



U.S. DEPARTMENT OF
ENERGY



October 1, 2021 DSG-RICH Update

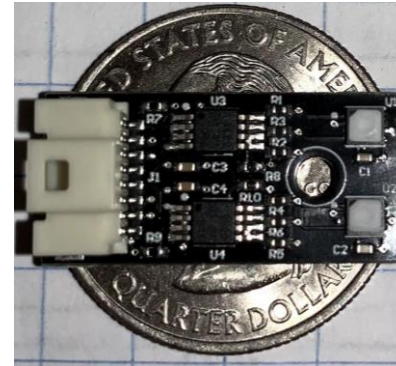
Tyler Lemon
Detector Support Group
October 1, 2021

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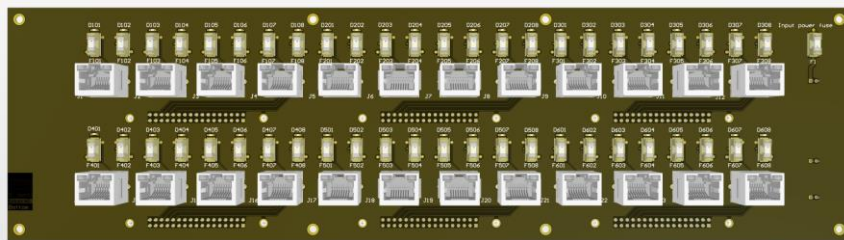
- Hardware Interlock System status
- EEL 124 cleanroom preparations
- Spherical mirror d0 test status
- Tentative schedule for DSG tasks
- Conclusion

Hardware Interlock System Status

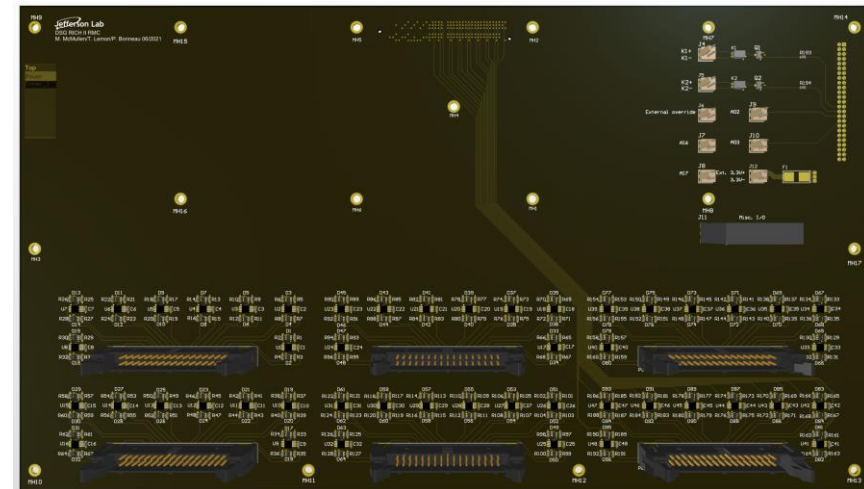
- All LabVIEW code for system is complete
- [SHT35 sensor PCBs](#) fabricated and delivered to JLab
 - In coming weeks, PCBs will undergo acceptance tests.
- [RMC design](#) complete and submitted for fabrication
- Backplane PCB design complete
 - Final reviews underway before sending for fabrication



Left: Prototype SHT35 sensor PCB compared to a US Quarter. PCB dimensions are 0.95" L x 0.46" W x 0.25" H.



Altium rendering of Backplane PCB



Altium rendering of RMC

EEL 124 Cleanroom Preparations

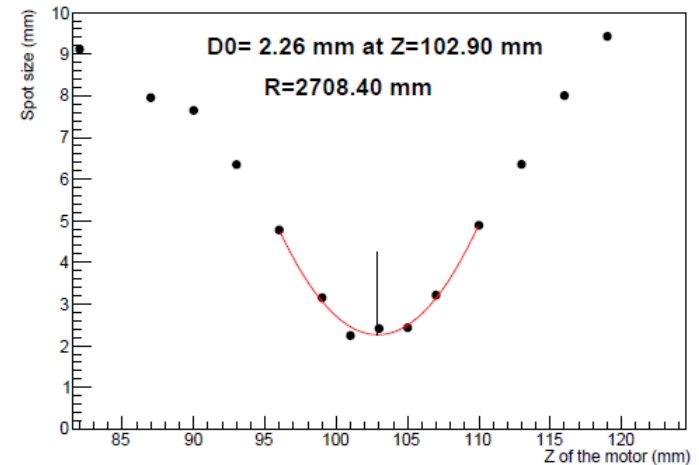
- Marc McMullen contacted JLab Facilities Management to arrange for floor repairs
 - Repairs needed are extensive
- General repair procedure:
 - Strip off old epoxy
 - Clean and prepare the underlying concrete
 - Pour new epoxy
 - Clean entire clean room to specification
- Facilities Management is compiling a time and price estimate for repairs



Example area where floor needs repairs in EEL 124. Area is in back of cleanroom between RICH assembly structure and aerogel dry cabinet. Area that needs repair is ~6 ft x ~3 ft.

