Laboratoire d'Annecy-le-Vieux
de Physique des Particules

SiD Hcal structure

&

1m² *Micromegas chamber prototype*

CALICE 2009

– LYON –
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In2p3

IN2P3
Institut National de Physique Nucléaire et de Physique des Particules

Université Savoie Chambery Annecy

Outline

- ***Hcal barrel*** mechanical structure
- ***Hcal end-cap*** mechanical structure
- ***1m² Micromegas*** chamber prototype

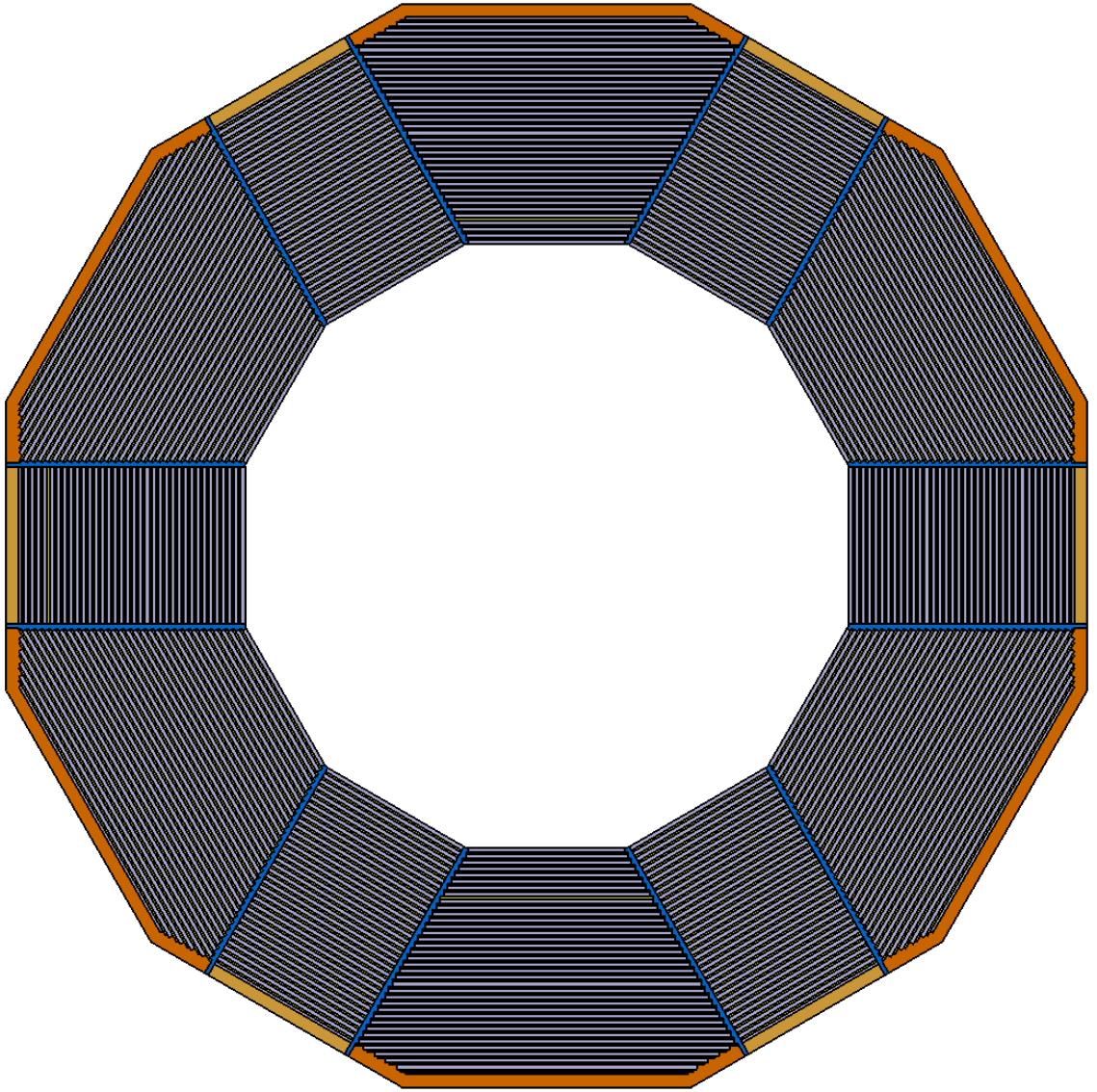
Hcal barrel: SiD baseline

12 non projective modules

↓

6 rectangles
+
6 trapezoids

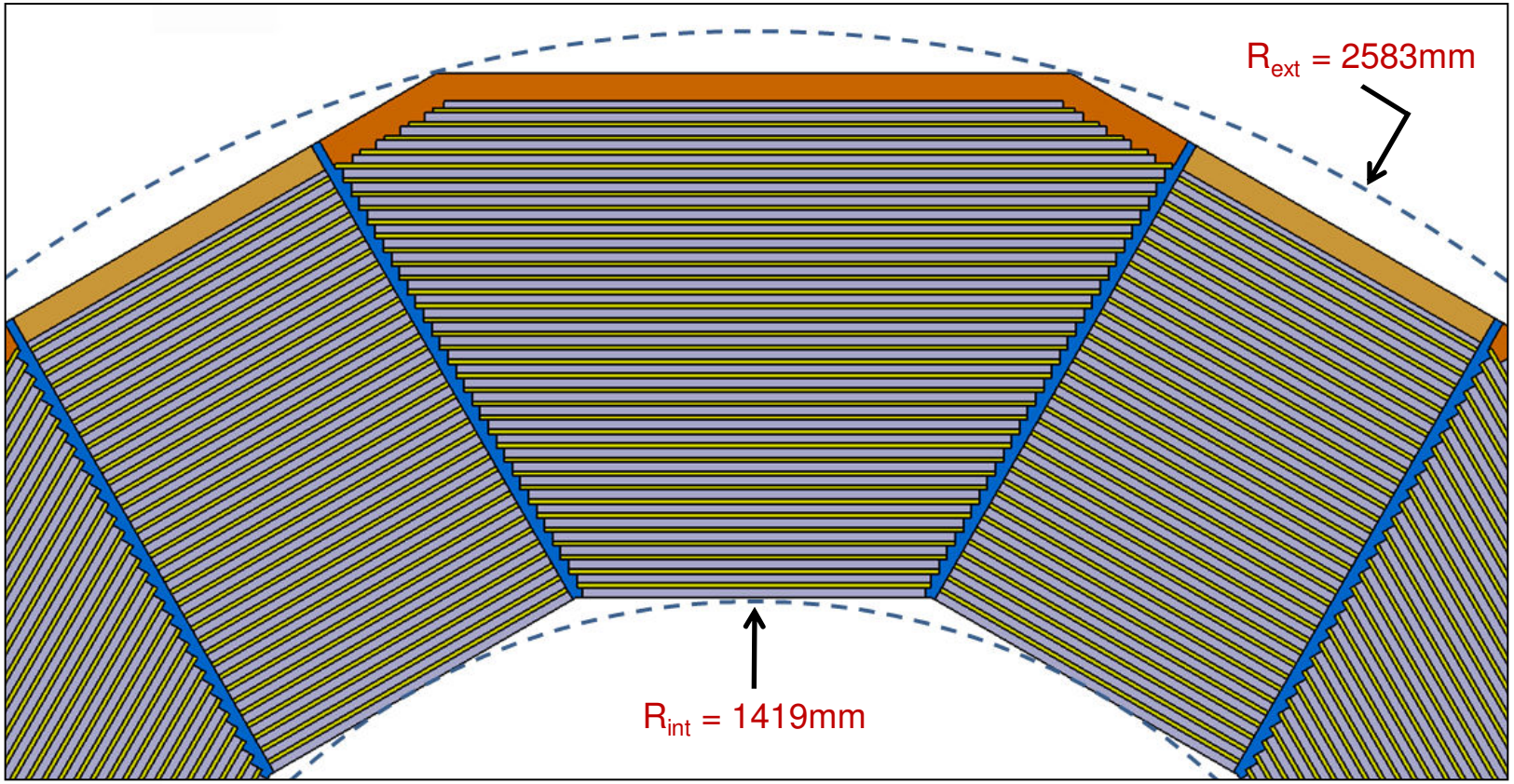
NB: same overall dimension than for a projective design



