

HYCAL TESTS AND STATES

BY: ARUNI NADEESHANI

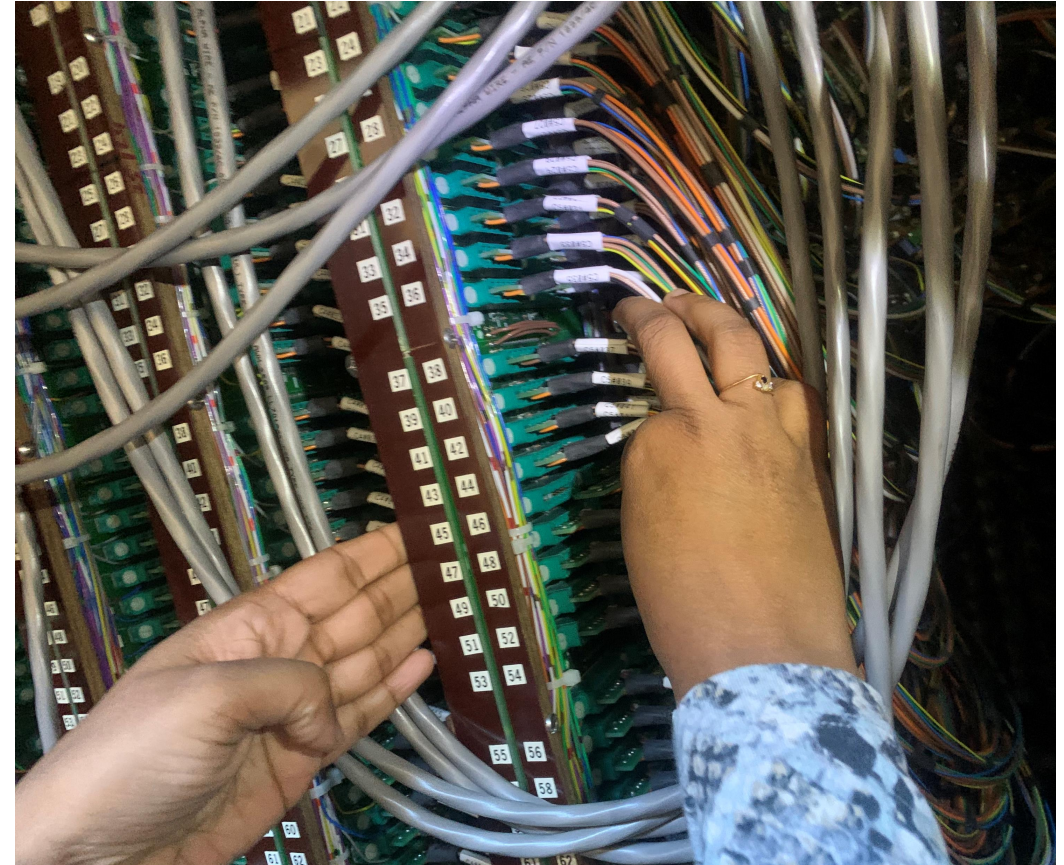


MISSISSIPPI STATE
UNIVERSITY™

DEPARTMENT OF PHYSICS
AND ASTRONOMY

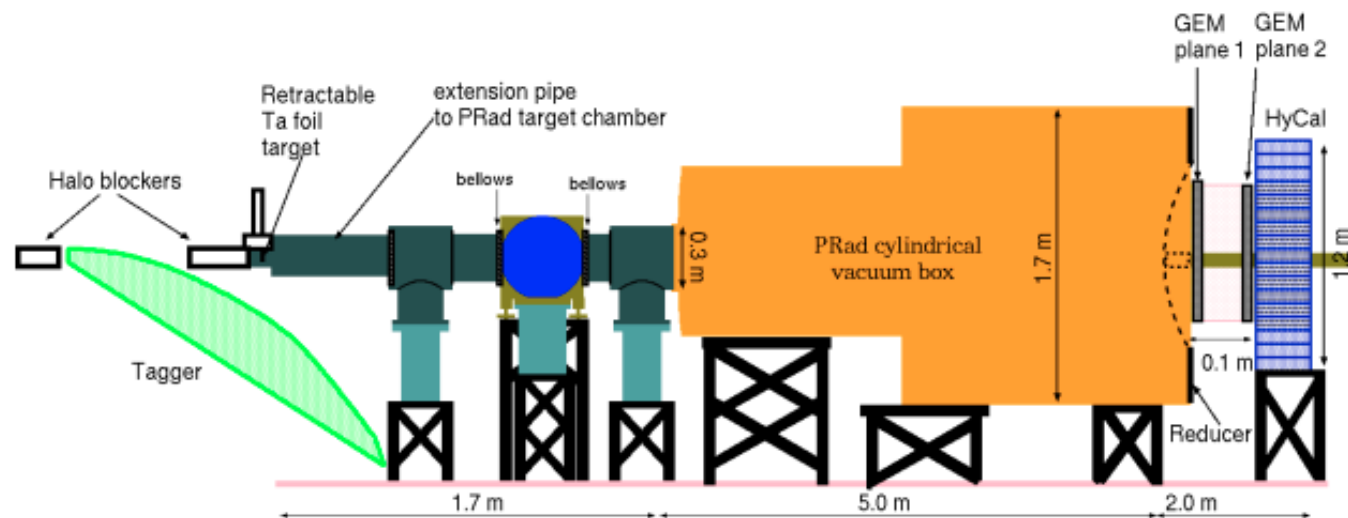
OUTLINE

- Introduction to HyCal Calorimeter
 - Experimental setup
 - Design of HyCal
- HyCal tests
 - HyCal cabling.
 - Hycal optical fiber and connection repair
 - HyCal HV test with cosmics and LMS
- Summary and future work



