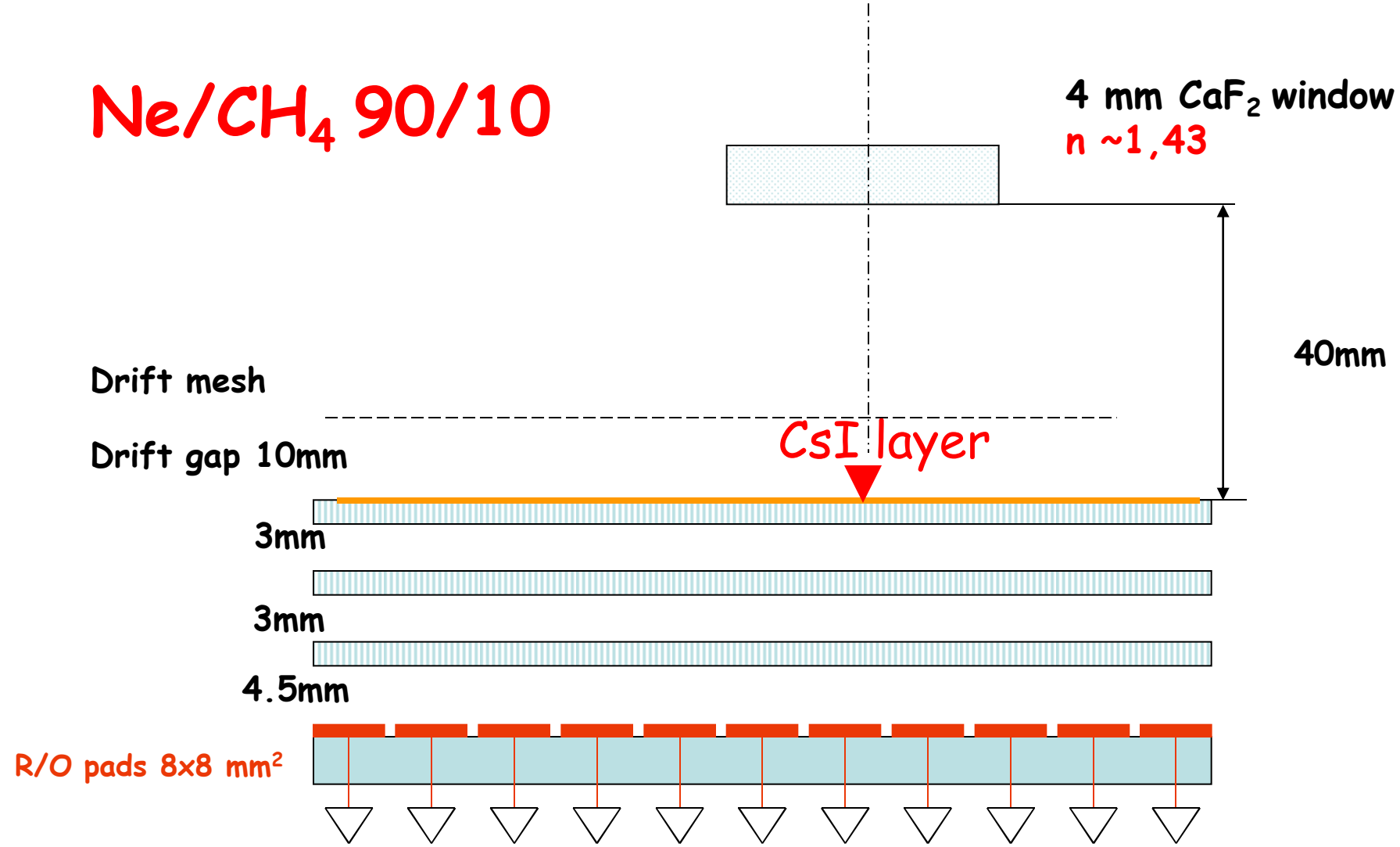
# Detection of Cherenkov light with CsI coated triple TGEM

P. Martinengo – CERN PH/DT

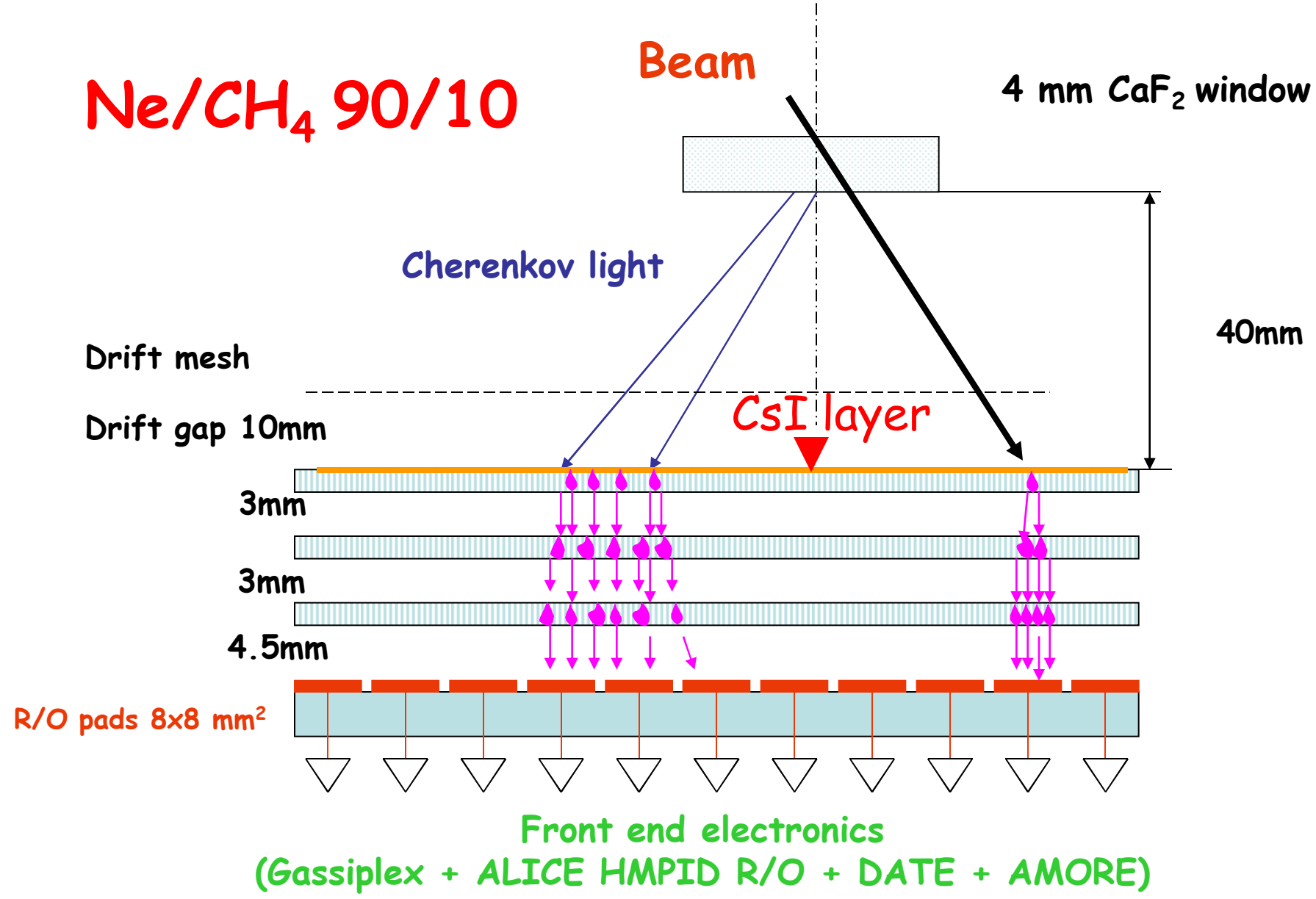
# Prototype layout

## $Ne/CH_4$ 90/10



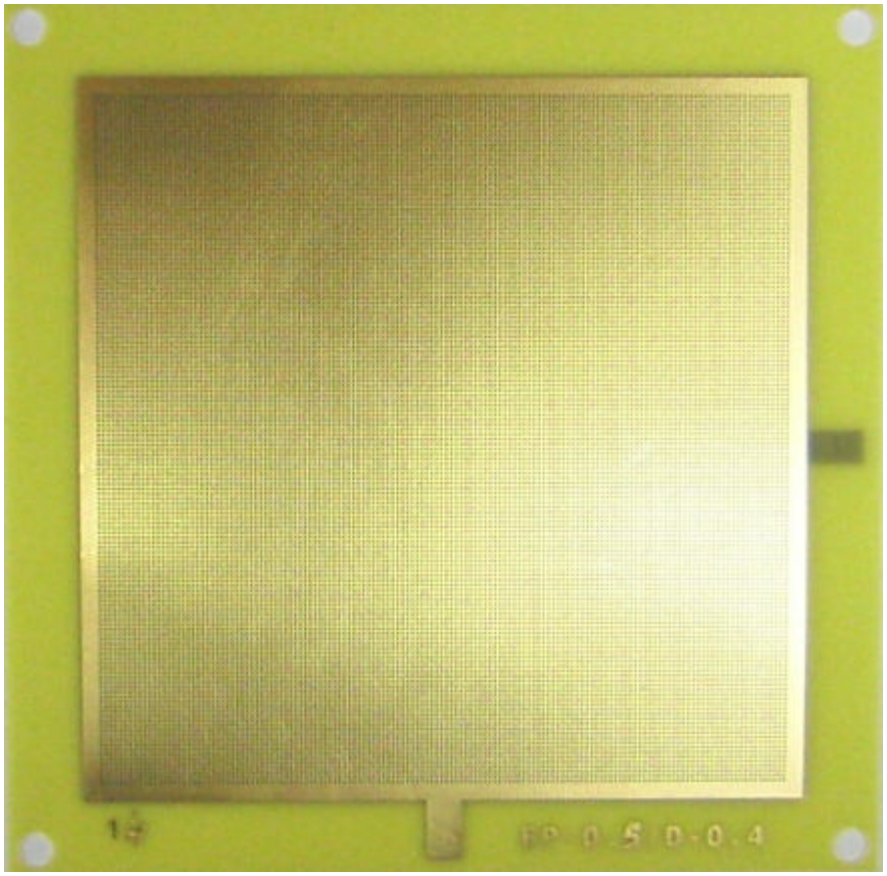

Front end electronics
(Gassiplex + ALICE HMPID R/O + DATE + AMORE)

