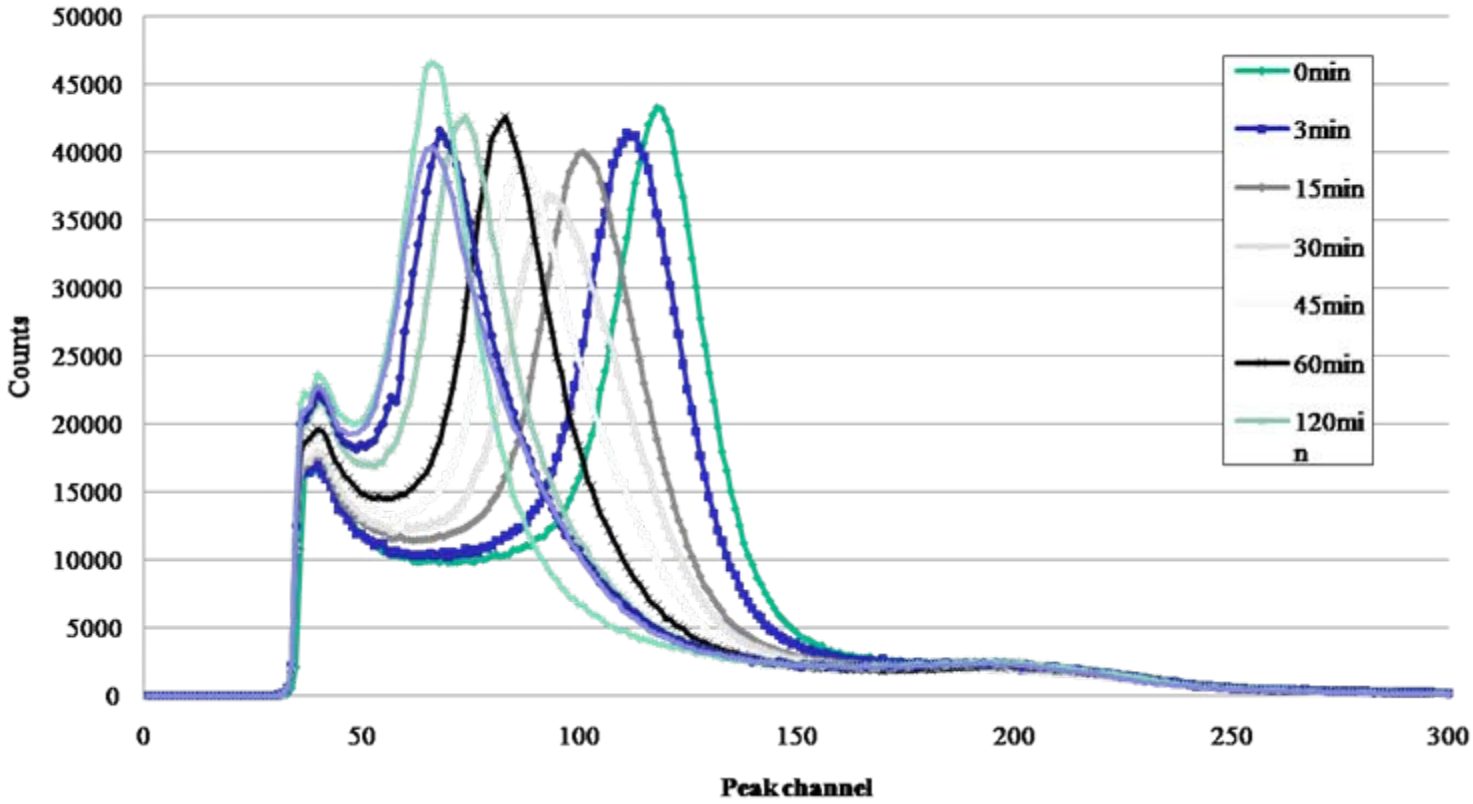
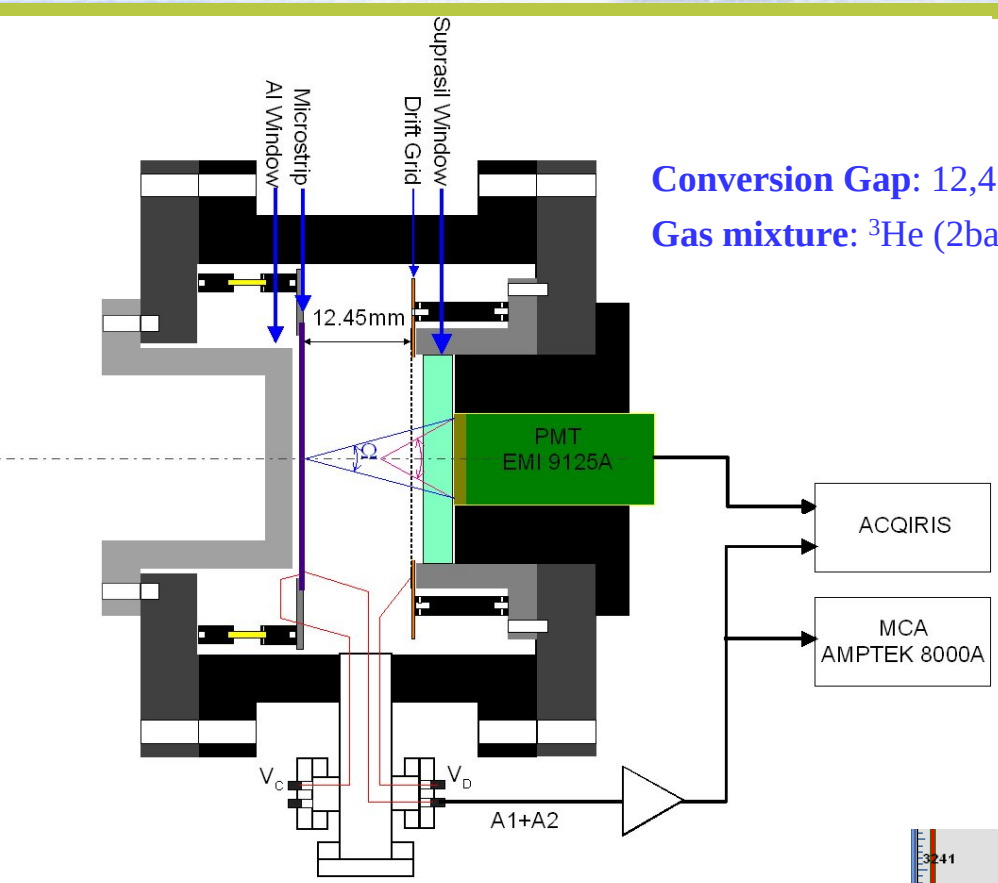
Ageing effect

