TC-Hw

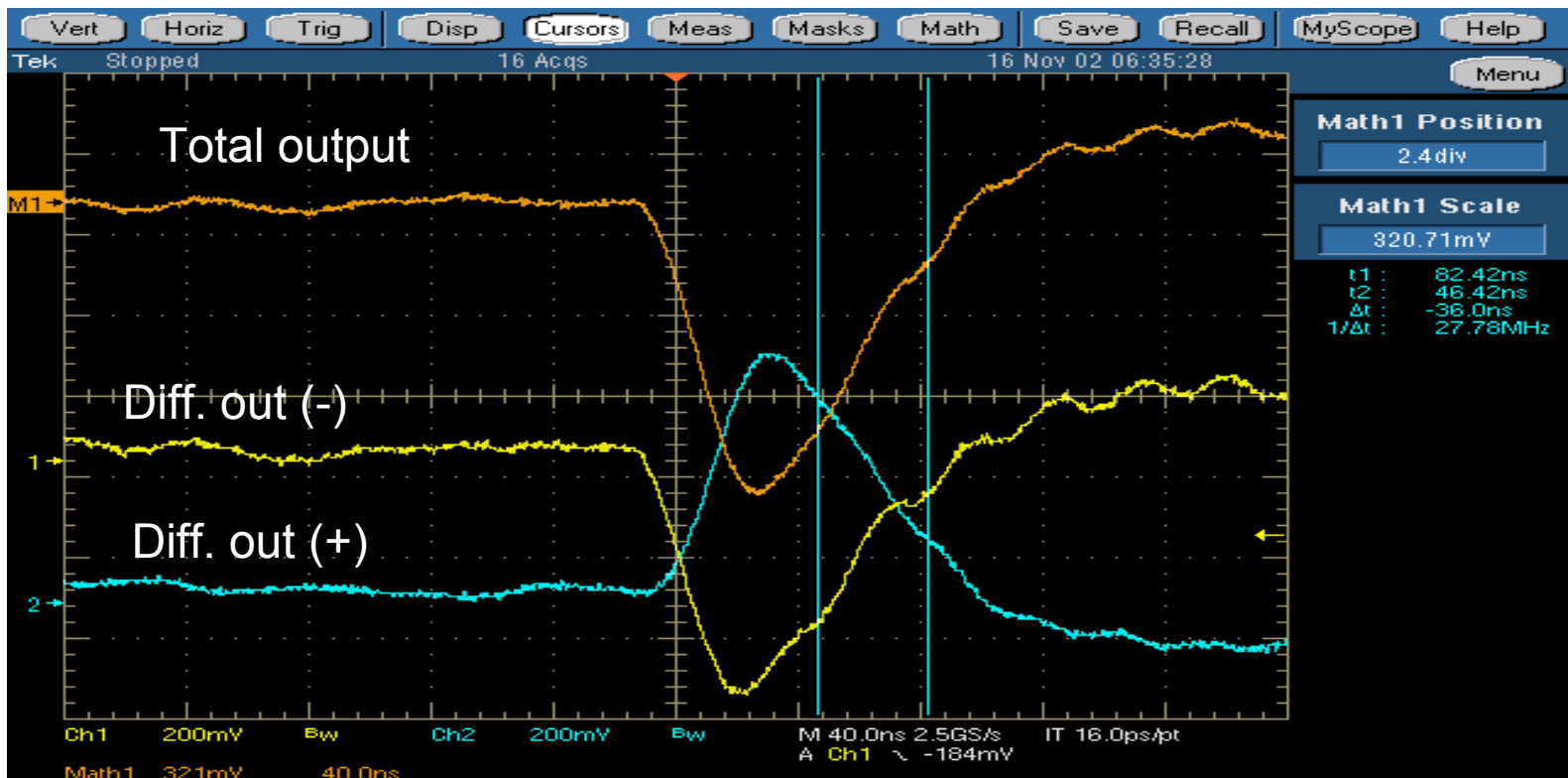## Darft of Slides for Review Meet.
## Flavio Gatti

Status in RUN 2009

- Longitudinal detector (Bars+PMTs): it has operated as in RUN 2008 without HW changes.

- Transversal detector (Fiber+APD): the readout electronics has been modified for achieving faster output pulses

New APD electronics

- Design of the new electronics Dec 08
- Prototype and test: Mar 09
- Component procurement and PCB production: APR 09
- Delay in delivery and bad production: first 32 channels in end of July and second 32 channels at end of october.
- Mounting, commissioning and integration test: TC US first week of August, TC DS 1st week of September.
- Positive stand-alone tests
- Not time available for integration test with DCH before run

