

EP-4022

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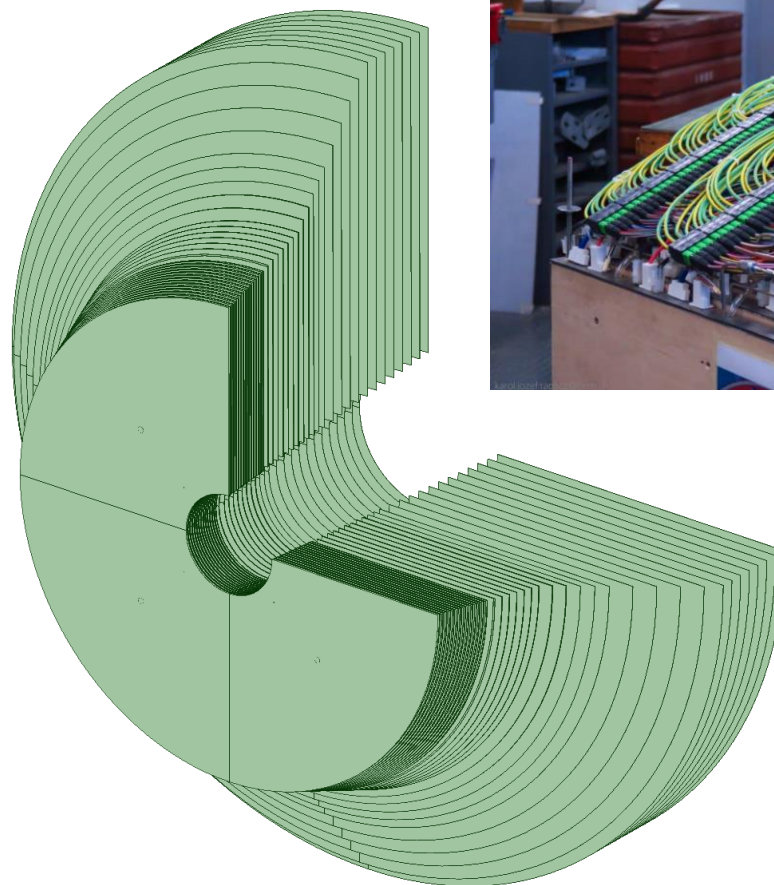
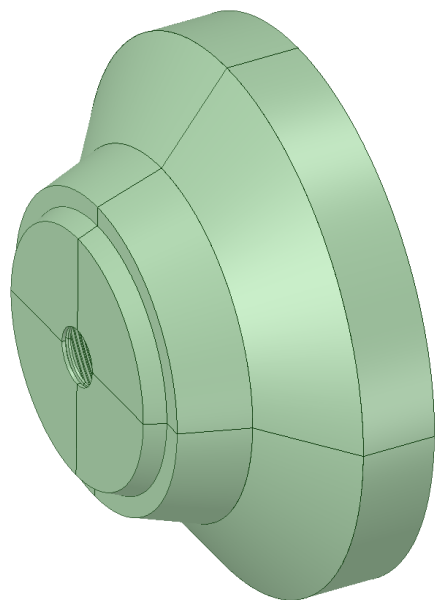
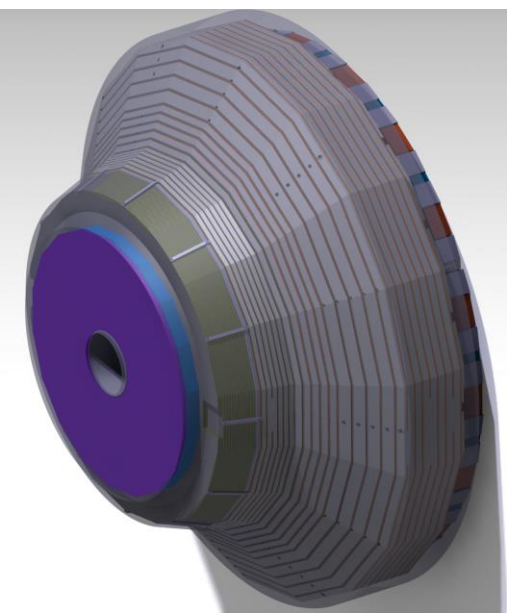
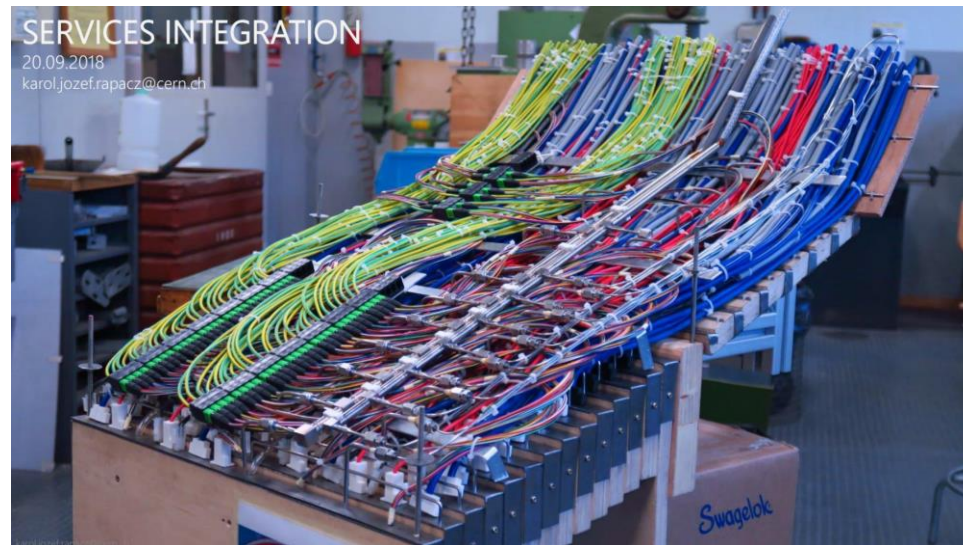
September 2018 EP-CMS / HGAL

HGCAL Topics

- Dry-out system
 - Modelling
 - Conclusions
- Endcap Structural supports
 - Initial concept
 - Architectural proposals
 - FEM
- Complete system
 - Preliminary analysis

