



CLICdp Tracker Technology Meeting

Update of the Mechanics for the Tracking Detector

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Presentation Layout

- **Design proposal of support structures & Petals for the ITD :**
 - Requirements & Objectives
 - Introduction to Design and the Concept Development Process
 - Design proposal of Petals
 - Design proposal of Support Structures
- **Summary**

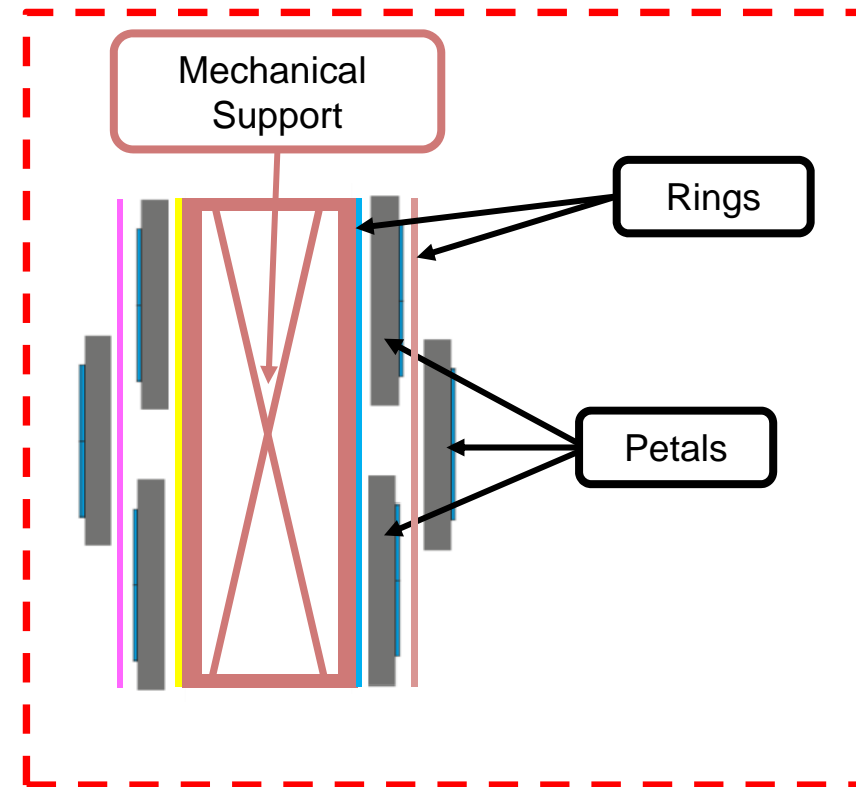
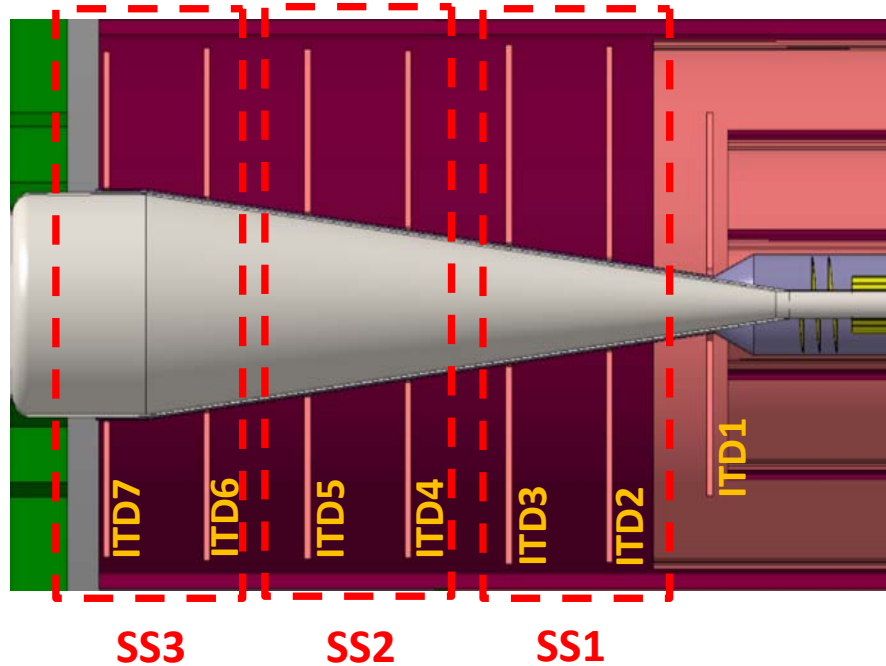
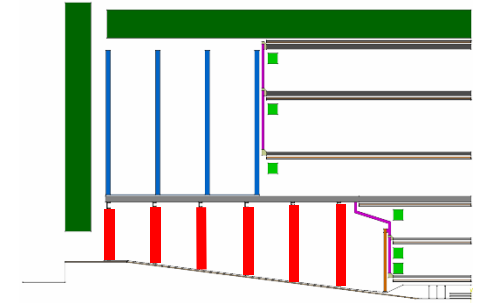
Requirements

- Due to the fact that the Inner Sub-System includes the beam pipe, the supports for all components, including the Inner Tracker Disks should be designed with two halves.
- Support structure should be easily attachable to the Support Tube and be compatible with the gaps that were established for the services.
- Petals from two different Tracker disks would share the same support structure.
- For the time being, we assumed the scenario where the petals of one Tracker Disk would be mounted in two different planes (to guarantee the overlap).