# Test of Dec.: APD on, new I2C master,…-> no improvement
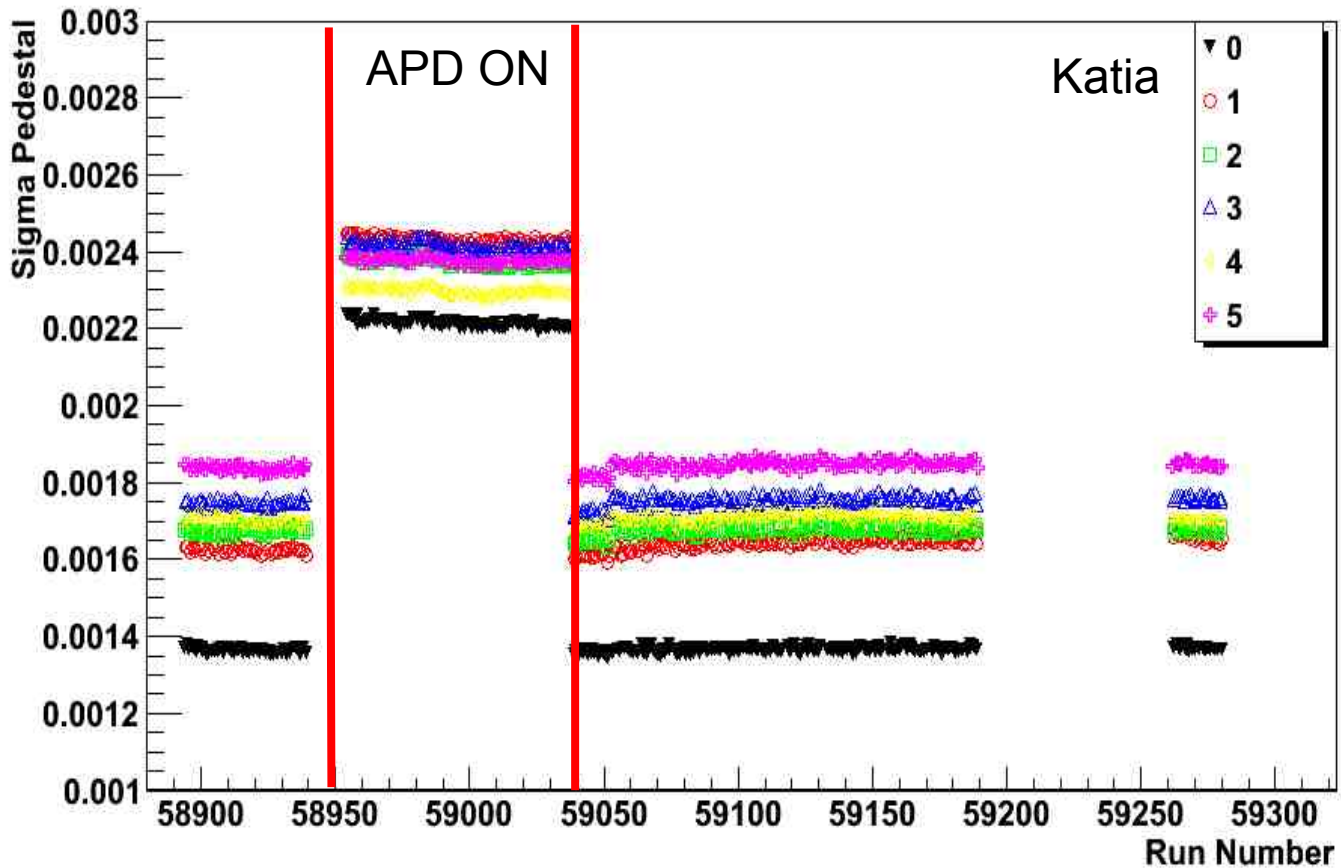
Oct. 2009: not a strict correlation of DCH noise from APD US/DS on/OFF

- From Run 50225-50358 APD ON,
- From Run 50359 APD off for DAQ problem
- From Run 50506 APD ON
- From Run 50590-50659 APD ON -> DS OFF-non effect -> US off noise disappear
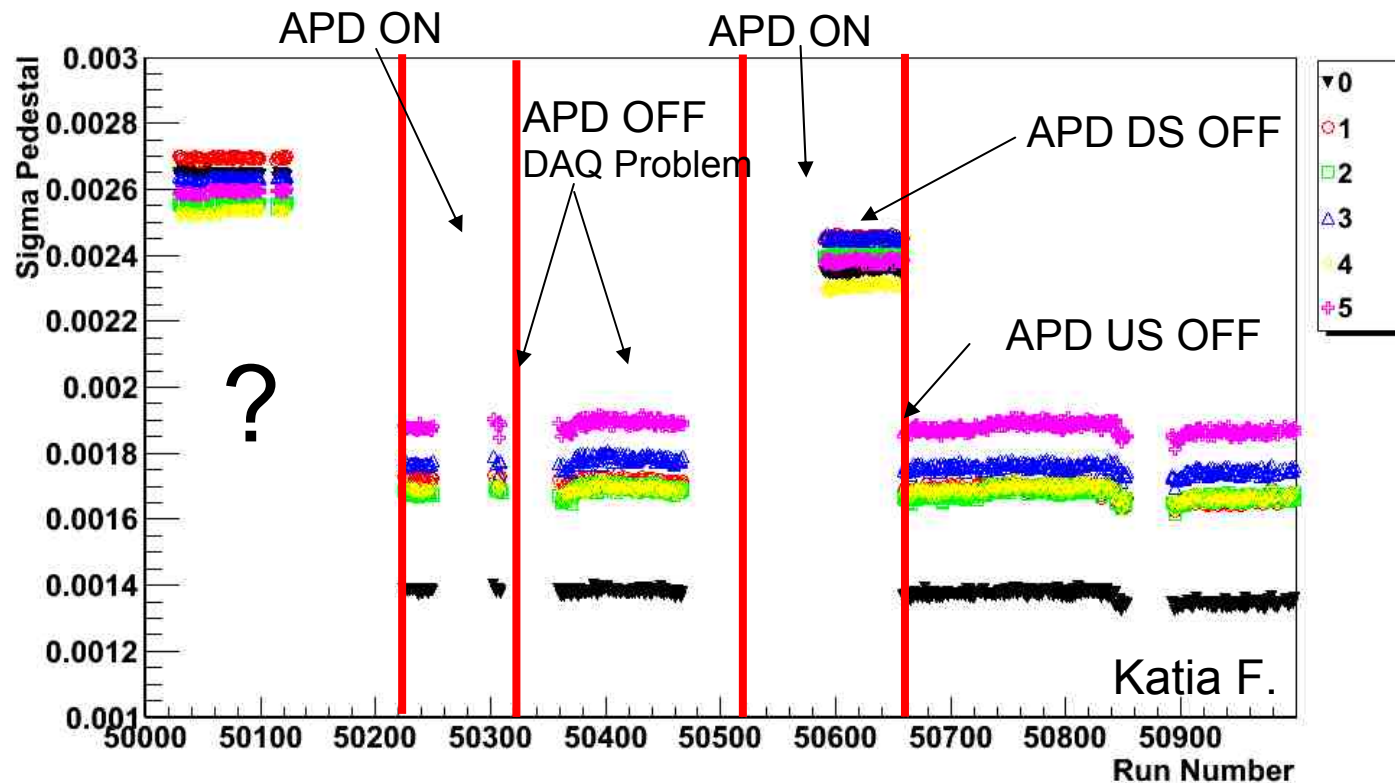
Comparison with Run2008