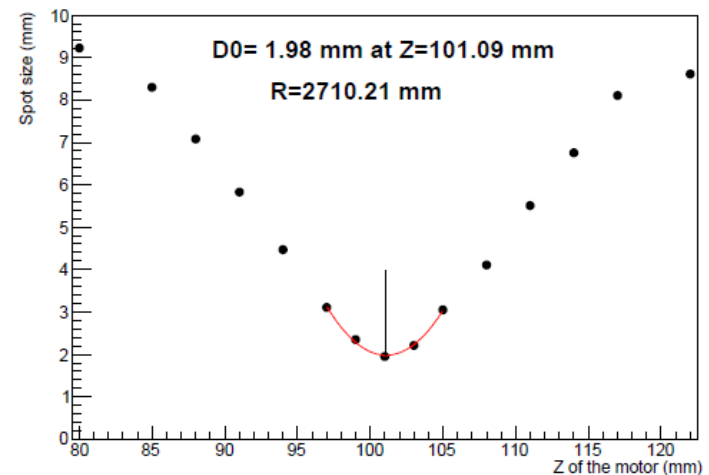
Spherical Mirror Status

- Mirror 5 and 5C delivered to JLab on September 27
- d0 tests completed on both mirrors
 - Aaron Brown, Mindy Leffel, and Tyler Lemon performed tests
- d0 tests will be repeated next week with:
 - Better background light conditions
 - Cleanroom exit light and instrument power indicators will be covered
 - Multiple background measurements before and after d0 measurements
 - Will help ensure CCD is stable



d0 vs. Z position for Mirror 5C.

From fit of data, $d0 = 2.26 \text{ mm}$ and $R = 2708.4 \text{ mm}$.



d0 vs. Z position for Mirror 5.

From fit of data, $d0 = 1.98 \text{ mm}$ and $R = 2710.2 \text{ mm}$.

Tentative Schedule for DSG Tasks

#	Task	Duration (Weeks)	Human Effort (Lead)	'21		FY 22																													
				Sept.	Oct	October	November	December	January	Feburary	March	April																							
1	Software			20	27	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	7	14	21	28	4	11	18	25
1.2	Develop new reflectivity test station	8	Tyler																																
1.3	Develop EPICS Client on sbRIO	5	Tyler																																
1.4	Develop EPICS GUIs	21	Mary Ann																																
2	Hardware																																		
2.1	SHT35 sensor PCB fabrication	2	Marc																																
2.2	RMC fabricaion	2	Marc																																
2.3	Backplane PCB fabrication	2	Marc																																
2.4	Fabricate interior detector I2C cabling	3	Mindy																																
2.5	Assembly of interlock chassis	2	Mindy																																
2.6	Fabricate gas system cabling	4	Mindy																																
2.7	Fabricate exterior I2C cabling	4	Mindy																																
3	Testing																																		
3.1	D0 measurements of spherical mirrors - pre-reflective coating	2	Mindy																																
3.2	Acceptance tests of RMC	4	Tyler																																
3.3	Acceptance tests of backplane PCB	4	Tyler																																
3.4	D0 measurements of spherical mirrors - post-reflective coating	6	Mindy																																
3.5	Reflectivity testing of spherical mirrors	6	Mindy																																
3.6	Acceptance tests and verification of SHT35 sensor PCBs	4	Tyler																																
4	Detector Assembly																																		
4.1	Prepare cleanroom areas	2	Facilities																																
4.2	Assemble electronic panel	7	Mindy																																
4.3	Assemble detector shell	2	Mindy																																
4.4	Install hardware interlock sensors and cabling	2	Mindy																																
4.5	Install nitrogen supply lines	2	Mindy																																
4.6	Install cooling supply lines	2	Mindy																																
4.7	Install planar mirrors	2	Mindy																																
4.8	Install spherical mirrors	2	Mindy																																
4.9	Install electronic panel	2	Mindy																																
4.10	Align mirrors	2	Tyler																																
4.11	Assemble exit window	1	Mindy																																
4.12	Install exit window	1	Mindy																																
4.13	Install aerogel	1	Mindy																																
4.14	Leak check entire detector	1	Mindy																																
4.15	Gas seal entire detector	1	Mindy																																
4.16	Survey before installation	1	Survey Group																																
5	Installation in Hall																																		
5.1	Move detector to hall	1	Hall B																																
5.2	Install detector on forward carriage	1	Hall B																																
5.3	Move of air-cooling system to hall	2	Hall B																																
5.4	Connection of detector to nitrogen supply	1	Hall B																																
5.5	Install interlock chassis in rack	1	Mindy																																
5.6	Run cables from interlock chassis to detector	1	Mindy																																
5.7	Run cables from interlock chassis to gas system	1	Mindy																																
5.8	Survey after installation	1	Survey Group																																
6	Documentation																																		
6.1	Create wiring diagrams for interlock chassis	18	Mary Ann																																
6.2	Create sensor mapping diagram for interlock system	6	Mary Ann																																

Conclusion

- PCB design and fabrication for Hardware Interlock System is nearing completion
- EEL 124 cleanroom is being prepared for RICH
- Spherical mirrors delivered to JLab first d0 tests performed.
 - Mirrors will be tested again next week
- Tentative schedule for DSG's tasks created
 - All times on schedule are estimated and are flexible