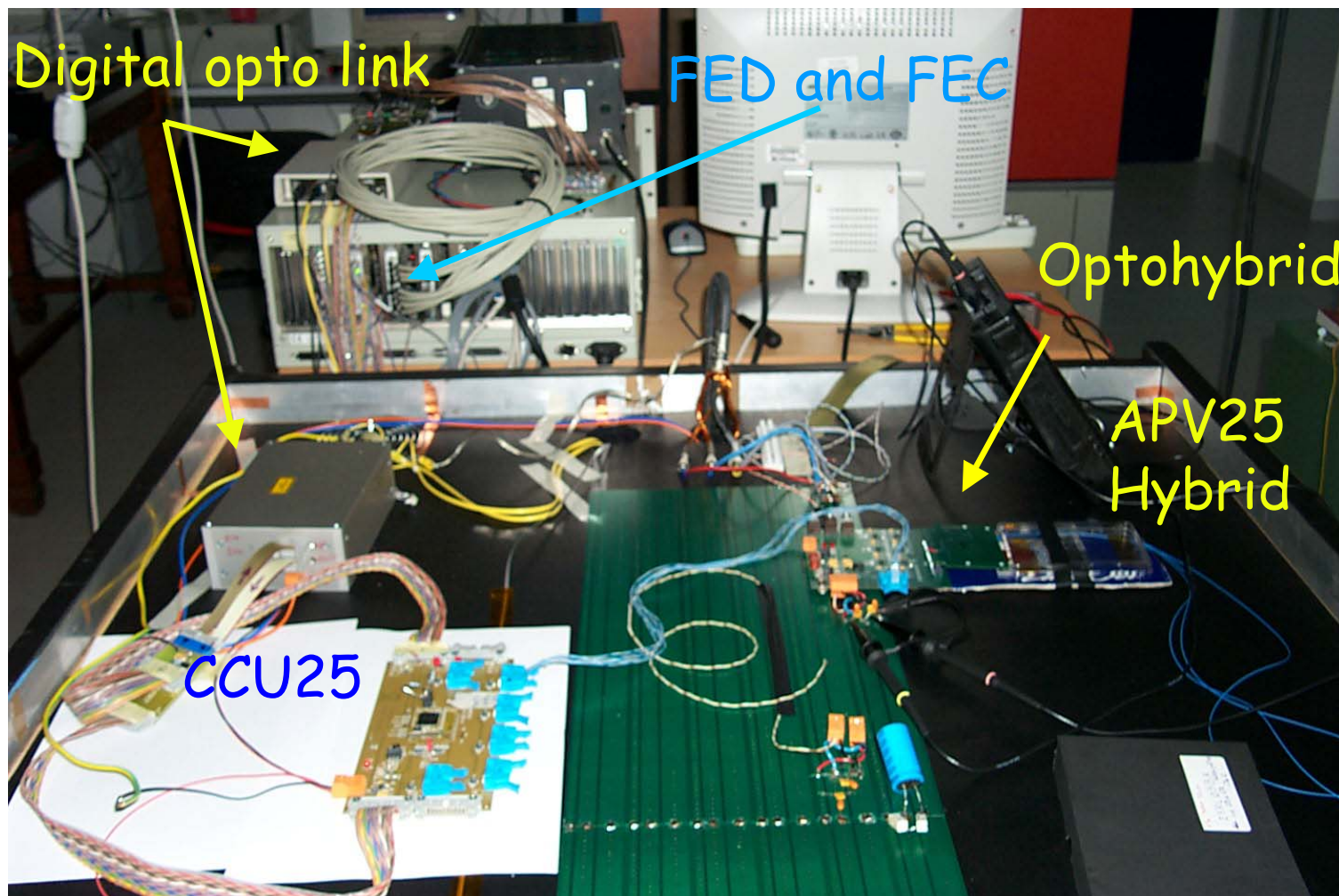
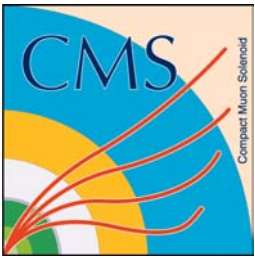