Dry-out system

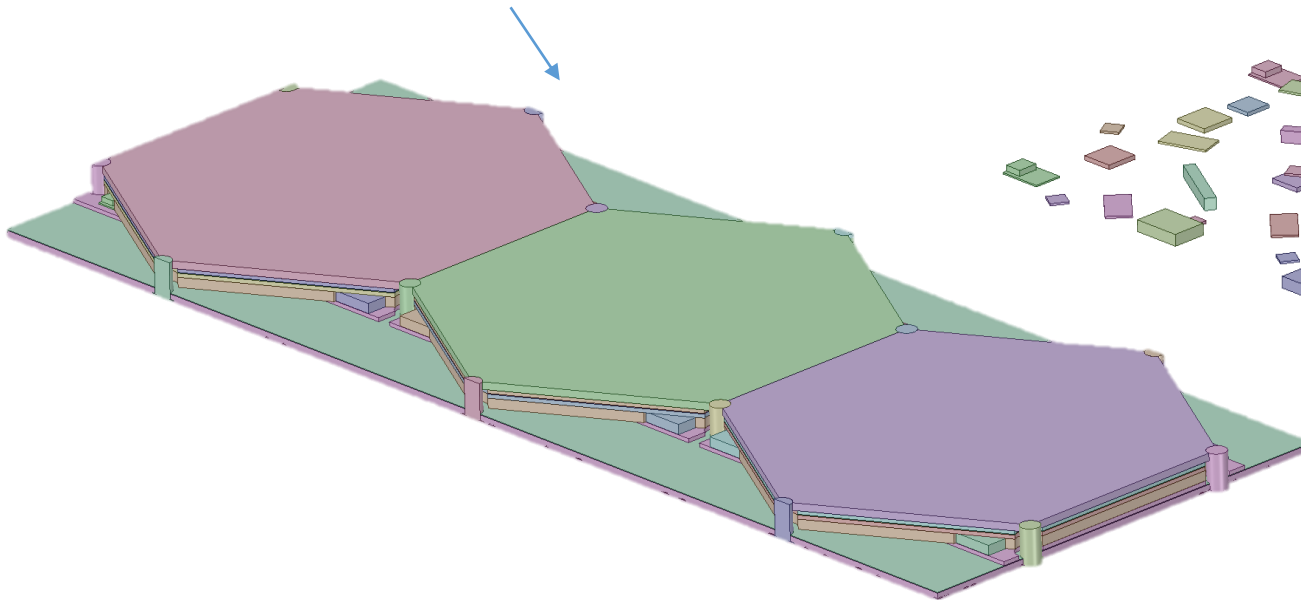
- Modelling



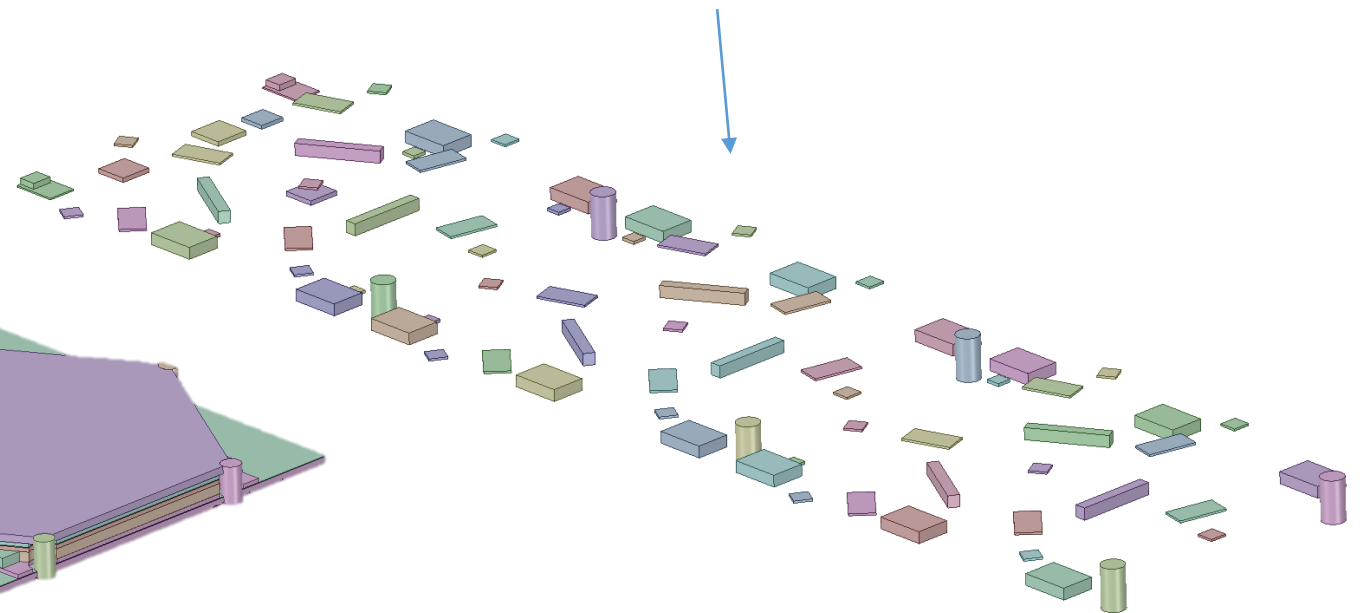
Dry-out system

- Modelling

Silicon Sensors + Mother board + Electronic components

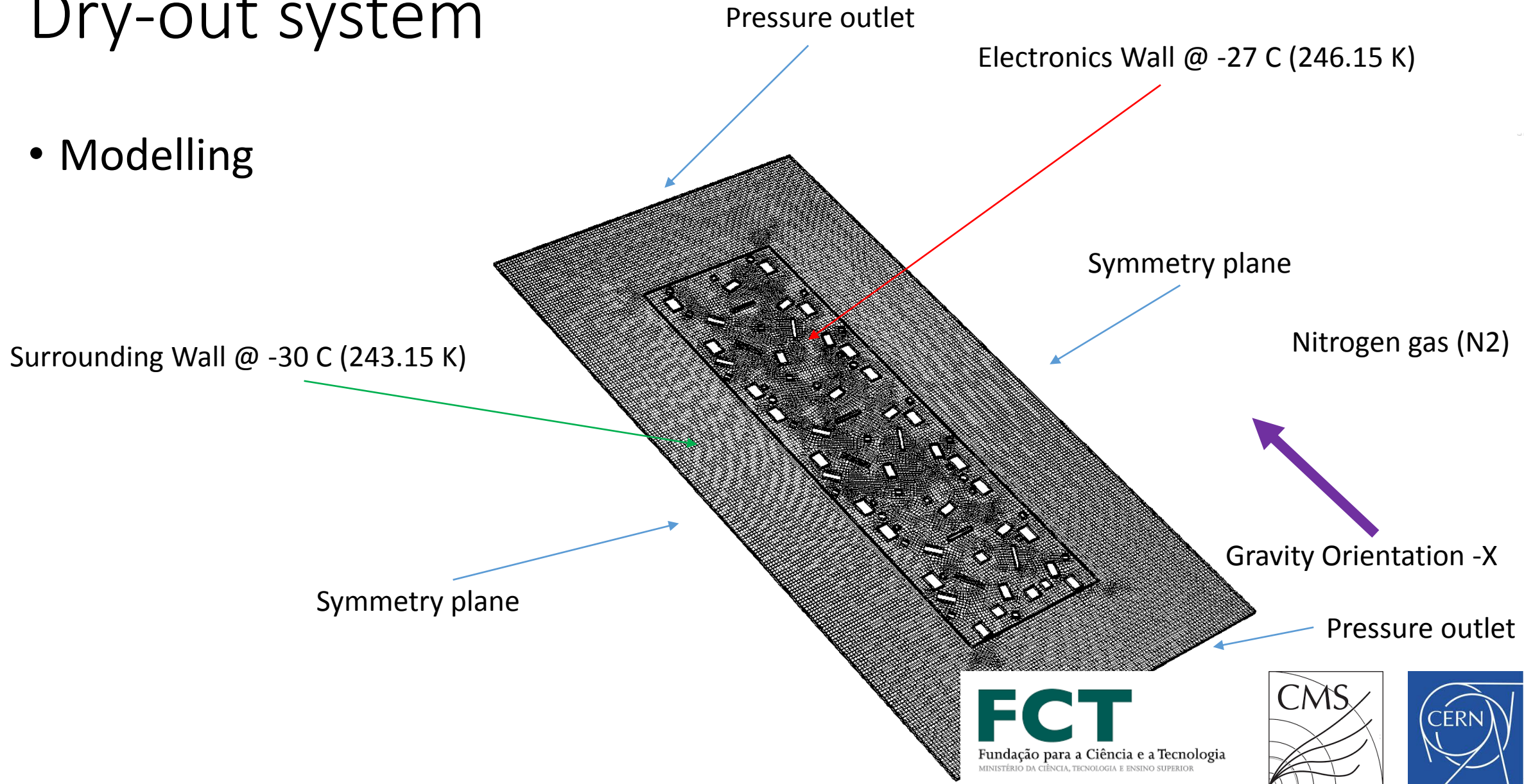


Flow blocking components



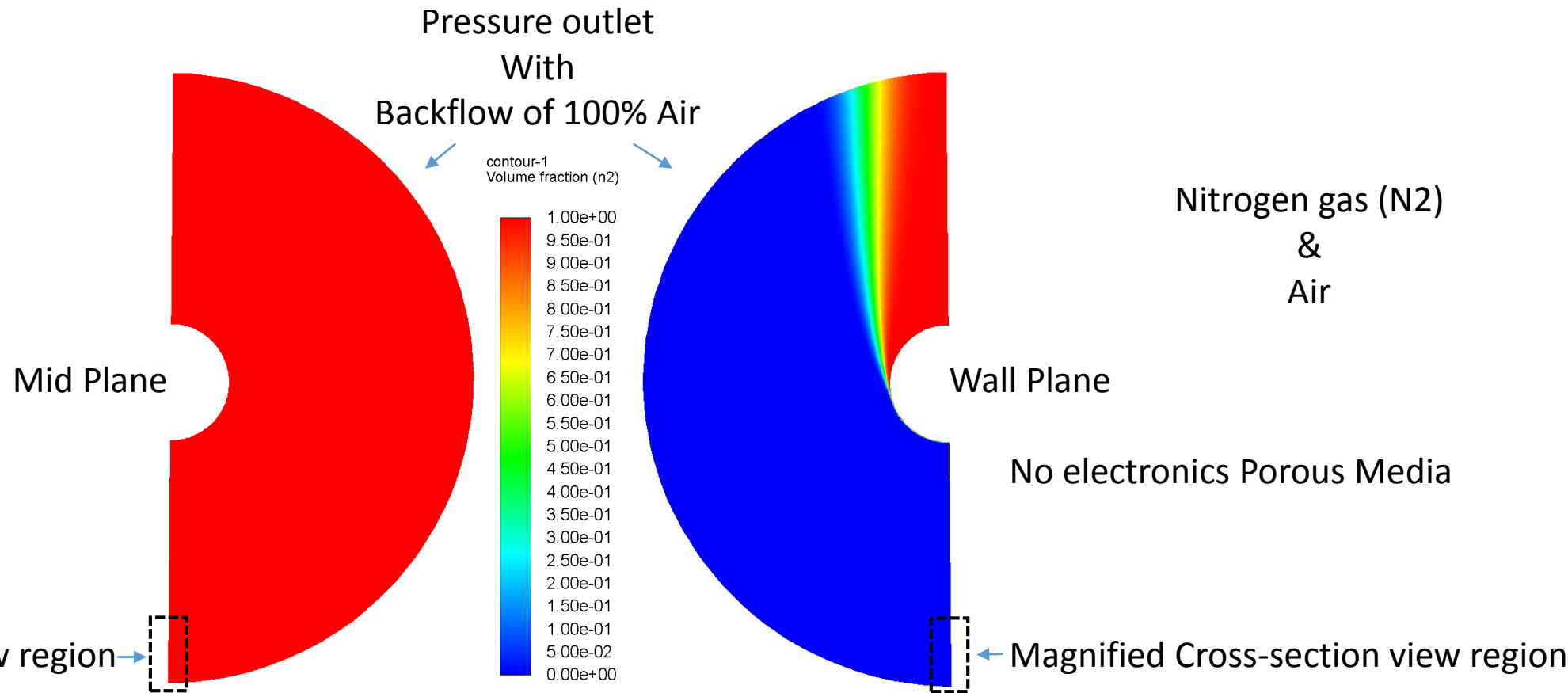
