



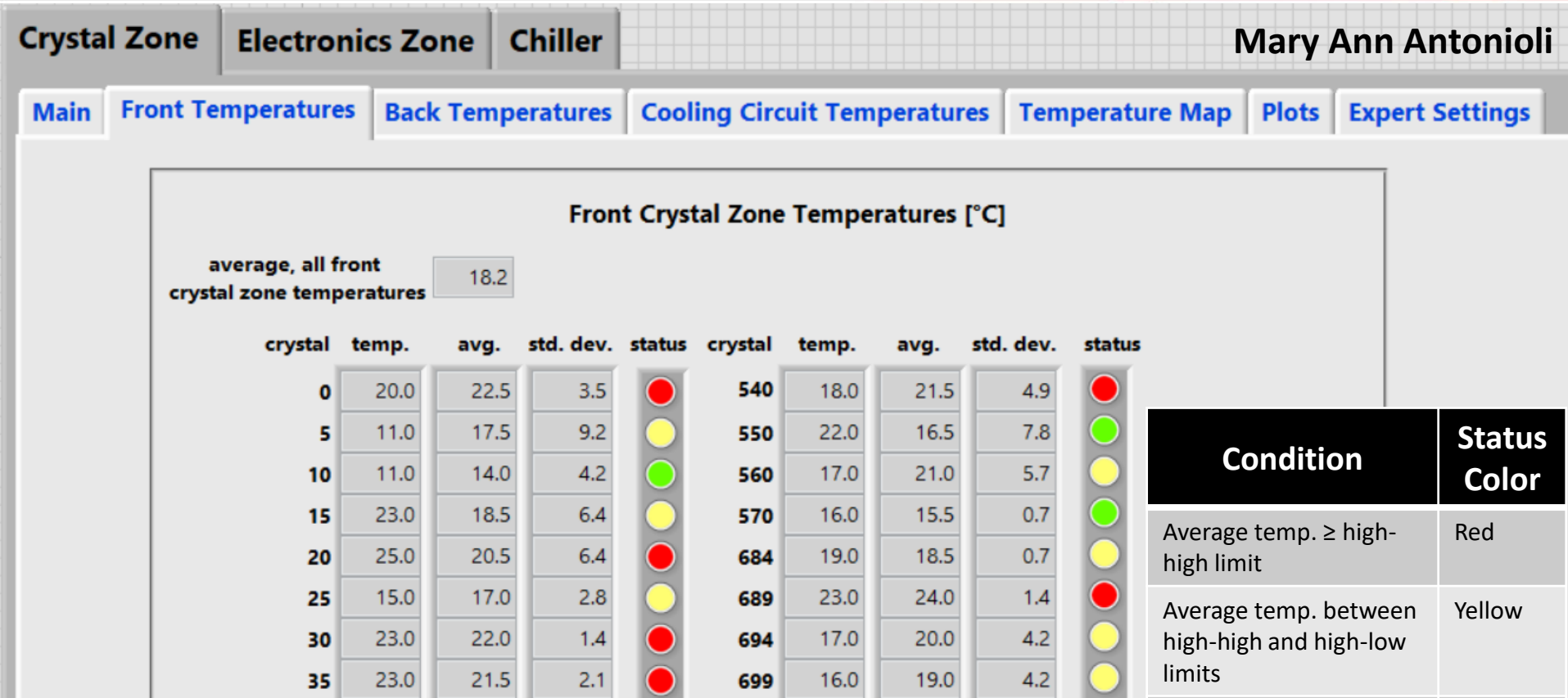
DSG NPS Collaborators' Meeting Update

Aaron Brown and the
Detector Support Group
July 15, 2021

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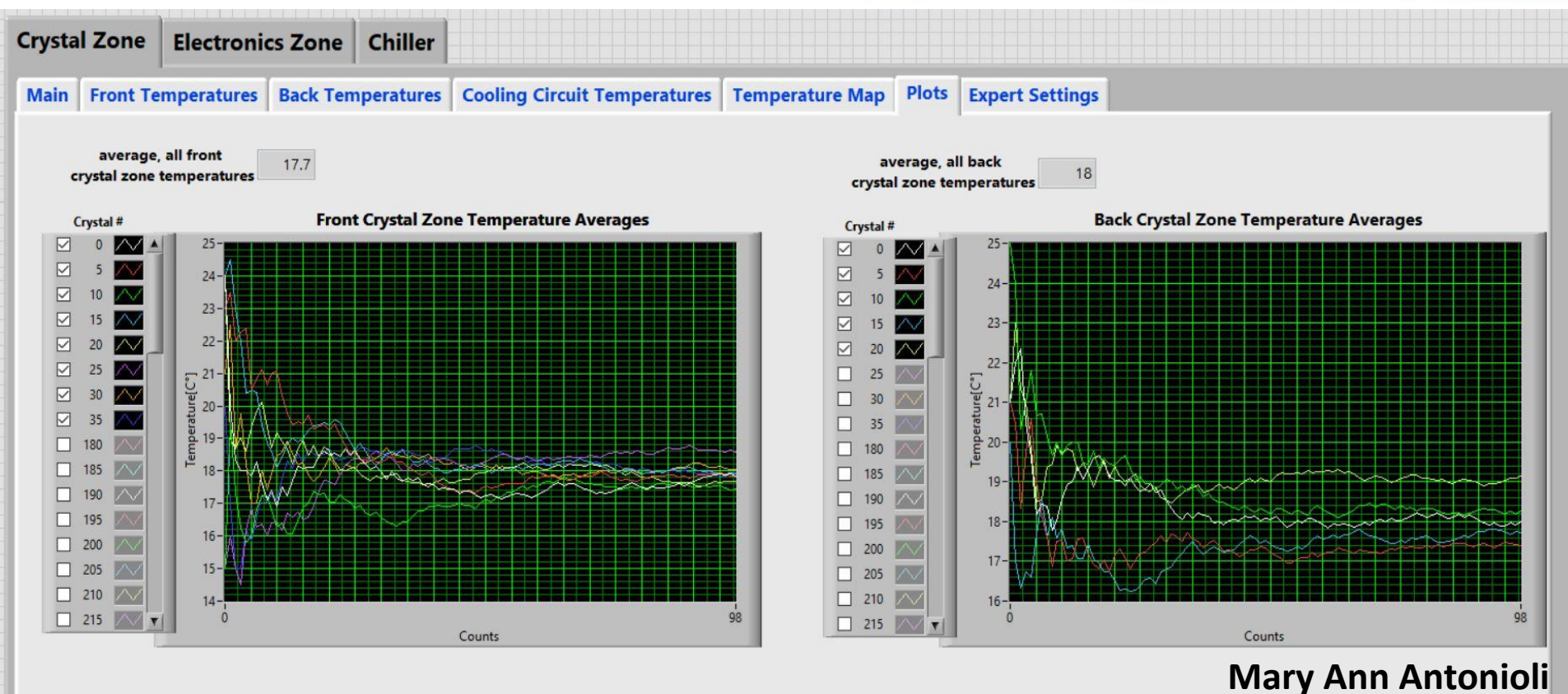
- LabVIEW Hardware Interlock System Program
- Keysight D-sub Extension Cable Fabrication
- Crystal Zone Thermal Simulation
- Conclusion

LabVIEW Hardware Interlock System Program



- Values shown are randomly generated for testing and debugging
- Averages are rolling average of 100 values
- Standard deviation calculated for each new average

