



Internship at the Cosmic Ray Physics Group



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Science, Discovery, and the Universe
Physics

Cosmic Ray Physics Group

The Cosmic Ray Physics Group is dedicated to the research of cosmic rays, energetic particles moving with velocities close to the speed of light. The group's main projects revolve around the CREAM (Cosmic Ray Energetics and Mass) missions, which use a series of different detectors to measure and collect data on cosmic rays passing through the CREAM.

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ISS-CREAM Logo

Photo Credit to cosmicray.umd.edu

ISS-CREAM

When I worked at the Cosmic Ray Physics Group, the main project was the ISS-CREAM, a CREAM detector destined to go on the International Space Station. The CREAM had to be redesigned for the ISS and reinforced for the flight up. I worked on a few different projects testing and preparing the flight components for launch. It was important that tests got done quickly and properly so that the mission could be ready for launch. There was always the possibility of NASA scraping the mission, so the tests needed to go smoothly.

Corona Test

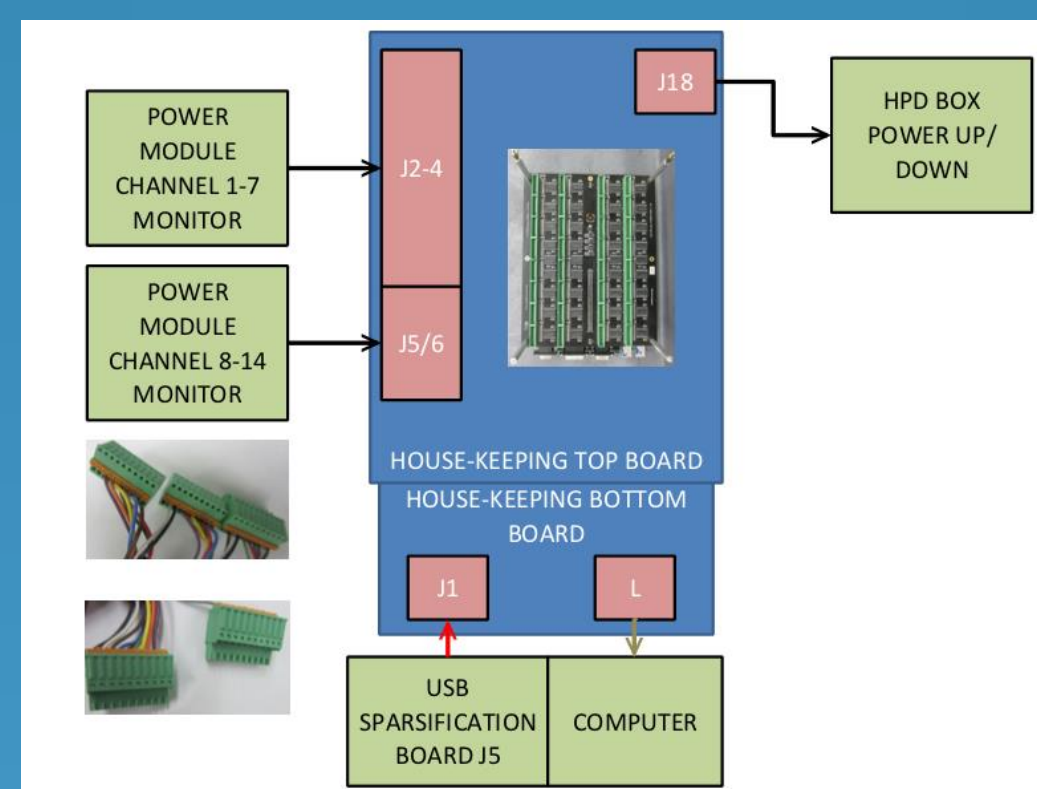
The Corona test looked for a corona effect, ionization of the air at low pressures resulting in power fluctuations, in running power supplies to be used on the ISS-CREAM. A typical test would run for 72 hours with the voltage and current of two power supplies being monitored. I was initially brought in to correct some issues with the program that recorded the voltage and current data. After fixing the program, I was taught to run the Corona test myself. We managed to get the majority of the power supplies through and to the next stage of testing in preparation for launch.