Dry-out system

- Modelling



Dry-out system

- Modelling



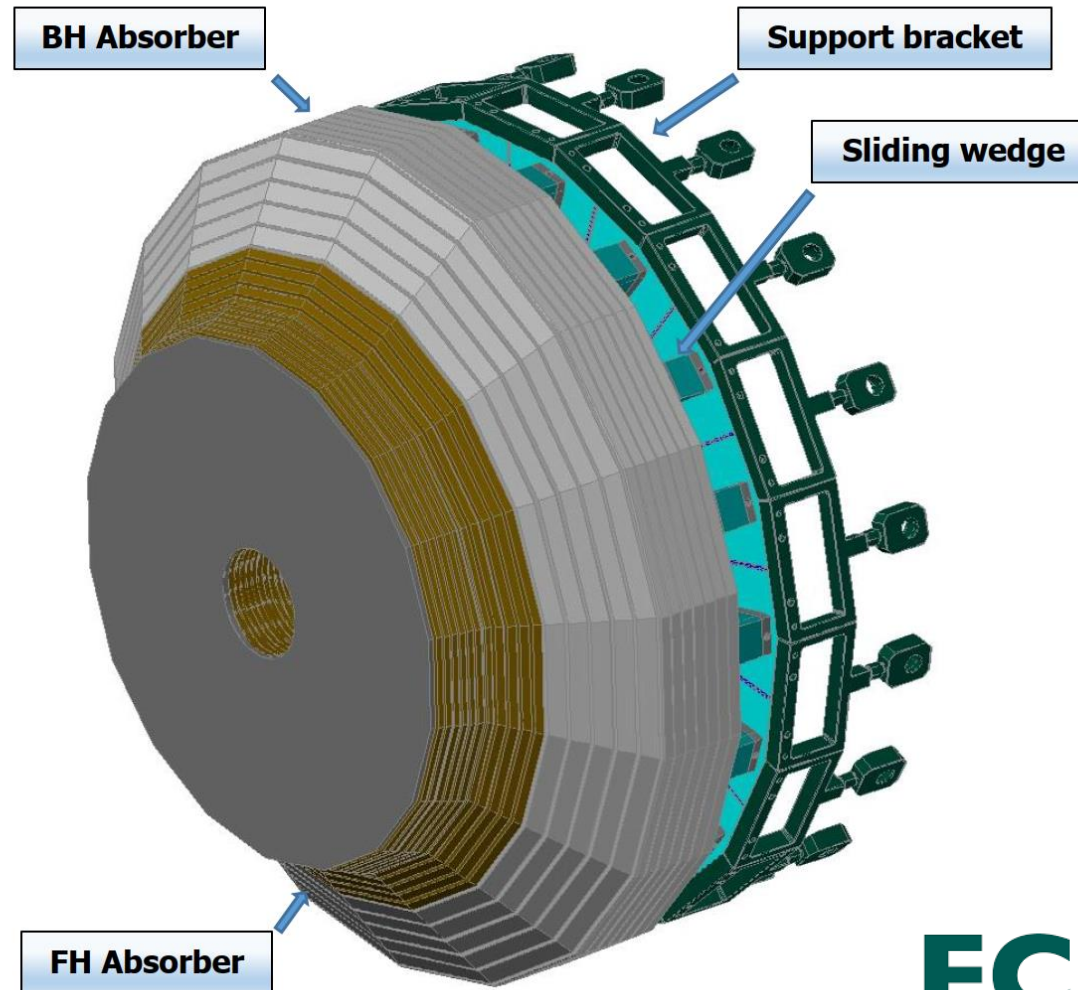
Dry-out system

- Conclusions

- HGCAL flush system volumetric flow (minimum)
 - Variable outer radius, gap thickness according to CAD, all gaps (74):
 - 50.8 m³/hour

