

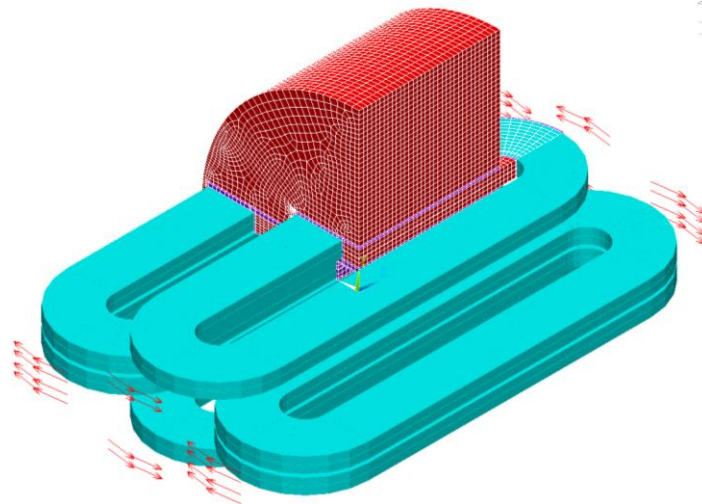


# Design of the sub- scale coil for EDIPO 2

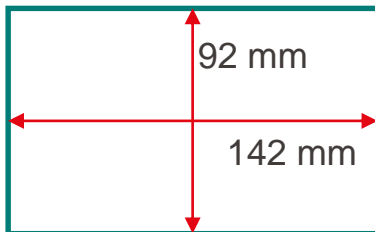
M. Daly

EDIPO2 Subscale  
13.02.2024

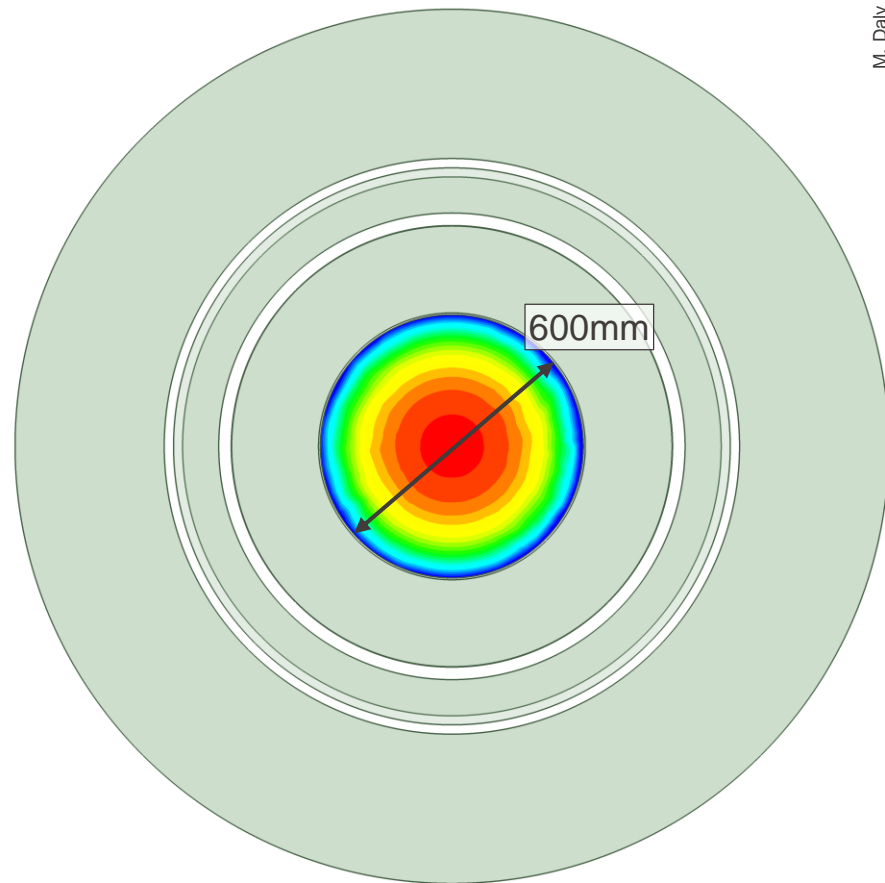
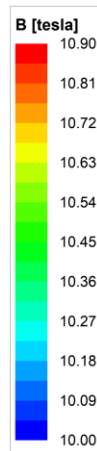
- Block coils (racetrack with or without flared ends)
  - Winding, tooling, feasibility of geometry, two layers or more, impregnation
  - Stress sensitivity of  $\text{Nb}_3\text{Sn}$
- Detachable poles
  - Coil behaviour
  - How to ensure reliable detachment
- Weak points of Coils
  - Layer jumps
  - Splices
  - Instrumentation
  - Coil ends
- Validate simulations
  - Conductor limits and quench simulations