- Effect of APD on the DCH
- From run 38104 al run 39349 gli APD OFF, in the remaining runs APD ON.
- Negligible effect on DCH
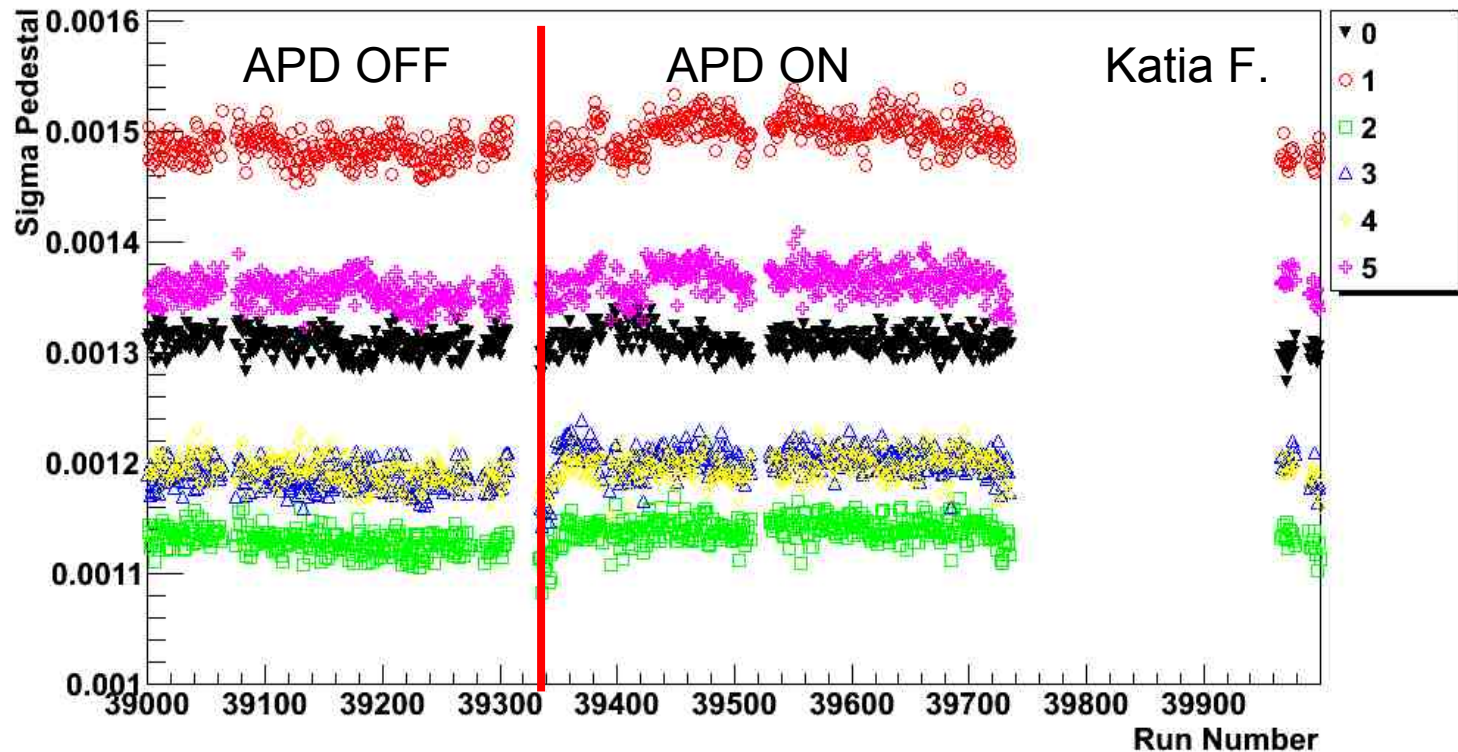
Work under way in Jan.-March

- We need to work with the US and DS TC just outside the COBRA to:
  1- test an EM shielding on the preamplifier input
  2- test the effect of pick-up on HV and LV cable
  3 – reduce the cable emission inside COBRA

  4- eliminate any cause of coupling of the output to the input
  5- change the not working boards and a few resistors on I2C bus receiver
- We need to test the effect of these changes with the DAQ and inside the COBRA. This means that we need to move the TC in and out the COBRA many times.