# Prototype layout

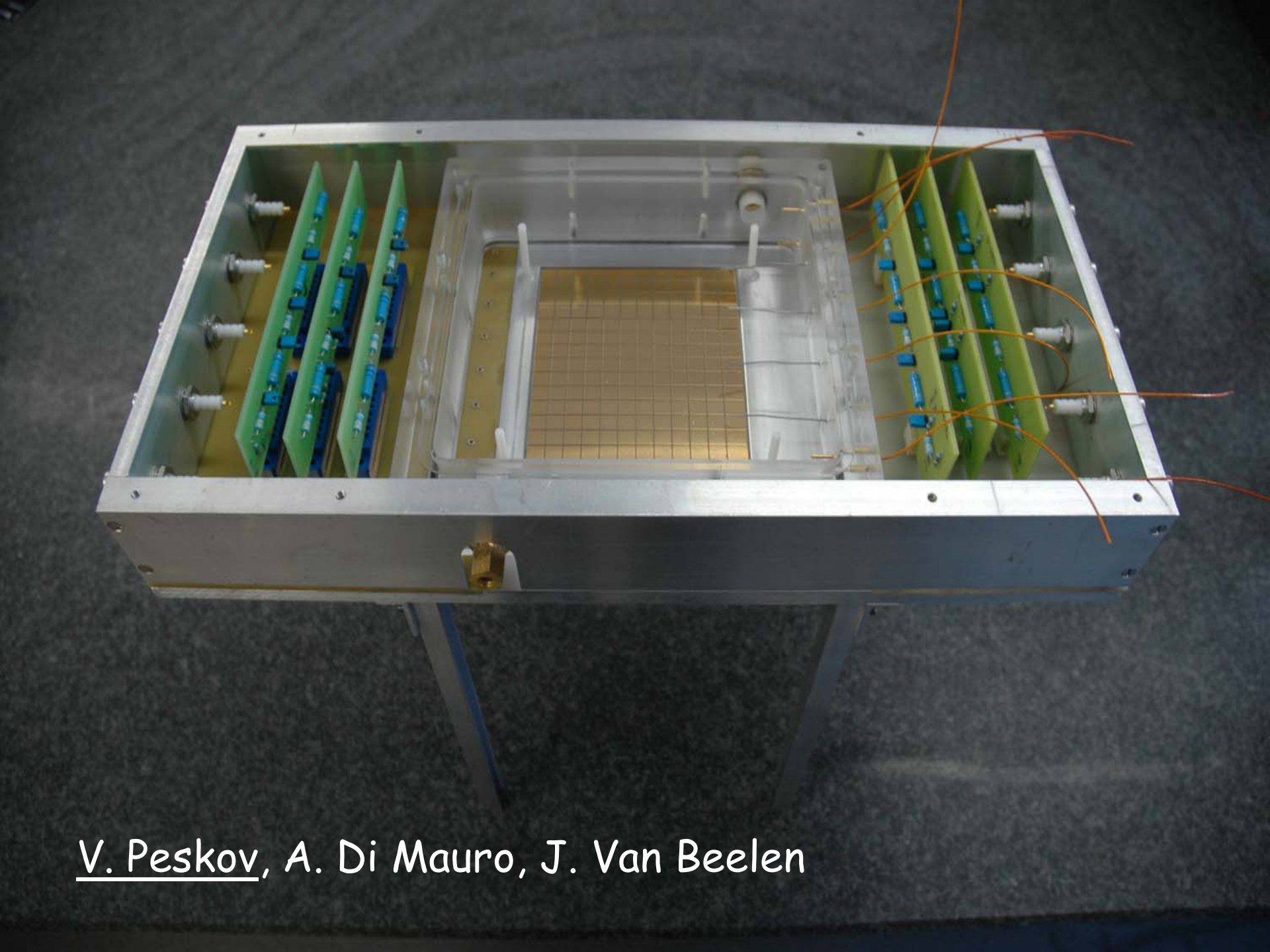


# TGEM

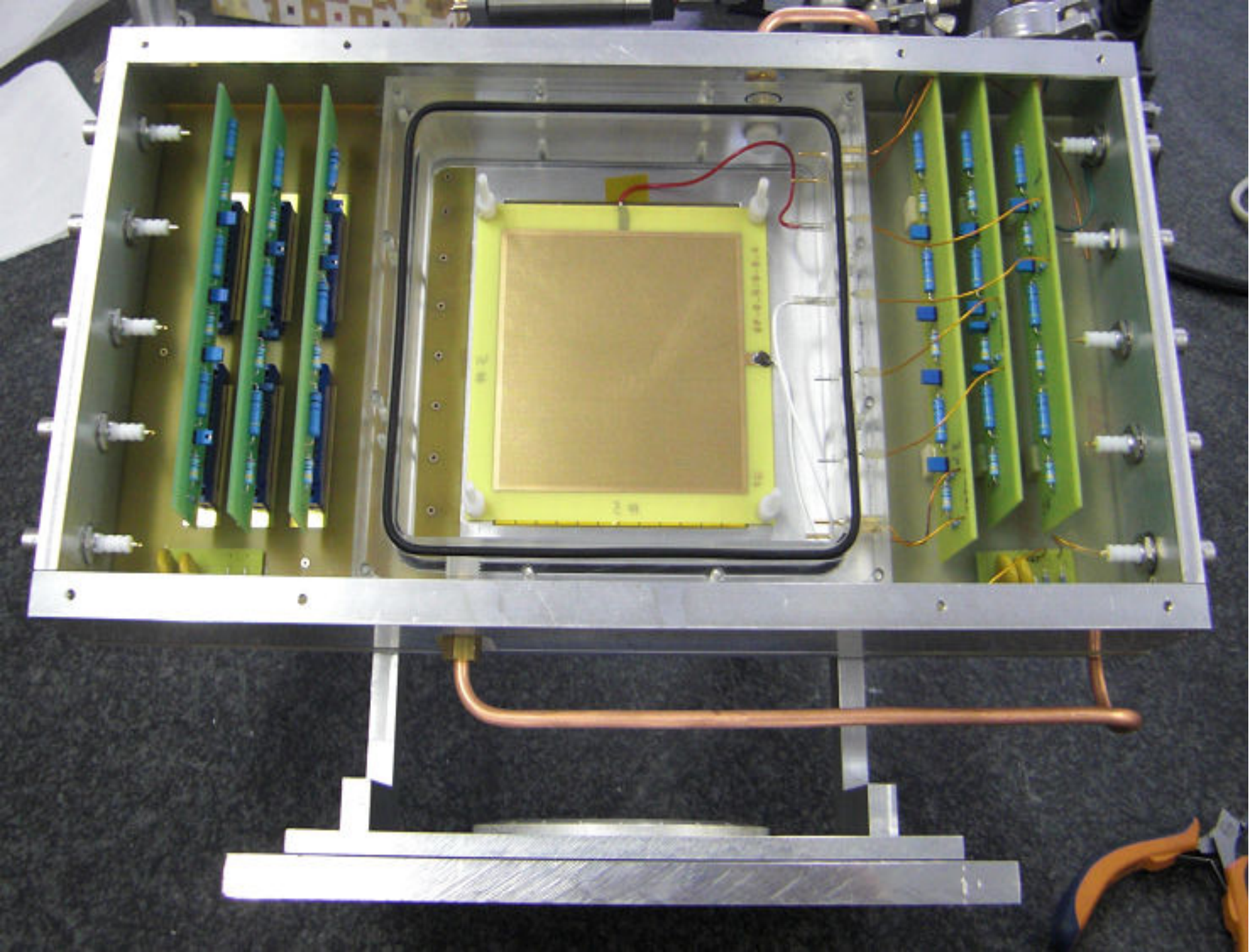
Thickness: 0.45 mm
Hole d: 0.4 mm
Pitch: 0.8 mm

