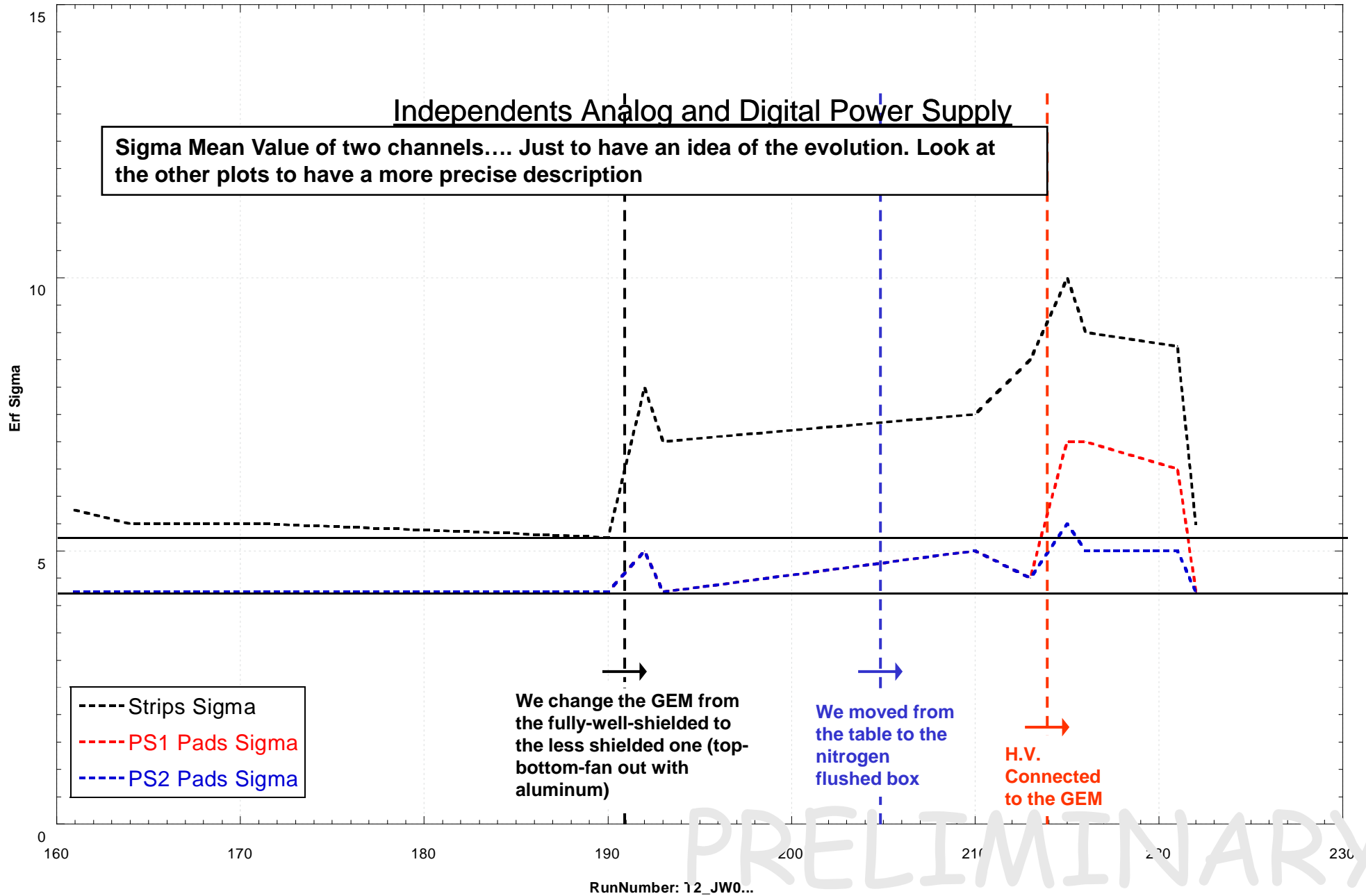


We really need to check all the results  
showed

Erf FIT Sigma versus run number



**Independents Analog and Digital Power Supply**  
Sigma Mean Value of two channels.... Just to have an idea of the evolution. Look at the other plots to have a more precise description

- Strips Sigma
- PS1 Pads Sigma
- PS2 Pads Sigma

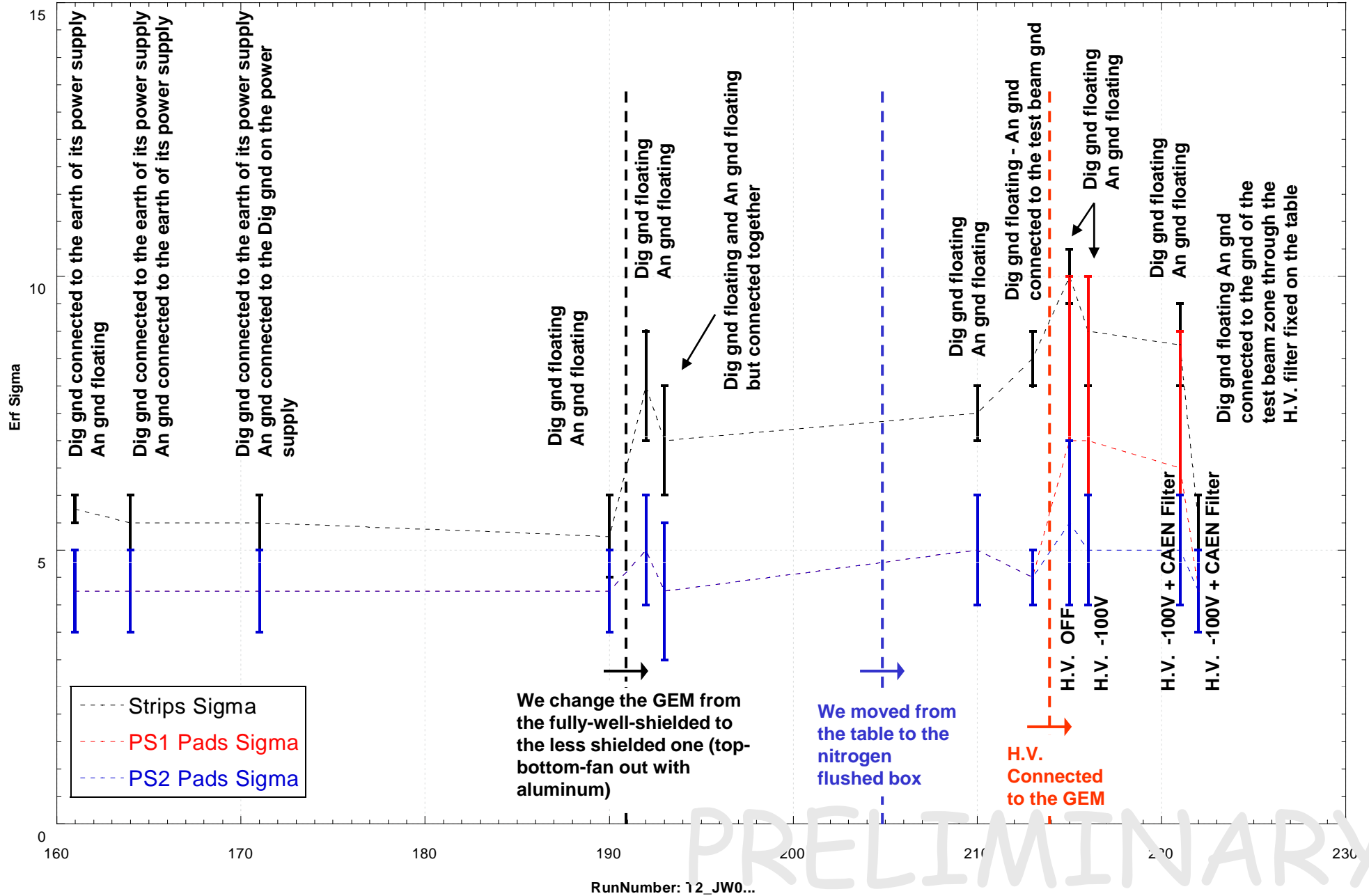
We change the GEM from the fully-well-shielded to the less shielded one (top-bottom-fan out with aluminum)

