

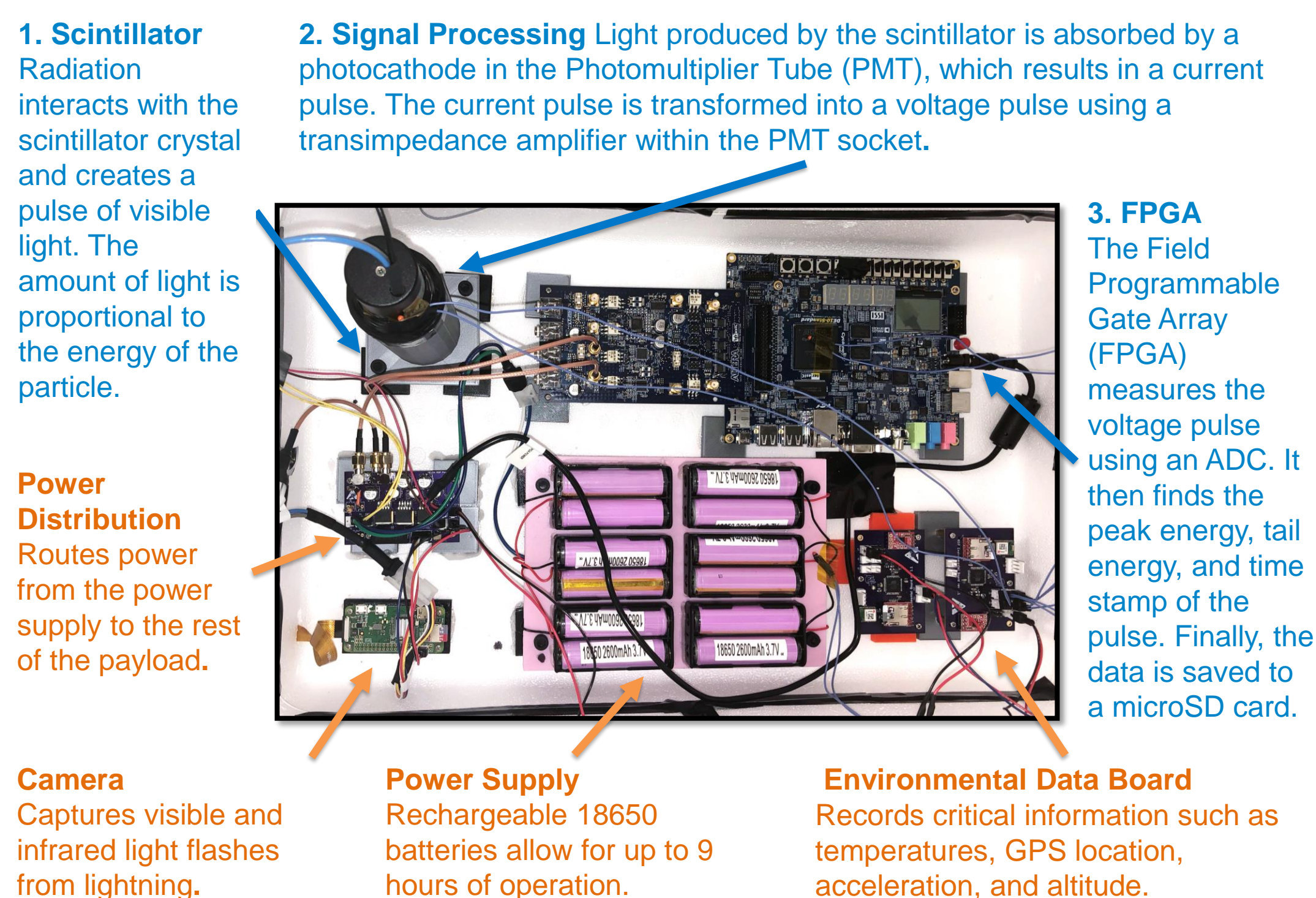
# The Design and Testing of a Gamma-Neutron Spectrometer for the HELEN Project

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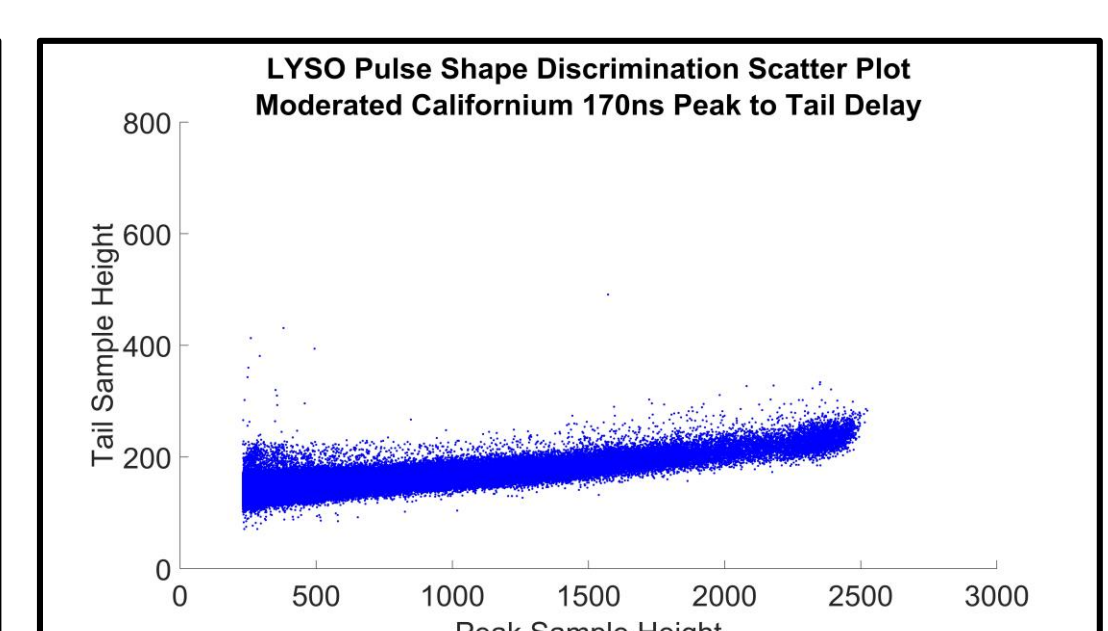
