

A detector to Study Small MSGCs (ITO MSGCs, etc) Prototypes at High Pressure

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Outline

- Main Purpose
- Detector Design
- Preliminary Measurements with a
MSGC ILL6C
- Future works

Main Purpose

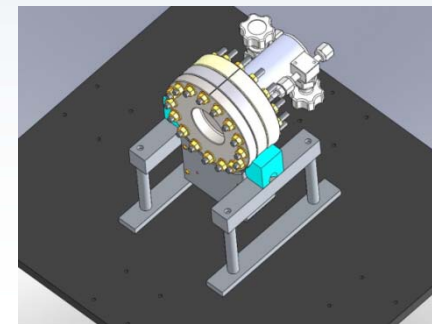
Optimize a detector for high resolution (0.5mm) and high counting rate (>1MHz)

- Study of the emission of light with small area charge amplifying structures prototypes (MSGCs, ITO MSGCs, etc)
- Investigate different gas mixtures
- Signal development

Detector Design

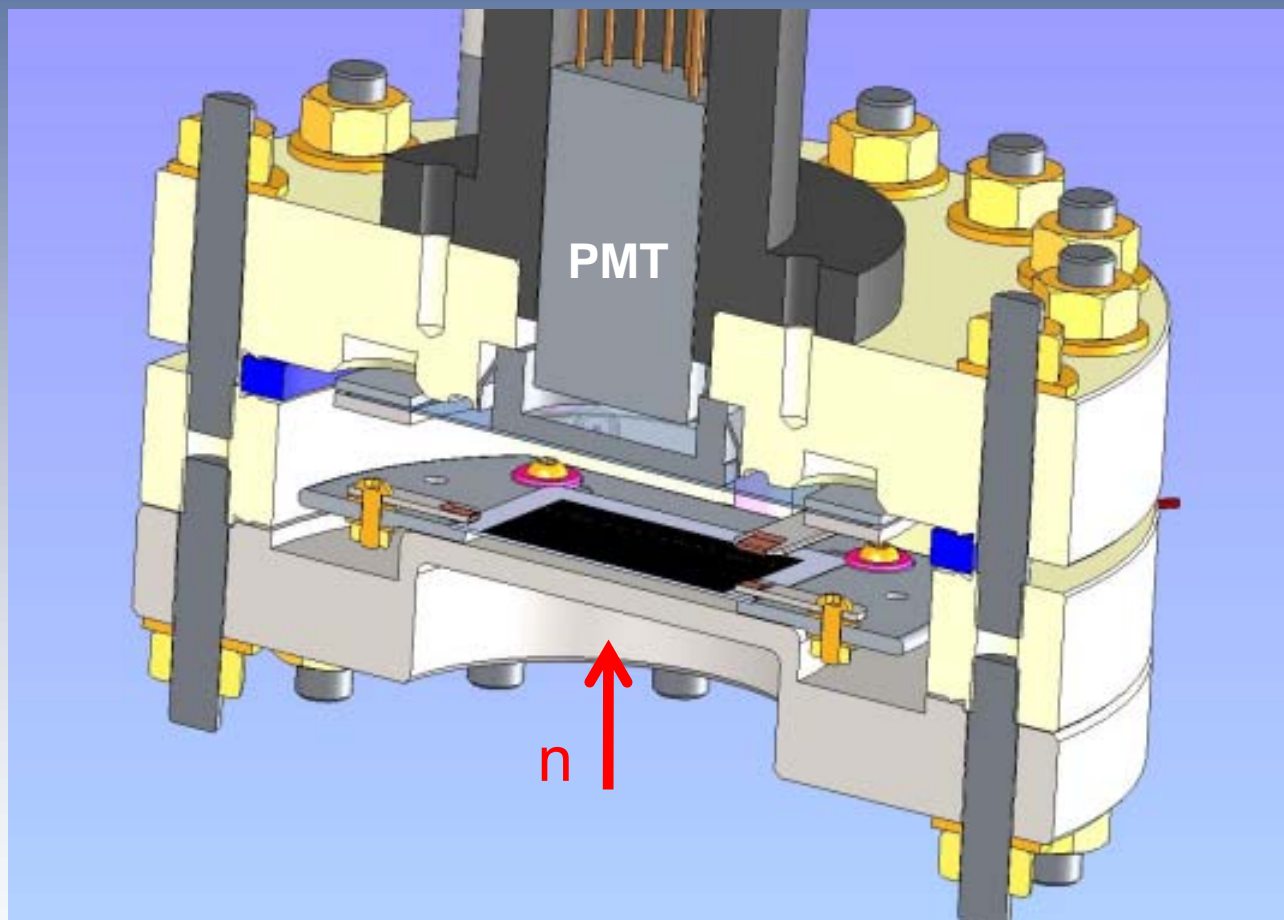
Detector Particularities