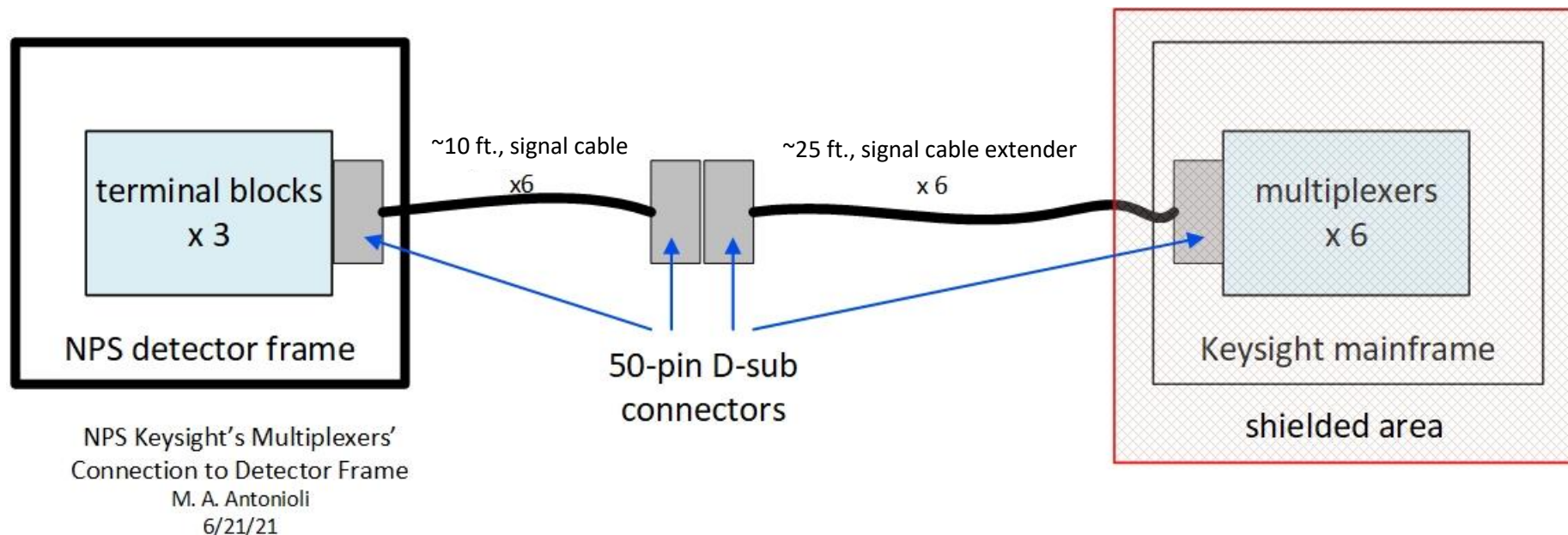
LabVIEW Hardware Interlock System Program



