

# **Status of Hall di Montaggio Tests**

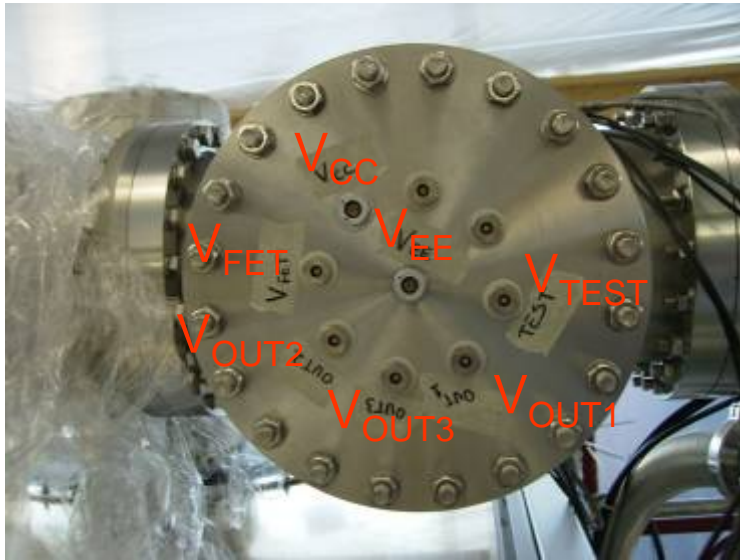
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# Outline

- Description of Hall di Montaggio (HdM) Bench Test
- Test Performed:
  - Signal Transmission
  - PZ0 Preamplifier Signal Out Transmission
  - High Voltage Test

## Description of HdM Bench Test

Trunk with flanges for preamplifier signals and LV bias supply connectors and for HV connectors. This trunk has been rotated in order to use the present signal connector flange because the CF40-150 adapter didn't allow the placement of the connector signals flange

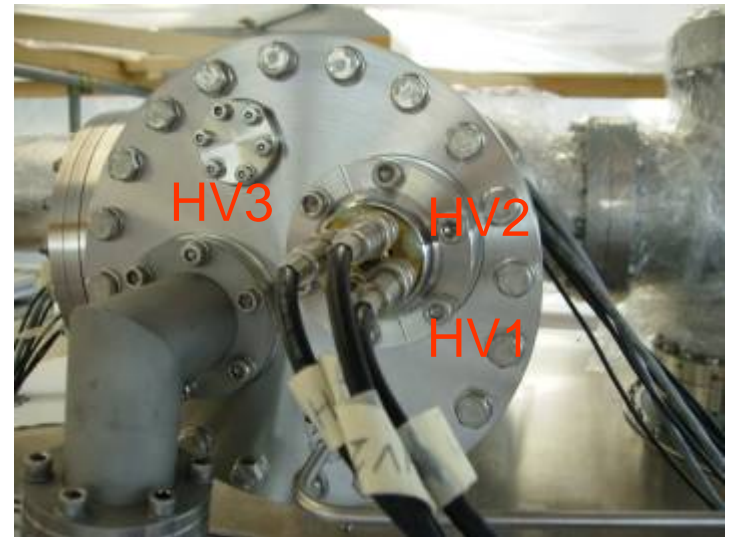


### Signal Connector Flange

$V_{CC}$ ,  $V_{EE}$ : 3 pole Fischer Connectors

$V_{TEST}$ ,  $V_{OUT1,2,3}$ ,  $V_{FET}$ : 1 pole Fischer (Lemo)