- Designed to study small ($50 \times 50 \text{mm}^2$) MSGCs, ITO MSGCs, etc
- Only metallic and ceramics inside (avoid the use of dirty materials like kapton, teflon, glues, etc.)
- Mechanical parts inside the detector appropriate for vacuum (machined screws, etc)
- Knife joints
- Detector outgassing at $T=100^\circ\text{C}$
- Small volume, $\sim 25 \text{cm}^3$ (allows a reasonable economy in gas consumption)

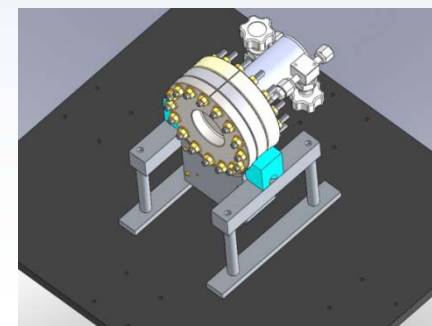


Detector Design

Sectional view



MSGC up the neutron entrance window

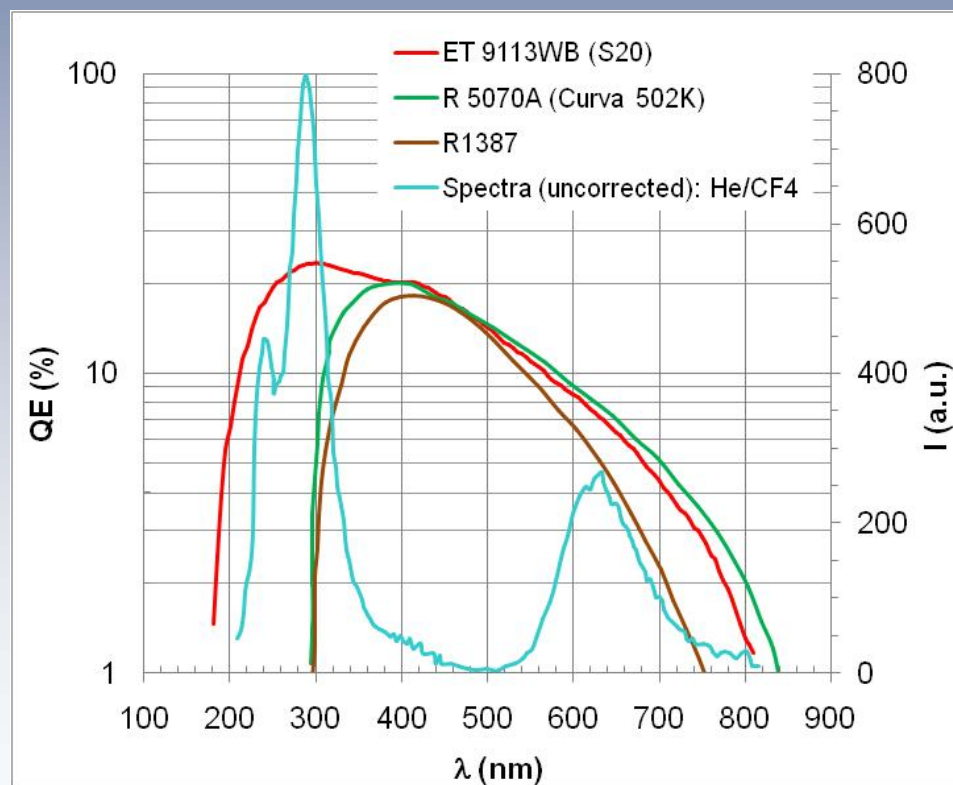
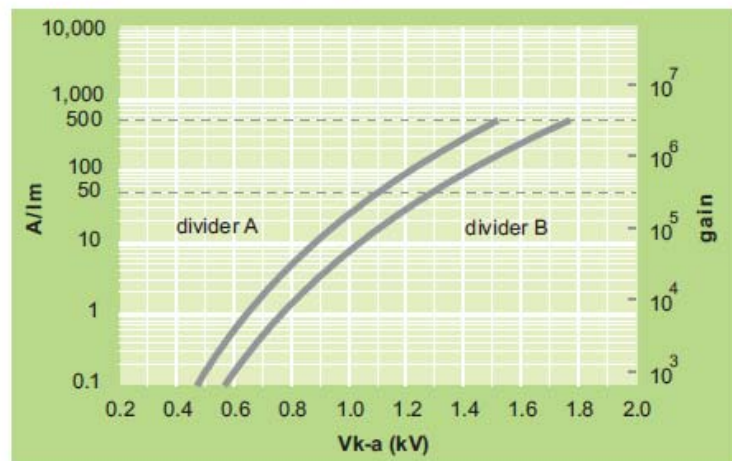