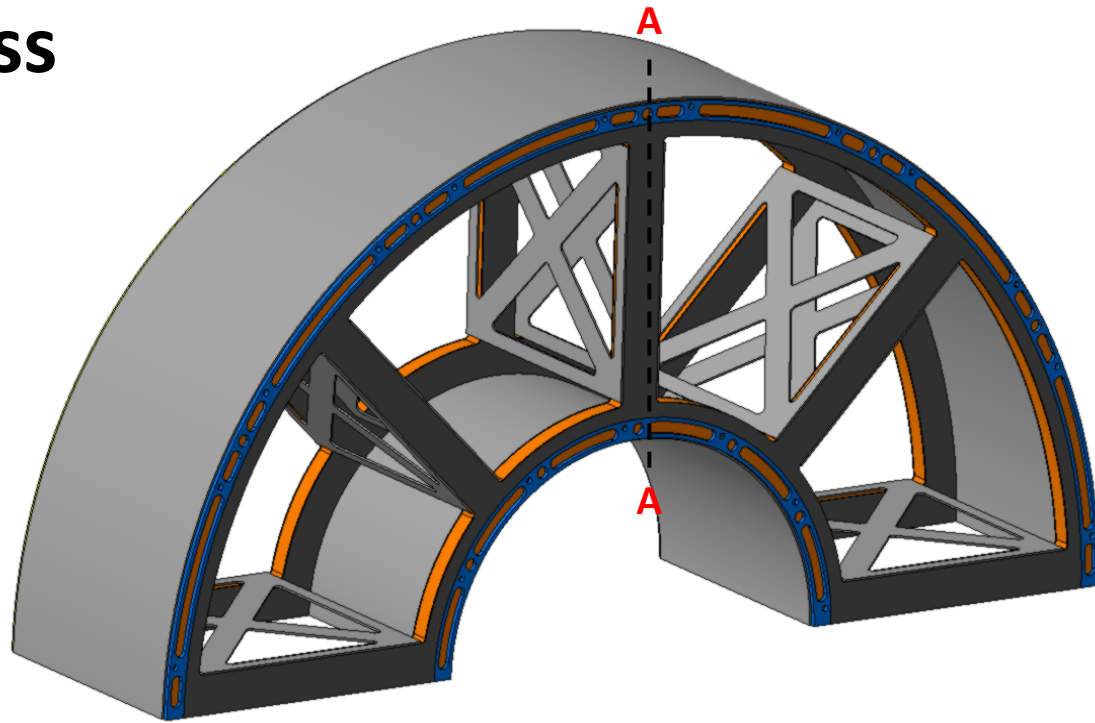
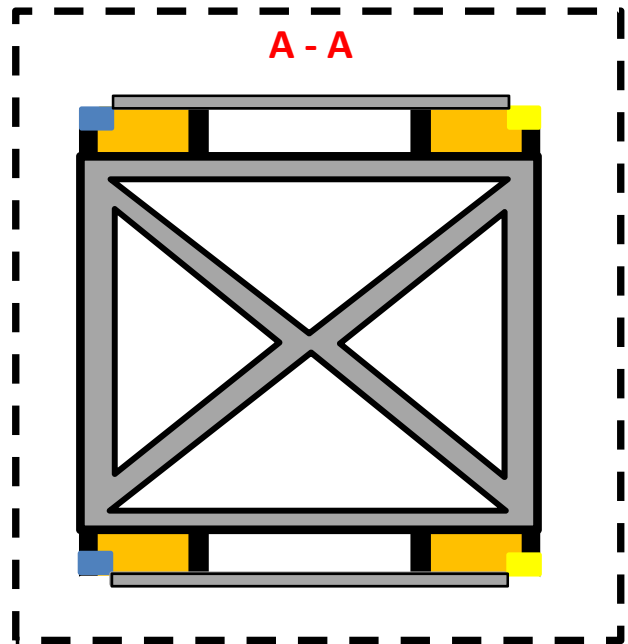
Objectives

- One of the major objectives is to minimize the value of radiation length and make the structure as much invisible for the particles as possible.
- Due to the detector performance, we are looking for a stiff and lightweight construction.
- Looking for a simple and coherent design of the support structures and petals.
- Number of designs regarding the support structures and petals should be minimized.

Introduction to Design and the Concept Development Process



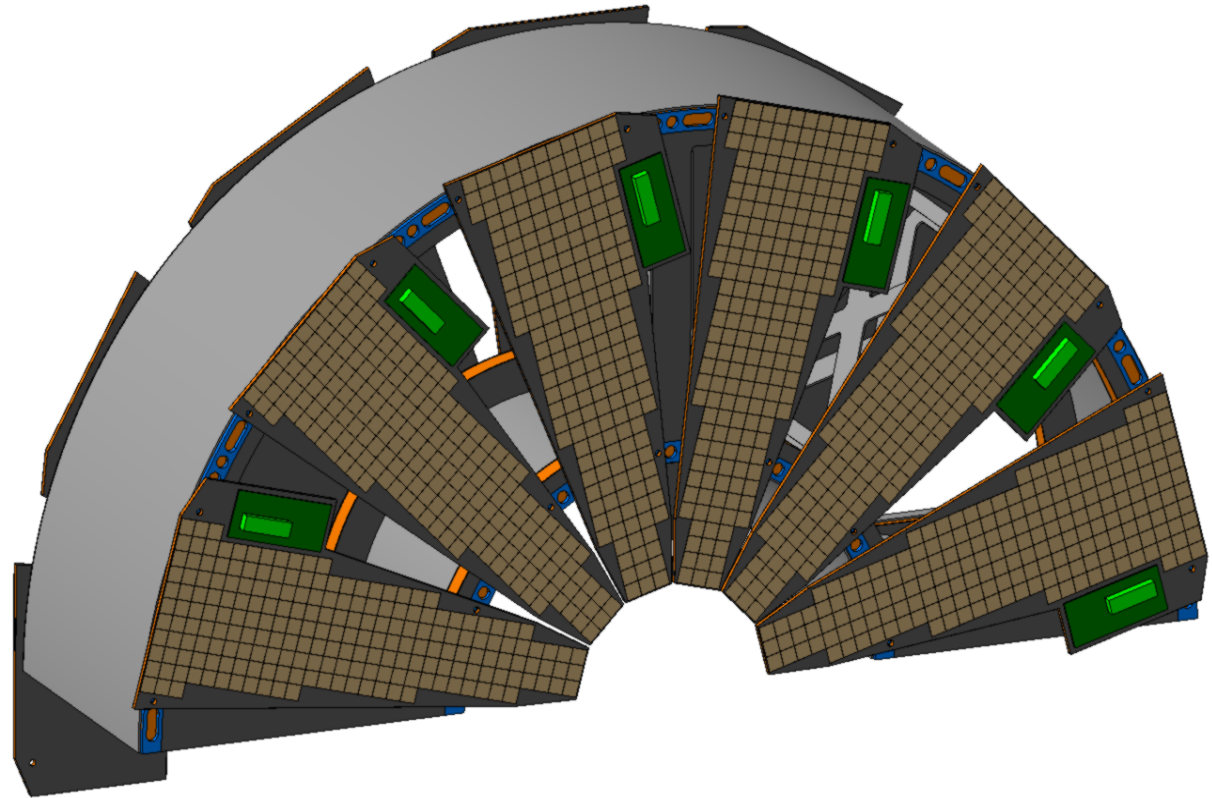
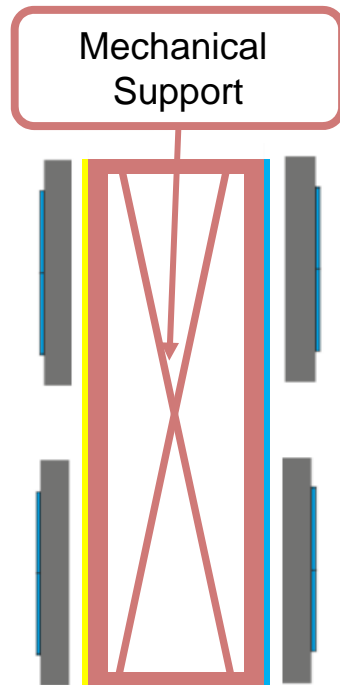
Introduction to Design and the Concept Development Process