- SULTAN sample cavity



- Follow similar preparation to SULTAN Samples
- 15 kA or 100 kA sample current
- Closed loop cooling (cooling plates and pressurized He)

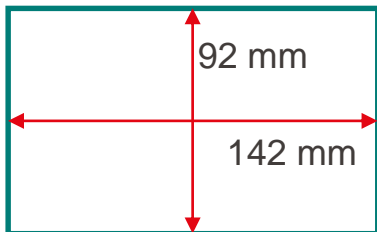


0

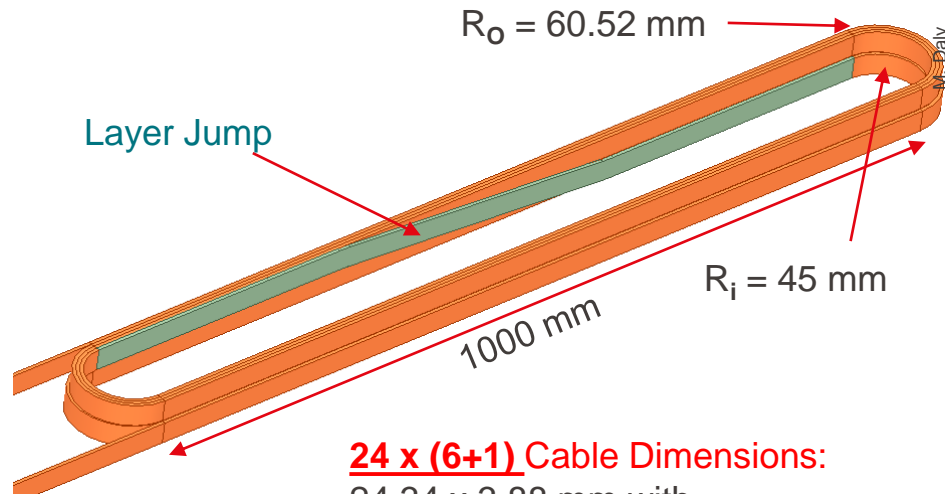
1e+03

2e+03 (mm)

