

# SPL Test Mock-up

Conceptual design review

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TE/MSC-CMI

# Summary

- Introduction
- Requirements
- Mock-up
- Power coupler mock-up
- Supporting scheme mock-up

# Introduction

- New supporting scheme
    - New alignment procedure
    - Forces on power coupler
    - Unusual stresses on interfaces
  
    - ‘Unknown’ behaviour of the assembly
- Mock-up to test in real condition

# Summary

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- **Requirements**
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# Requirements

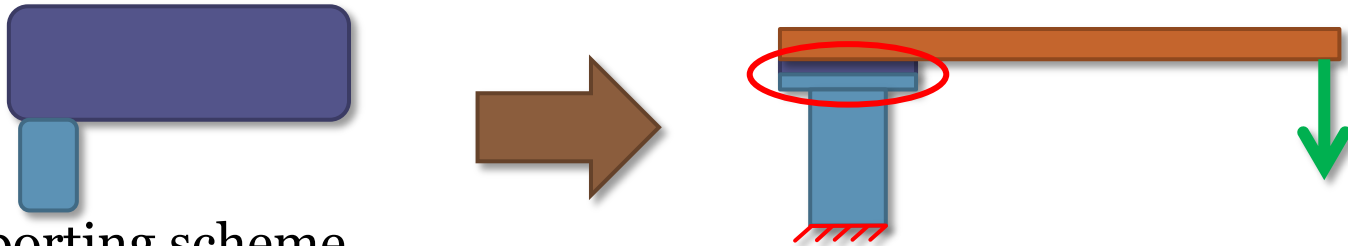
- New supporting scheme
  - Alignment procedure
  - Thermal contraction
  - Alignment stability
  - Stresses
- Inter-cavity support
  - Friction
  - Thermal contraction
  - Displacement
- Power coupler as support
  - Thermo-mechanical behaviour
  - Leak tightness when loaded

# Summary

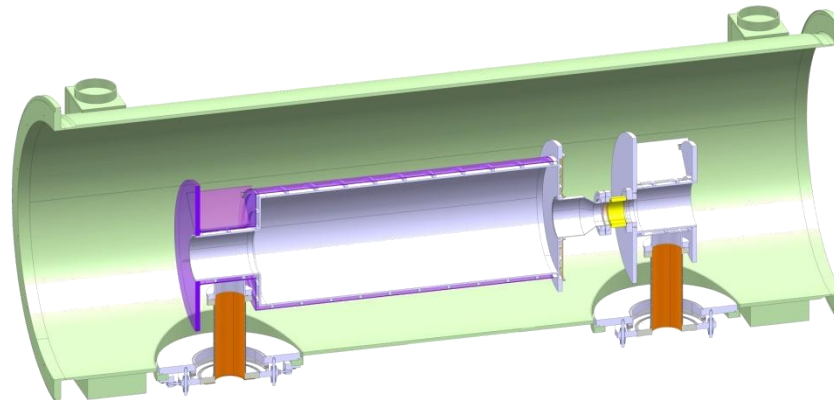
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# Mock-up

- Power coupler flange
  - Behaviour of seal/flange under constraint



- Supporting scheme
  - Assembly and alignment
  - Behaviour during cool-down/warm-up
  - Thermo-mechanical performance of supporting system



