Detector Support Group

We choose to do these things "not because they are easy, but because they are hard".

Weekly Report, 2023-10-11

Hall A – ECAL

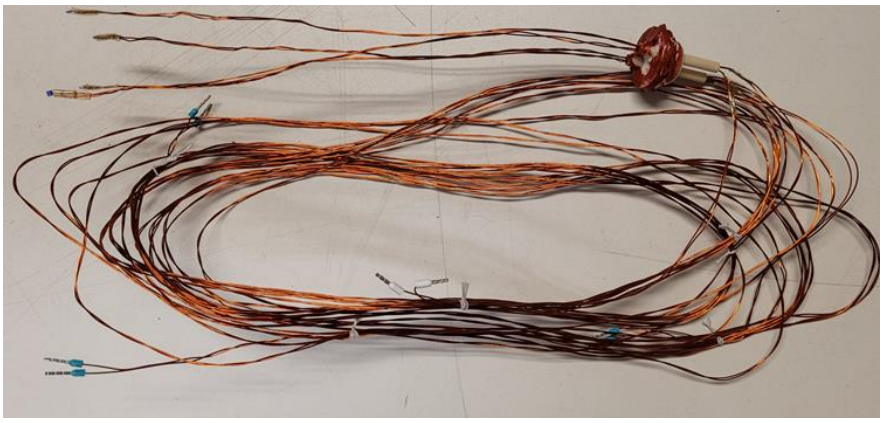
Brian Eng, Mindy Leffel, and Marc McMullen

- Developed a LabVIEW program that formats the output shared variable file into an EPICS database file with process variable names and attributes
- Fabricated one high voltage cable with two Fischer connectors; 23/24 completed

Hall A - Gen II

Mindy Leffel

- Fabricated four RTD cables with a feedthrough; one shown below



Hall A - SoLID LAPPD (Large Area Picosecond Photodetector)

Pablo Campero

- Researched linear translation stage systems from Thorlabs; potential system to be used is LTS300C

Hall B – Magnets

Pablo Campero and Brian Eng

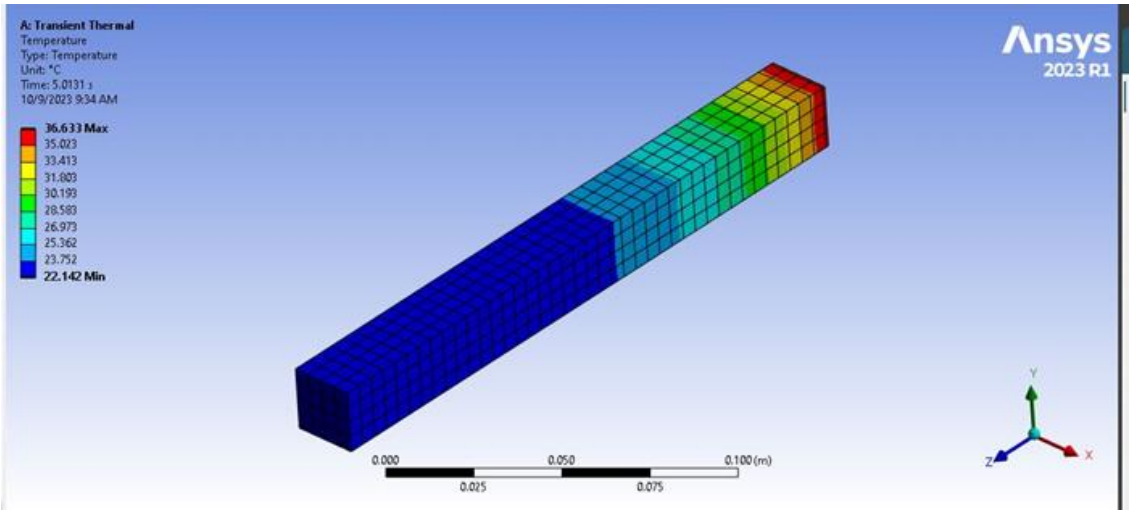
- Both Torus and Solenoid fast dumped
  - ✶ https://logbooks.jlab.org/entry/4192030
  - ✶ https://logbooks.jlab.org/entry/4196814