- SULTAN sample cavity

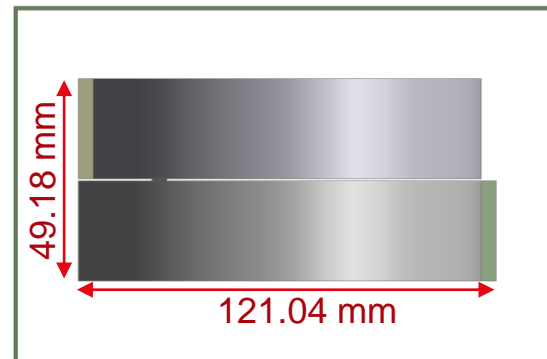


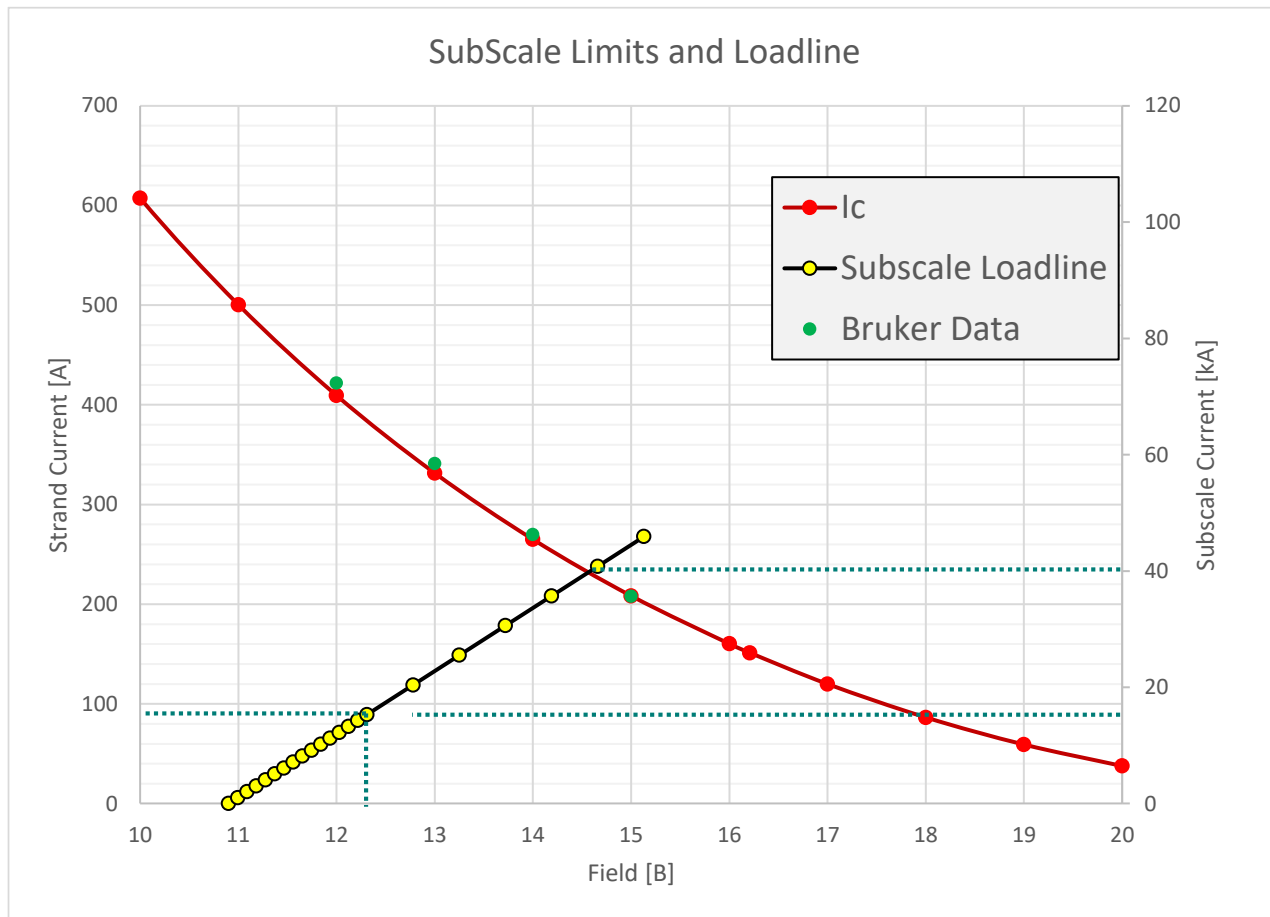
- Follow similar preparation to SULTAN Samples
- 15 kA or 100 kA sample current
- Closed loop cooling (cooling plates and pressurized He)



**24 x (6+1) Cable Dimensions:**

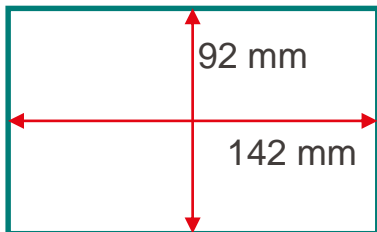
24.34 x 3.88 mm with  
0.2mm insulation included



