MM mechanical prototypes

Full wedge option

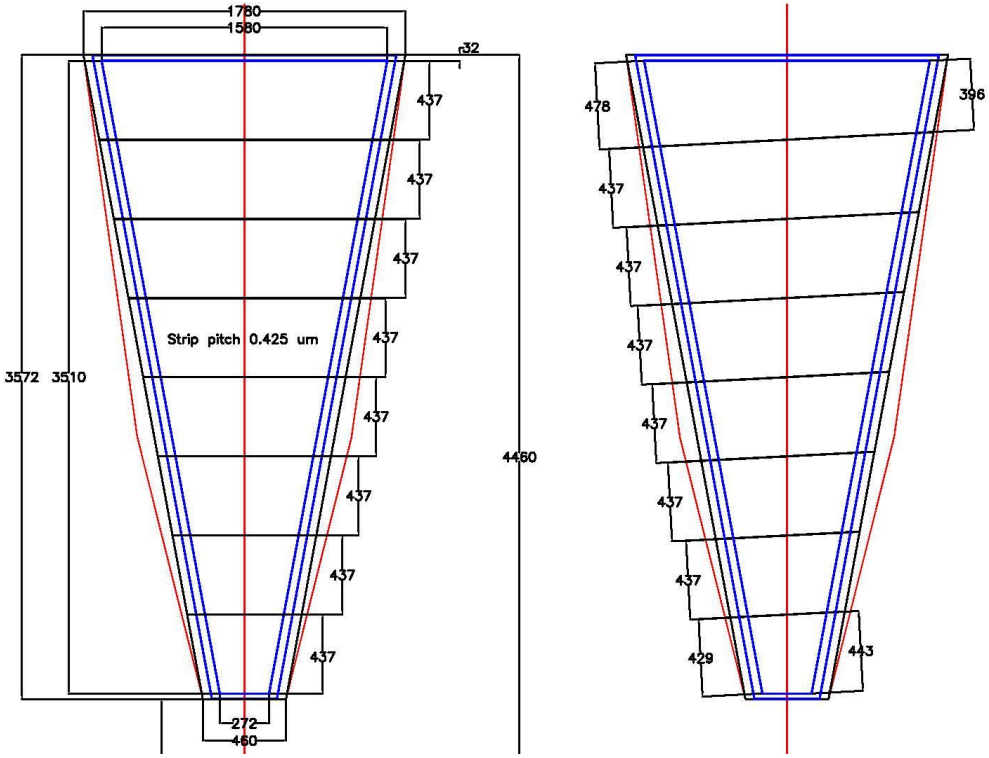
At CERN

Purpose

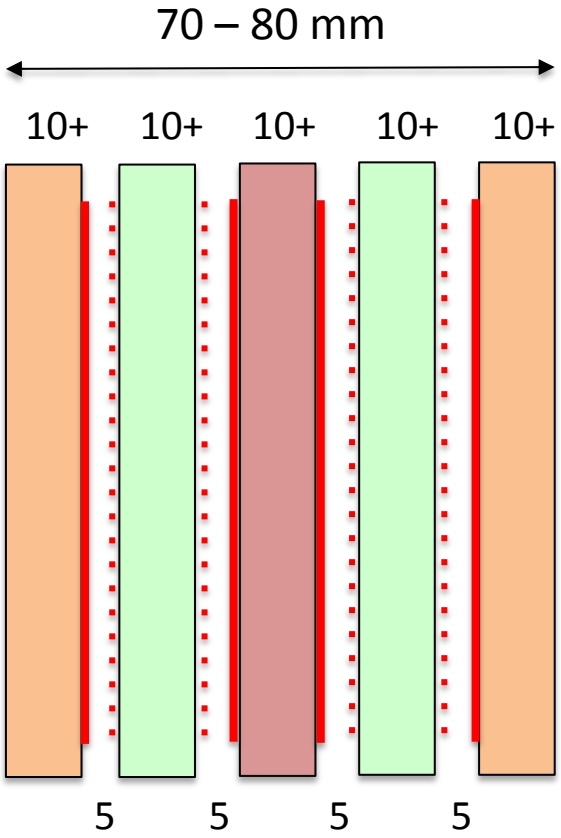
- Demonstrate feasibility
- Setup of basic infrastructure
- Gain experience with
  - construction/assembly ideas/schemes
  - Materials
  - Procedures
  - Precision (for me not the main objective)
- Produce objects that can be measured
- Establish an Assembly Manual

