

DSG Ansys R&D Meeting

Date: June 8, 2023

Time: 2:00 PM – 2:30 PM

Attendees: Pablo Campero, Brian Eng, and Tyler Lemon

1. EIC test stand thermal analysis

Pablo Campero and Brian Eng

1. Discussed improvements to the model
 - Completed development of the annulus space, beampipe inner volume, and heater pipe inner volume
 - Added three element heaters to the model with 9.25 in of immersed length
 - After reviewing specifications, noted that only one element heater would be required; two extras will be removed
 - Applied share topology option to make sure there is thermal interaction between the surfaces and edges in contact

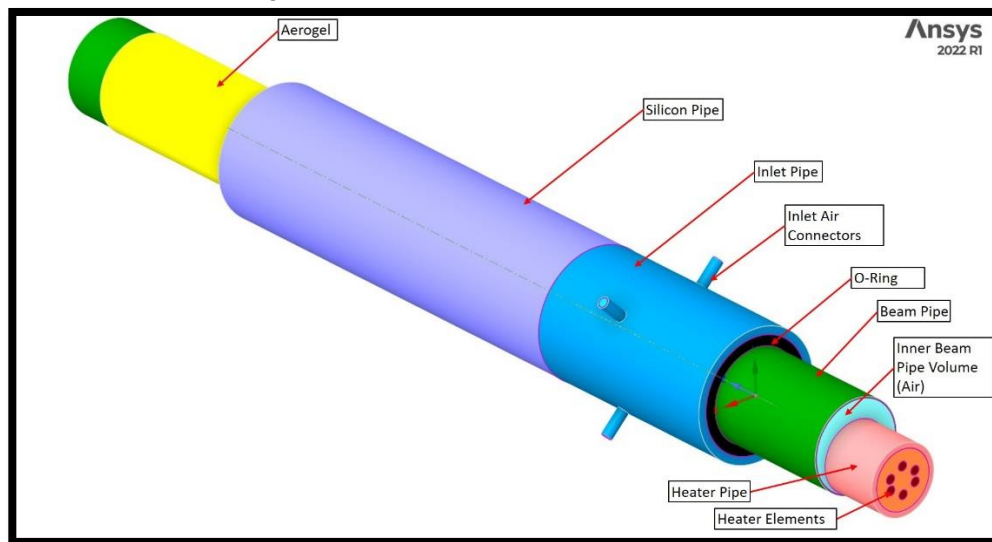


Fig.1. EIC test stand modified model

2. Meshed model with *Ansys Fluent with Meshing* software
3. Generated polynomial coefficients to simulate thermal properties behavior of the mineral oil used in the test stand; data acquired from paper (DOI: 10.1051/e3sconf/20171901040) showed that thermal properties vary with the temperature
4. Set materials and boundary and cell conditions for model
5. Attempted to run simulation
 - Encountered floating point exception errors, potentially related to the setup of mineral oil fluid inside the heater pipe
 - Tried Laminar and K-epsilon models; error persisted when mineral oil was applied to the inner volume of the heater pipe
 - Ran simulation with air inside the heater pipe with an inlet velocity of 0.1 m/s; simulation completed 1000 iterations
 - From the resulted temperature contour plot noted that heat transfer between the heater elements and inner fluid volume inside the heater pipe was not correct
 - Investigation in progress