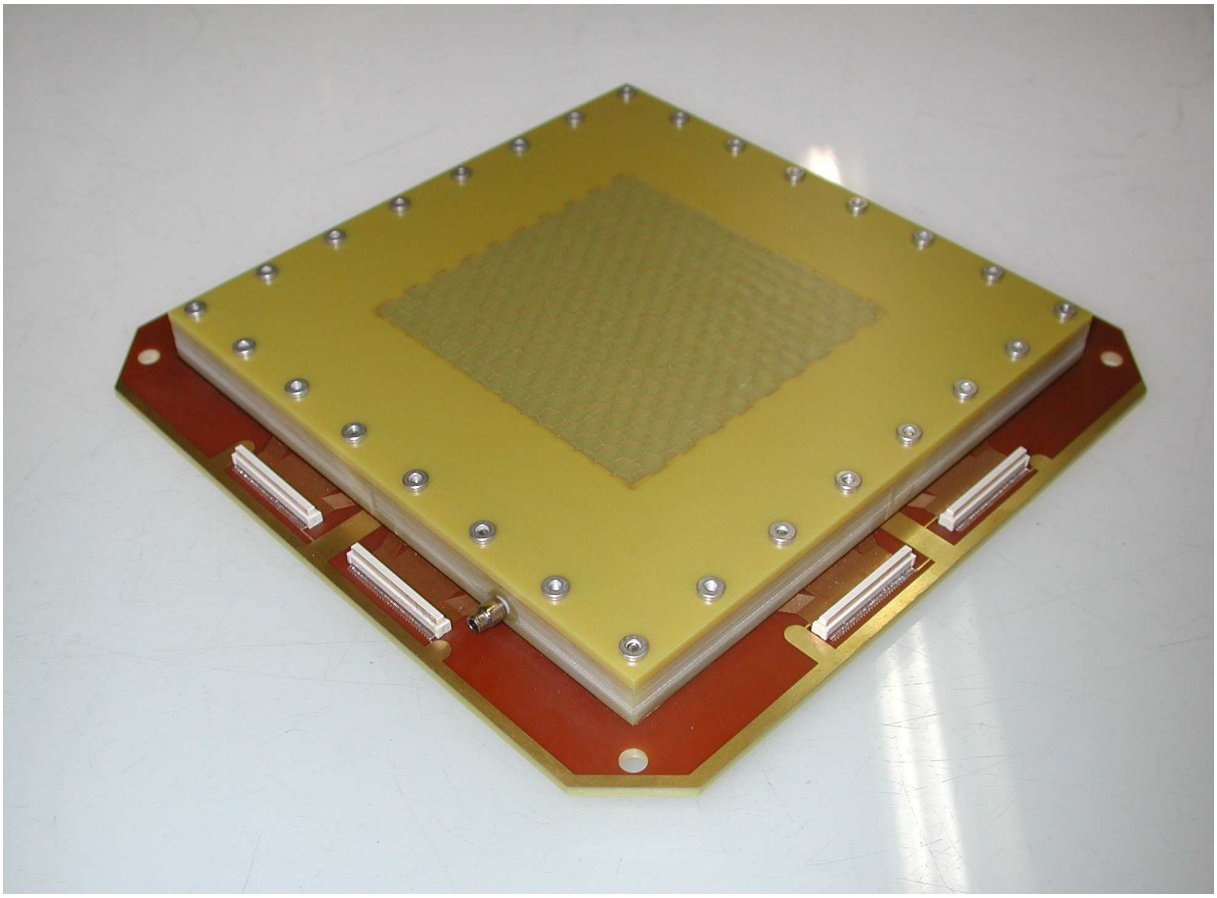
GEM 10x10cm detector

with XY readout



Product by : PCB workshop (EN-ICE-DEM bat.102)

Project supervisor: Serge Ferry

External Dimensions :

- Dimension : 230x230x30 mm
- Fixation : 4 holes of diam. 6mm separeted by 200x200 mm
- Volume (gas) 157x157x12 mm (~300 cm^3)

External Connections :

- X readout for GEM : 2x connectors 130 pins « Panasonic » AXK6SA3677YG
- Y readout for GEM : 2x connectors 130 pins « Panasonic » AXK5SA3277YG
- High tension for Drift : 10x pads Ni/Au for self made welding
- Gas connectors : 2x fast connectors 2/3
  2x adapters fast connectors 4/6

Parts :

- Baseplate with honeycomb (mesh 5 cm) 10x10 cm wide 3.2 mm thick (epoxy +2x kapton 5/50/5) :
  - XY printed board (256 X-tracks, 256 Y-tracks)