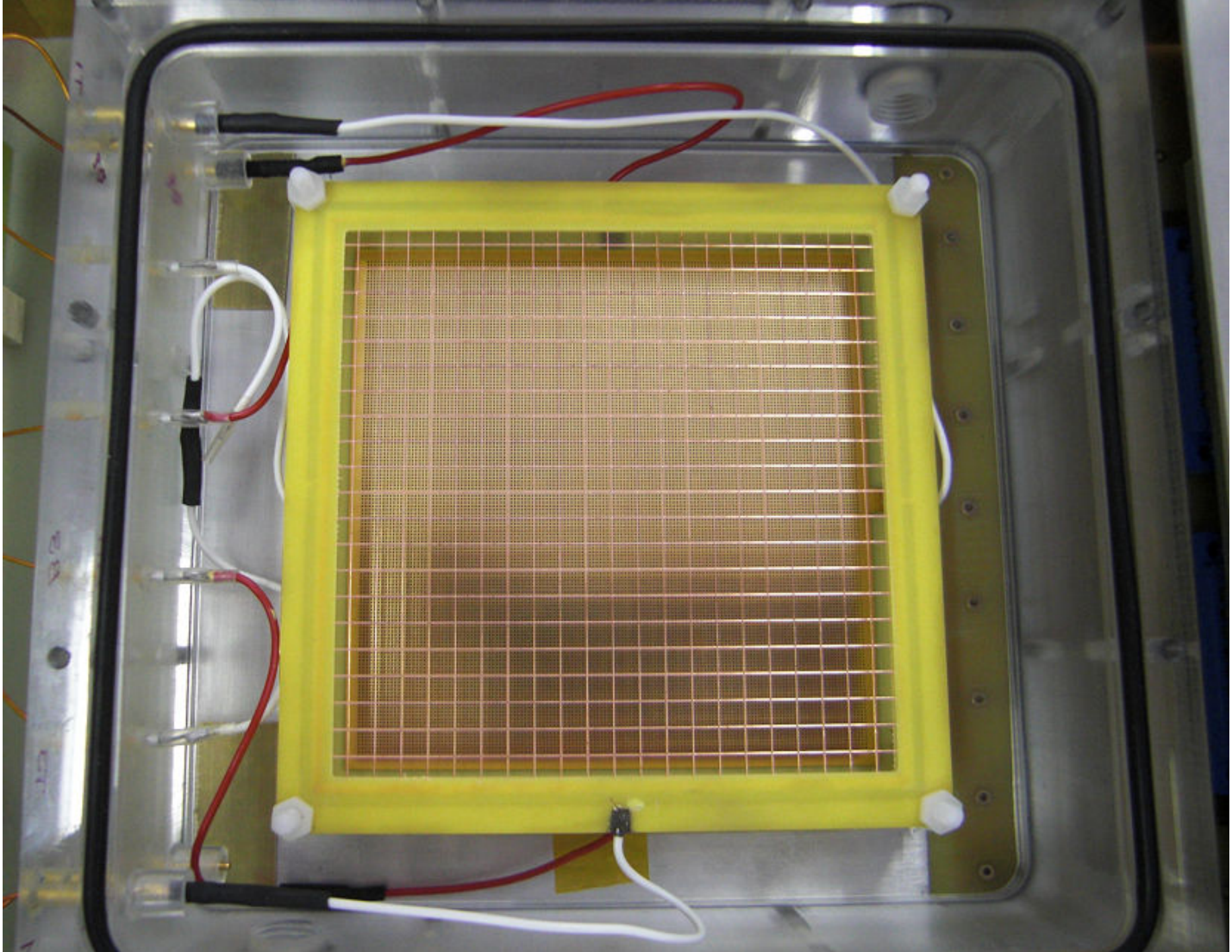


100mm

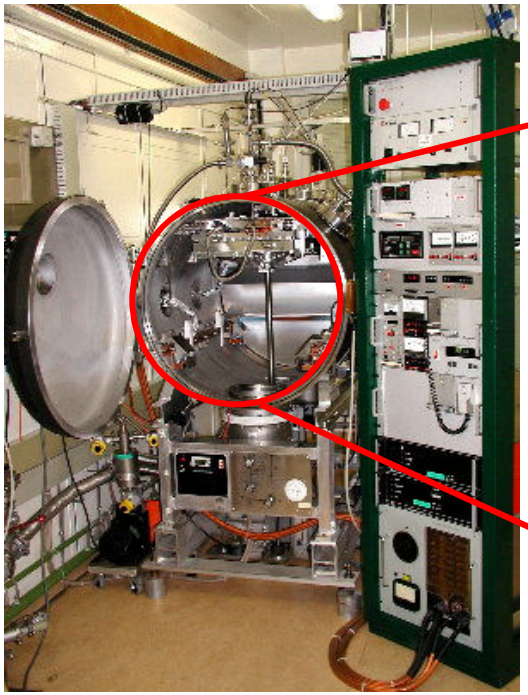


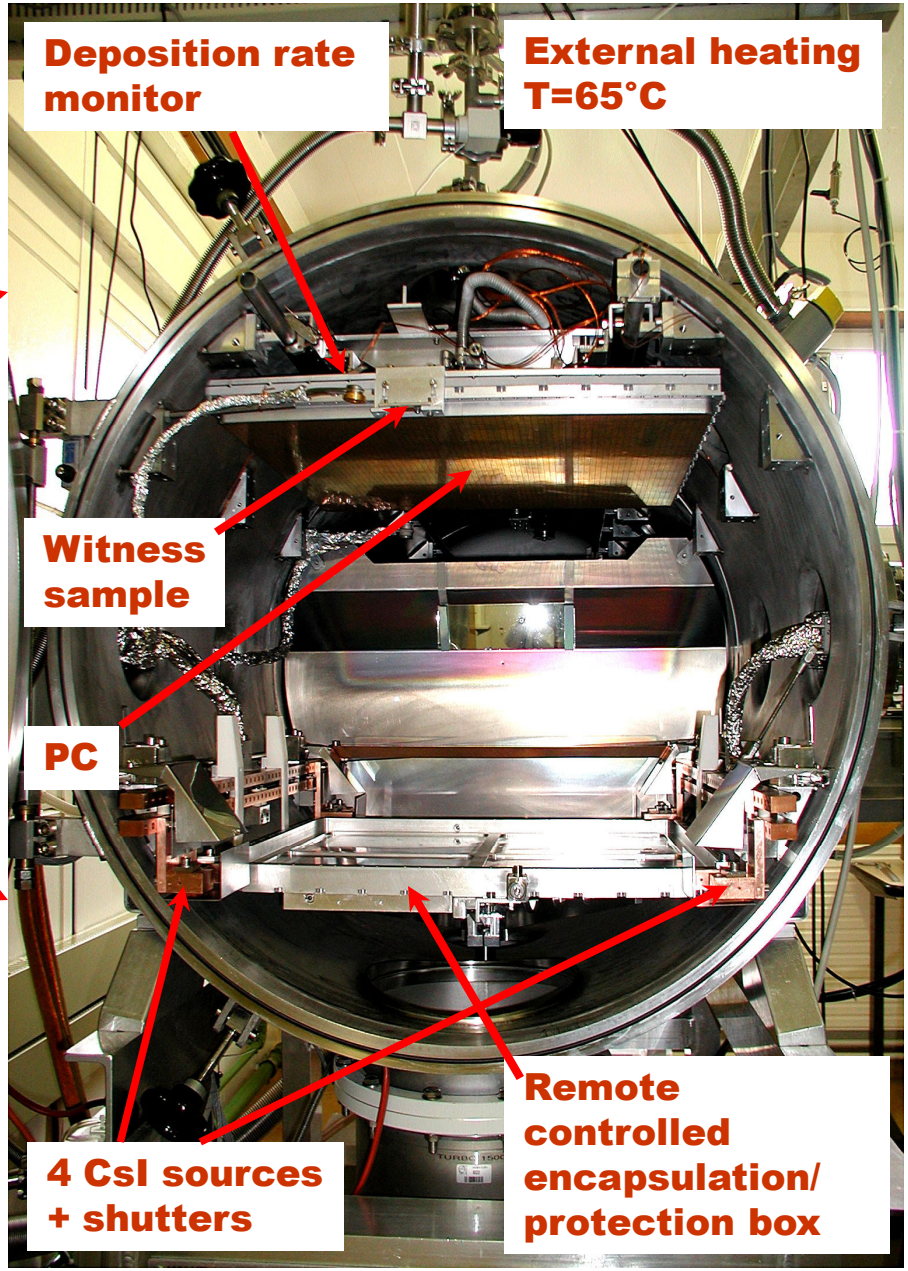
V. Peskov, A. Di Mauro, J. Van Beelen





# CERN CsI deposition plant (bldg 3 cleanroom)

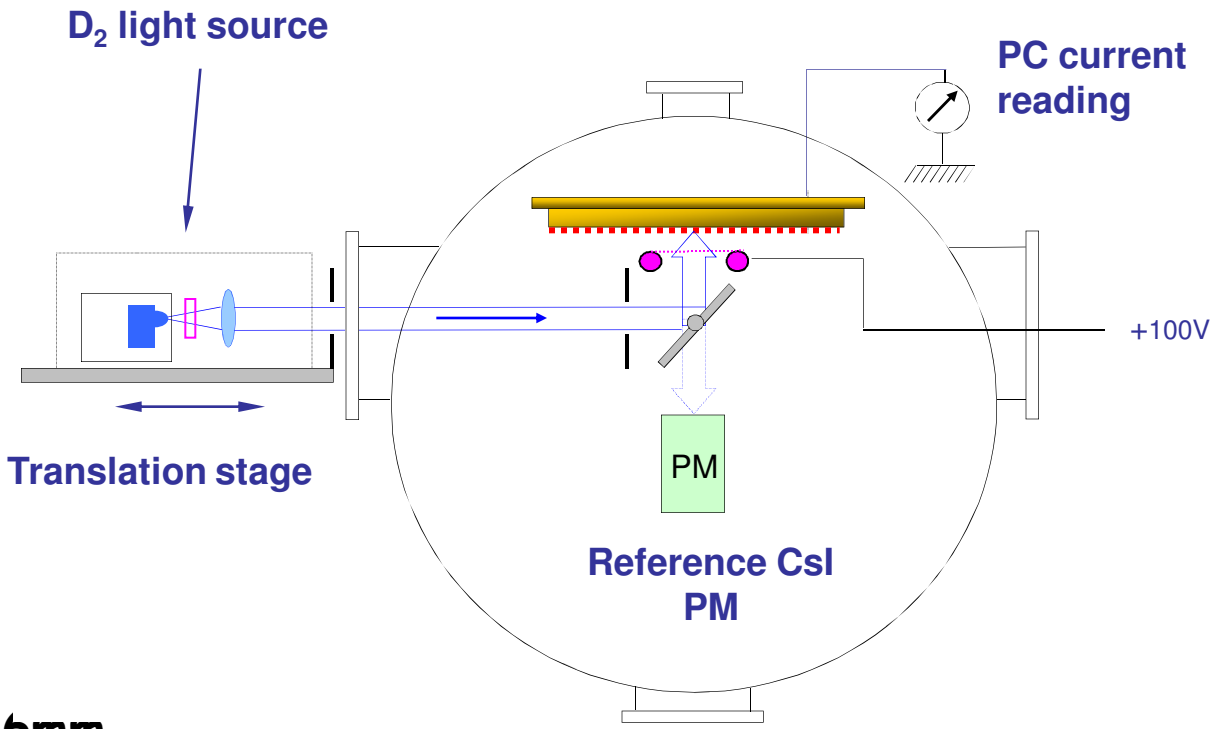





A. Braem, M. Van Stenis, C. David
CERN PH/DT