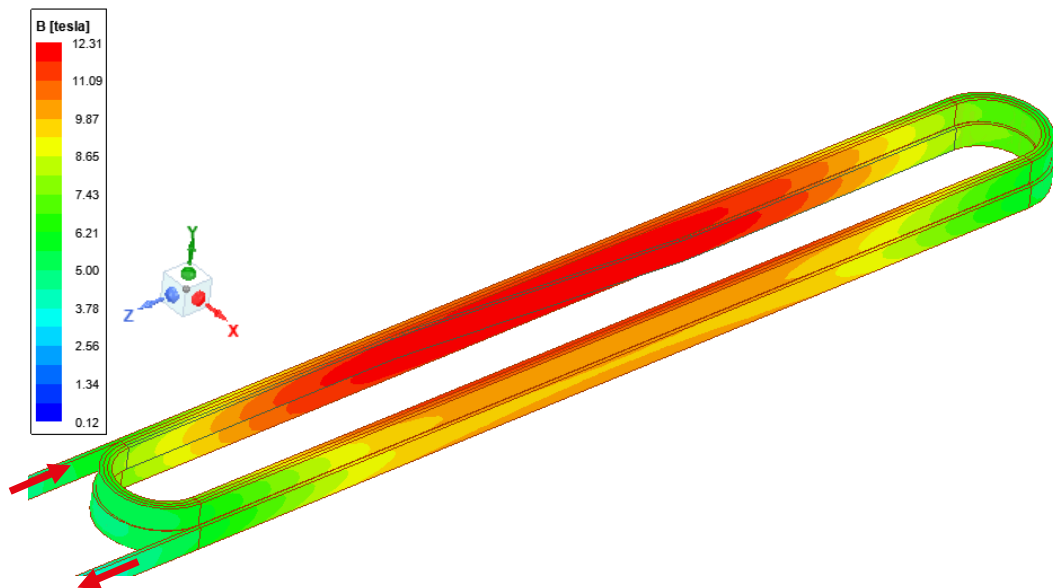


# Testing in SULTAN

- SULTAN sample cavity

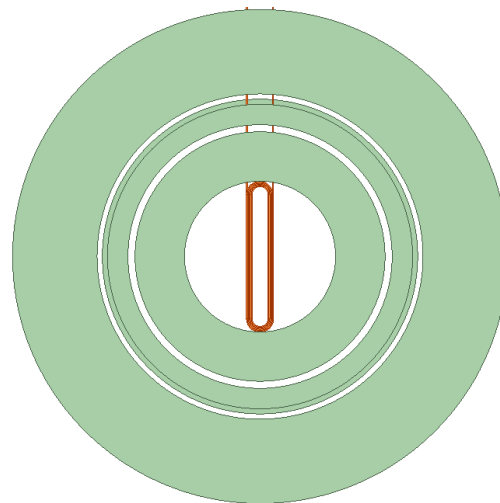
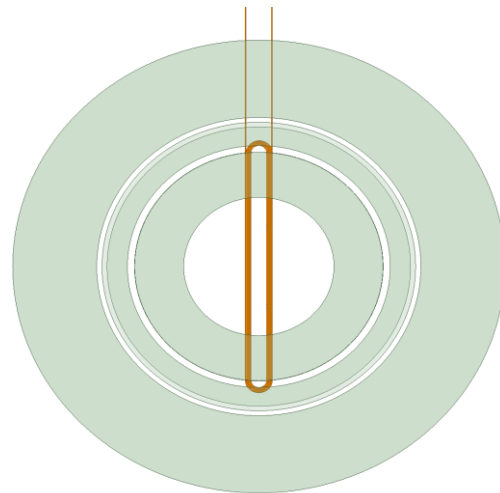
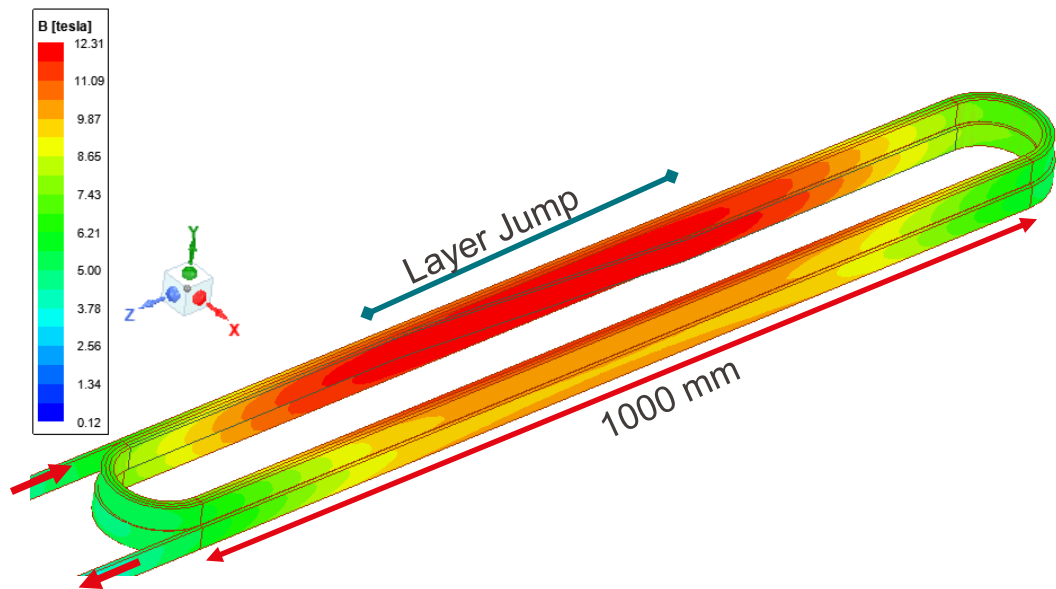