Hcal barrel: SiD baseline

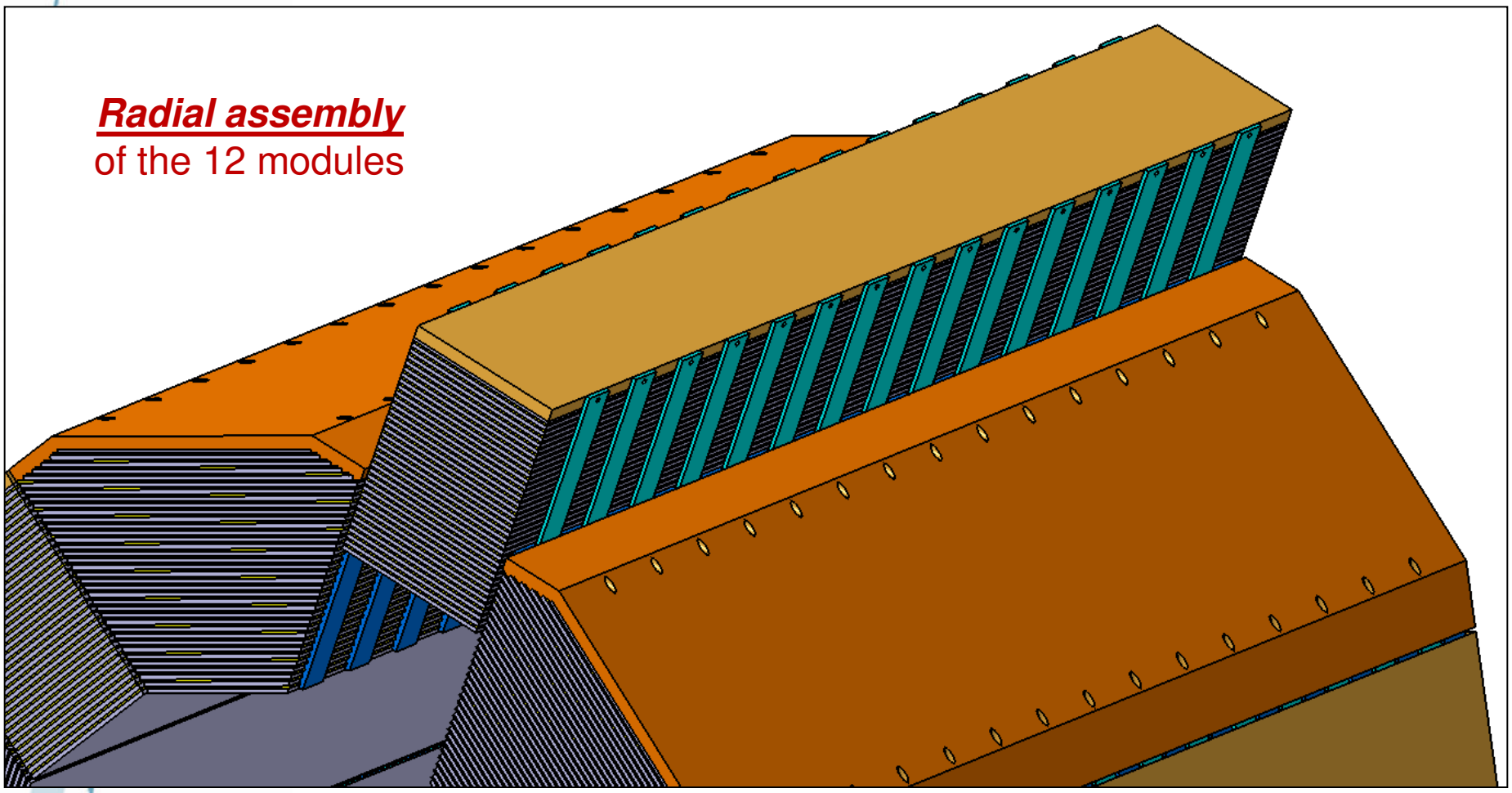
4.5 λ
Stainless steel absorbers

- 40 layers (absorber thickness 18.9mm)
- 8mm between two consecutive absorbers



Hcal barrel: SiD baseline

Radial assembly
of the 12 modules

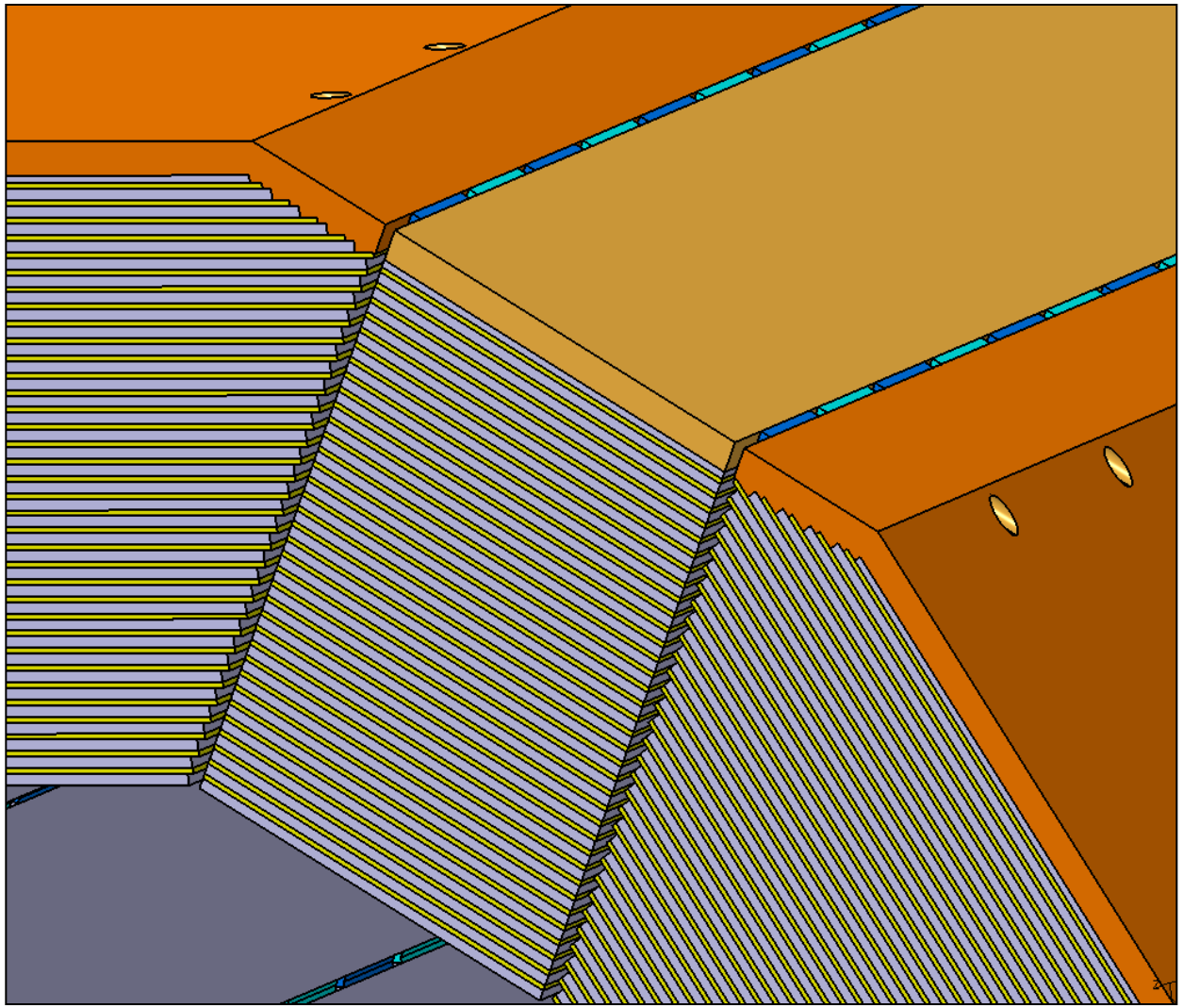


Hcal barrel: baseline pour SiD

Shifted stringers

