



OV.

Long Long Term

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Introduction

INFN

Having nothing better to do,
we decided to use the LT
setup to stress a group of
modules during Xmas
holydays...



- ◆ A full Vienna Box was equipped with 9 modules production modules
- ◆ All of them were "good" modules already fully qualified by the standard tests (ARCS and Long Term)
- ◆ The temperature was continuously varied **between $-14\text{ }^{\circ}\text{C}$ and $-18\text{ }^{\circ}\text{C}$** for a full month (18 Dec - 19 Jan), for a total of more than 700 hours
 - ♥ 4 modules with 6 chips (2 Stereo Right and 2 Stereo Left)
 - ♥ 5 modules with 4 chips

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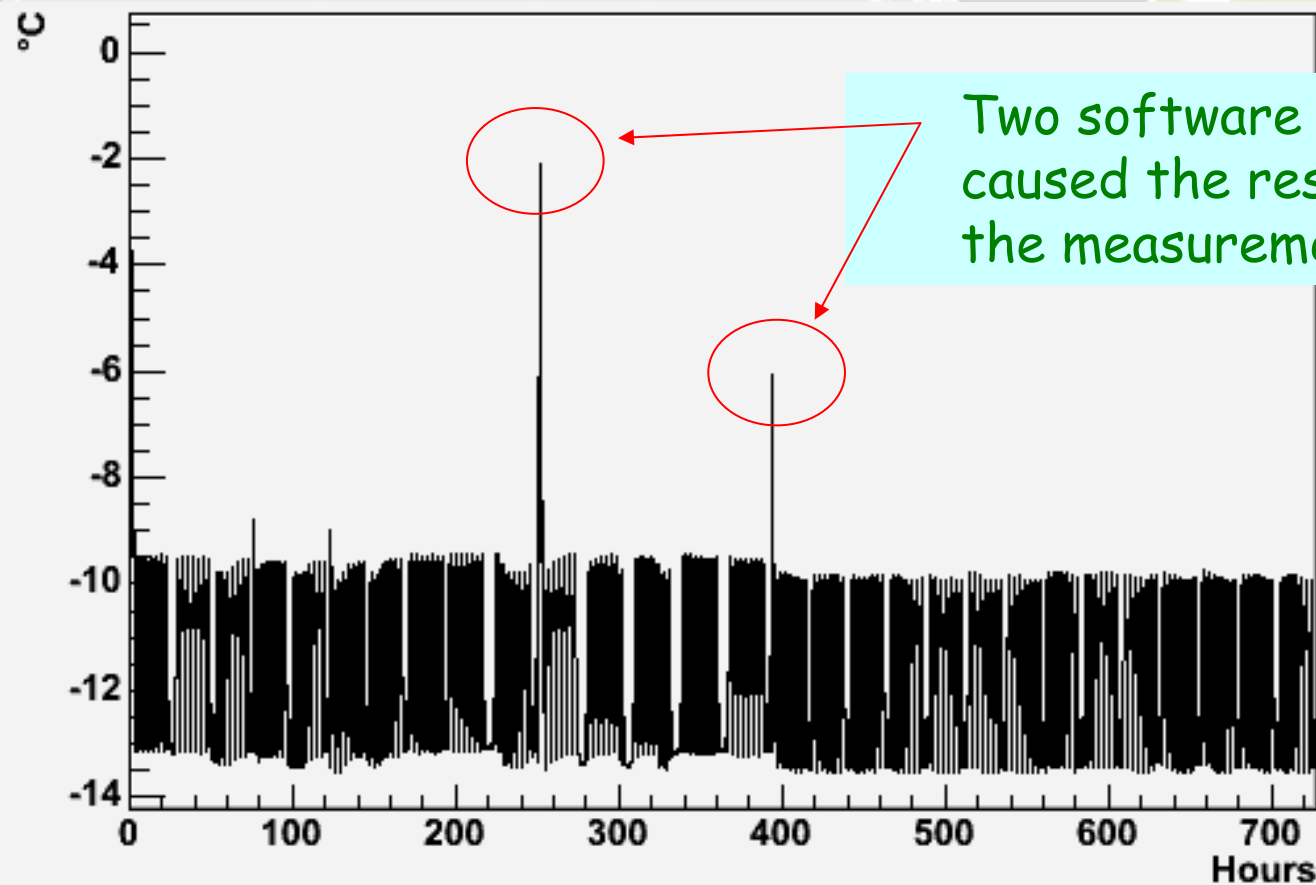