CERN mechanical prototype

- Full-wedge small sector quadruplet
  - Eta and stereo doublet
- All panels of equal thickness 11-12 mm
  - Standard Al profiles of t=10 mm as frames
  - Al honeycomb of t=10 mm
  - Skins = 0.5 mm (FR4)
  - Glue gaps ≈ few 100 µm
- Drift gap spacers: 5 mm
- Total thickness: 75–80 mm

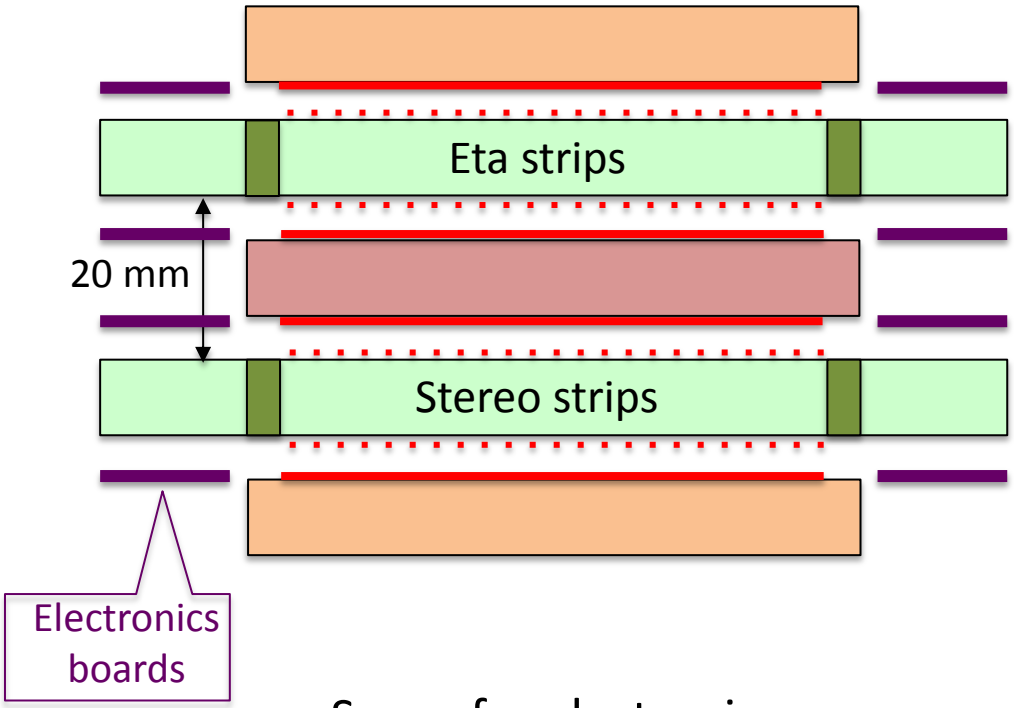


Dimensions



MM multiplet stack
(10+: 11 or 12 mm)

Dead area: 50 mm
Space for electronics: 50 mm



Space for electronics
(50 mm in phi)

Collaborative effort

- CERN, Lecce, Saclay, … more collaborators are welcome
- Drawings and calculations: Lecce and CERN
- Infrastructure and tooling: CERN, Saclay
- Technical work: CERN, Lecce, Saclay
- Evaluation: all (two summer students for mechanical)