Mary Ann Antonioli

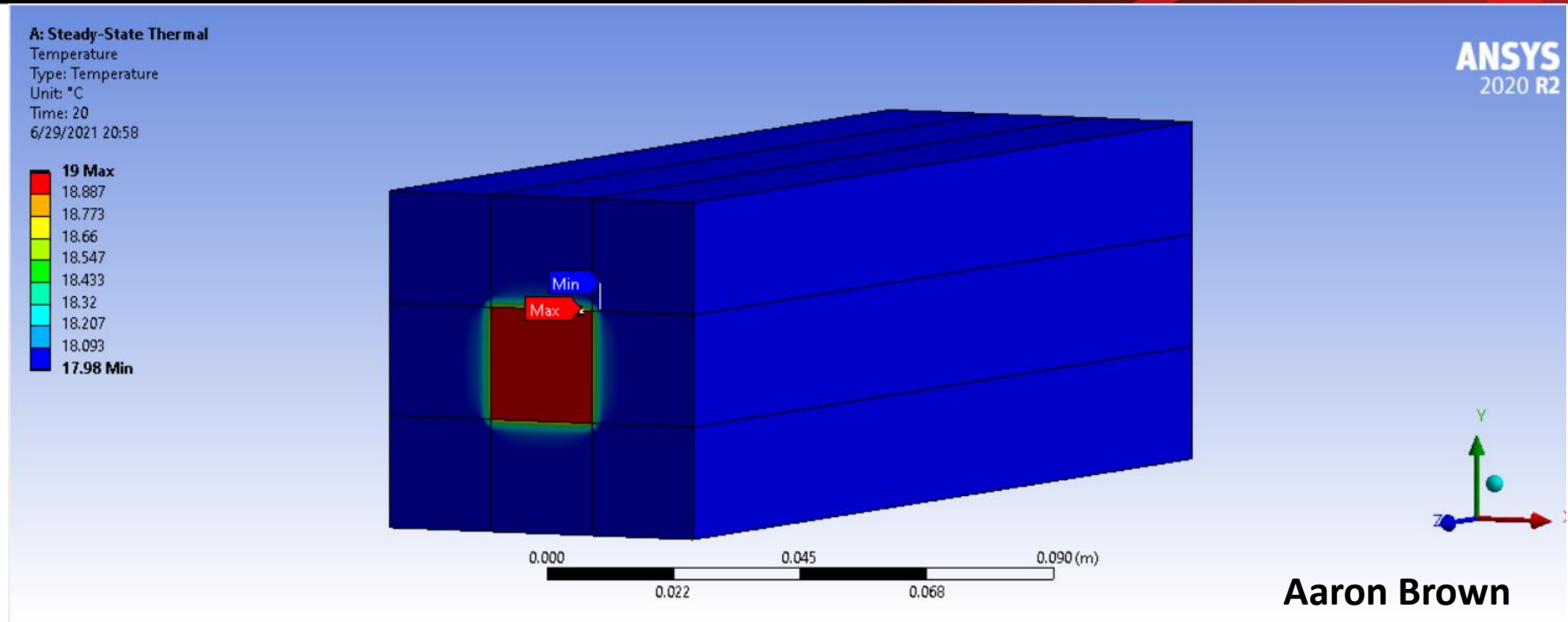
- Live plots of front and back crystal zone average temperatures (random numbers)

Keysight D-sub Extension Cables



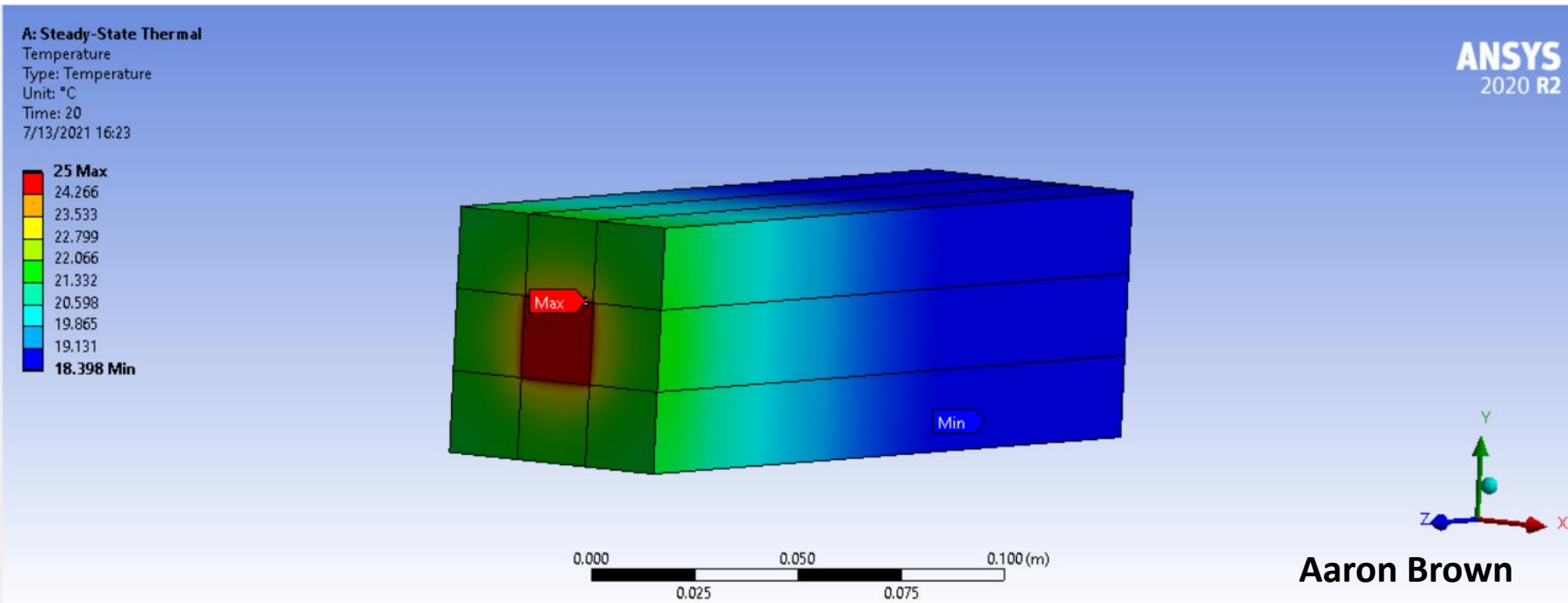
- Need to know cable routing plan from detector to shielded area
- Keysight-supplied cables are not long enough
 - Will need for extension cables, patch panel and feedthroughs
 - Can fabricate full-length cables once cable length is determined