We moved from the table to the nitrogen flushed box

H.V. Connected to the GEM

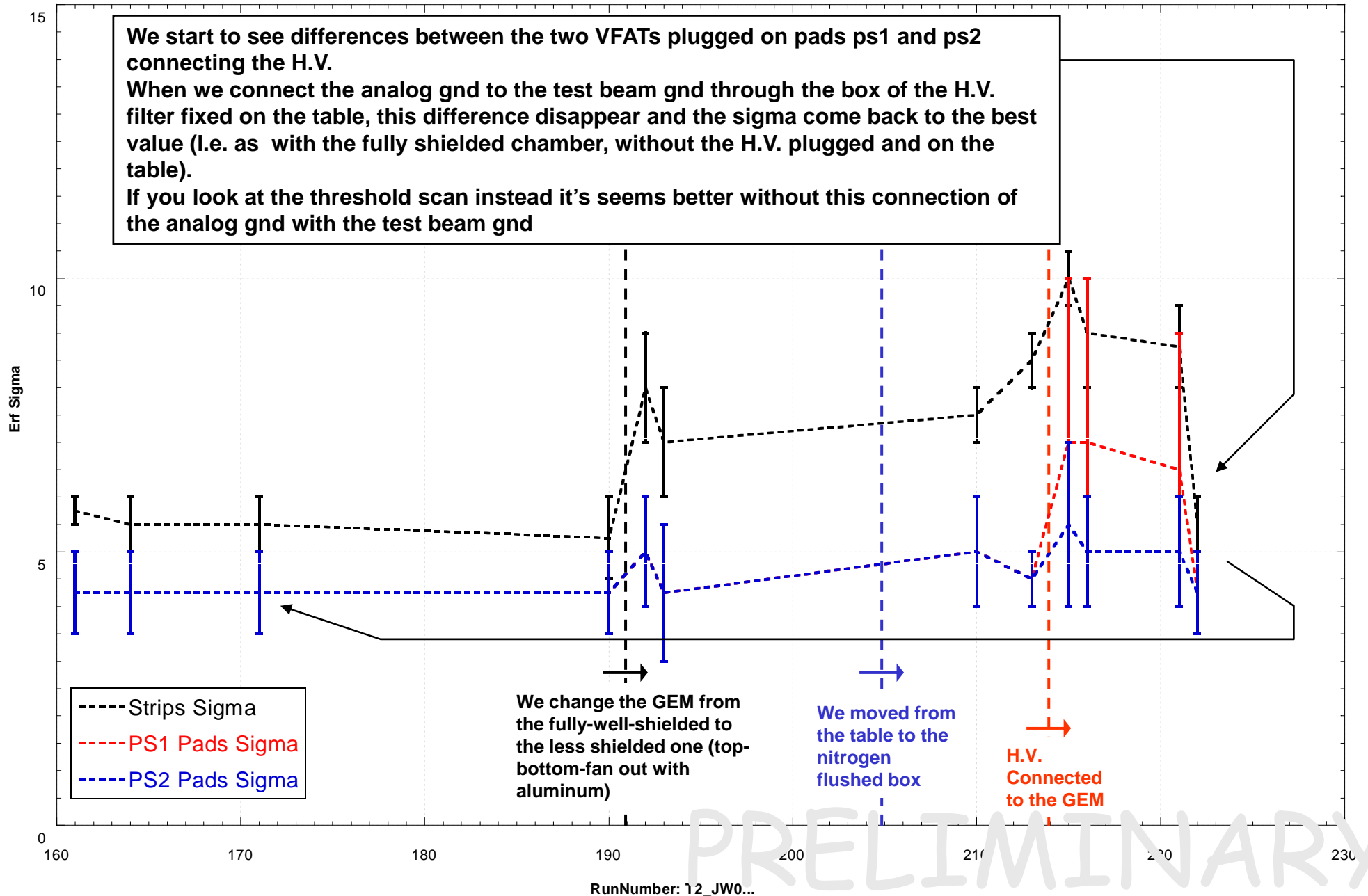
PRELIMINARY

Erf FIT Sigma versus run number



PRELIMINARY

Erf FIT Sigma versus run number



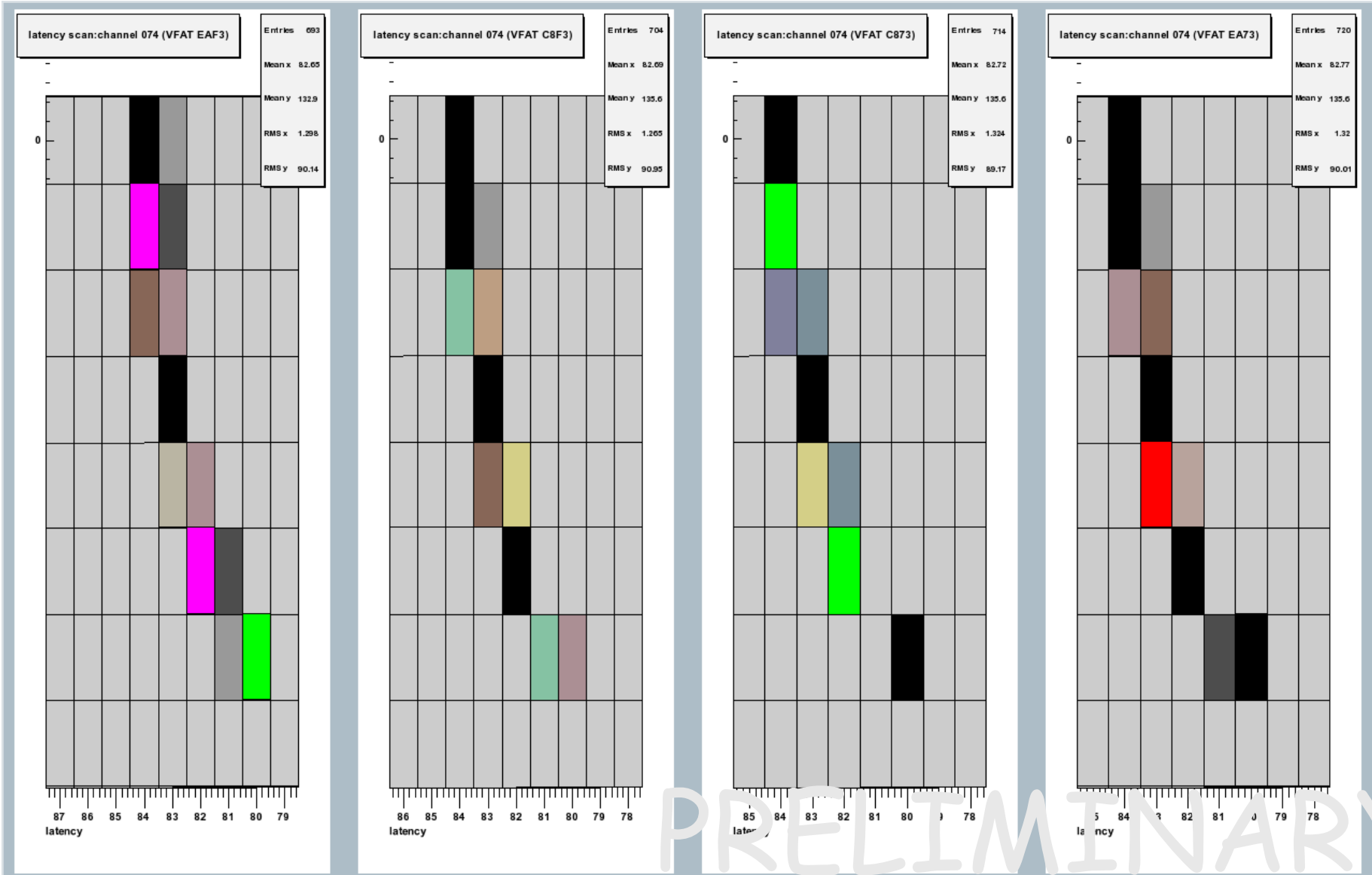
PRELIMINARY

## WITH THE NEW POWERING SCHEME: ANALOG AND DIGITAL SEPARATED

- The An gnd have to be referenced to a good gnd otherwise:
  - Latency problems (inefficiency, worse sigma)
- If the dig gnd is directly linked to the An gnd it's seems that we have more cross talking effect. (when we are in test beam zone we have the problem