# Detector Support Group

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

**Weekly Report, 2023-05-03**

## Hall A – ECAL

*Brian Eng, Tyler Lemon, and Marc McMullen*

- Ordered power cables to connect test stand heaters to the control channels

## Hall A - GEp

*Mindy Leffel*

- Completed two high voltage boxes; 11 of 22 completed

## Hall A – Møller

*Brian Eng*

- Investigating flow transmitters for chiller system, which will now use Hall A LCW, which is rated up to 250 psi
    - ✶ Previously, possible sensors for some lower flows (up to ~25 GPM) were only rated to 147 psi
    - ✶ Submitted PR for vortex-based flow meters from Universal Flow Monitors, which was recently acquired by Dwyer. Appear to be the same as those that Omega is rebranding; include temperature readout, flow and temperature limit relays, and a local display

## Hall A – SoLID

*Mary Ann Antonioli and Pablo Campero*

- Modified electrical drawings A00000-16-03-0101, -0311, -0212
- Rewired liquid level readout to match drawing A00000-16-03-0220

## Hall B – LTCC

*Brian Eng*

- cRIO has gone offline twice in the past week
    - ✶ Caused by trip of GFCI outlet upstream of the junction box that the forward carriage rack UPS is plugged into
    - ✶ During first outage, cRIO was upgraded from LabVIEW 2021 to 2022; also fixed old version of DAQ code that had S2 and S6 pressures as fixed constants, and added those sensors to EPICS

## Hall B – MVT

*Brian Eng*

- Troubleshooting bad mix ratio for FMT
    - ✶ Overall requested flow is below the minimum that the argon MFC can provide
    - ✶ Added a LOLO limit in EPICS to the overall requested flow, attempting to show that the mixing system is working properly

## Hall C – NPS

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

- Continued thermal readout LabVIEW program replacing array-based shared variables with individual shared variables
  - ✶ Checking all PVs in the EPICS client to ensure they are correct data type
  - ✶ Added code to force program to run in LabVIEW control mode for the first loop iteration and then switch to EPICS control mode for all successive iterations; ensures that all variables are initialized with values from the configuration file and that the values are sent to all EPICS PVs
  - ✶ Adding code to control relays for hardware interlocks based on fault conditions
- Continued detector volume thermal Ansys analysis
  - ✶ Modifying geometry to make contact between heat exchanger cooling plate and crystal block
  - ✶ Added materials setup—plastic for detector walls, lead tungstate for crystal blocks, and copper for cooling plates
- Remade alarm testing screens for crystal zone cooling circuit, electronics zone, and detector frame, using indivial PVs instead of arrays
- Investigated implementation of Phoebus (V4.6.10) save and restore program that is used to restore PV settings upon reboot of IOCs
  - ✶ Alarm test system softIOC has ~ 6000 settings to restore upon reboot
  - ✶ Requires a relational database server and building Phoebus from source files
  - ✶ Missing authentication and authorization security and search of configurations or snapshots

## Hall D – JEF

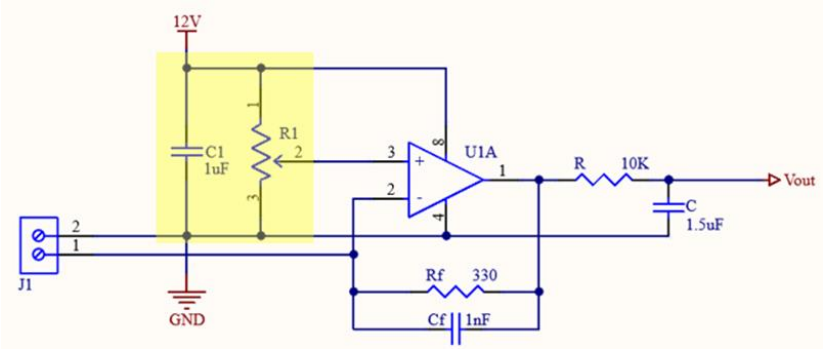
*George Jacobs, Mindy Leffel*

- Wrapped seven crystals with 3M foil and Tedlar; 733 wrapped to date
- Populated 20 PMT bases, 370 to date
- Pre-shaped 32 foils

## EIC - DIRC

*Tyler Lemon and Marc McMullen*

- Reviewing programs provided by collaborators for laser test station DAQ and analysis
- Tested breadboard prototype of single power supply op-amp circuit with input currents from 0 mA to 15 mA at 1 mA steps
  - ✶ Measured input current and output voltage using a Keithley 6517B electrometer




Photodiode readout circuit using single power supply. Yellow highlighting is a potentiometer voltage divider that biases the op-amp, allowing the negative voltage reference of the op-amp to be connected to ground rather than to a 12 V DC power supply.