Opto Hybrid Test in Florence

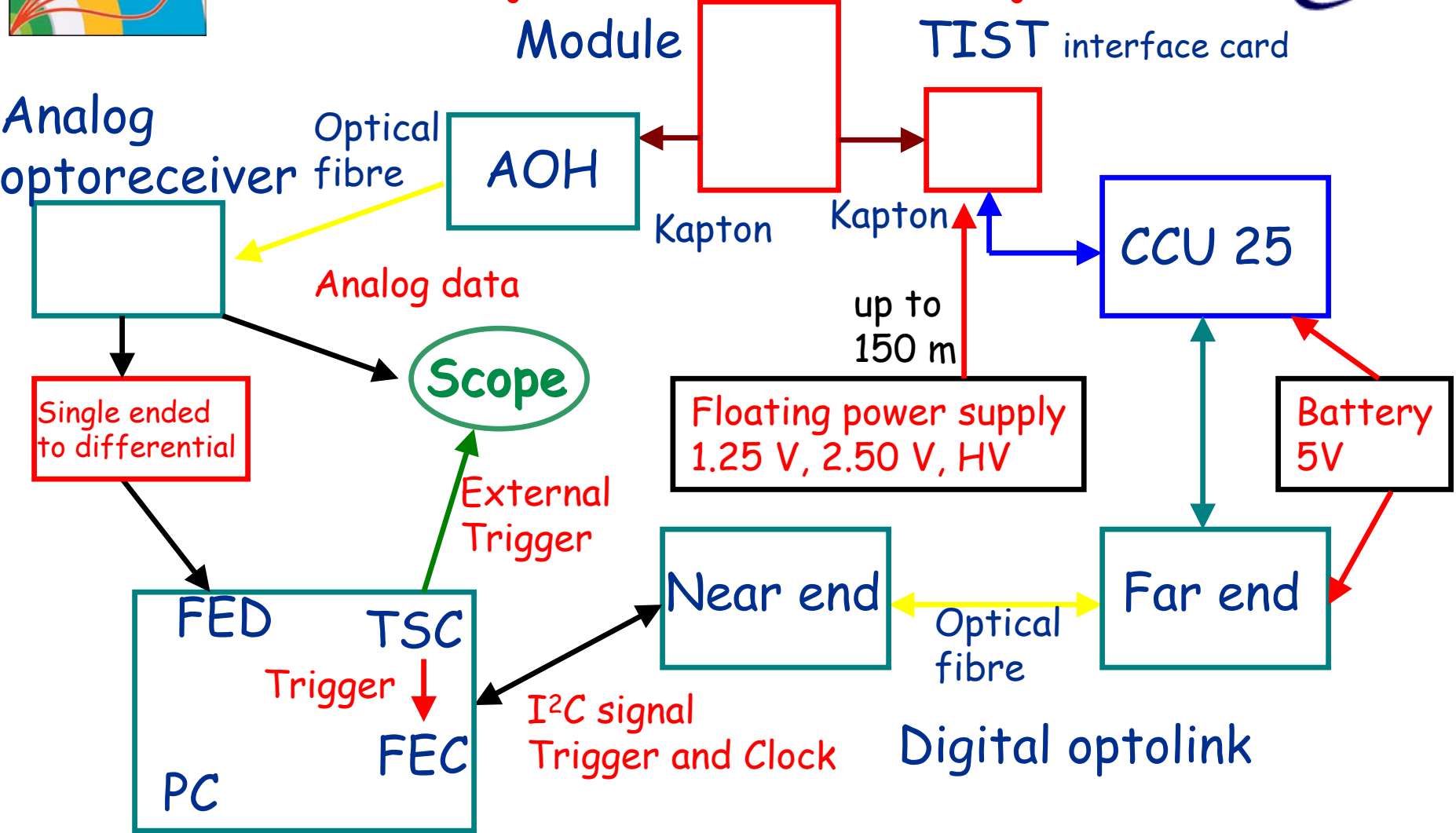
Cristiano Marchettini
INFN Firenze

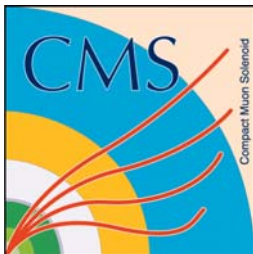
System Setup





System Setup

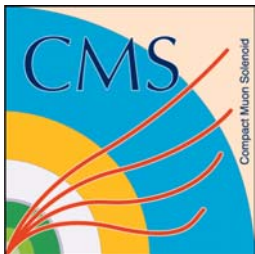




Software Used



- 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

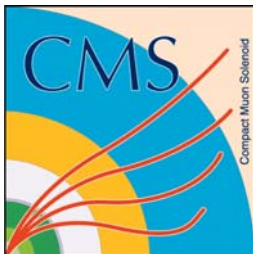


Test Procedures



We investigated several configurations, varying:

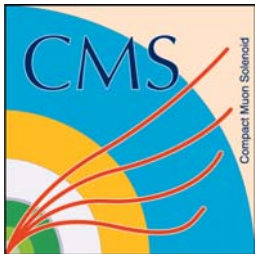
- The Optohybrid gain
 - 4 possible values: 5, 7.5, 10, 12.5 mS
- The Multiplexer gain (8 switchable parallel resistors on APV hybrid, each of 400 Ohm)
 - 50 or 100 Ohm
- The Optohybrid input impedance (single ended)
 - 50, 100 and 1000 Ohm