- We think that this work need to be done in two periods:

  1-the first just after the Xtmas holidays (jan 11 to 29) in order to find the cause of the excess noise and study/test the solutions

  2-the second period after a while in order to have enough time to build the shielding tool in our workshop (2nd half of February- to be fixed)

Work effectively done

- Balanced the I^{2}C bus from Pacth Panel to F.E. boards (change of pull-up resistors) → now bus signal in the specifics in any conditions and stable when idle
- Inserted a shield on to APD-Preamplifier input → decoupled input from EMI and HV or output (digital or analogic cables)
- Reduced the analogic output band from 150 Mhz to approx 50 MHz with further feedback capacitor → reduced the capability to emits high frequency signals
- Decoupled differential amplifier output from twisted pairs cable with small resistor (60ohm/polarity) → reduced back action from electronics rack
- Reduced HV- output coupling by choosing different cable paths and proper shielding → output signal decoupled from FE input through HV cables
- Burst signals generated by HV where filtered (do be done properly later)
- Improved Power supply of F.E boards by changing cables from Patch Panel → decoupling of different F.E. Board respect supplied by the same Patch Panel
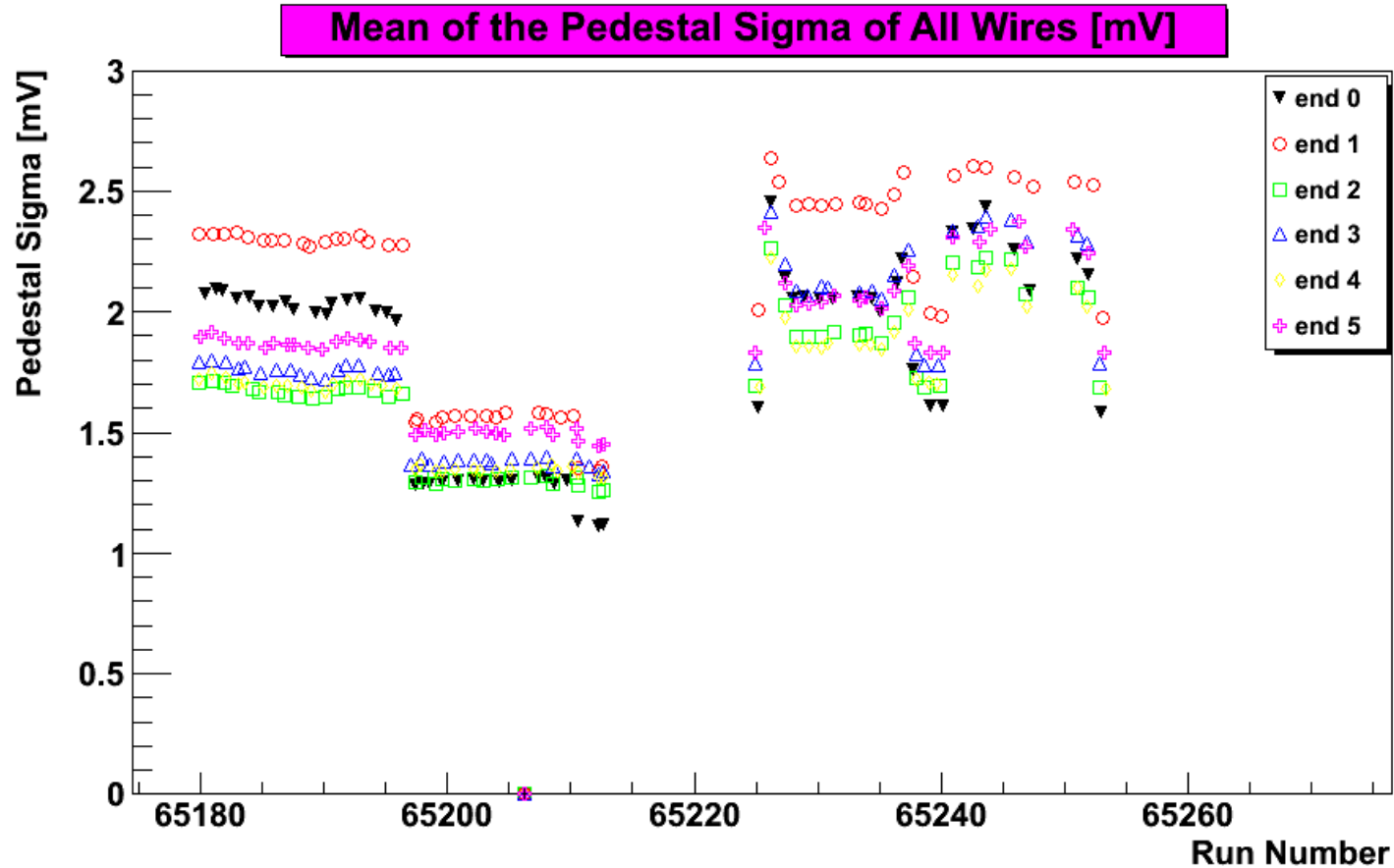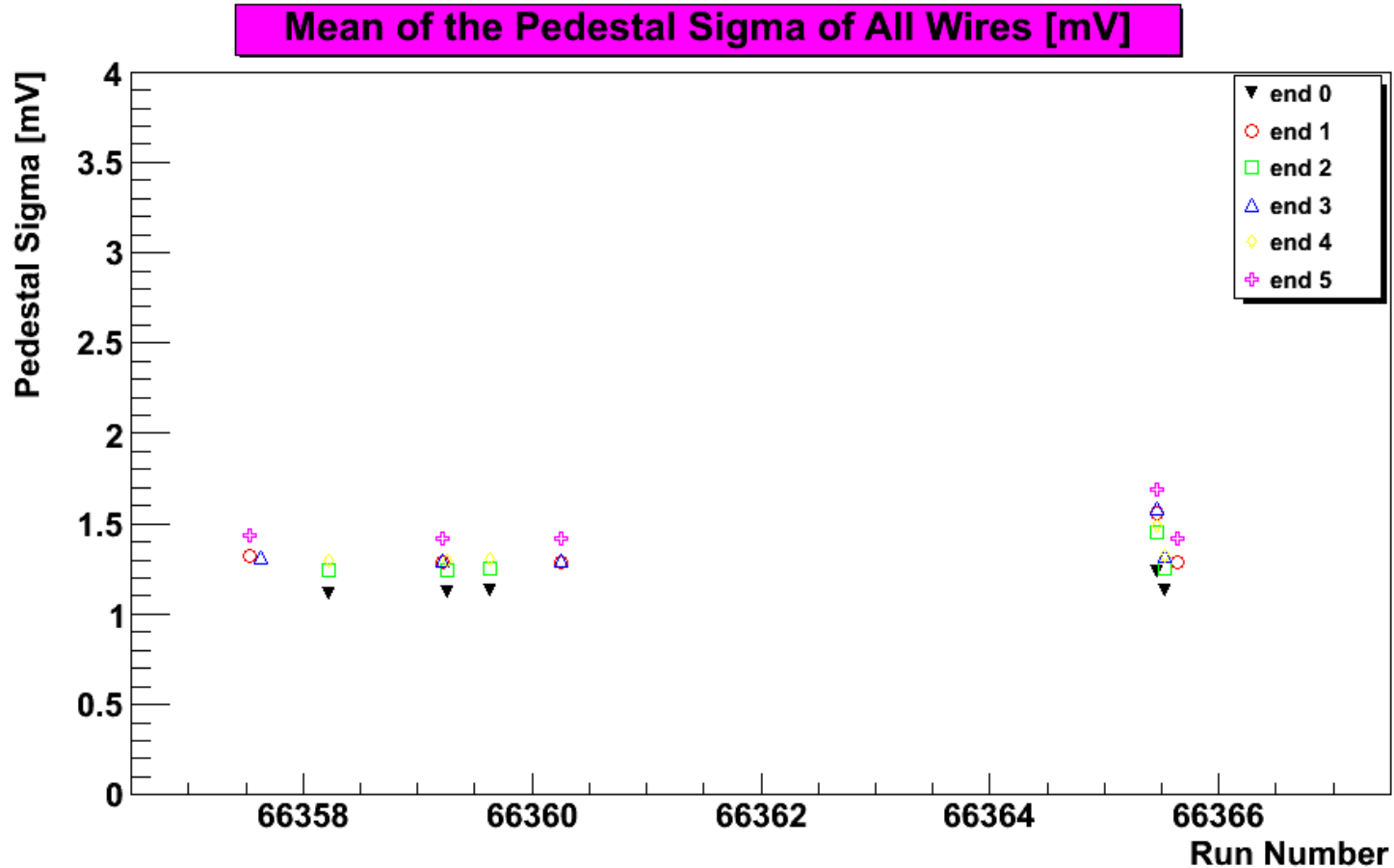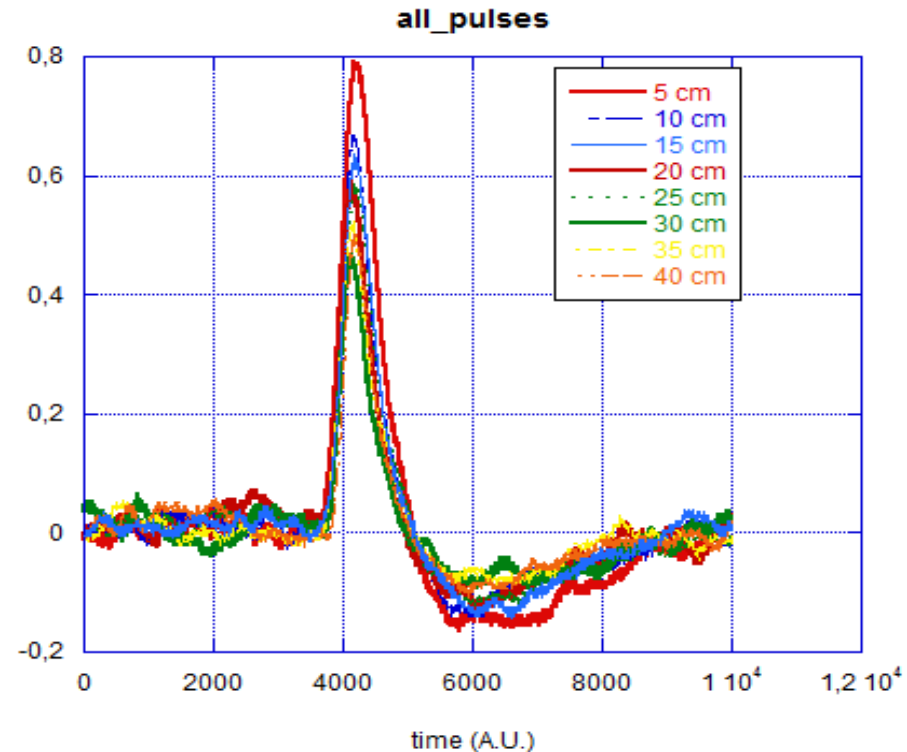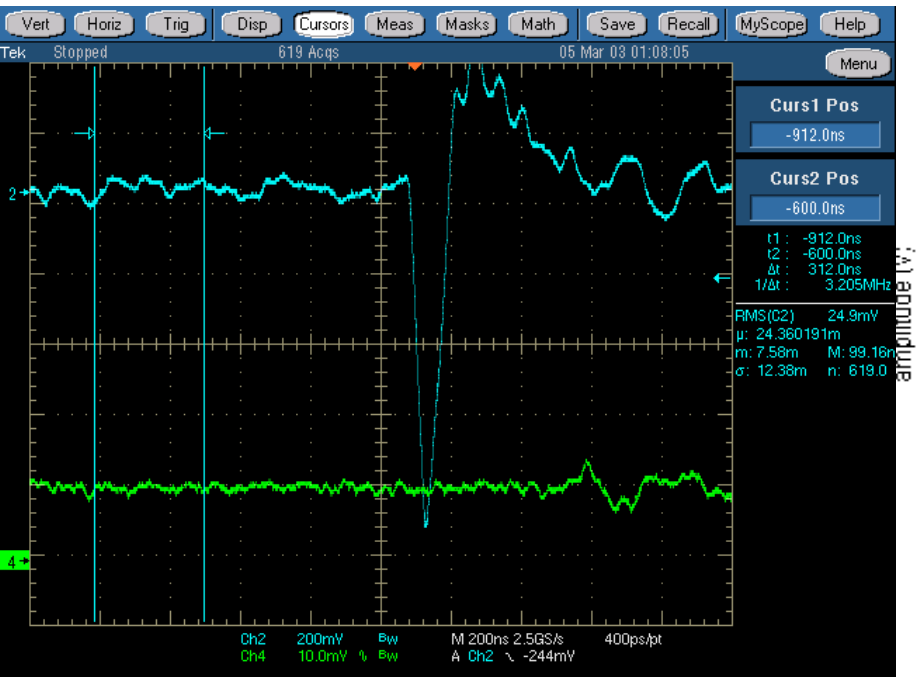
