# Detector Support Group

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

**Weekly Report, 2021-09-29**

# Summary

## Hall A – GEM

*Brian Eng, George Jacobs, Marc McMullen*

- Calculated actual flow using gasses other than $N_2$ or air, for which the rotameters and flow meters are calibrated
- Connected the 42 SBS GEM flow meters to the corresponding mass flow transducers and labeled the lines
- Installed Raspberry Pi in the EEL building as the data acquisition for the SBS tests

## Hall A – SoLID

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

- Modifying electrical drawing A00000-16-03-0350 based on changes done for power distribution
    - ✶ Added 5 VDC power supply for radial and axial load sensors
    - ✶ Modified line connections and labels to move radial and axial support load sensors to an independent 5 VDC power supply
- Wiring Allen Bradley terminal blocks; nine of 13 complete

## Hall B – RICH-II

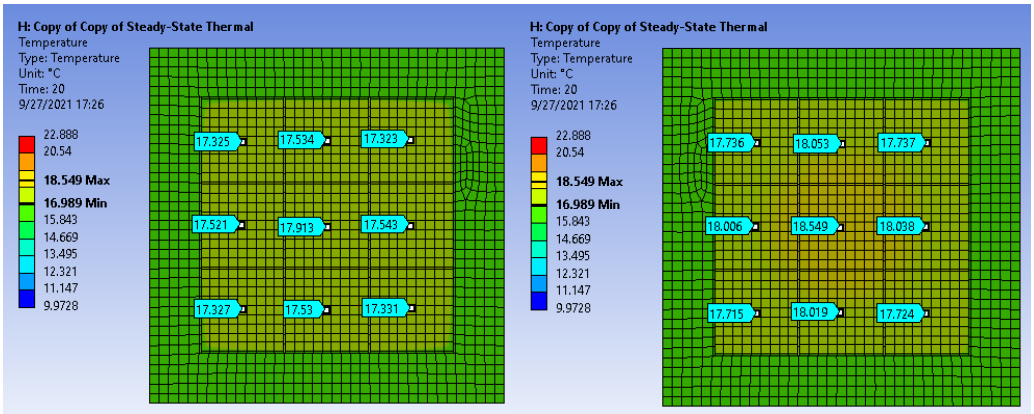
*Mary Ann Antonioli, Peter Bonneau, Pablo Campero, Brian Eng, George Jacobs, Tyler Lemon, Marc McMullen*

- Performed d0 test on spherical mirror 5C in horizontal and vertical positions
    - ✶ When horizontal, minimum d0 observed was 2.248 mm
    - ✶ When vertical, minimum d0 observed was 3.168 mm
    - ✶ Differences in d0 size in position due to aberrations in reflected light caused by imperfections in mirror surface
- Completed design of the hardware interlock system chassis

## Hall C – NPS

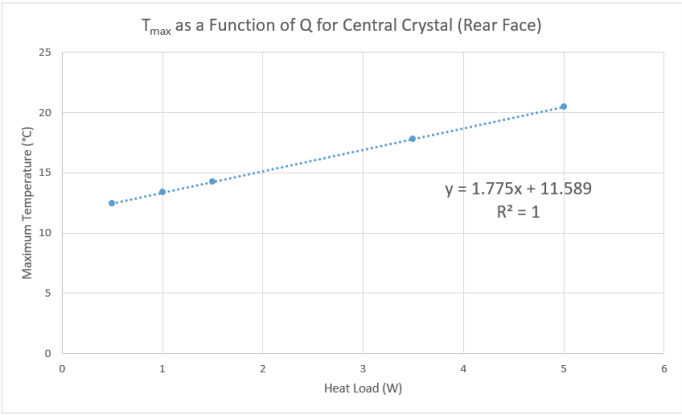
*Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, George Jacobs, Mindy Leffel, Tyler Lemon, Marc McMullen*

- Conducted simulation of 3x3 block of full-length crystals
    - ✶ Increased heat load from 0 W to 5 W to see how that affected the temperature profiles of the front and rear crystal faces
- Conducted simulation of 3x3 block of full-length crystals: constant heat load of 0.5 W
    - ✶ Increased temperature of Cu shell (from 10°C to 20°C)
    - ✶ Found that maximum temperature for crystals exceeded 18°C after Cu shell temperature was increased above 17°C