Measurements

- ◆ The official LT software (mainMonitor) ran with weekly scenarios to avoid problems
- ◆ Modules were kept always powered (but without triggers) and with Si biased at 400 V
- ◆ Once a day, a standard set of measurement was done:
 - ♥ Pedestals (4 APV modes)
 - ♥ Noise (4 APV modes)
 - ♥ Calibration (4 APV modes)
 - ♥ IV curve (0-450 V)
- ◆ All of these measurements were taken at $-18\text{ }^{\circ}\text{C}$
- ◆ LV currents, temperature and humidity were constantly monitored

Module Temperature

- ◆ Si temperature as measured by the module's DCU
- ◆ Temperature was varying between $-10\text{ }^{\circ}\text{C}$ and $-13\text{ }^{\circ}\text{C}$ while set values were $-14\text{ }^{\circ}\text{C}$ / $-18\text{ }^{\circ}\text{C}$

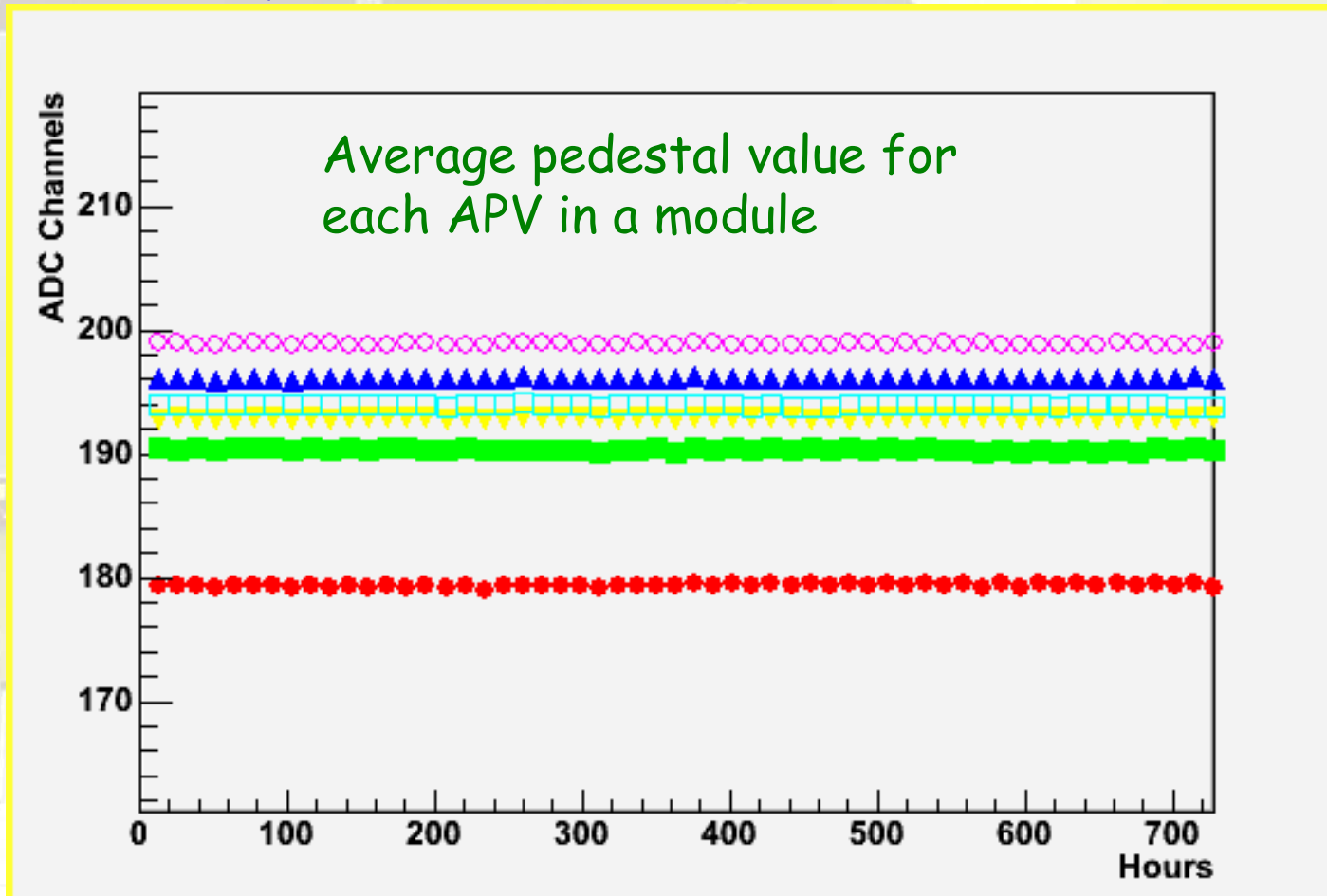


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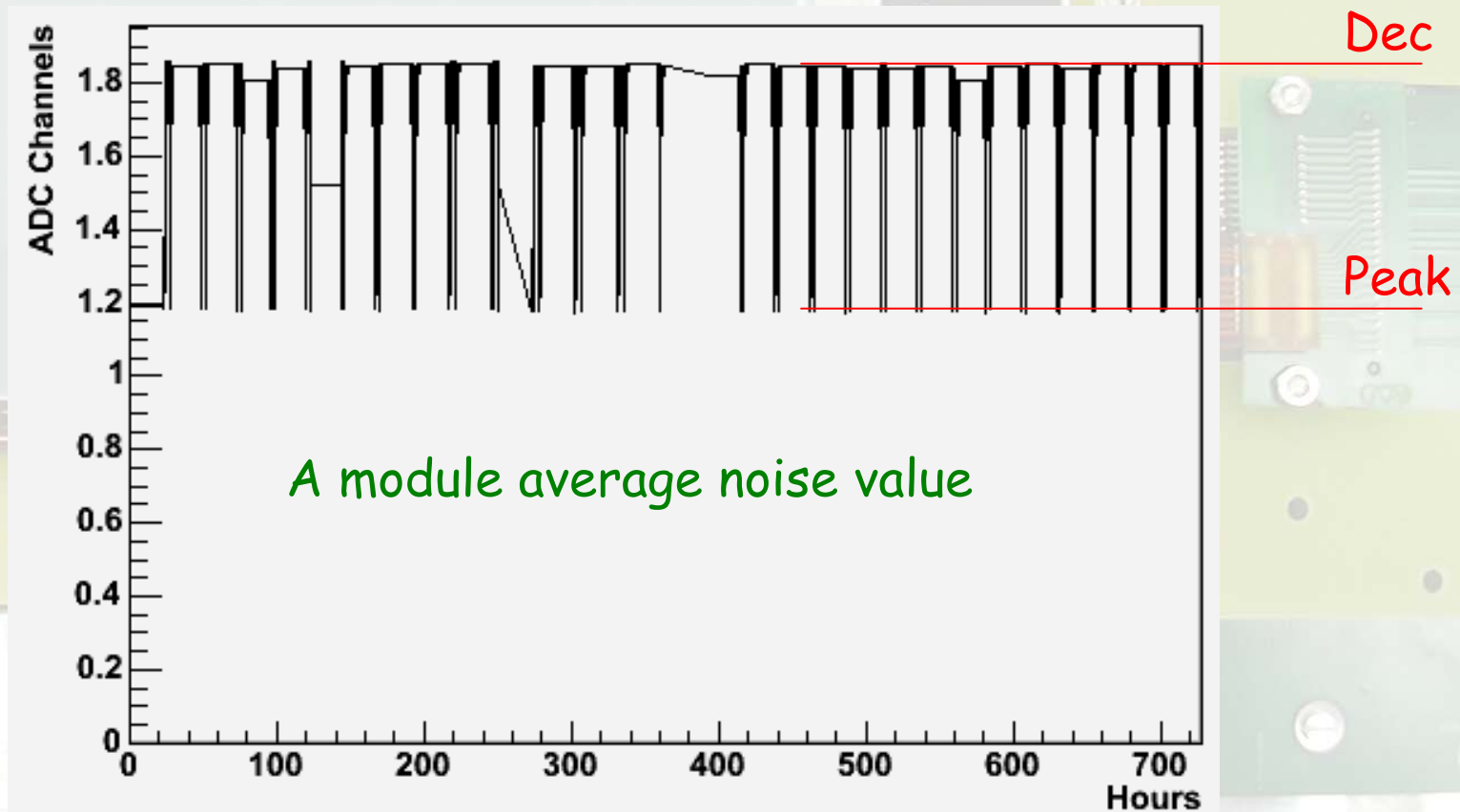
Pedestals

