Detector Support Group

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

Weekly Report, 2021-10-13

Summary

Hall A – ECal

George Jacobs, Mindy Leffel, Marc McMullen

- Inspected seven ECal assembly structures for defects – no obvious defects found
- Reviewed latest super module frame drawings

Hall A – GEM

Brian Eng, George Jacobs, Marc McMullen

- Completed integration of Big Bite gas panel pressure sensors in WEDM monitoring

Hall A – SoLID

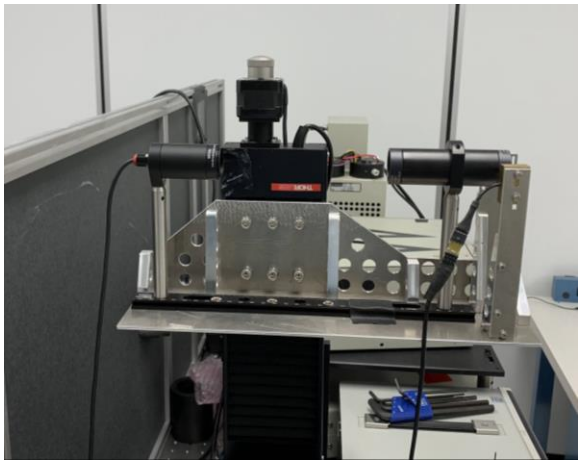
Mary Ann Antonioli, Pablo Campero, Brian Eng, Mindy Leffel, Marc McMullen

- Generated table detailing information for each terminal block needed to connect instrumentation and PLC IO modules
    - ✶ Added information for cable terminations and ground connections
- Developing electrical drawings: *Power Supply M-panel Connections* and *ASCII Communication System Diagram*
- Completed electrical drawings: *PLC IO, Remote A, Slot 4 Wiring Diagram* and *SoLID Magnet Interconnect System Diagram*
- Cut and terminated ferrule-to-ferrule cables: two 20-conductor and ten 4-conductor

Hall B – RICH-II

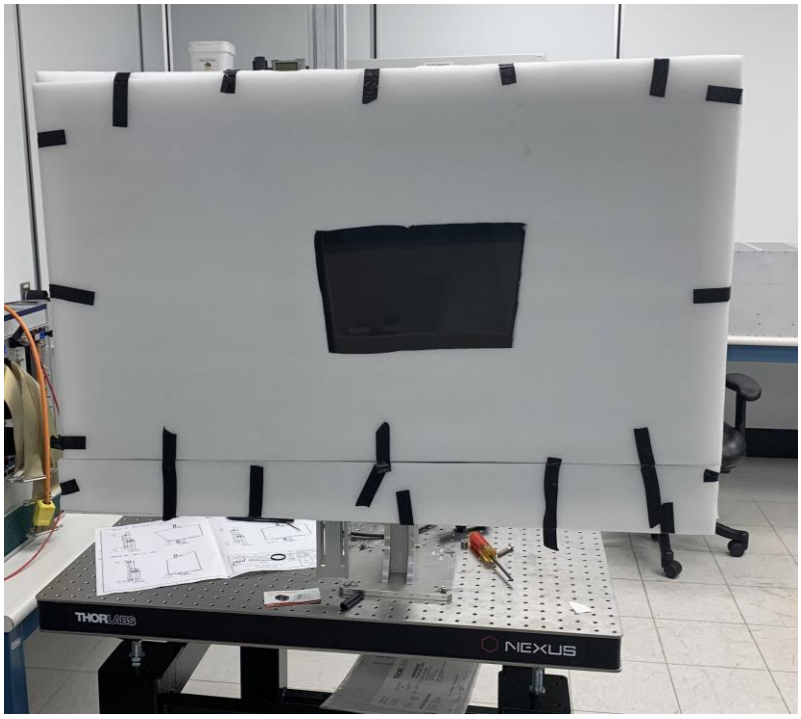
Mary Ann Antonioli, Peter Bonneau, Pablo Campero, Brian Eng, George Jacobs, Tyler Lemon, Marc McMullen

- Repeated d0 test on spherical mirror 5C after systematically adjusting test station to see if poor end result of initial test could have been caused by an instrumentation issues
    - ✶ First, realigned test station using a laser pointer and collimators – had no effect on results