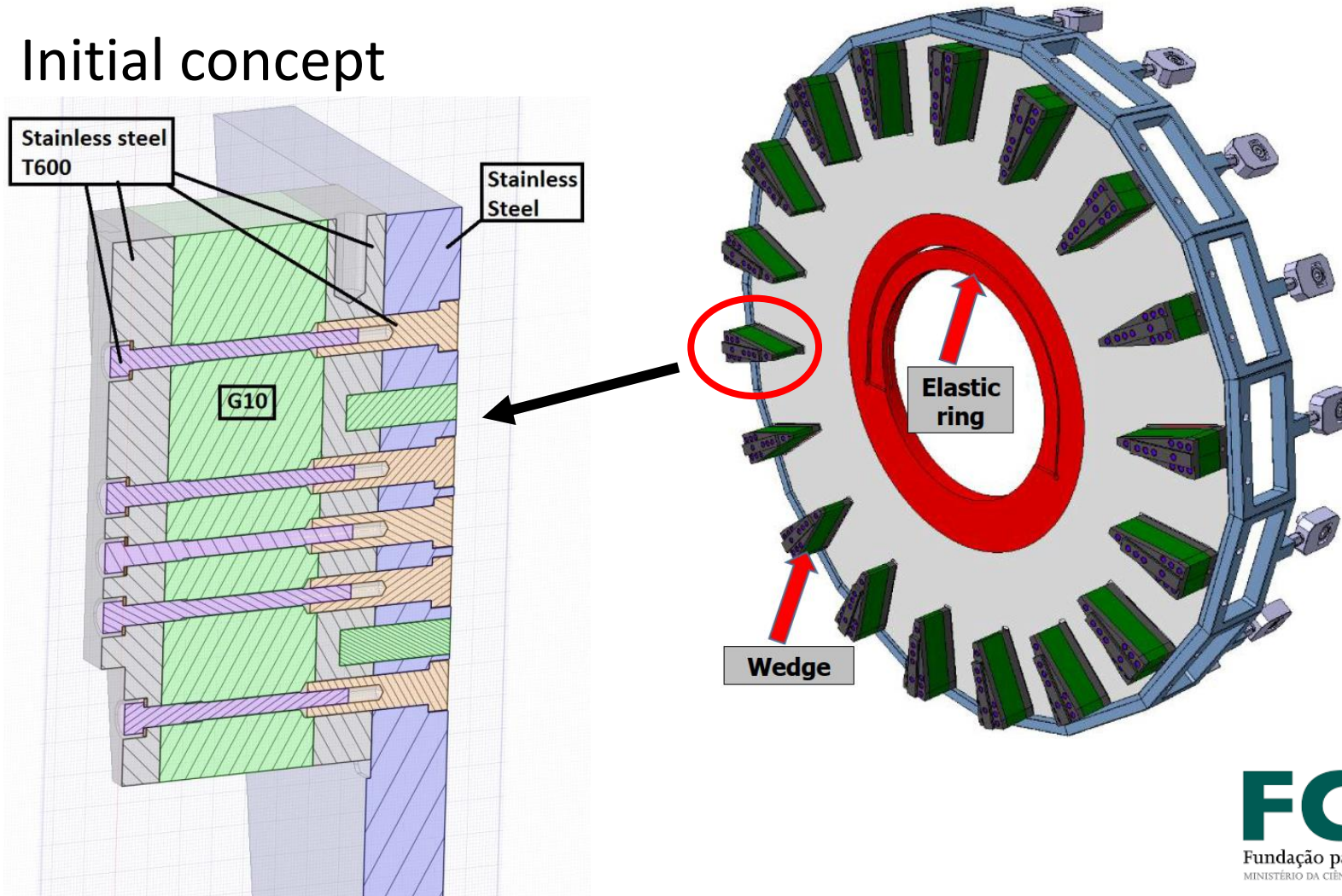
Endcap Structural Supports

- Initial concept



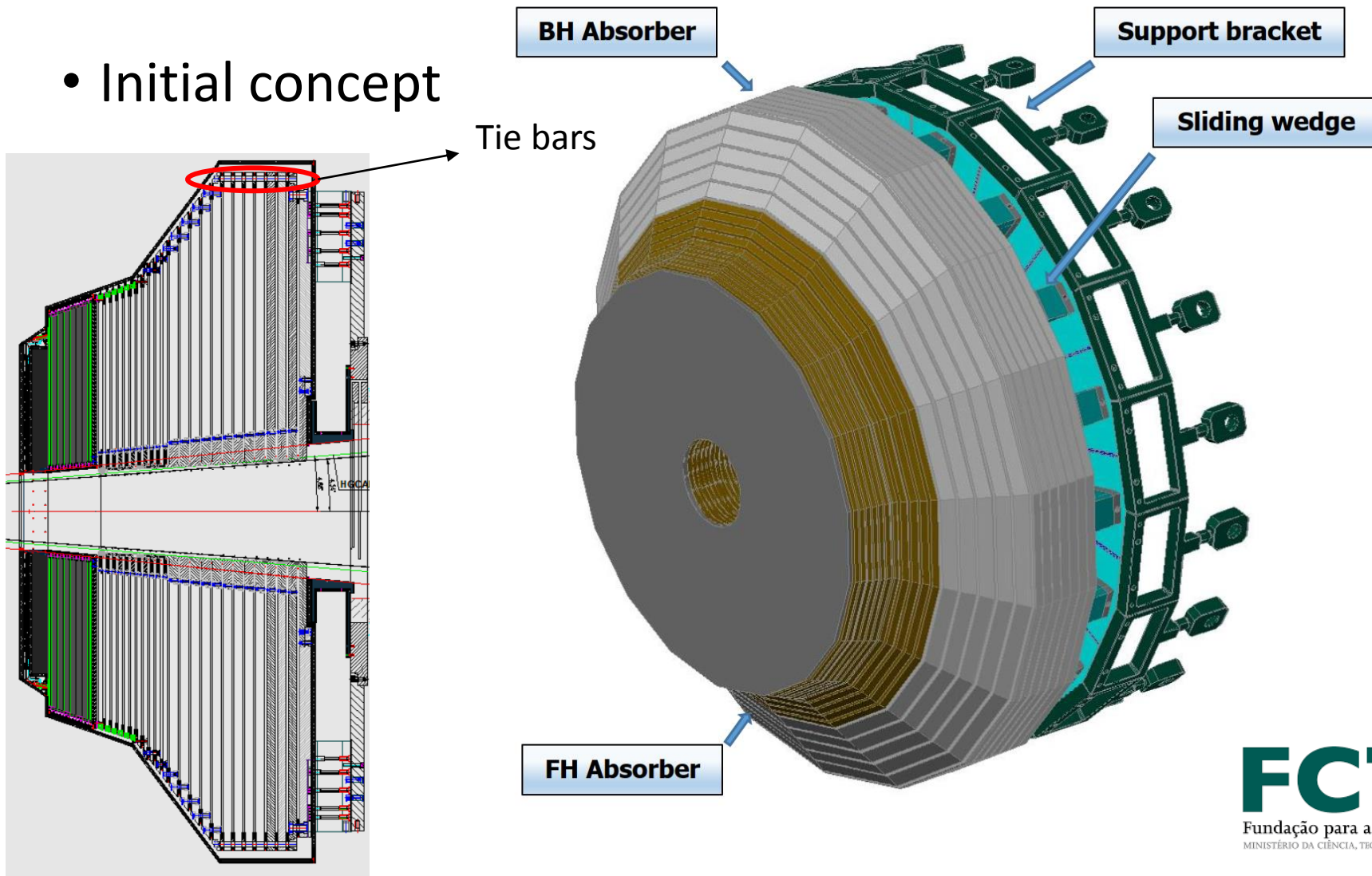
Endcap Structural Supports

- Initial concept



Endcap Structural Supports

- Initial concept



Endcap Structural Supports

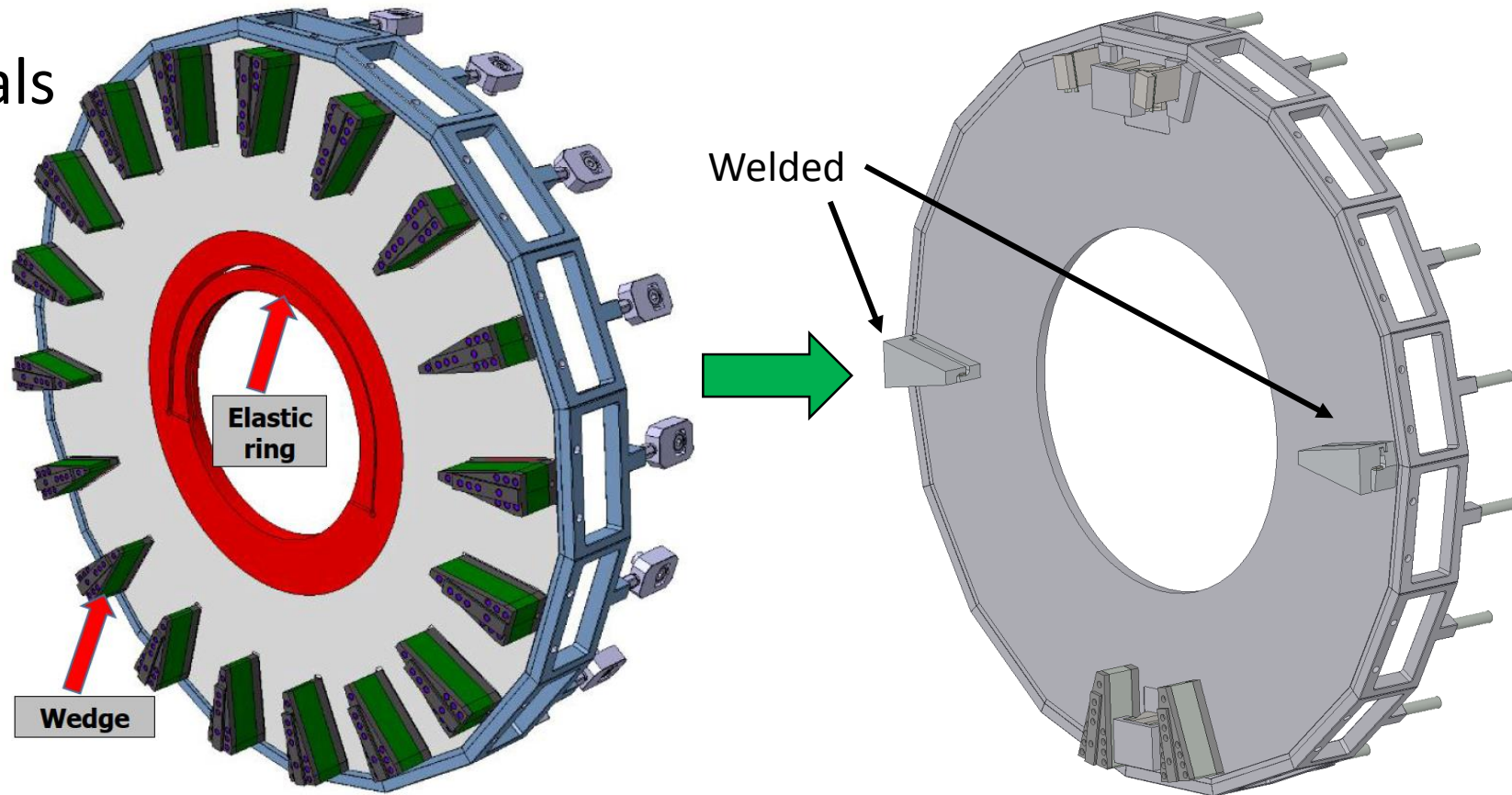
- Initial concept
 - Issues
 - Lack of structural reliability of the 18 wedges design.
 - Size of the used tie bars is too large (M55).

