

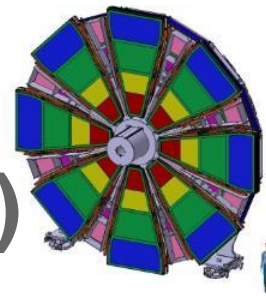
DE LA RECHERCHE À L'INDUSTRIE



[www.cea.fr](http://www.cea.fr)

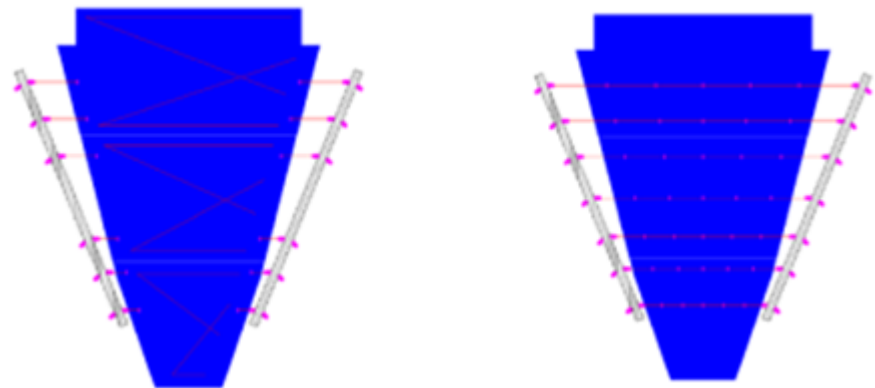
[Irfu.cea.fr](http://Irfu.cea.fr)

# ATLAS - NSW (NEW SMALL WHEEL)



## MICROME GAS DETECTORS

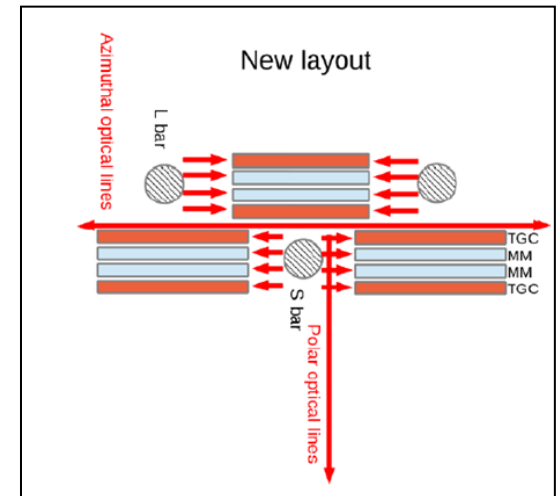
Impact of the in-plane alignment on  
the assembly procedure



Patrick PONSOT

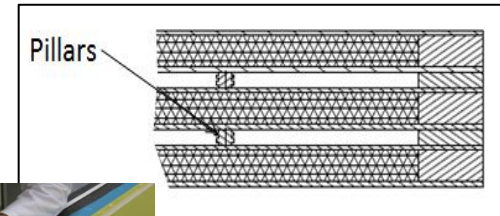
CERN MM workshop – 5-6 of November 2013

- A short presentation to remind you that we don't forget the impact of the in-plane alignment on the assembly procedure (for more details see presentation at Roma meeting on mid-July)
- Two major issues → to have under control the out of plan deformation of the strips (identified with the thermomechanical simulations)
  - Different bending of the IP modules compare to the HO modules within a temperature gradient of 2° (modules are fixed on the spacer only all around their frames)
    - In-plane alignment sensors are needed on each module
  - Transmission of the deformation from the RO panels to the external in-plane alignment sensors
    - Strong impact on the assembly of the modules

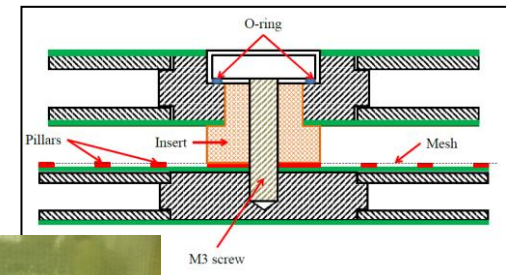


- How can we transmit with high precision the deformation of the RO panels to the external in-plane alignment sensors?
  - Due to the drift gap we need to link all the panels together

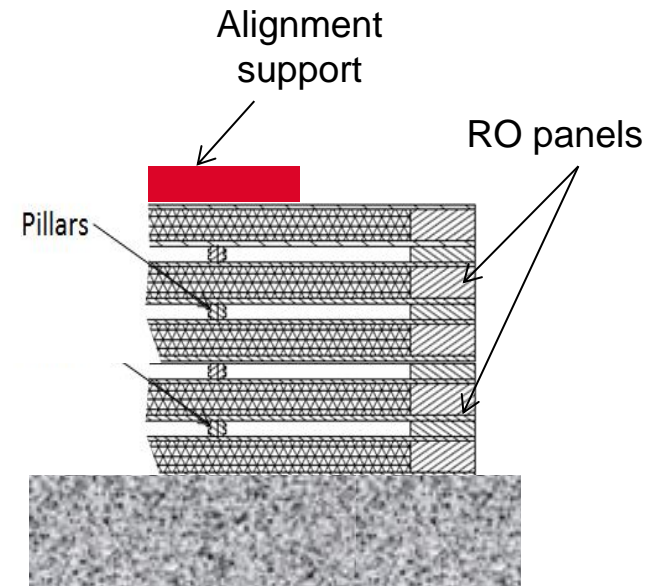
- With glued pillars (option from Saclay)
  - Diameter ~5mm
  - All is glued, not dismantable
  - No holes to drill, gluing of the pillars through the mesh has been tested
  - Experience from TGC community