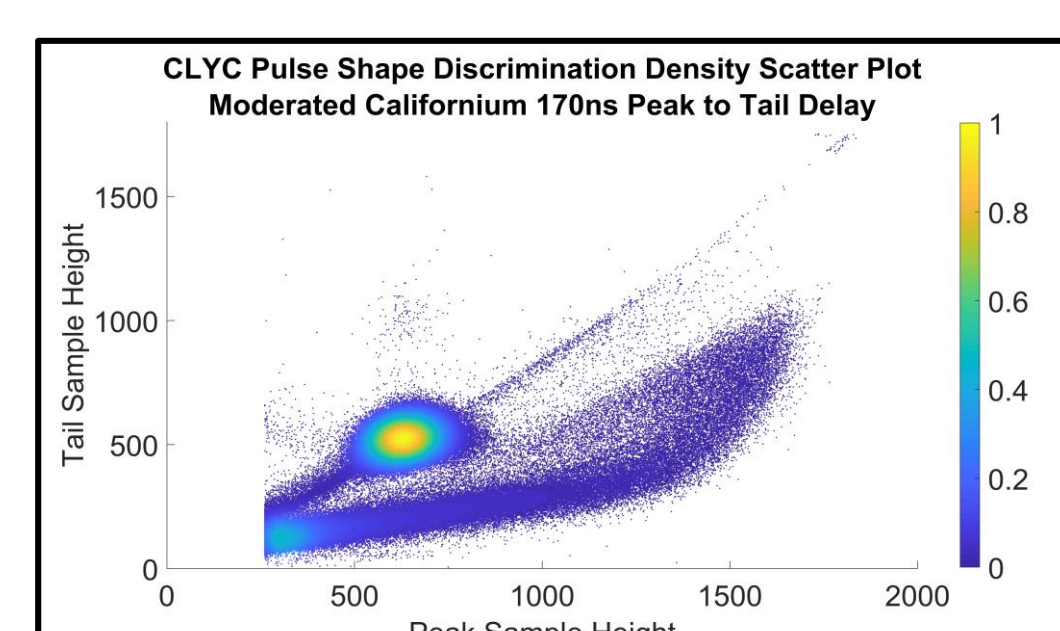
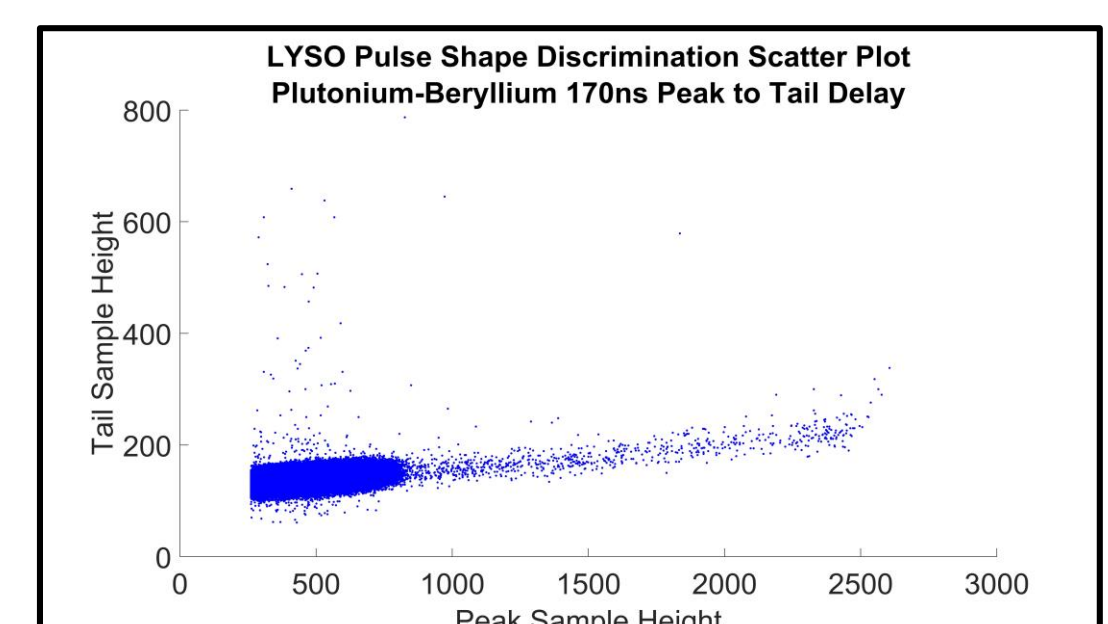
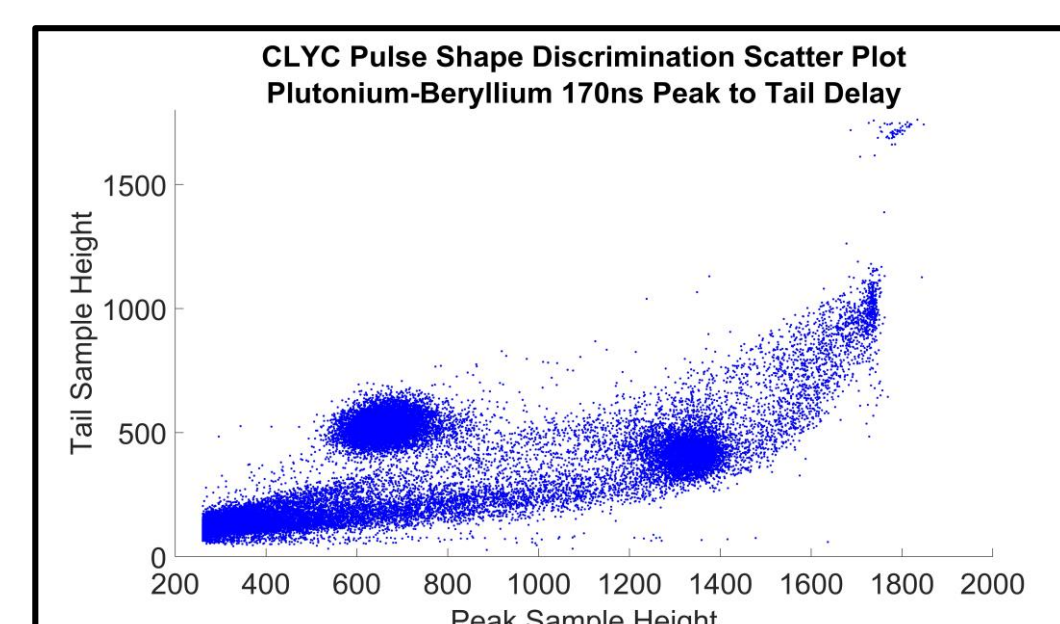
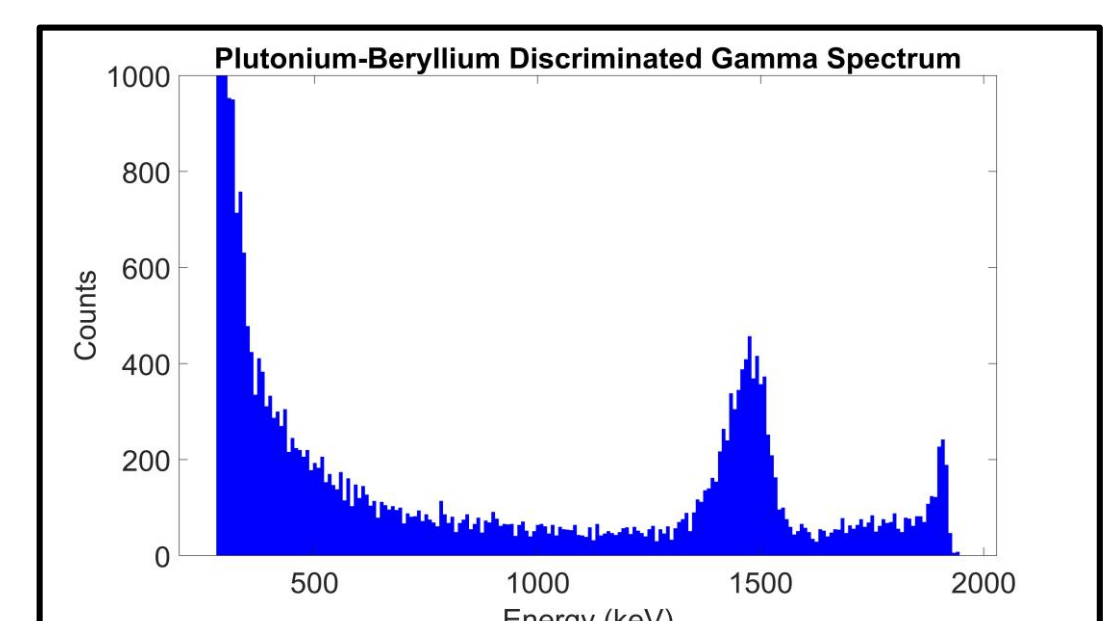