of the trigger line that in any case link digital and analog gnd if the analog is referred to the test beam zone gnd).
- If we leave the analog gnd floating, without any connection with the digital part we don't see cross talking (but the results from the threshold scan that we use to see this cross talking are in some way crazy!)

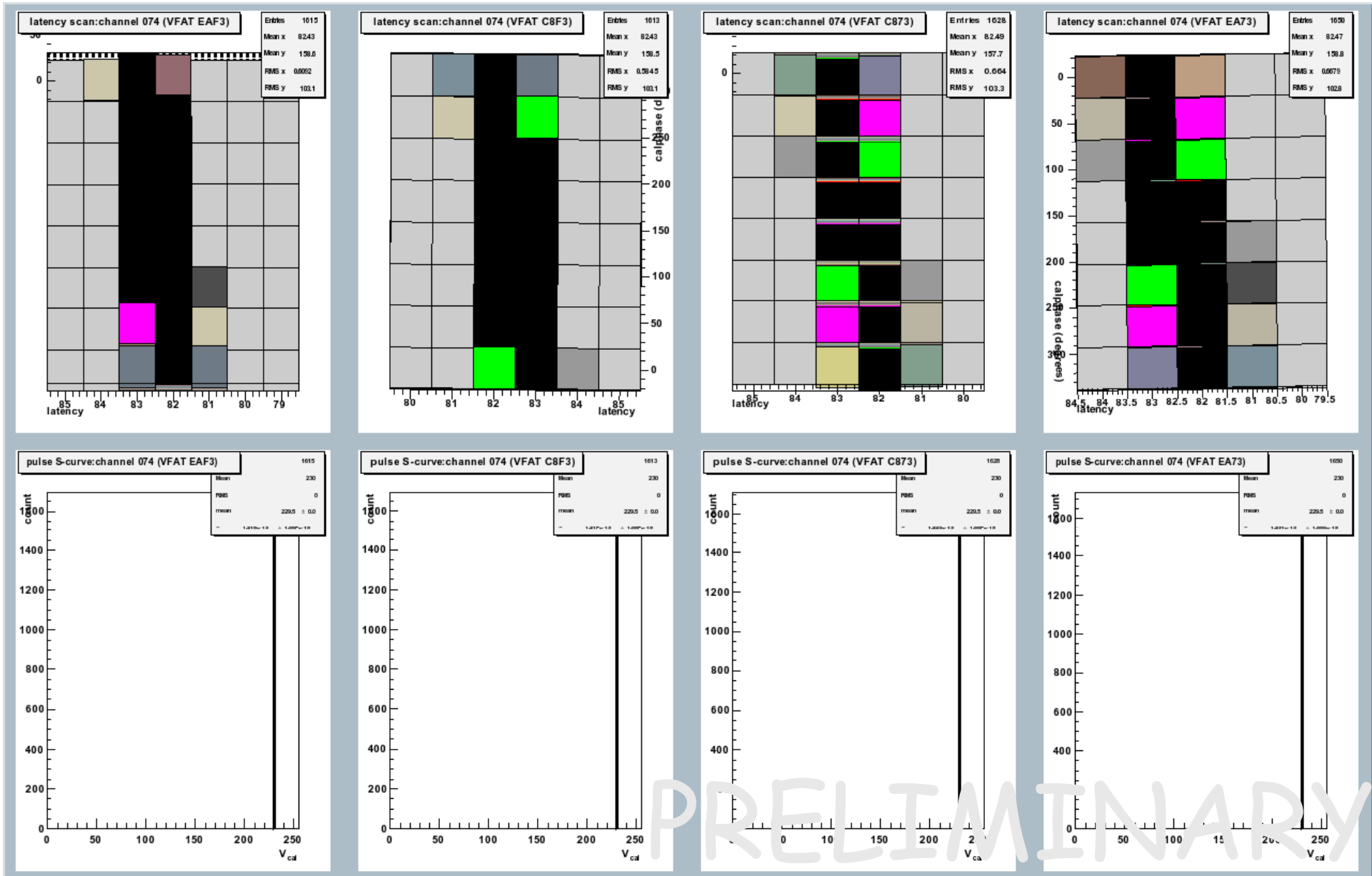
PRELIMINARY

# Latency scan with the analog gnd floating (Vcal 200, Th 50, MSPL 1clk)



PRELIMINARY

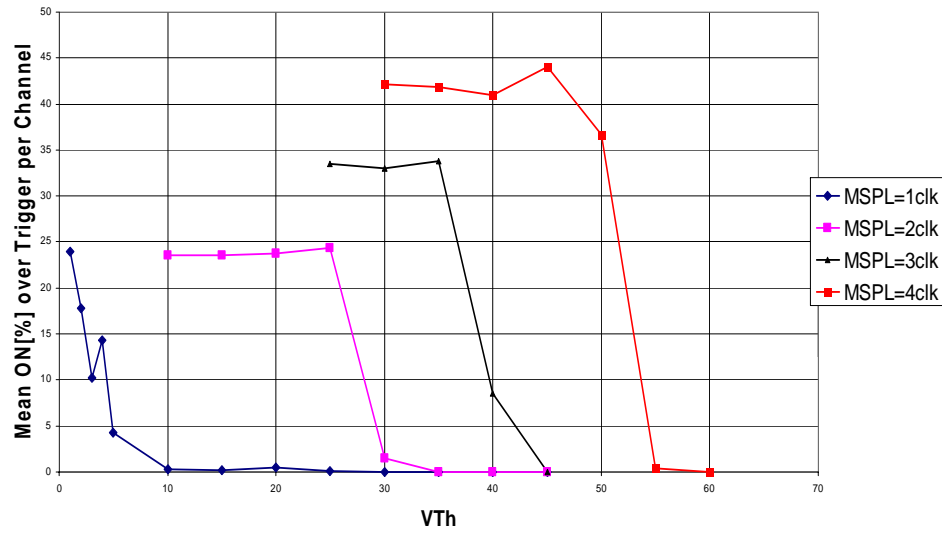
# Latency scan with the analog gnd referenced (Vcal 230, Th 40, MSPL 2clk)