- 15 kA
- 5 turns (more or less)
- $B_{\text{background}} = 10.9 \text{ T}$
- 1000 mm Straight segments



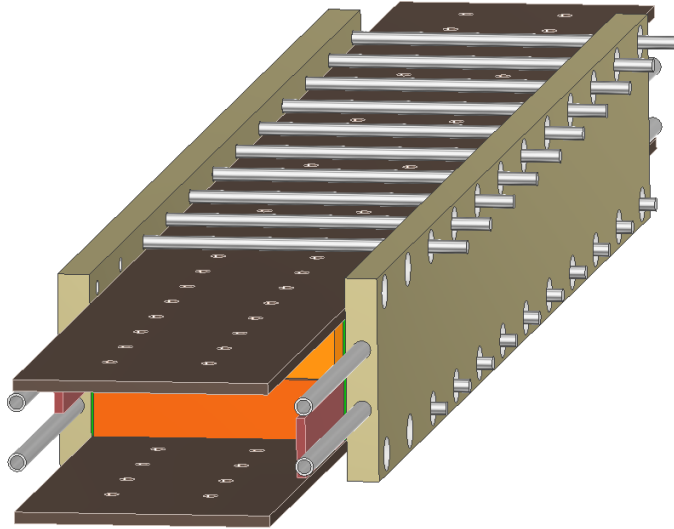
Ansys Mechanical (N)	X	Y	Z
Positive Lorentz Forces	1044517	50479	15
Negative Lorentz Forces	-1044326	-42543	-9994