↓

Optimization of the detection volume



Outline

- ***Hcal barrel*** mechanical structure
- ***Hcal end-cap*** mechanical structure
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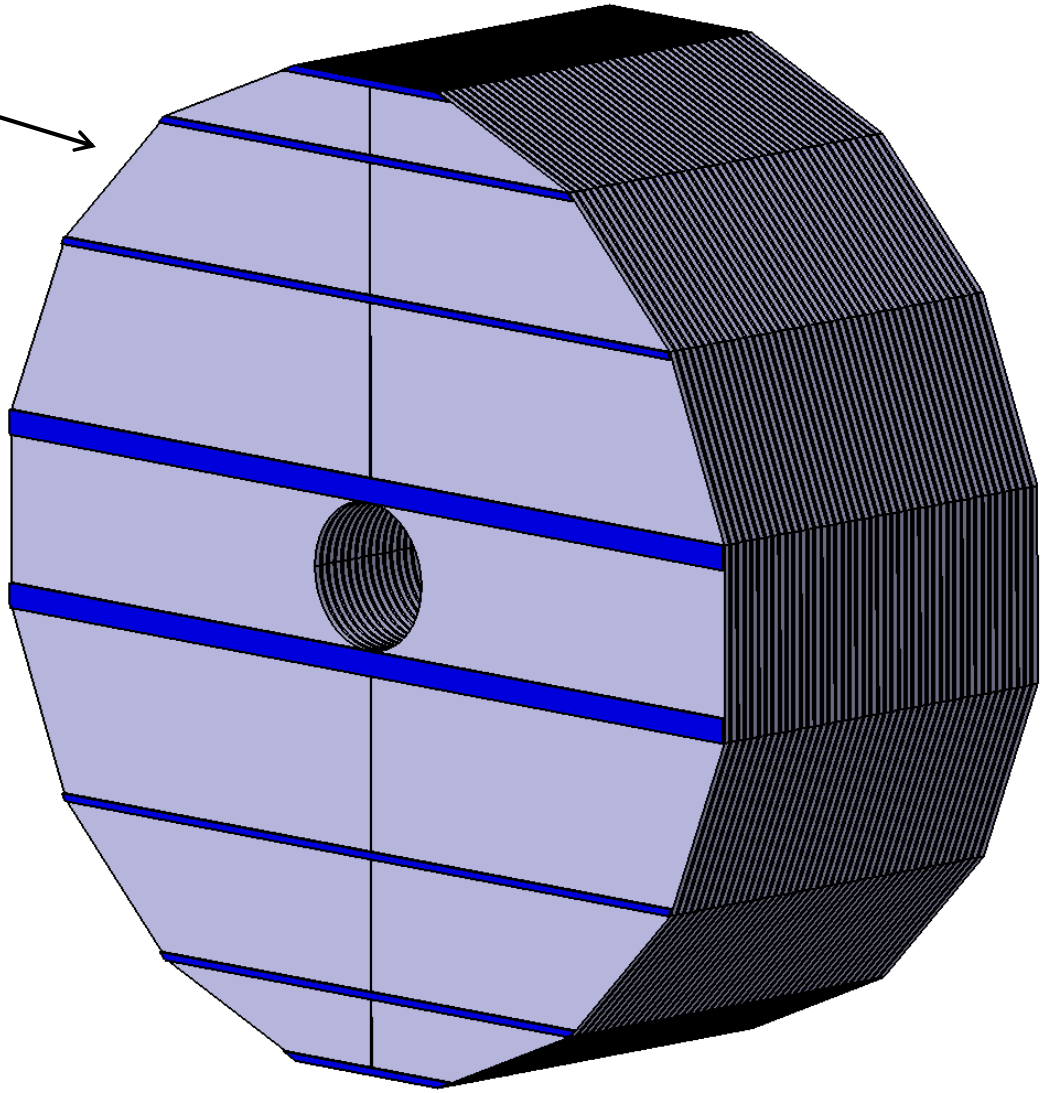
Hcal end cap : SiD baseline

Cantilever structure

Each absorber made
with 2 C parts
(surronding the beam axis)

