DSG-Ansys R&D Meeting Minutes

Date: May 5, 2022
Time: 14:00 to 15:00

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

1. NPS thermal analysis

Aaron Brown, Pablo Campero, and Marc McMullen

1. Modified simplified model; changed heat exchanger blocks with cylinders to represent the fans
   - Added four cylinders: two for top section and two for bottom section
   - Added electronic volume occupied by the PMTs, bases, and dividers using dimensions provided by NPS 3D model
2. In Design Modeler, combined electronics volume occupied by PMTs and electronic volume that encloses the electronics and cooling system (to the end of the box/frame plates)
3. Imported model to Fluent
   - Set material and configured solid and fluid domains
   - Implemented Turbulent Flow analysis (Model SST-K-omega)
   - Adding boundary conditions to set thermal heat transfer in model
   - Found another way to set the source of heat for volume in fluid domain but results do not make sense yet; more investigation required

2. EIC-Beryllium Section Thermal Analysis

Pablo Campero and Brian Eng

1. Completed thermal simulation for a model with 5 mm between the inner face of Si sensor L1 and the outer face of the Be pipe
   - Plotted results and presented in EIC Engineering meeting
   - The maximum temperature for Si sensor L1 is 31.23°C when air in annulus space is 18°C and 5 m/s
2. Noticed that temperature between models with 4 and 5 mm gap only drops about 4°C
3. Results for simulation at other temperatures followed the same trend

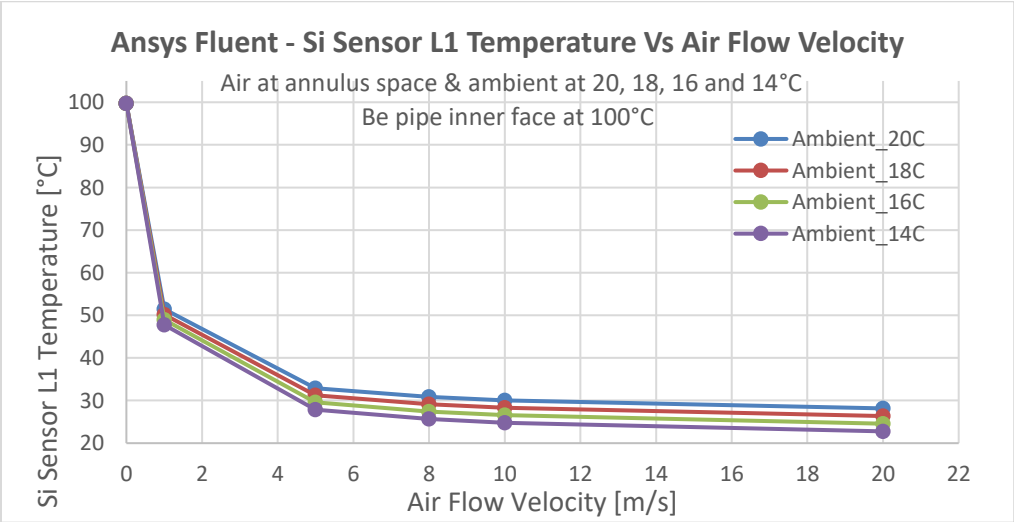

Fig.1. Maximum temperature for Si sensor L1 for model with 5 mm of separation