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



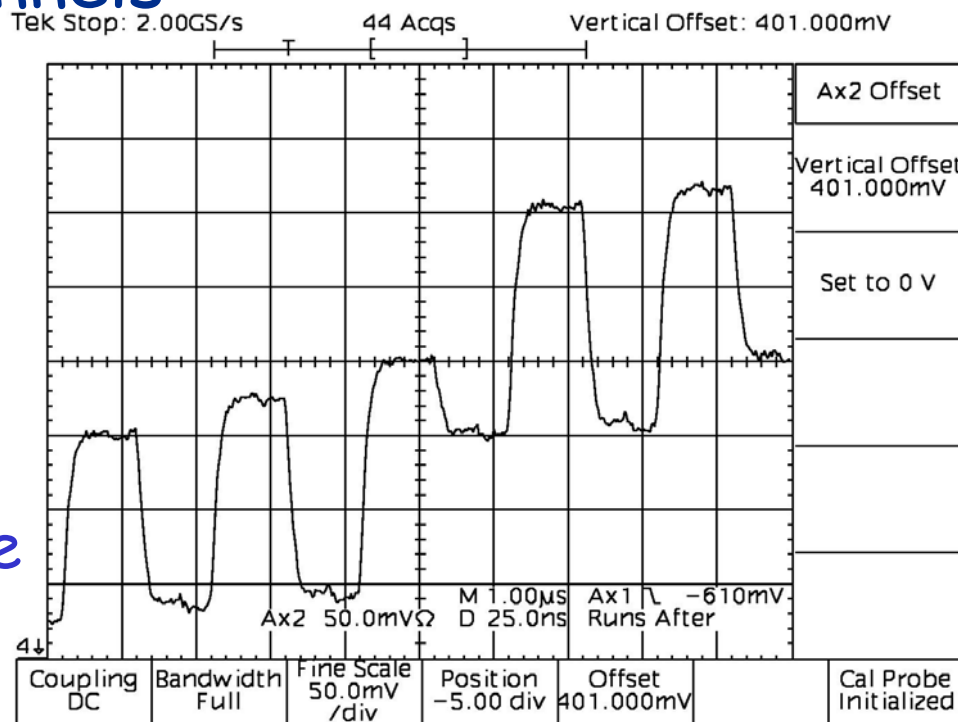
1000 Ohm

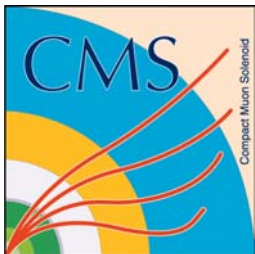


- Gain 3, Mux 255 (50 Ohm)
- S/N = 68.7
- Noise = 2.14 ADC channels

The signal is clean and flat-top in this case

Scope picture
ICAL = 80





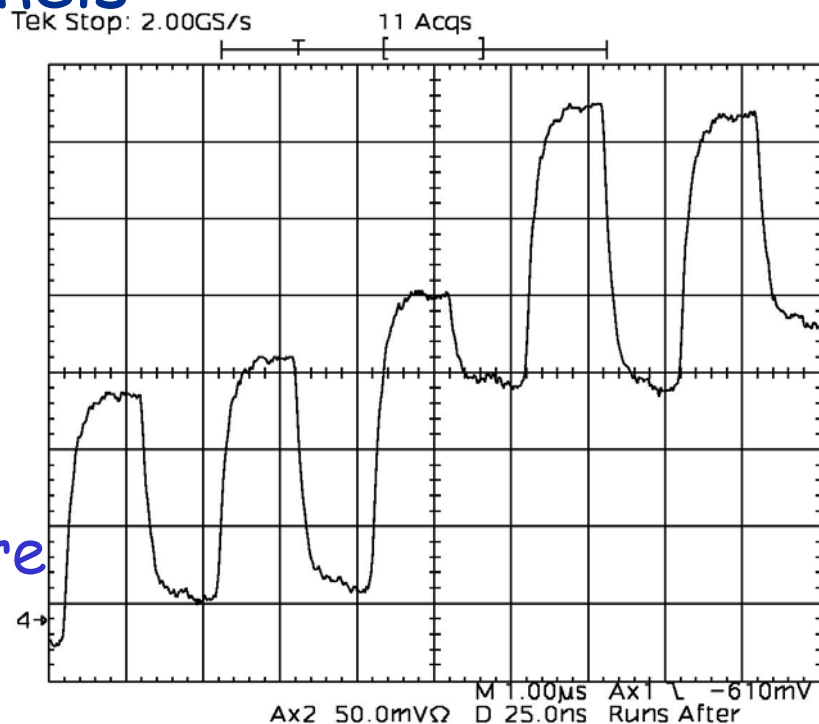
1000 Ohm



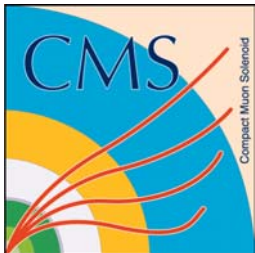
- Gain 1, Mux 15 (100 Ohm)
- S/N = 74.6
- Noise = 2.28 ADC channels

In both cases the AOH saturates at about 4 MIPs

Scope picture
(ICAL = 80)



