

## DSG Ansys R&D Meeting Minutes

**Date: November 30, 2023**

**Time: 2:00 PM – 2:30 PM**

*Attendees: Aaron Brown, Peter Bonneau, Pablo Campero, Brian Eng, George Jacobs, Tyler Lemon, and Marc McMullen*

### 1. NPS thermal analysis with Ansys Mechanical

*Aaron Brown*

1. Ansys Mechanical crashed and simulation stopped; will proceed using internal heat generation option

### 2. NPS thermal analysis with Ansys Mechanical and Fluent in transient mode

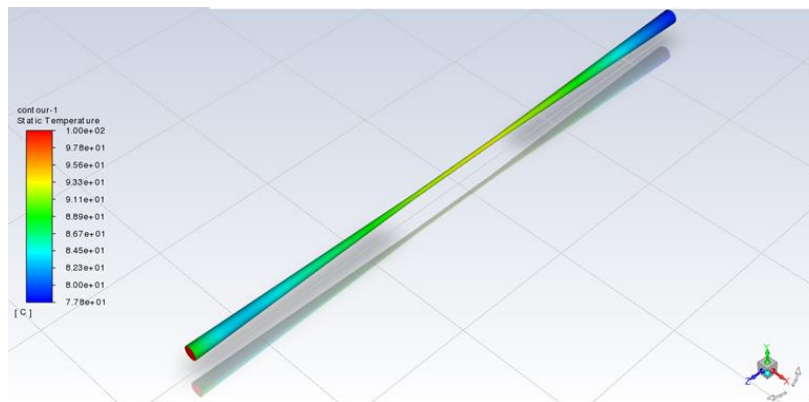
*Pablo Campero*

1. Common model to be used in both simulations is in progress
  - Added 1080 slice volume (20x20x1 mm) to set the internal heat generation
  - Reduced each of the 1080 crystals at the mu-metal section by 1 mm (z-axis direction)
2. Discussed Share Topology option, which is not recommended for Ansys Mechanical (per Ansys Tech support), but is needed for Ansys Fluent simulations

### 3. EIC beampipe Ansys Fluent thermal analysis

*Pablo Campero*

1. Completed mesh using Ansys Fluent with Mesh; final has ~29 million cells
2. Set up Ansys Fluent with thermal boundary condition
  - Assigned material thermal properties for aluminum, thermal heat insulator (aerogel, polyimide, aluminum), and beryllium
  - Added thickness for the insulator using Conduction Shell options in Fluent
  - Set convection for exterior walls of aluminum and beryllium
3. Ran thermal simulation
  - Set 300 iterations in steady state analysis mode; converged at 142 iterations
  - Generated temperature contour plot
  - Measurement of temperatures for critical points of the model is in progress



Isometric view of contour temperature for 9-m EIC beampipe