INTRODUCTION : EXPERIMENTAL SETUP

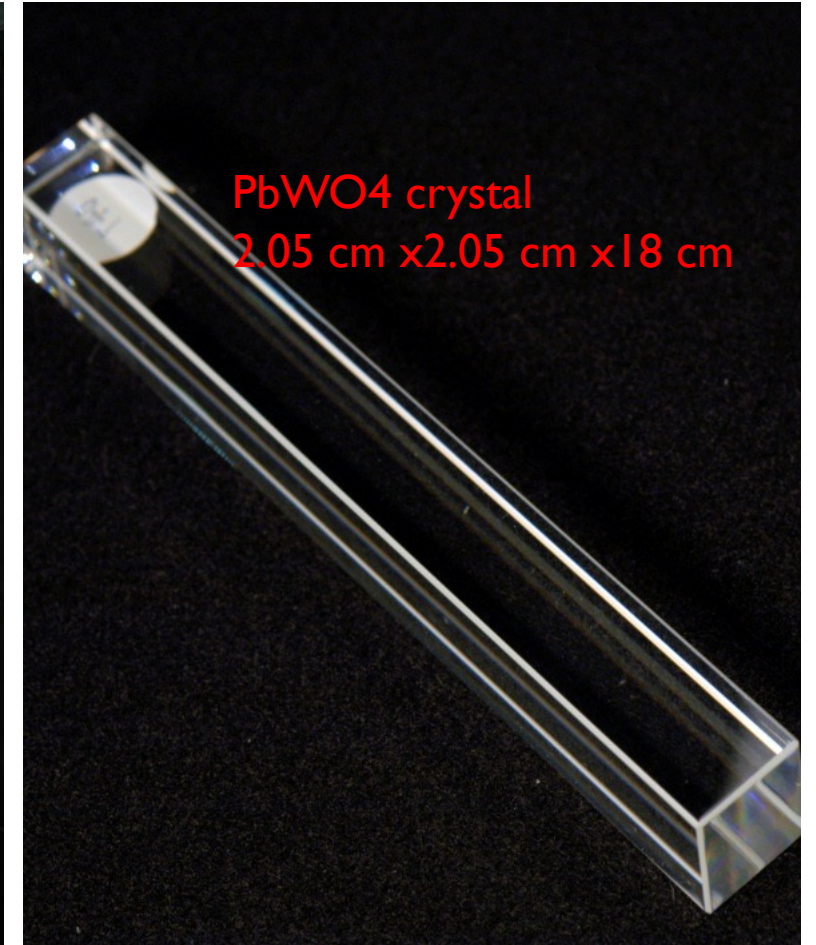
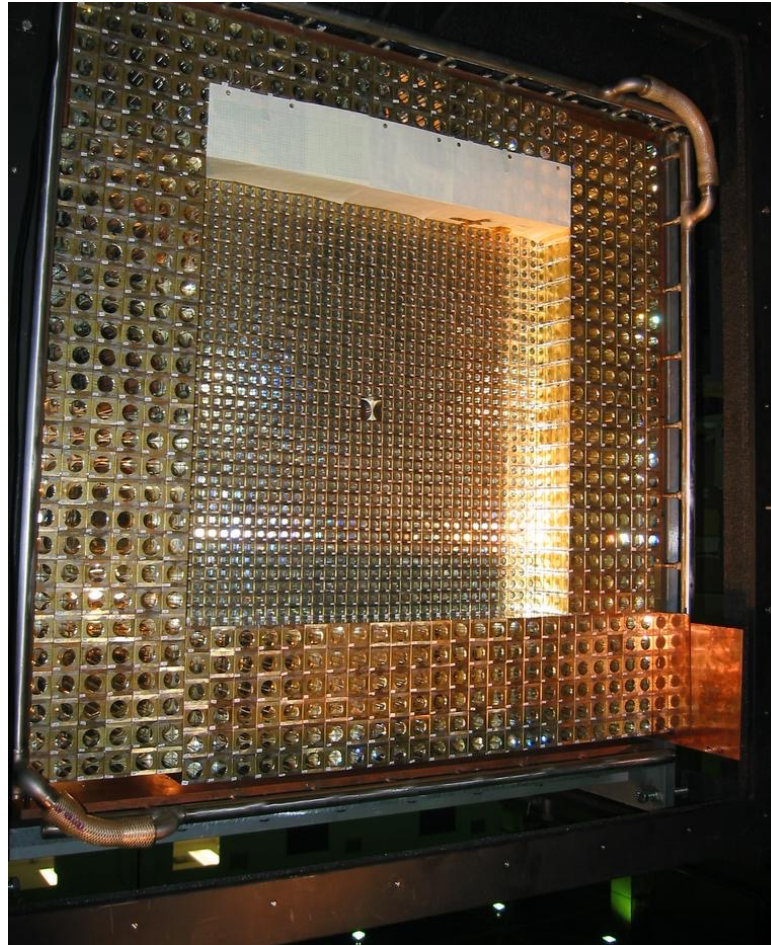
- GEMs- A pair of GEM detector planes, separated by about 40 cm.(From UVA group)
- Target: Windowless hydrogen gas flow target (reduced back grounds)
- High resolution all PbWO₄ crystal calorimeter (the PbWO₄ crystals) with fADC based readout. (HyCal repairs: MSU , NCA&T State University and JLab)
- Vacuum chamber, one thin window, large area GEM chambers (better resolution)