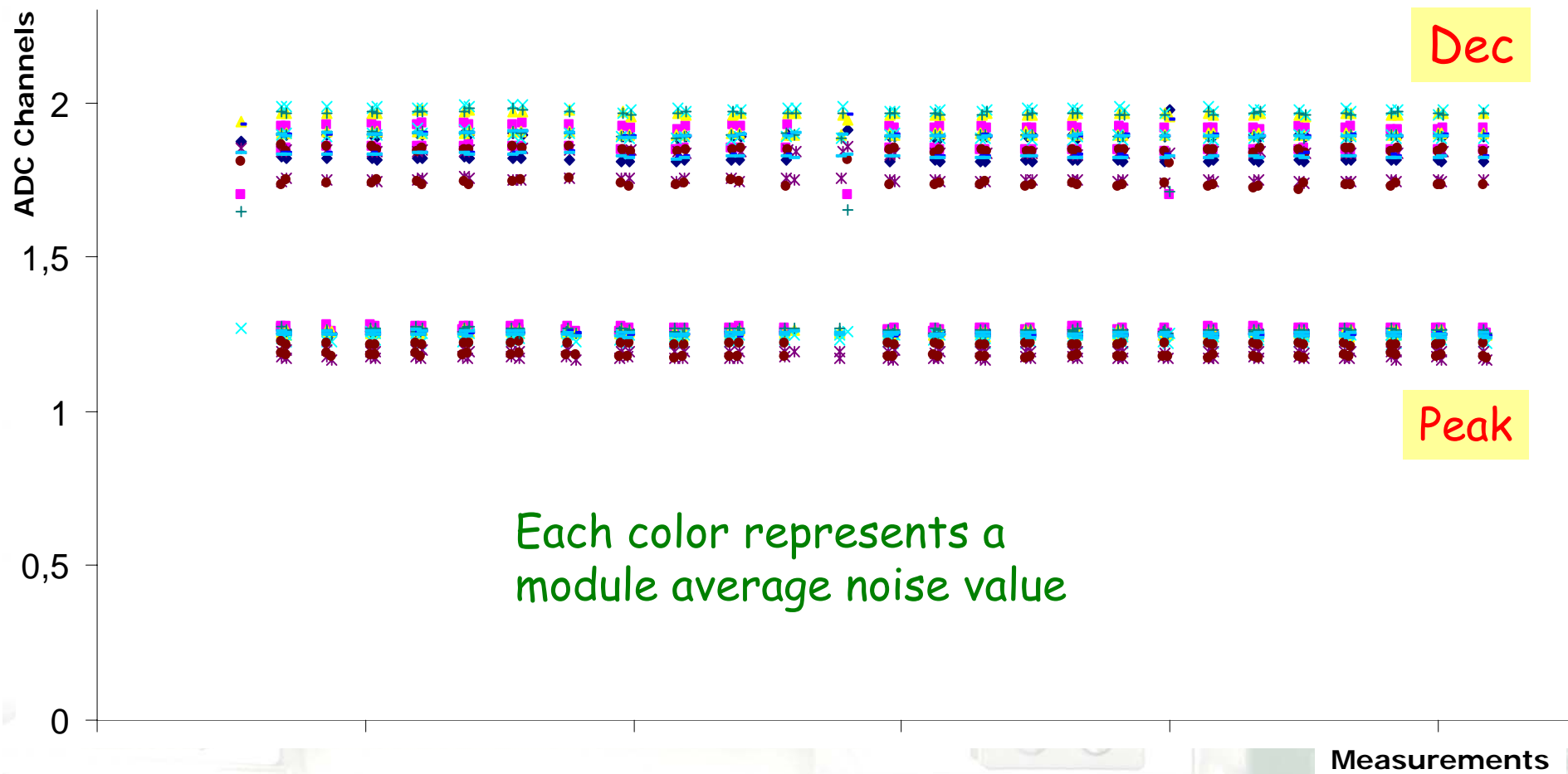
- ◆ Time evolution of pedestal in Peak Inverter Off shows a good stability