Endcap Structural Supports

- Architectural proposals

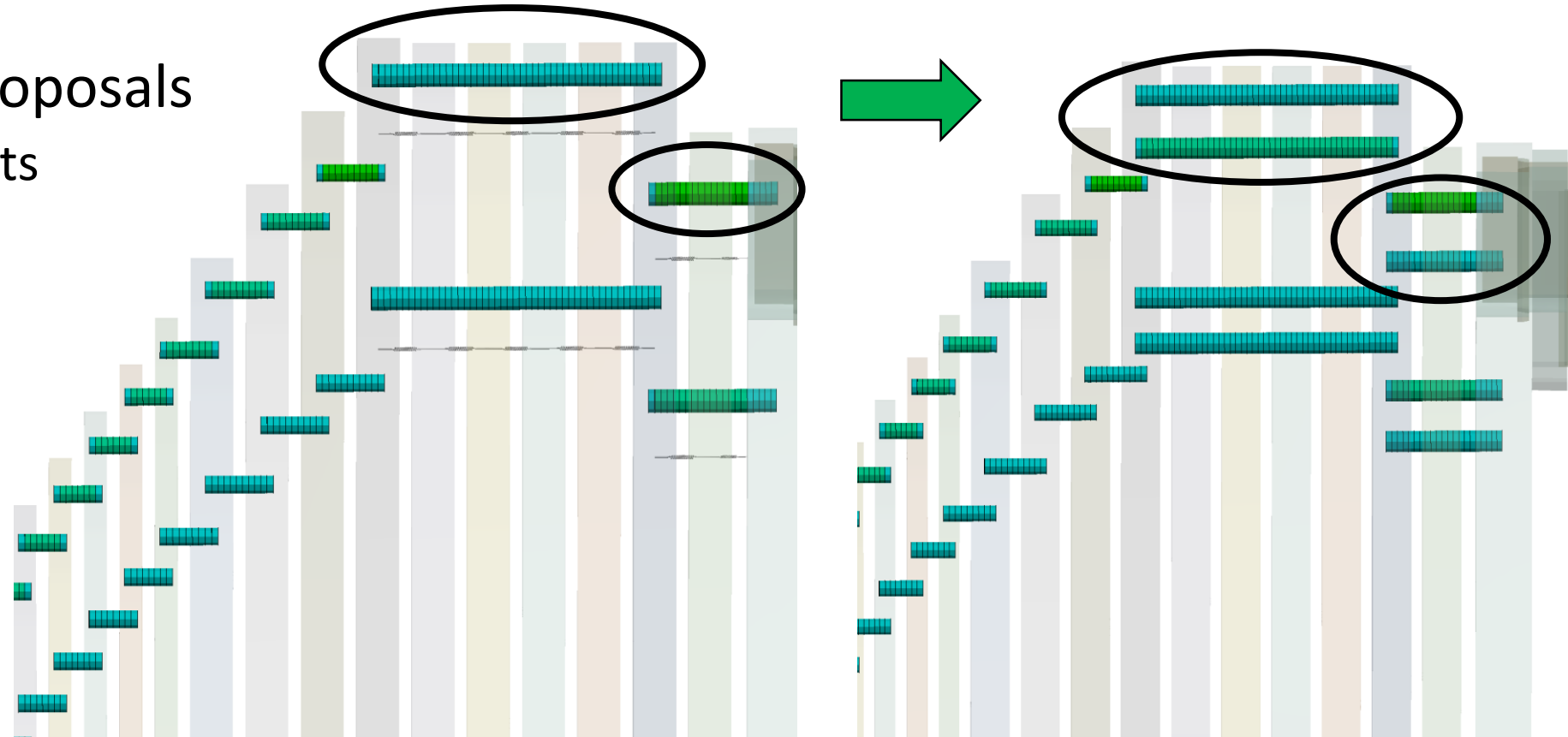
Endcap Structural Supports

- Architectural proposals
 - Wedge supports



Endcap Structural Supports

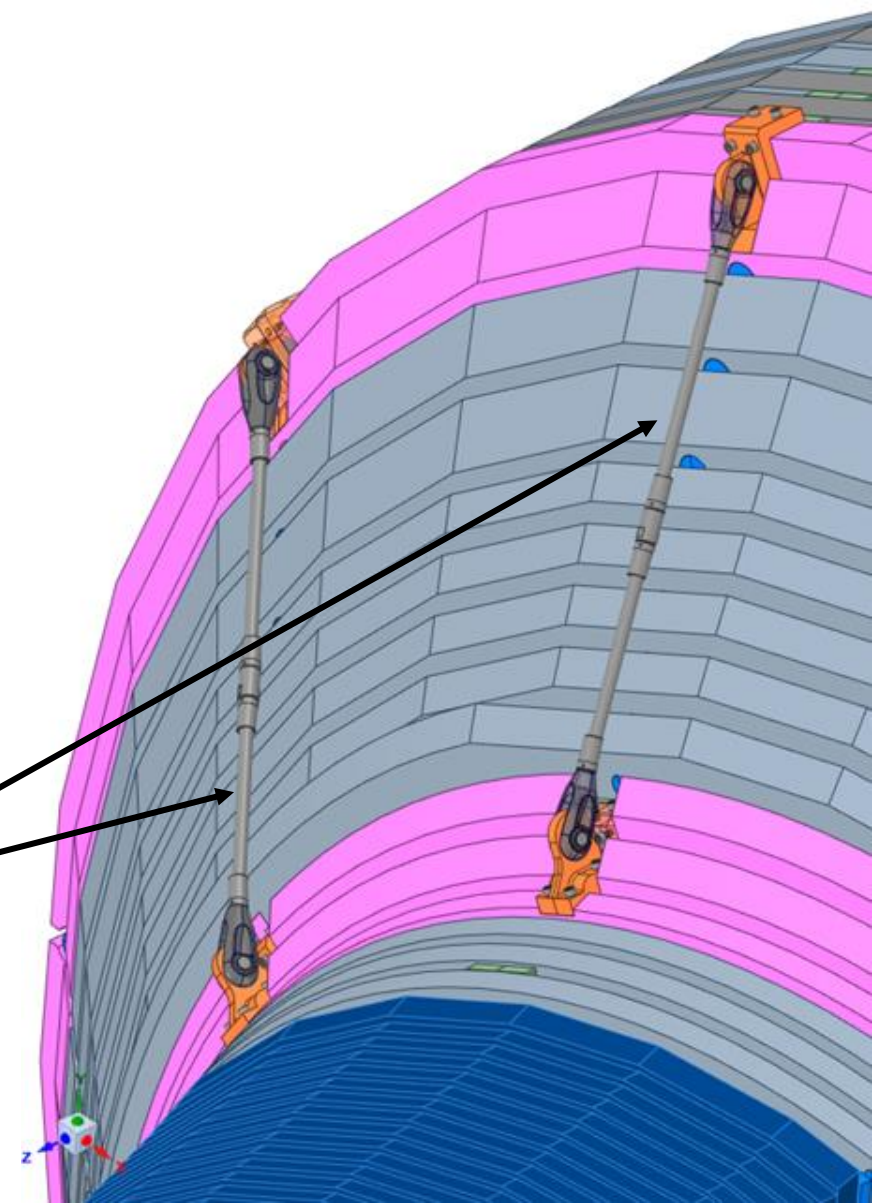
- Architectural proposals
 - Wedge supports
 - Tie bars



Endcap Structural Supports

- Architectural proposals
 - Wedge supports
 - Tie bars
 - External supports

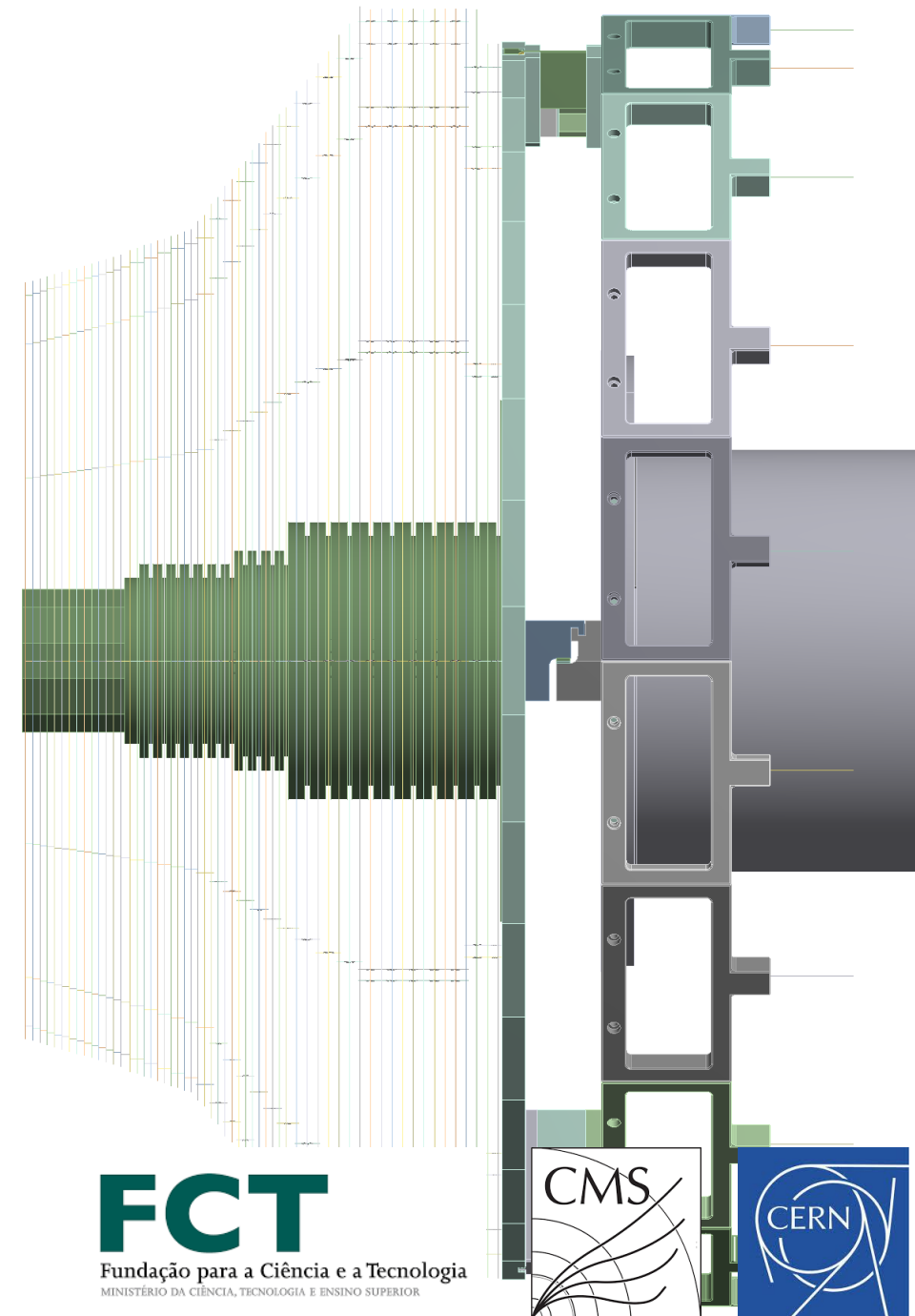
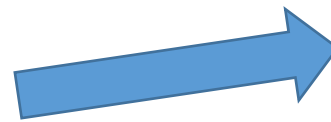
External Bars