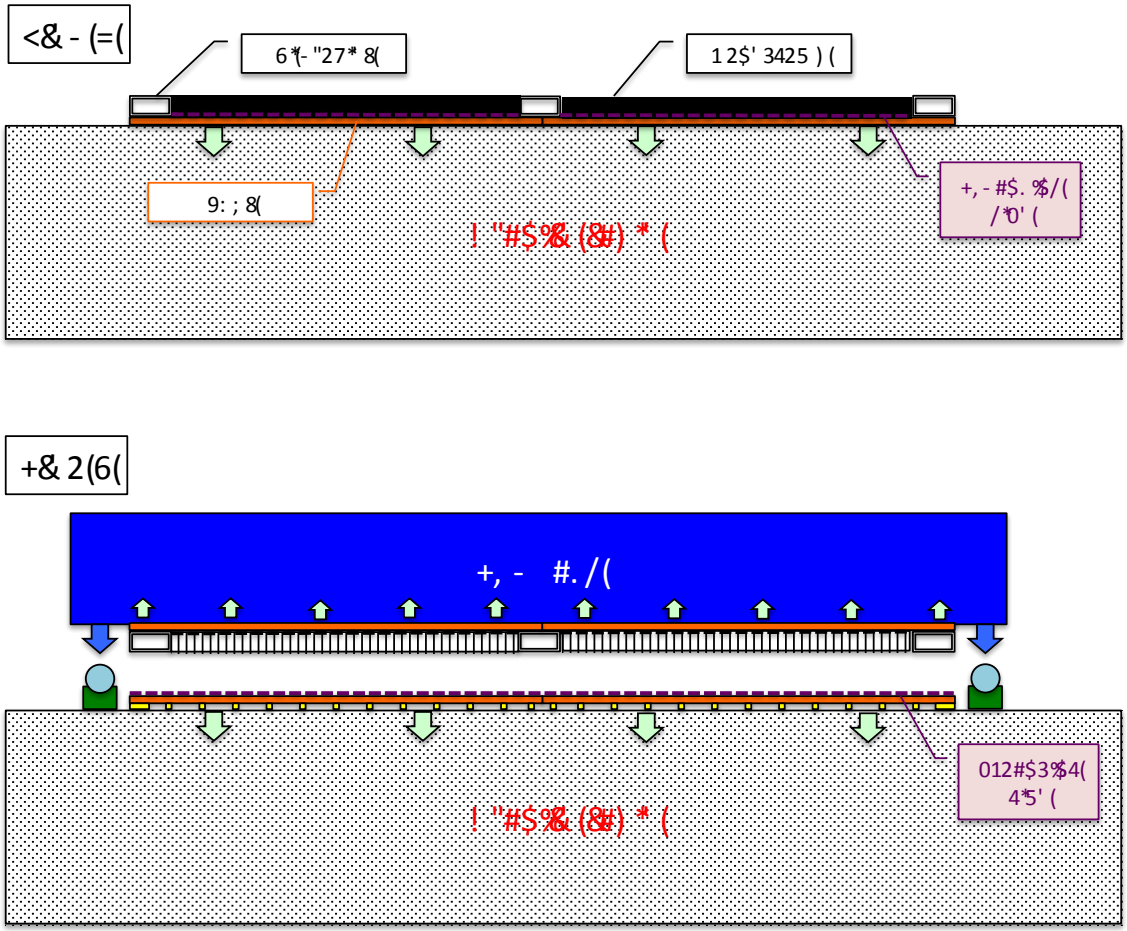
What could/should be included

- Realistic materials and glues
- Realistic thickness and segmentation of PCBs
- Space for on-chamber electronics boards
- Simplified cooling and cabling channels
  - We foresee to insert heating wires into the cooling channels to simulate electronics/cooling
- Gas channels and seals (to allow for gas pressure tests)
- Mesh frame (but not necessarily the mesh)
- T-sensors (a few) to allow for test measurements
- Other ???