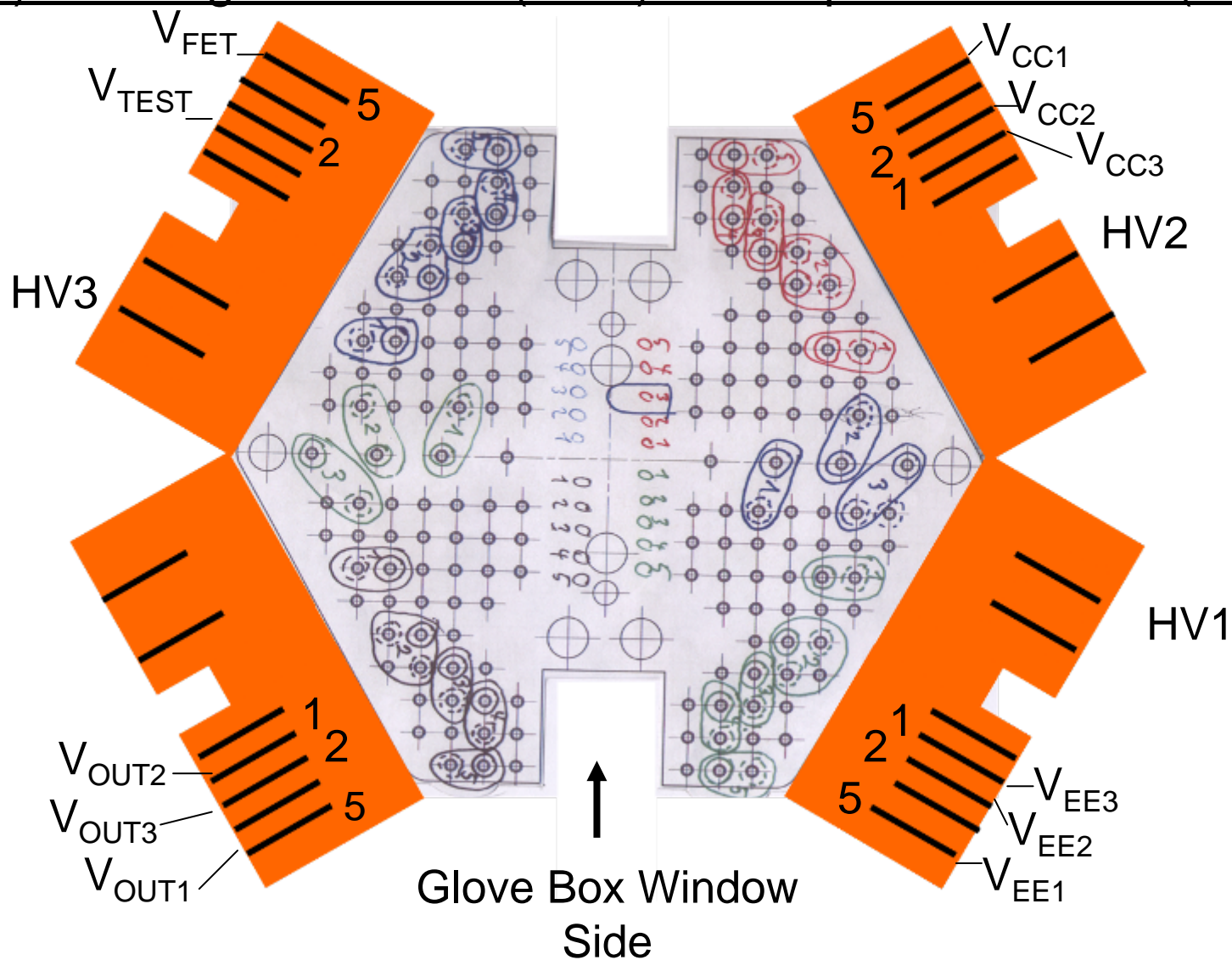
Insulating rings have been added to decouple the connectors from the flange



### HV Flange

gnd of SHV connectors separated from the flange as choice of project

# Correspondence between Signals, LV and HV (connectors previous slide) with Pogo Pin Matrix (PPM) and Kapton Flat Cable (KFC)



Numbers indicate the correlation between the tracks on kapton and pairs of pins used on PPM

## Description of HdM Bench Test

Circuit mounted in the e.m. shield on the copper support and connected to the PPM