PRIMEX HYCAL CALORIMETER

11/11/2024

- Combination of PbWO_4 and Pb-glass detectors ($118 * 118 \text{ cm}^2$)
- $34 * 34$ matrix of $2.05 \times 2.05 \times 18 \text{ cm}^3$ PbWO_4
- 576 Pb-glass detectors $3.82 \times 3.82 \text{ cm}^2$ x 45 cm.
- Allows coverage of extreme forward angle ($0.7^\circ - 7.5^\circ$) in a single setting and complete azimuthal angle coverage.
- HyCal reused for PRAD experiment.
- The first experiment to use a magnetic spectrometer free method to measure r_p .



11/11/2024

5/15

HYCAL TESTS

- Hycal optical fiber and connection repair
- HyCal cabling
- HyCal HV test with cosmics
- HyCal HV test with LMS

ARUNI NADEESHANI.
PRAD COLLABORATION MEETING

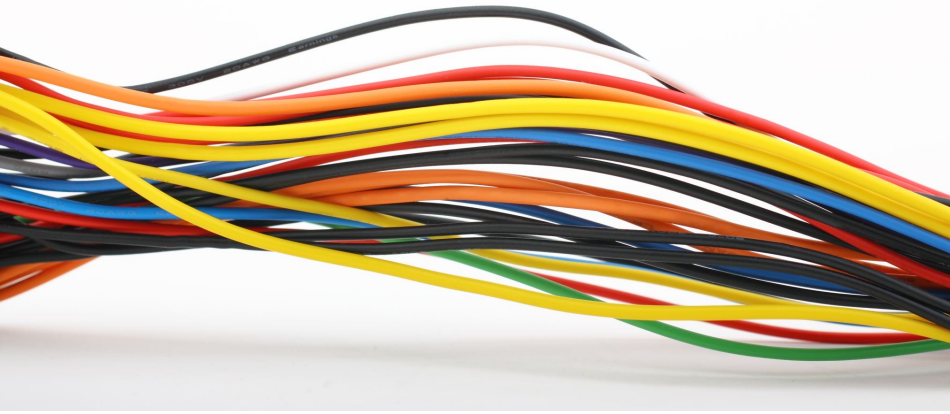


HYCAL OPTICAL FIBER AND CONNECTION REPAIR

- The optical fibers, plexiglass connectors, and light blocking coverings necessary for the Light Monitoring System (LMS) to send control signals to the HyCal modules required repairs to have all ~2000 modules in proper working order.
- These fibers can be used to test the various modules as well as be used as a control signal during experiment and calibration.
- HyCal was in the ESB at JLab where an ePAS approval needed to be filed for the work as it involved clear UV-activated glue for securing the optical components to each module.

HYCAL OPTICAL FIBER AND CONNECTION REPAIR








- Open the HYCal front side and check the fiber entrance to see which ones need to be repaired. Check with our hand and move the fiber to check if the fiber is loose and already removed from the plexiglass retainer.
- Record all the fibers that need to be repaired.
- Remove plexiglass retainers loosely attached to the PMTs with light manual pressure.
- If we need to remove fibers from the plexiglass retainers, we will need to cut them using Quartz fiber cutter to ensure a uniform cut.
- Clean the surface if there is residual glue.
- Insert fibers to new plexiglass retainer.
- Glue it using UV-cured glue and let the glue set.
- Cover the plexiglass with black tape/cover.
- Note which repairs have been made.
- Close the HyCal front..