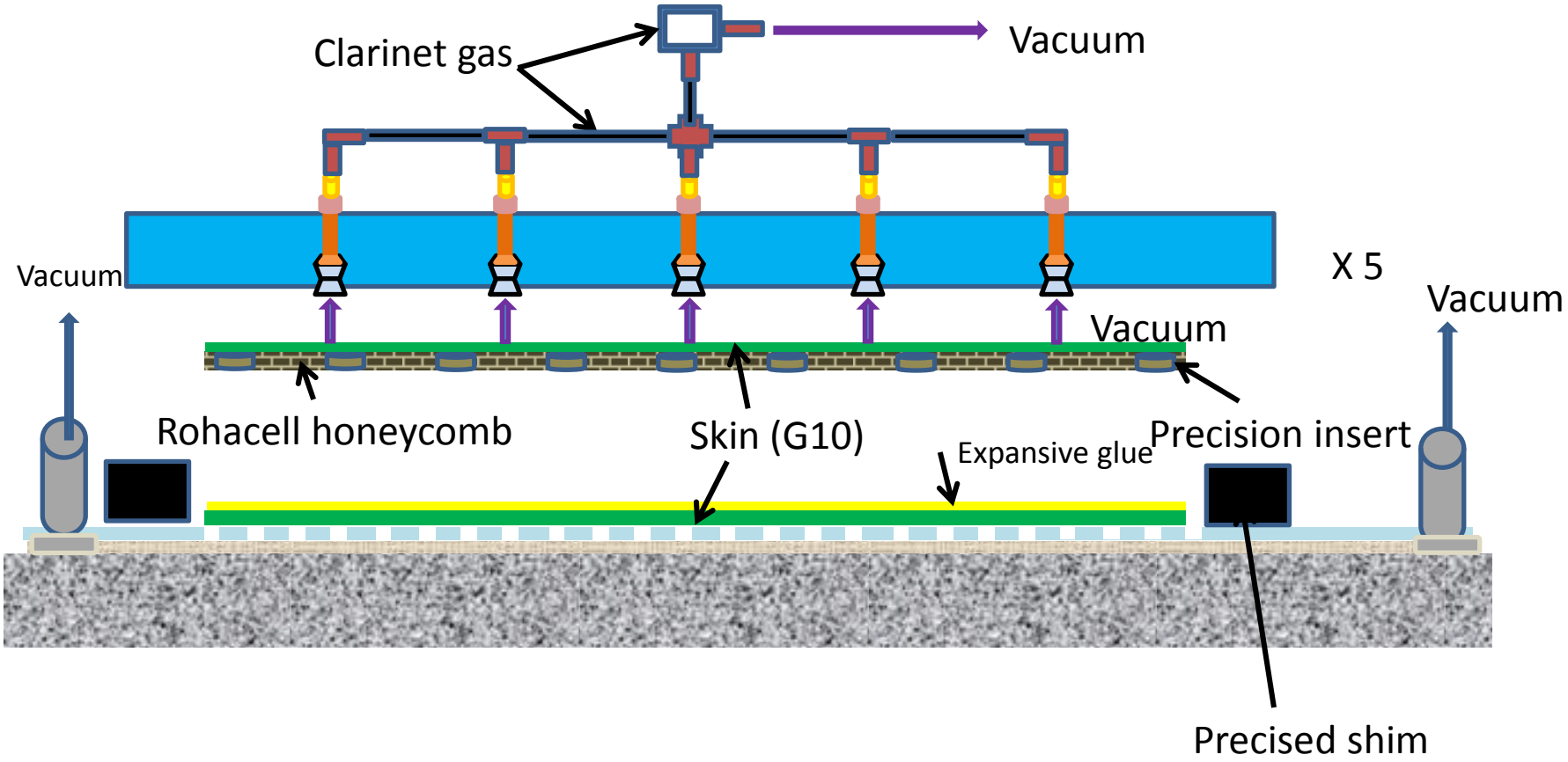
The table

- Size: 4 x 2.5 m
- Flatness: ≤ 20 µm
- Location: B16
- Available: mid May

Assembly scheme



Using Skin suction Tool



Stiffback

- Simple stiffback structure with suction heads (following small test structure) used for 2 x 1 m^2 prototype
- CERN-DT group is working on a more final system using a perforated honeycomb structure with a perforated lower skin
- Work in progress
  - Small 50 x 50 cm^2 system under construction
  - Large system if prototype successful