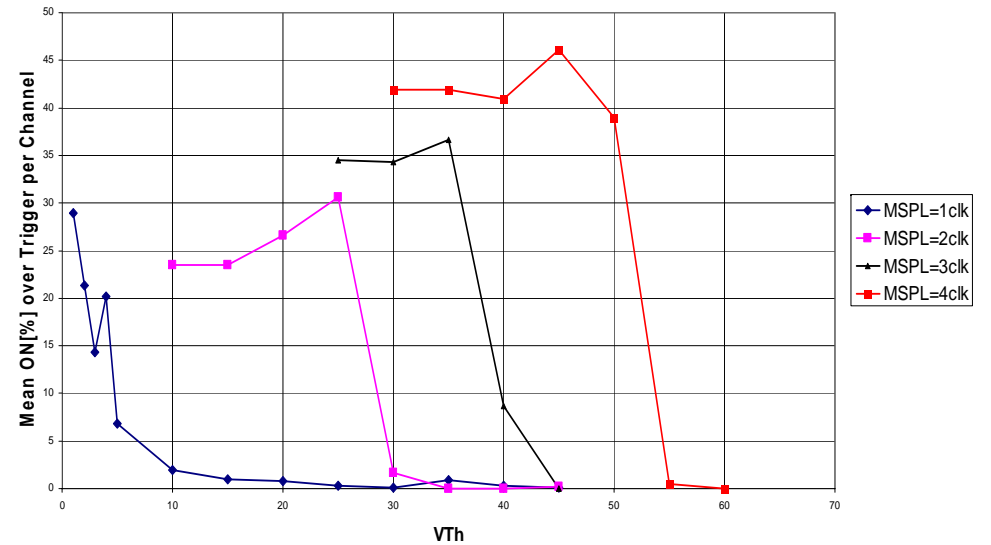
PRELIMINARY

# Averaged Noise Occupancy per channel

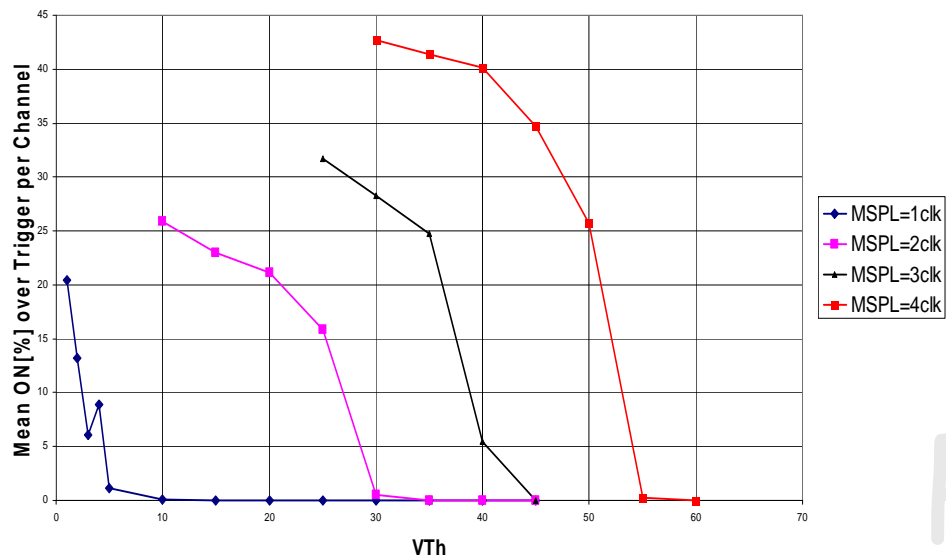
## External Strips - Threshold Scand vs MSPL



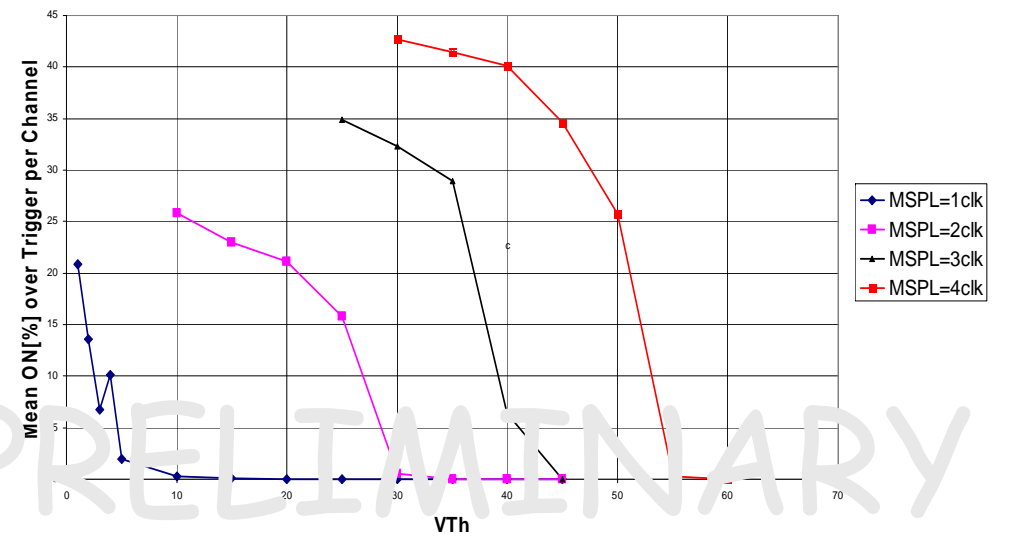
## Internal Strips - Threshold Scand vs MSPL