Hall C – NPS

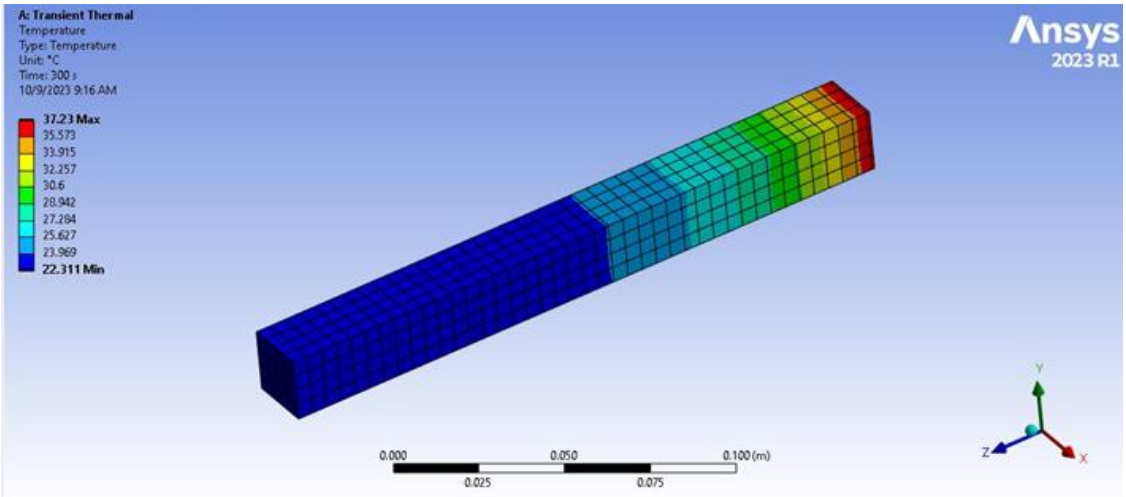
Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, Mindy Leffel, and Marc McMullen

- Completed code to automatically disable interlock enable and averaging enable if a sensor is disabled, and to send the new values for interlock and averaging enables to EPICS
- Continued revision of control and monitoring software
  - ✶ Made three subVIs
    - Determine if latch or status is true
    - Compare trip time with current time and determine if latch is needed based on the trip delay value
    - Action to take if there is a latch
  - ✶ Replaced code with subVIs for each detector area monitored

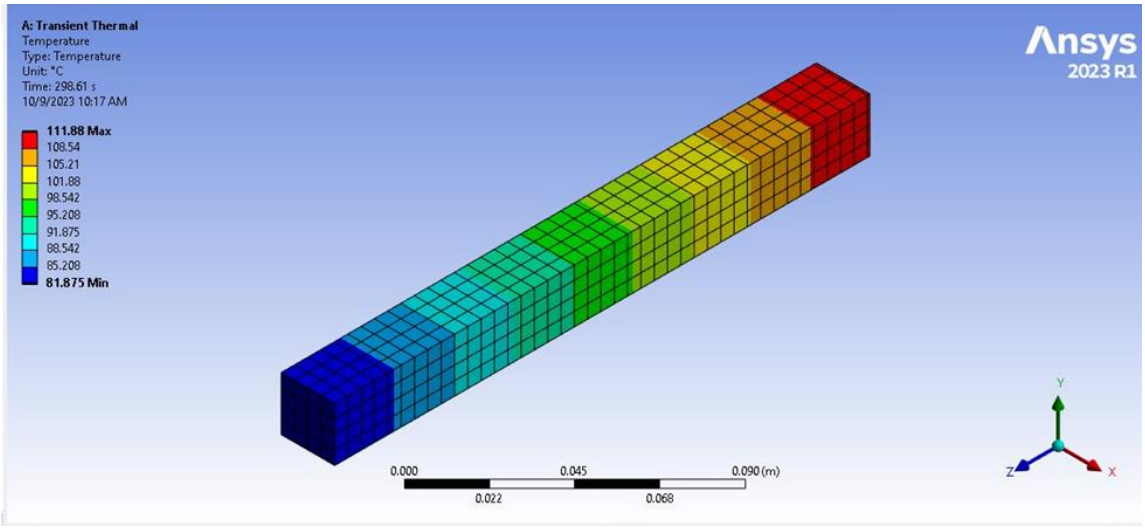
- Recovered NPS high voltage channels after interlock triggered by external chiller flow meters
    - ✶ https://logbooks.jlab.org/entry/4193292
    - ✶ https://logbooks.jlab.org/entry/4195652
    - ✶ Investigating cause of erroneous flow meter temperature and pressure
- Investigating problems with sensor readings from Keysight mainframe
    - ✶ To recover the sensors, sometimes the LabVIEW program must be restarted
- Made Visio drawing of crystals with fluid for NPS Ansys note
- Created Ansys model with only one crystal
    - ✶ Set up model with internal heat generation of 7.5e5 W/m3 and heat flow of 0.3 W
    - ✶ Ran multiple simulations applying convection to different number of walls