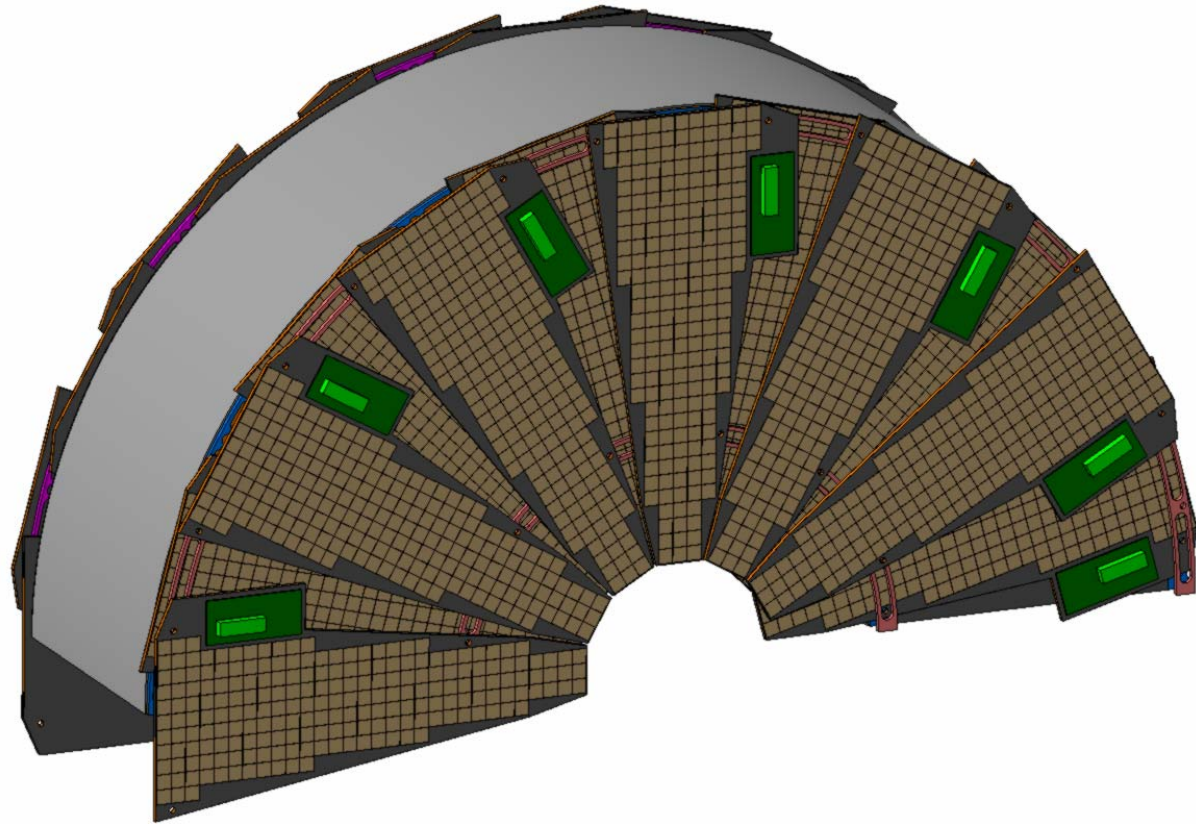
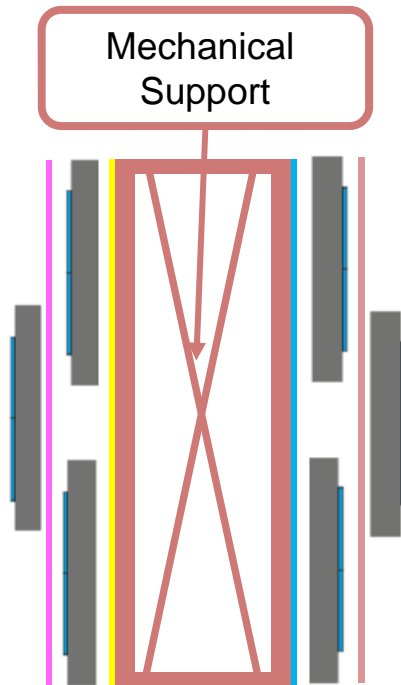
Design details:

- 2 Sandwich faces [CFS-CORE-CFS]
- 2 Rings on each side (in total 4) e.g. made of PEEK
- Horizontal Interlinks – Inner & Outer CF Shell
- Radial Interlinks – CF Plates

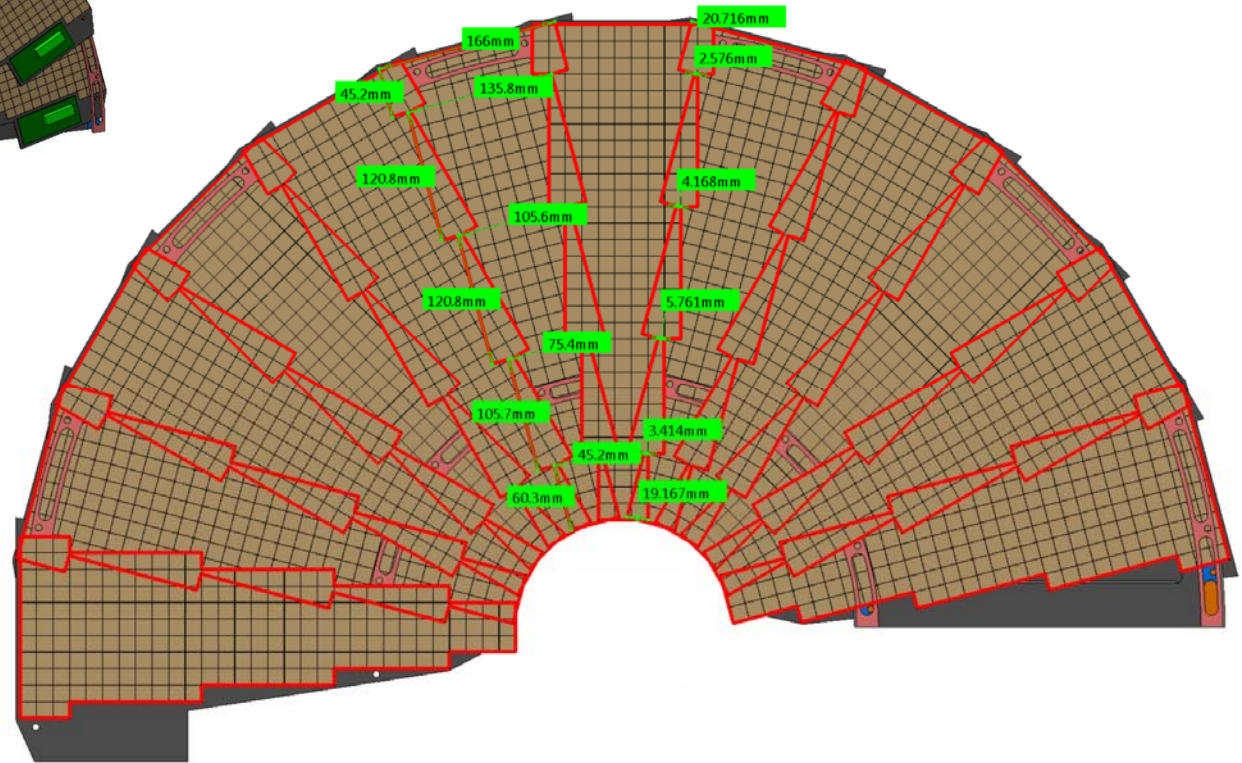
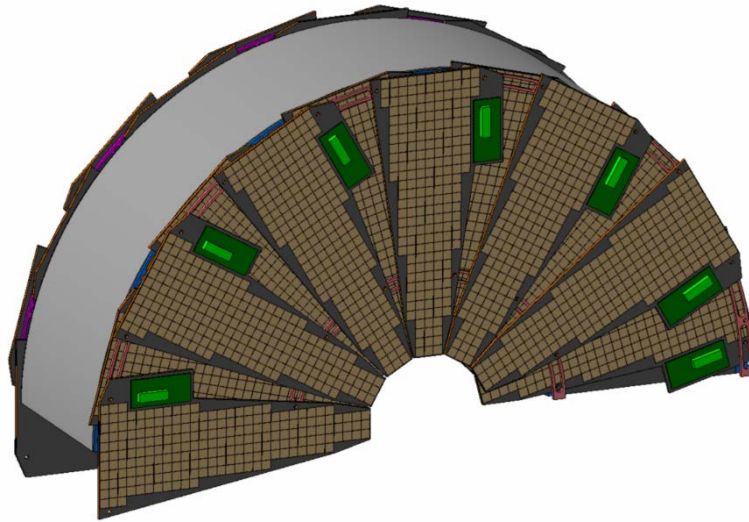
Introduction to Design and the Concept Development Process