Endcap Structural Supports

- FEM
 - Modelling

Shell surfaces
+
Beam elements
+
Spring elements
+
Solid elements



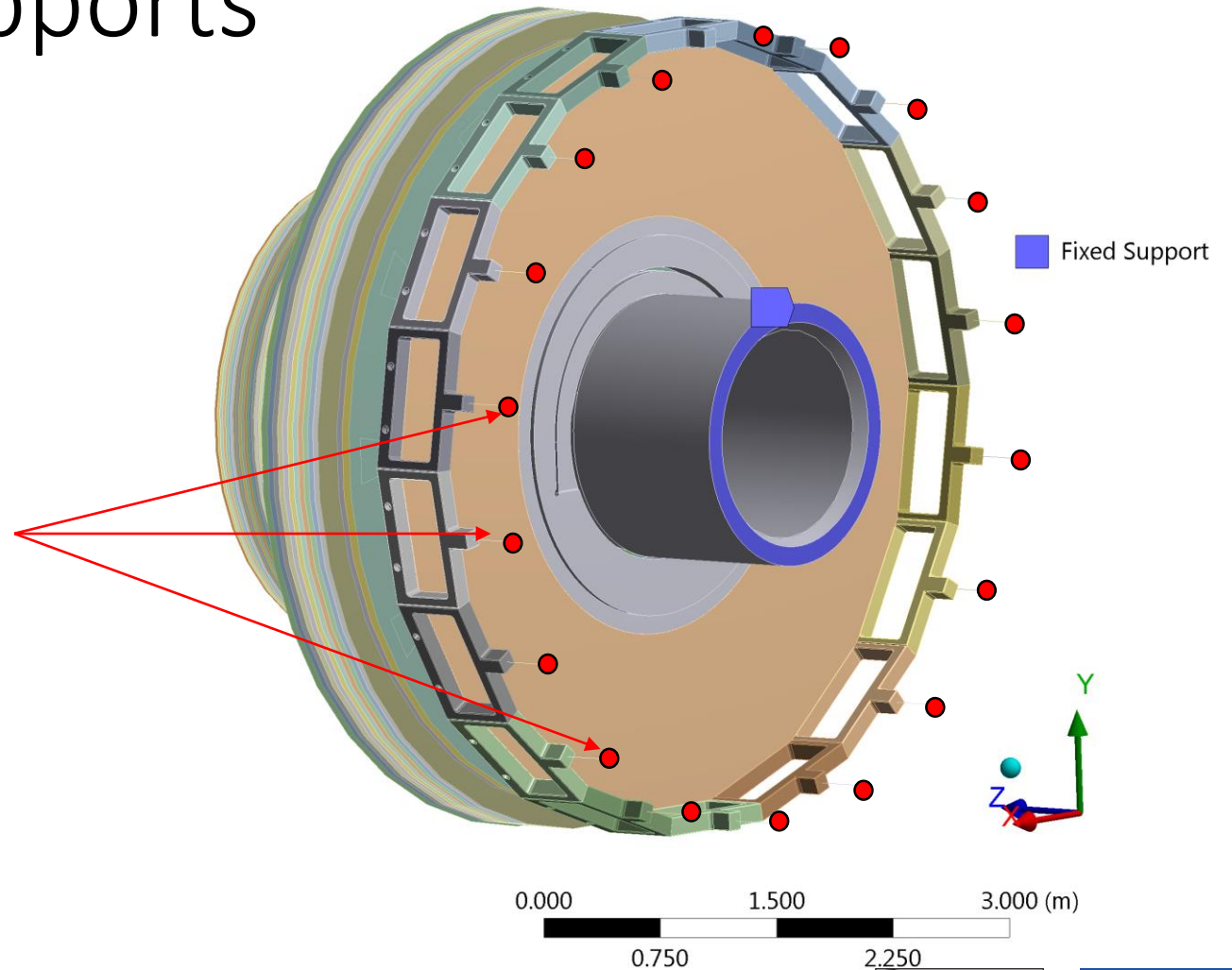
Endcap Structural Supports

- FEM
 - Modelling

Gravity orientation along Y



Spherical Joints



Endcap Structural Supports

- FEM
 - Results
 - Brackets

L: Static Structural

Equivalent Stress 2

Type: Equivalent (von-Mises) Stress

Unit: Pa

Time: 1

08/05/2019 18:31

2.8904e8 Max

2.5693e8

2.2483e8

1.9273e8

1.6063e8

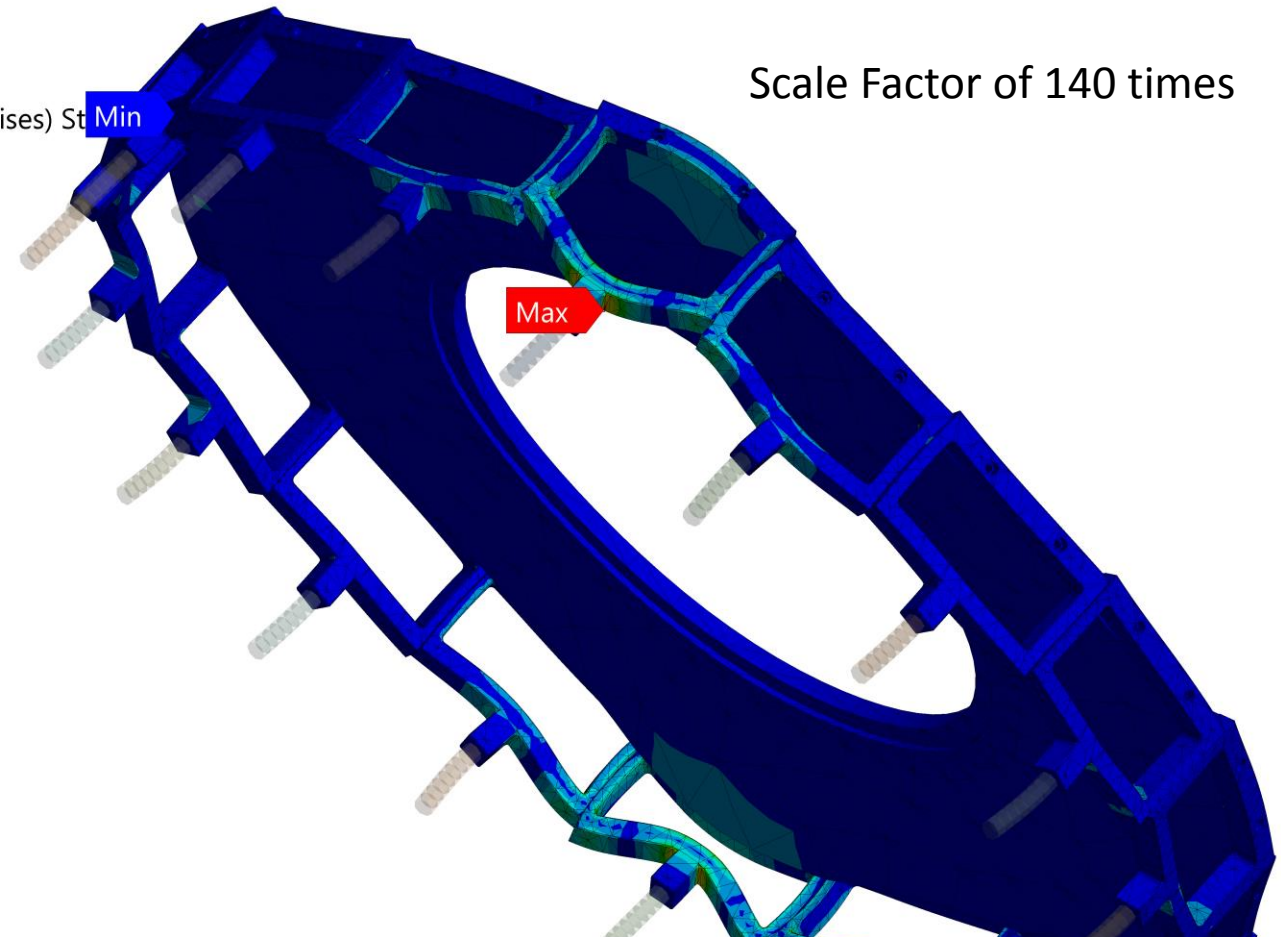
1.2852e8

9.6421e7

6.4318e7

3.2215e7

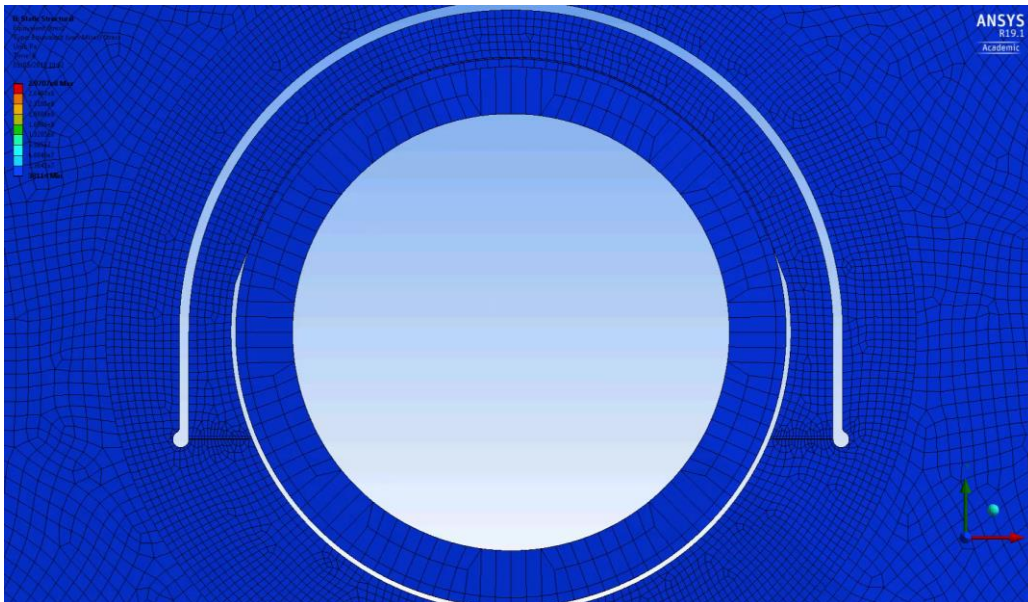
1.1289e5 Min



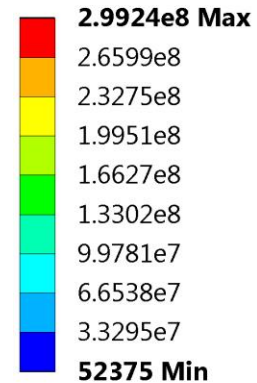
Scale Factor of 140 times

Endcap Structural Supports

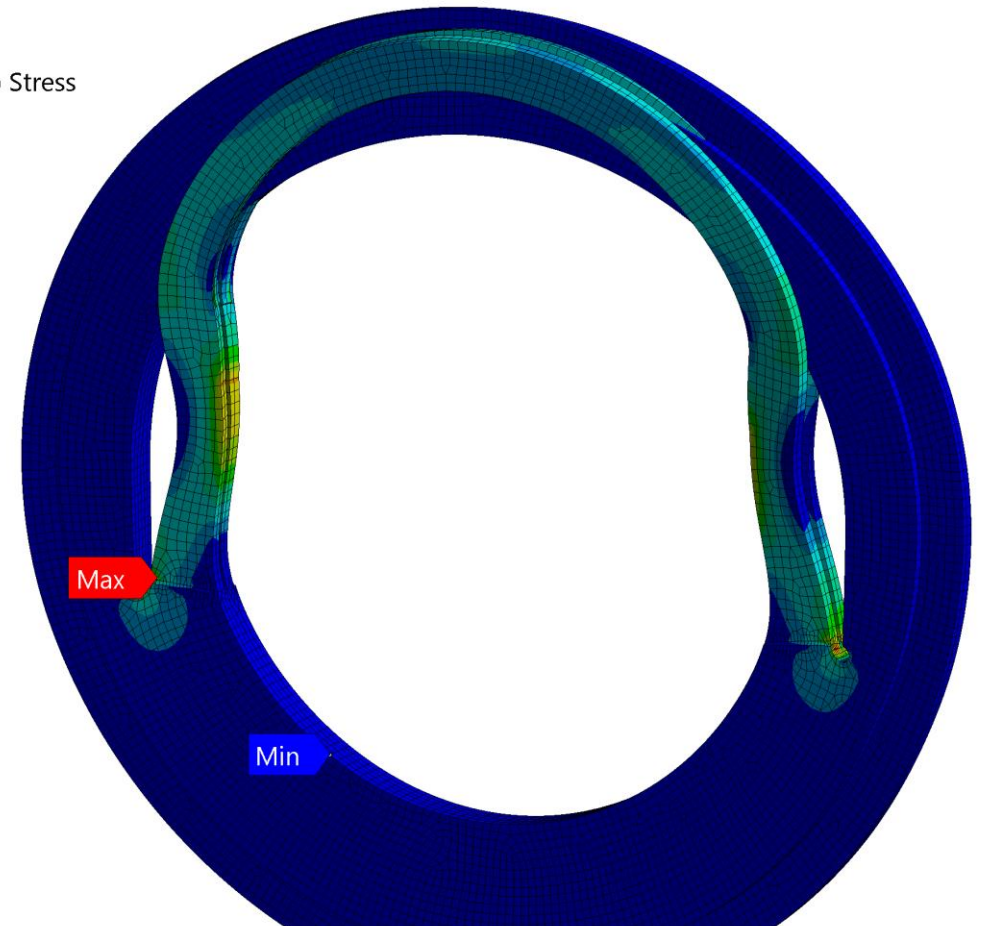
- FEM
 - Results
 - Elastic Ring



L: Static Structural
Equivalent Stress 3
Type: Equivalent (von-Mises) Stress
Unit: Pa
Time: 1
08/05/2019 18:26



