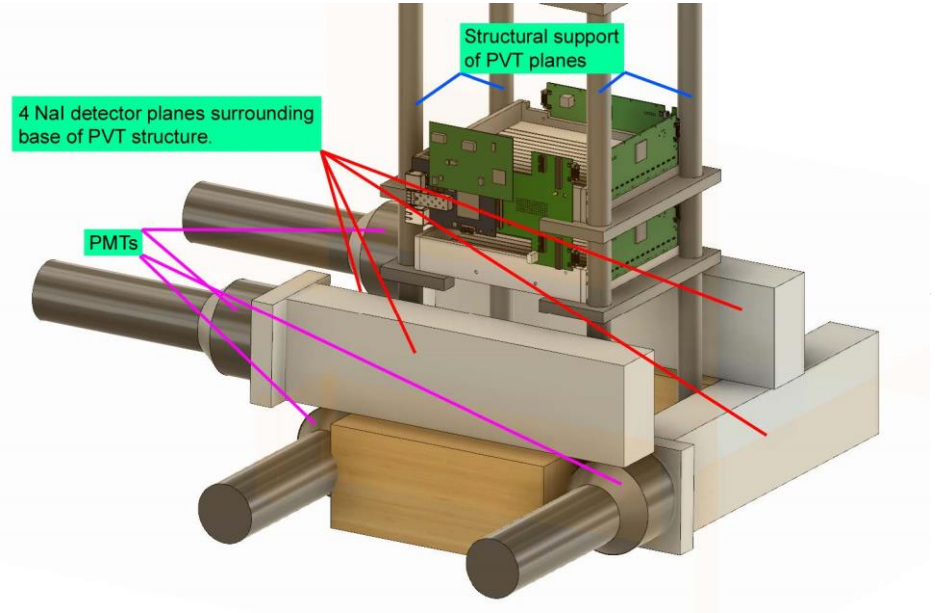
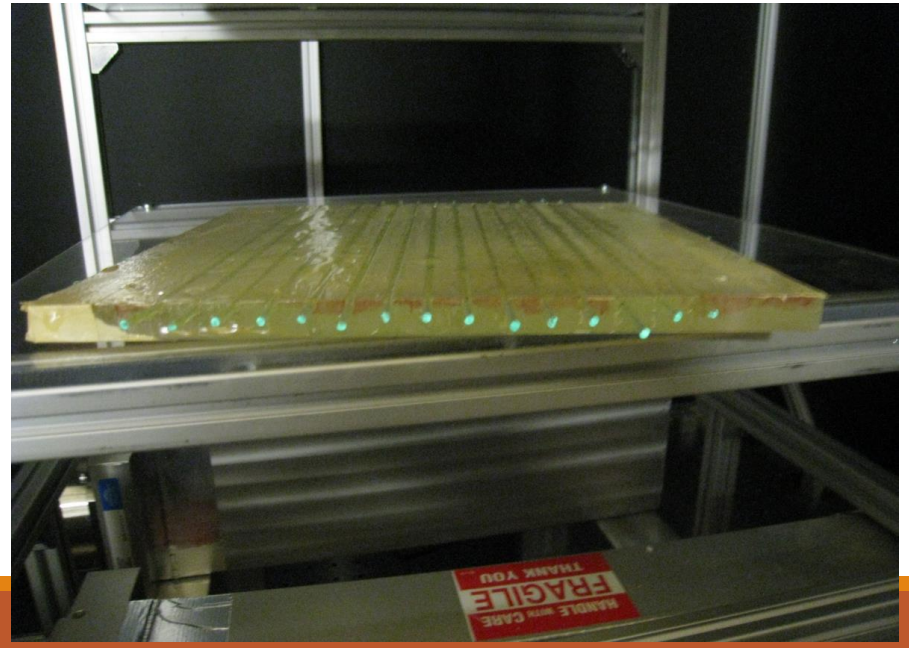
# SiPM Readout for Muon Detection

ALECZANDER PAUL

# Motivation

- SiPM used in the Hawaii Muon Beamline v3 (HMBv3)
  - Detection of muons
- Muon hits the scintillating fiber, causing a photon to propagate
  - SiPM at the end used to measure this photon
- Need a board to test if the SiPM works before placing on HMBv3



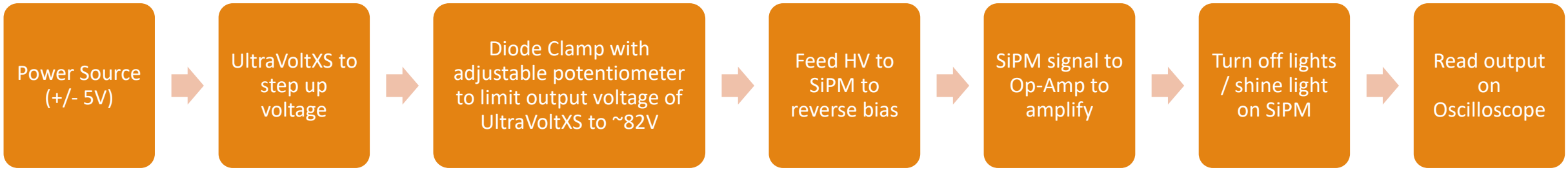
# Current Problems with SiPM Readout

- MPPC requires a high voltage to reverse bias (~72V)
- Current PCB's in the IDLab for SiPM readout can be improved
  - One that works, but the 72V bias comes from an external power supply
  - One designed to have the 72V bias internally, but it does not work
    - Still have not figured out why exactly that is
    - Has also been butchered trying to fix it
- Stepping stone to create one that works without external power supply
  - Working on breadboard setup
  - Eventually will be made into a PCB

# Specifications

- SiPM: Hamamatsu MPPC S10362-11-100P
  - V_op = 72.31V
  - Dark Count: 256kHz (at 25°C)
- High Voltage Source: UltraVolt XS
  - V_in = 5 +/- 0.5 V
  - HV Output: 0-100V programmable
    - 0-2.5V adjustable pin
  - Output Power: 100 mW


# Implementation



# Circuit Diagram