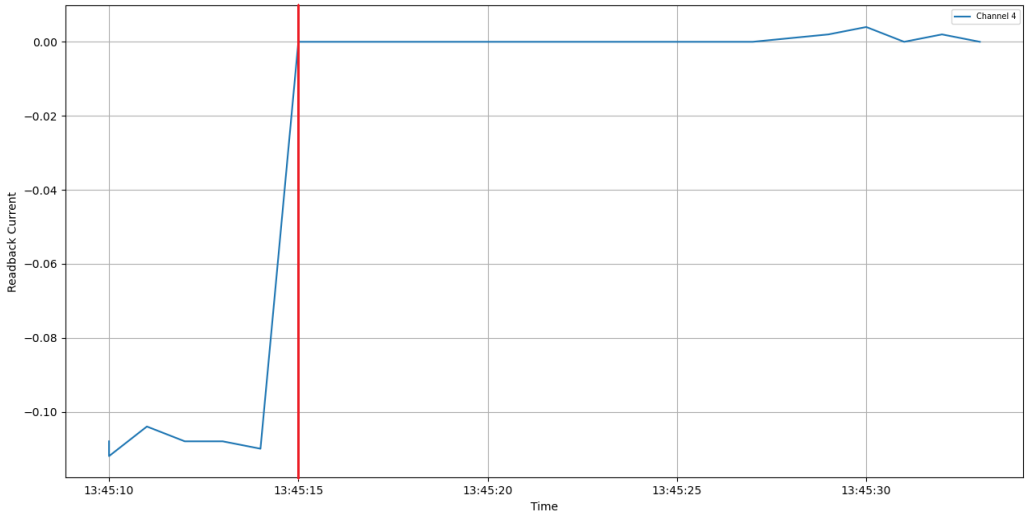

Temperature profile for front (left) and rear (right) of 3x3 block of $PbWO_4$ crystals. Cu shell temperature held at a fixed 17°C with a maximum temperature of ~18.5°C

- Generated plot of $T_{max}$ vs. Q for a 3x3 block of crystals with carbon fiber dividers, mu metal dividers, and a Cu shell