# Subscale: Dimensions

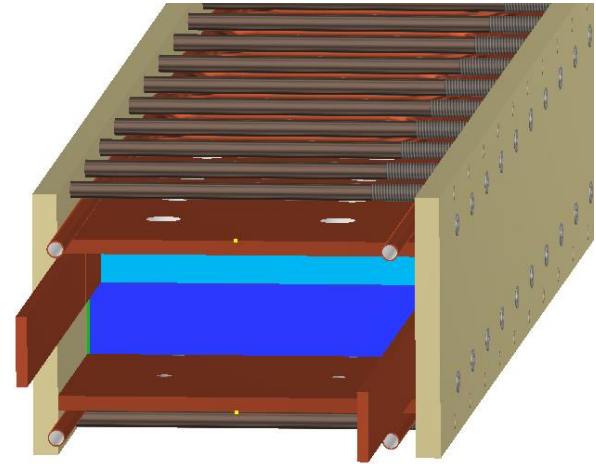




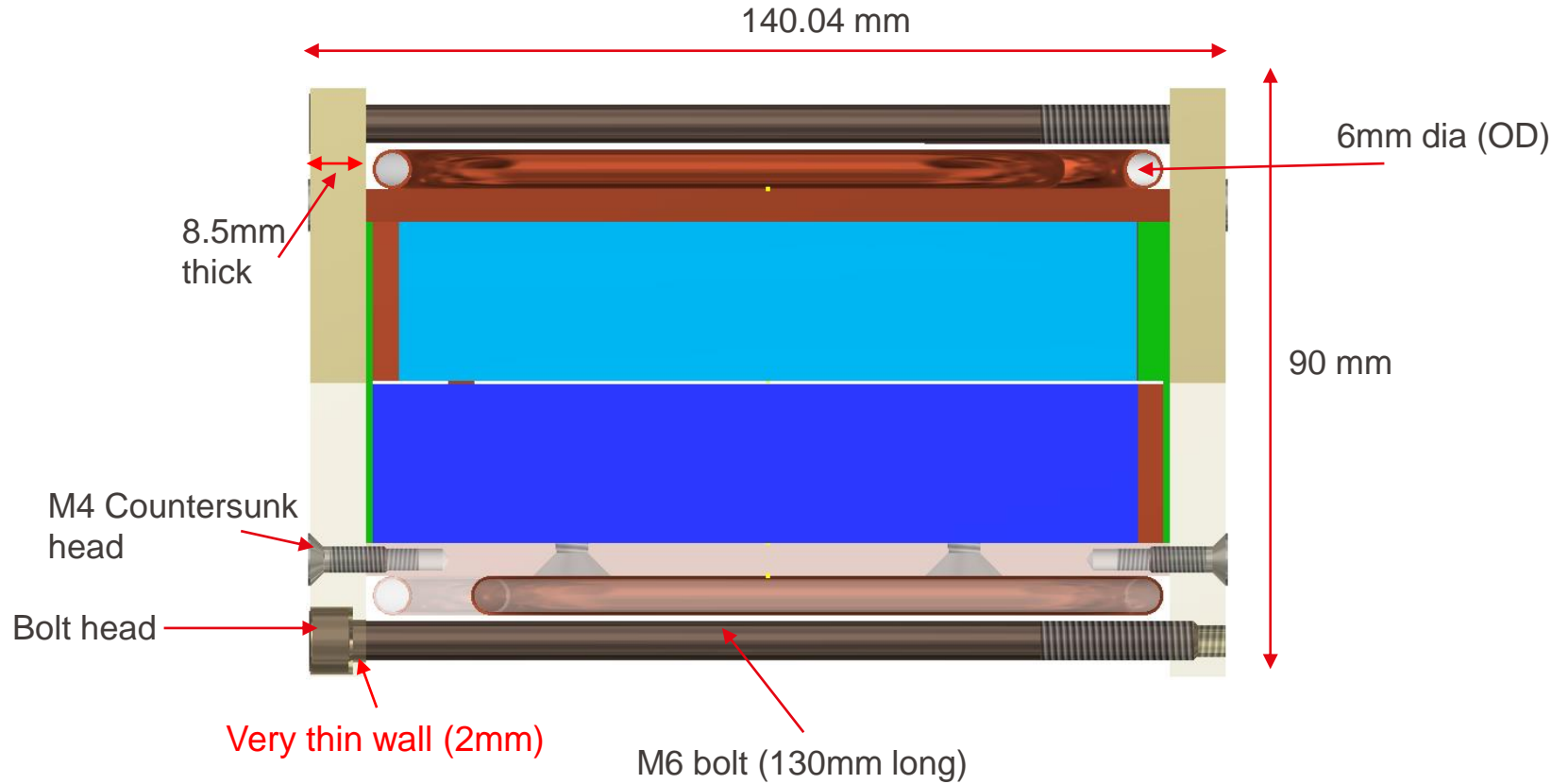
- 2 Layer Subscale 02