8 Jul 2002
16:51:52



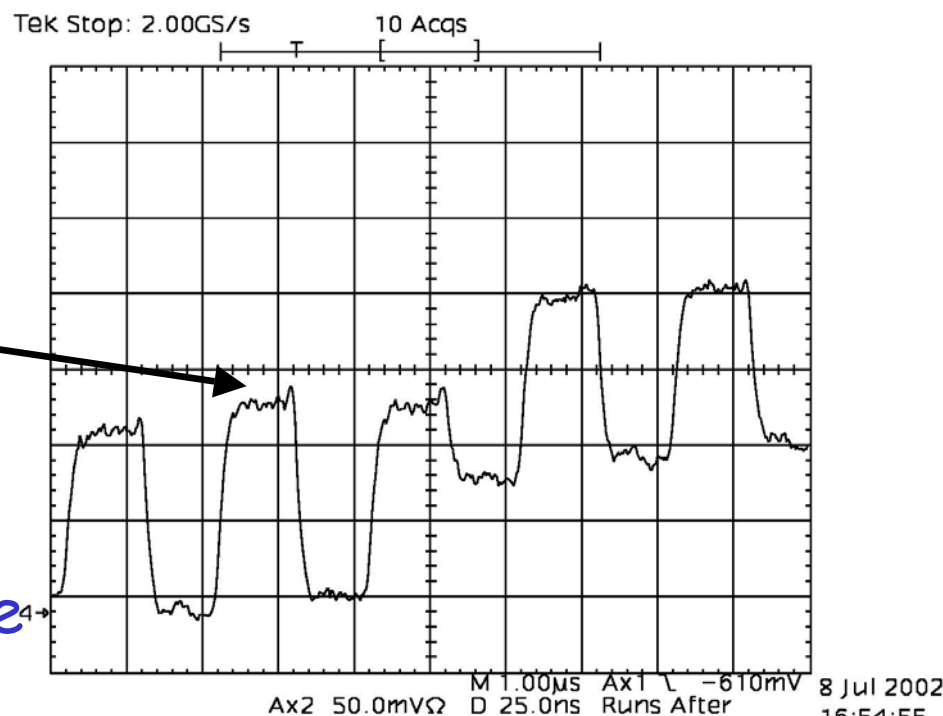
100 Ohm

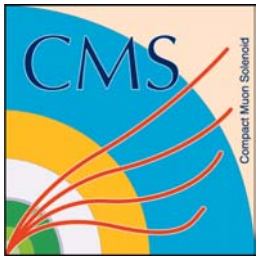


- Gain 3, Mux 255 (50 Ohm)
- S/N = 68.1
- Noise = 1.37 ADC channels

Small spike
Flat signal

Scope picture

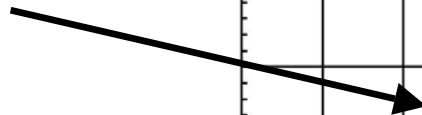




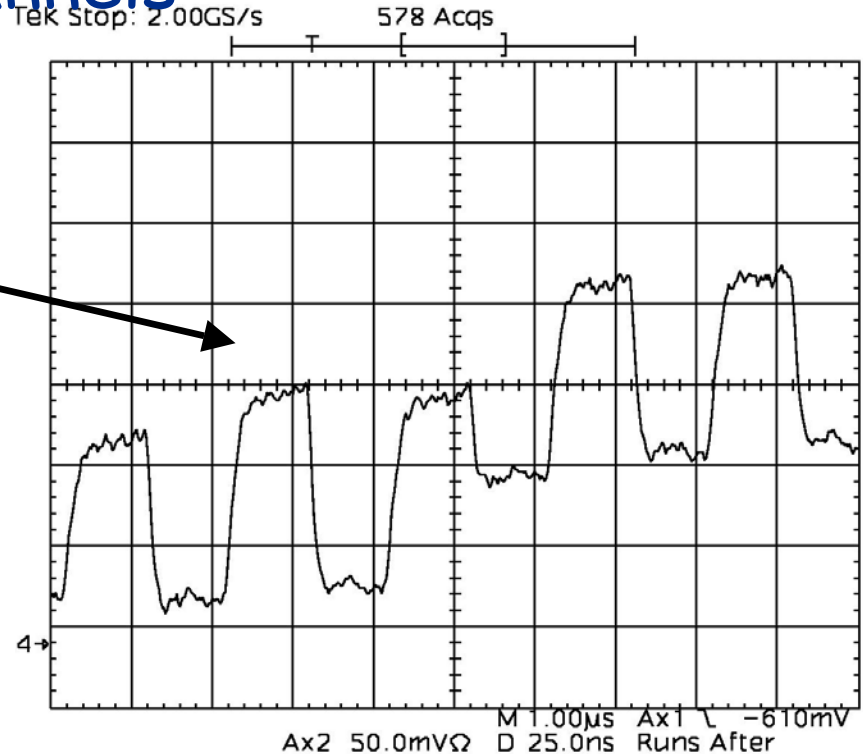
100 Ohm

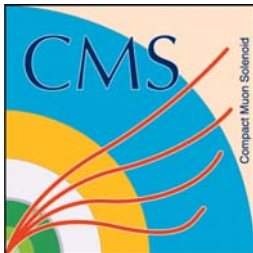
- Gain 1, Mux 15 (100 Ohm)
- S/N = 68.7
- Noise = 1.33 ADC channels

Small spike



Scope picture





50 Ohm



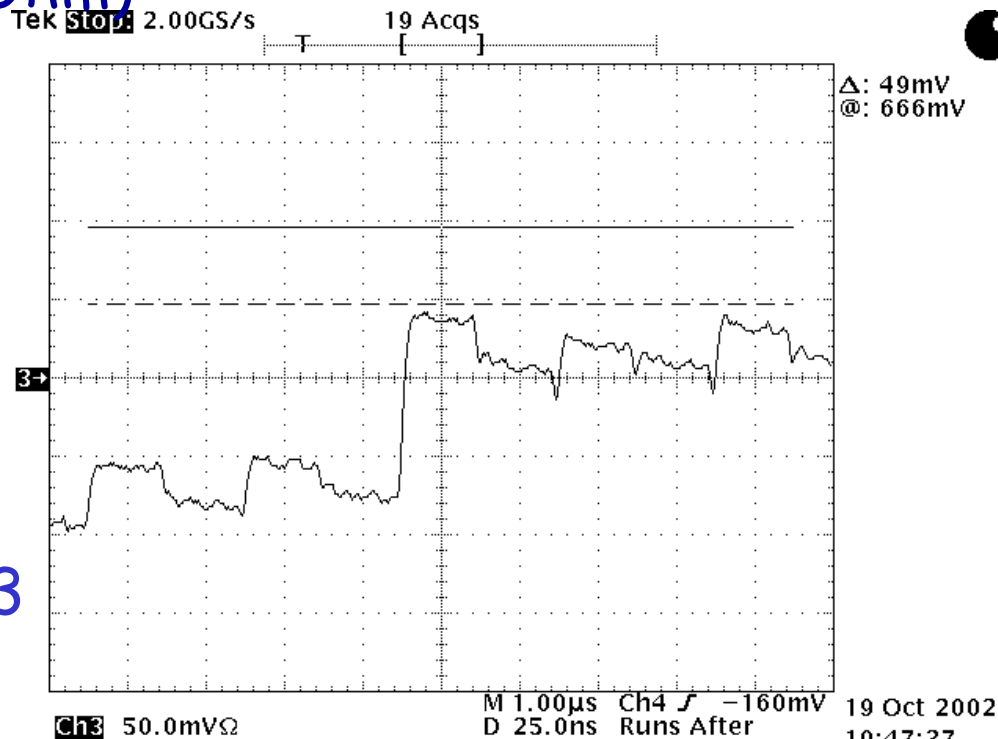
In all these cases

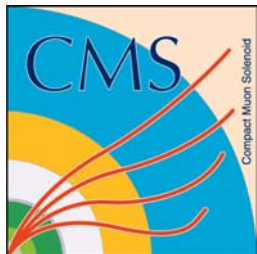
- Gain 1, Mux 255 (50 Ohm)
- Gain 3, Mux 255
- Gain 1, Mux 15 (100 Ohm)