CCD stand with alignment laser pointer and collimators

- ✶ Second, intensity of light source was increased using built-in trim potentiometer – adjustment had no effect on results
- ✶ Third, covered edges of mirror to measure only the center of mirror – unable to collect good data, suspect that light reflecting off of white foam threw off measurements; will repeat with a black barrier



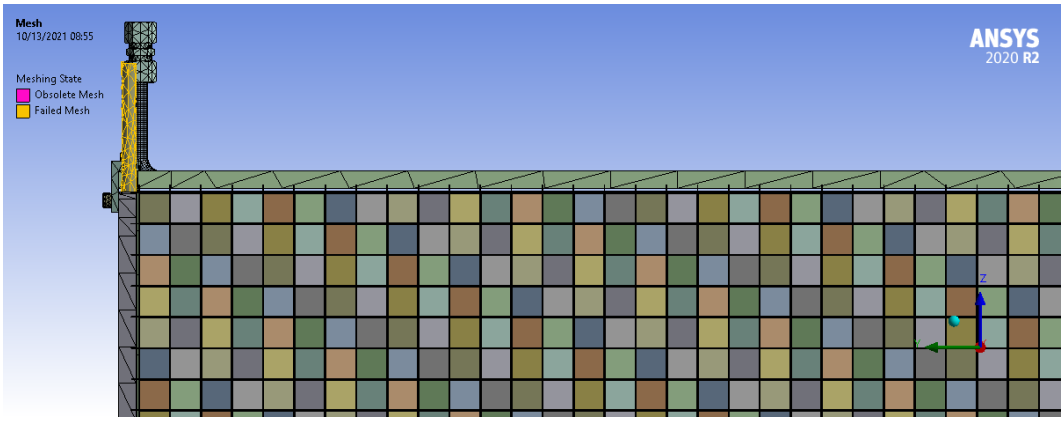
Mirror 5C with foam blocking edges of mirror, allowing d0 measurement of only uncovered portion of mirror

- Developing an automated d0 data acquisition program
  - ✶ Currently, all measurement commands and stage movements are performed manually
  - ✶ Program in development uses SSH to execute data acquisition commands on Debian Linux PC and a Thorlabs APT interface to control CCD stand stages
  - ✶ D0 Daq program is complete, Thorlabs interface program in progress

Hall C – NPS

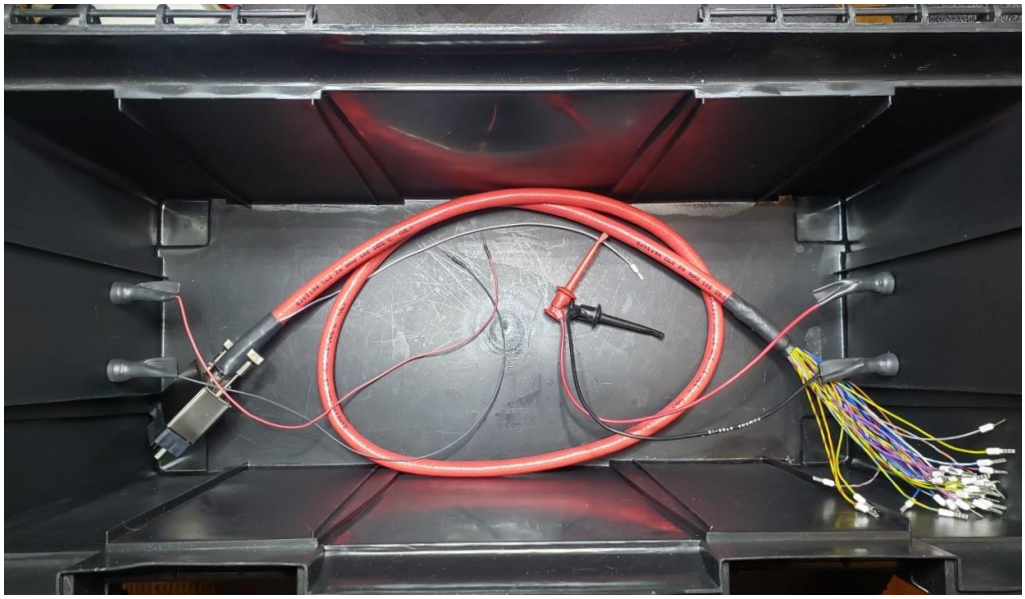
Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, George Jacobs, Mindy Leffel, Tyler Lemon, Marc McMullen