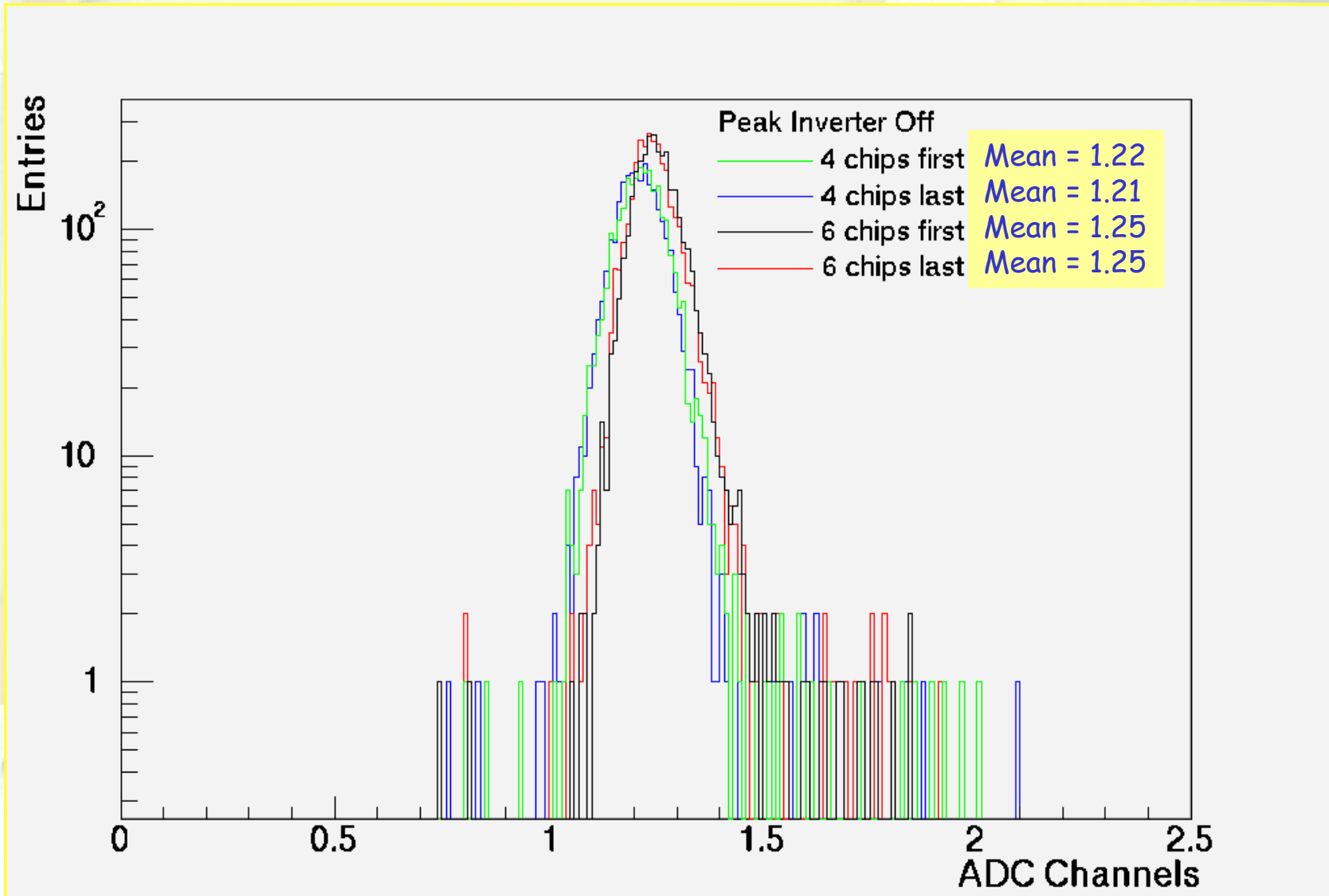
Noise

- ◆ No change in noise behavior during the whole month





Noise Distribution



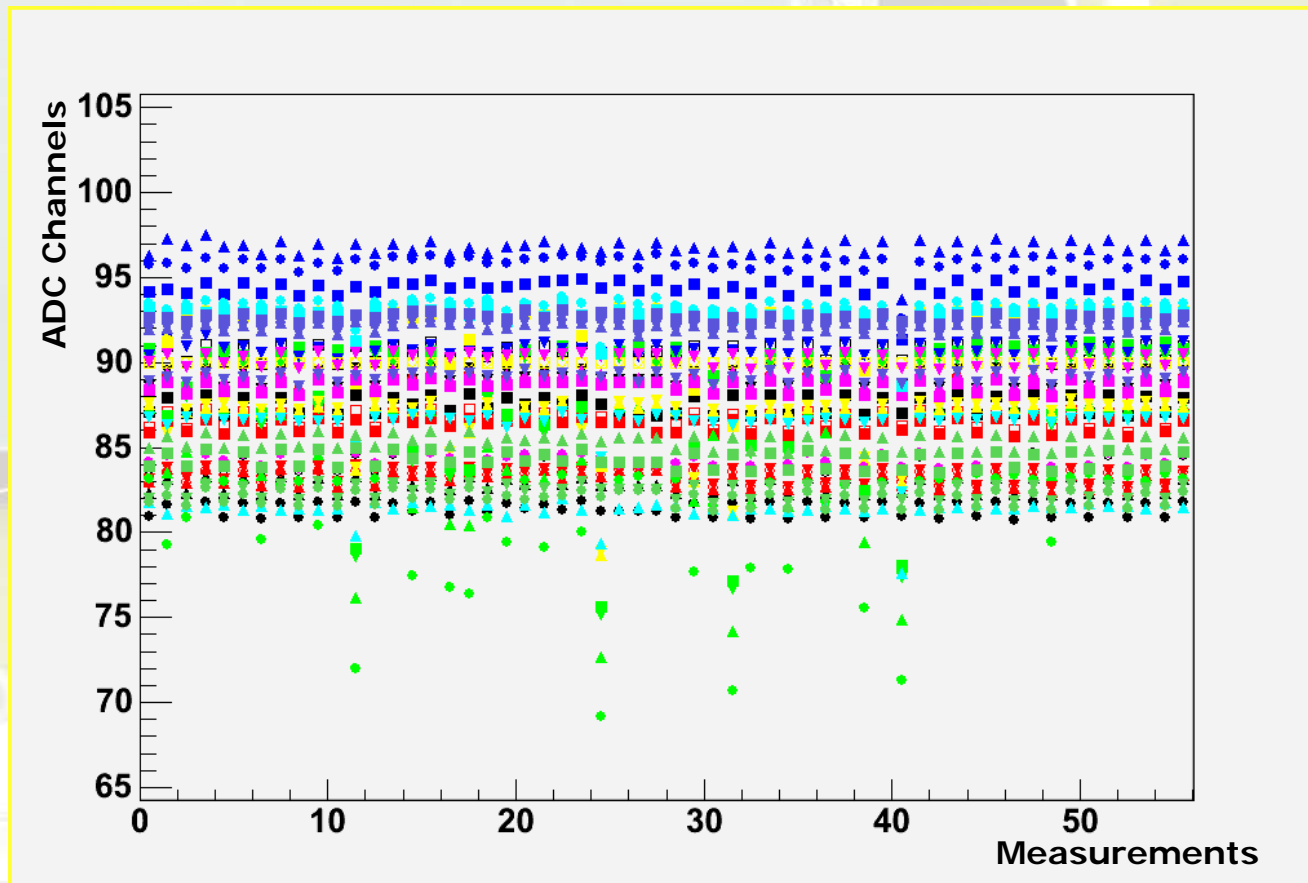
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Calibration