## PS13 Pads - Threshold Scand vs MSPL



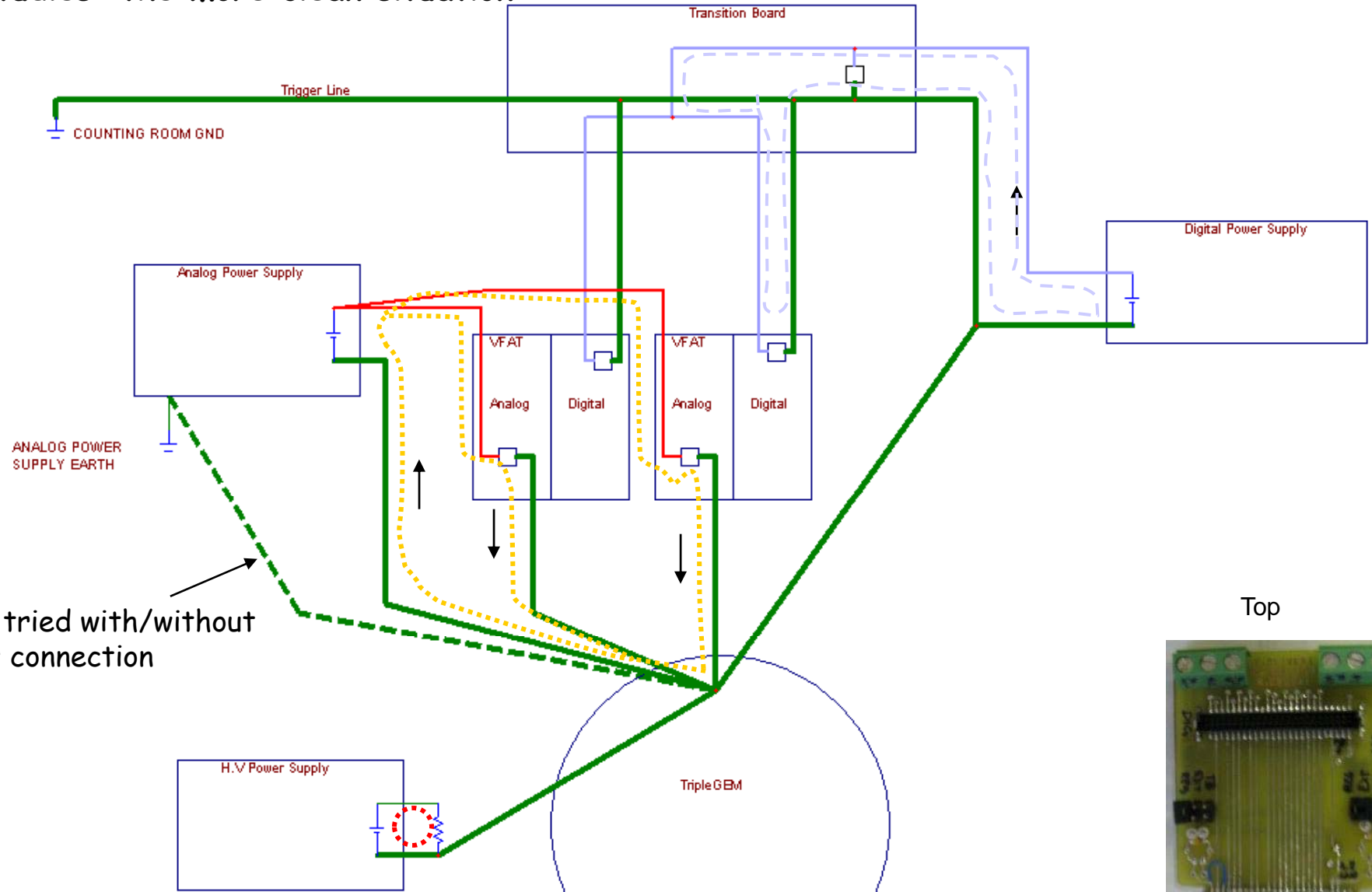
## PS12 Pads - Threshold Scand vs MSPL



PRELIMINARY



# Gnd Studies: the more clean situation



We tried with/without this connection



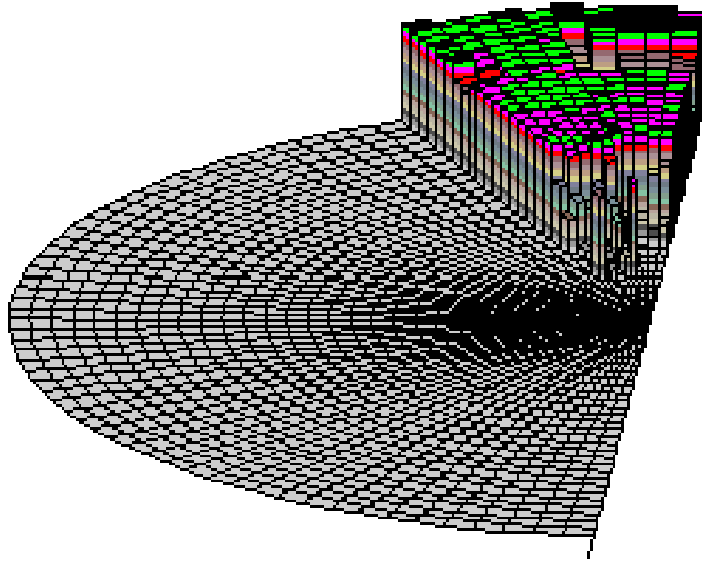
PRELIMINARY

- This MSPL noise dependence tested on:
  - Separated Digital/Analog power supply:
    - Only one gnd ref: trigger gnd from Counting Room
    - Another gnd ref in Test Beam Zone (directly connected on the GEM gnd plane )
  - Common Power Supply for Analog/Digital through Transition Board (Gnd only from Trigger line)
    - VFATs without/with gnd connection on the Hybrids<sup>(\*)</sup>

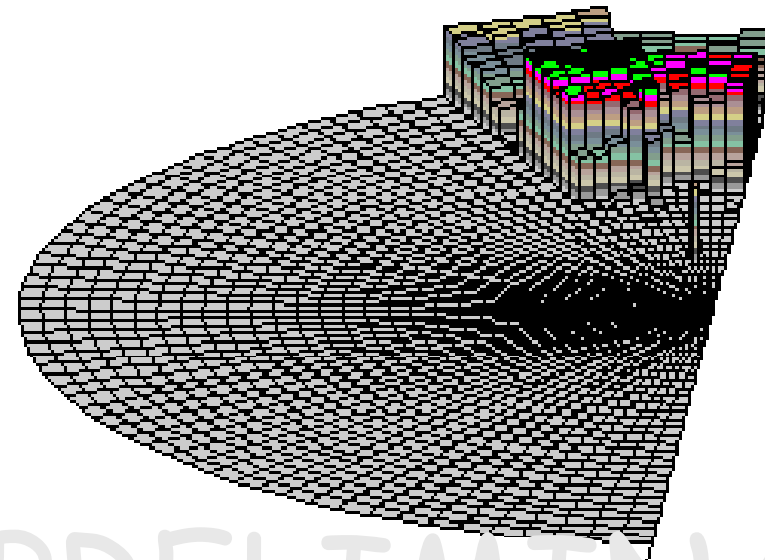
(\*) under study...we start just now the tests with the hybrids with this connection, it's seems that we have the same effect, but we have to investigate its magnitude.