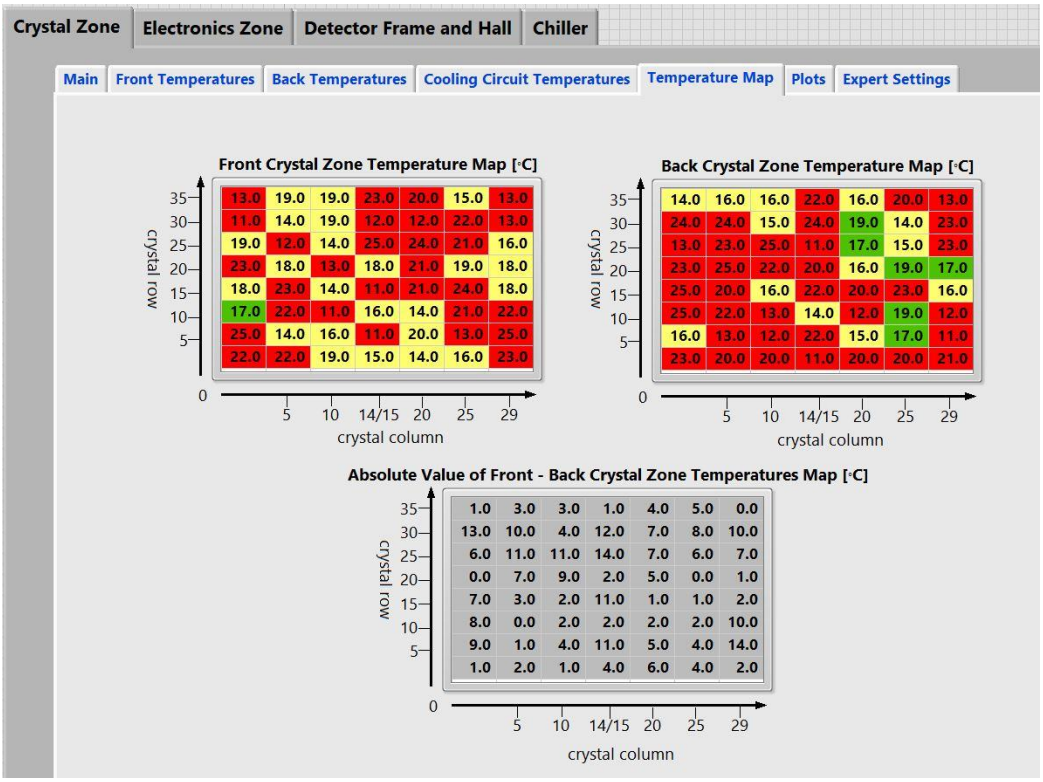

Plot of temperature (T) vs. heat load (Q) for values of Q between 0.5 W and 5 W

- Developed Python script to calibrate CAEN HV module's readback current
  - ✶ Script uses the PyEpics package to read back current for a module with no load connected
  - ✶ If the readback current is less than or greater than 0 µA, the readback value is multiplied by -1 and a command is sent to set the ImAdj parameter to this value




Plot of readback current vs. time for channel 4 of module in slot 4; vertical red line indicates when new value for ImAdj is set

- Completed map of absolute value of difference between front crystal zone and back crystal zone sensor temperatures

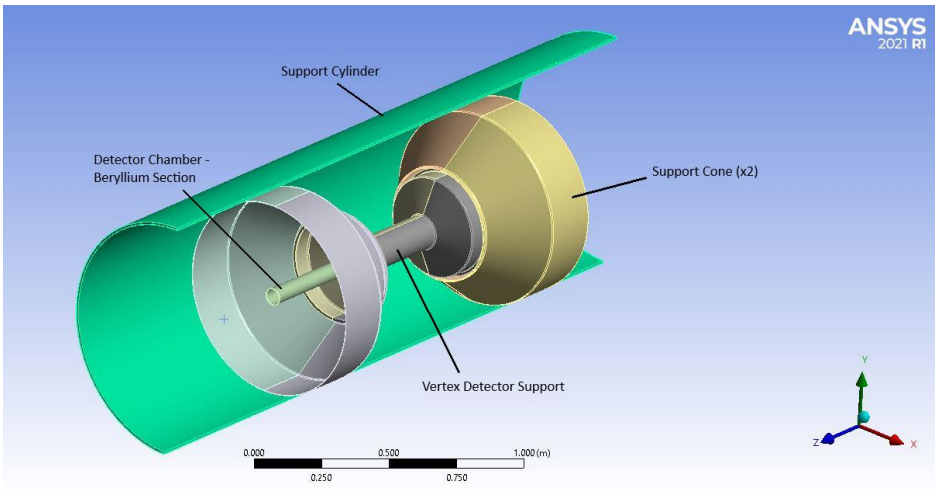



Screenshot of Crystal Zone Temperature Map tab

## EIC

*Pablo Campero, Brian Eng*

- Conducting Ansys thermal analysis of the beam pipe
  - ✶ Imported complete beam pipe and vacuum system step files to Ansys
  - ✶ Using NX-12, generated missing sections for Vertex Detector, Support Cones (x2), and Support Cylinder since original step files for these parts were cross sections
  - ✶ Found issues generating whole body mesh for the Detector Chamber-Beryllium Section – attempting to generate face mesh instead




Three-dimensional model imported to Ansys from NX-12

- Attended ATHENA and ECCE tracking working group meetings
  - ✶ Working on service routing in an attempt to reduce the materials budget – bringing cabling out along a fixed angle (Eta) rather than along a cylinder

## DSG R&D – SoLID

*Pablo Campero*

- Developing PLC program to simulate PID control over the valves
  - ✶ Added generic modules to simulate input and output modules to the virtual PLC chassis running on RSLogix 5000 Emulate software

## DSG – Safety

*Marc McMullen*

- Met with facilities management and a contractor to discuss the process of refinishing the EEL cleanroom floor
  - ✶ Facilities has ordered a moisture sample of the floor to determine the process and materials needed for proper adhesion of the epoxy to the concrete floor