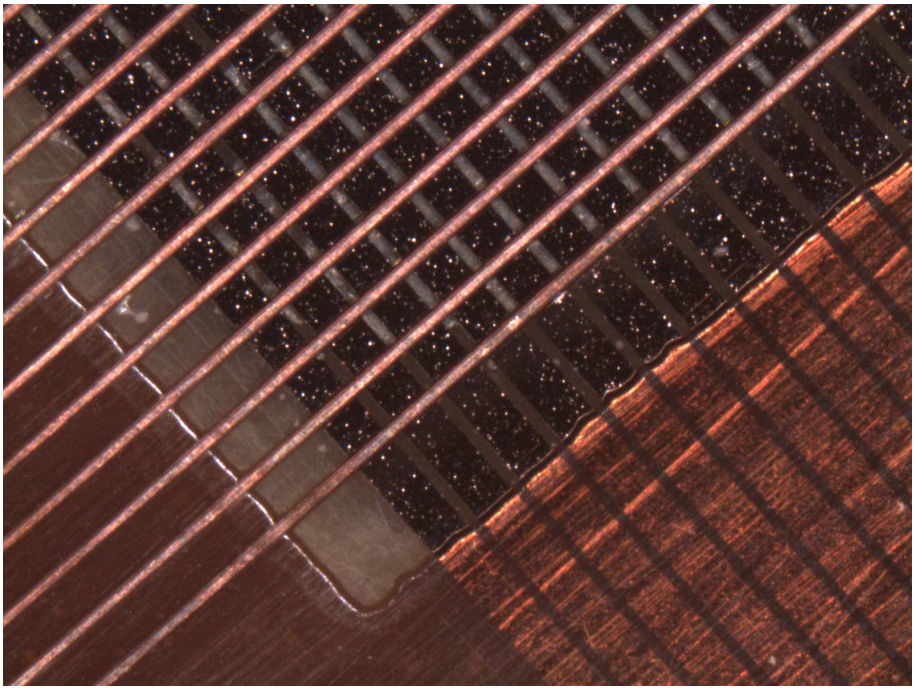


Figure 1: XY readout

  - External Connectors (4x 130 pins)
  - M3 nylon screws, GEM and Drift support

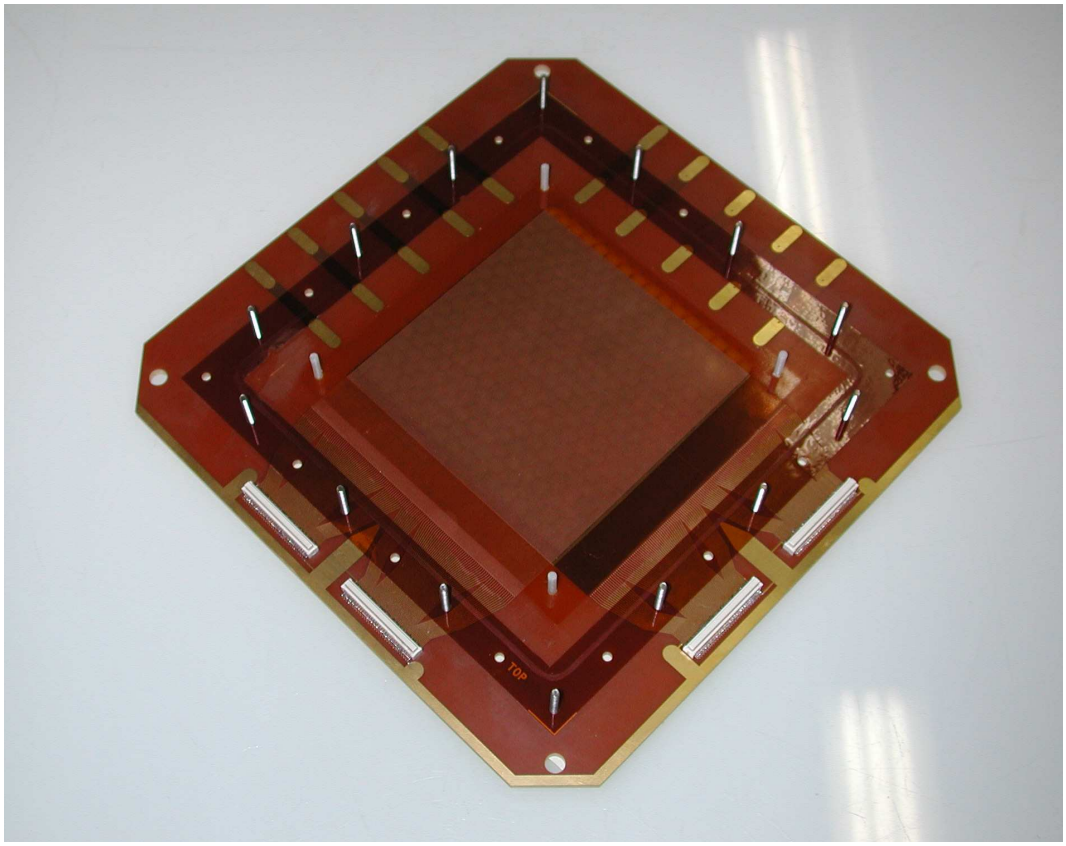


Figure 2 : Baseplate with readout, connectors and screws