HyCal Layout (Row.Column) [Front View - PbWO4 ONLY]																																
1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.28	1.29	1.30	1.31	1.32	1.33	1.34
2.02	2.03	2.04	2.05	2.06	2.07	2.08	2.09	2.10	2.11	2.12	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.20	2.21	2.22	2.23	2.24	2.25	2.26	2.27	2.28	2.29	2.30	2.31	2.32	2.33	2.34
3.02	3.03	3.04	3.05	3.06	3.07	3.08	3.09	3.10	3.11	3.12	3.13	3.14	3.15	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.23	3.24	3.25	3.26	3.27	3.28	3.29	3.30	3.31	3.32	3.33	3.34
4.02	4.03	4.04	4.05	4.06	4.07	4.08	4.09	4.10	4.11	4.12	4.13	4.14	4.15	4.16	4.17	4.18	4.19	4.20	4.21	4.22	4.23	4.24	4.25	4.26	4.27	4.28	4.29	4.30	4.31	4.32	4.33	4.34
5.02	5.03	5.04	5.05	5.06	5.07	5.08	5.09	5.10	5.11	5.12	5.13	5.14	5.15	5.16	5.17	5.18	5.19	5.20	5.21	5.22	5.23	5.24	5.25	5.26	5.27	5.28	5.29	5.30	5.31	5.32	5.33	5.34
6.02	6.03	6.04	6.05	6.06	6.07	6.08	6.09	6.10	6.11	6.12	6.13	6.14	6.15	6.16	6.17	6.18	6.19	6.20	6.21	6.22	6.23	6.24	6.25	6.26	6.27	6.28	6.29	6.30	6.31	6.32	6.33	6.34
7.02	7.03	7.04	7.05	7.06	7.07	7.08	7.09	7.10	7.11	7.12	7.13	7.14	7.15	7.16	7.17	7.18	7.19	7.20	7.21	7.22	7.23	7.24	7.25	7.26	7.27	7.28	7.29	7.30	7.31	7.32	7.33	7.34
8.02	8.03	8.04	8.05	8.06	8.07	8.08	8.09	8.10	8.11	8.12	8.13	8.14	8.15	8.16	8.17	8.18	8.19	8.20	8.21	8.22	8.23	8.24	8.25	8.26	8.27	8.28	8.29	8.30	8.31	8.32	8.33	8.34
9.02	9.03	9.04	9.05	9.06	9.07	9.08	9.09	9.10	9.11	9.12	9.13	9.14	9.15	9.16	9.17	9.18	9.19	9.20	9.21	9.22	9.23	9.24	9.25	9.26	9.27	9.28	9.29	9.30	9.31	9.32	9.33	9.34
10.02	10.03	10.04	10.05	10.06	10.07	10.08	10.09	10.10	10.11	10.12	10.13	10.14	10.15	10.16	10.17	10.18	10.19	10.20	10.21	10.22	10.23	10.24	10.25	10.26	10.27	10.28	10.29	10.30	10.31	10.32	10.33	10.34
11.02	11.03	11.04	11.05	11.06	11.07	11.08	11.09	11.10	11.11	11.12	11.13	11.14	11.15	11.16	11.17	11.18	11.19	11.20	11.21	11.22	11.23	11.24	11.25	11.26	11.27	11.28	11.29	11.30	11.31	11.32	11.33	11.34
12.02	12.03	12.04	12.05	12.06	12.07	12.08	12.09	12.10	12.11	12.12	12.13	12.14	12.15	12.16	12.17	12.18	12.19	12.20	12.21	12.22	12.23	12.24	12.25	12.26	12.27	12.28	12.29	12.30	12.31	12.32	12.33	12.34
13.02	13.03	13.04	13.05	13.06	13.07	13.08	13.09	13.10	13.11	13.12	13.13	13.14	13.15	13.16	13.17	13.18	13.19	13.20	13.21	13.22	13.23	13.24	13.25	13.26	13.27	13.28	13.29	13.30	13.31	13.32	13.33	13.34
14.02	14.03	14.04	14.05	14.06	14.07	14.08	14.09	14.10	14.11	14.12	14.13	14.14	14.15	14.16	14.17	14.18	14.19	14.20	14.21	14.22	14.23	14.24	14.25	14.26	14.27	14.28	14.29	14.30	14.31	14.32	14.33	14.34
15.02	15.03	15.04	15.05	15.06	15.07	15.08	15.09	15.10	15.11	15.12	15.13	15.14	15.15	15.16	15.17	15.18	15.19	15.20	15.21	15.22	15.23	15.24	15.25	15.26	15.27	15.28	15.29	15.30	15.31	15.32	15.33	15.34
16.02	16.03	16.04	16.05	16.06	16.07	16.08	16.09	16.10	16.11	16.12	16.13	16.14	16.15	16.16	16.17	16.18	16.19	16.20	16.21	16.22	16.23	16.24	16.25	16.26	16.27	16.28	16.29	16.30	16.31	16.32	16.33	16.34
17.02	17.03	17.04	17.05	17.06	17.07	17.08	17.09	17.10	17.11	17.12	17.13	17.14	17.15	17.16	17.17	17.18	17.19	17.20	17.21	17.22	17.23	17.24	17.25	17.26	17.27	17.28	17.29	17.30	17.31	17.32	17.33	17.34
18.02	18.03	18.04	18.05	18.06	18.07	18.08	18.09	18.10	18.11	18.12	18.13	18.14	18.15	18.16	18.17	18.18	18.19	18.20	18.21	18.22	18.23	18.24	18.25	18.26	18.27	18.28	18.29	18.30	18.31	18.32	18.33	18.34