# Quality control: VUV-Scanner

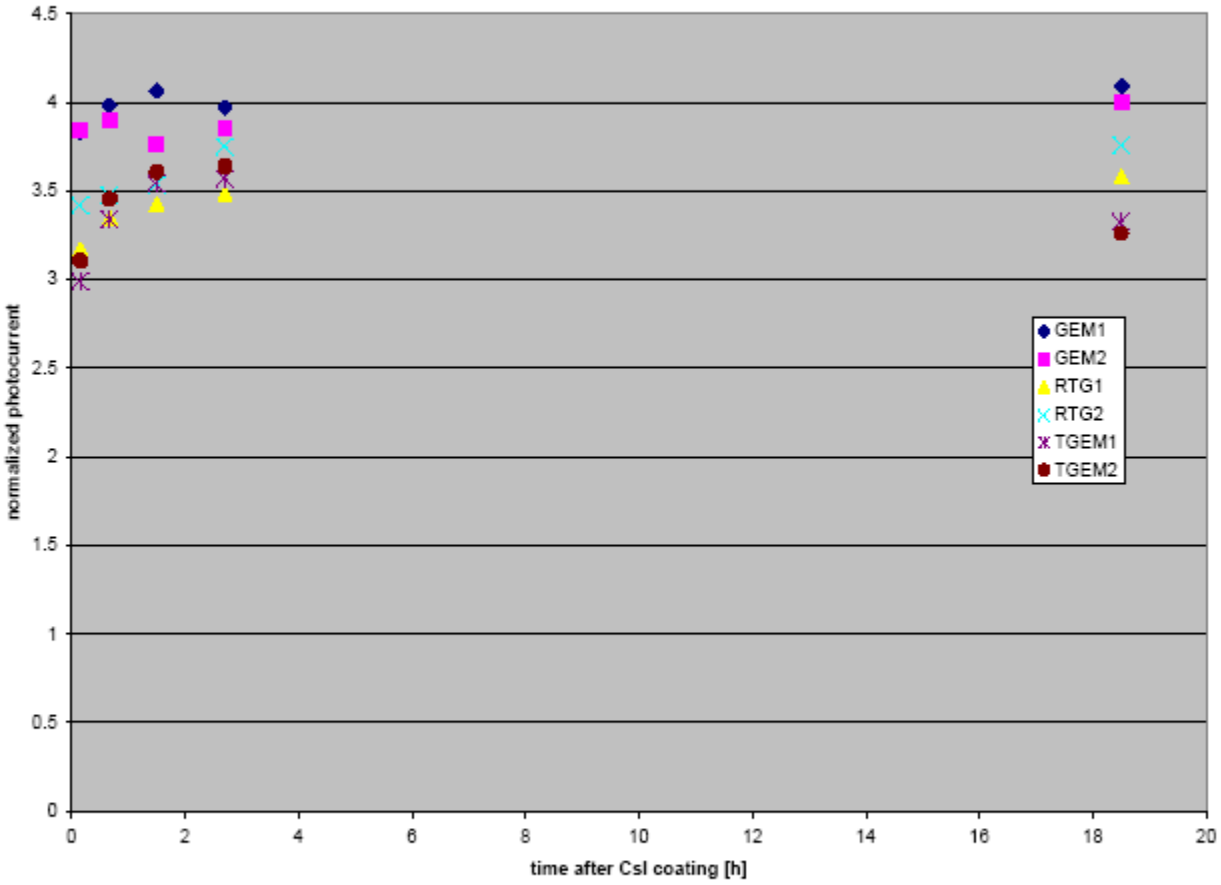
## Measurement of the photocurrent on the cathode:



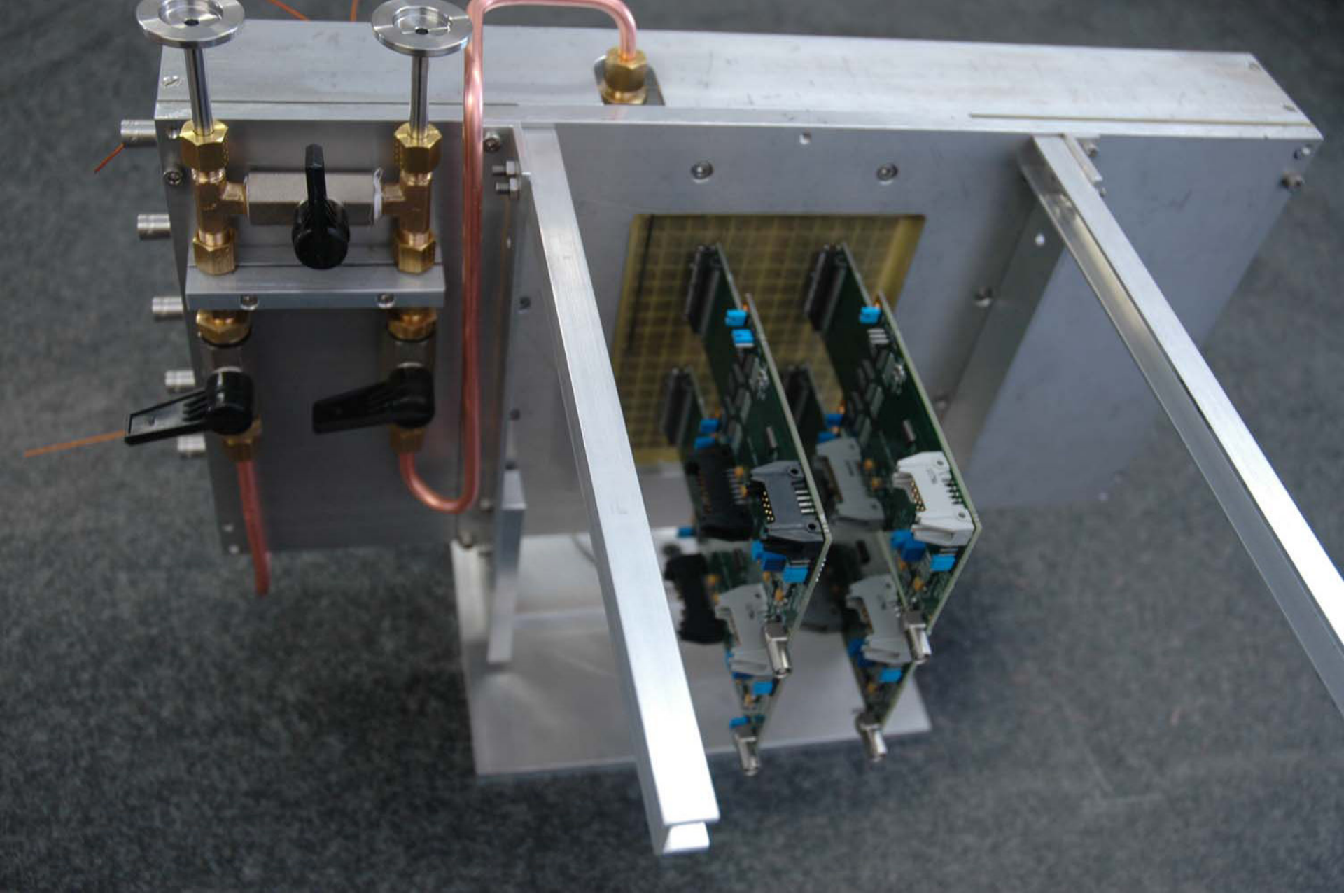

diameter of UV spot: 16mm
photo-e- extracted from PC by anode bias
reference measurement on a photomultiplier by means of rotative mirror

