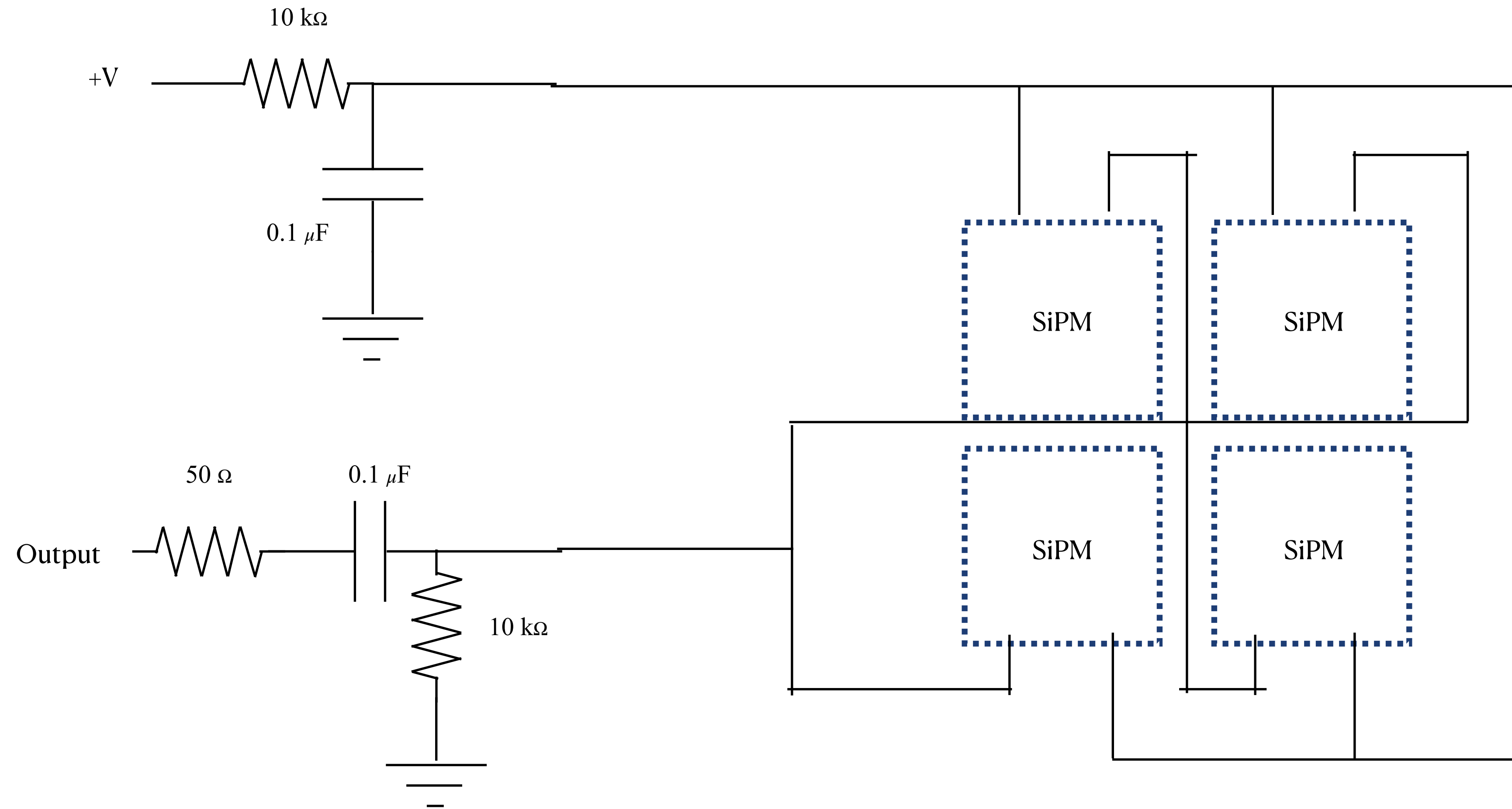


SiPM board for PoF

March 17th, 2021

Dante Totani