19.02	19.03	19.04	19.05	19.06	19.07	19.08	19.09	19.10	19.11	19.12	19.13	19.14	19.15	19.16	19.17	19.18	19.19	19.20	19.21	19.22	19.23	19.24	19.25	19.26	19.27	19.28	19.29	19.30	19.31	19.32	19.33	19.34
20.02	20.03	20.04	20.05	20.06	20.07	20.08	20.09	20.10	20.11	20.12	20.13	20.14	20.15	20.16	20.17	20.18	20.19	20.20	20.21	20.22	20.23	20.24	20.25	20.26	20.27	20.28	20.29	20.30	20.31	20.32	20.33	20.34
21.02	21.03	21.04	21.05	21.06	21.07	21.08	21.09	21.10	21.11	21.12	21.13	21.14	21.15	21.16	21.17	21.18	21.19	21.20	21.21	21.22	21.23	21.24	21.25	21.26	21.27	21.28	21.29	21.30	21.31	21.32	21.33	21.34
22.02	22.03	22.04	22.05	22.06	22.07	22.08	22.09	22.10	22.11	22.12	22.13	22.14	22.15	22.16	22.17	22.18	22.19	22.20	22.21	22.22	22.23	22.24	22.25	22.26	22.27	22.28	22.29	22.30	22.31	22.32	22.33	22.34
23.02	23.03	23.04	23.05	23.06	23.07	23.08	23.09	23.10	23.11	23.12	23.13	23.14	23.15	23.16	23.17	23.18	23.19	23.20	23.21	23.22	23.23	23.24	23.25	23.26	23.27	23.28	23.29	23.30	23.31	23.32	23.33	23.34
24.02	24.03	24.04	24.05	24.06	24.07	24.08	24.09	24.10	24.11	24.12	24.13	24.14	24.15	24.16	24.17	24.18	24.19	24.20	24.21	24.22	24.23	24.24	24.25	24.26	24.27	24.28	24.29	24.30	24.31	24.32	24.33	24.34
25.02	25.03	25.04	25.05	25.06	25.07	25.08	25.09	25.10	25.11	25.12	25.13	25.14	25.15	25.16	25.17	25.18	25.19	25.20	25.21	25.22	25.23	25.24	25.25	25.26	25.27	25.28	25.29	25.30	25.31	25.32	25.33	25.34
26.02	26.03	26.04	26.05	26.06	26.07	26.08	26.09	26.10	26.11	26.12	26.13	26.14	26.15	26.16	26.17	26.18	26.19	26.20	26.21	26.22	26.23	26.24	26.25	26.26	26.27	26.28	26.29	26.30	26.31	26.32	26.33	26.34
27.02	27.03	27.04	27.05	27.06	27.07	27.08	27.09	27.10	27.11	27.12	27.13	27.14	27.15	27.16	27.17	27.18	27.19	27.20	27.21	27.22	27.23	27.24	27.25	27.26	27.27	27.28	27.29	27.30	27.31	27.32	27.33	27.34
28.02	28.03	28.04	28.05	28.06	28.07	28.08	28.09	28.10	28.11	28.12	28.13	28.14	28.15	28.16	28.17	28.18	28.19	28.20	28.21	28.22	28.23	28.24	28.25	28.26	28.27	28.28	28.29	28.30	28.31	28.32	28.33	28.34
29.02	29.03	29.04	29.05	29.06	29.07	29.08	29.09	29.10	29.11	29.12	29.13	29.14	29.15	29.16	29.17	29.18	29.19	29.20	29.21	29.22	29.23	29.24	29.25	29.26	29.27	29.28	29.29	29.30	29.31	29.32	29.33	29.34
30.02	30.03	30.04	30.05	30.06	30.07	30.08	30.09	30.10	30.11	30.12	30.13	30.14	30.15	30.16	30.17	30.18	30.19	30.20	30.21	30.22	30.23	30.24	30.25	30.26	30.27	30.28	30.29	30.30	30.31	30.32	30.33	30.34
31.02	31.03	31.04	31.05	31.06	31.07	31.08	31.09	31.10	31.11	31.12	31.13	31.14	31.15	31.16	31.17	31.18	31.19	31.20	31.21	31.22	31.23	31.24	31.25	31.26	31.27	31.28	31.29	31.30	31.31	31.32	31.33	31.34
32.02	32.03	32.04	32.05	32.06	32.07	32.08	32.09	32.10	32.11	32.12	32.13	32.14	32.15	32.16	32.17	32.18	32.19	32.20	32.21	32.22	32.23	32.24	32.25	32.26	32.27	32.28	32.29	32.30	32.31	32.32	32.33	32.34
33.02	33.03	33.04	33.05	33.06	33.07	33.08	33.09	33.10	33.11	33.12	33.13	33.14	33.15	33.16	33.17	33.18	33.19	33.20	33.21	33.22	33.23	33.24	33.25	33.26	33.27	33.28	33.29	33.30	33.31	33.32	33.33	33.34
34.02	34.03	34.04	34.05	34.06	34.07	34.08	34.09	34.10	34.11	34.12	34.13	34.14	34.15	34.16	34.17	34.18	34.19	34.20	34.21	34.22	34.23	34.24	34.25	34.26	34.27	34.28	34.29	34.30	34.31	34.32	34.33	34.34