- 2 O-ring joints for sealing Viton (fluoro carbone)
- Frame spacer with gas connectors 2/3 (epoxy)

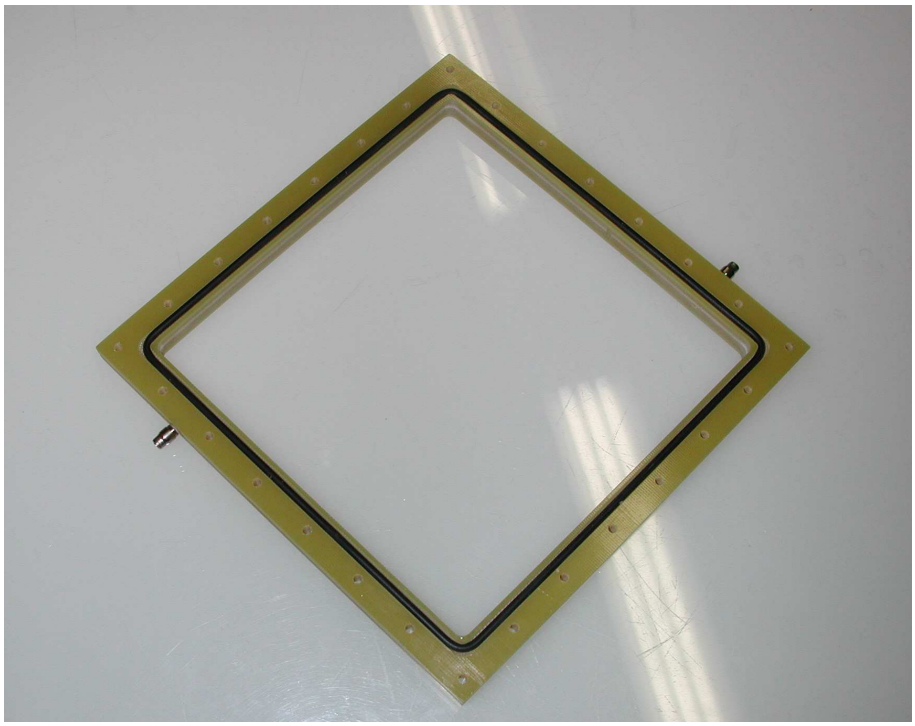


Figure 3 : frame spacer with joint and gas connectors 2/3

- Top with honeycomb window (mesh 5 cm) 10x10 cm (epoxy and inox inserts A4)