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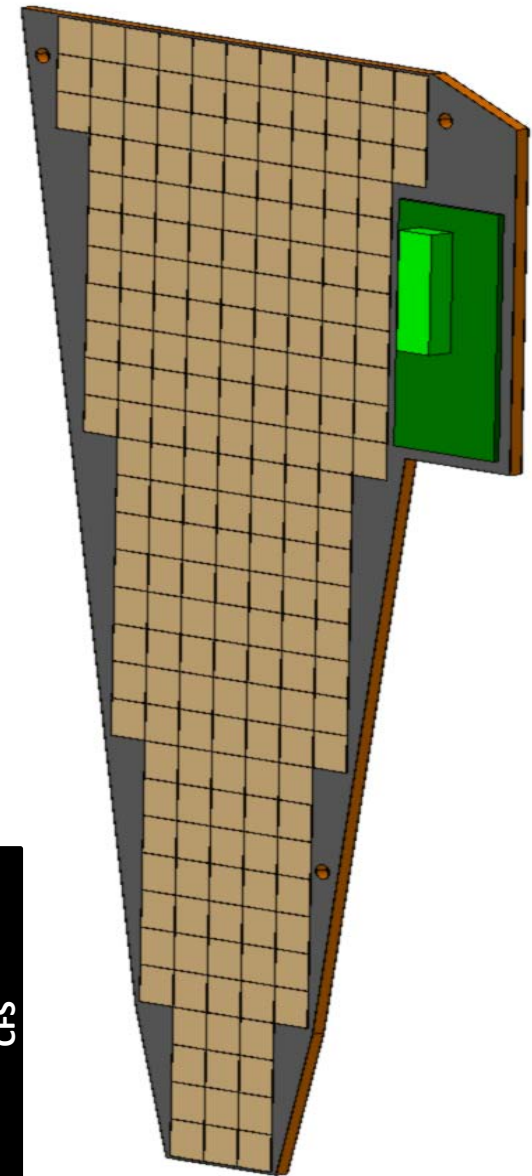
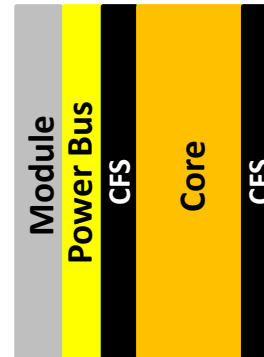


e.g. ITD2

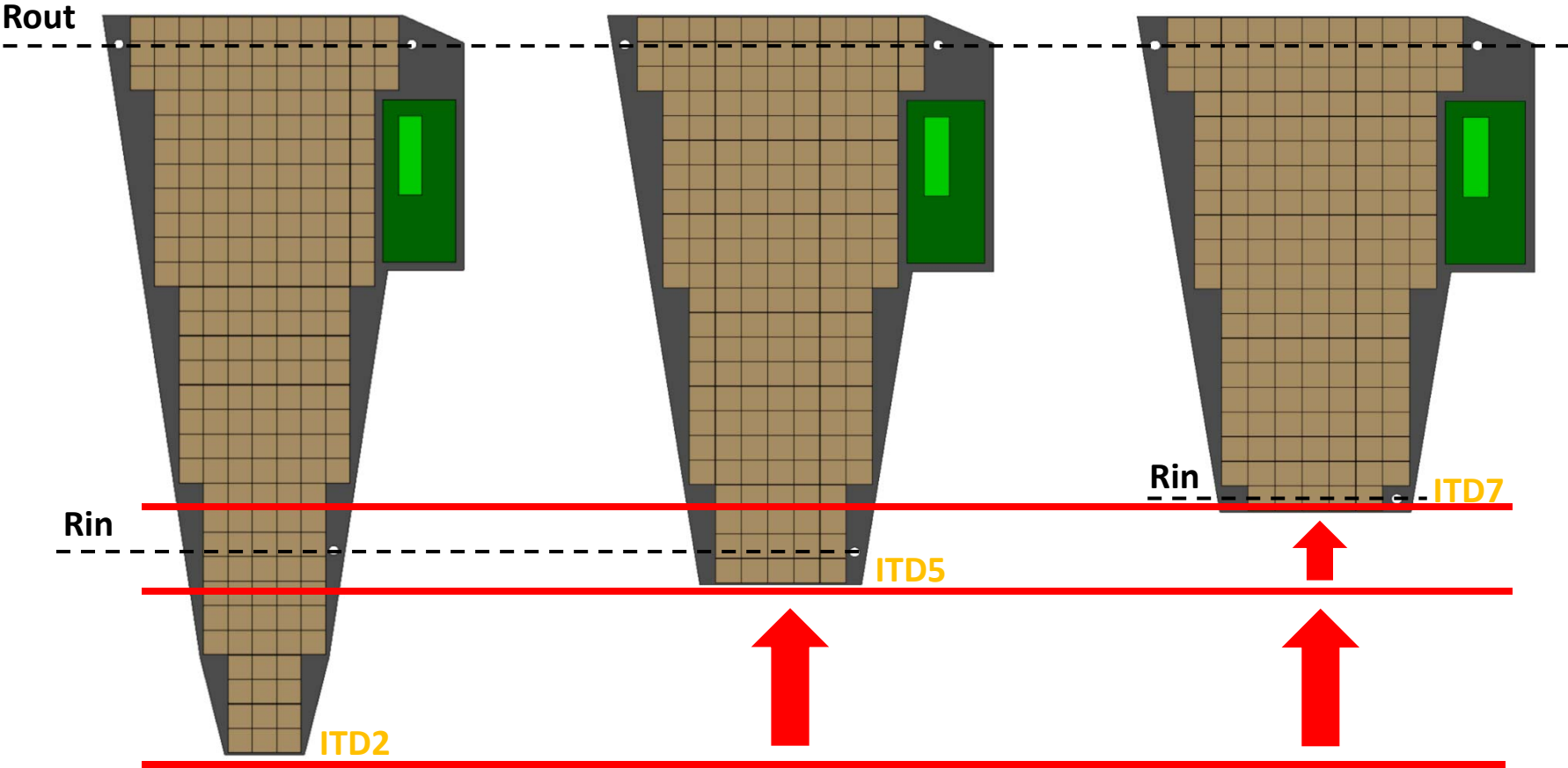
Design of Petals

Assumptions:

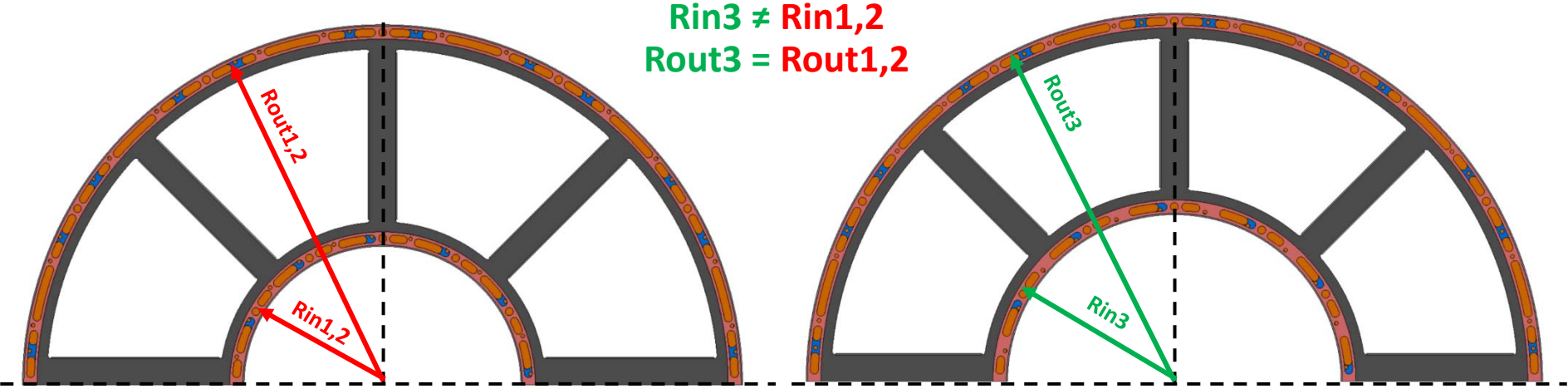
- **Module:**
 - Silicon Pixel Chips: $T = 300 \mu\text{m}$
 - FPC Metal layer (Aluminium): $T = 50 \mu\text{m}$
 - FPC Insulating layer (Polyimide): $T = 100 \mu\text{m}$
 - Glue (Eccobond 54): $T = 100 \mu\text{m}$
- **Power Bus:**
 - Metal layer (Aluminium): $T = 200 \mu\text{m}$
 - Insulating layer (Polyimide): $T = 200 \mu\text{m}$
 - Glue (Eccobond 54): $T = 100 \mu\text{m}$
- **Electrical connector**
- **Mechanical layout:**
 - CF Skins: e.g. Toray M55J, $T = 210 \mu\text{m}$
 - CORE: e.g. Rohacell IG51, $T = 5 \text{ mm}$
 - Cooling pipes (missed so far)
 - Graphite foam (missed so far)