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

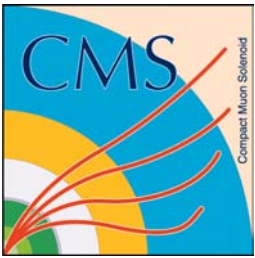




Linearity



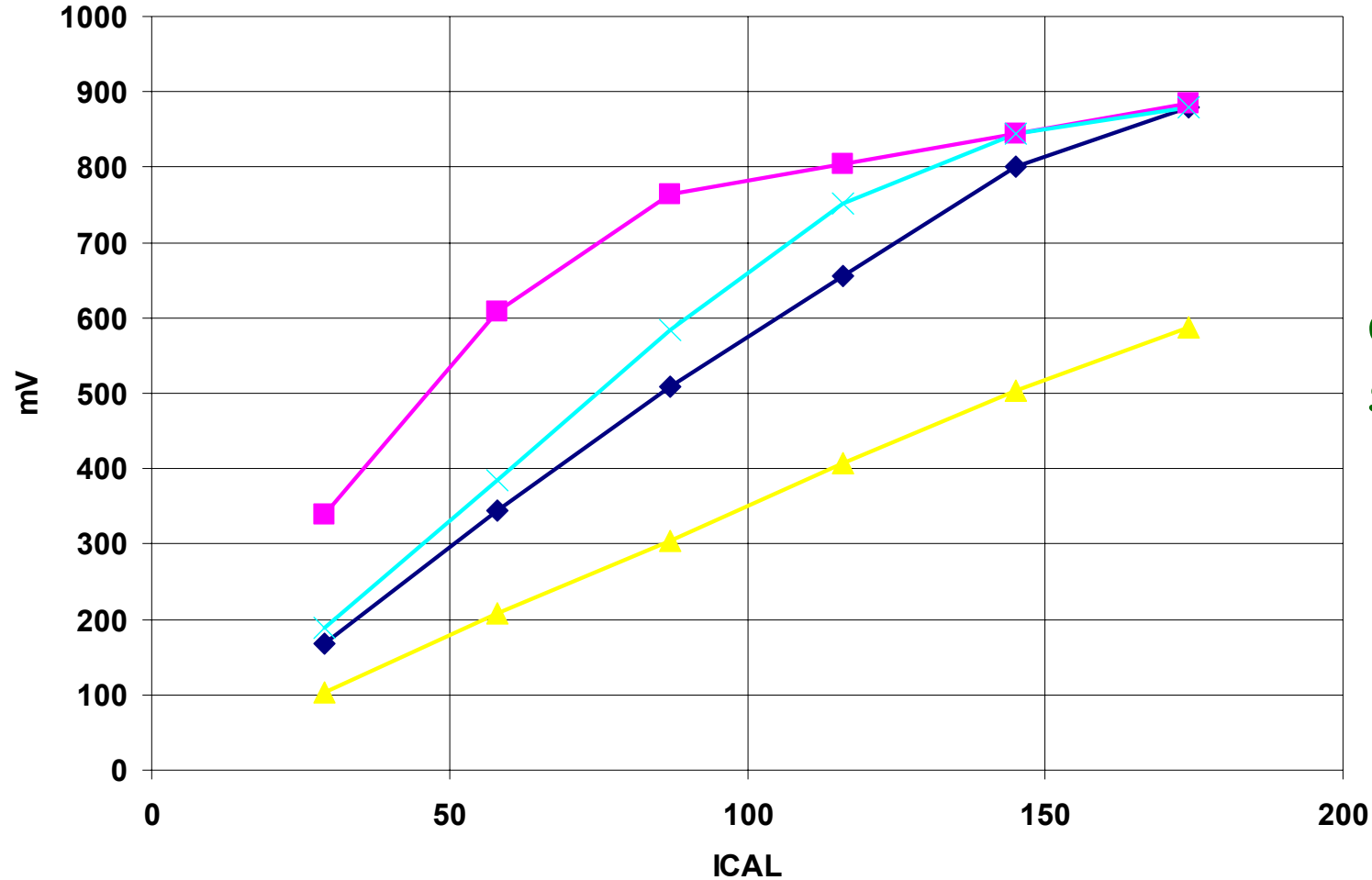
- Measurements are made connecting the scope on one output of the optoreceiver
- All the tests (1000, 100 and 50 Ohm) show a linearity of the analog optohybrid up to about 600 mV