Circuit tested at CERN



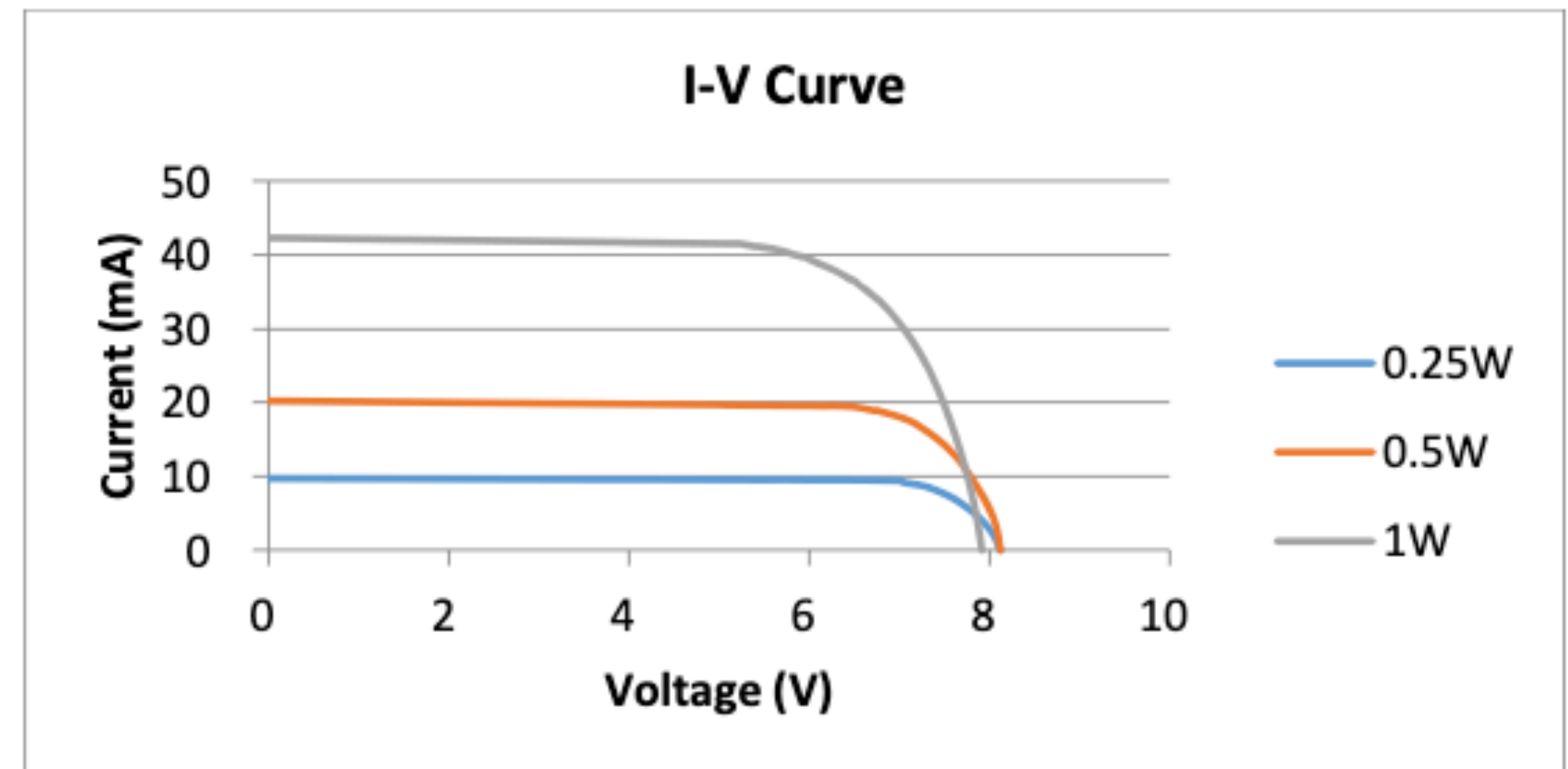
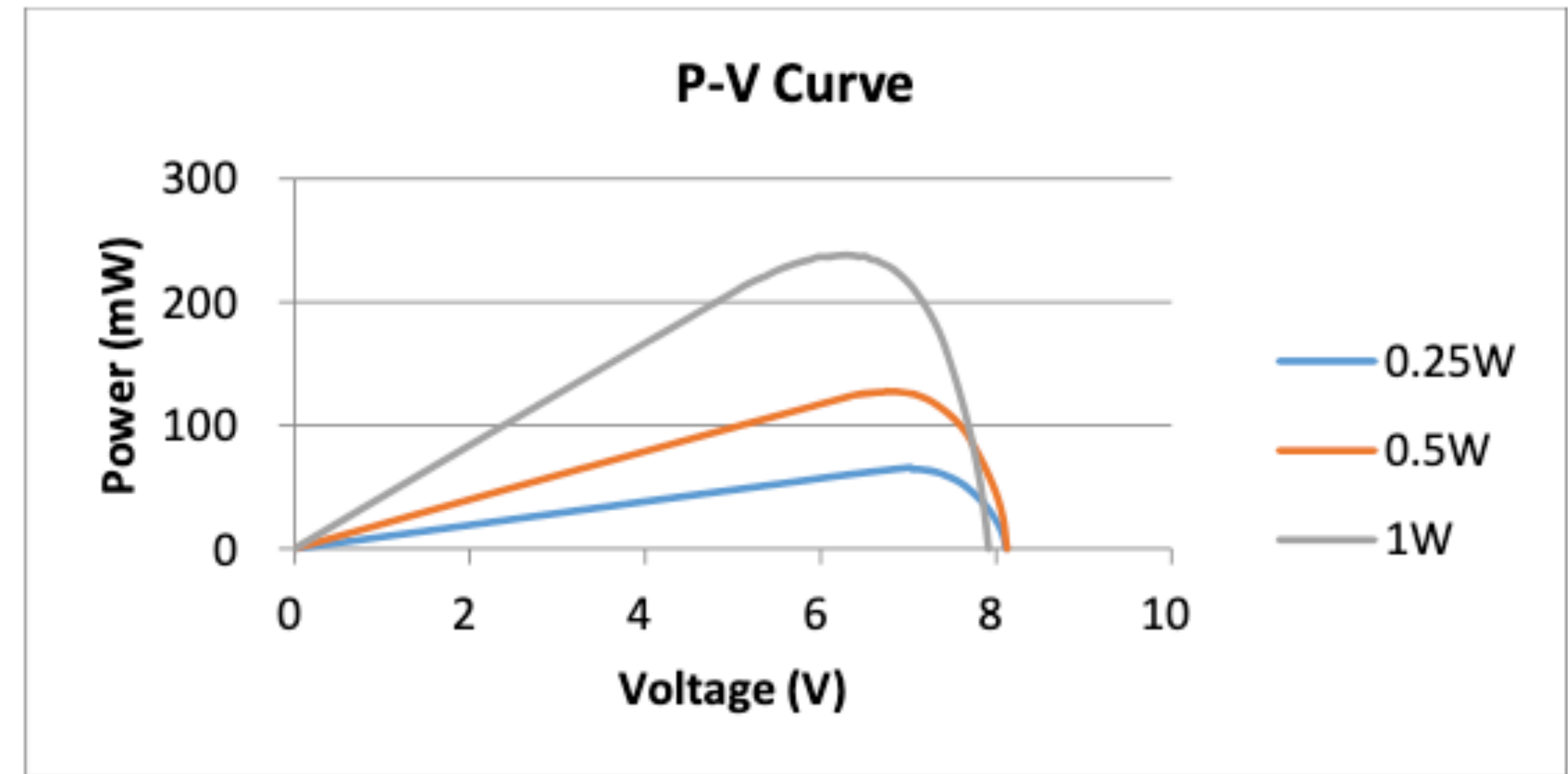
Ground = PoF return. In the final setup the ground reference is the HV cathode.