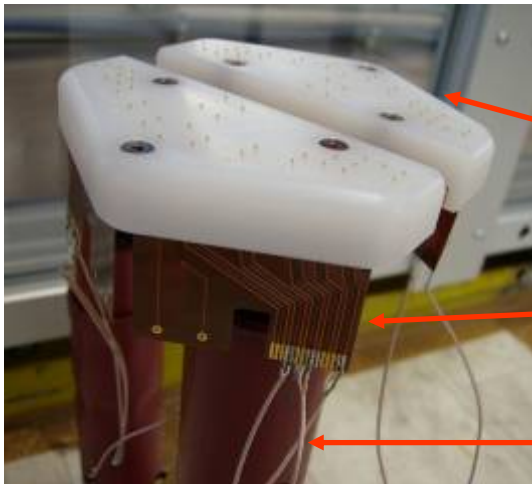
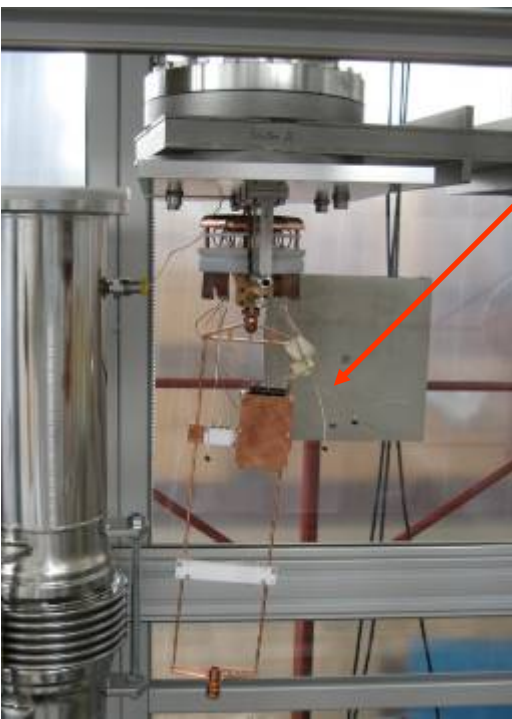
Pogo Pin Matrix: signal and HV cables, coming from flanges, laser welded