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# Power coupler mock-up

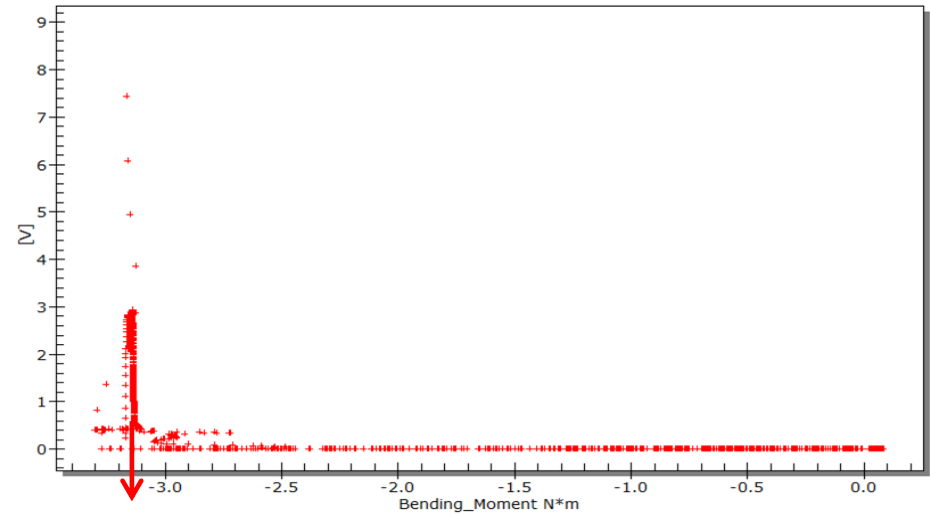
- Tube : same inertia as double walled tube
- Real flanges
- Force at end of beam (torque on flange)



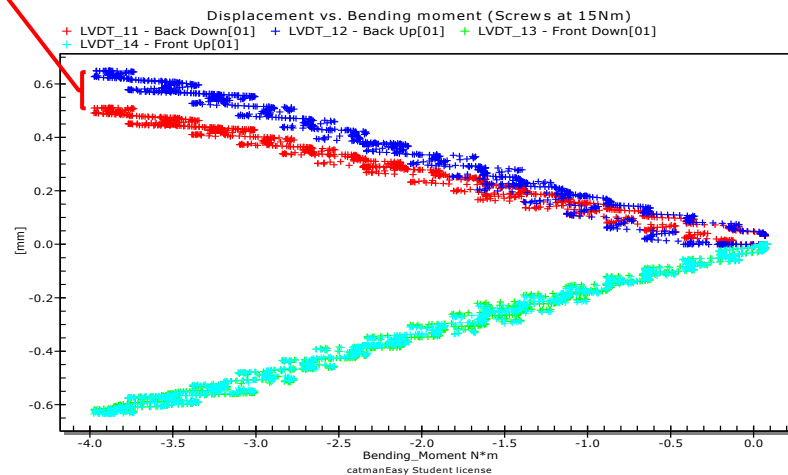
# Power coupler mock-up

- Preliminary results

Relative displacement  
(Opening of the flange)



Leak at around 3.1 kNm



Courtesy of  
Raúl Moron-Ballester

# Power coupler mock-up

- Preliminary results

Torque on the flange screws [Nm]	Bending moment needed to produce a leak [kNm]
11	3.1
13.5	3.3
15	3.5