Scale Factor of 300 times

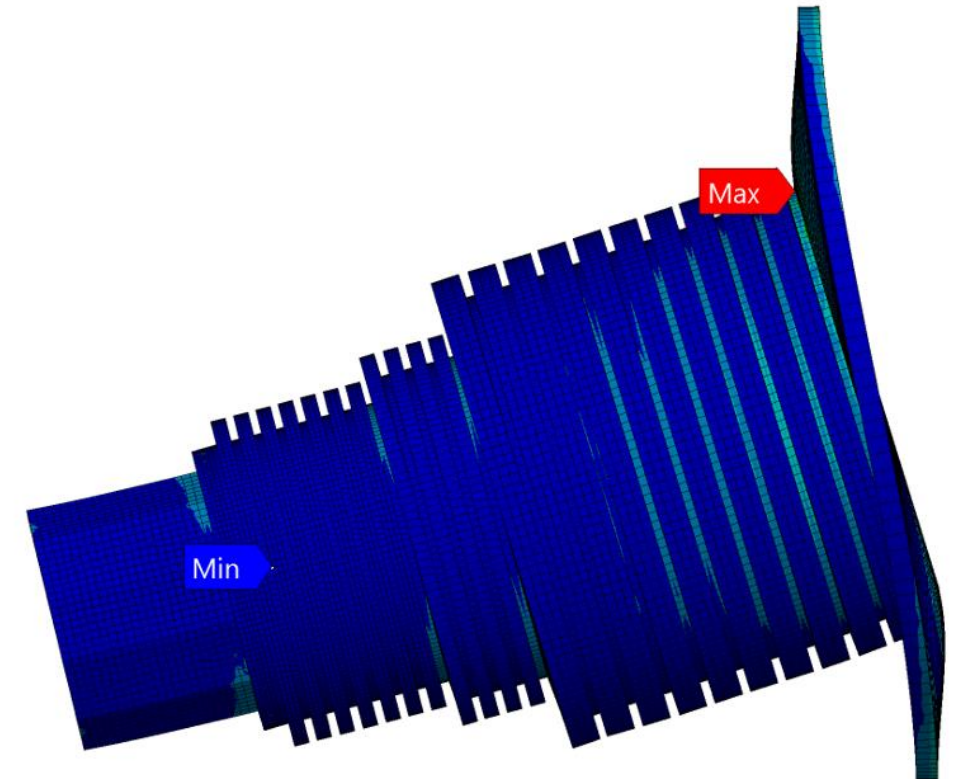
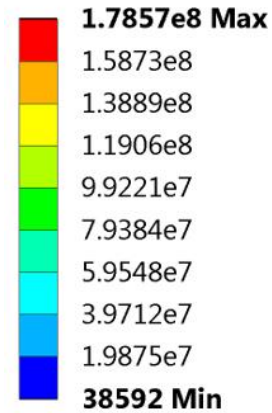


Endcap Structural Supports

Scale Factor of 300 times

- FEM
 - Results
 - Central Tube

B: Static Structural
Equivalent Stress
Type: Equivalent (von-Mises) Stress
Unit: Pa
Time: 1
09/05/2019 10:05

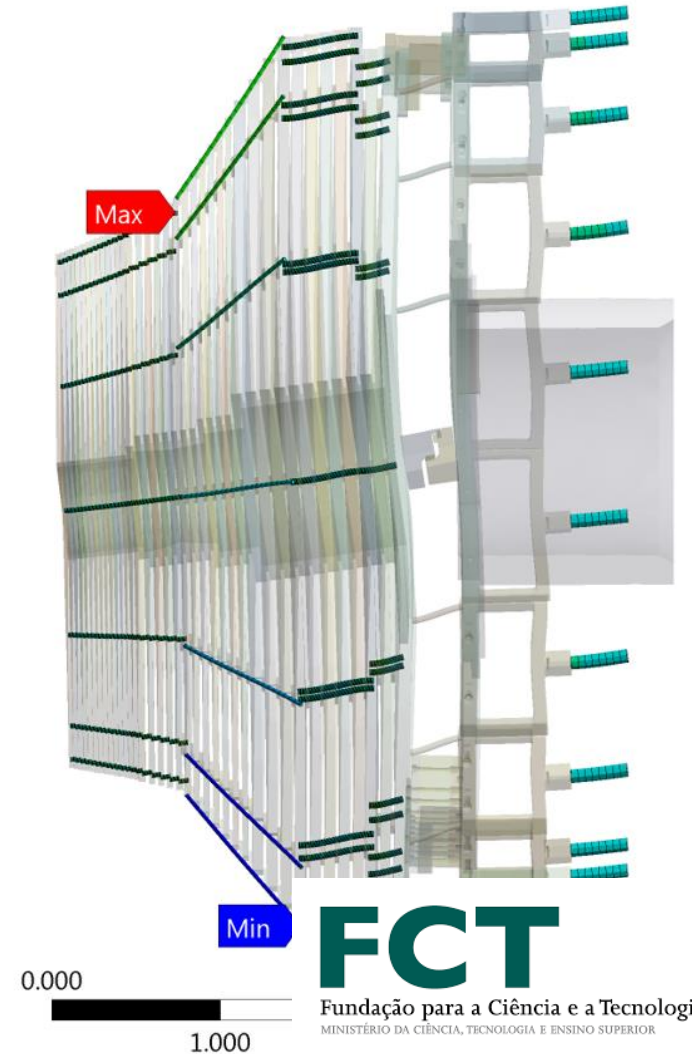
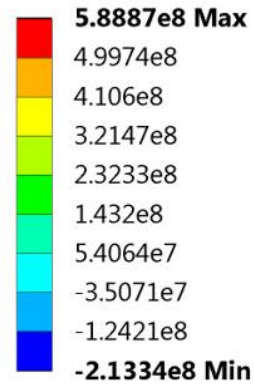


Endcap Structural Supports

Scale Factor of 300 times

- FEM
 - Results
 - Tie Bars

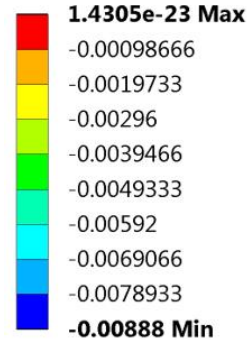
B: Static Structural
Maximum Combined Stress
Type: Maximum Combined Stress - Top/Bottom
Unit: Pa
Time: 1
16/08/2019 09:54



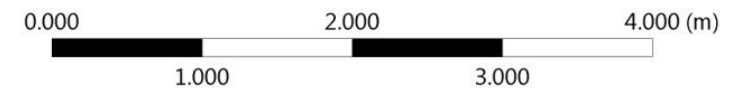
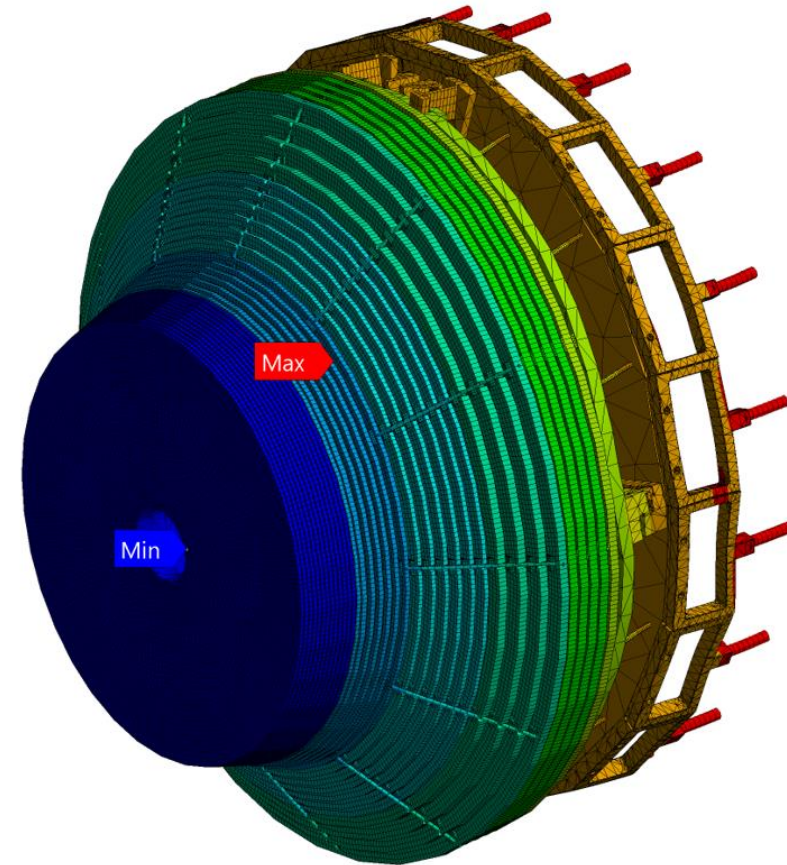
Endcap Structural Supports

- FEM
 - Results
 - Overall deflection

B: Static Structural
Directional Deformation 3
Type: Directional Deformation(Y Axis)
Unit: m
Global Coordinate System
Time: 1
16/08/2019 09:53