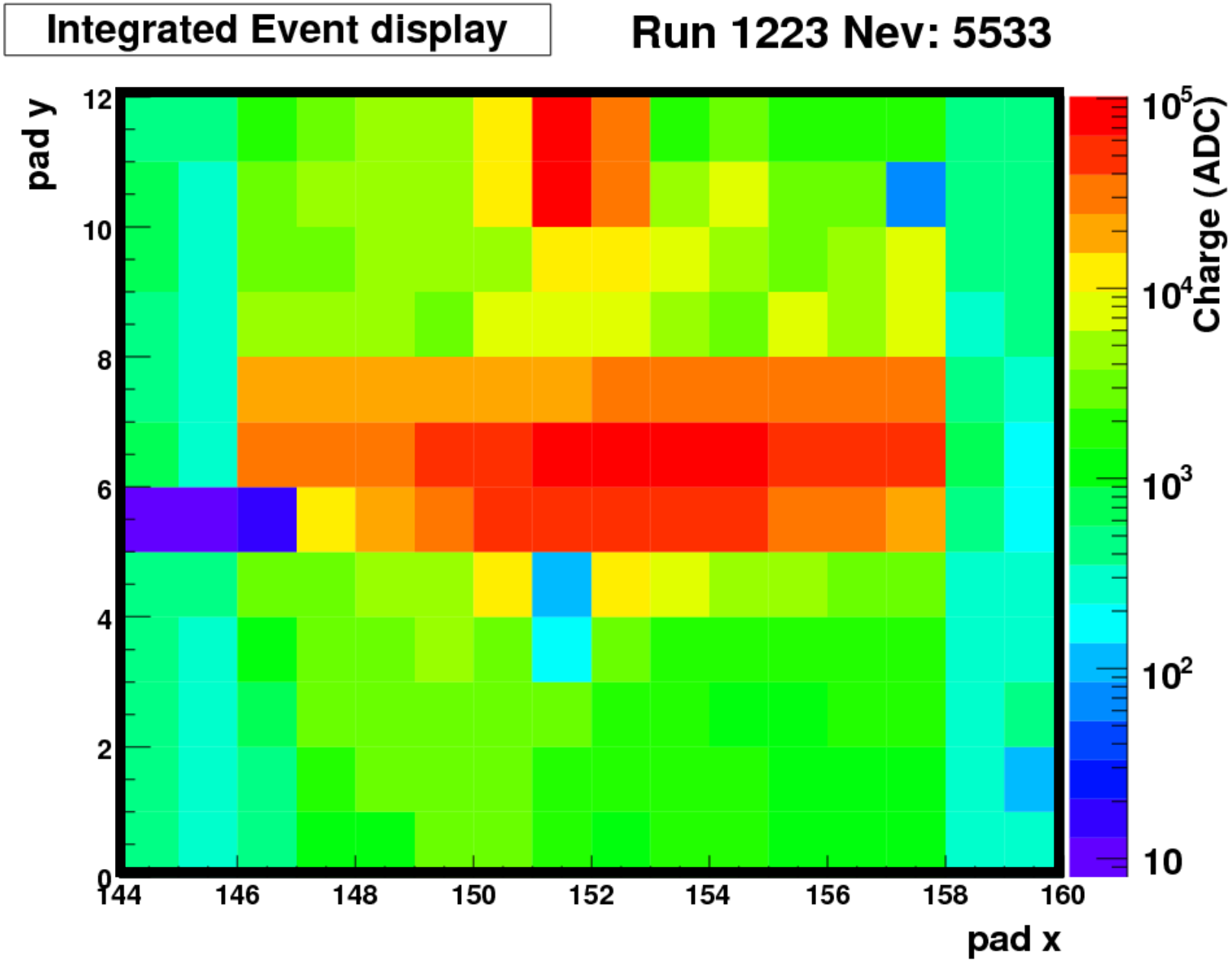
# CsI quality control

Normalized photocurrent

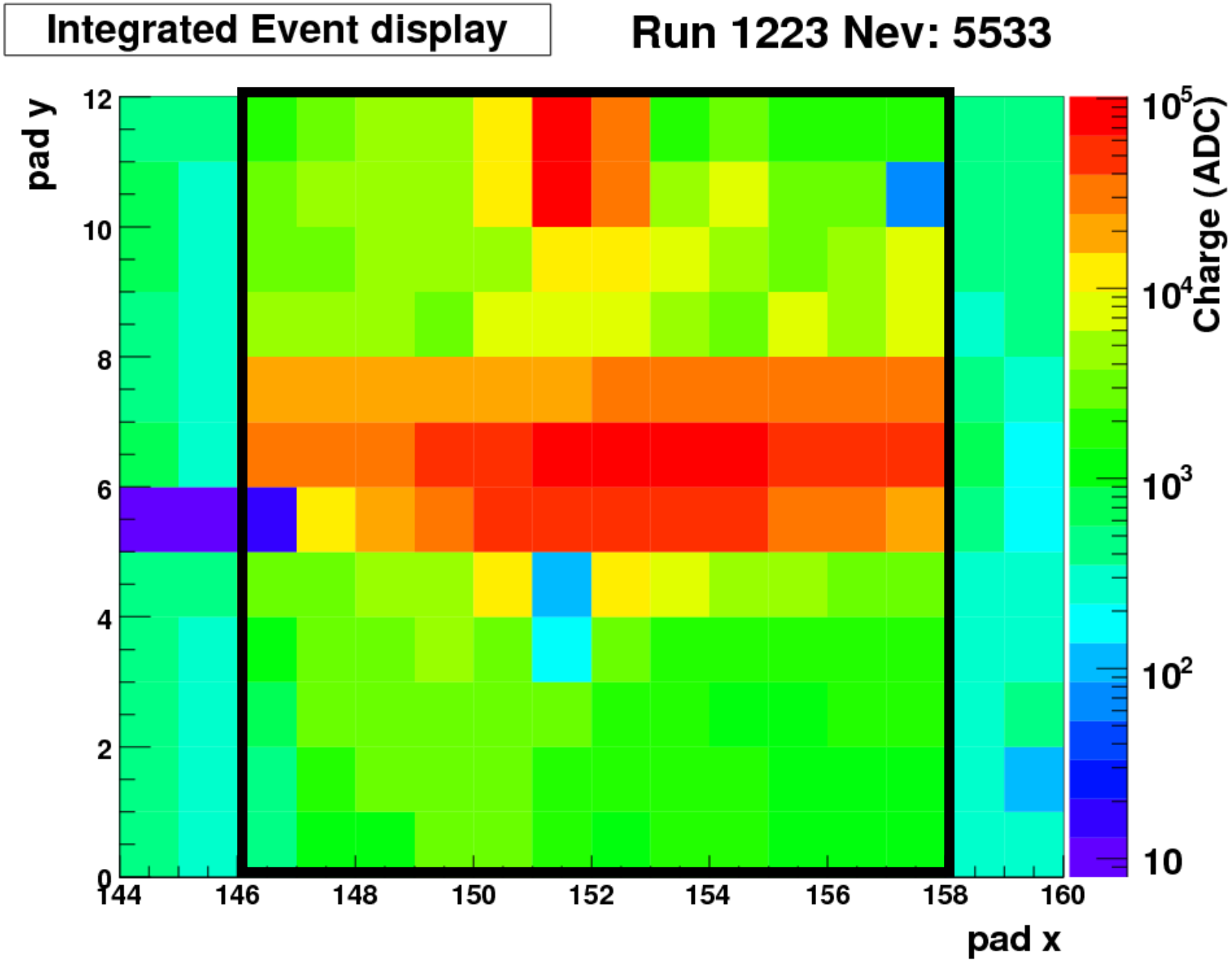



Time after coating [h]