PRELIMINARY

Measurements with the an/dig power supply directly from TB:  
It seems better..... Th=60



Th=100

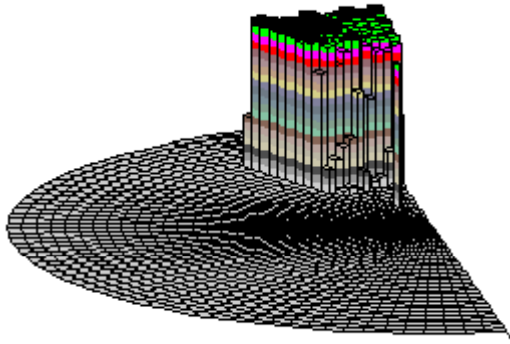


With power from TB  
Analog Digital together

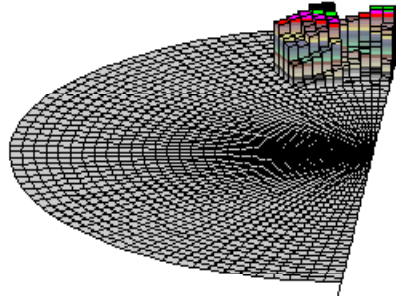
PRELIMINARY

Particles ..?..

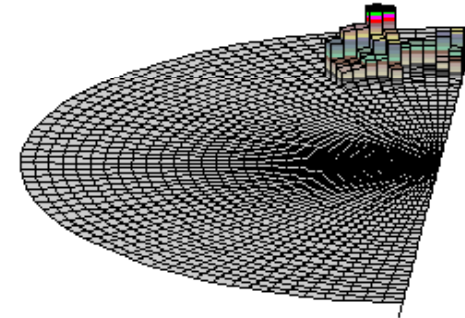
Th=90



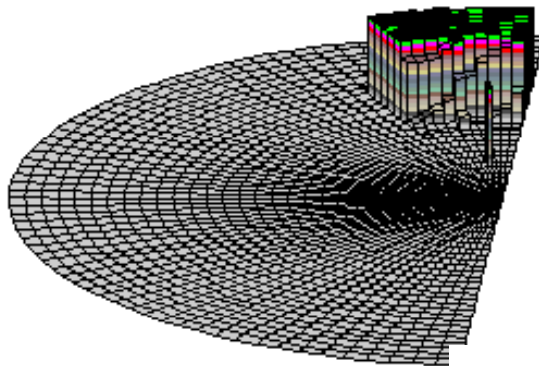
Th=150



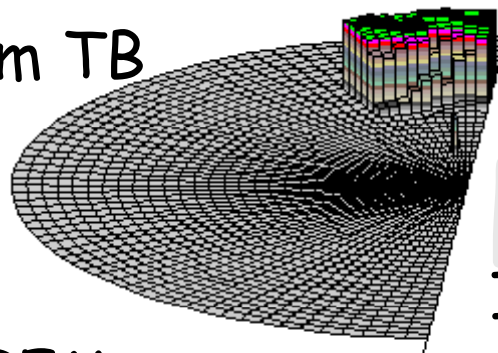
Th=160



Th=110

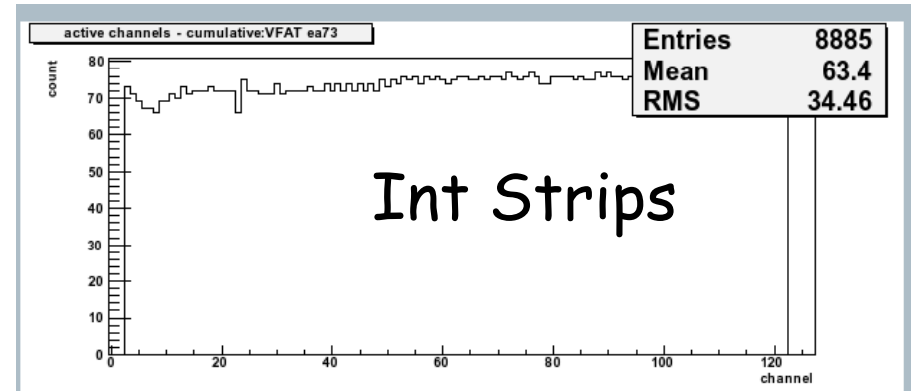


Th=130



With power from TB  
Analog Digital  
together

3.6kV on the GEM



PRELIMINARY

If strips are at high threshold  
no signal on pads!  
This is not possible!

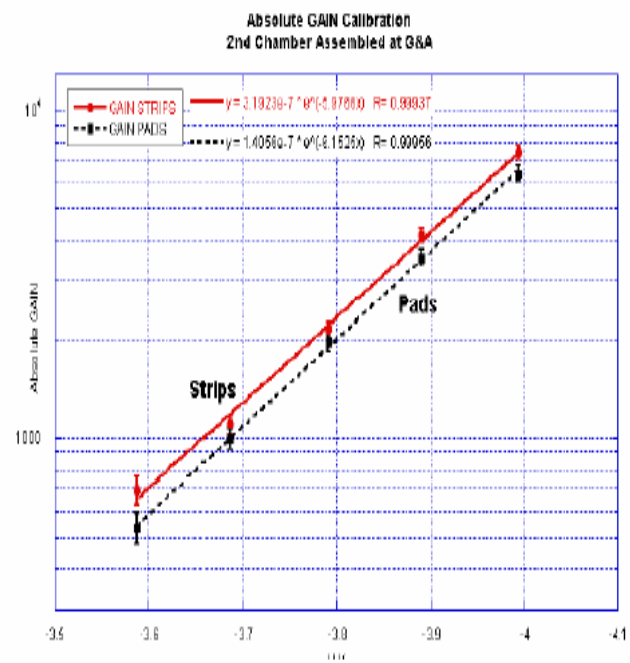
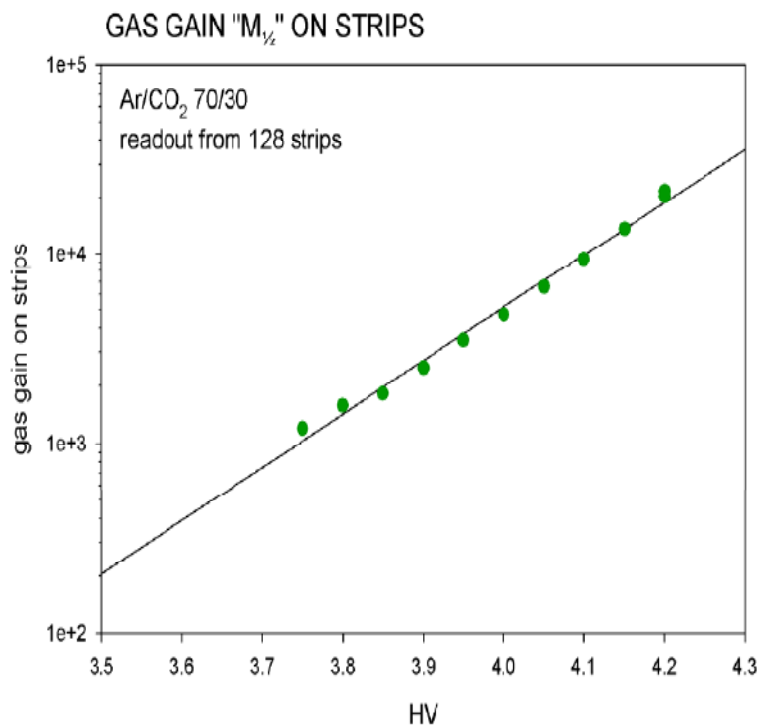


Figure 7: Absolute GAIN of strips and pads versus the TripleGEM H.V. for the second chamber assembled by G&A and tested in September. The GAIN is obtained using Eq.1.