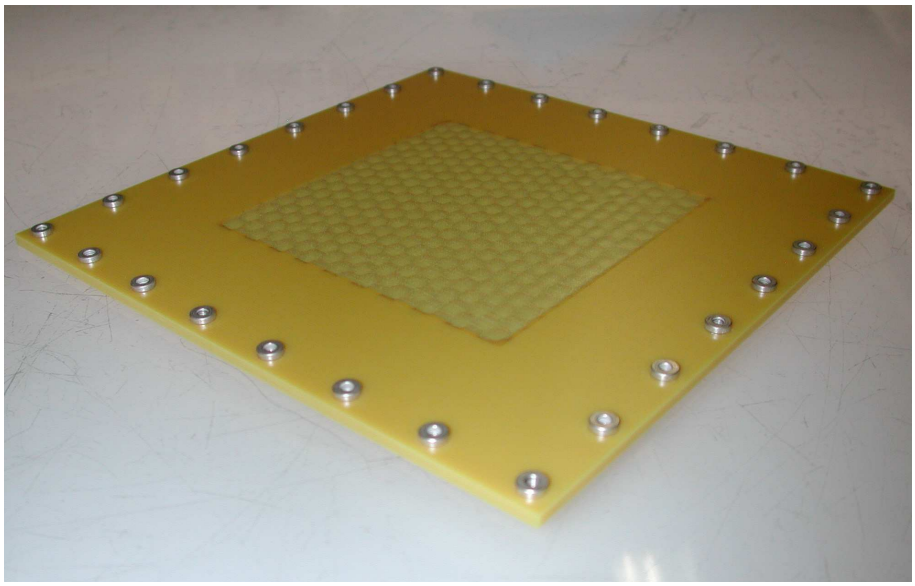


Figure 4 : top with honeycomb and inox inserts

- 28x inox screws A4 (ISO 3506) 6 pans (imbus) to close the detector
- 100x epoxy washers (0,2 mm thickness) for z spacing between GEM and Drift
- 2x M3 gas connections fast connectors 2/3 « legris »
- 2x gas fast connectors adaptators 4/6
- 4x M3 nylon nut for internal elements support

Figure 5 : accessories

Internal Connections

Self made welding of internal elements on Ni/Au pads

Assembly plan :

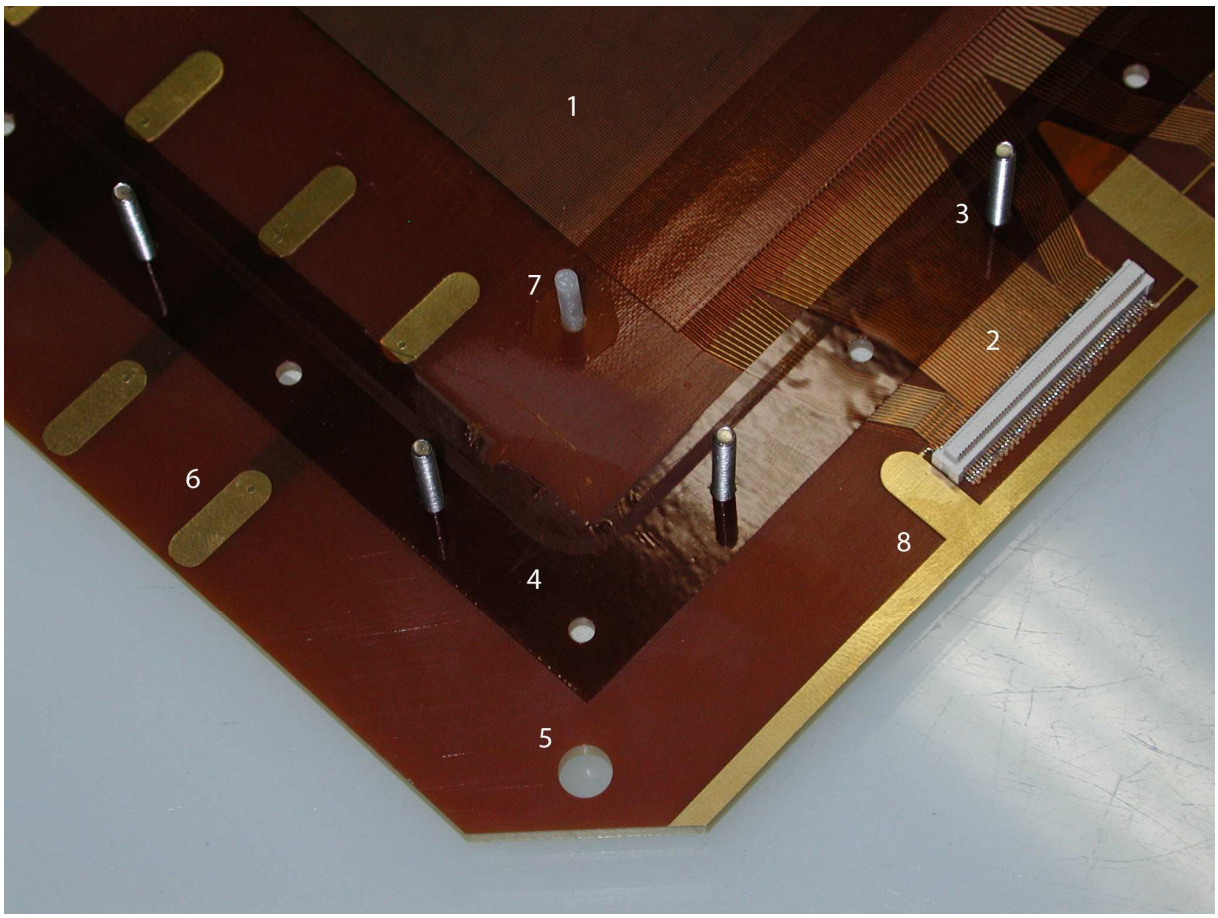


Figure 6 : XY readout

1. XY readout
2. Connector type « panasonic »
3. Inox screws
4. Sealing Kapton
5. External fixation hole 6 mm diameter
6. Ni/Au connections pads for drift/gem
7. Nylon screws for internal support
8. Electric mass