Design of Petals

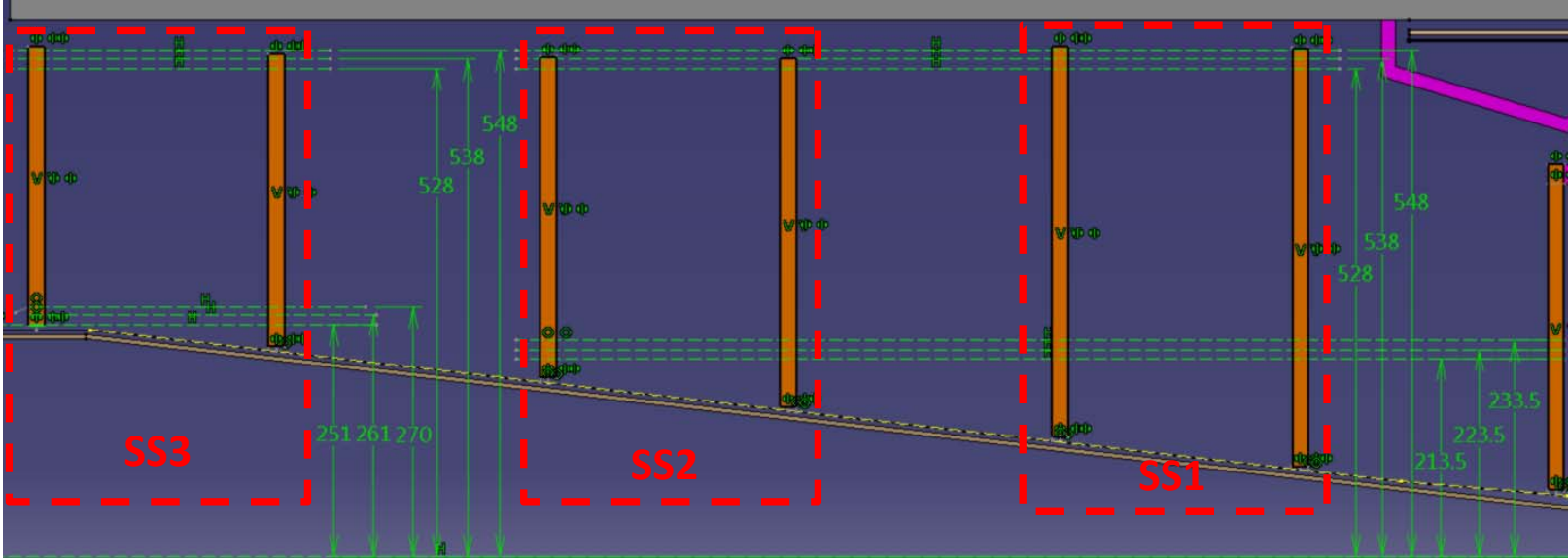


Design of Support Structures



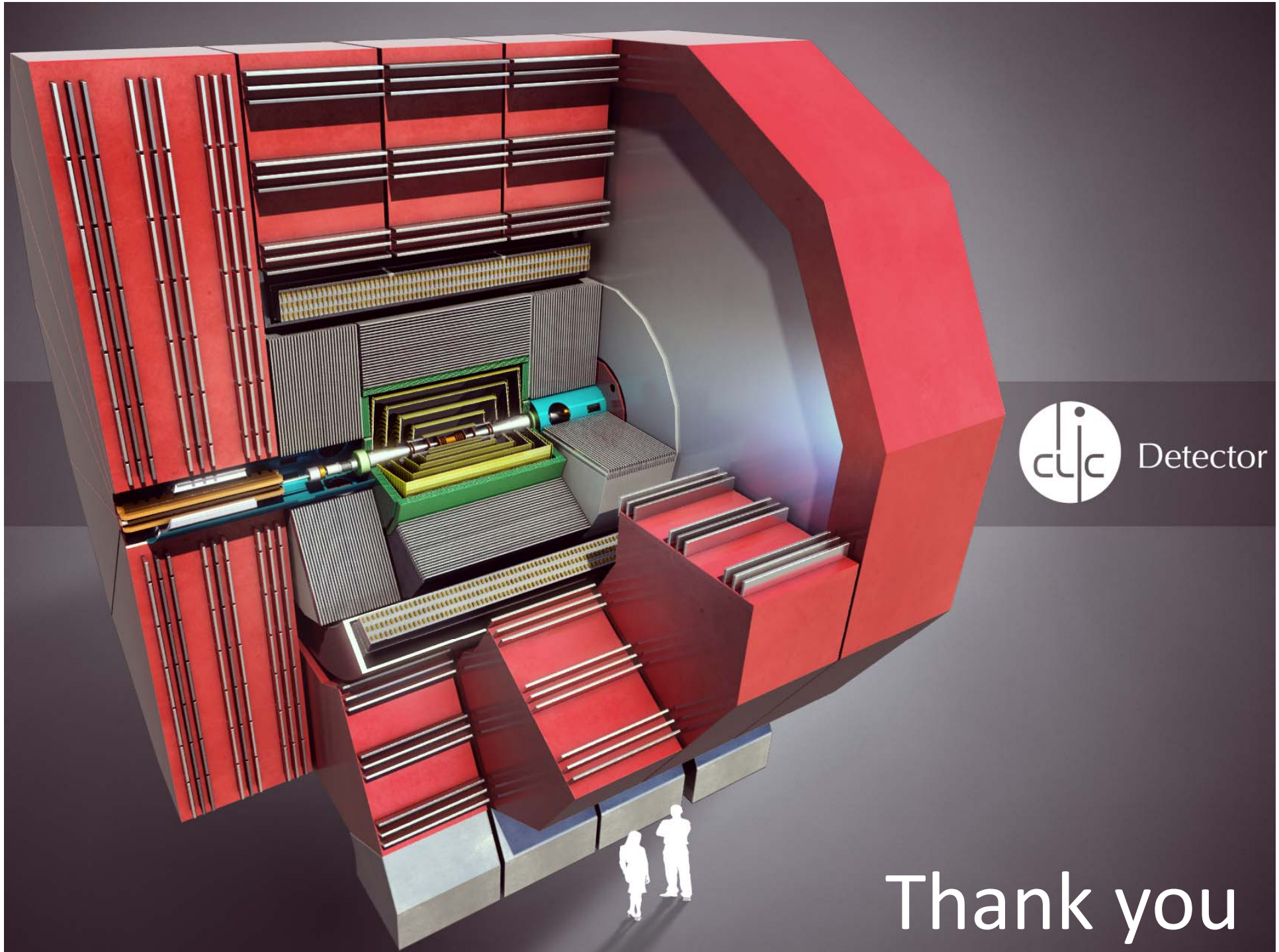
SS1 almost the same as SS2

SS3 ≠ SS1



Summary:

- Design concepts of the mechanical supports for the Inner Tracker Disks & Petals have been shown.
- Number of designs of the support structures is minimized to two.
- Design of Petals for the different layers is uniform.
- Design proposal of the support structures. requests FEA calculations.
- The concepts need further optimization.