Bottom part of Pogo Pin Matrix with sliding contact

Kapton Flat Cable

Small pieces Habia

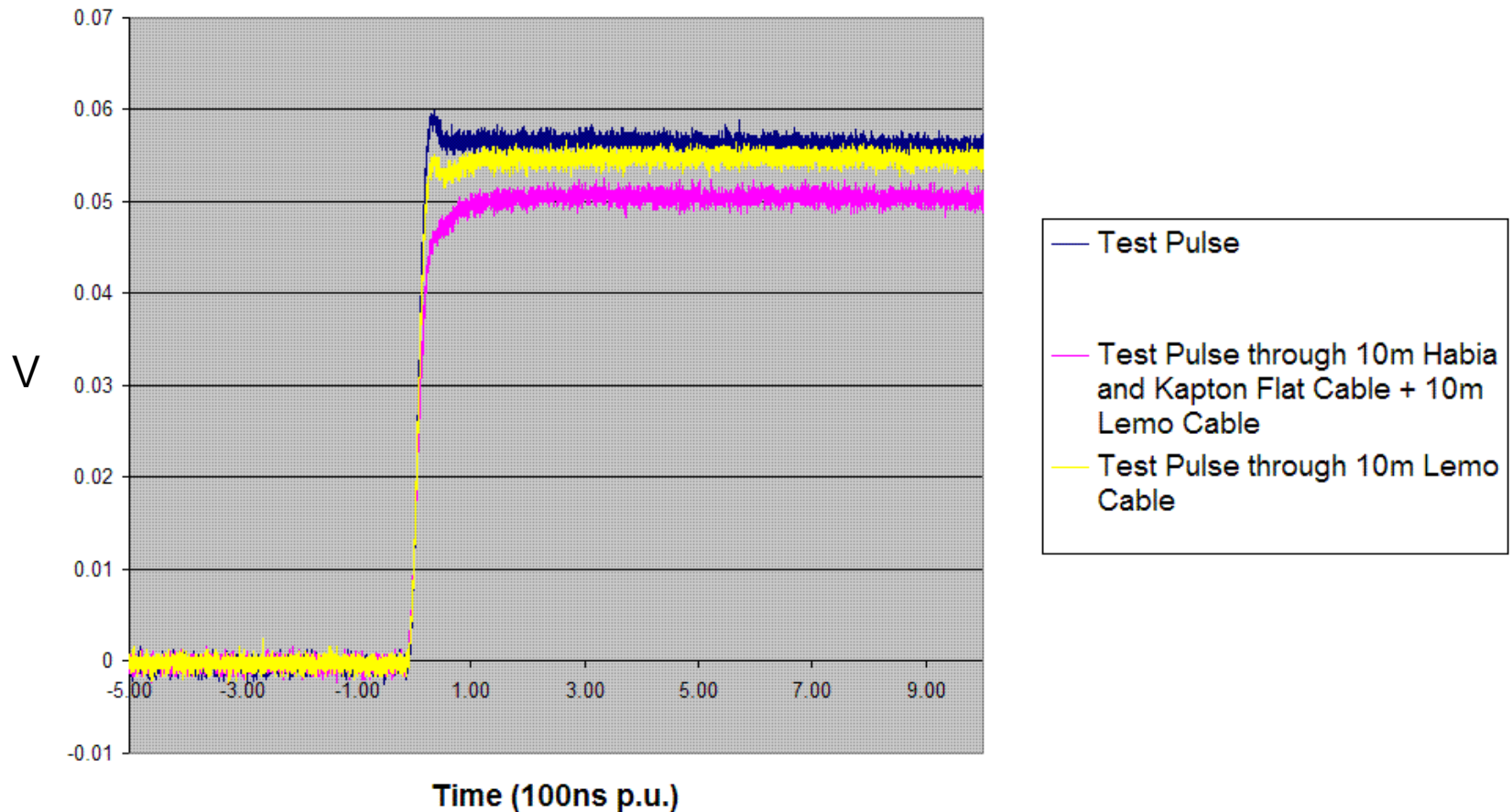
At the beginning KFC assembled with signal-gnd tracks reversed; first tests have been done with this, then it's been replaced



# Signal Transmission

A 55 mV Test Pulse has been sent from the KFC and its transmission through 10m Habia and 10m RG174 (LEMO) has been observed and studied

10m Habia Resistance:  $R=9.7$  Ohm **Pulse Transmission**



Small effect of integration and attenuation due to distributed capacitance and resistance of cables.

# Preamplifier Signal Out Transmission

The circuit used is a 3 channel PZ0, the same used for underground tests with the Prototype

Tests performed with a  $C_{\text{detector}}=33 \text{ pF}$ , mounted on the circuit (a) and external (b) (HV line not connect to the circuit)

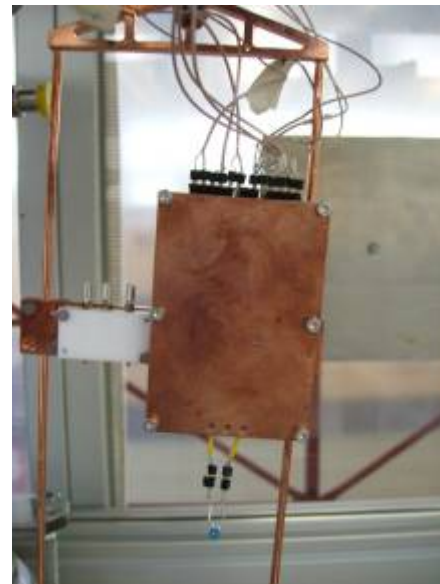
The ASIC is polarized by  $V_{\text{CC}}$  and  $V_{\text{EE}}$  with 3 cables in parallel (soldered in the same pin) in order to minimize the resistance of cable and reduce voltage drops on power supplies.