- Working on meshing for 36x30 model of $PbWO_4$ crystal array with Cu shell and all crystal wrappings and dividers imported from NX-12 into Ansys
  - ✶ Multiple model components have failed or obsolete meshing – debugging issue before conducting thermal simulation



Top left corner of crystal array showing failed mesh on one of the cooling pipes

- Developing Python script to generate quiver and gradient plots of crystal temperatures
- Added detector frame relative humidity readings to the LabVIEW Hardware Interlock Monitoring program
- Worked on reflective film pre-shaping – 20 of ~600 films complete
- Fabricated high voltage supply cable test box to be used for voltage drop testing


Interior of completed High Voltage Supply cable test box

EIC

Pablo Campero, Brian Eng

- Generated simplified three-dimensional model for the Be beam pipe, Barrel L1-Sensor, and Barrel L1-PEEK Rings (x2), using dimensions from original step file model provided by Jim Fast
- Imported model to Ansys, assigned materials (Be, Si, and PEEK), and meshed each part
- Simulated temperature inside of the Be pipe
    - ✶ Fluid: Ar at 200°C; maximum heat generated is 132.35 W

- Simulated convection outside of the Be pipe and inside of the Barrel L1-Sensor and Barrel L1-PEEK Rings
    - ✶ Fluid: Air at 22°C; maximum heat dissipated is 132.35 W

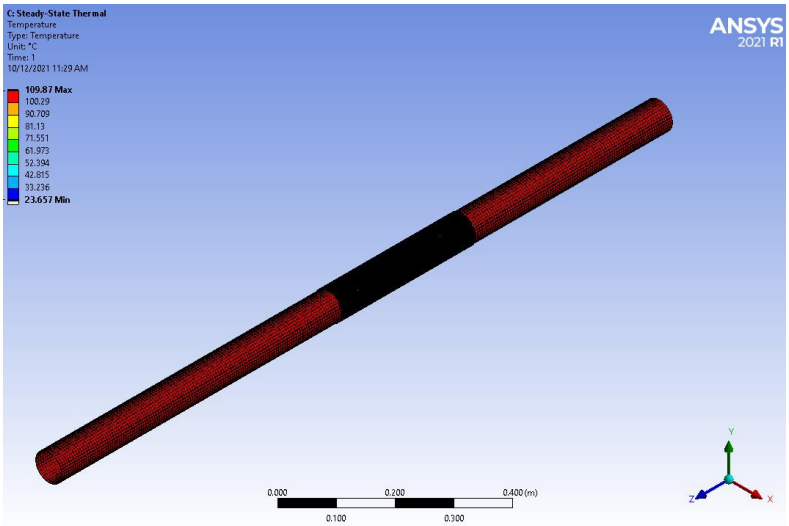


Figure 1. Temperature profile resulted after convection simulation in each part

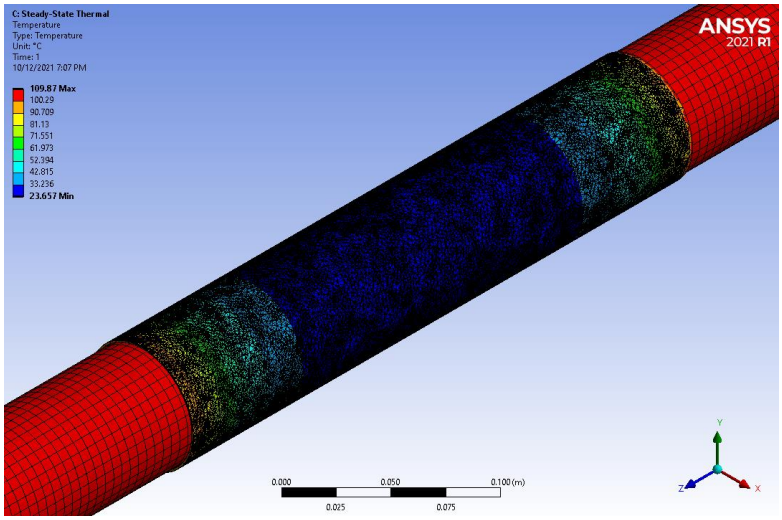


Figure 2. Zoomed in view of the Barrel L1 Sensor surrounding the beryllium pipe