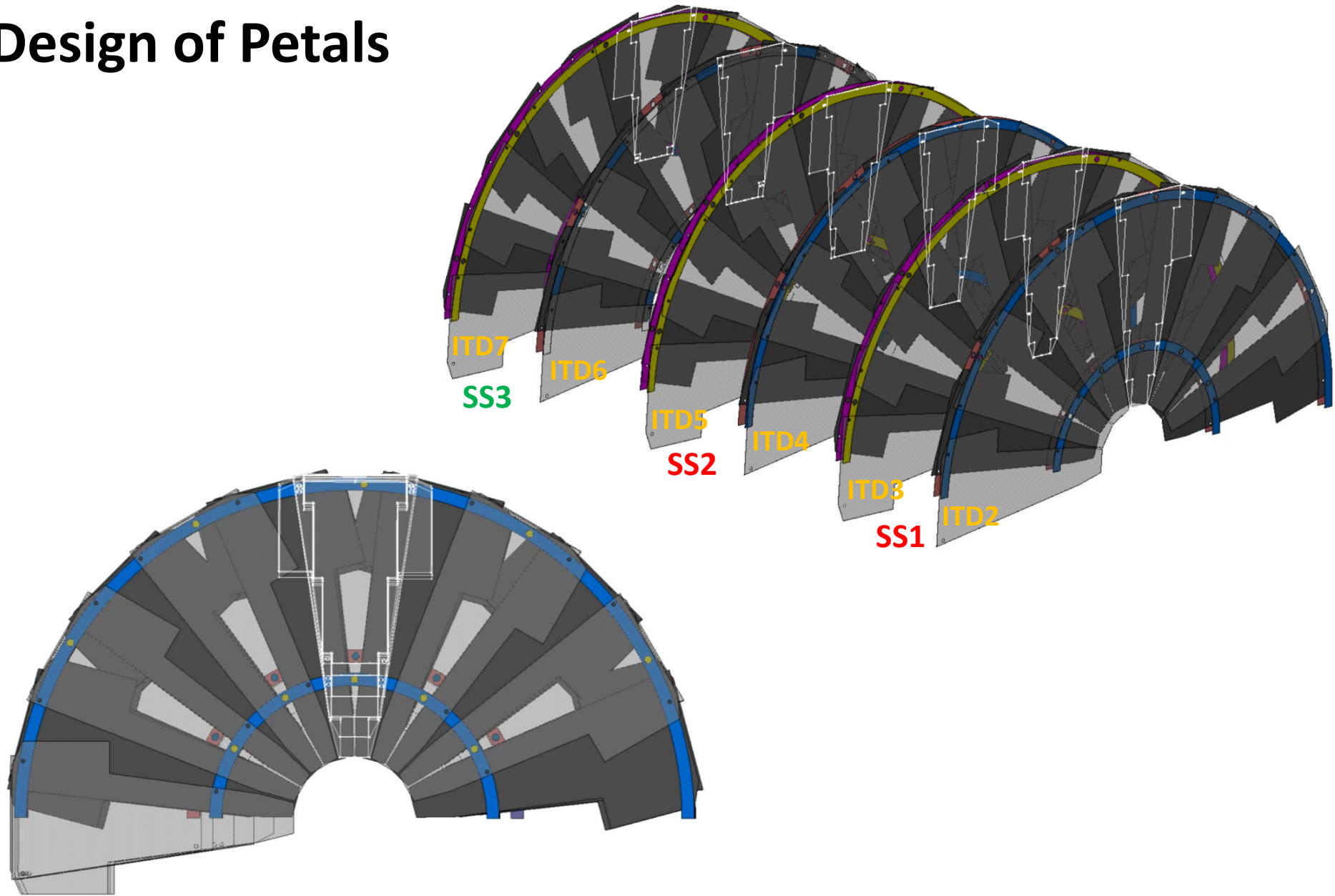
 CLIC Detector

Thank you

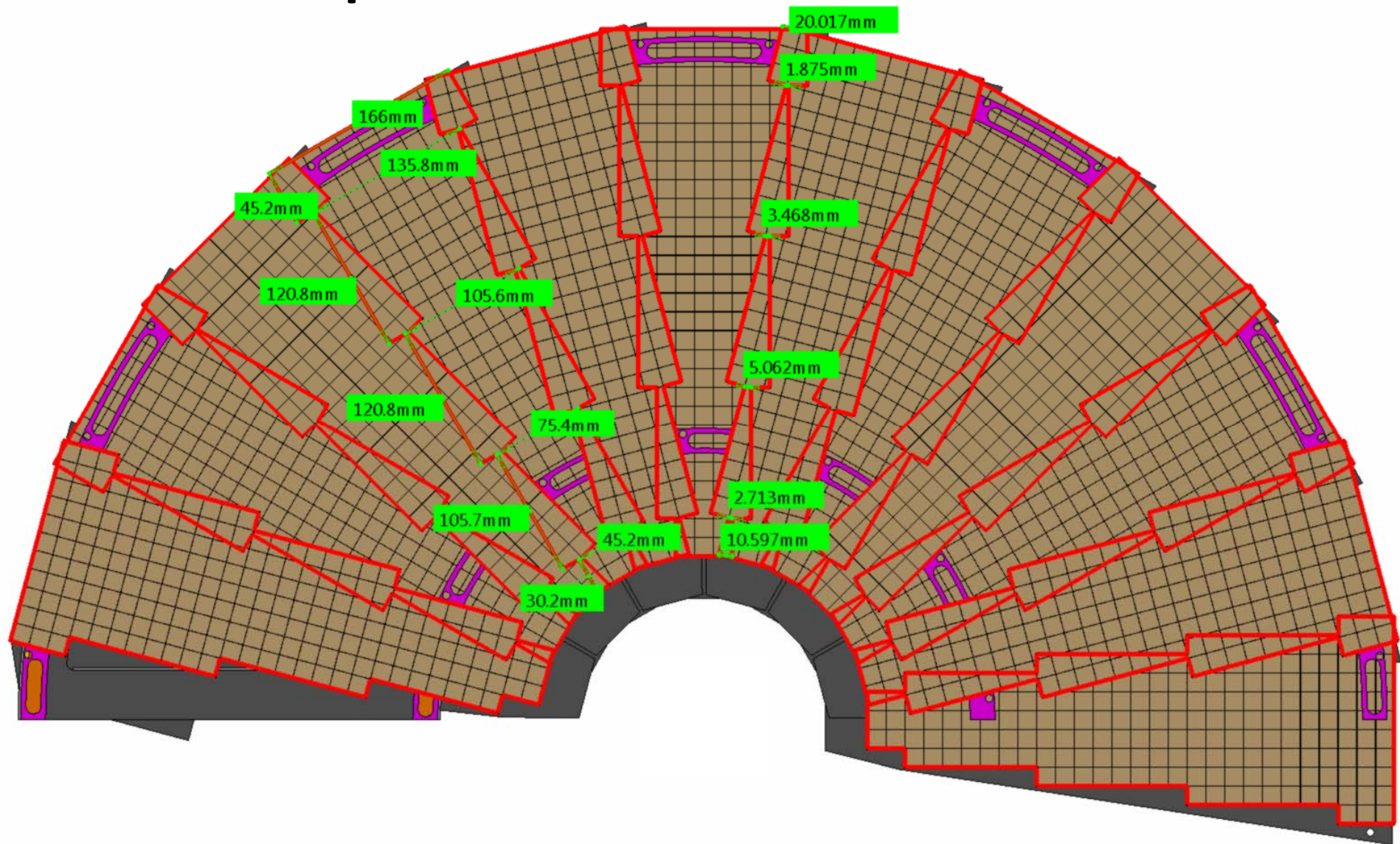
Backup slides



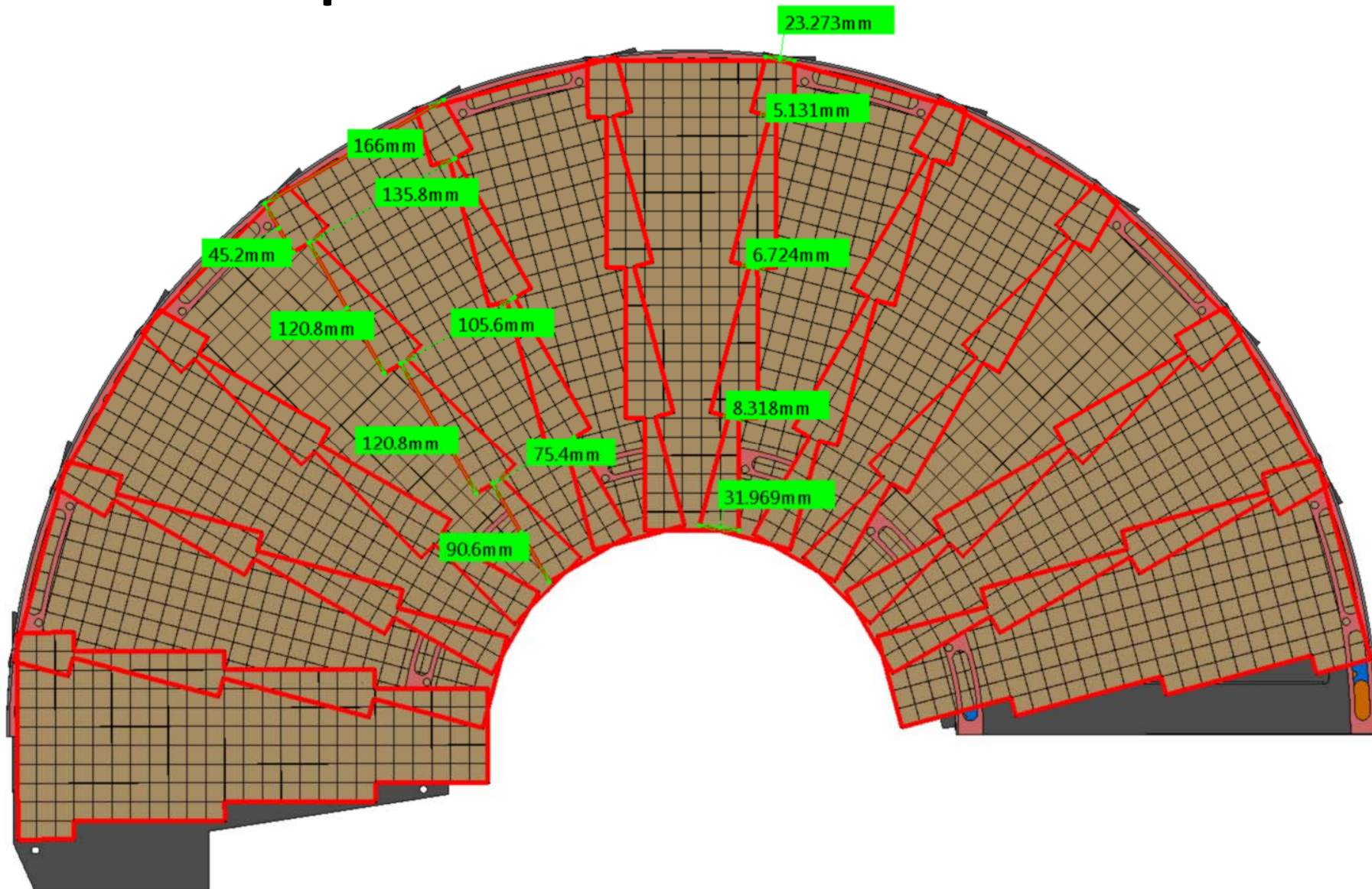
Design of Petals