Mounting procedure :

1. Open the detector from the bottom which a 6 pans key (imbus) 2,5 mm.
2. Take care of the honeycomb wich is fragile.
3. Adjust the space between the elements with washers (10 washers = 1.97±0.05 mm).

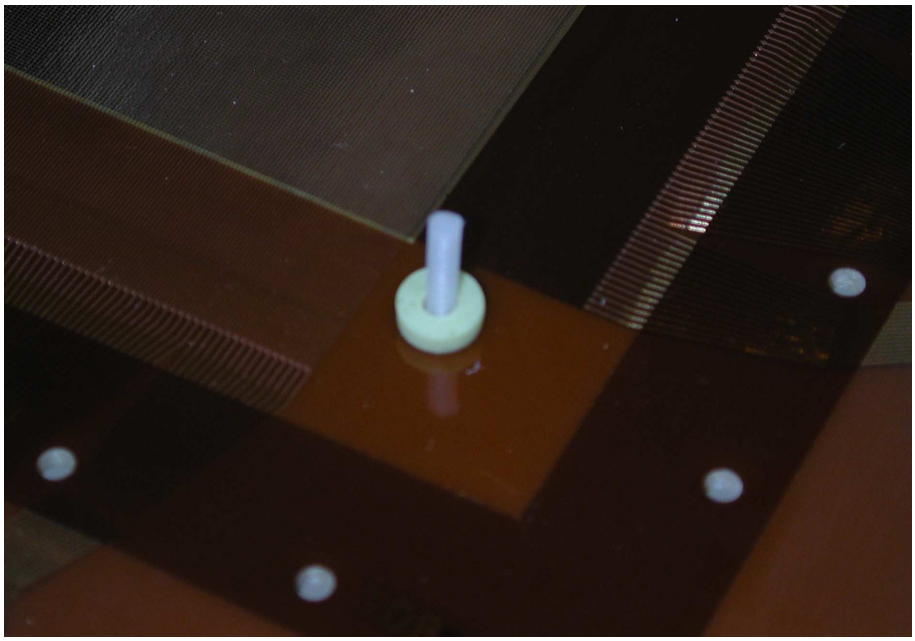


Figure 7 : z space with washers

4. Put the internal element (GEM, Drift, etc.) on the 4 nylon screws.

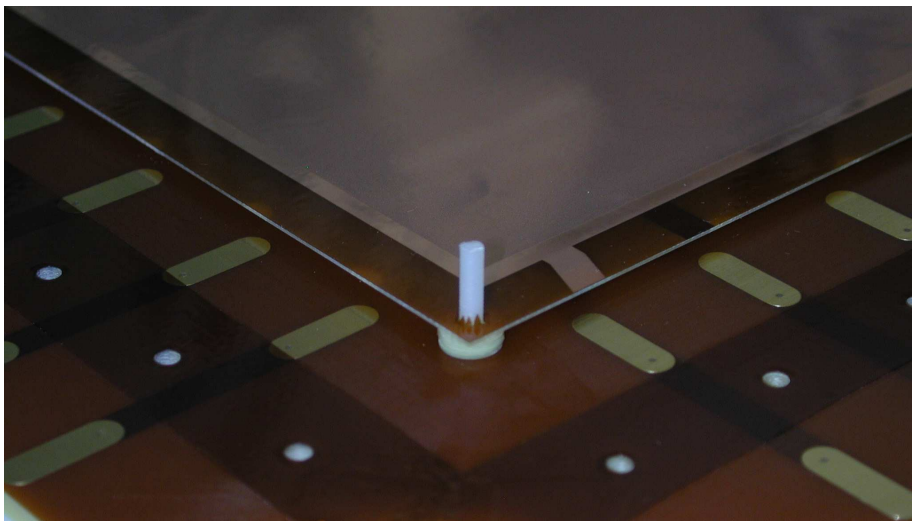


Figure 8 : internal element mounted on a screw (here it's a GEM)