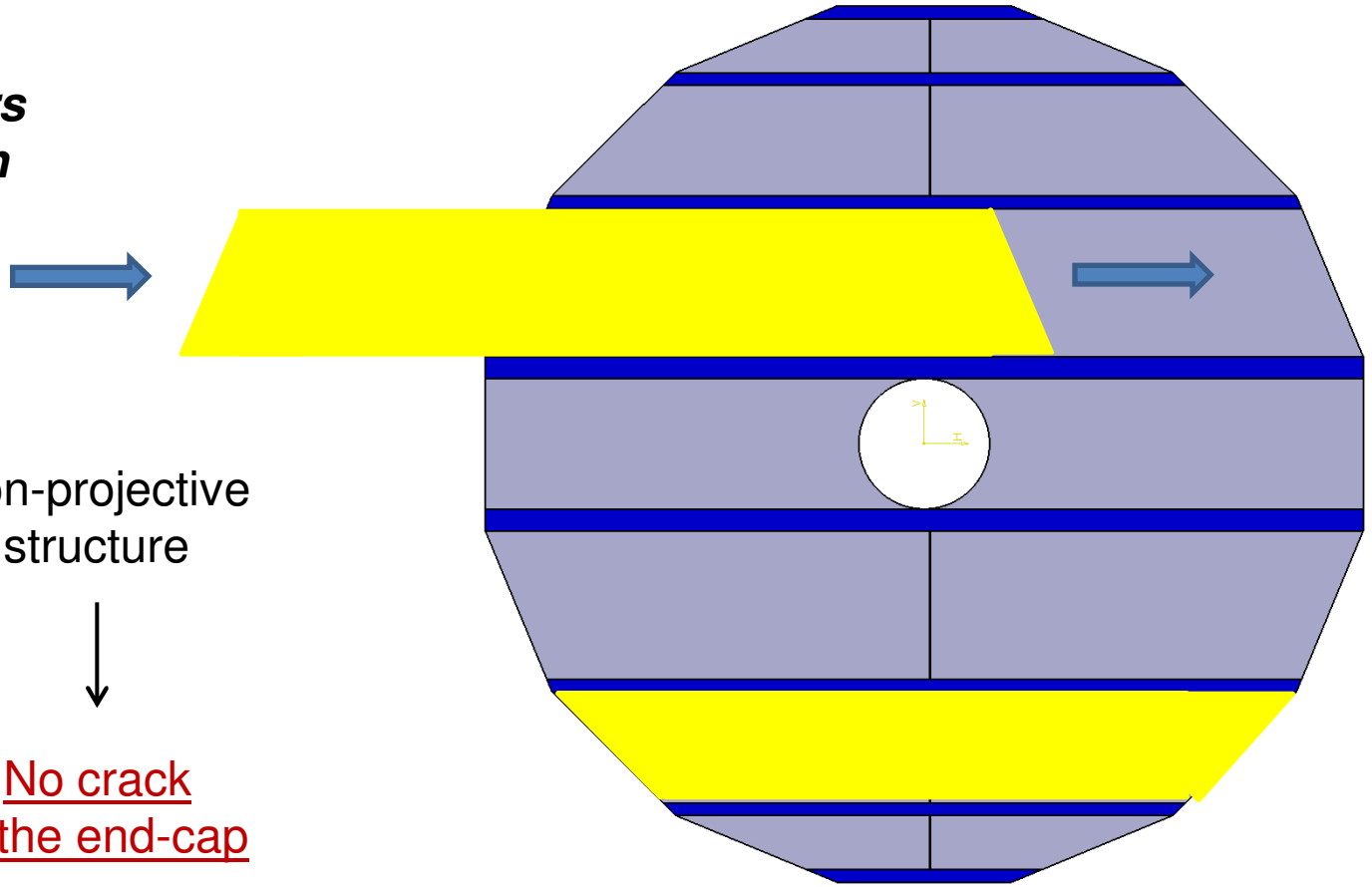
Use of spacers (in blue)
between each plan

Constant distance
between 2 absorbers
for the chambers to be
inserted



Hcal end cap : SiD baseline

Chambers insertion

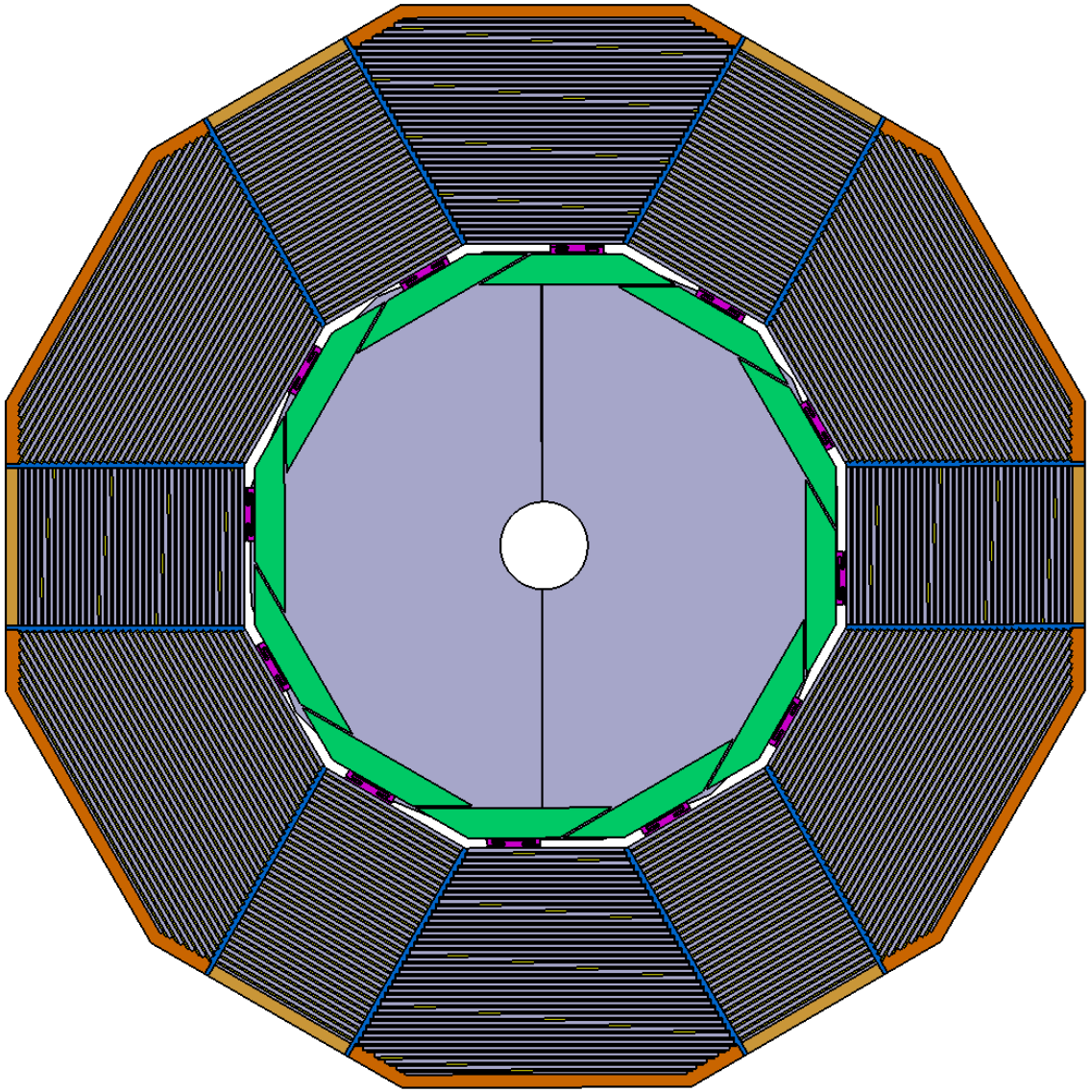


Non-projective structure

No crack in the end-cap

Longitudinal view of the detectors

The rectangular module could be a good option for the module 0 prototype !