PbWO4 - NOTES
6.11 - Fiber is disconnected
32.04 - Fiber is disconnected
21.10 - Fixed Black Tape
17.10 - Fiber is disconnected
13.18 - - Fiber is disconnected
14.18 - Fiber is disconnected
14.19 - Fiber is disconnected
16.20 - Fiber is disconnected
17.20 - Fiber is disconnected
18.20 - Fiber is disconnected
19.20 - Fiber is disconnected
16.26 - Fiber is loose
6.27 - Fiber is disconnected
9.29 - Fiber is disconnected
5.30 - Fiber is loose
6.31 - Fiber is loose
28.33 - Fiber is loose
23.31 - Black tape needs to be fixed

Temperature Sensors	Simulator Notation	Module ID
11.01	W341	1341
24.09	W791	1791
11.10	W350	1350
18.13	W591	1591
17.20	W566	1566
25.24	W840	1840
24.34	W816	1816
11.25	W365	1365

Key	
	Temperature Sensor
	Issue
	Empty
	Under Tungsten Absorber
	Issue/Temperature Sensor
	Repaired/Found to be good
	Repaired/Under Tungsten Absorber

HyCal optical fiber repair mapping spreadsheet for PbWO

1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.28	1.29	1.30
2.01	2.02	2.03	2.04	2.05	2.06	2.07	2.08	2.09	2.10	2.11	2.12	2.13	2.14	2.15	2.16	2.17	2.18	2.19	2.20	2.21	2.22	2.23	2.24	2.25	2.26	2.27	2.28	2.29	2.30
3.01	3.02	3.03	3.04	3.05	3.06	3.07	3.08	3.09	3.10	3.11	3.12	3.13	3.14	3.15	3.16	3.17	3.18	3.19	3.20	3.21	3.22	3.23	3.24	3.25	3.26	3.27	3.28	3.29	3.30
4.01	4.02	4.03	4.04	4.05	4.06	4.07	4.08	4.09	4.10	4.11	4.12	4.13	4.14	4.15	4.16	4.17	4.18	4.19	4.20	4.21	4.22	4.23	4.24	4.25	4.26	4.27	4.28	4.29	4.30
5.01	5.02	5.03	5.04	5.05	5.06	5.07	5.08	5.09	5.10	5.11	5.12	5.13	5.14	5.15	5.16	5.17	5.18	5.19	5.20	5.21	5.22	5.23	5.24	5.25	5.26	5.27	5.28	5.29	5.30
6.01	6.02	6.03	6.04	6.05	6.06	6.07	6.08	6.09	6.10	6.11	6.12	6.13	6.14	6.15	6.16	6.17	6.18	6.19	6.20	6.21	6.22	6.23	6.24	6.25	6.26	6.27	6.28	6.29	6.30
7.01	7.02	7.03	7.04	7.05	7.06																			7.25	7.26	7.27	7.28	7.29	7.30
8.01	8.02	8.03	8.04	8.05	8.06																			8.25	8.26	8.27	8.28	8.29	8.30
9.01	9.02	9.03	9.04	9.05	9.06																			9.25	9.26	9.27	9.28	9.29	9.30
10.01	10.02	10.03	10.04	10.05	10.06																			10.25	10.26	10.27	10.28	10.29	10.30
11.01	11.02	11.03	11.04	11.05	11.06																			11.25	11.26	11.27	11.28	11.29	11.30
12.01	12.02	12.03	12.04	12.05	12.06																			12.25	12.26	12.27	12.28	12.29	12.30
13.01	13.02	13.03	13.04	13.05	13.06																			13.25	13.26	13.27	13.28	13.29	13.30
14.01	14.02	14.03	14.04	14.05	14.06																			14.25	14.26	14.27	14.28	14.29	14.30
15.01	15.02	15.03	15.04	15.05	15.06																			15.25	15.26	15.27	15.28	15.29	15.30
16.01	16.02	16.03	16.04	16.05	16.06																			16.25	16.26	16.27	16.28	16.29	16.30
17.01	17.02	17.03	17.04	17.05	17.06																			17.25	17.26	17.27	17.28	17.29	17.30
18.01	18.02	18.03	18.04	18.05	18.06																			18.25	18.26	18.27	18.28	18.29	18.30
19.01	19.02	19.03	19.04	19.05	19.06																			19.25	19.26	19.27	19.28	19.29	19.30
20.01	20.02	20.03	20.04	20.05	20.06																			20.25	20.26	20.27	20.28	20.29	20.30
21.01	21.02	21.03	21.04	21.05	21.06																			21.25	21.26	21.27	21.28	21.29	21.30
22.01	22.02	22.03	22.04	22.05	22.06																			22.25	22.26	22.27	22.28	22.29	22.30
23.01	23.02	23.03	23.04	23.05	23.06																			23.25	23.26	23.27	23.28	23.29	23.30
24.01	24.02	24.03	24.04	24.05	24.06																			24.25	24.26	24.27	24.28	24.29	24.30
25.01	25.02	25.03	25.04	25.05	25.06	25.07	25.08	25.09	25.10	25.11	25.12	25.13	25.14	25.15	25.16	25.17	25.18	25.19	25.20	25.21	25.22	25.23	25.24	25.25	25.26	25.27	25.28	25.29	25.30
26.01	26.02	26.03	26.04	26.05	26.06	26.07	26.08	26.09	26.10	26.11	26.12	26.13	26.14	26.15	26.16	26.17	26.18	26.19	26.20	26.21	26.22	26.23	26.24	26.25	26.26	26.27	26.28	26.29	26.30
27.01	27.02	27.03	27.04	27.05	27.06	27.07	27.08	27.09	27.10	27.11	27.12	27.13	27.14	27.15	27.16	27.17	27.18	27.19	27.20	27.21	27.22	27.23	27.24	27.25	27.26	27.27	27.28	27.29	27.30
28.01	28.02	28.03	28.04	28.05	28.06	28.07	28.08	28.09	28.10	28.11	28.12	28.13	28.14	28.15	28.16	28.17	28.18	28.19	28.20	28.21	28.22	28.23	28.24	28.25	28.26	28.27	28.28	28.29	28.30
29.01	29.02	29.03	29.04	29.05	29.06	29.07	29.08	29.09	29.10	29.11	29.12	29.13	29.14	29.15	29.16	29.17	29.18	29.19	29.20	29.21	29.22	29.23	29.24	29.25	29.26	29.27	29.28	29.29	29.30
30.01	30.02	30.03	30.04	30.05	30.06	30.07	30.08	30.09	30.10	30.11	30.12	30.13	30.14	30.15	30.16	30.17	30.18	30.19	30.20	30.21	30.22	30.23	30.24	30.25	30.26	30.27	30.28	30.29	30.30

PbGlass - NOTES	
2.01	Fiber is loose
20.03	Fiber is loose
20.04	Fiber is loose
30.01	Fiber is loose
27.04	Fiber is disconnected
3.25	loose
6.20	loose connection
1.09	Fix tape
2.09	Fix tape
5.21	Fiber is loose
25.08	Fiber is loose
27.08	Fiber is loose
3.29,20.01	Fiber disconnected
16.28	Fiber is loose
20.25	Fiber is loose
25.27	Fiber is loose
25.28	Fiber is loose
26.28	Fiber is loose
30.30	Fiber is loose
30.24	Fiber is loose
25.24	Fiber is loose
27.22	Fiber is loose
29.10	Fiber is loose
18.04	Fiber disconnected