The resolution is same for both cases a) and b)

$R=1.1\text{-}1.2 \text{ keV FWHM}$  at 1 MeV (55 mV Test Pulse on 1 pF Test Capacitor)



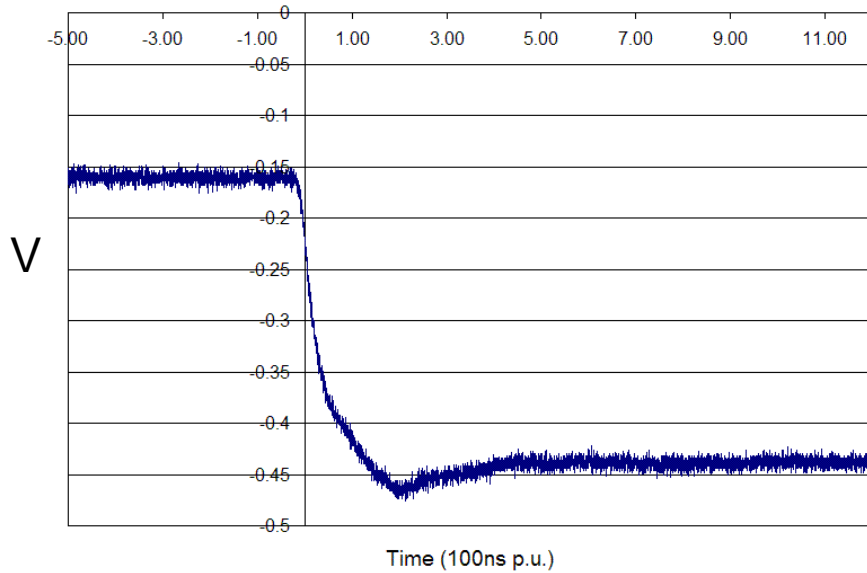
(a)



(b)

# Preamplifier Signal Out Transmission

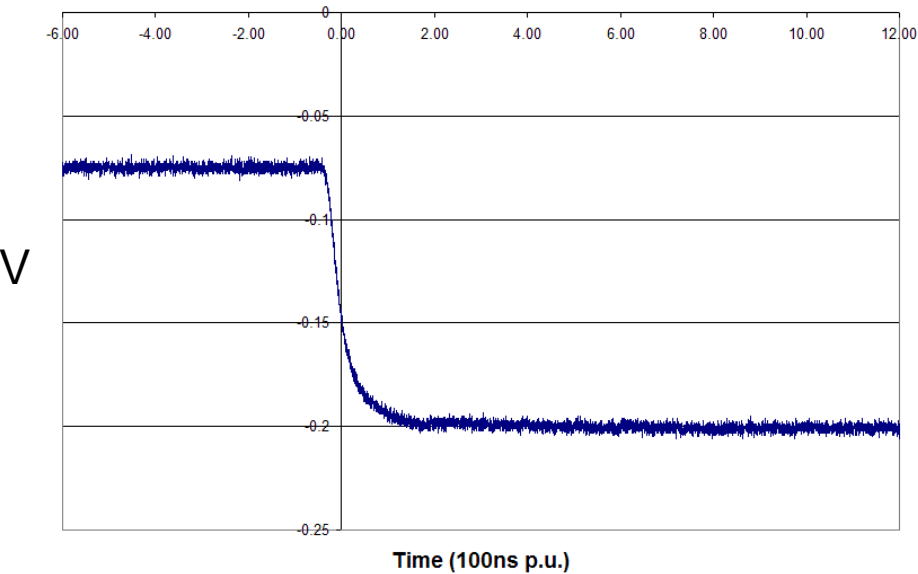
Preamp Signal Out Transmission (1 MOhm term)



Preamplifier Signal Out  
(1 MOhm Termination)

Reflection effect due to non-termination  
of the cable

Preamp Signal Out Transmission (50 Ohm term)



Preamplifier Signal Out  
(50 Ohm Termination)



# HV Test: Leakage Current and Energy Resolution

Tests performed in two conditions:

- a) HV cables with crimp contact and shield not connected btw the HV cables from the PPM and the HV cables from the feedthrough
- b) HV cables with crimp contact and shield connected.

