

Cylon Time-Projection Chamber - Status Report

Brandon Ling
Zachary Orent

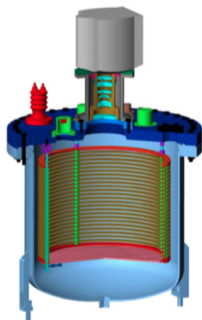
AdLab
Boston University

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- Intro to Cylon
- Goals
- Current progress
- Future work

Intro to Cylon

Originally built as a dark matter detector.



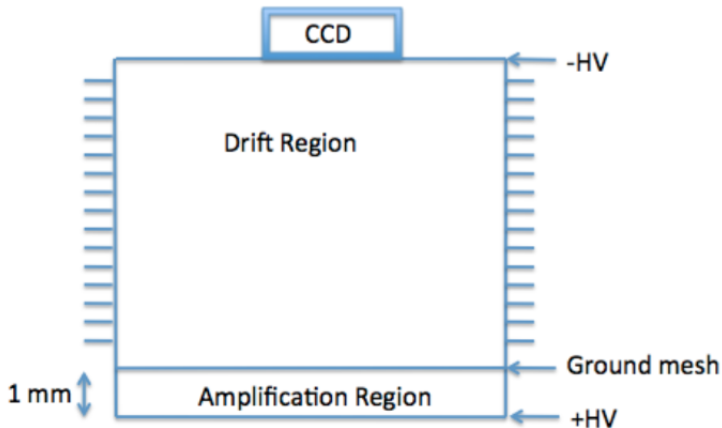
(a)



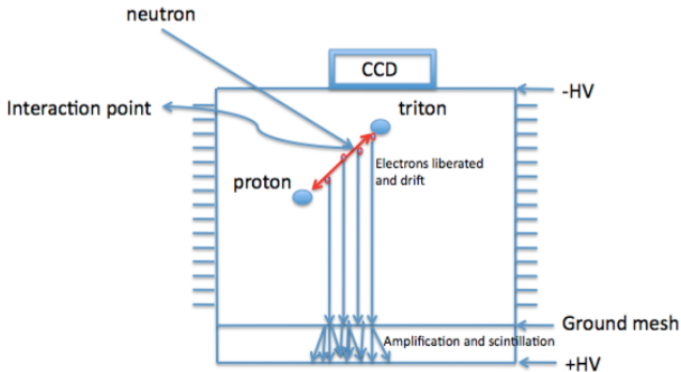
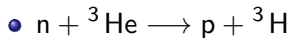
(b)

Figure: (a) cross-sectional view (b) photo of Cylon

Intro to Cylon



Intro to Cylon



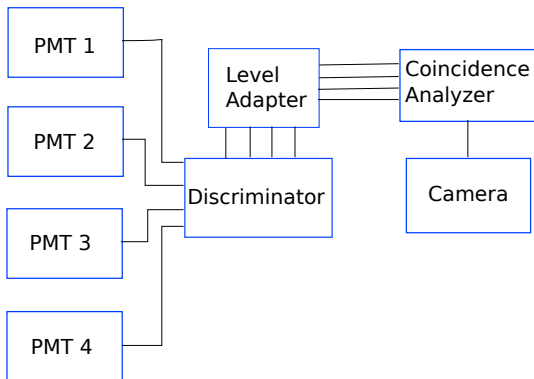


Figure: NIM electronics for triggering camera

- Measure cross section of thermal neutron interaction with ^3He

- Measure cross section of thermal neutron interaction with ^3He
- Obtain three-dimensional track information

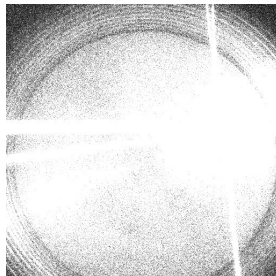
- First day seemed OK



Figure: typical thermal neutron event

Current Progress

- Cannot get anode to high enough voltage



- Sparking always in same location

Current Progress

- NIM modules set up, working fine
- PMTs 2, 3, 4 signals OK, but PMT 1 is temperamental

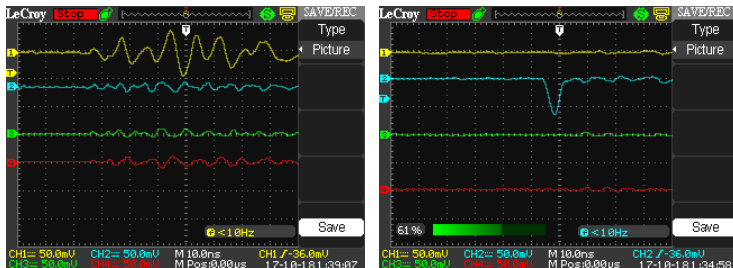


Figure: left - PMT 1, right - PMT 2

Future Work

- Chamber needs to be opened and inspected
- PMT 1 needs to be checked, maybe grounding issue
- Figure out why coincidence rate is so low, maybe adjust thresholds, pulse widths

Acknowledgments

I would like to thank Professor Sulak, Situ, my lab partner Zach, and especially Dan for all of their help and insights.

Figures taken from [1] and [2].

- [1] E. Rosenfeld, “A helium-3 ultra-sensitive, multiband, low background neutron spectrometer,” (2013).
- [2] H. Tomita, *Detector Development for Direction-Sensitive Dark Matter Research*, Ph.D thesis, Boston University (2011).