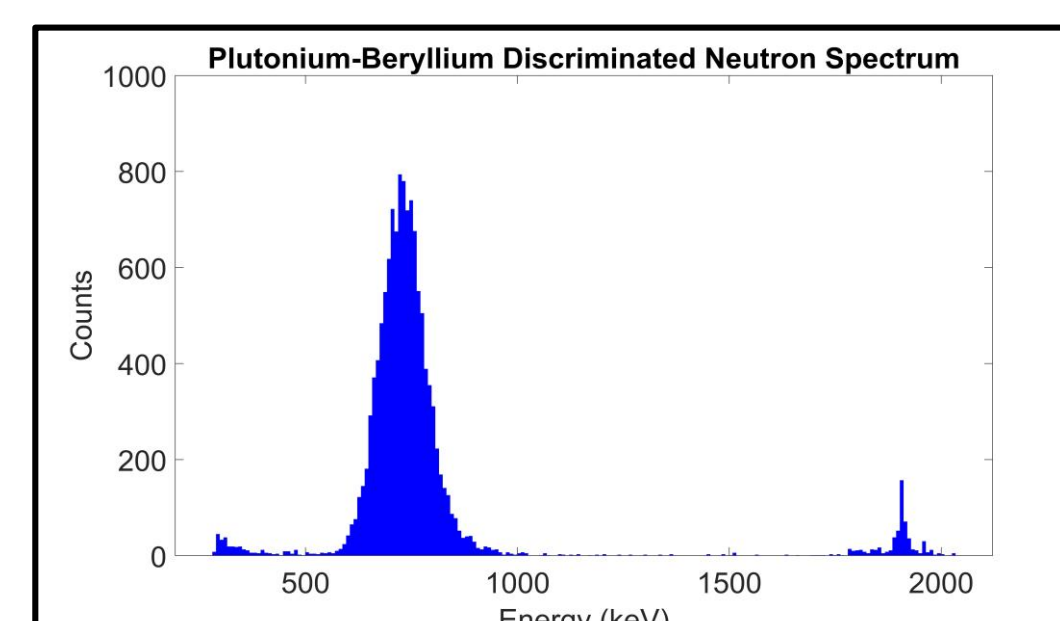
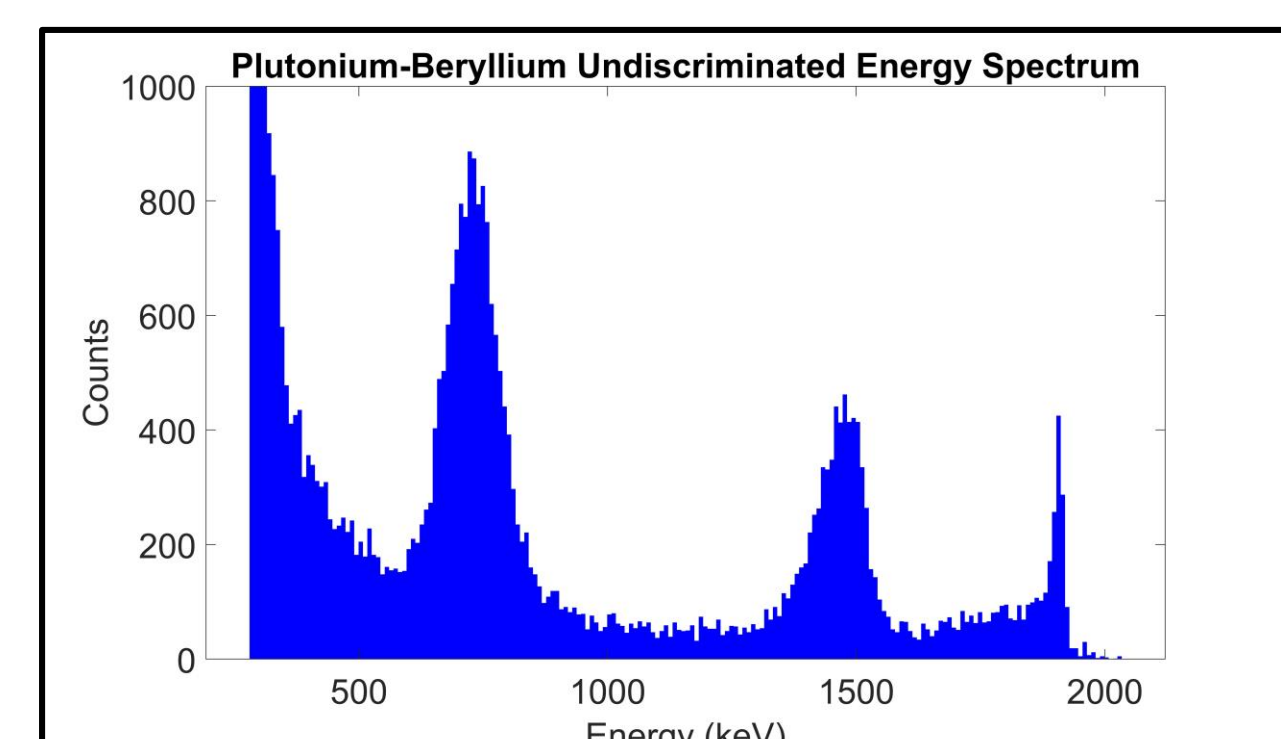
## Overview

HELEN is a high-altitude ballooning payload network that is designed for multiple in-situ measurements of Terrestrial Gamma-ray Flashes (TGFs). The primary science instrument of HELEN is a gamma-neutron spectrometer: an instrument capable of detecting and discriminating between photons and neutrons. The instrument and supporting hardware were designed and assembled in-house, while testing was performed in collaboration with the United States Army Radiation Standards Laboratory.

