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Week 6 July/8-12/2024

**Day 1: July/8/2024**

Today I started with data collecting which was halted for a bit as I needed to debug the setup. Turns out that one of the platforms was loose after our restructuring, causing the pulse height to be off by a big margin. There are alot more variables than I expected. These variables can drastically affect the pulse height of the project. After the debug I finished gathering data. I was able to find a step trend that should match with how the laser is reflected. I am working on normalizing the data I have right now and figuring out how exactly these reflections/transitions affect pulse size. With a new decision to increase the TTL width to 170, there is now a huge difference in how the light concentrator reacts with the laser, this data should prove more usable than previous attempts.

**Day 2: July/9/2024**

I used Tuesday to normalize and analyze the data from the previous day. This data looked quite promising as the data proved a clear step function for each reflection point predicted. I also began another light concentrator test that is shifted about 5 mm above the center point. We hypothesize that with the TTL width increased, another batch of tests is required.

**Day 3: July/10/2024**

The problems experienced on Monday happened again today and even though it was corrected soon after finding the error, it affected the results of the theta test today, meaning there is a high likelihood it is inaccurate and that this will have to be repeated. Suzuki-san and I agreed that I would start mapping out the exact layout and procedure for aligning the test. To my knowledge only one similar test was ever performed, which happened last year, it’s important to keep the data reproducible.

**Day 4: July/11/2024**

With most of the data recorded, normalized and posted for this week's weekly report slides. I shifted my focus on helping with the symposium which will be written about the project/test. I spent some time getting pictures and making step by step instructions on what and how to align the test and I also made simplified side and top view diagrams. This should help aid in aligning as well as providing an easy to understand version of the project. I took all I have worked on this week and added it to a new powerpoint that will be used to explain the procedure for the test and that will most likely be included in my final report.

**Day 5: July/12/2024**

Something quite exciting happened in my observation on the laser test I did two days ago with just the laser going into the pmt. As I have noted before, some of my tests this week seemed to have some sort of error occurring. The first thought was to calibrate/align everything in our dark

box so that it was possible to eliminate this error. However, I believe I may have found another factor for these tests. Time seems to affect the results even when nothing is touched except for the voltage and oscilloscope. I am currently turning on the voltage for a short period, freezing that frame on the scope, waiting 5 to 10 minutes and turning on the voltage again. With the limited data so far, every 5 minutes the peak increases by about 2 or 4 mv. I will continue to record results and analyze them with Suzuki-san as he also appeared curious about the findings.