Following studies:

- Realize FEA,
- Study Hcal locking devices on the magnet,
- Check cables and gaz pipe routes…

Outline

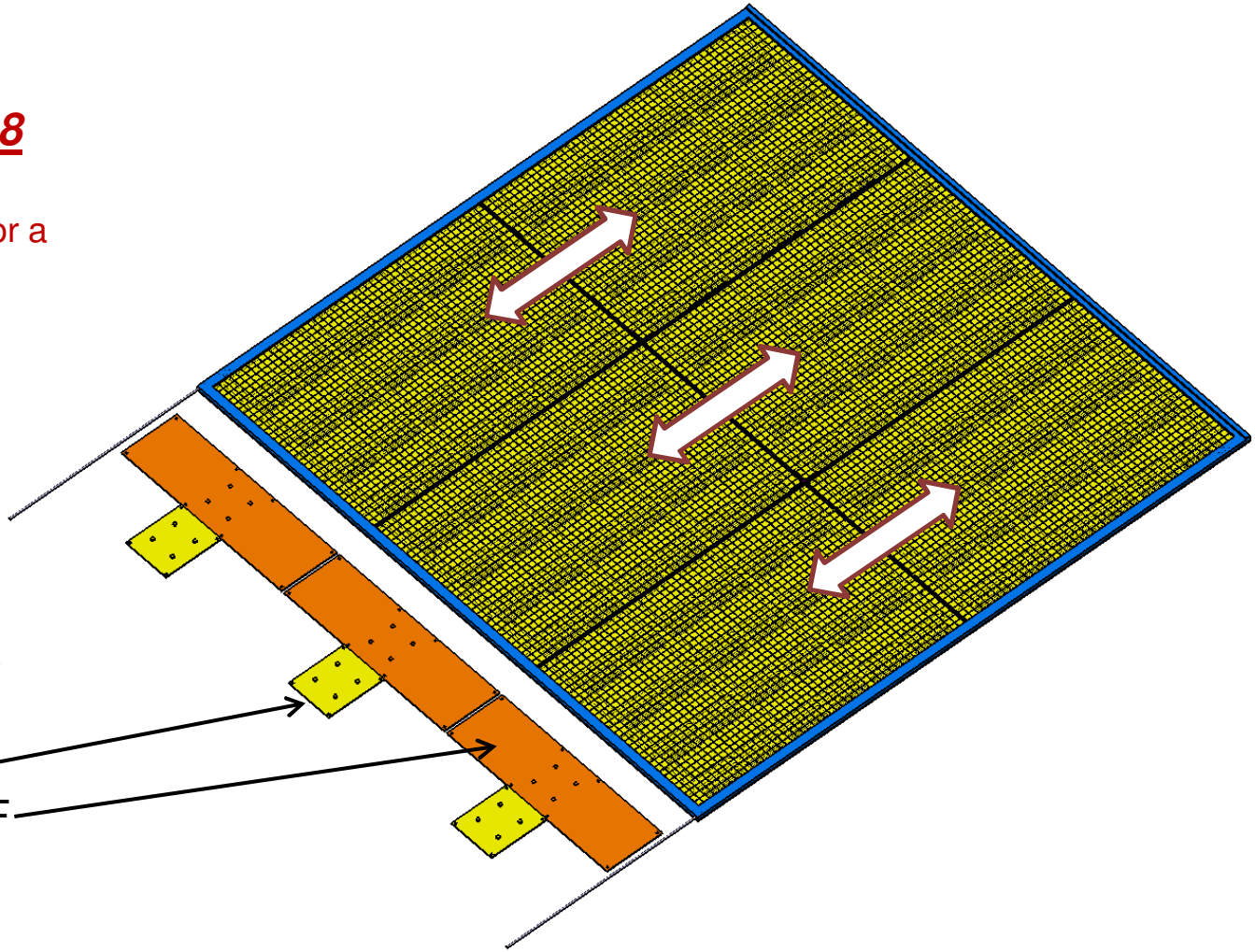
- ***Hcal barrel*** mechanical structure
- Hcal ***end-cap*** mechanical structure
- ***1m² Micromegas chamber*** prototype

1m² Micromegas chamber prototype

6 PCB 32x48

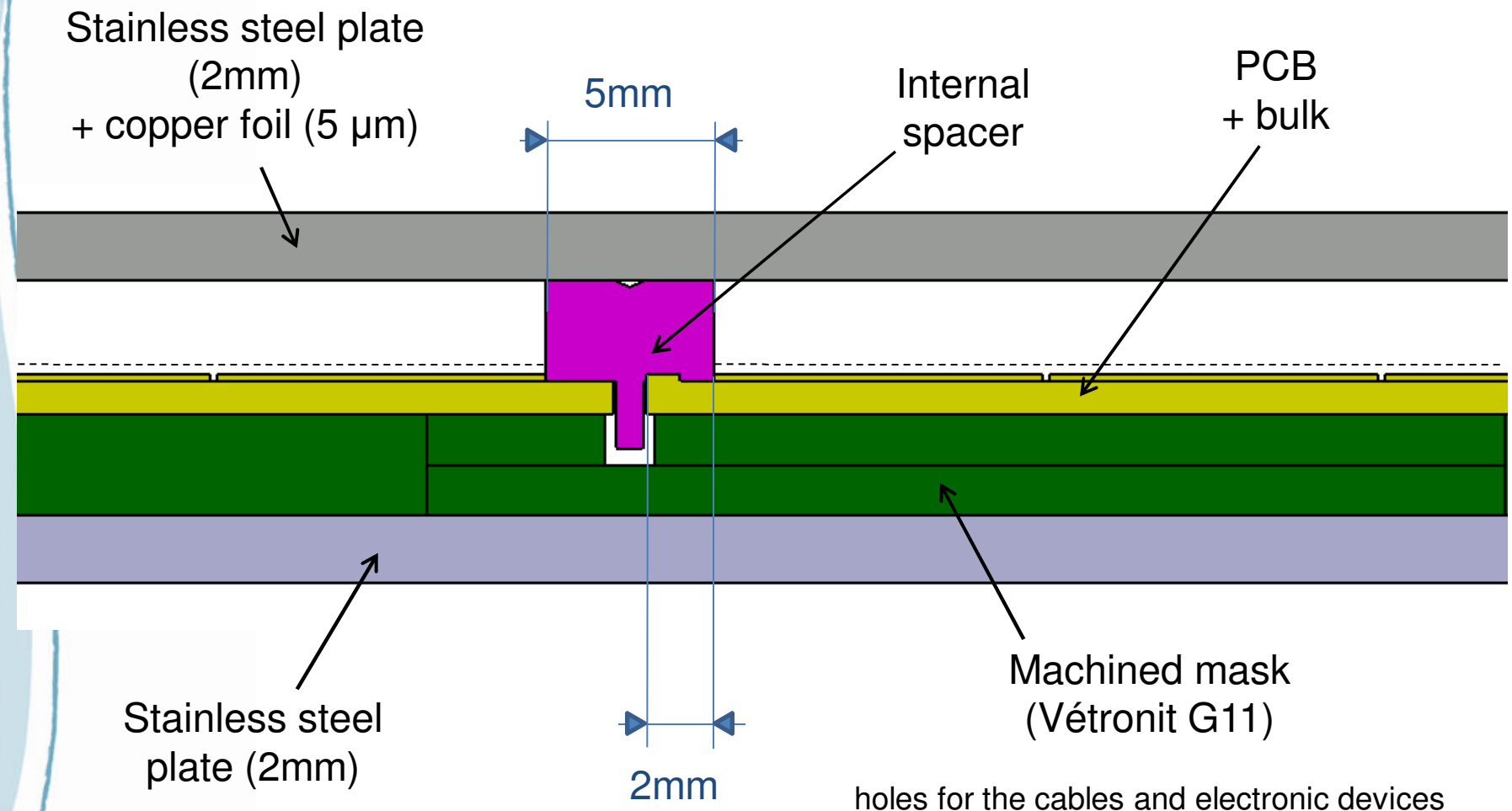
(2 chained ASU for a SLAB)