5. Repeat step 3 and 4 for the other internal elements.

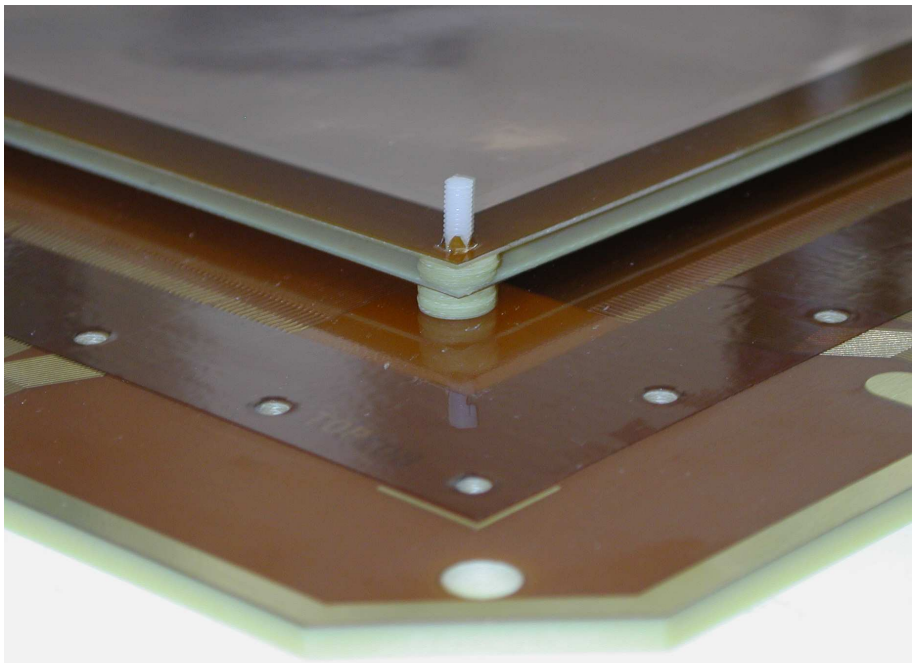


Figure 9 : 2 different internal elements (here a GEM and a drift)

6. Gently tighten the nylon screws. DO NOT USE FORCE !

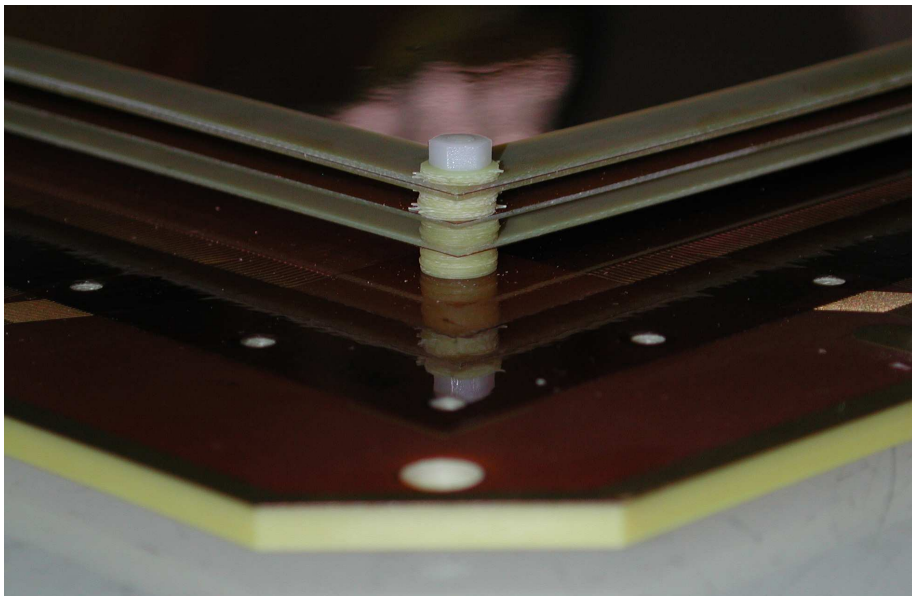


Figure 10 : final fixation with nylon a nut

7. Check the cleanliness of the baseplate, the entretoise, top and 2 o-ring joint.
8. Do the internal electrical connections.
9. Put the 2 o-ring joints in frame spacers grooves.