No HV ground on Kapton

Leakage Current Measurement: LC value of the order of 20 pA in air with HV applied of 2kV

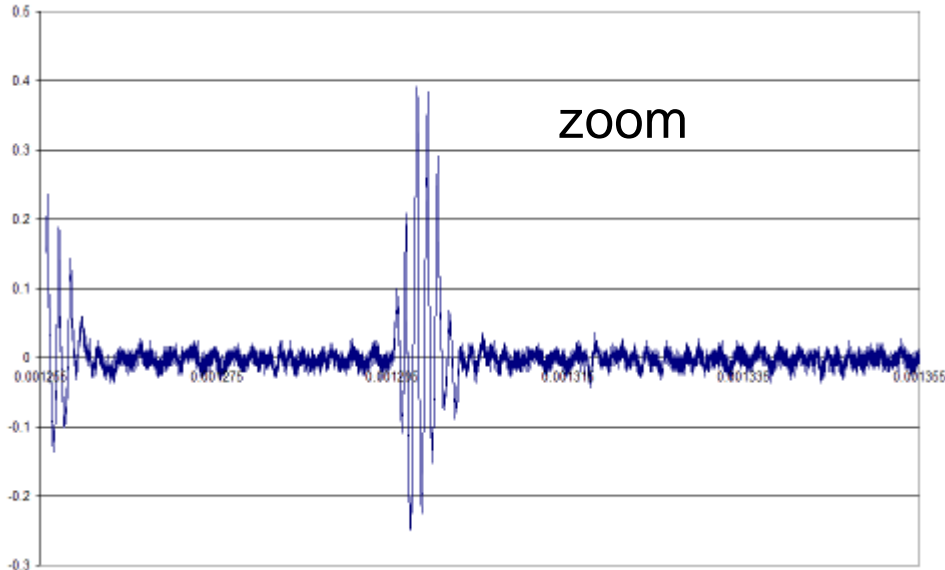
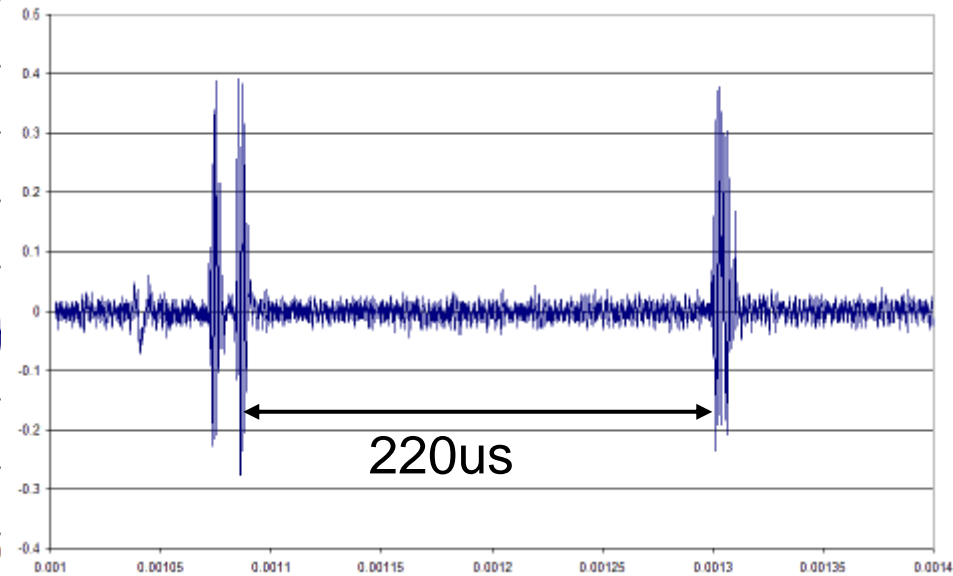
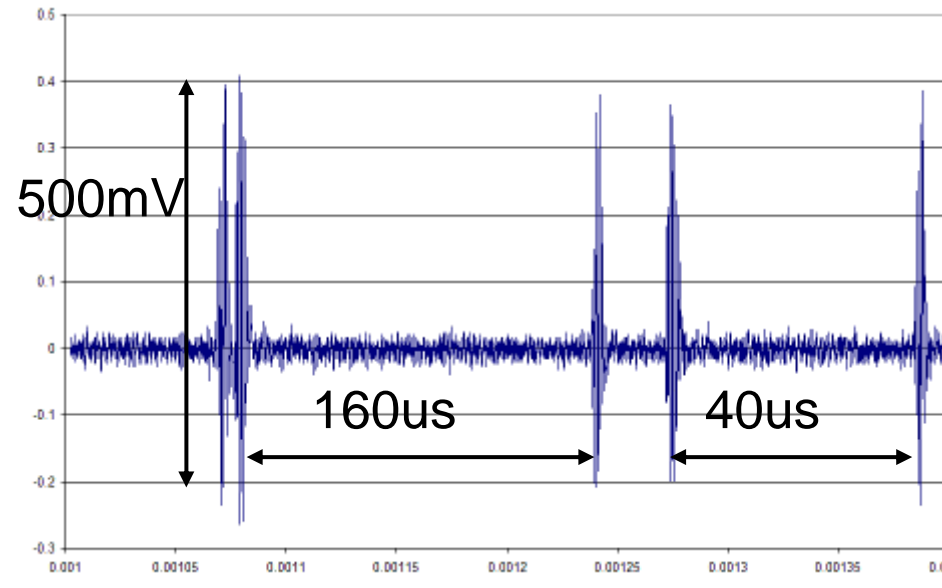
A real measure of LC on Kapton has not be done: the HV ground should be connect to the KFC to see if some leaks or discharges appear.