1000 Ohm

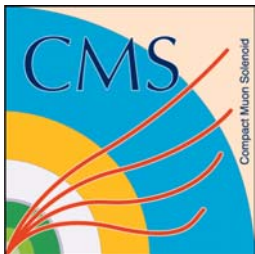


Peak mode, not inverting



Data took at the scope

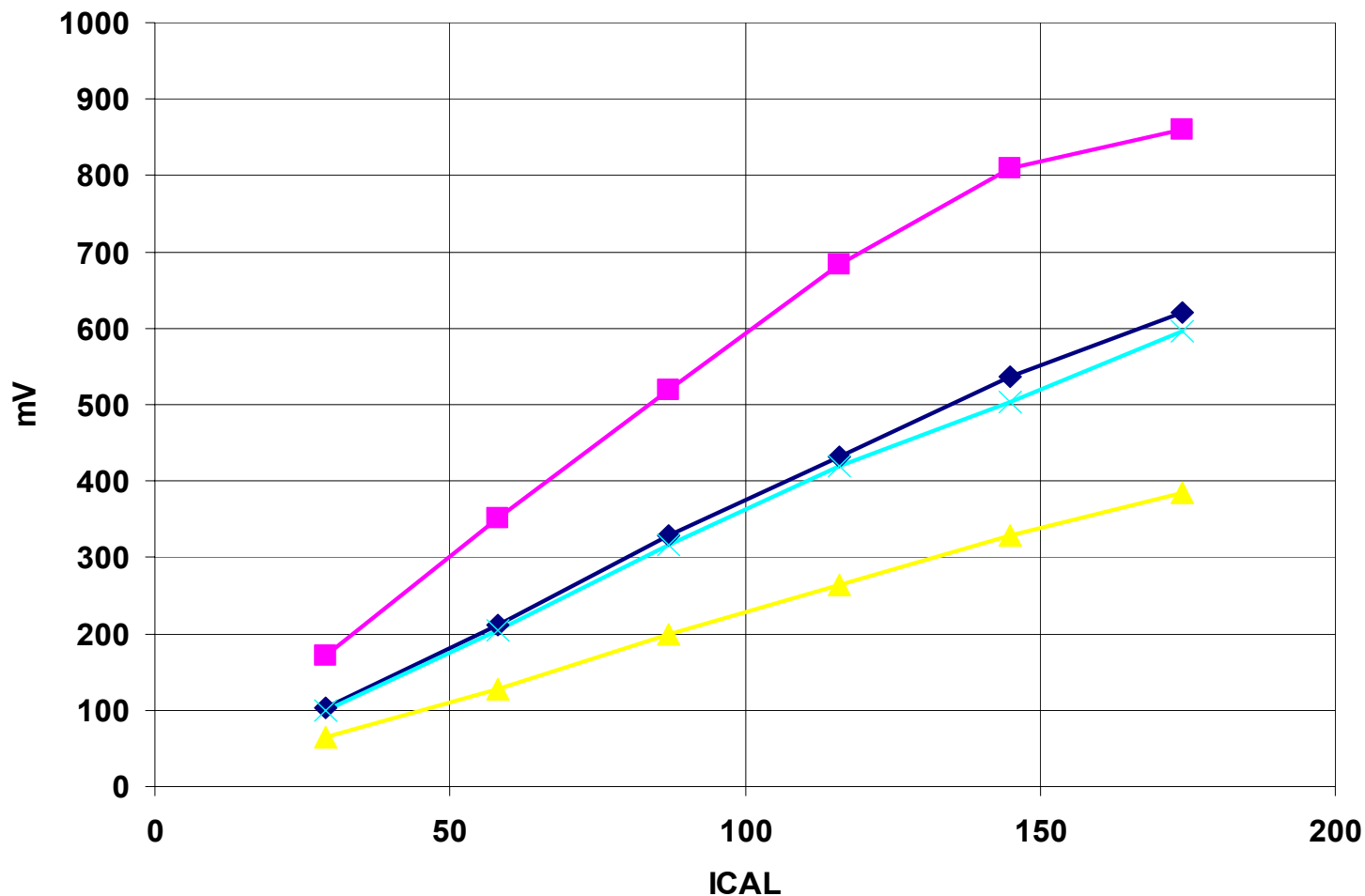
- Gain 3 Mux 255
- Gain 3 Mux 15
- Gain 1 Mux 255
- Gain 1 Mux 15