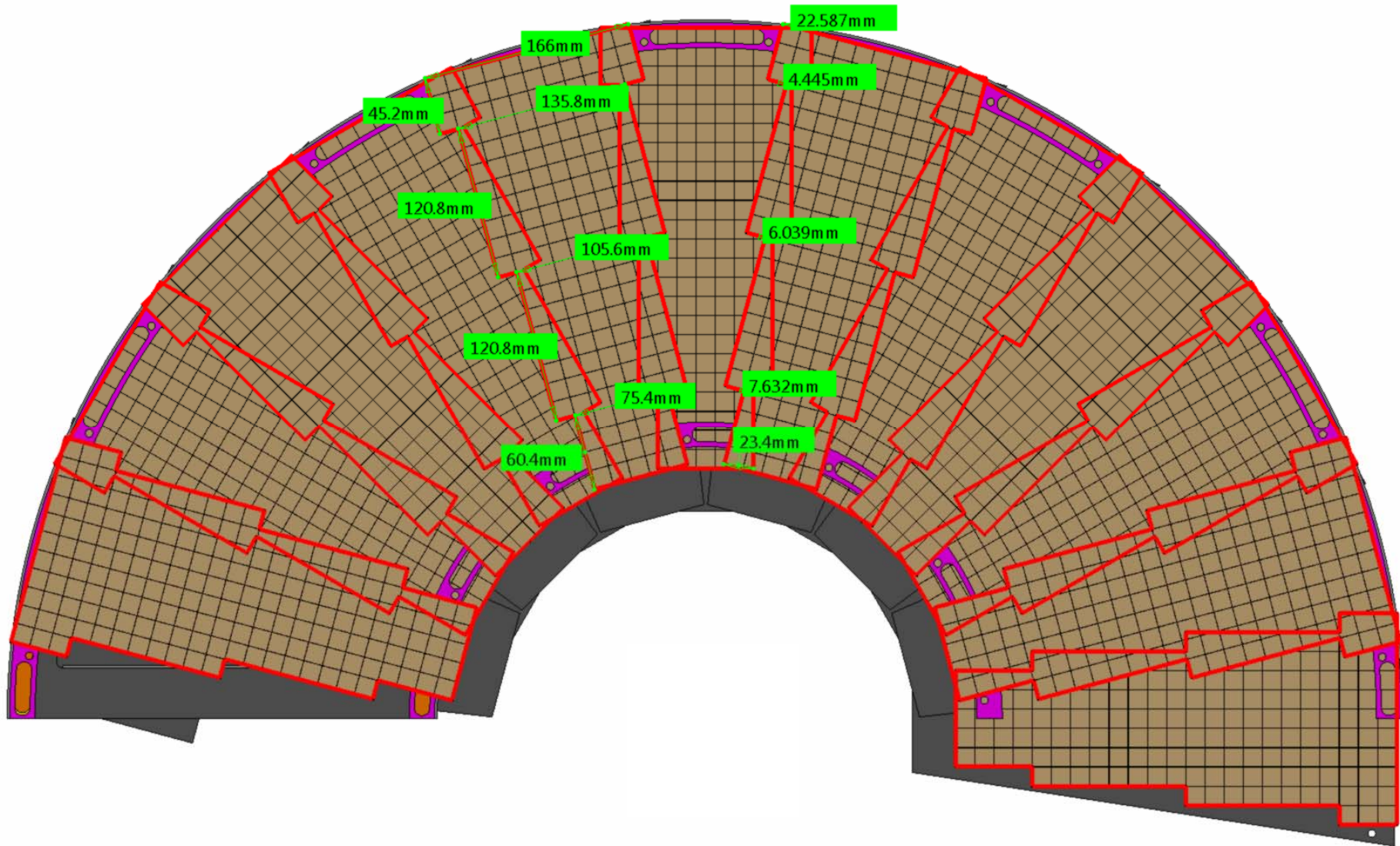
ITD3 - Overlap



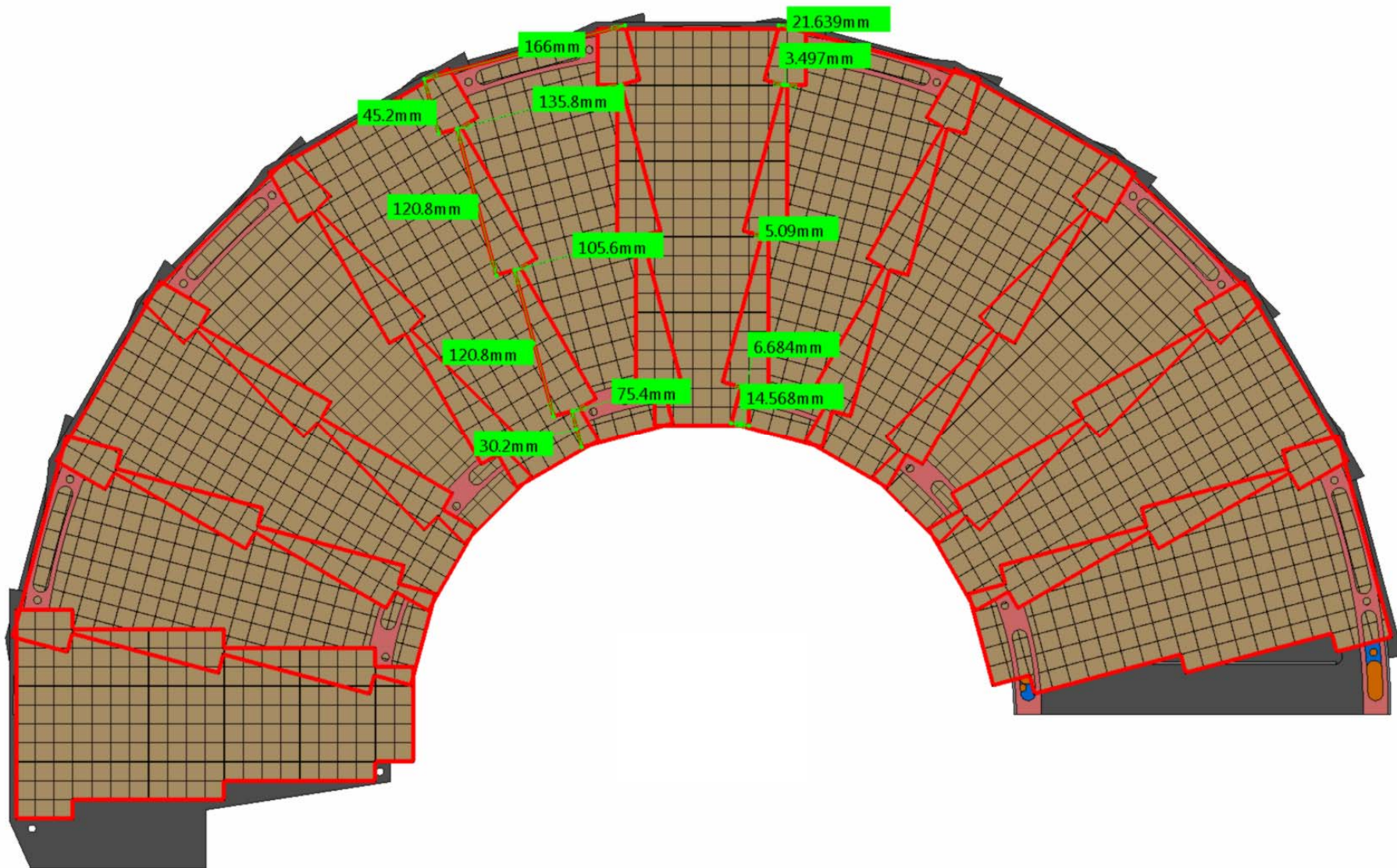
ITD4 - Overlap



ITD5 - Overlap



ITD6 - Overlap



ITD7 - Overlap