electronic boards
3 DIF
3 inter-DIF

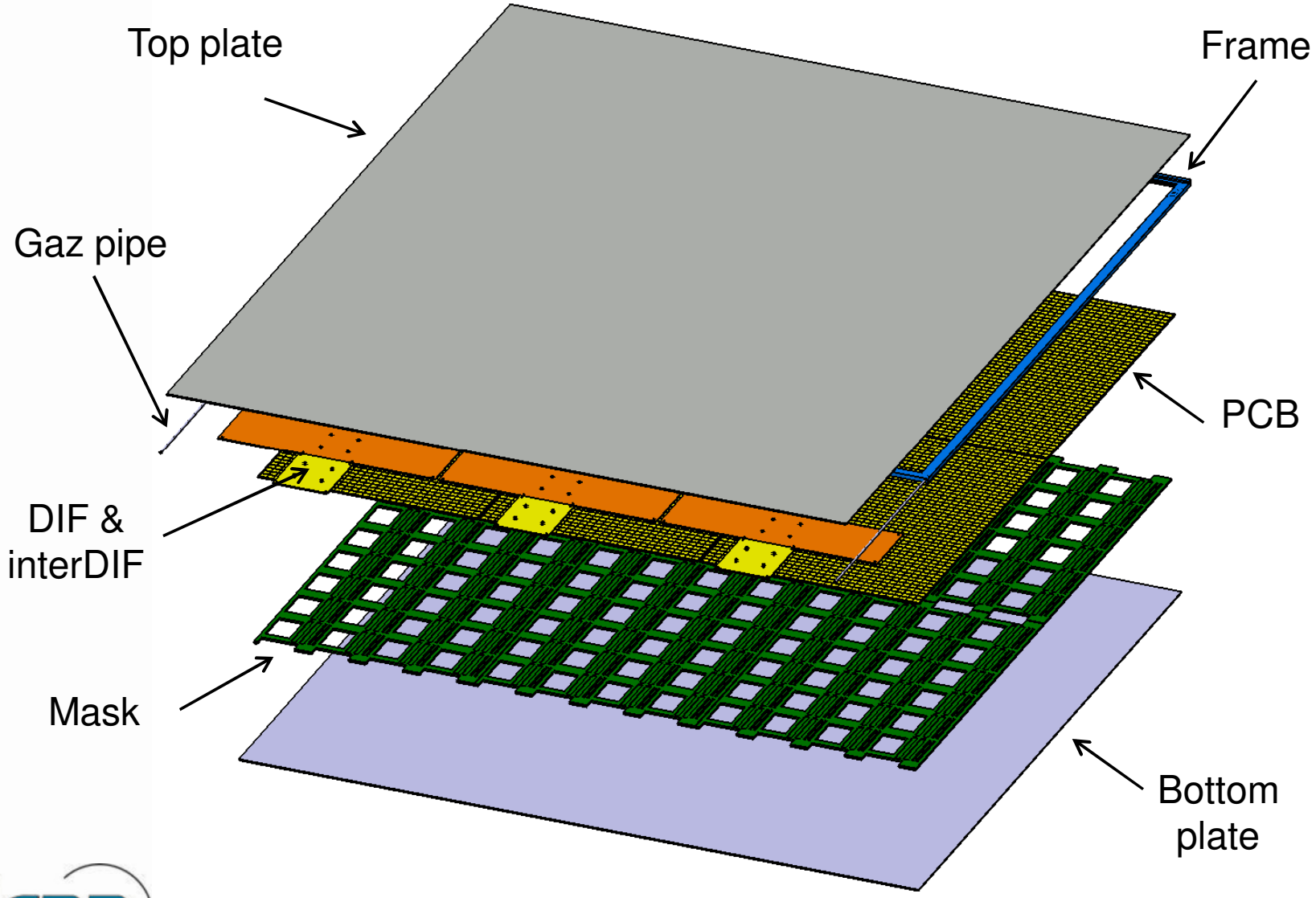


1m² Micromegas chamber prototype

[Chamber cross section]



1m² Micromegas chamber prototype



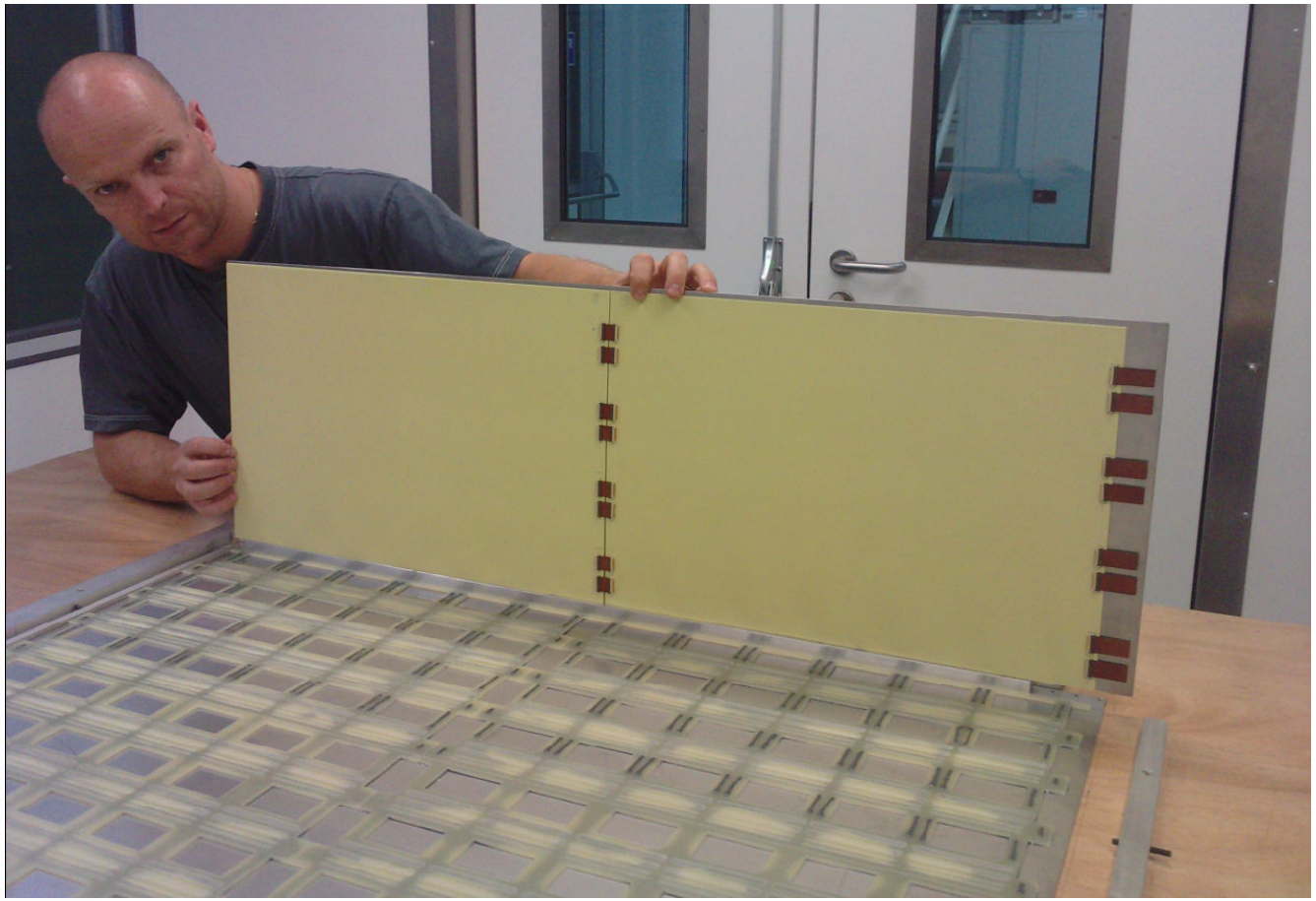
Assembly procedure

mechanical prototype : no electronics !