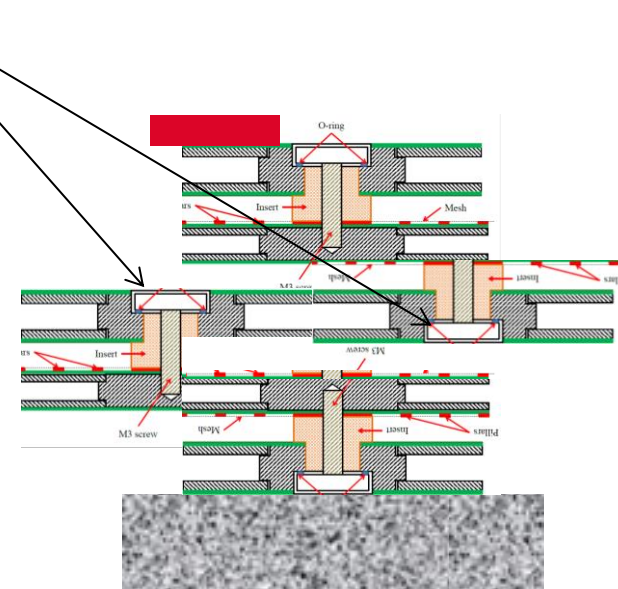
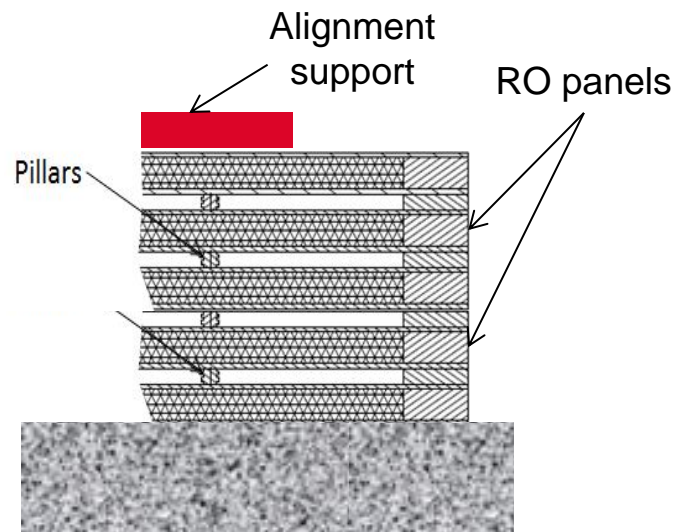
- With interconnecting screws (option from CERN)
  - Diameter ~10mm
  - Dismountable, but enclosing of all the pins during the assembly (precise positioning of the inserts)
  - Holes in the mesh (electrical insulation with kapton between the mesh and the resistive strips)
  - Holes in the drift cathode
  - Sealing with o-rings



- How can we transmit with high precision the deformation of the RO panels to the external in-plane alignment sensors?
  - Parameters to reach the precision
    - Optimization of the number of pillars
      - estimated by simulation to  $\sim 20$  per  $m^2$
      - Also to limit the shear stress and the tensile stress induced by the gas pressure
    - **Assembly of the modules on the granite table**
      - to have a planar reference during the piling
      - to create the reference for the in-plane alignment system (registration of a measurement without deformation)
      - Using of calibrated Bcams installed on the granite table
    - Position of the alignment supports
      - as closer as possible to the pillars (piling zone)
      - But the pillars should not be at the same place (vertically and horizontally along the same line) to avoid particular deformation of the modules (to be confirmed with simulations and tests)



- How can we transmit with high precision the deformation of the RO panels to the external in-plane alignment sensors?
  - Assembly procedure ?
    - With glued pillars
      - Just by piling! All is glued!
    - With interconnecting screws
      - Is it possible to align the 2 doublets (clearance around the screws M3)?
      - It seems impossible to connect the central drift panel with the 2 RO panels at the same time





# Thank you for your attention !

Commissariat à l'énergie atomique et aux énergies alternatives  
Centre de Saclay | 91191 Gif-sur-Yvette Cedex  
T. +33 (0)1 69 08 79 30 | F. +33 (0)1 69 08 89 47

Etablissement public à caractère industriel et commercial | RCS Paris B 775 685 019

DSM  
Irfu  
SIS/LCAP (PC N°12, Bt 123)  
Patrick PONSOT