PRELIMINARY

# COMPASS

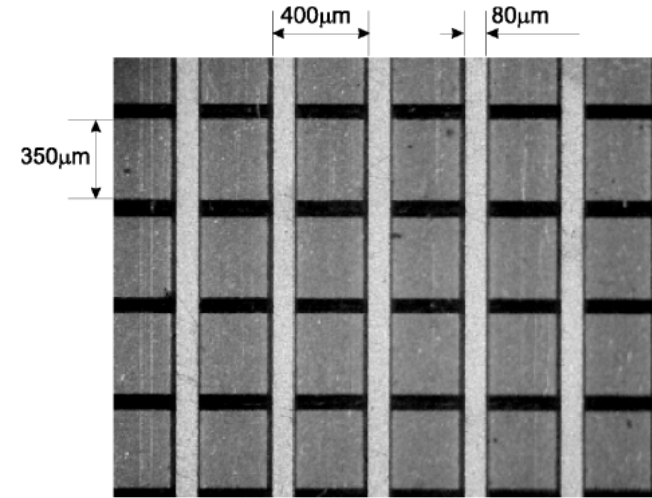
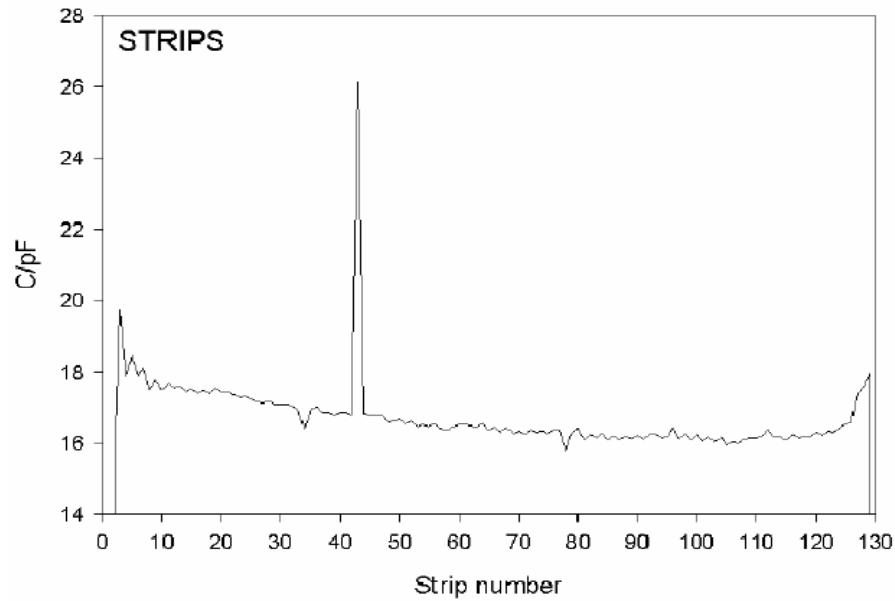


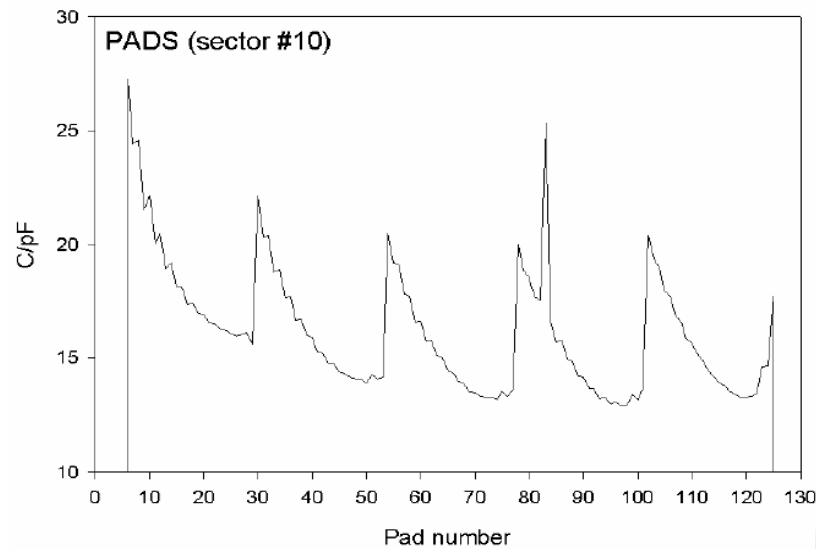
Fig. 7. Microscope photograph of the 2-D readout structure.

$$C \sim 20 \text{ pF}$$

$$\text{Noise} \sim 400 e^- + 40/60 e^- / \text{pF}$$

$$\text{Noise} \sim 400 e^- \quad \sigma \sim 1 \text{ bin}$$

$$\sim 1600 e^- \quad \sigma \sim 4 \text{ bin}$$



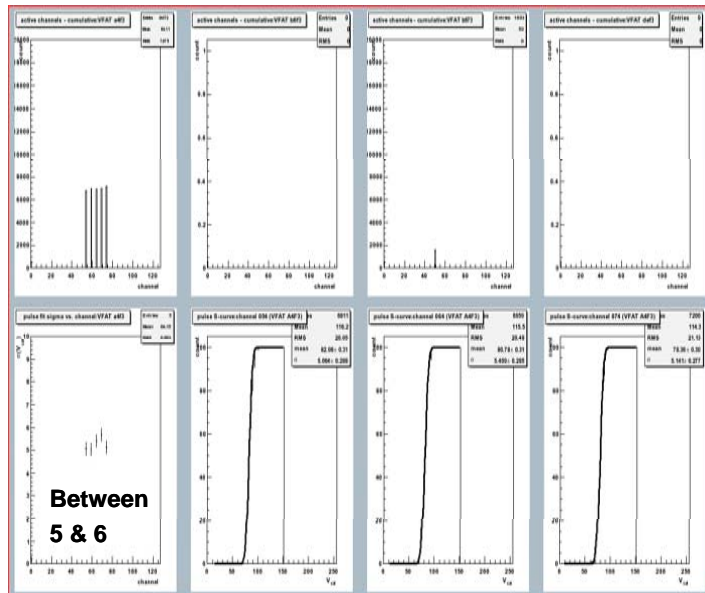
PRELIMINARY

Noise  $\sim 400e^- + 40/60 e^-/pF$

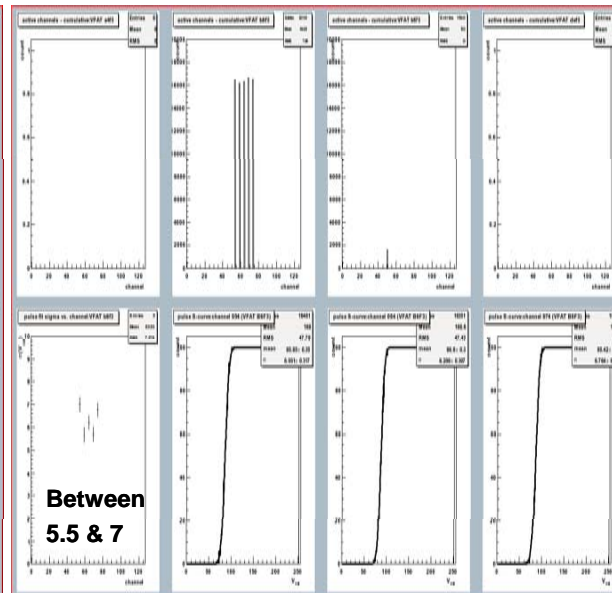
$\sigma \sim 1\text{bin} + 1.5\text{bin}/pF$