Temperature Sensors	Simulator Notation	Module ID
6.13	G30	30
1.30	G163	163
18.06	G259	259
13.25	G318	318
25.18	G414	414

Key	
Orange	Temperature Sensor
Red	Issue
Black	Empty
Yellow	
Pink	Missing Plexiglass Covering (These have been fixed with Black Tape)
Red/White	Issue/Temperature Sensor
Green	Repaired

HyCal optical fiber repair mapping spreadsheet for Pb-glass



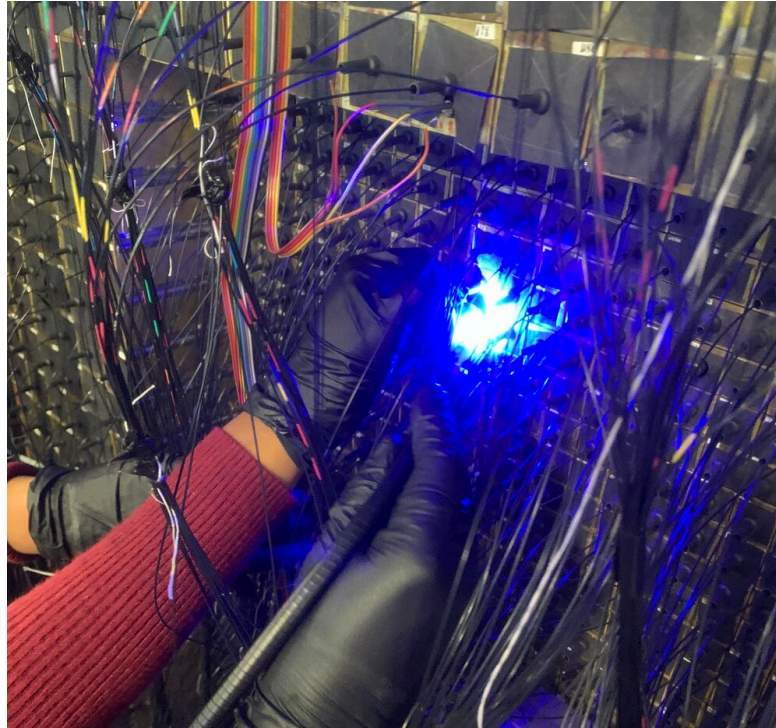
REPAIR OF CRYSTALS BENEATH THE TUNGSTEN ABSORBER

- The central 12 PbWO_4 crystals of HyCal surround a fitting for the beam to pass through the calorimeter. Mounted in this beam pipe fitting and covering the 12 crystals is a tungsten absorber
- These crystals allow for an extremely tight angular coverage that makes HyCal so useful in experiments that require high precision at low angles like the PRad experiments.
- The optical fibers for the covered crystals must be fed through holes on the absorber and then have a plexiglass optical donut connector affixed to the fiber and then attached to the crystals with UV activated glue.
- Challenges:
 - The absorber when slid into its final position only has a very small gap from the crystals with the optical donuts needing to fit into pre-drilled holes within the absorber, but these holes are slightly smaller than the openings to the crystals. This necessitates a more precise placement of the connectors.
 - The optical donuts were placed in the center of each crystal with a tolerance of a few millimeters then the absorber would be able to be successfully seated.
 - This was successfully done on September 26th, 2024.

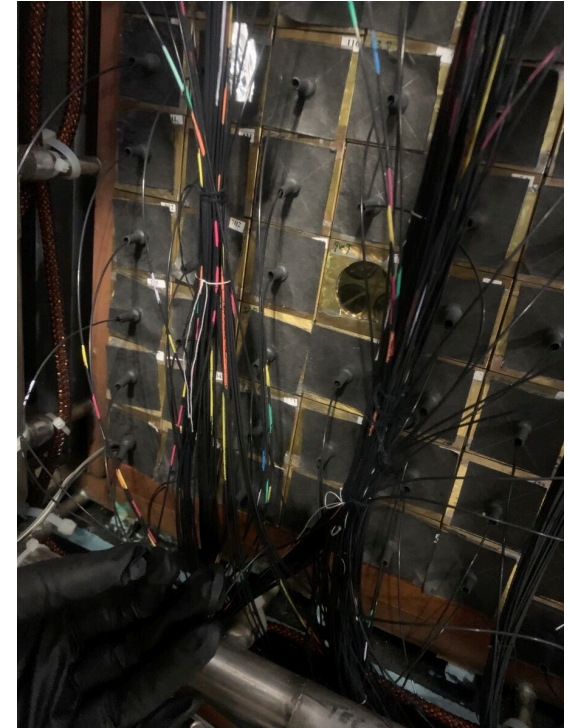
HYCAL OPTICAL FIBER AND CONNECTION REPAIR



ARUNI NADESHANI.