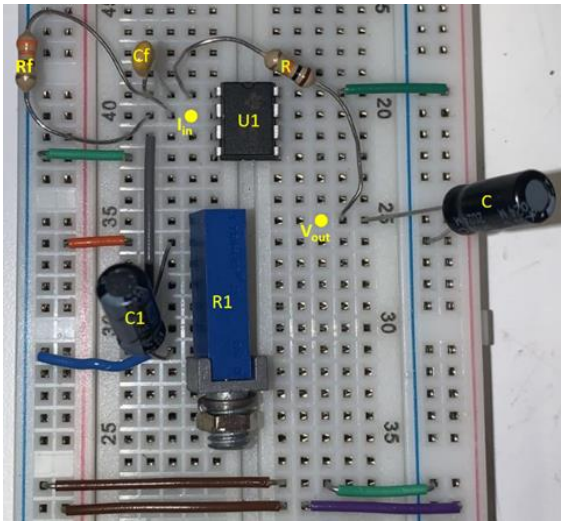
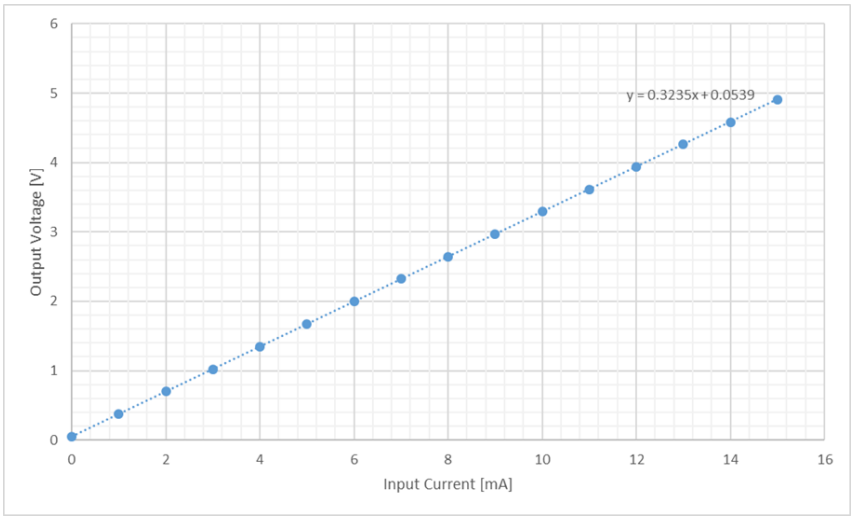



Photo of breadboard used for testing. Parts are labeled to match schematic. Points where input current $I_{in}$ was supplied and output voltage $V_{out}$ was read are labeled.



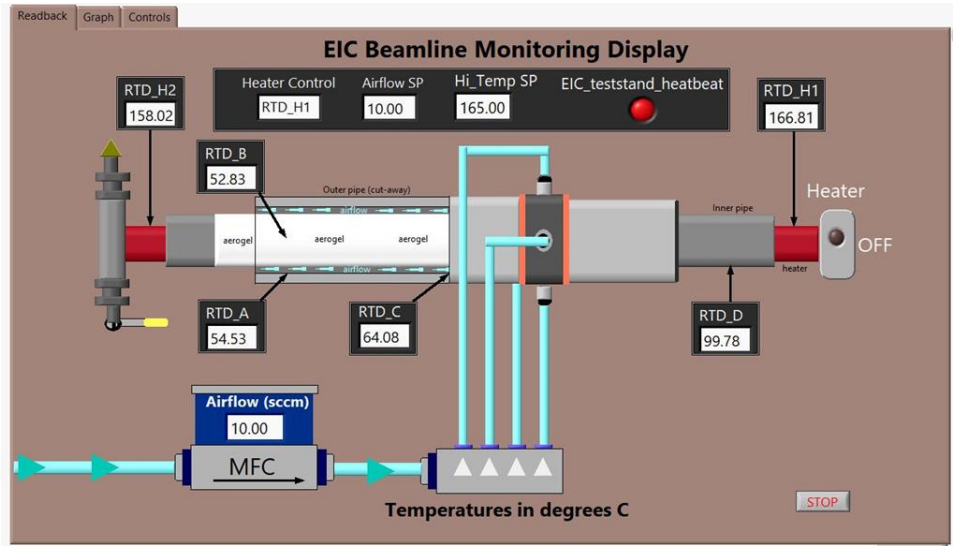

Plot of test output voltage vs. input current from single-supply op-amp circuit.

- Continued modifying layout of the interlock board to improve ease of population
  - ✶ Replaced surface mount resistors with through-hole resistors
  - ✶ Replaced Schottky diodes integrated circuits with through-hole passive Schottky diodes
- Completed Task Hazard Analysis for cleaning quartz crystal bars

## EIC - Thermal Test Stand

*George Jacobs and Marc McMullen*

- Repaired leak on oil heater vent pipe
- Relocated carbon filter farther from the heat
- Ramped the test stand to 100°C on the simulated beam pipe (RTD_D in figure below)




- Wrote code that automates flow tests to run at 10, 20, 50, 100, 150, 200, and 250 liters per minute for three hours at each flow rate
  - ✶ After each flow rate test, the code sets the flow to zero for three hours so that the starting temperature for each flow rate is approximately the same
  - ✶ Records flow data to text files