

## DSG Ansys R&D Meeting Minutes

**Date: September 14, 2023**

**Time: 2:00 PM – 3:30 PM**

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

### 1. NPS thermal analysis with Ansys Mechanical

*Aaron Brown, Pablo Campero, and Brian Eng*

1. Verified geometry of the model in SpaceClaim
  - Used overlapping and interference tools to inspect the model geometry
  - Found over 22,000 overlapping parts that need to be resolved
2. Attempted to redo the meshing to resolve the problems with the model's geometry
  - Unable to get a SpaceClaim license
    - Suggested choosing a different group license option available from dropdown menu

### 2. NPS thermal analysis with Ansys Fluent

*Pablo Campero*

1. Installed eight 64-GB RAM in EXPCAMPERO computer
  - For the model with 17 M cells, memory used while running simulation in Fluent Solver was ~135 GB
  - Tested performance while model running; no issues found
2. Completed setting up Shell Conduction options for each crystal wall that is in contact with the dividers
3. Ran first simulation
  - Took ~25 hrs. to complete 1000 iterations in steady state mode
  - Discussed results of the simulation
    - Airflow direction and magnitudes for the heat exchanger fans are correct based on the velocity contour and pathline plots
    - Found spots in the fluid volume surrounding the crystal with unexpected high (>900°C) temperature
    - Noted a spike in the residuals plot after iteration #925

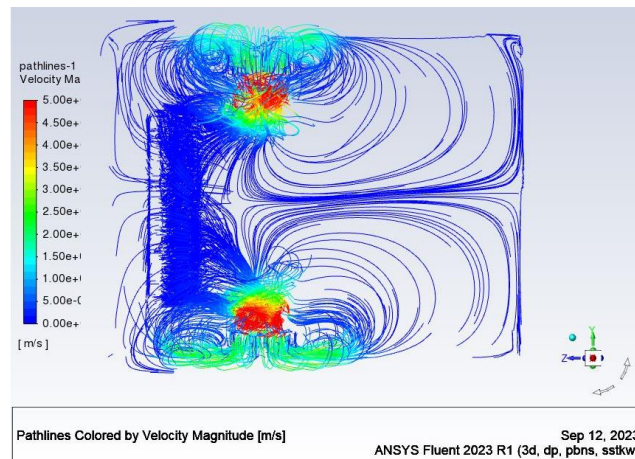


Fig.1. Right side of velocity pathlines for YZ plane

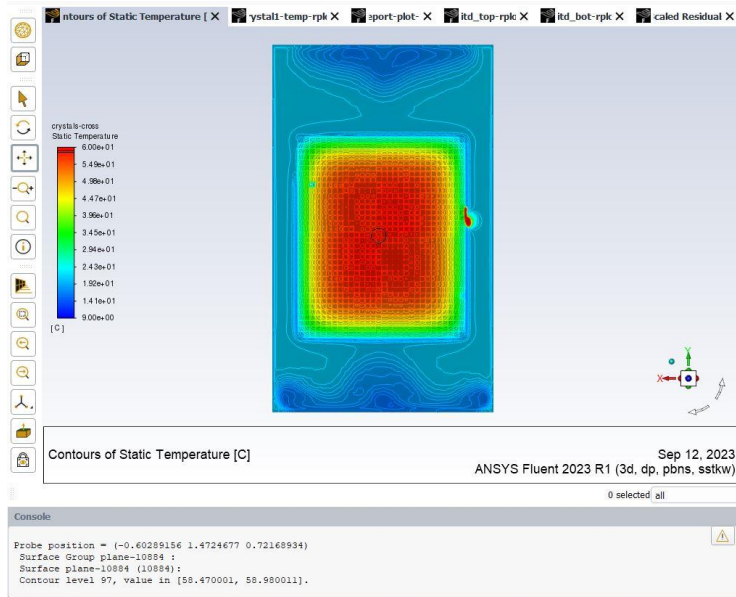


Fig.2. Back side of the temperature contour plot of YX cross-section plane at the rear face of crystals; red spot next to the crystal array (fluid domain) has a temperature >900 °C