Crystal with internal heat generation of 7.5e5 W/m3 and convection at 10 walls. Maximum temperature was 36.6°C.



Crystal with heat flow of 0.3 W and convection at 10 walls. Maximum temperature was 37.23°C



Crystal with heat flow of 0.3 W and convection at two walls, rear and front. Maximum temperature was 111.88°C

Hall D – FCAL2

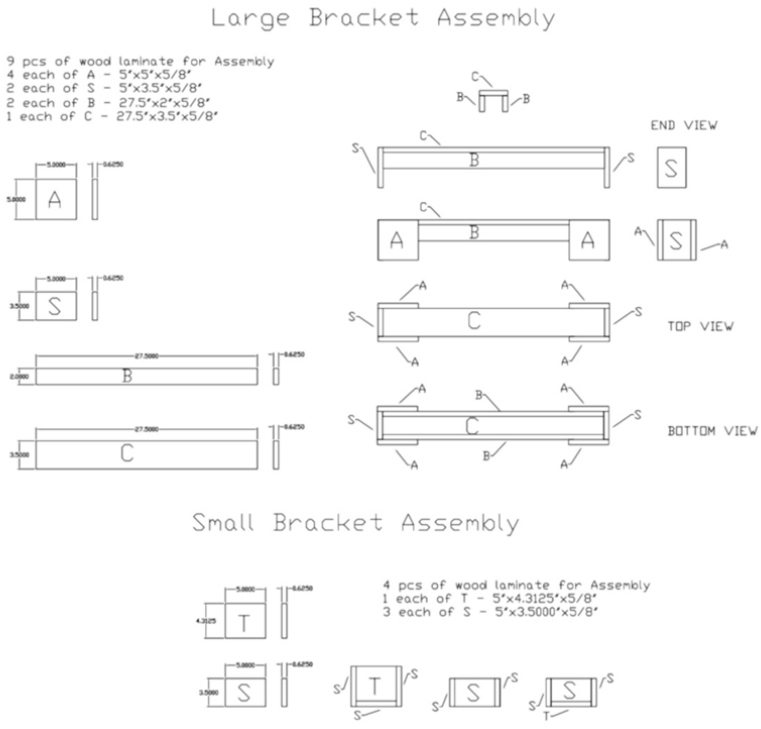
Mindy Leffel

- Populated 20 PMT bases; 640/1750 completed

EIC - DIRC

Peter Bonneau, Mindy Leffel, George Jacobs, Tyler Lemon, and Marc McMullen

- Created dimensional drawings of the wooden crate brackets



- Continued assembly of laser interlock system's interior control unit
- Creating wiring diagram for control units
- Started component placement in the design for the data acquisition PCB
- Developing an EPICS softIOC to test the software packages programmed for the Phoebus alarm system test

EIC - Thermal Test Stand

Pablo Campero, Brian Eng, George Jacobs, and Marc McMullen

- Ansys Fluent thermal analysis
  - ✶ Added another layer of insulation for a total thickness of 0.78 mm
  - ✶ Ran thermal simulation; difference between models with insulation thickness of 0.39 mm and 0.78 mm is <0.2°C
  - ✶ Overall temperature is higher with 0.78 mm
  - ✶ Plotted temperature vs eight different airflow inlet velocities at fixed inlet flow temperature of 100°C (below)