PRAD COLLABORATION MEETING



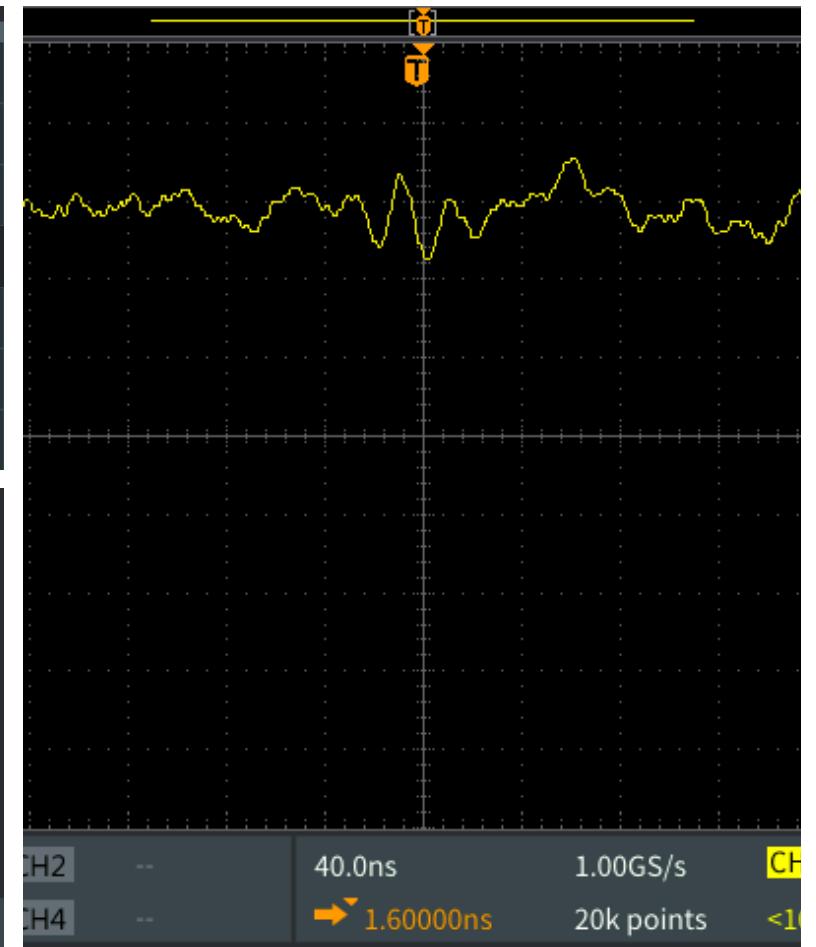
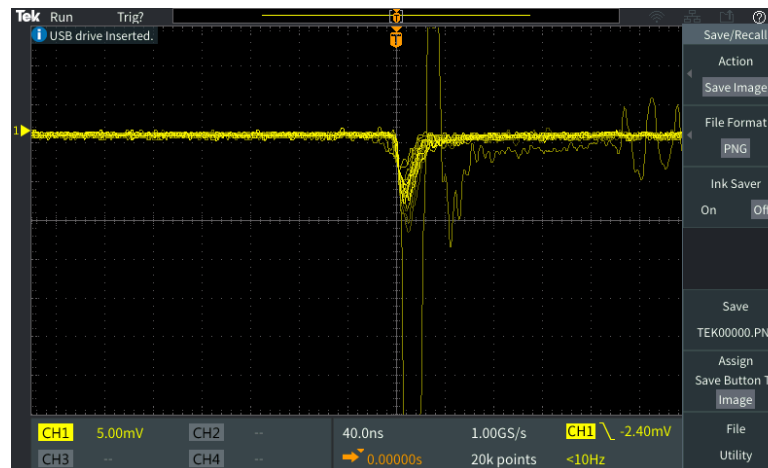
11/11/2024

11/15

HYCAL HV TEST WITH COSMICS

11/11/2024

- Checked all PbWO4 modules.
- Most signals are good.
- Two have been labeled bad so far.
- For more details : Erik Wrightson's' talk



HYCAL HV TEST WITH LMS

- LMS does not have an easy swappable setup for putting in a different light module.
 - It would require removing the LMS(without damaging the fiber bundle that goes into HyCal).
- We have confirmed that the filter can still move between its preset positions.
- We still need a 100V pulse generator.
- We checked one of the LMS PMTs with its attached radiation source and that gives a good consistent signal.
- After confirm LMS working properly we need to check all PbWO₄ modules with LMS
- We attempted to see if we could get any signal from using the present pulse generator.
 - It does not reach a high enough voltage for even weak pulsing.



HYCAL CABLING

- The cables attached to computing crates need to be changed to LEMO connectors for use in the flash Analogue-to-Digital Converters (fADC) boards to use with PRADII experiment.
- Electronic group at JLab is working on these replacement and MSU is testing the cables after it modified.
- Finish testing and labeling 51 bundles. (9 left)
- The damaged bundle boards were already replaced. Need to test these three bundles.
- For more details: Buddhiman's talk

SUMMARY AND FUTURE WORK

- Cable testing:
 - Most of the cables have been tested and the bad connectors repaired by JLab electronic group.
- HyCal HV testing:
 - All PbWO_4 modules check with cosmics and just two module identified as bad modules.
 - Pb glass module check with cosmics will be start this week.
 - All modules need to check with LMS.
- Hycal optical fiber and connection repairs:
 - All fibers identified from mechanical test were repaired. After HV test with LMS if we have more fibers which need to be repair we will continue.

SPECIAL THANKS TO ...

- D. Dutta, Buddhiman Tamang, Erik Wrightson (Mississippi State University group)
- C. Cuevas, Mark Taylor, Armen Stepanian, Jim (Jefferson Lab electronics group)
- Morgan Cook and hall B staff
- Ashot Gasparian, Eugene Pasyuk, Youri Sharabian and Alexander Somov ...

11/11/2024

17/15

QUESTIONS?

ARUNI NADEESHANI.
PRAD COLLABORATION MEETING