Step 1 : gluing of the mask on the bottom plate

Assembly procedure

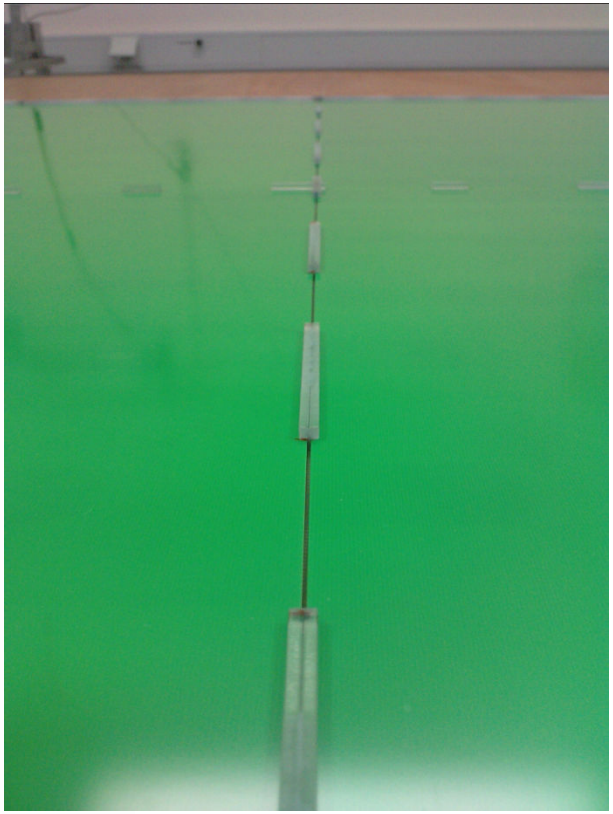
Step 2 : gluing of the (dummy) PCB on the mask

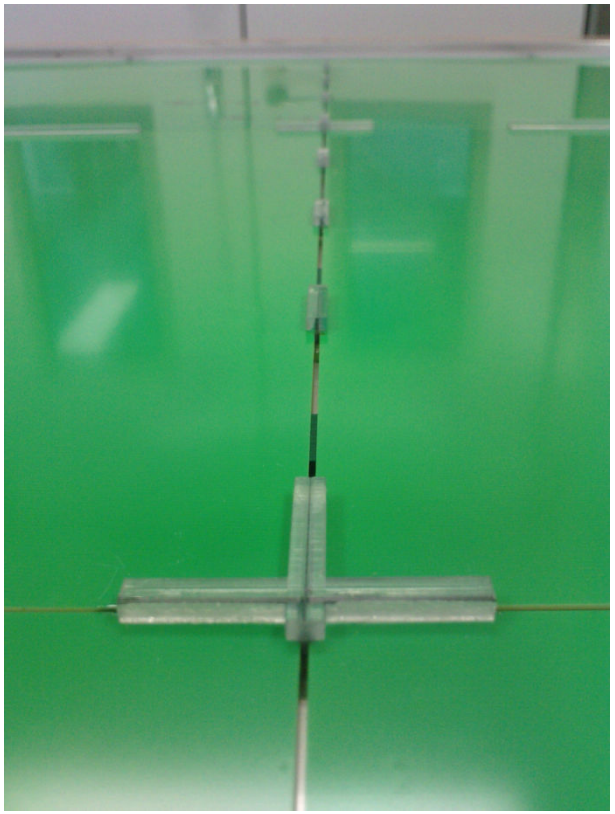


Assembly procedure

Step 3 : gluing of internal spacers

(designed to ensure a constant space between PCB and a constant drift gap)