Light Readout

- PMT ET 9113WB (1")
 - Window: UV glass
 - S20 Photocathode
 - QE \in [170 , 850 nm]



7 typical voltage gain characteristics

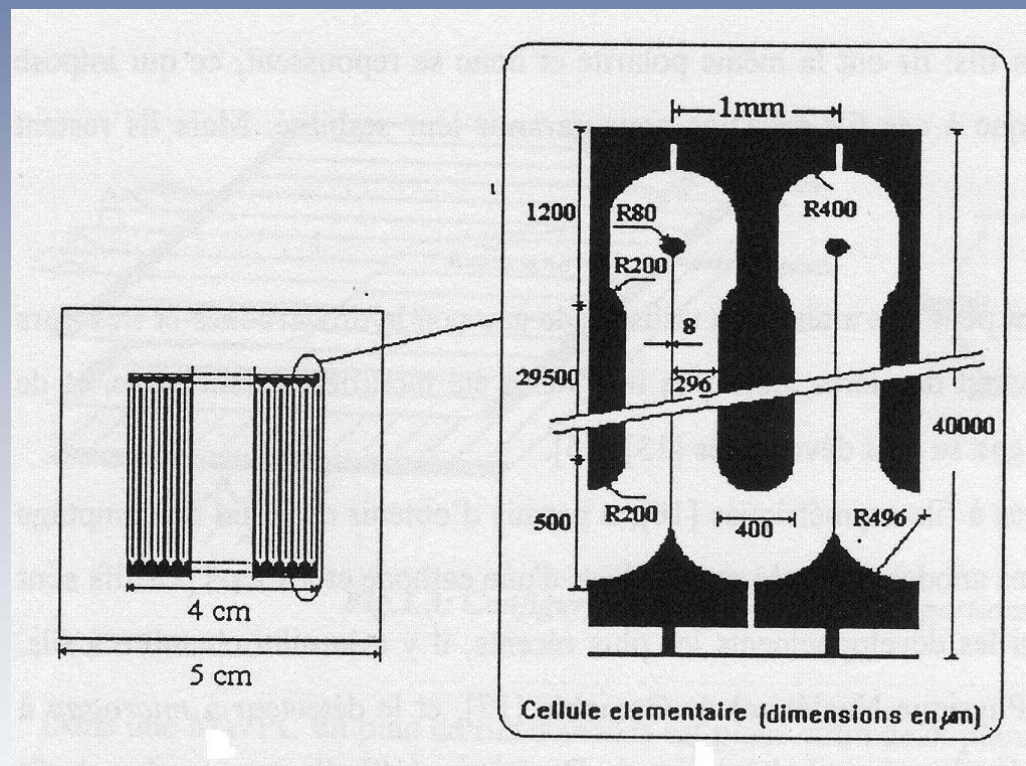


PMTs Quantum efficiency

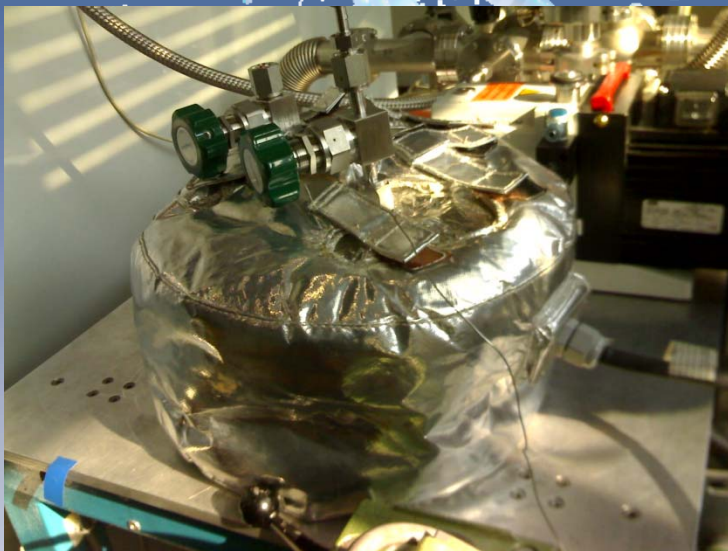
