

DSG Ansys R&D Meeting

Date: February 23, 2023

Time: 2:00 PM – 3:00 PM

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

1. Discussed results for thermal simulation of EIC beam pipe model with different aerogel properties

1. Used model with 5-mm separation between beryllium beam pipe and first layer of silicon sensors
2. Density of aerogel insulation changed from 50 kg/m³ to 250 kg/m³ in 50 kg/m³ steps
3. Thermal conductivity values of 0.0156 W/m•K and 0.014 W/m•K used

Air Velocity at Annulus & Enclosure [m/s]	Temp. at Annulus & Enclosure [°C]	Aerogel Properties			Max. Si Sensor Temp. [°C]	Min. Si Sensor Temp. [°C]
		Density [Kg/m ³]	Thermal Cond. [W/m*K]	Mass [Kg]		
1.00E-07	20	50	0.0156	0.001613	99.7735	69.7811
		100		0.003227		
		150		0.004846		
		250		0.008067		
		50	0.014	0.001613	99.7648	69.5366
		100		0.003227		
		150		0.004846		
		250		0.008067		

Table of results when varying aerogel density and with different values of thermal conductivity for the aerogel.

2. Discussed mass flow rates and heat transfer rates for different air flow velocities

Airflow [m/s]	Mass flow rate at inlet [Kg/s]		Heat transfer [W]
	Annulus space	Enclosure	From beam pipe
1	0.001195	0.033272	26.5557
5	0.005976	0.166363	46.4342