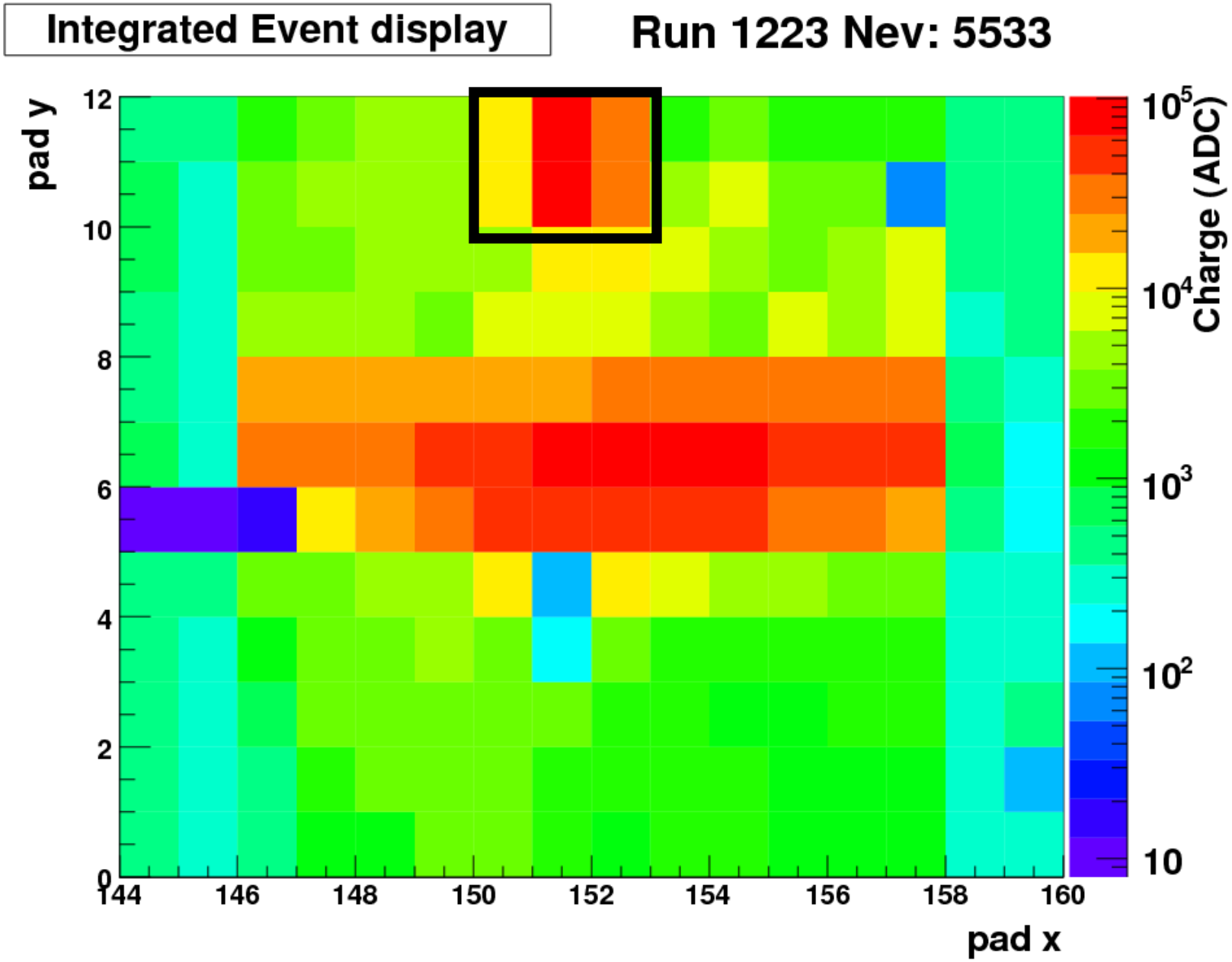




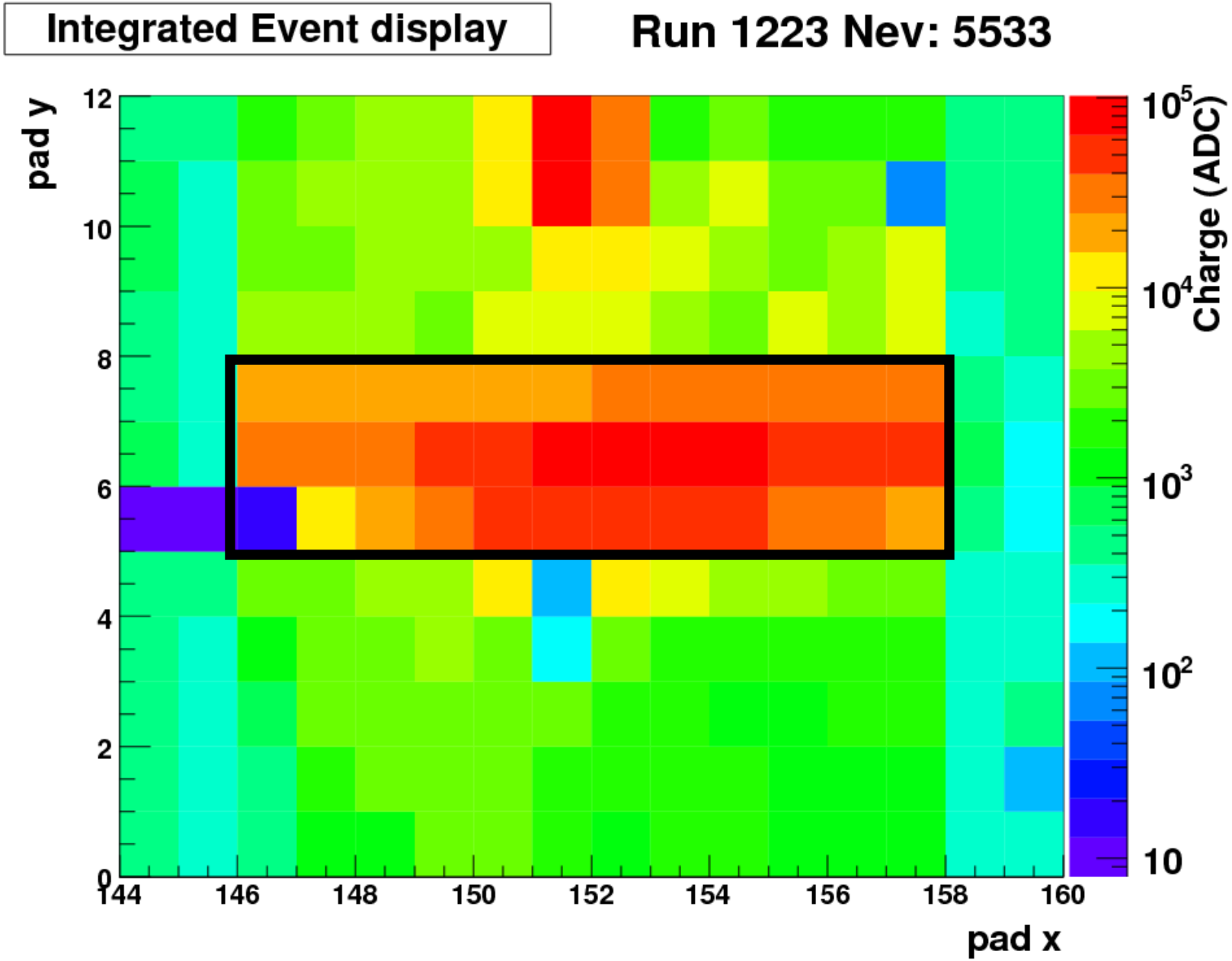

Anode area, 16x12 pads, 8x8 $mm^2$



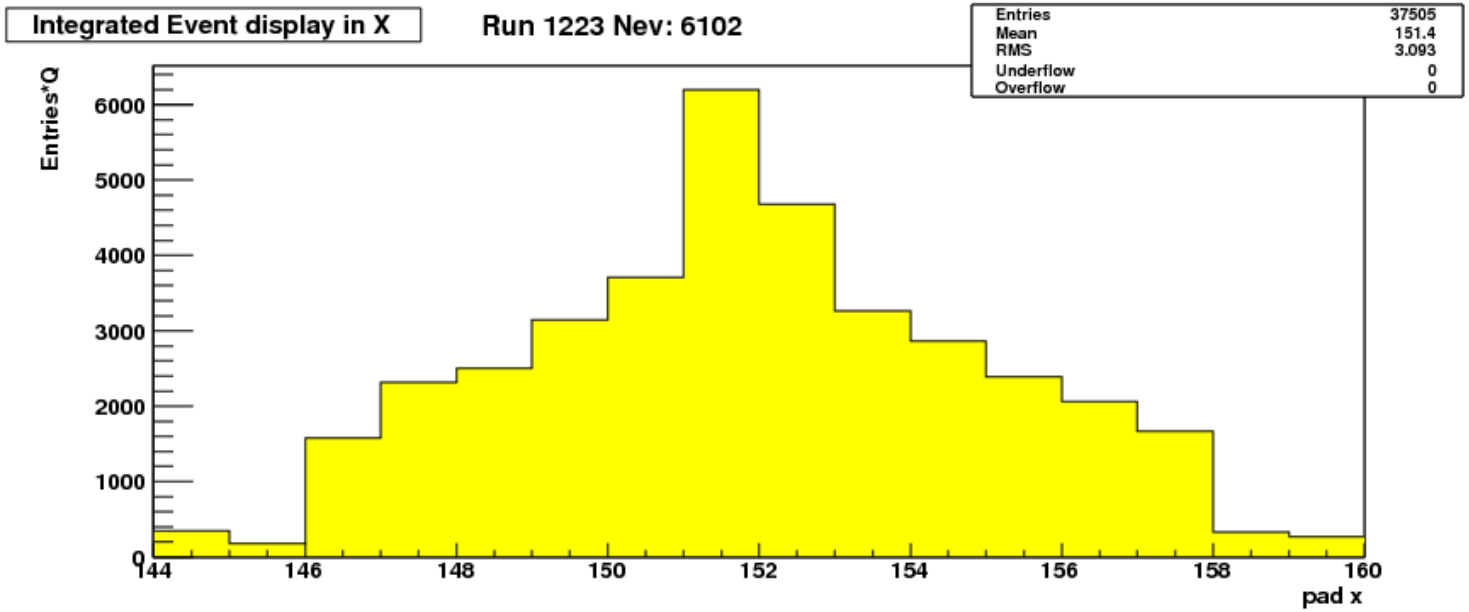

TGEM active area, 12x12 pads

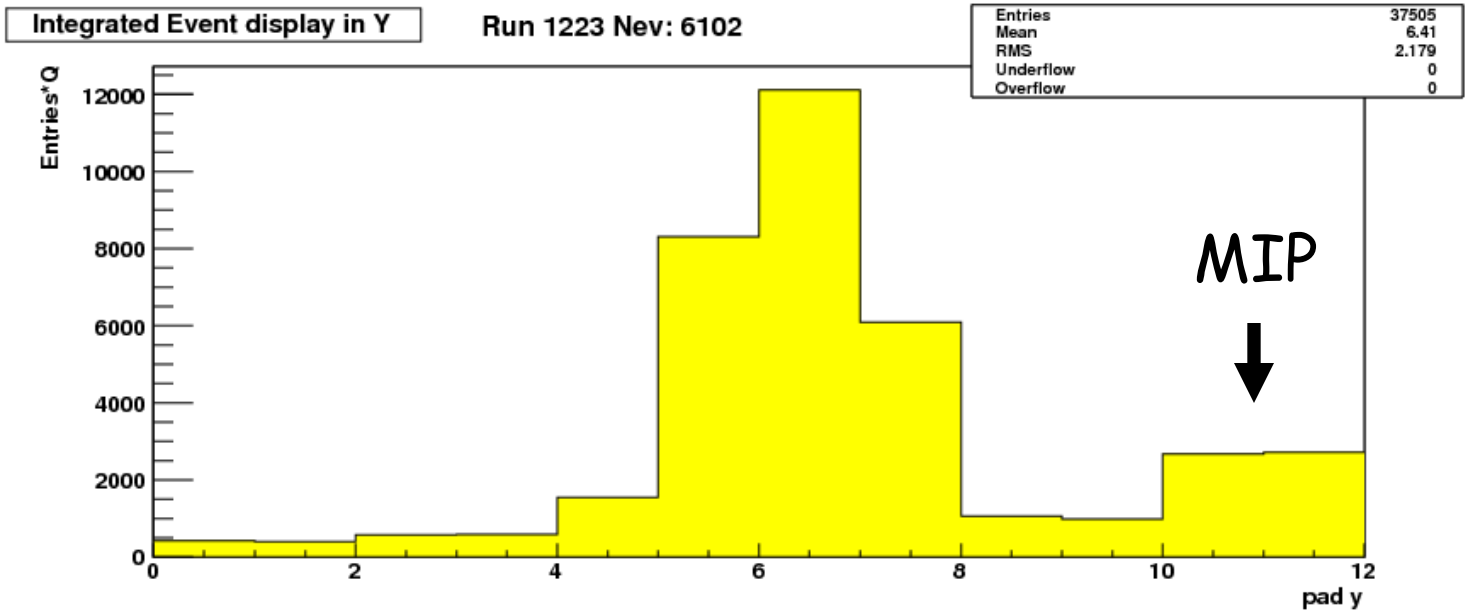

Integrated Event display
Run 1223 Nev: 5533
pad y
pad x
Charge (ADC)
0
2
4
6
8
10
12
144
146
148
150
152
154
156
158
160
10
$10^2$
$10^3$
$10^4$
$10^5$