Noise  $\sim 400e^-$   $\sigma \sim 1$  bin VFAT alone  
 $\sim 1600e^-$   $\sigma \sim 4$  bin

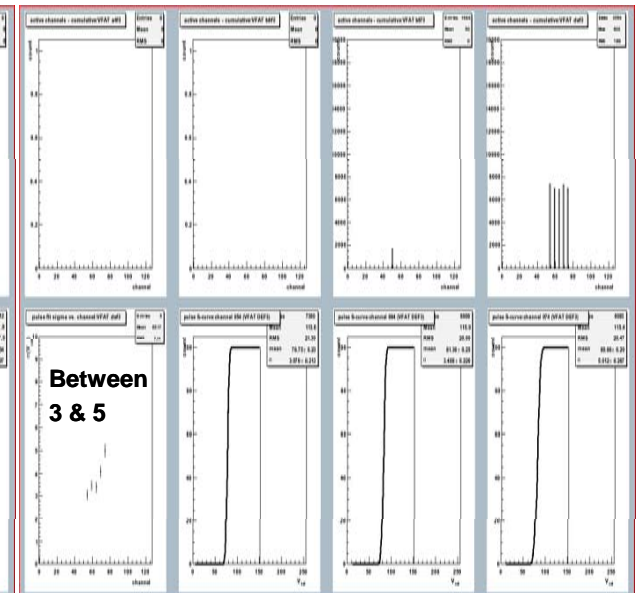
### INTERNAL STRIPS



### EXTERNAL STRIPS



### PADS



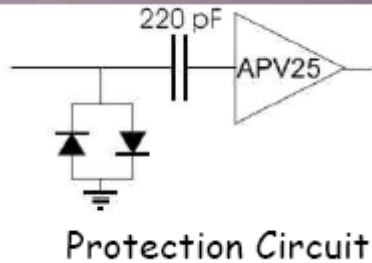
Source: Generic scan/tmp/T2/runT2\_300663.dat

Source: Generic scan/tmp/T2/runT2\_300657.dat

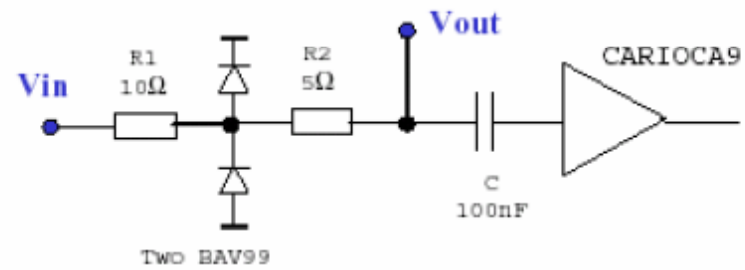
Source: Generic scan/tmp/T2/runT2\_300664.dat

$\sigma \sim 7\text{bin} \rightarrow \sim 40pF$

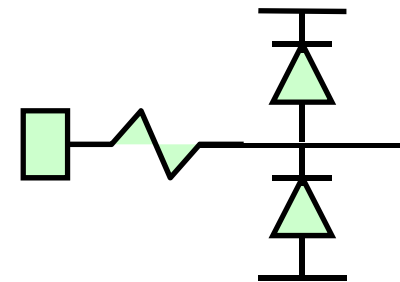
PRELIMINARY



### Protection Circuit for GEM Detector



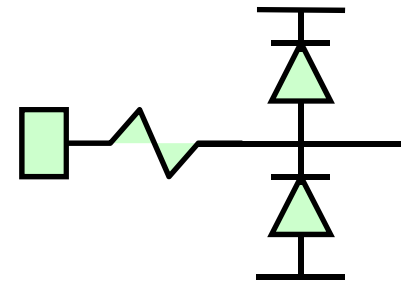
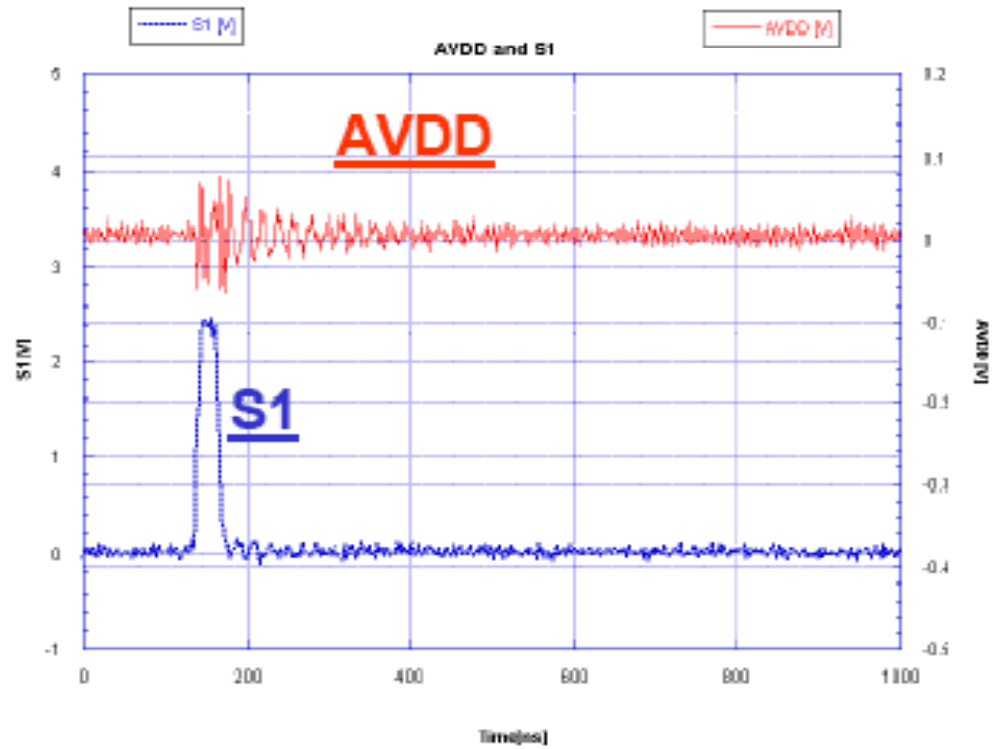
VFAT



ability of the system. It consists of a pair of inverted high-speed signal diodes (BAV99) connected to ground, and a coupling capacitor ( $C_c = 220 \text{ pF}$ ) to avoid leakage currents into the amplifier, as shown in Fig. 8. The potential of the anode strips is

PRELIMINARY





PRELIMINARY

# Possible tests for the signal/noise

- We will try to use a chip without protection
- If it is possible we can try to inject charge directly on the readout board (strips/pads).
- Come back in the Nov06 test beam setup.

PRELIMINARY