At this level there is no worse in terms of electronic noise



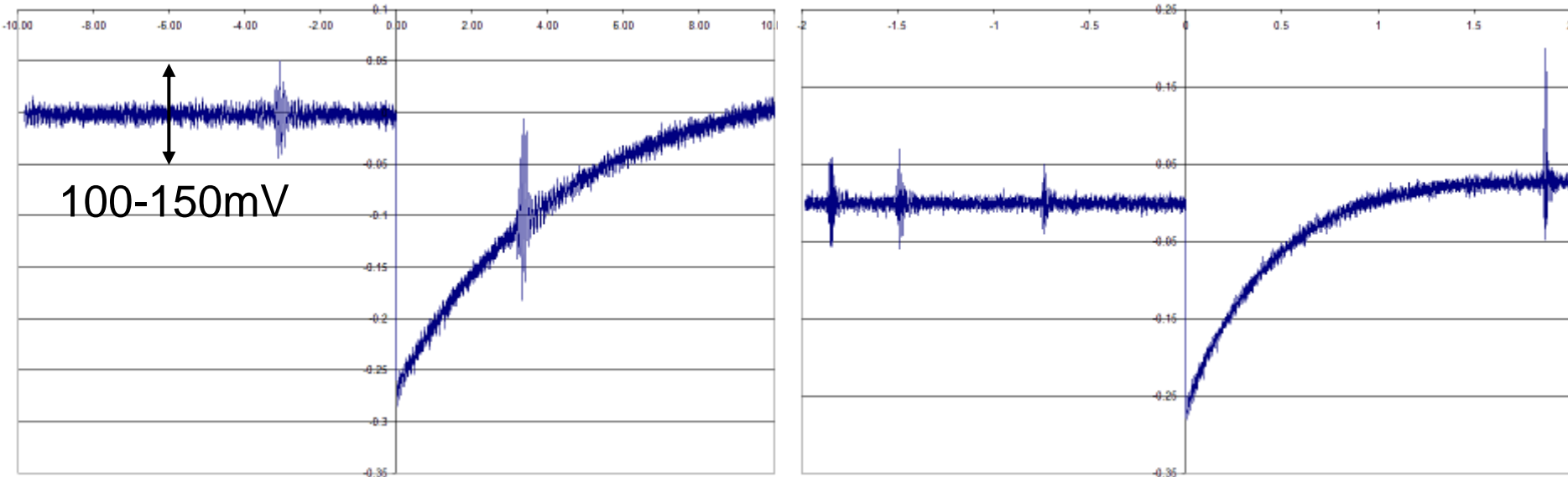
Test with  $C_{\text{det}}=100\text{pF}$  and  $\text{HV}=2\text{kV}$  in case a) and b)  
NOISE not depend on 100pF but HV not shielded