MIP region

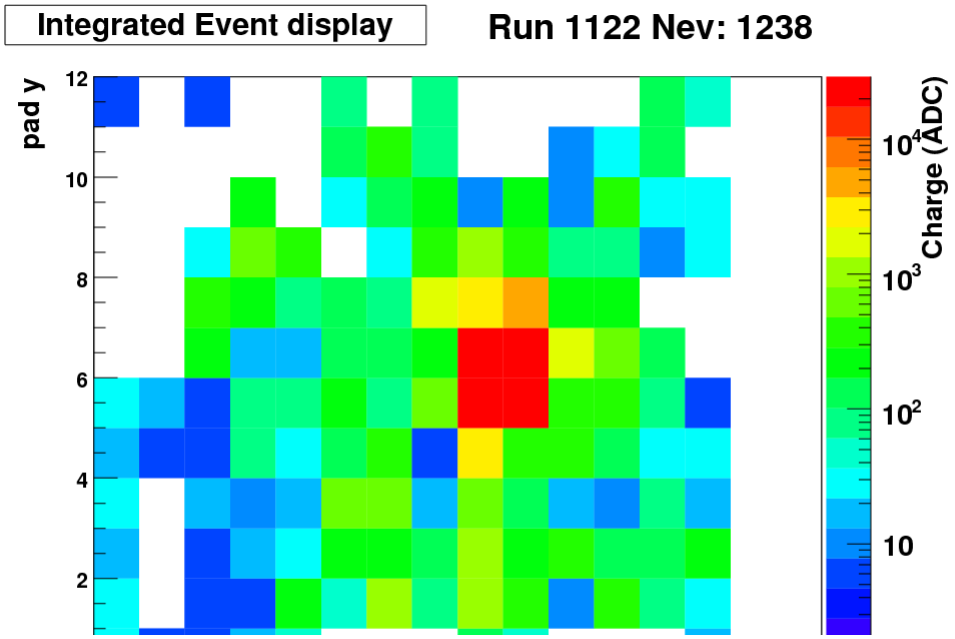


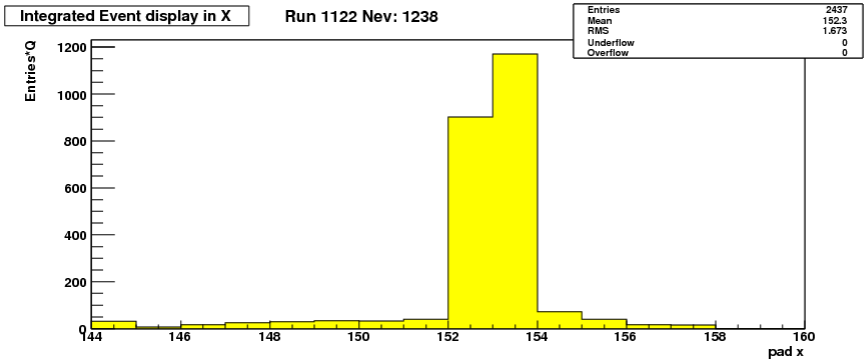

Photons region

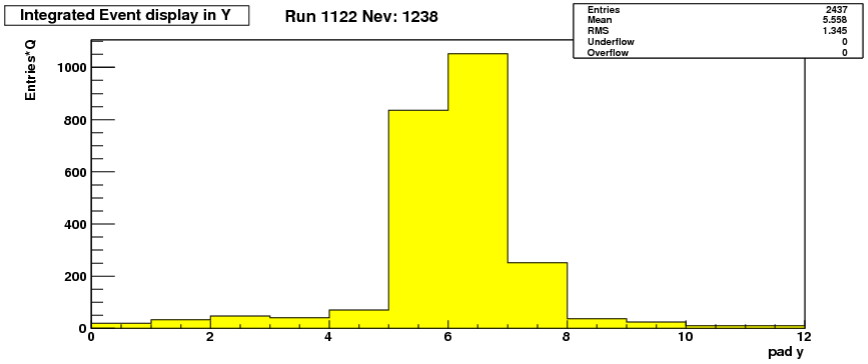

Integrated Event display in X
Run 1223 Nev: 6102
Entries 37505
Mean 151.4
RMS 3.093
Underflow 0
Overflow 0
Entries*Q
6000
5000
4000
3000
2000
1000
0
144
146
148
150
152
154
156
158
160
pad x


Integrated Event display in Y
Run 1223 Nev: 6102
Entries 37505
Mean 6.41
RMS 2.179
Underflow 0
Overflow 0
Entries*Q
12000
10000
8000
6000
4000
2000
0
0
2
4
6
8
10
12
pad y
MIP