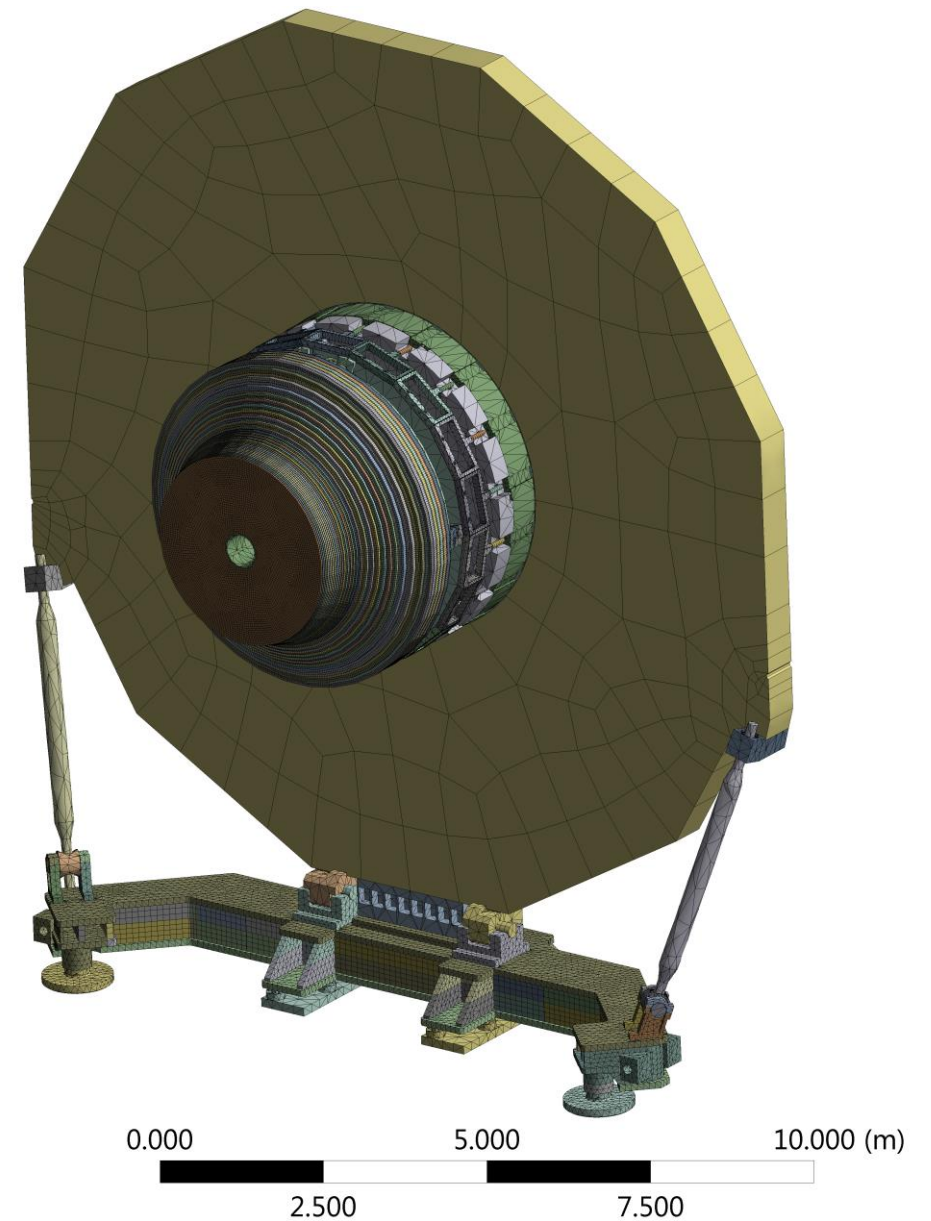


Scale Factor of 50 times



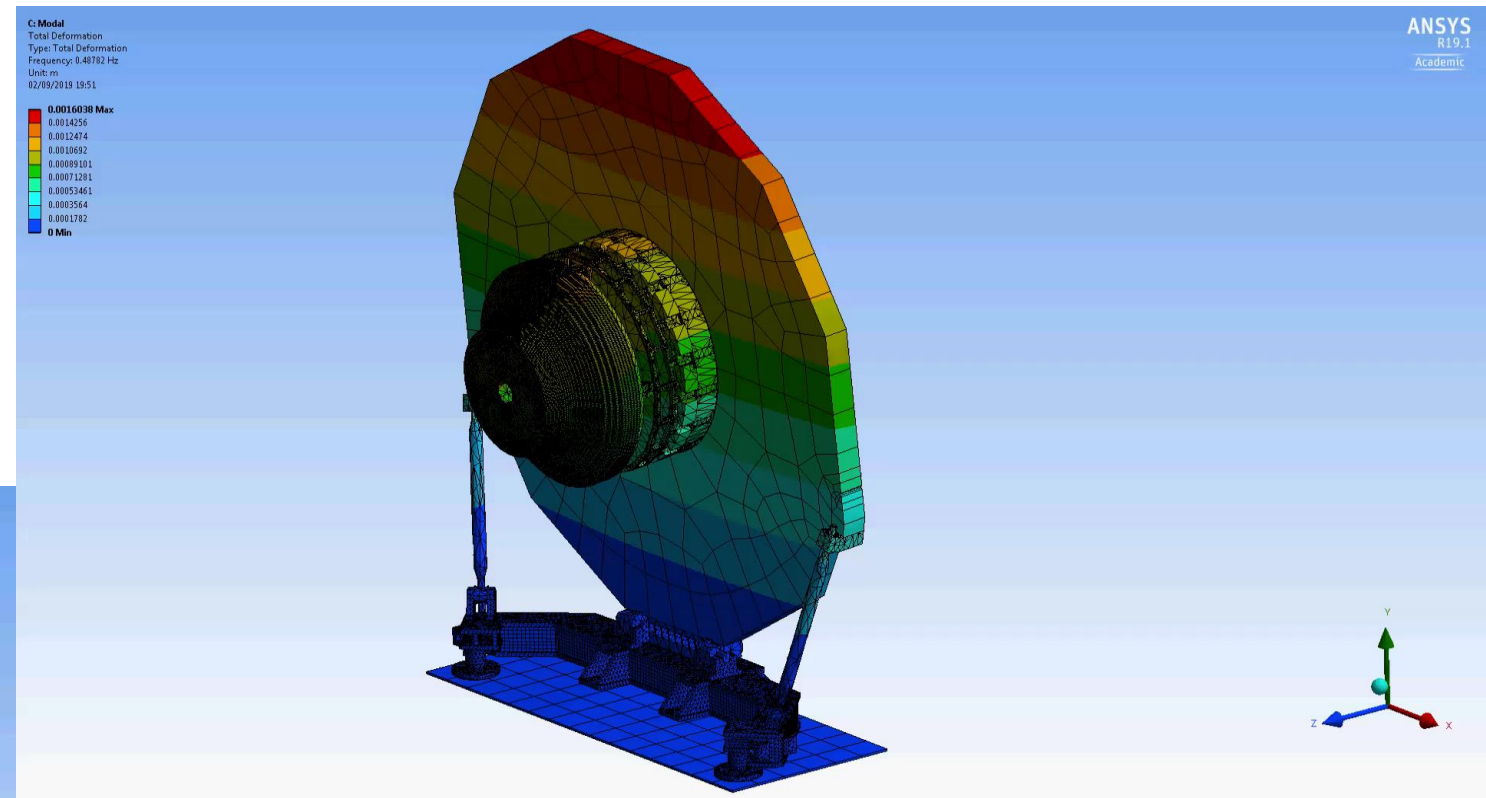
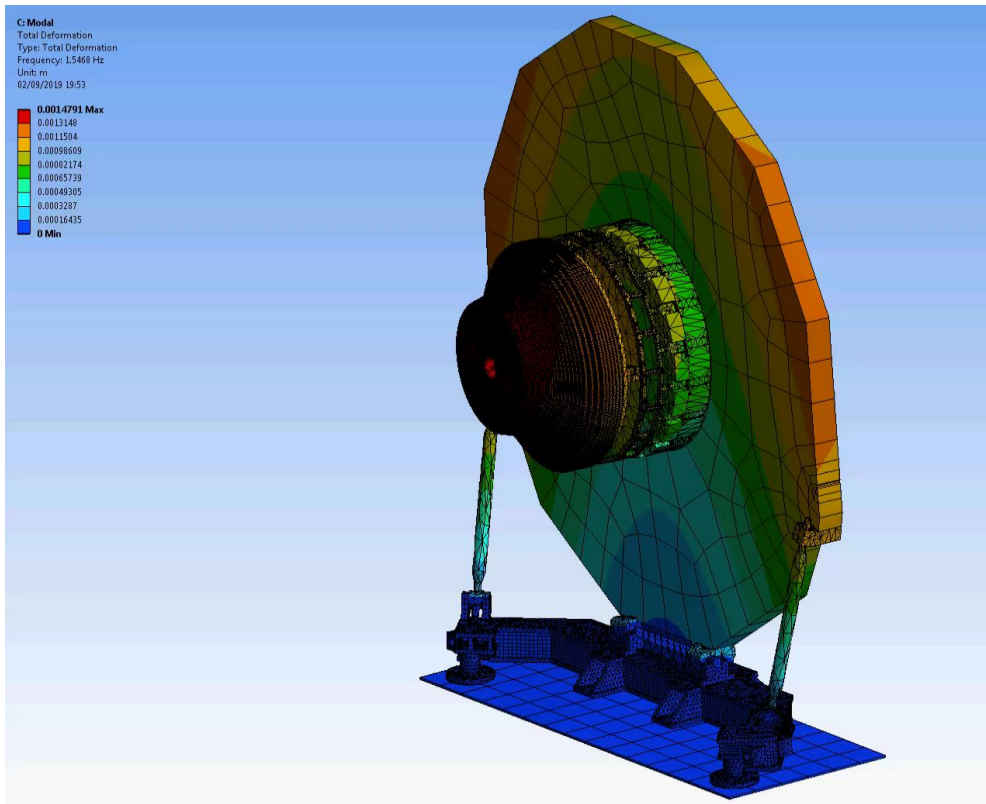
Complete system

- Preliminary analysis



Complete system

- Preliminary analysis
 - Fundamental Modes



Q&A

- Thank you for your time.