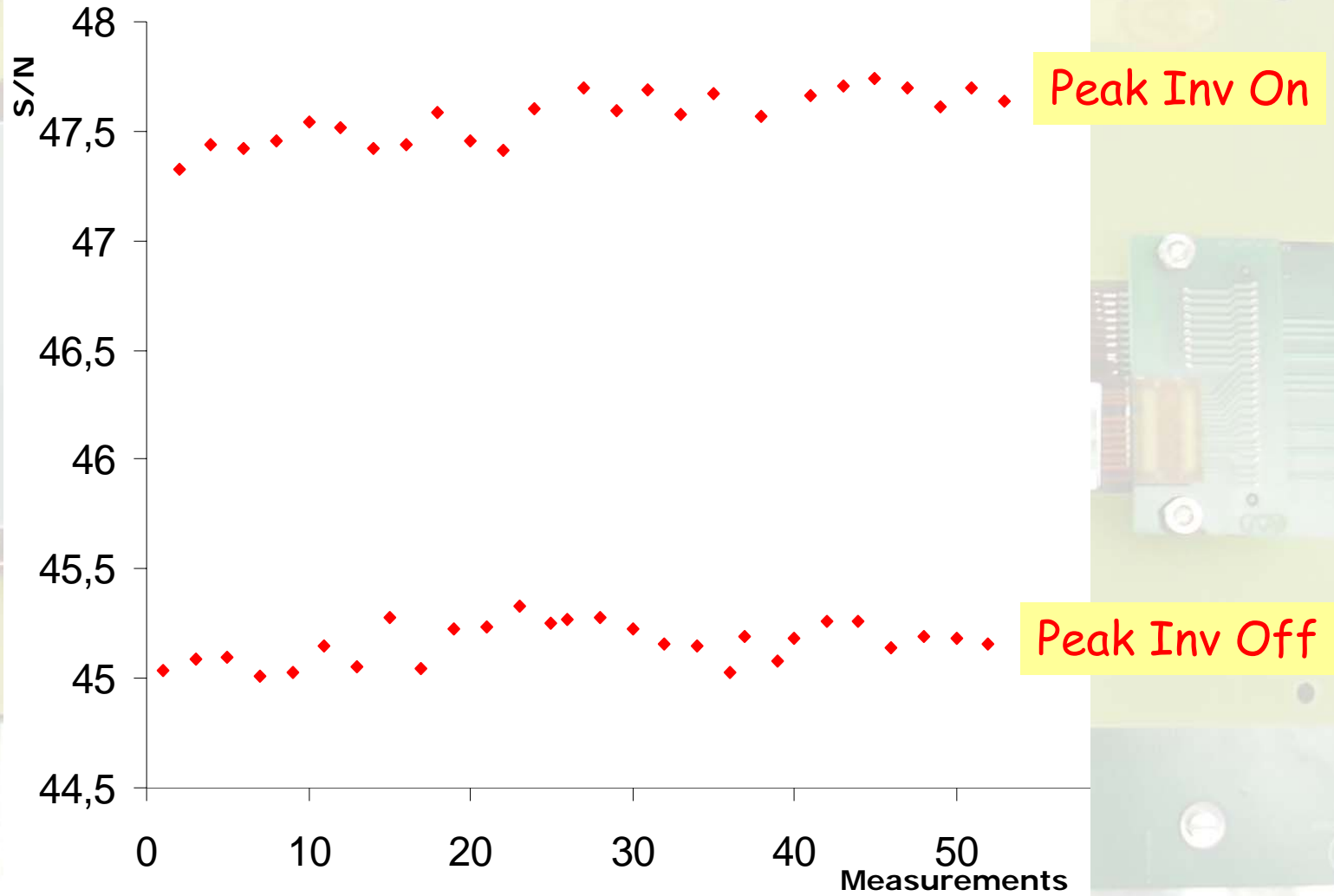
- ◆ Calibration maximum amplitude in Peak mode (Inv Off and On) for all the APVs
- ◆ Each color represents a module; each dot an APV