after 180min, the gain is decreased by a factor 2 and then remains constant

CF4 is reacting with Al on the surface of the strips

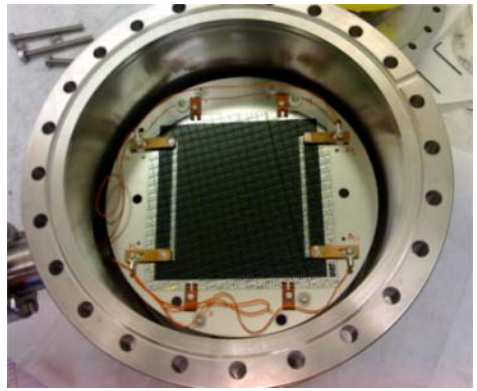


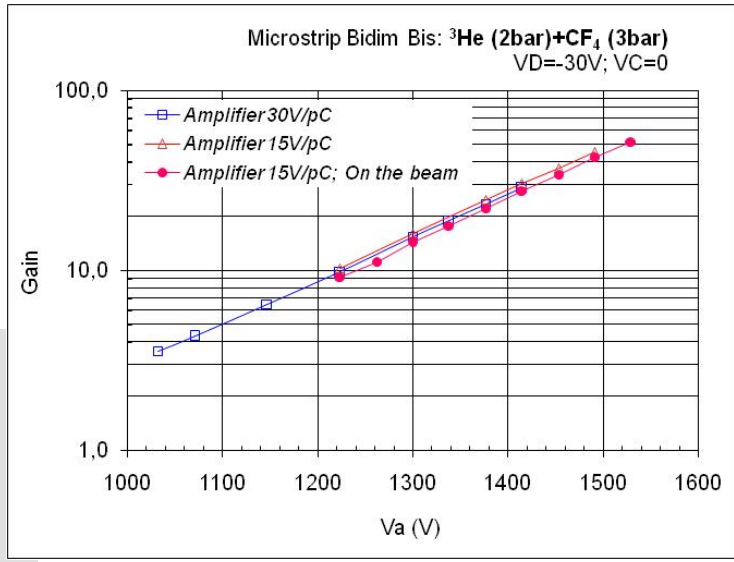
Task 22.2.3 Measurements with the MSGC80: description