100 Ohm

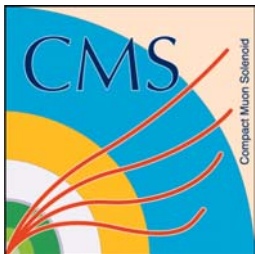


Peak mode, not inverting



Data took at the scope

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



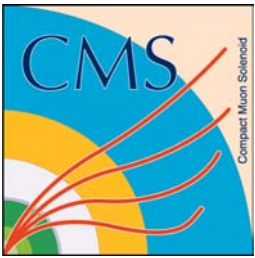
Reproducibility



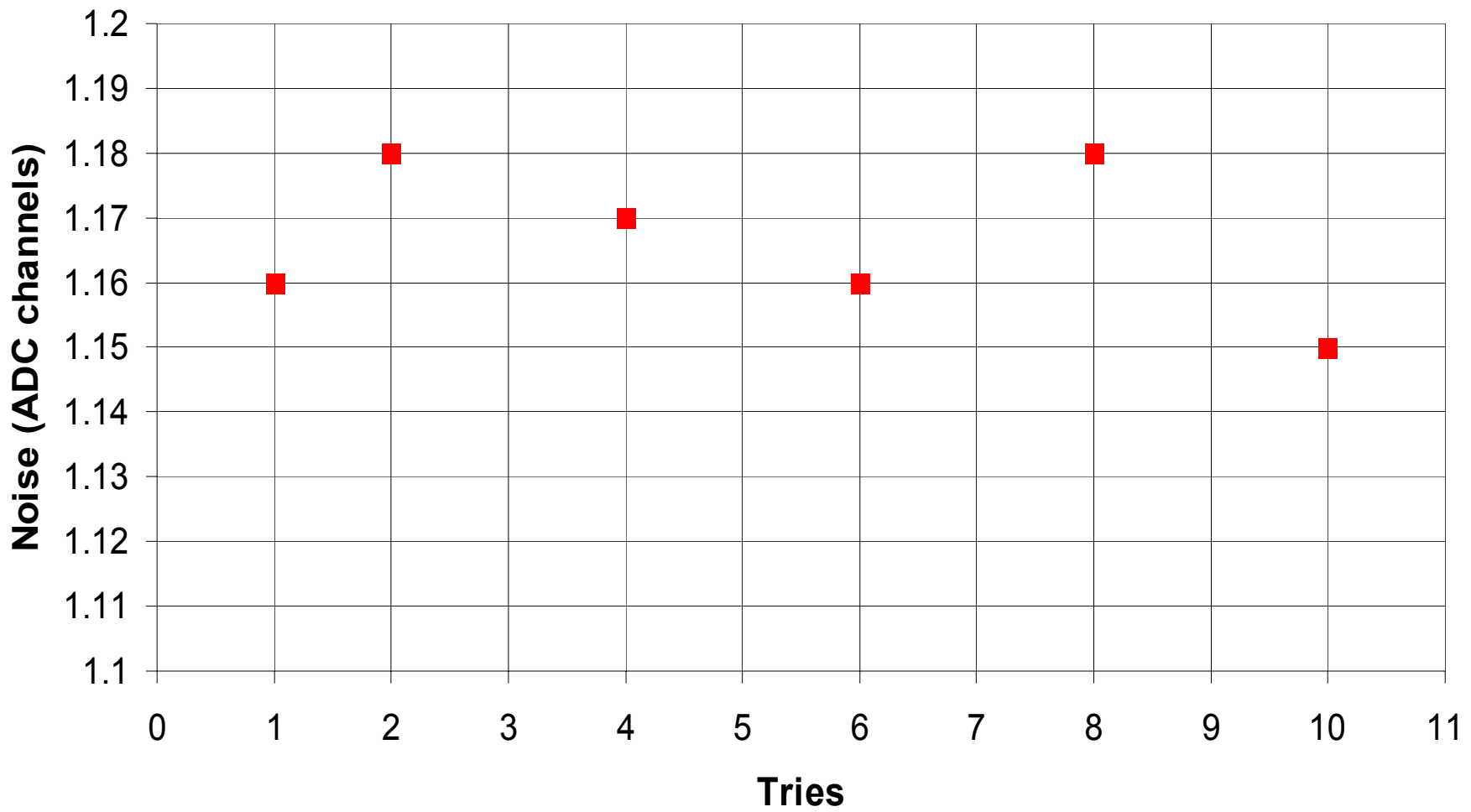
Connecting and disconnecting several times the optical fibres doesn't show any important change in results

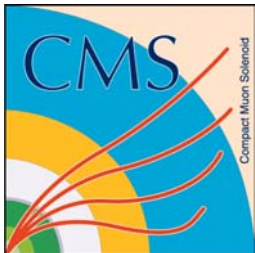
In the first measure we obtained $N = 1.16$ (ADC channels) and in the tenth $N = 1.15$ (ADC channels)