Gain Stability

◆ S/N behavior in Peak Inv Off and On

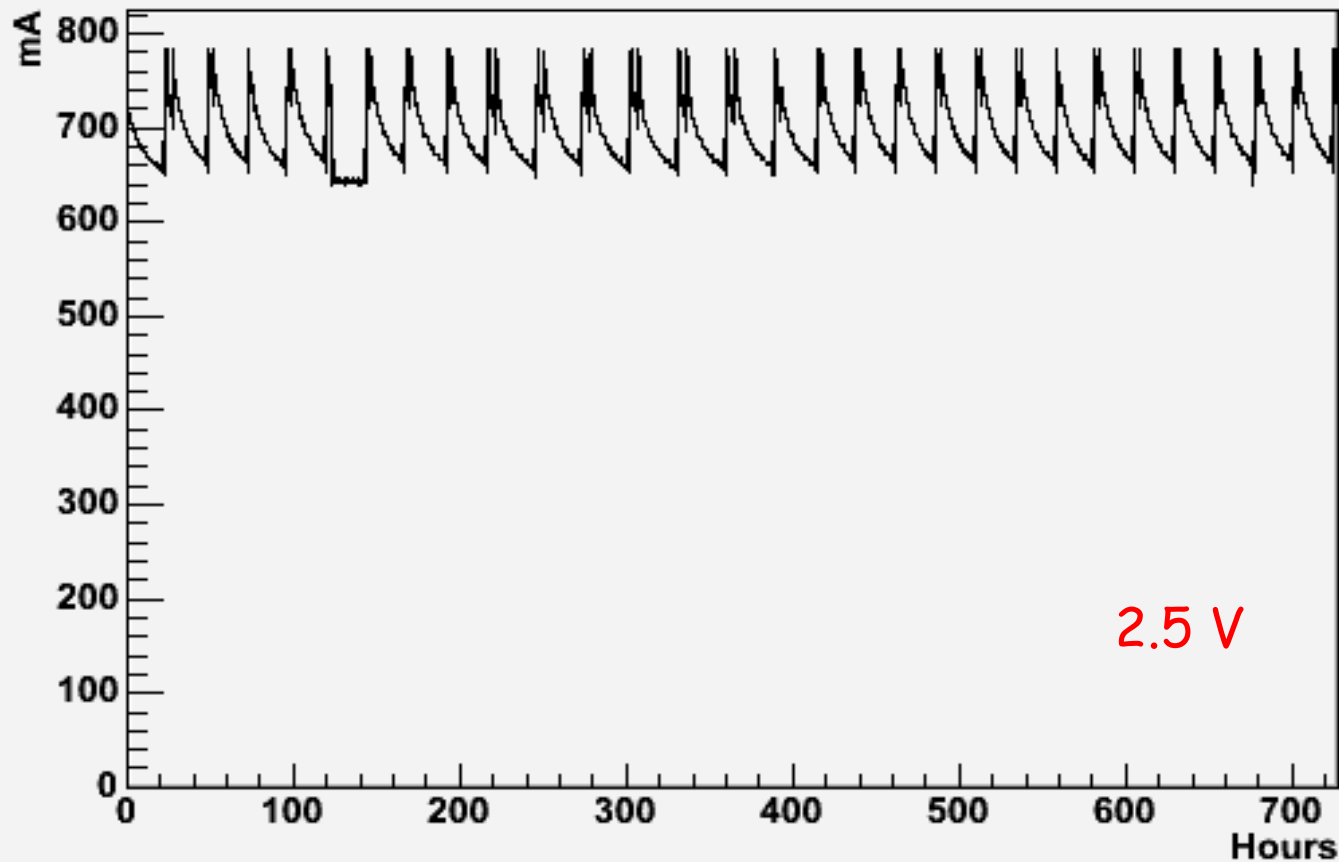




LV Currents



- ◆ LV readout is done via PAACBs
- ◆ I (1.25 V) doesn't vary
- ◆ While I (2.5 V) slowly decreases when the APVs are not receiving triggers for a long time