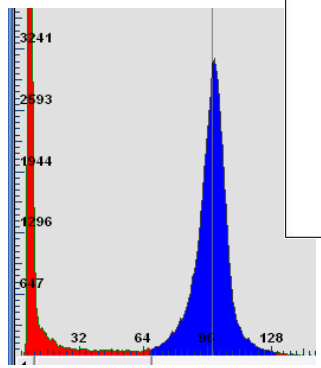


Conversion Gap: 12,45mm

Gas mixture: ^{3}He (2bar) + CF_4 (3bar)







PMT: EMI 9125A

- 28mm diameter (25mm active diameter)
- 300 – 650 nm (bialkali)

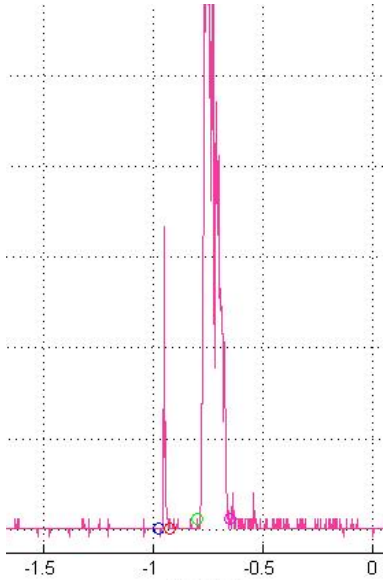
Grid - Suprasil Window distance: 4.5mm

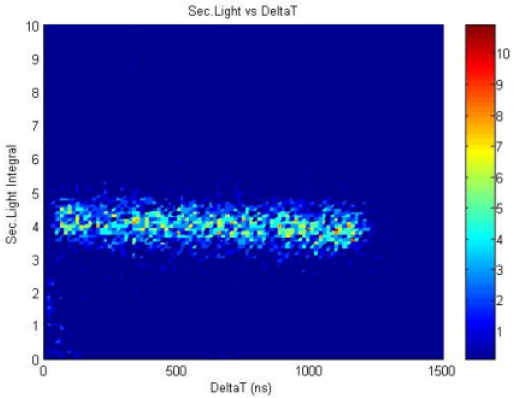
Suprasil Window thickness: 6mm

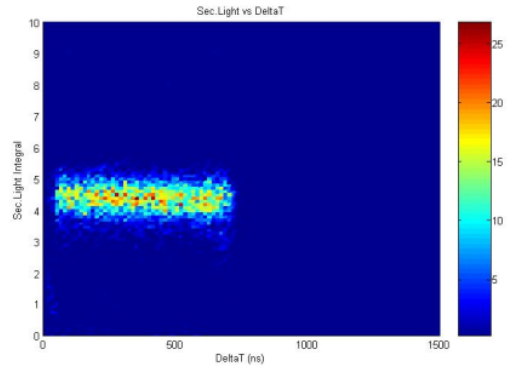
Distance MSGC – PM Photocathode: ~23,8mm

Task 22.2.3 Measurements with the MSGC80 (beam line): Acqiris analysis

Track of the PMT signal

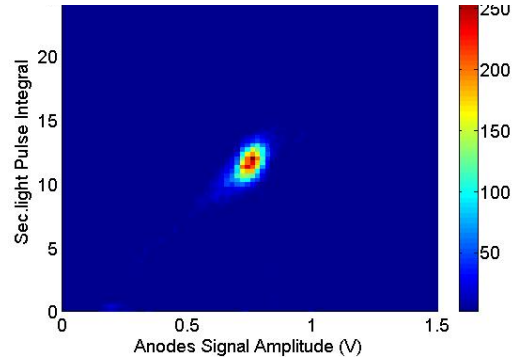


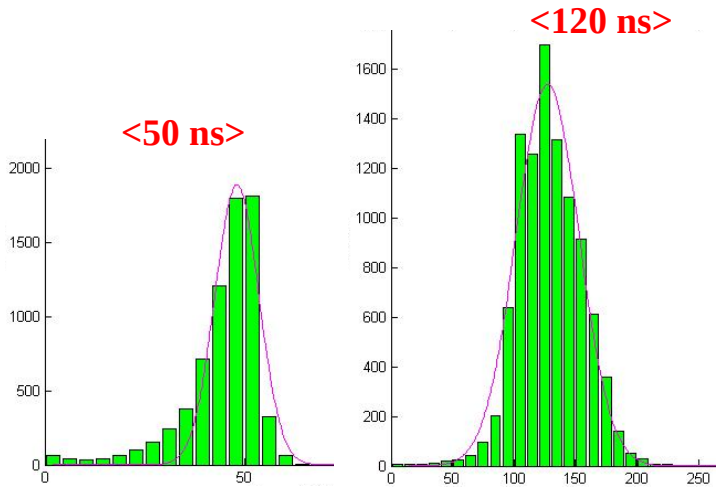




By increasing the drift field by a factor of 2 the maximum drift time is reduced by a factor of 2. We estimate the drift velocity at a value of 1.5 cm/µs for a reduced drift field of 200 V/cm.bar