Also the height of the calibration pulse remained the same



Reproducibility



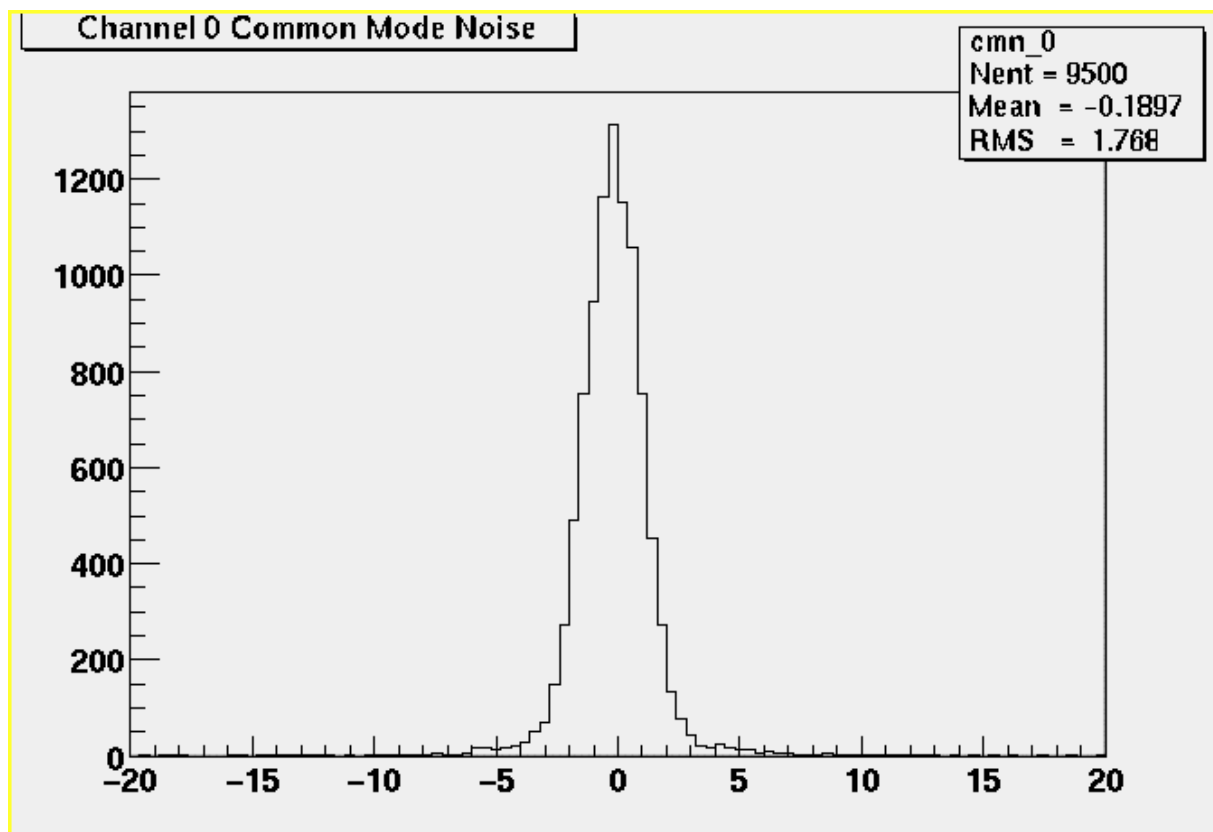


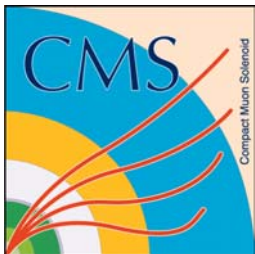
Common Mode Noise



- 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

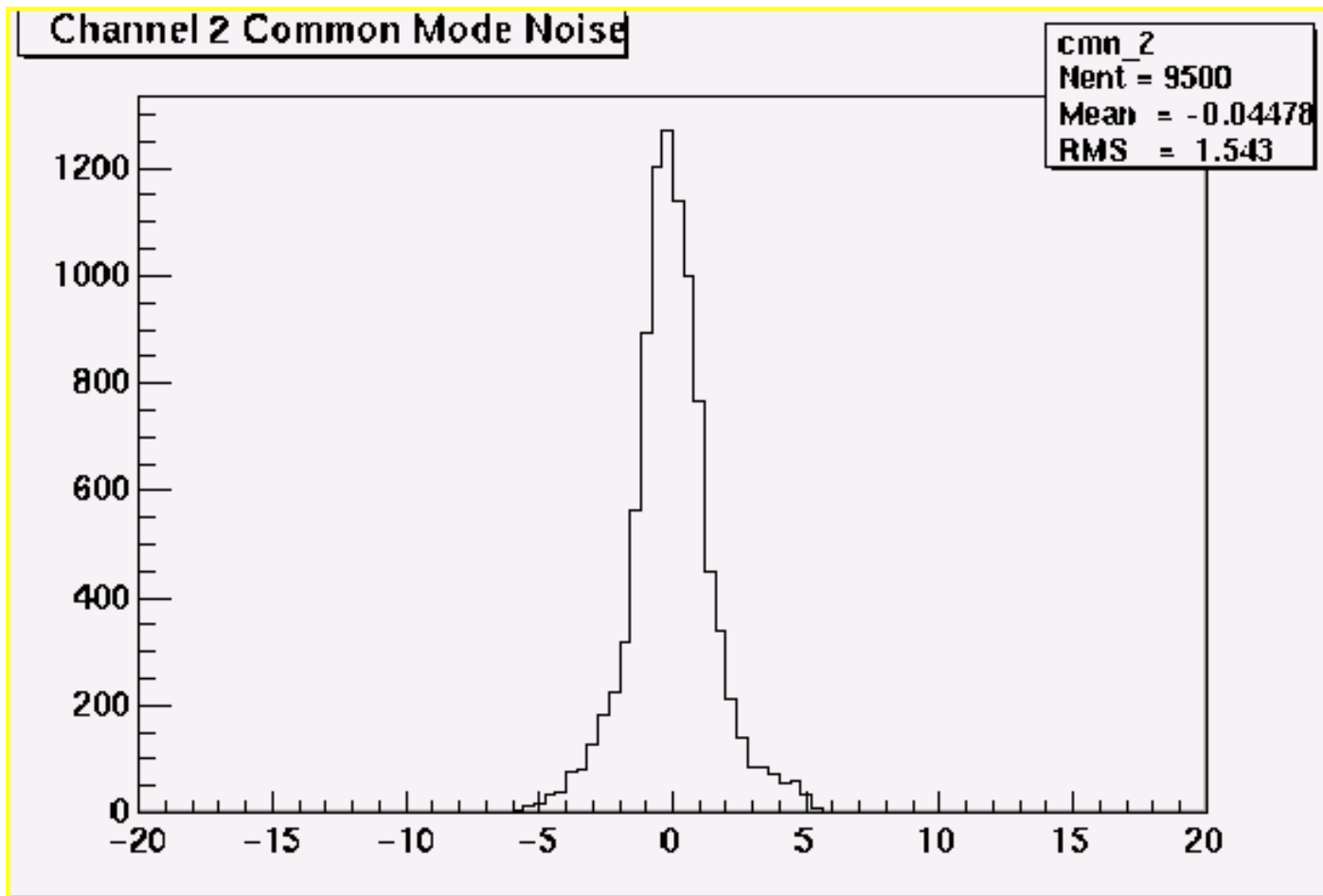


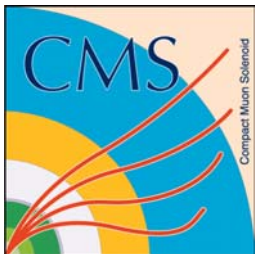


Common Mode Noise



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

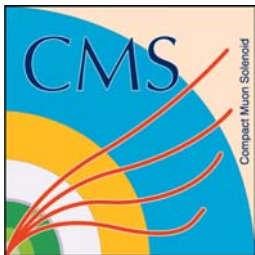




Conclusions For TIB



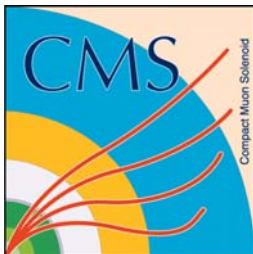
- We suggest then to use, as the default configuration for the input impedance of the optohybrid a value of **100 Ohm**
- In addition to this a Mux resistor of 100 Ohm (corresponding to **Mux Resistor Value = 15** in Mirabito's HybridDialog) and a optohybrid **Gain = 1** (in Mirabito's OptoDialog) should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