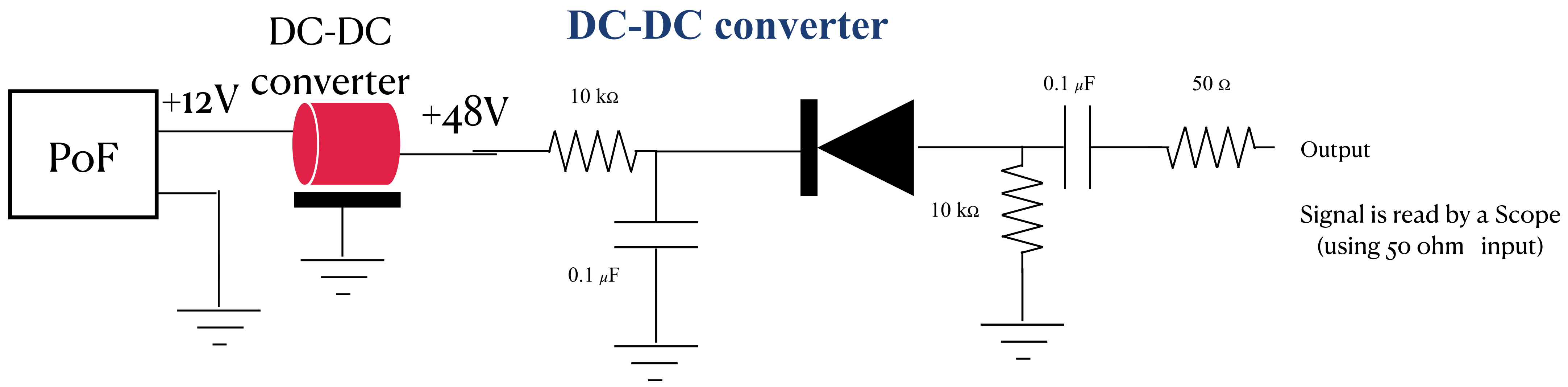
PoF Electrical Characteristics

- It works more or less as a current generator.
- The maximum power is given by selecting the right load resistor.
- In Liquid Argon the max Voltage =12V.
- Direct connected to SiPM is not stable since no current flows.

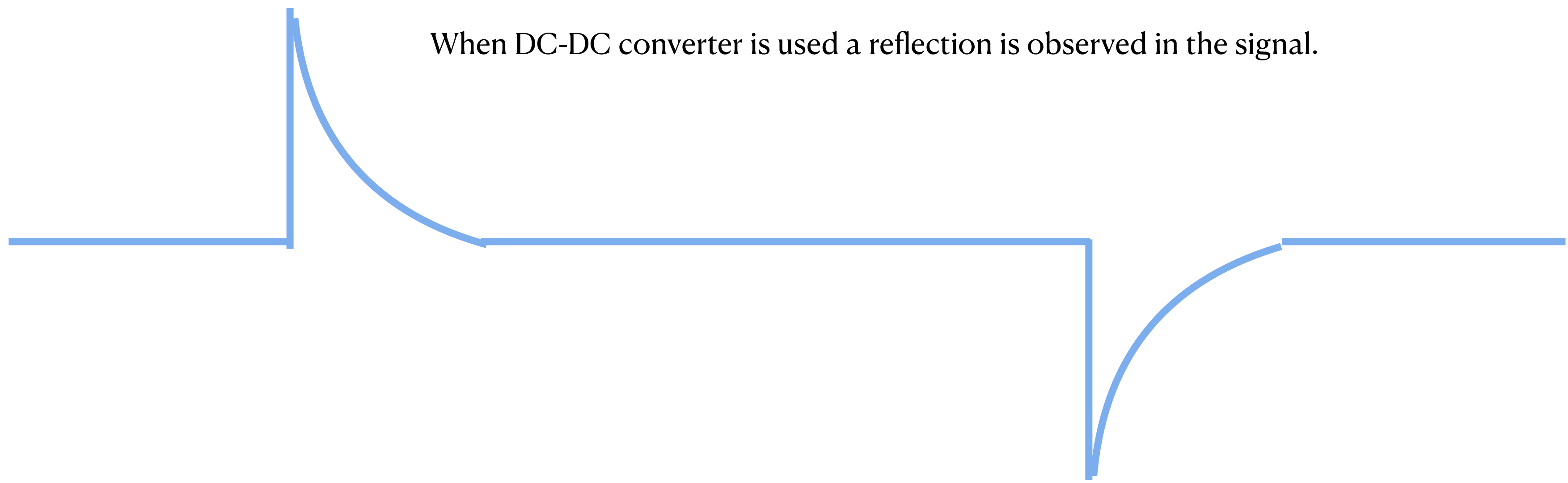
The idea to use a DC-DC converter can help in multiple ways:

- Stabilizing the voltage
- Current flux from PoF even with SiPM off.
- Increase the voltage form 12V to 48V.
- Since SiPMs use low current it should be not a problem (1 PoF can bias a lot of SiPM ~300mW per PoF unit).