Light (secondary) versus charge



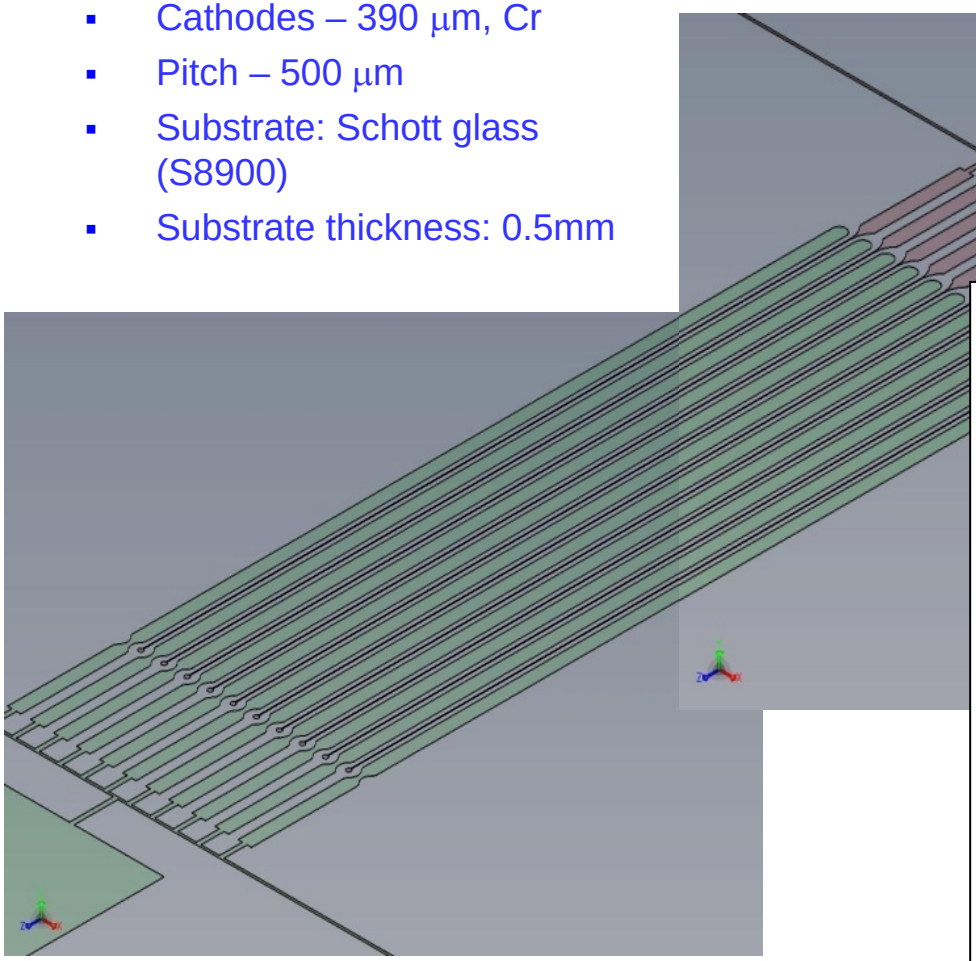


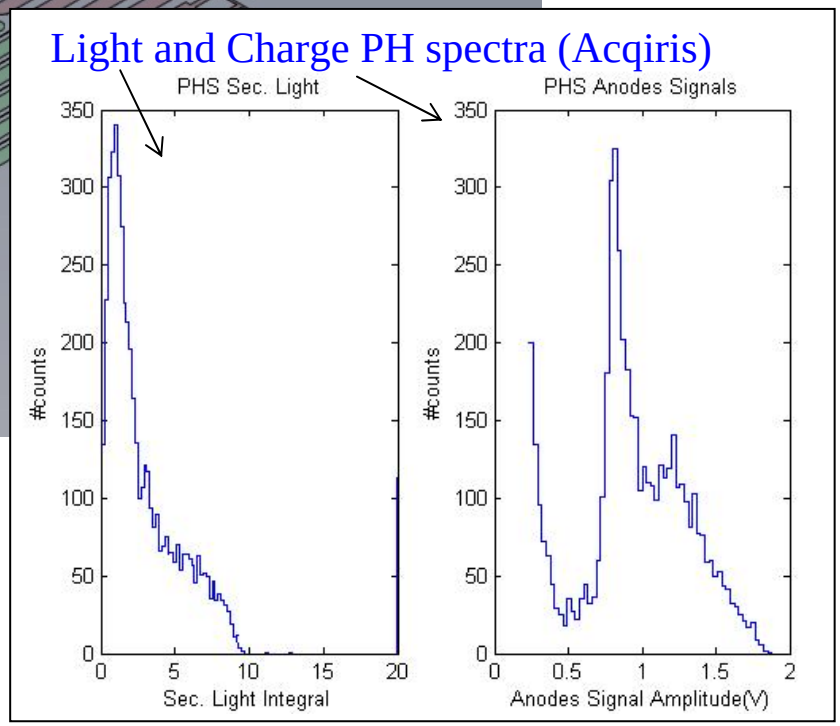
Primary (left) and secondary (right) light pulse TOT distribution

Task 22.2.3 Measurements with the MSGC500: description

MSGC500 layout

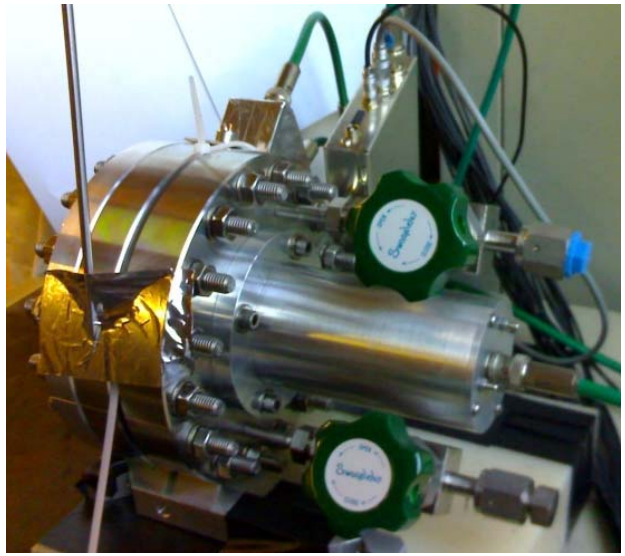
- Active area: 90 mm x 90mm
- Anodes – 10 μm, Cr
- Cathodes – 390 μm, Cr
- Pitch – 500 μm
- Substrate: Schott glass (S8900)