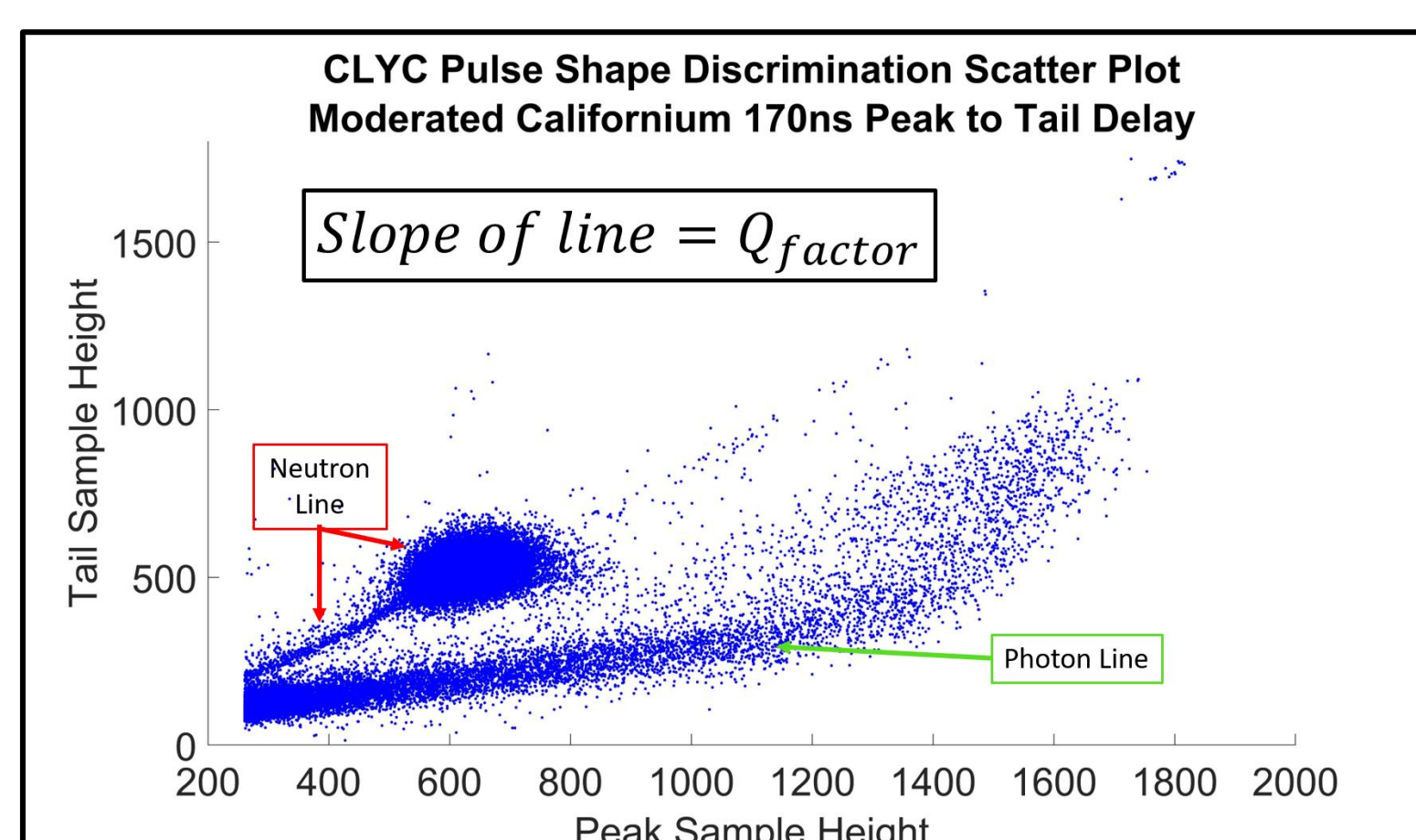
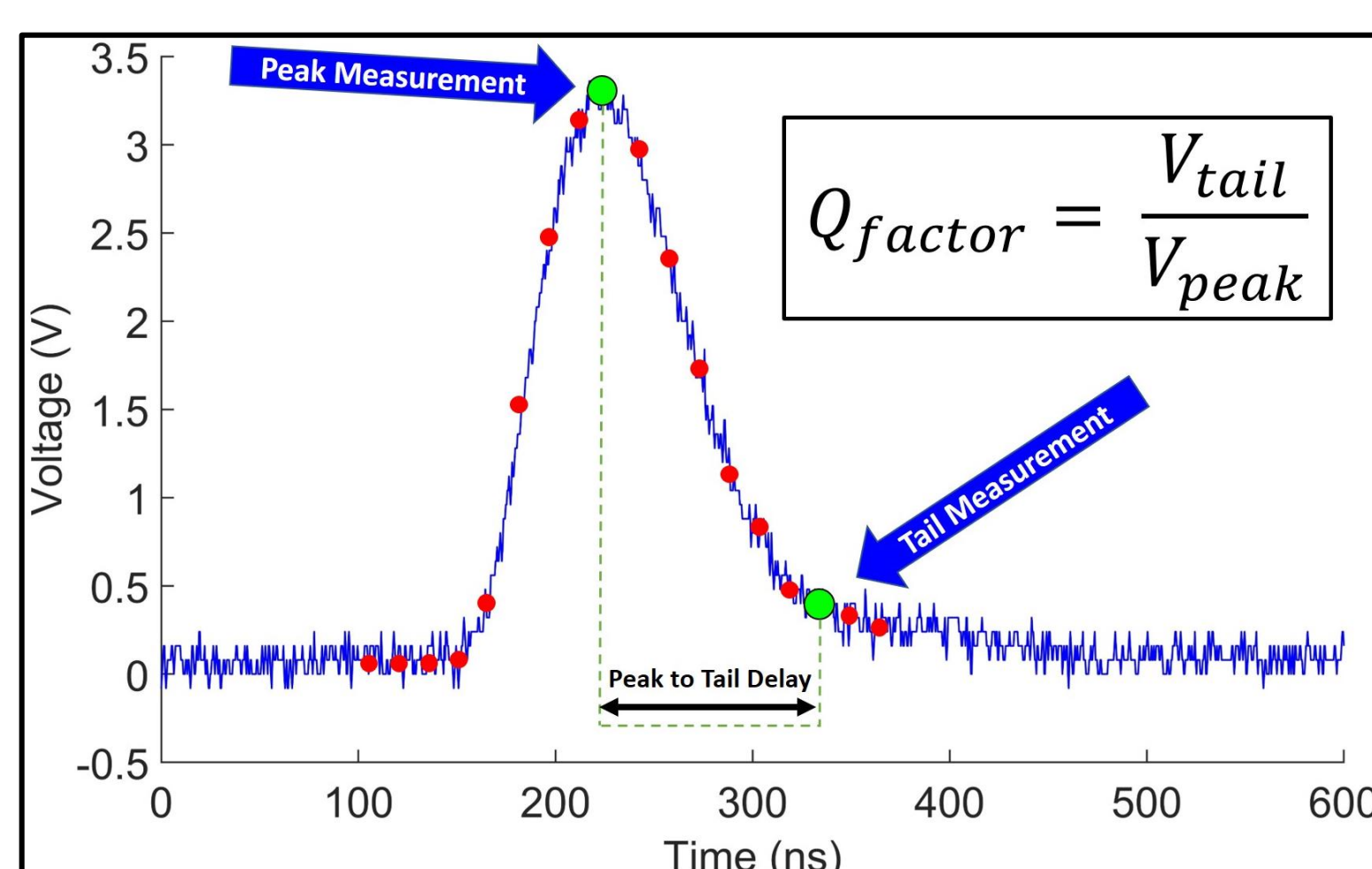
## Instrumentation



## Testing Data



## Pulse Shape Discrimination Algorithm



## Conclusions

As a result of the tests with the US Army Radiation Standards Laboratory, we are equipping HELEN with CLYC scintillators that allow for gamma-neutron detection and discrimination. HELEN will attempt to use this detector to investigate photonuclear reactions inside of a TGF beam in the coming months.

## Acknowledgements

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