Beam perpendicular

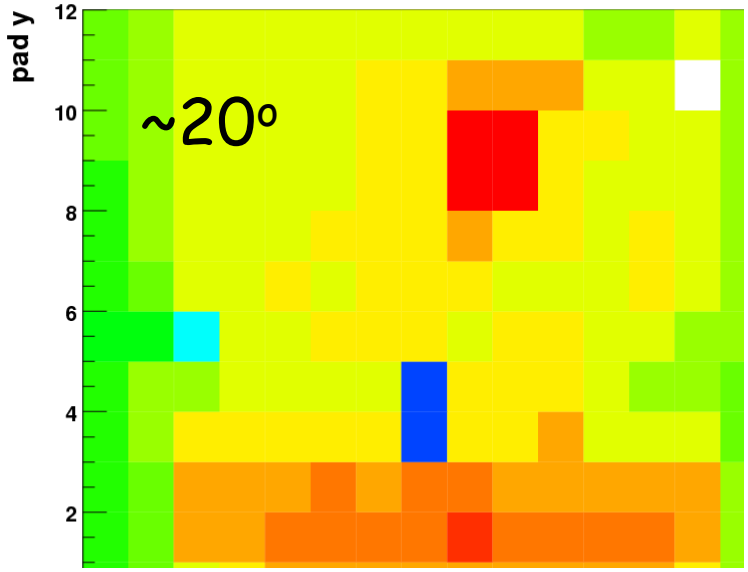


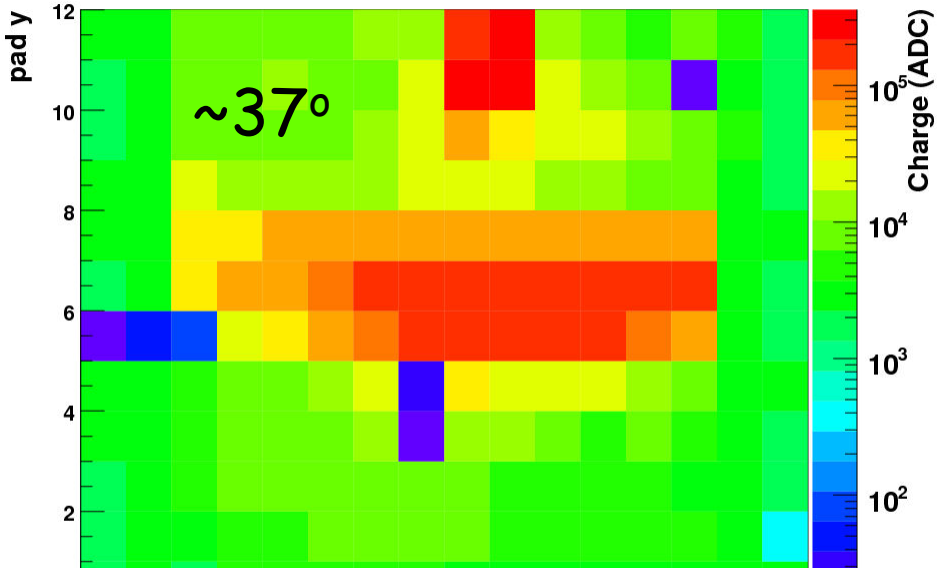
Integrated Event display

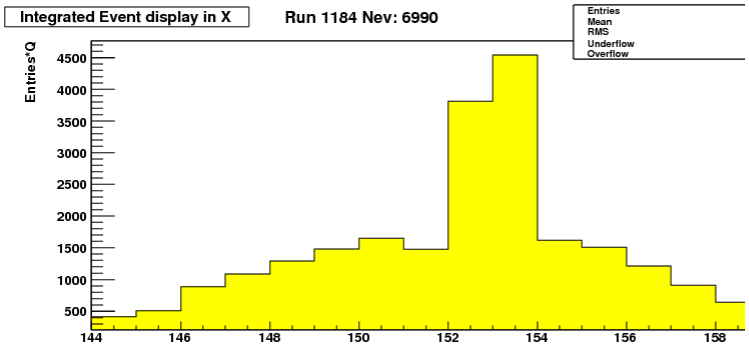
Run 1184 Nev: 6

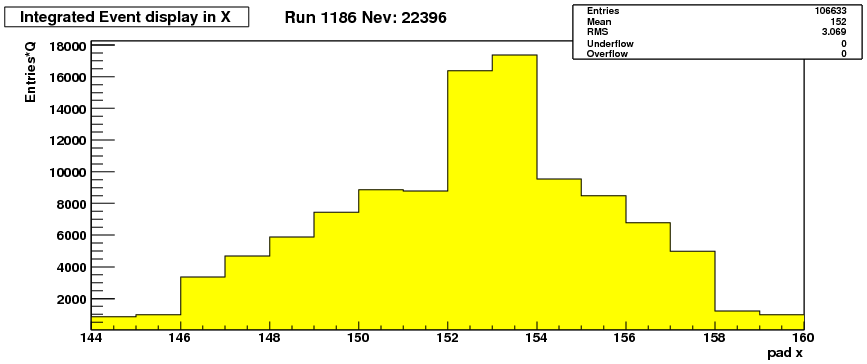


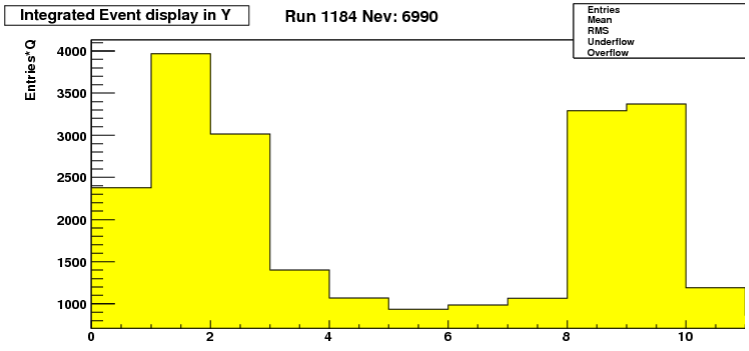

Integrated Event display

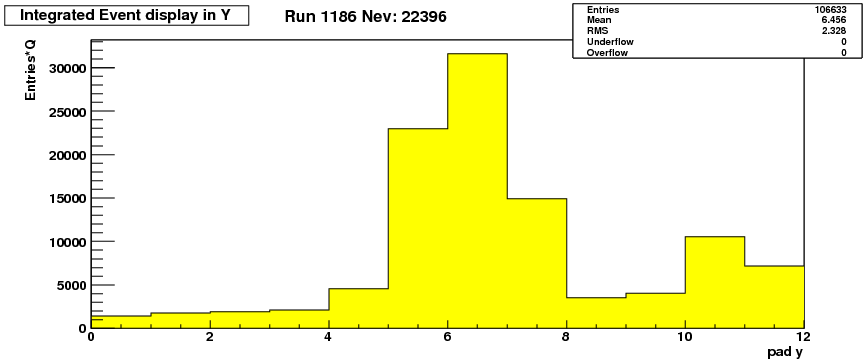
Run 1186 Nev: 22396



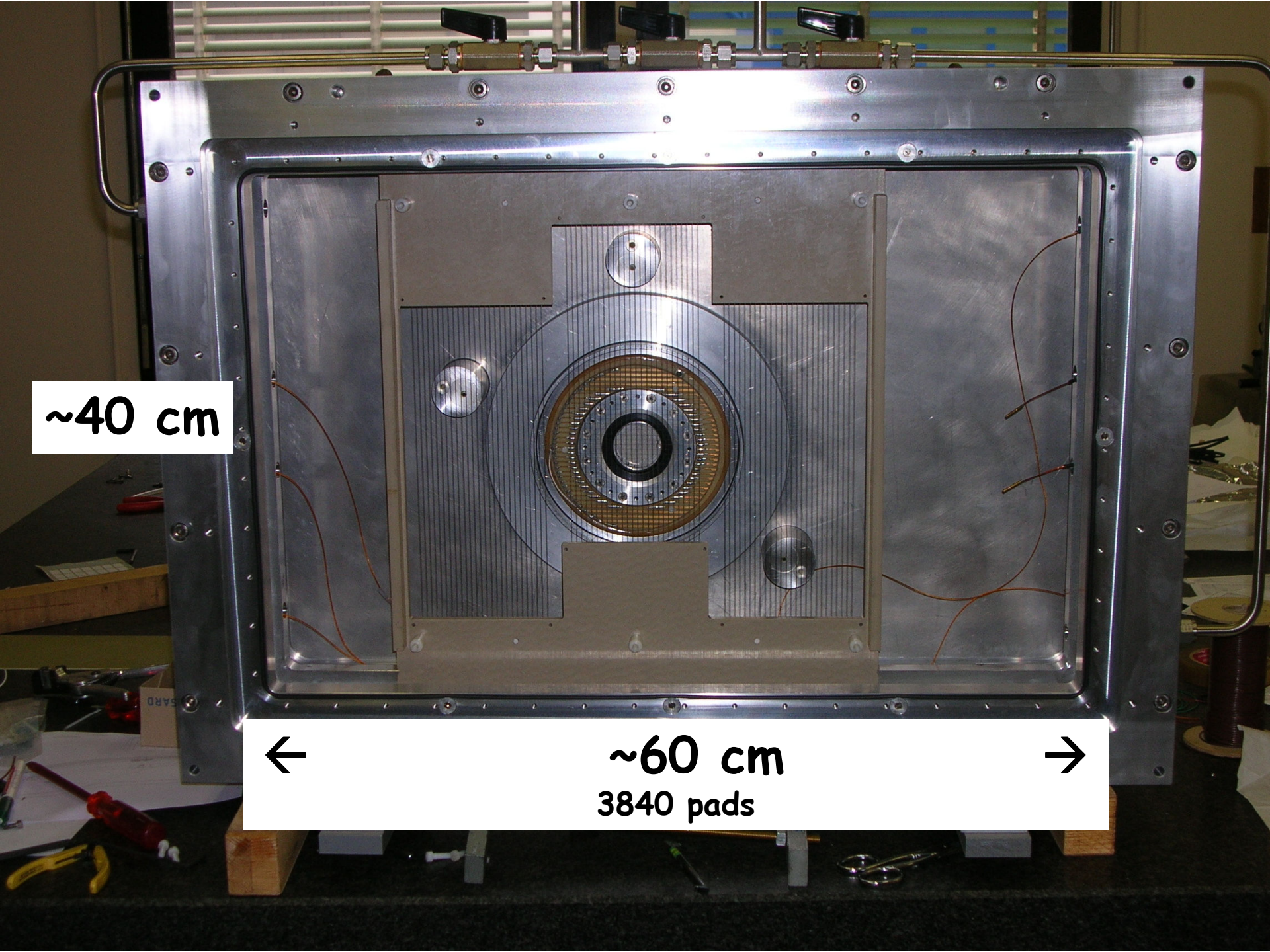



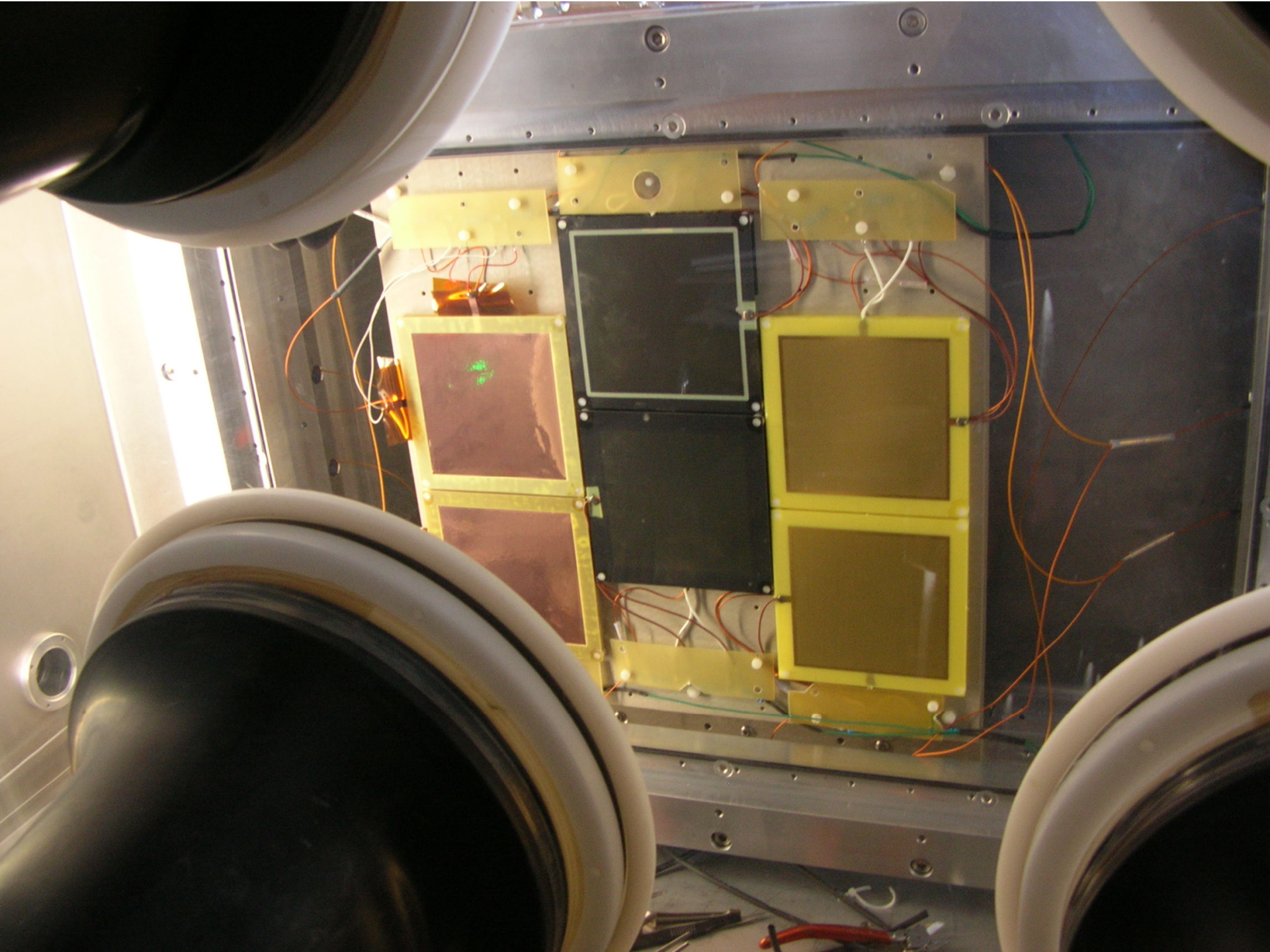



# Conclusions

- We detected Cherenkov photons with TGEM+CSI
- The detector was operated and stable for several hours
- Several parameters have to be tuned in order to improve the performances (gas, gap, TGEM)
- Data analysis just started
- We plan to test and operate a medium scale prototype with full ring capability next spring


~40 cm
~60 cm
3840 pads



- Encapsulated
- Long peaking time
- Simple operation, only 3 control signals: RST, T/H, CLK
- Granularity (16 channels/chip)
- Easy to couple to oscilloscope
- Robust
- ~1000 $e^-$ on detector
- 12 mW/ch