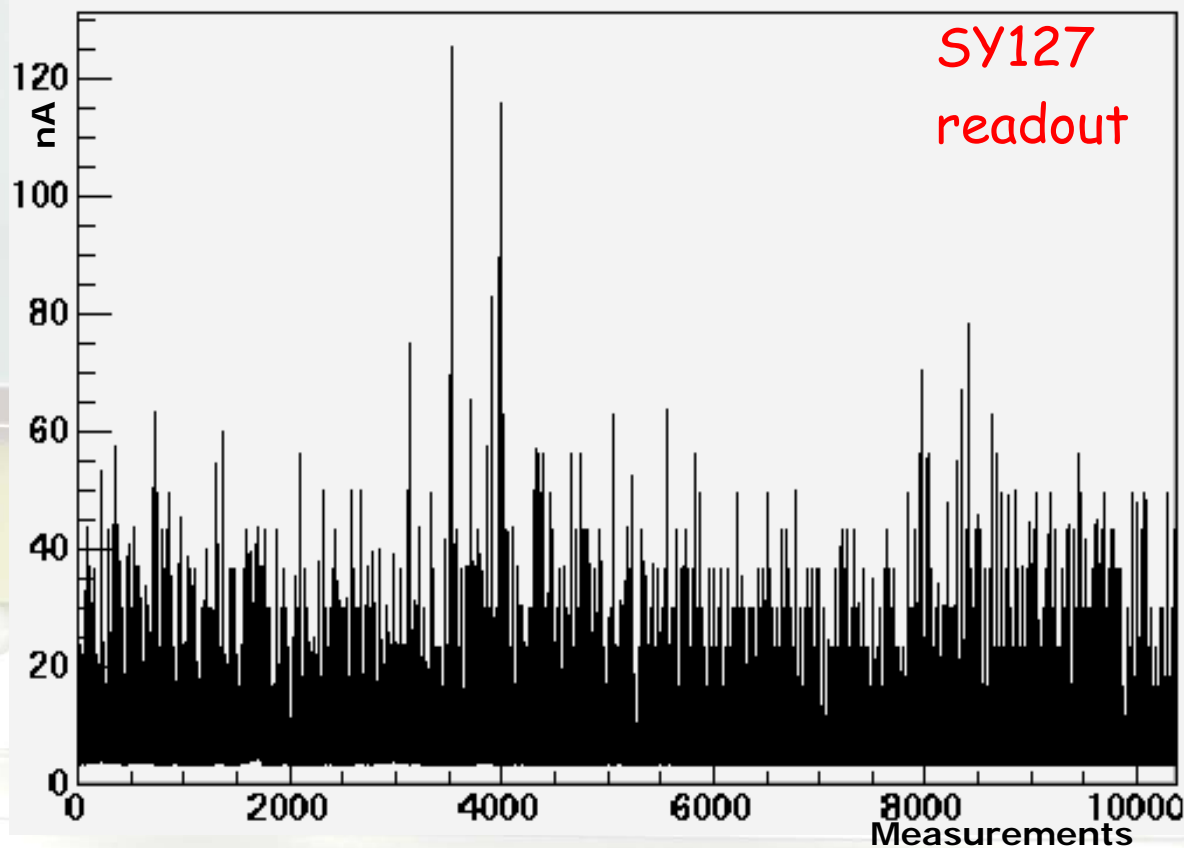
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Bias Current

- ◆ Modules were kept at 400 V for the entire month
- ◆ Being at low T the resolution of the readout doesn't allow precise measurements, but shows a stable behavior of bias currents during time
- ◆ No breakdown occurred



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Conclusions

- ◆ During the month, we suffered a couple of software failures, forcing us to restart the scenario from scratch:
 - ♥ FecServer crash
 - ♥ All modules excluded from the acquisition
- ◆ Apart from this, the LT behaved correctly
- ◆ From the modules point of view this measurement can be considered a success:
 - ♥ Good pedestal stability
 - ♥ Noise and calibration don't change during time
 - ♥ Low temperature for a long time has no evident effect on modules behavior, which perform in an excellent way