Detector Setup

Microstrip plate: ILL6C

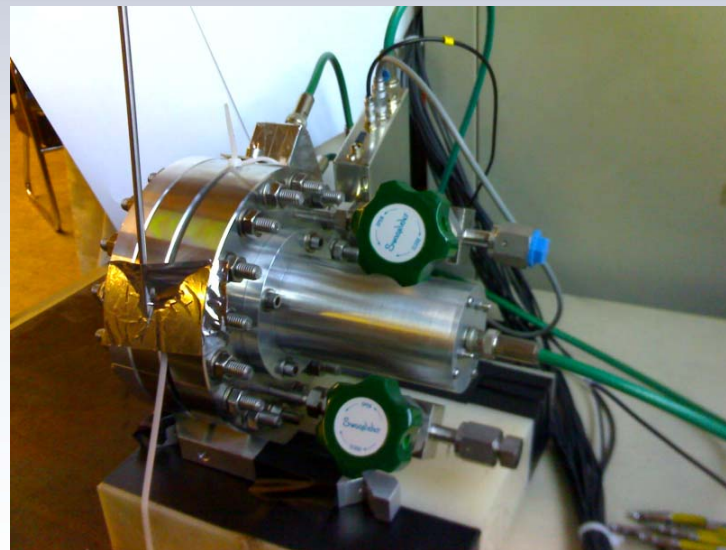
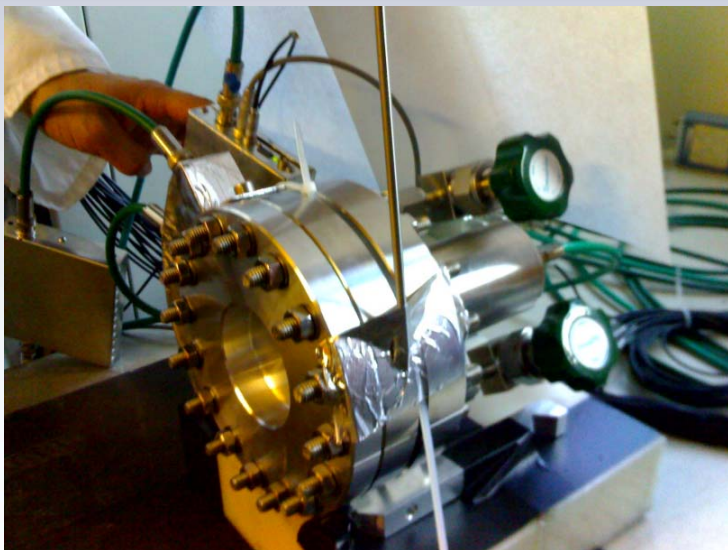
- Substrate:
 - DESAG D263
 - Thickness: 0.5mm
 - Active area: 40 x 40 mm²
- Anodes width: 8 μm, Cr
- Cathodes: 400 μm, Cr
- Pitch: 1mm