- Substrate thickness: 0.5mm





Task 22.2.4: Design study of the pressure vessel

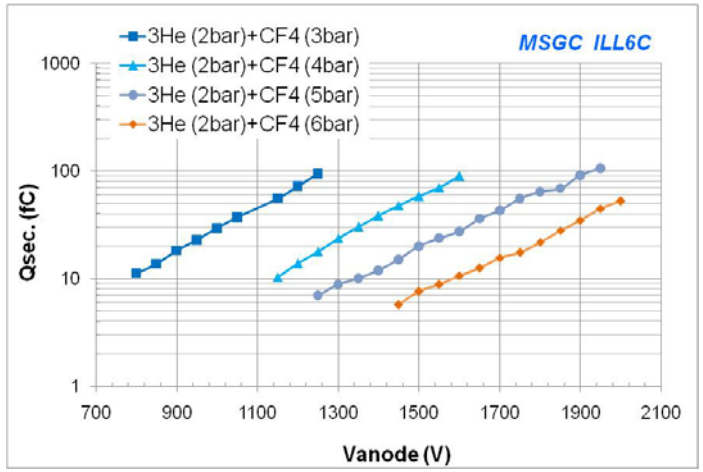
A **High pressure Prototype** has been designed and fabricated with the following objective:
- To demonstrate that a MSGC can operate at 6 bars of CF4
- To measure the light yield in function of the pressure
- To measure the dead time in function of the gas and drift field



