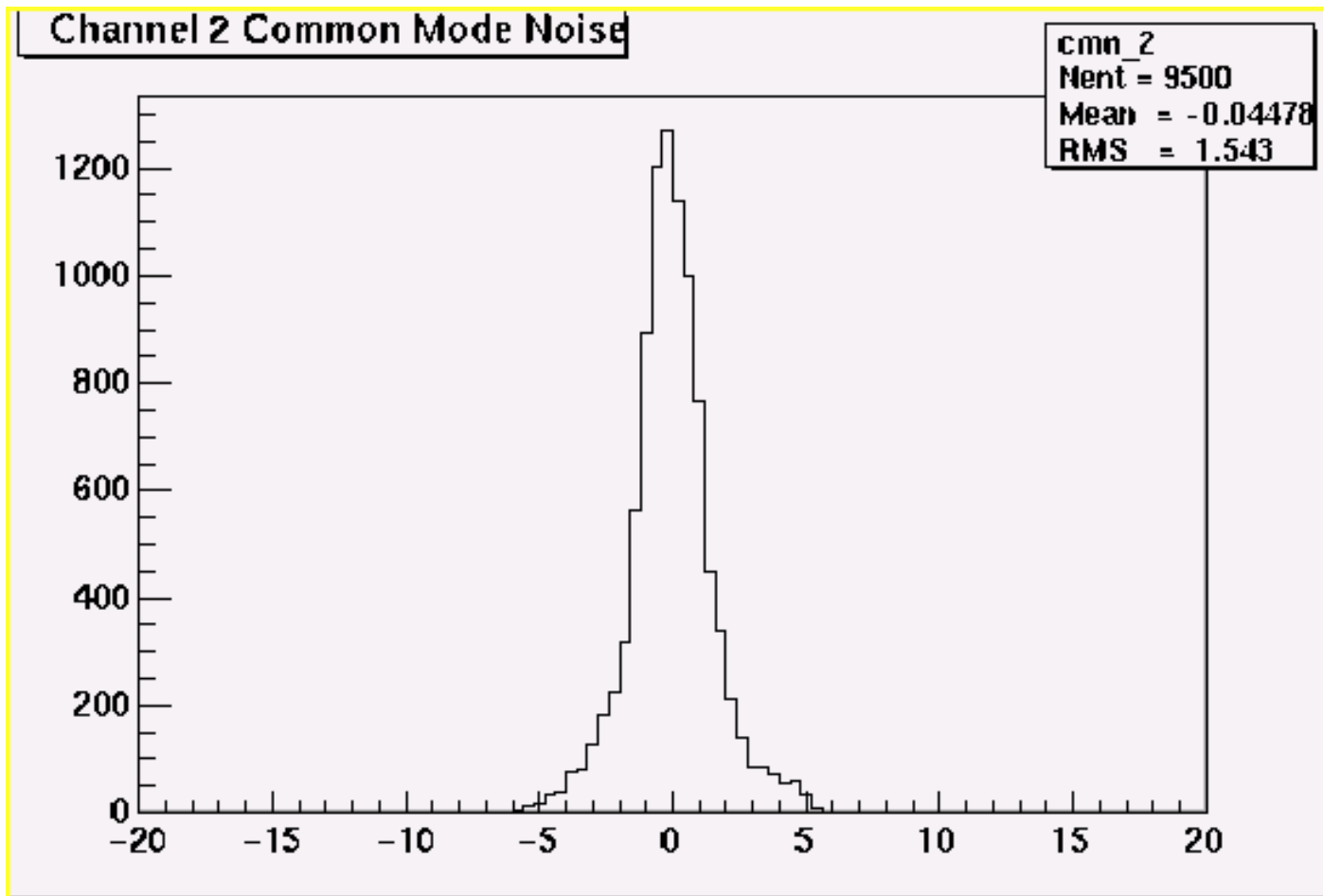




Common Mode Noise



In the same conditions, with a prototype power supply and a cable of 150 m

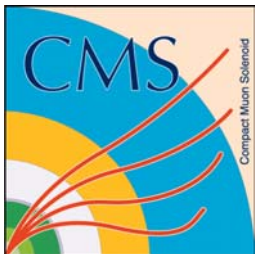




Conclusions For TIB



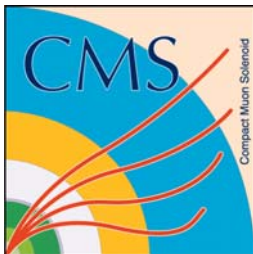
- We suggest then to use, as the default configuration for the input impedance of the optohybrid a value of **100 Ohm**
- In addition to this a Mux resistor of 100 Ohm (corresponding to **Mux Resistor Value = 15** in Mirabito's HybridDialog) and a optohybrid **Gain = 1** (in Mirabito's OptoDialog) should be used



With 100 Ohm...



- No significant reflections in the signal
- Good signal to noise ratio
- Linearity up to 6 MIPs, using all the optohybrid range
- 6 MIPs correspond to 200 ADC channels, well in the range of the FED



To be done...



- We need a software able to control and set several modules at the same time, both for the APV25 and the optohybrid I2C registers