- Next

- Control the friction coefficient
- Other seals

**Paulo's presentation:  
max applied in cantilever  
= 1.9 kNm**

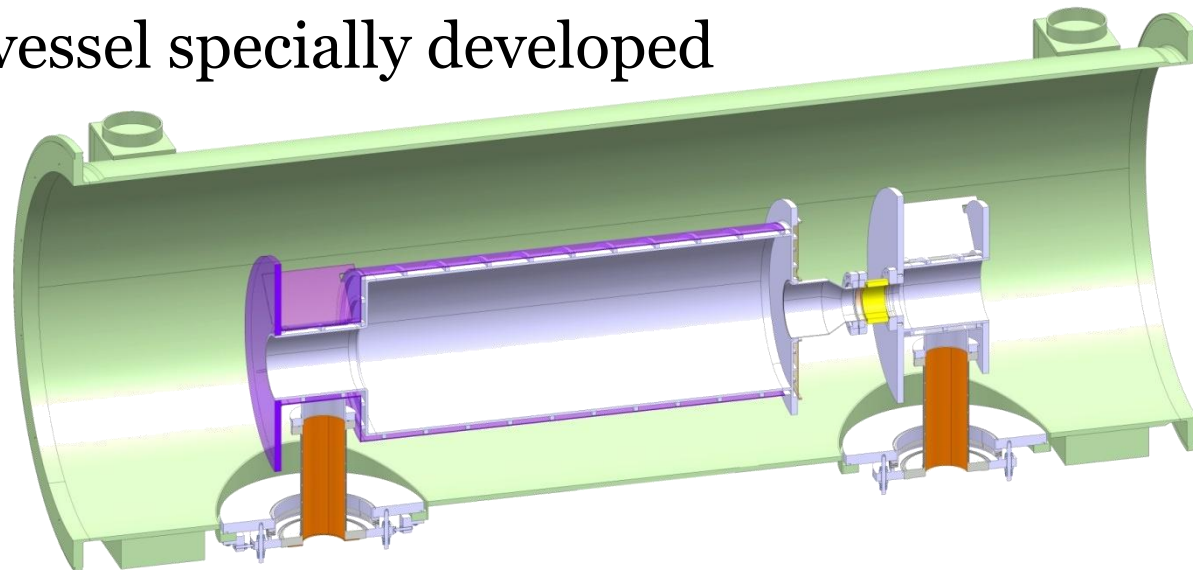
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# Supporting scheme mock-up

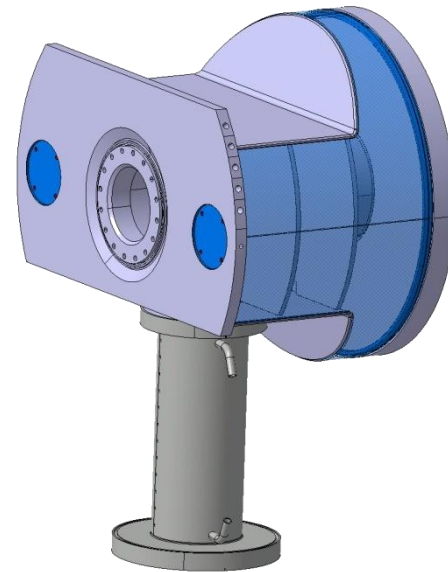
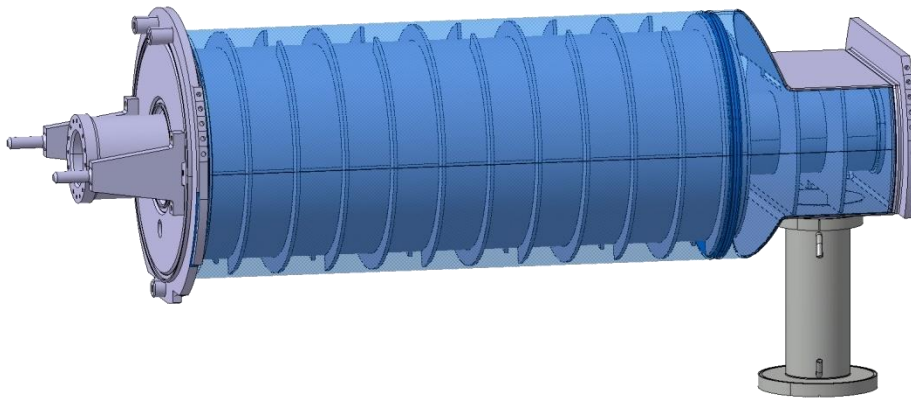
## Still in development

- Cooled with liquid nitrogen
- Same mechanical behaviour as real cavity/Helium Tank
- Real surrounding components
  - Double walled tube
  - Inter-cavity support
- Vacuum vessel specially developed



# Supporting scheme mock-up

- Real helium tank
  - Shape, thickness
  - Interfaces
- Pseudo cavities



Thank you for your attention

# Power coupler mock-up

- Instrumentation
  - Leak detector
  - Load cell
    - Control force
  - LVDTs
    - Displacement of flanges