# Preamplifier Signal Out with 100pF HV Cdet case a)



Noise so high in module that it's not been possible to make a measurement in term of FWHM of pulser line

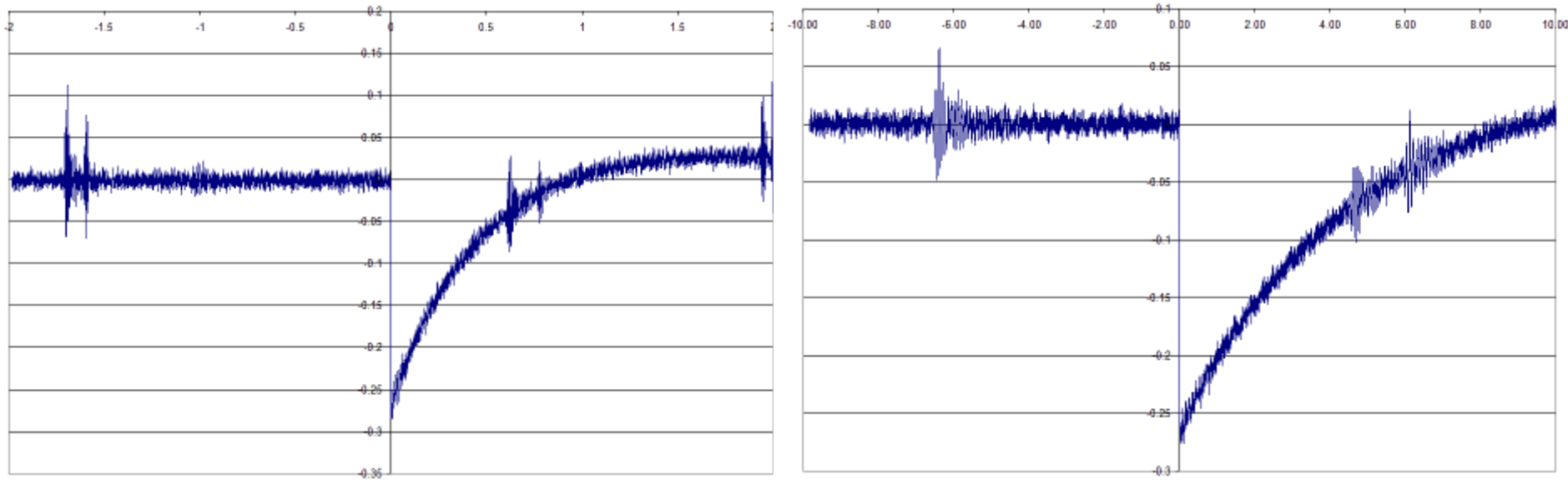
# Preamplifier Signal Out with 100pF HV Cdet case b), HV=0



Noise is significantly reduced, and it is always in the same order of frequency

The FWHM of the pulser line, corresponding to 1MeV, with  $C_{det}=100\text{pF}$   $HV=0\text{V}$ , is found to be 1.3-1.4 keV (very preliminar measurment)

## Preamplifier Signal Out with 100pF HV Cdet case b), HV=2kV



The FWHM of the pulser line, corresponding to 1 MeV, with  $C_{det}=100\text{pF}$   $HV=2\text{kV}$ , is found to be 1.3-1.4 keV (very preliminary measurement)

These plots and the value of resolution obtained show the HV applied doesn't introduce an additional noise

## Conclusions

- Connect the HV ground on the KFC
- Repeat the tests with the HV on and the HV line connected to the circuit with 100pf HV Capacitor
- See if we need a second stage to couple the preamplifier to the FADC