Corona Test Set-Up
Photo Credit to Jacob Murphy

LED Test

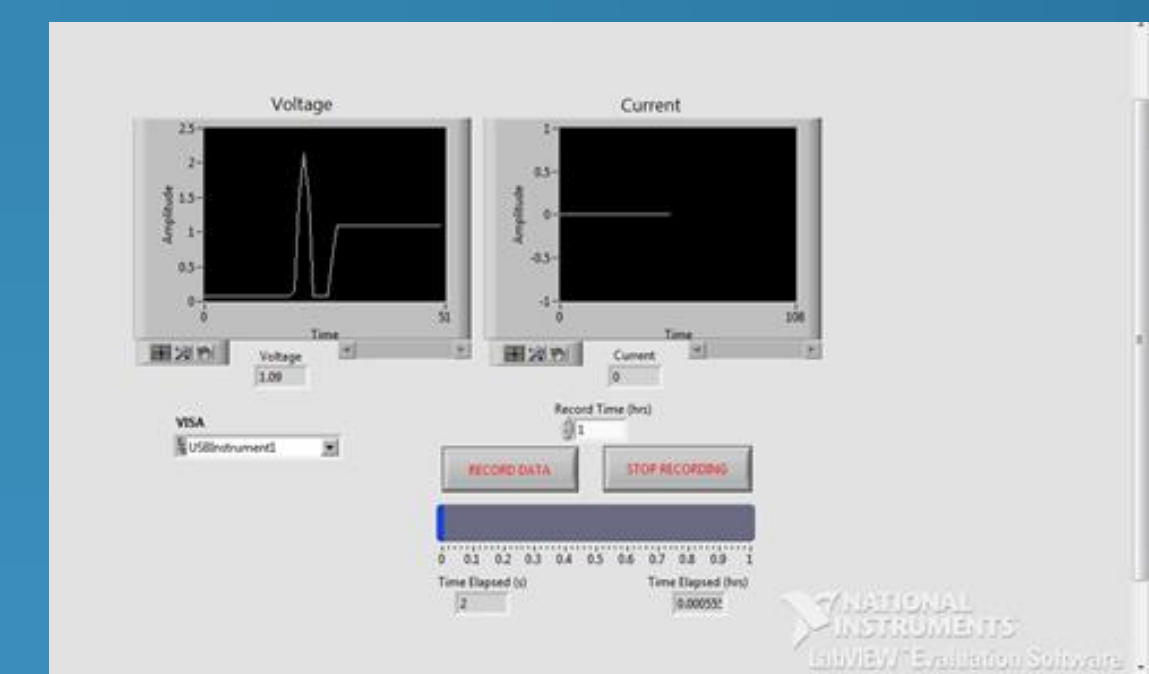
The LED test involved measuring how well scintillating ribbons held light. These ribbons were a part of a larger detector for cosmic rays. I worked on setting up and adjusting the test many times. I also made a wire diagram for the test set up. The LED test was by far the most complicated test I worked on simply due to the number of components involved. I created a very thorough diagram for all of the components and wires. This was useful as the test was constantly taken apart and rebuilt when moved for testing.



Part of LED Test Wire Diagram
Photo Credit to Jacob Murphy

Power Module Testing

The Power Module was another component of the ISS-CREAM being tested. I created a program to monitor and record the voltage and current of a high voltage power supply being used in the testing, similar to the program I used in the corona test. I made it to record in real time for an indefinite period. After finalizing the program I made a manual to accompany it. Using it on some of my peers in the lab, I made sure someone with no experience with the equipment could run the program and read the data using the manual.



Front Panel Monitoring Power Supply
Photo Credit to Jacob Murphy

Impact on the Project

After completing my projects at the Cosmic Ray Physics Group, I felt I had made a sizable contribution to the project. I helped prepare a number of power supplies for launch and sped up the testing process by being there to run the Corona test. My work with the LED test proved helpful and the wire diagram should hopefully make future tests easier. Finally, I helped make the Power Module testing easier for the people running it with my program and accompanying manual.

Acknowledgements

I would like to acknowledge Professor Eun-Suk Seo, Moo Hyun Lee, Peter Weinmann, Oluchi Ofoha, and Ike Faddis. Thank you all for your guidance and the opportunities you gave me.

Looking Forward

I feel this was a very beneficial experience for me. I learned quite a bit on how a project of this scale works. I also gained more experience with LabVIEW programming that should prove helpful to me in the future. The skills I have acquired in working on and running these different tests will I believe prove helpful in my future endeavors in physics. I hope to work in a lab again soon and to use what I have learned to help progress science.