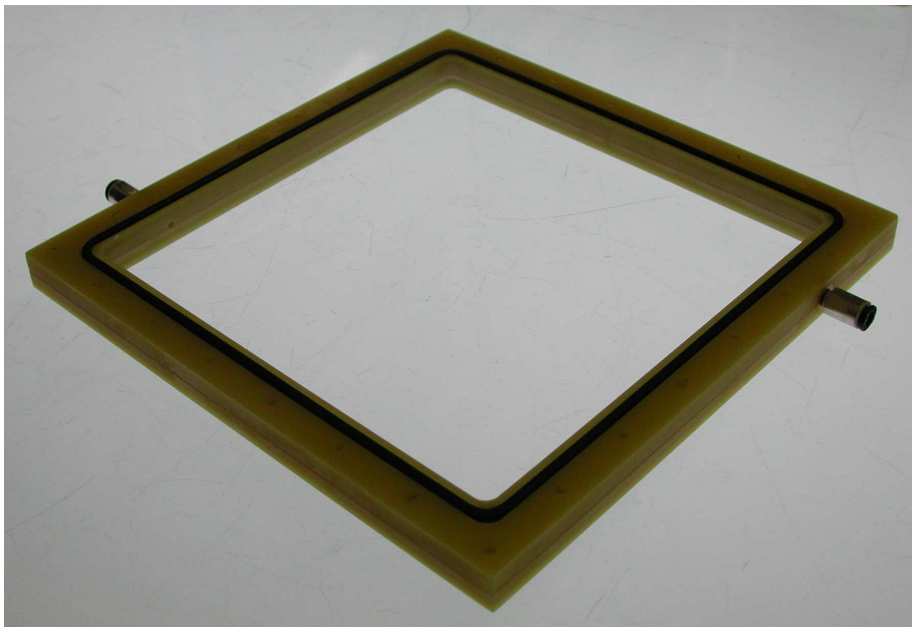


Figure 11 : frame spacer with o-ring joint

10. Align the frame spacer on the baseplate with inox screws

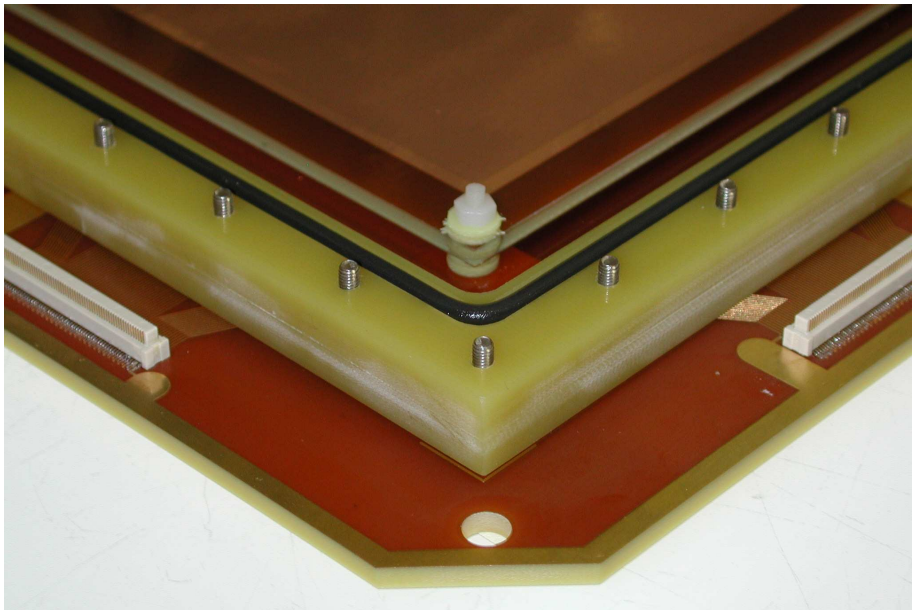


Figure 12 : frame spacer on the baseplate with inox screws

11. Put the top on the inox screws

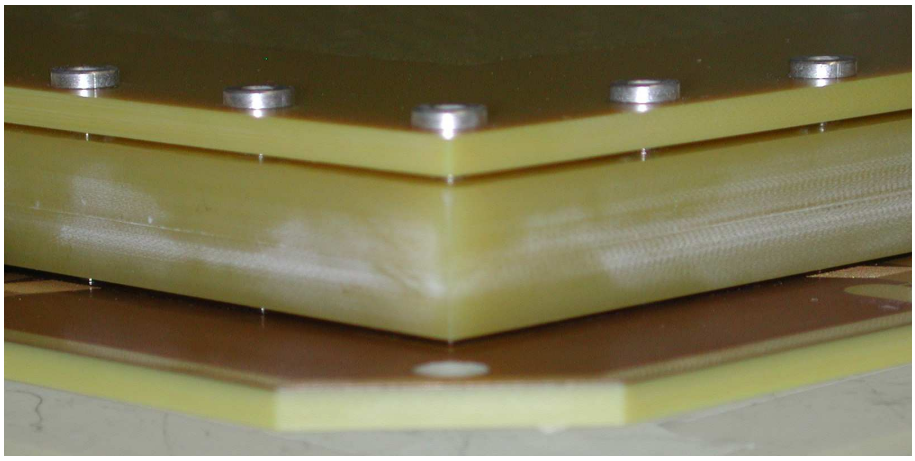


Figure 13: top on the frame spacer with inox screws

12. Close the detector with 28 inox M3 screws 6 pans (imbus)

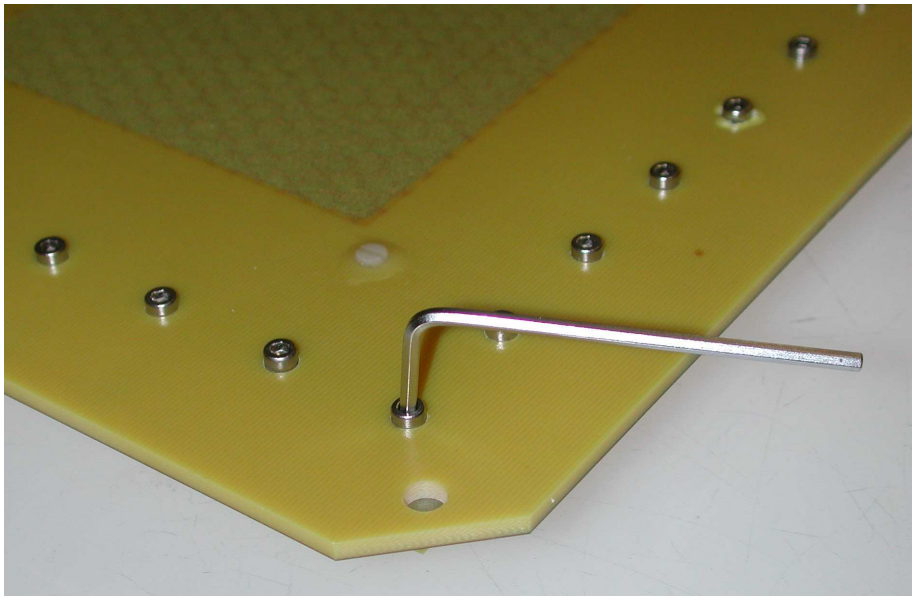


Figure 14: self made clamping

13. Tight until the top, the frame spacer and the baseplate are in contact

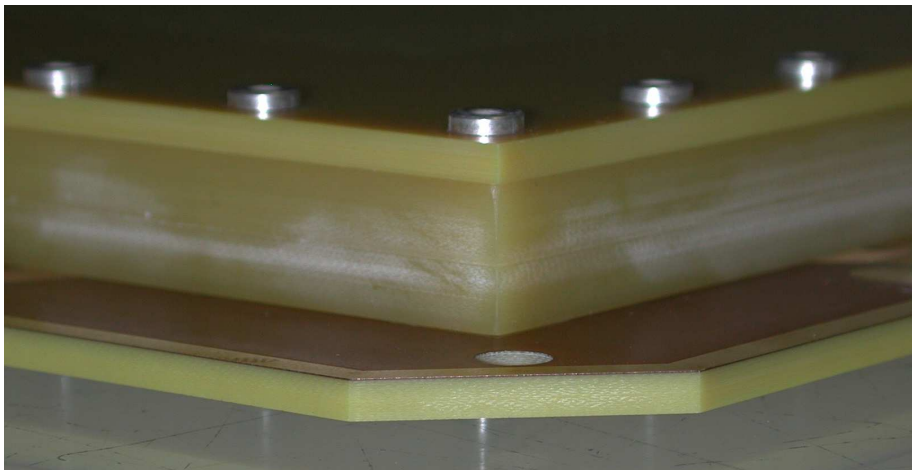


Figure 15 : top, frame spacer and baseplate are in contact (VS fig 13)

Connections informations

Internal

- Connect the elements (GEM, Drift, etc.) to the internal pads.

External

- Connect the 4 connectors « Panasonic ».
- Self made welding high tension connectors .
- Connect the gas with the black adapters (2/3->4/6 Gaz) fast connectors.
- Fix the detector on an external support with holes (diam. 6 mm, distance 200x200 mm)

GEM's caracterisations

GEM 100x100 mm:

1. Washed and passivated
2. Dryed at 70°C for 60 minutes prior to testing
3. Electric validation conditions :
    a. : leak current <10 nA @ 600V hygrometry <50%