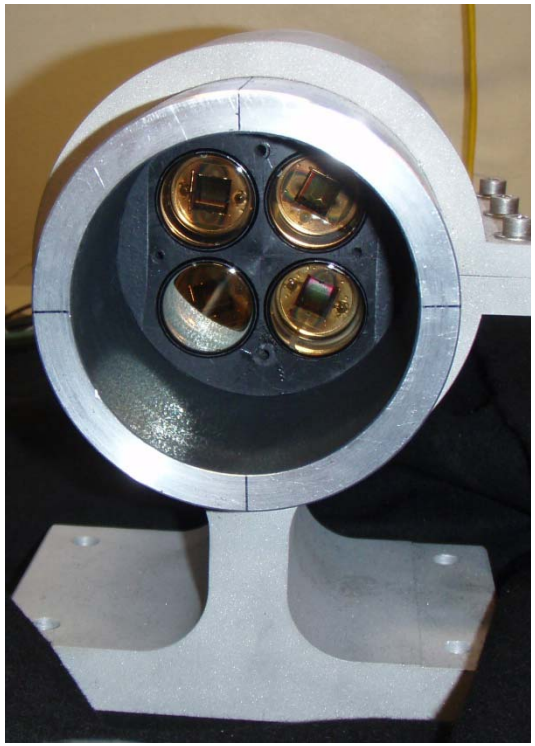
see Luis presentation

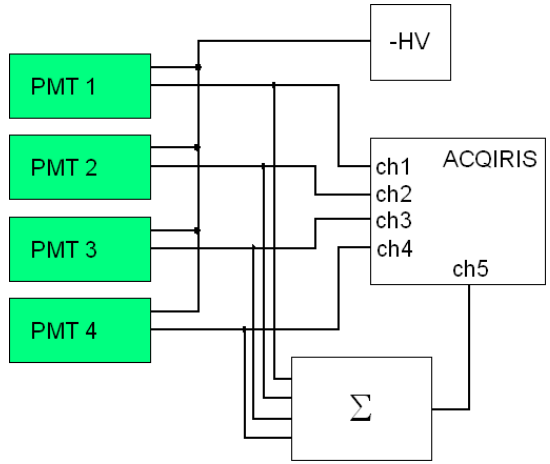
What this prototype can also do:
- To measure the signal emitted from a transparent ITO-MSGC (MSGC mounted in the reverse mode)
- To measure the PH in function of the conversion depth (by measuring both the primary and the secondary light)

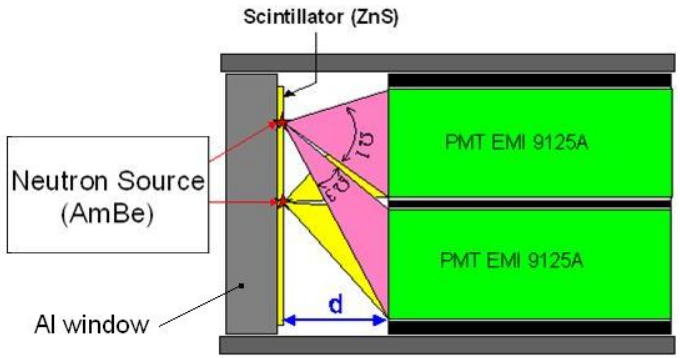
What he can NOT do: Position processing; only one PMT can be inserted (the window is only 28 mm diameter)