Crystal Zone Thermal Simulation



- ANSYS thermal simulation of 3x3 block of PbWO_4 crystals
 - Temperature on face of central block is set to 19°C
 - Using thermal conductivity of the crystals ($2.4 \text{ W}\cdot\text{m}^{-1}\text{K}^{-1}$ in x- and y-axes, $2.0 \text{ W}\cdot\text{m}^{-1}\text{K}^{-1}$ in z-axis)
- Simulation used to understand how heat moves through crystals and what can be expected from crystal to crystal

Crystal Zone Thermal Simulation



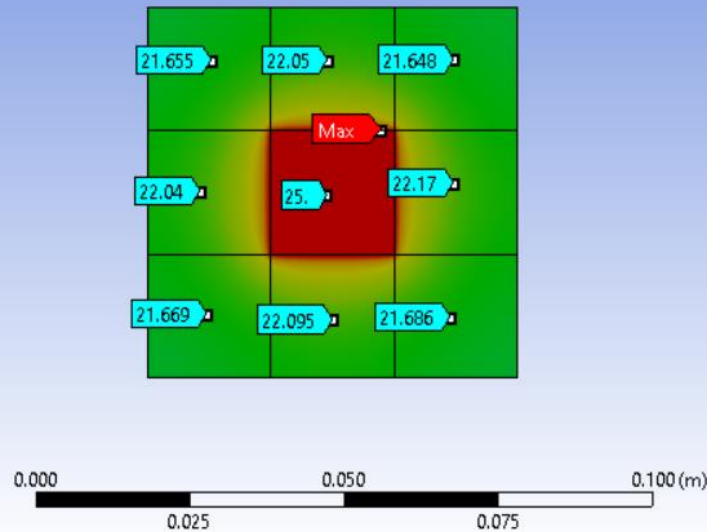
- ANSYS thermal simulation of 3x3 block of PbWO_4 crystals
 - Temperature increased from 19°C to 25°C
 - Temperature increased to display a more obvious heat spread

Crystal Zone Thermal Simulation

ANSYS
2020 R2

A: Steady-State Thermal
Temperature
Type: Temperature
Unit: °C
Time: 20
7/14/2021 14:41

25 Max
24.266
23.533
22.799
22.066
21.332
20.598
19.865
19.131
18.398 Min



Aaron Brown

- Front view (x,y) of 3x3 block of crystals with temperature on central crystal at 25°C

Conclusion

- Current work
 - Hardware Interlock System program development (**Mary Ann Antonioli**)
 - Crystal zone thermal analysis (**Aaron Brown, Brian Eng**)

Thank You!