DSG Ansys R&D Meeting

Date: May 25, 2023
Time: 2:00 PM – 2:30 PM

Attendees: Aaron Brown, Pablo Campero, Brian Eng, and Marc McMullen

1. **EIC beampipe test stand thermal analysis**
   Pablo Campero, Brian Eng, and Marc McMullen
   1. Completed model modifications to improve simulation
      - Redid the cap that represents the O-ring used in the test stand, using rubber silicon
   2. Discussed the set boundary and cell conditions in Fluent
      - Fixed temperature for heater pipe at 102°C
      - Inlet air temperature of 23°C
      - Convection for silicon pipe with air temperature at 23°C and 5 W/m^{2}K
   3. Ran simulations for different flow rates from 0 to 200 l/min
      - Generated velocity and temperature contour plots
      - Generated plot of inlet silicon pipe temperature vs flow rate; compared simulation results to test stand measurements
      - Generated plot of outlet silicon pipe temperature vs flow rate; compared simulation results to test stand measurements
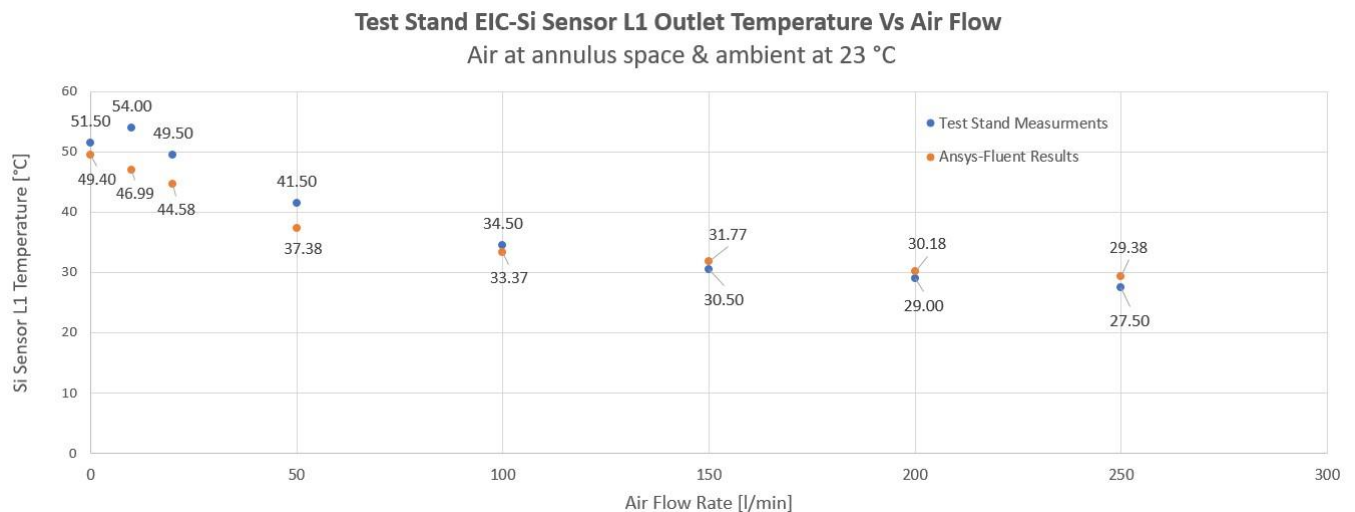

Fig.1. Silicon temperature vs air flow rate

   4. Discussed modifications to the model to improve simulation
      - Heater pipe in the test stand does not have a fixed temperature
      - Will change the fixed temperature boundary condition to a heat source boundary condition
      - Will monitor maximum temperature at the upper section of the heater pipe and compare with the test stand temperatures