Few details
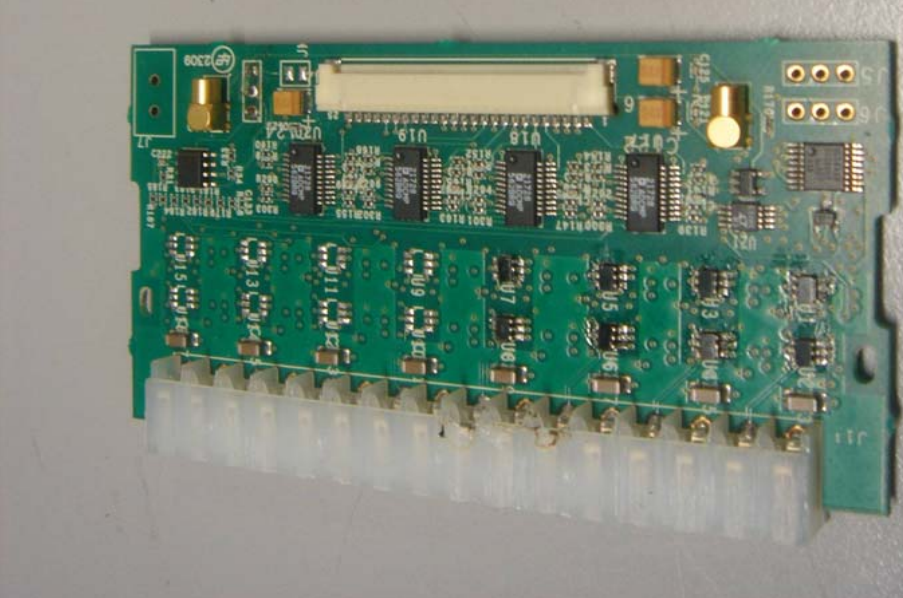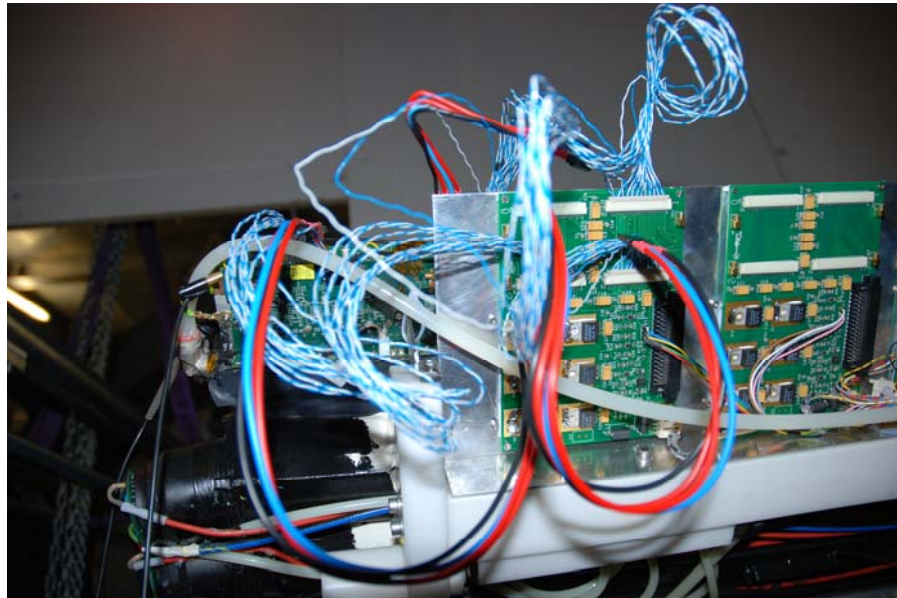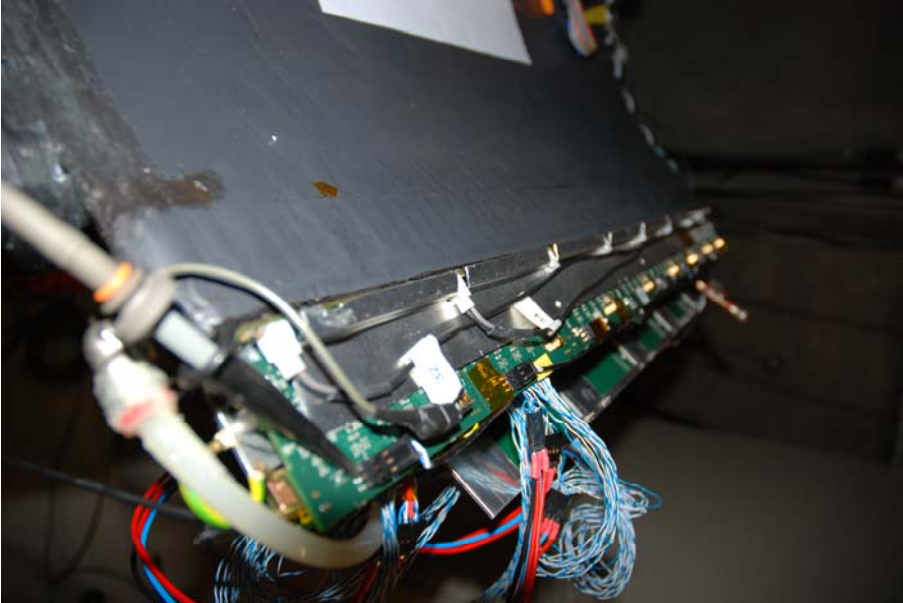
Before/After
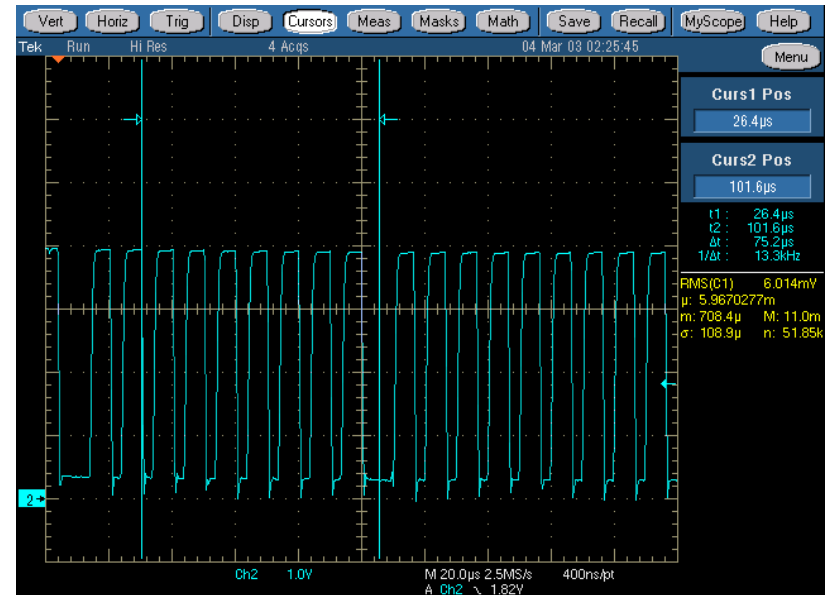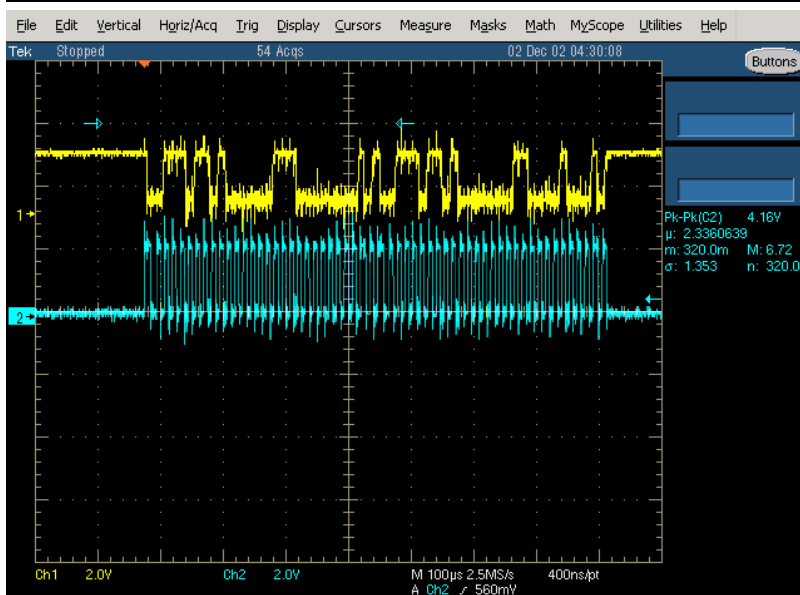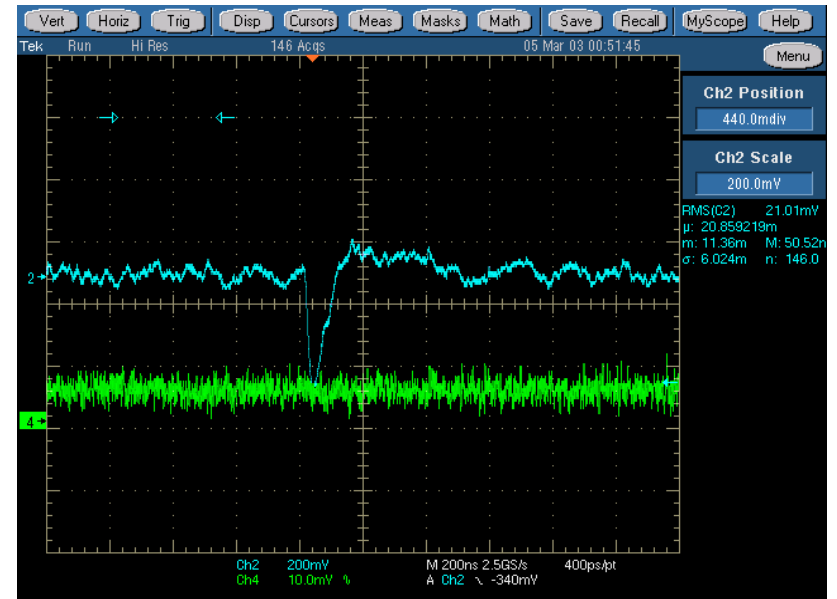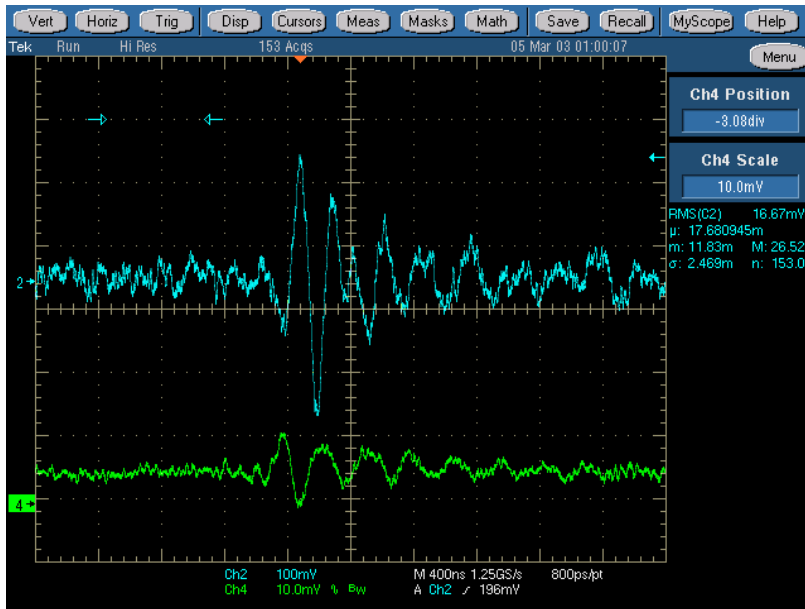
DCH pedestals: first part of january tests

DCH pedestals: final configuration at the end of January tests

Now Achieved average noise RMS of 25 mV as in the APD test with standalone electronics excited with Sr-90
- Genoa and PSI (outside COBRA), Aug 09

Conclusion

- Working on TCs Shielding, filtering and signal matching, we are now at the target performance of APDs

- We need to perform these modifications for all channels and both TC in the next months

- Most of February/March needed for preparing these modification (schields, cables, filters on HV))

- Completion of work: end of March