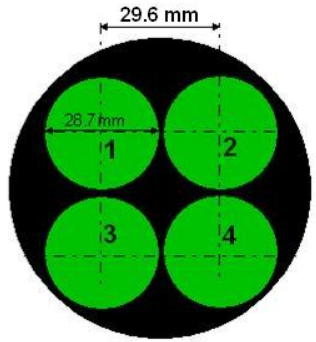


Preliminary test to see the effect of the distance from light source to PMTs

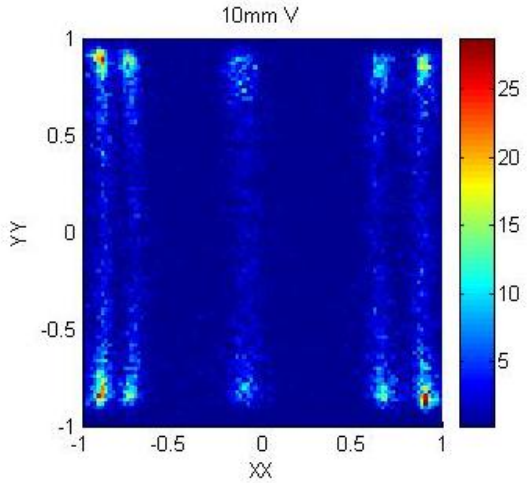


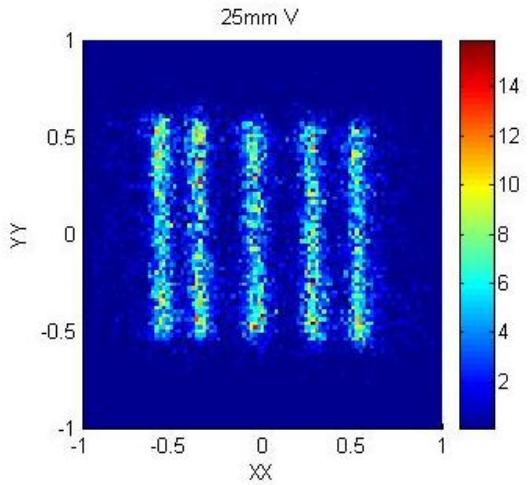


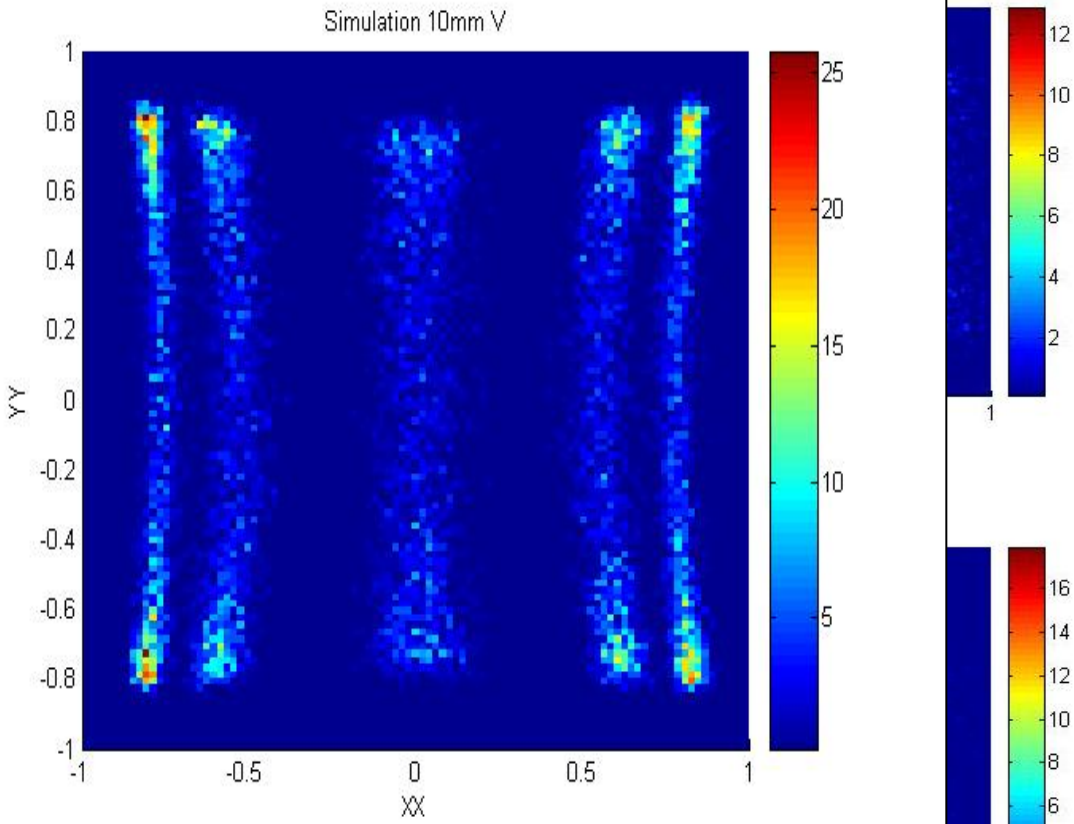




Images at different distances from scintillator to PMTs

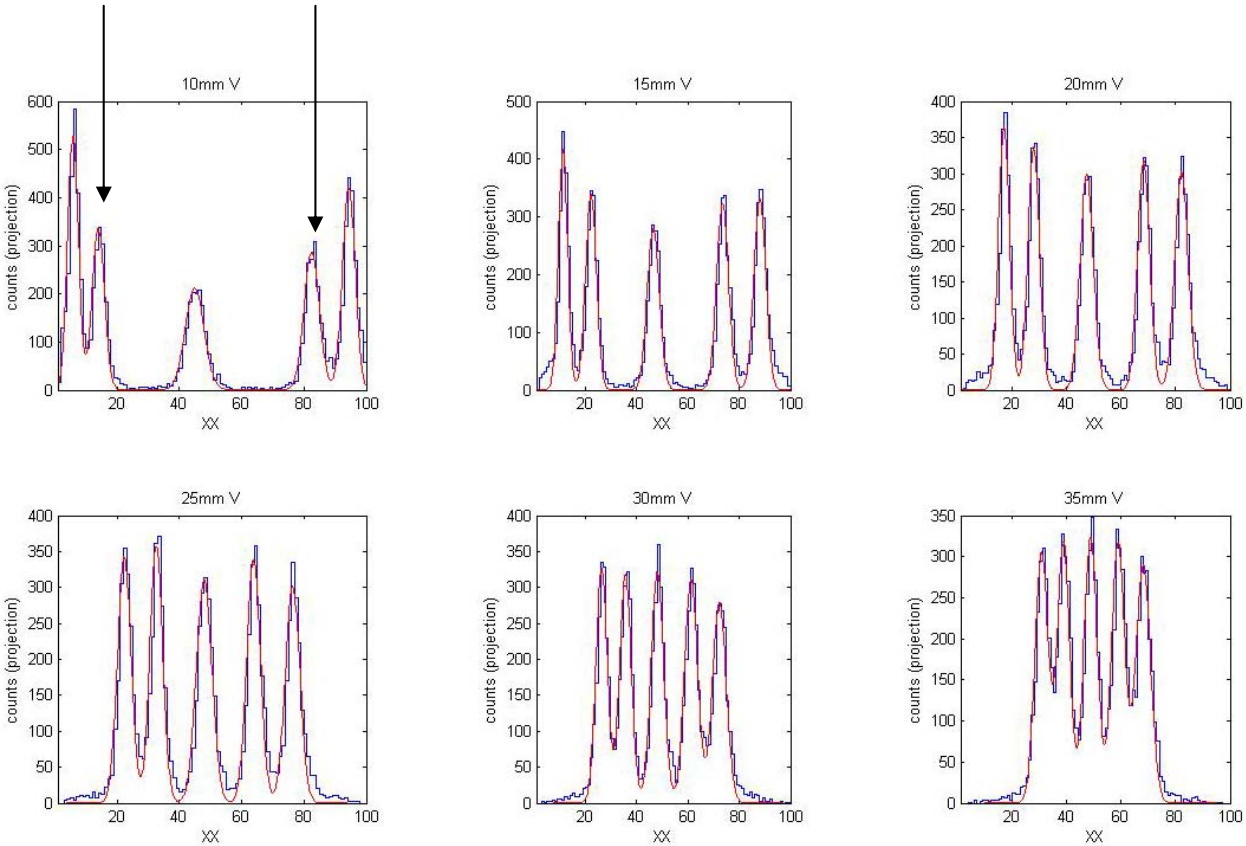


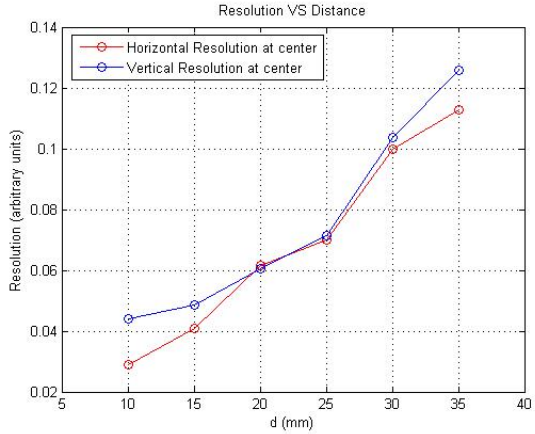




Distorsion well reproduced by a simple MC simul
→ will allow to improve the detector design

Scale calibration factor measured with the 2 intermediate slits





Position resolution (FWHM) at the center

Conclusion

MSGC 20cmx20cm x pitch 3mm + parallel charge division (MSGC200) readout tested

→ Very high count rate (>100 kHz per Anode strip)

→ Spatial resolution along the anode = 2 mm with 2 bars of CF4

the pressure vessel does not allow to test pressures > 5 bars total

→ Pb of ageing: under study

The develop of a new MSGC200 without Al coating will start this year (in parallel with WP22)

MSGC 8cmx8cmx1mm (MSGC80)

→ the method to characterize detector performances has been defined

→ ~100 ns dead time has been measured

MSGC 9cmx9cmx0.5mm (MSGC500)

→ The detector is working but shows a strange PH spectrum, attributed to a non adequate mounting (gain uniformity will be checked on a beam line)

→Test on the beam line with the 4-PMT head will start after the reactor restart

High pressure prototype + MSGC ILL6C

→ Measurements have just started; the detector has been successfully tested at 8 bars

Full characterization will be made.

The design study of a 20cm x 20 cm pressure vessel will start this year