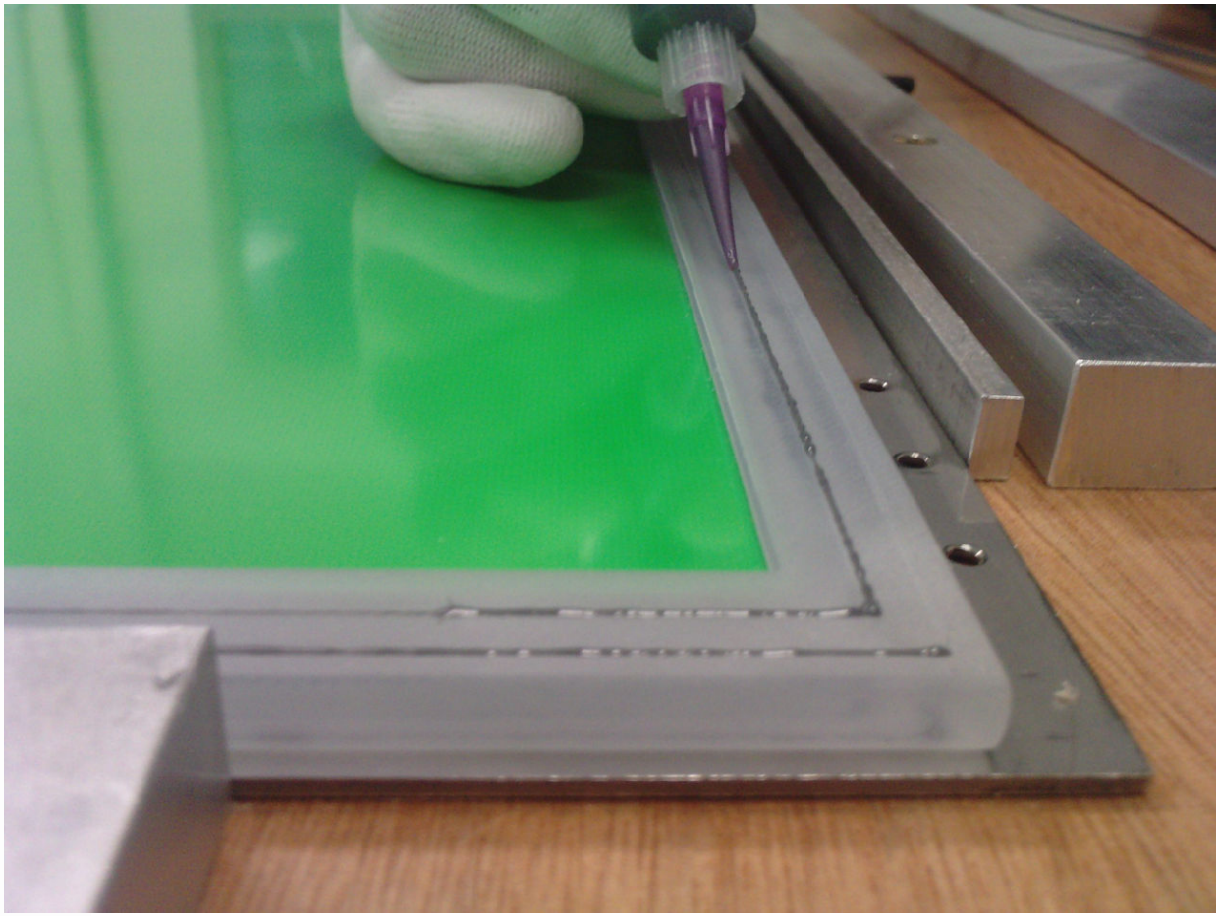




Assembly procedure

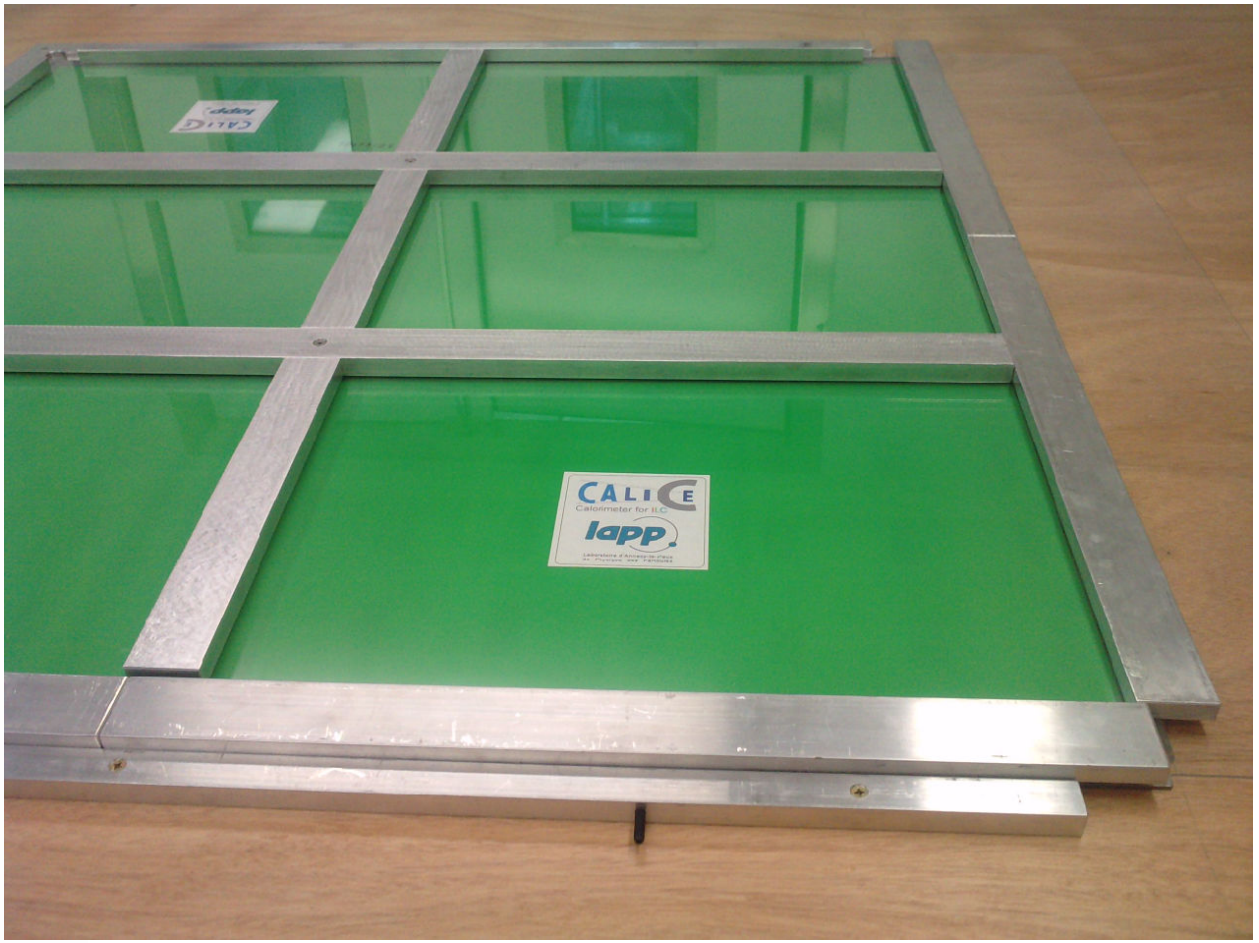
Step 4 : gluing of external frame

(designed to ensure a constant drift gap and chamber air tightness)



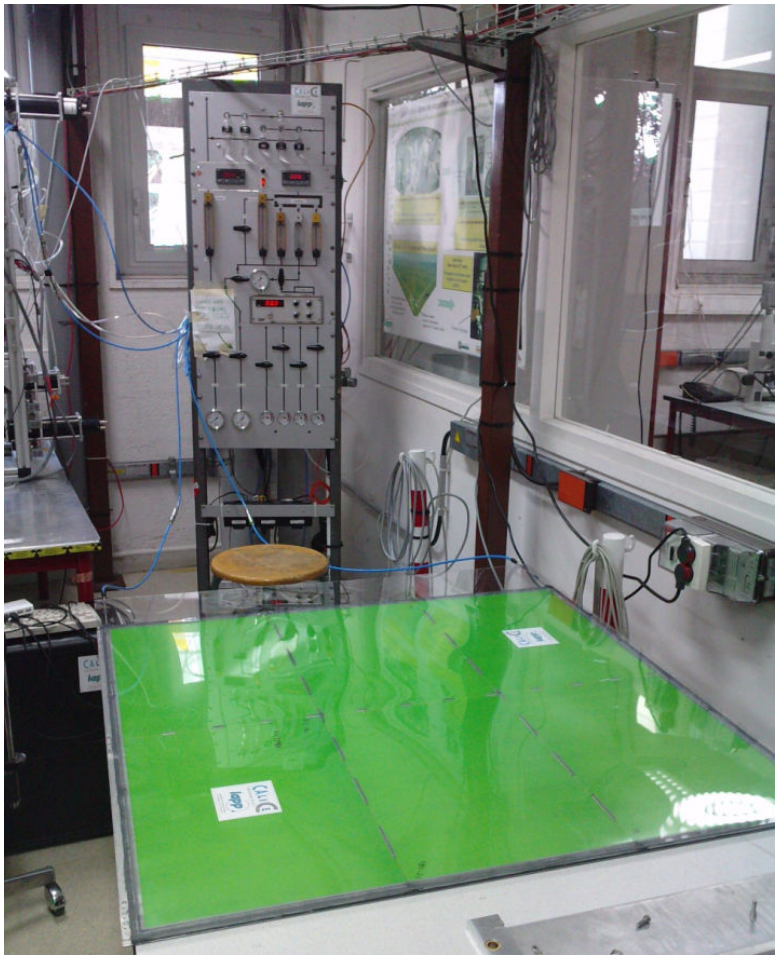
Assembly procedure

Step 5 : gluing of top plate (plexiglass plate for this prototype)



Assembly procedure

Step 6 : tests of air tightness



Test OK :

Air-tight chamber !

Next step :

Assembly of the 'true' prototype in a laminar flow clean room.