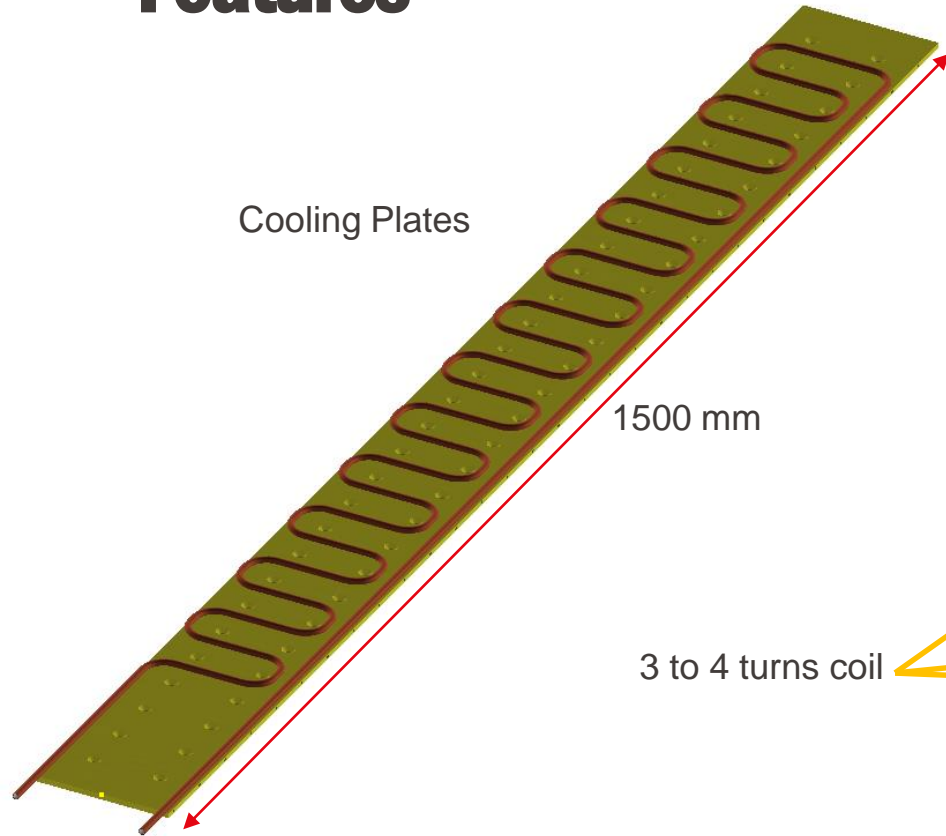


- 2 Layer Subscale 03

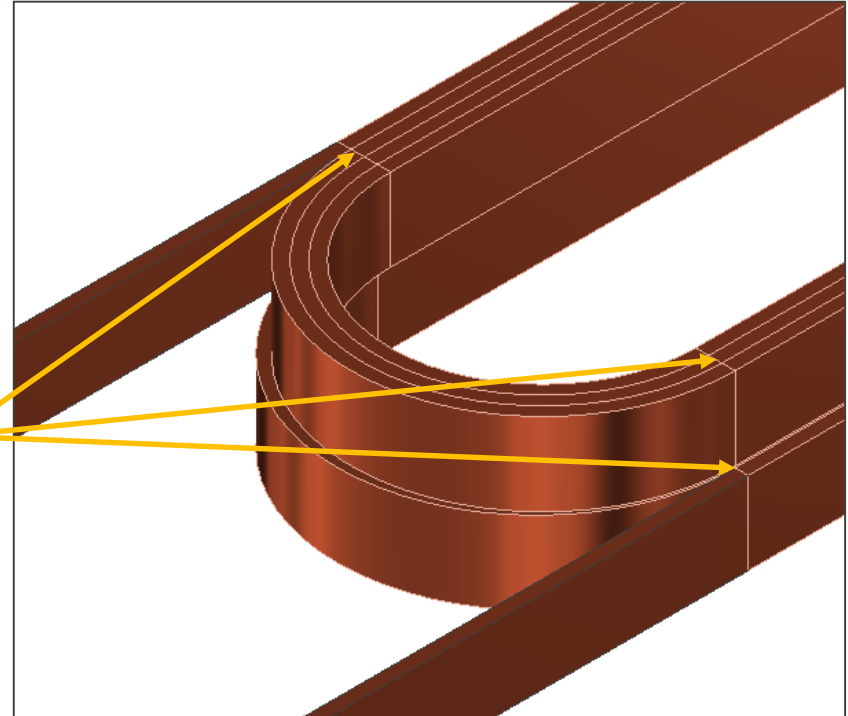


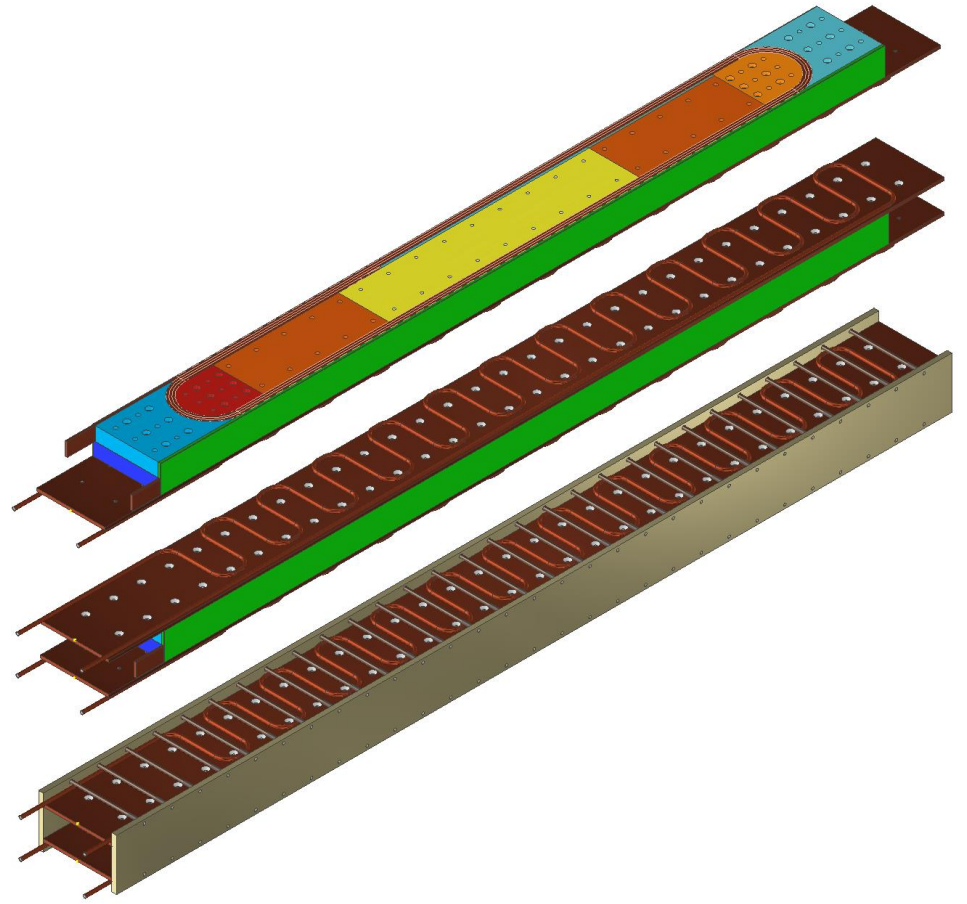
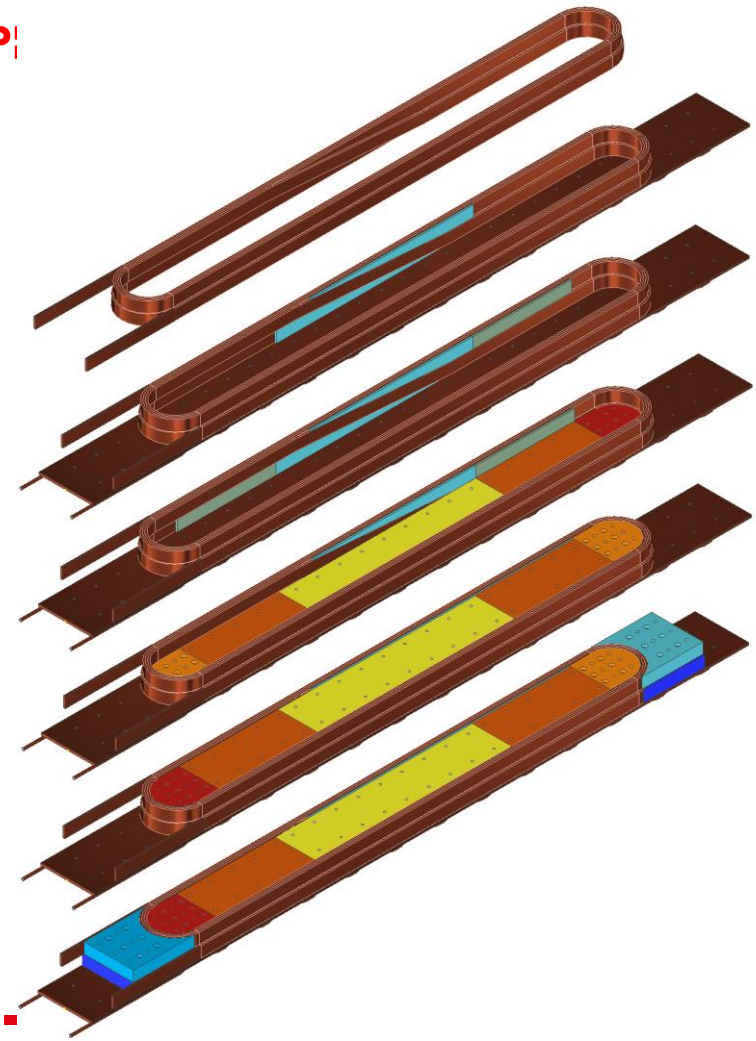






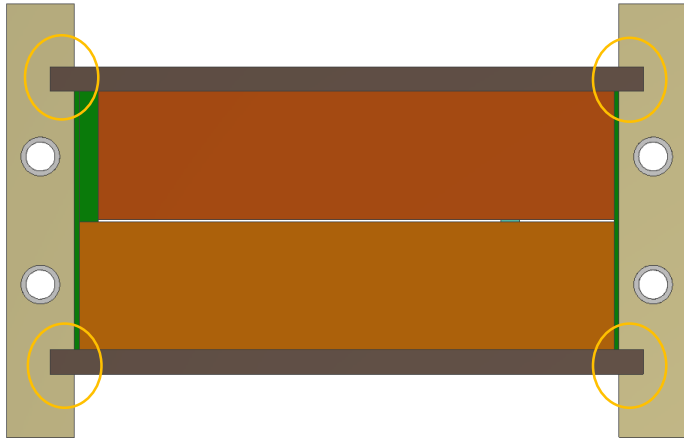
3 to 4 turns coil





# Alternative designs

- Counter Y-direction forces



- Leads (1m)