Detector with a MSGC ILL6C



- Leak test (mass spectrometer)
- Vacuum and outgassing @ 100°C (ultimate pressure $\sim 2 \times 10^{-8}$ mbar)
- Detector filled with:
 ^3He (2bar) + CF_4 (3, 4, 5 and 6 bar)

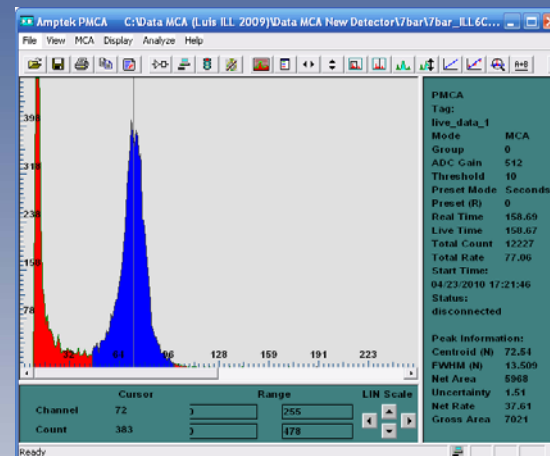


Preliminary Measurements with MSGC ILL6C

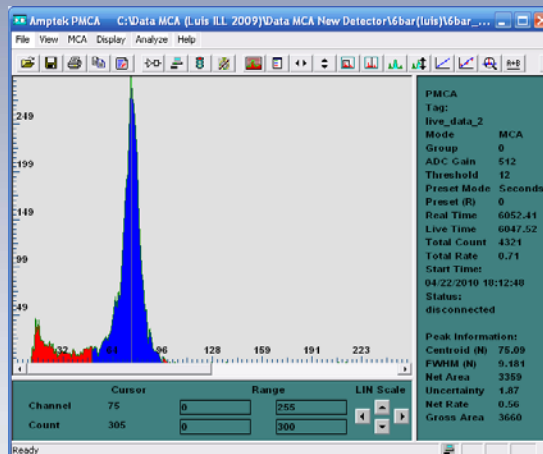
PHS Anodes signals - High Pressure

- Measurements with an AmBe neutron source

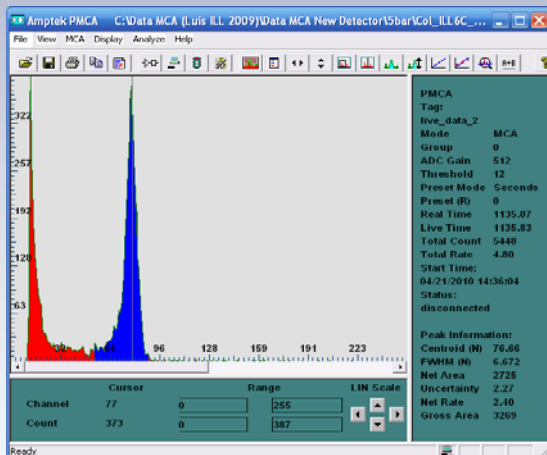
^3He (2bar)+ CF_4 (5bar)



^3He (2bar)+ CF_4 (4bar)



^3He (2bar)+ CF_4 (3bar)



VD=-600V; VC=0;
Va=+1750V
Full energy peak (764keV)
@ch73

VD=-600V; VC=0;
Va=+1520V
Full energy peak (764keV)
@ch75

VD=-500V; VC=0;
Va=+1200V
Full energy peak (764keV)
@ch76