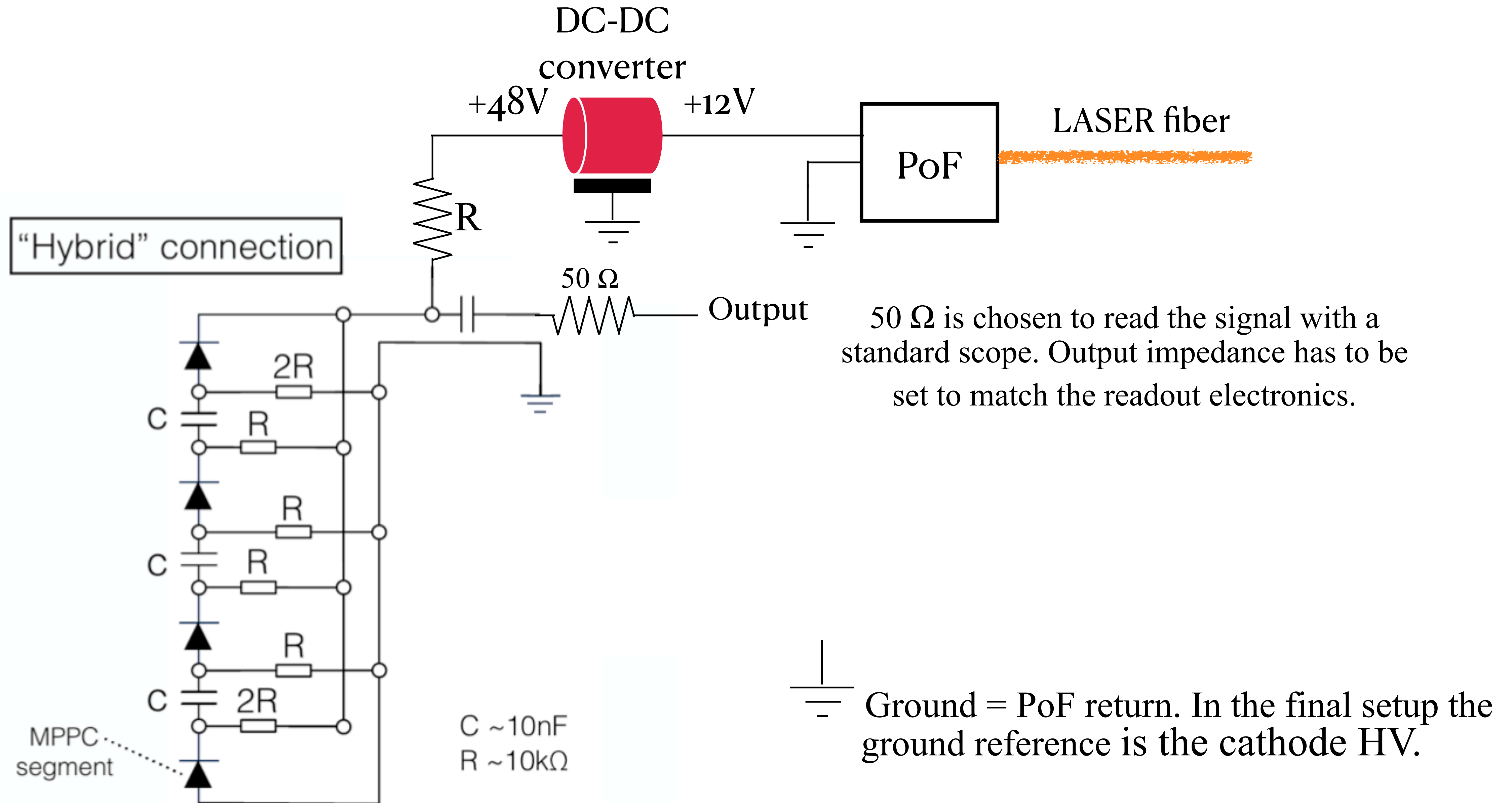
When DC-DC converter is used a reflection is observed in the signal.



SiPM Hybrid Ganging sample:

https://indico.fnal.gov/category/1299/attachments/140749/176985/HybridGanging-ieki_xesat2017-1.pdf

SiPM Hybrid Ganging plus PoF:



SiPM Hybrid Ganging plus PoF

- Hybrid Ganging has to be tested to check the noise (signal noise ratio, SPE, etc.).
- DC-DC converter can solve the PoF instability at zero current working point, but reflection has to be fixed.
- Output impedance has to be set.