

Development of a portable system for scintillation detection

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Assembly and test of a portable device that detects scintillation from samples of scintillators

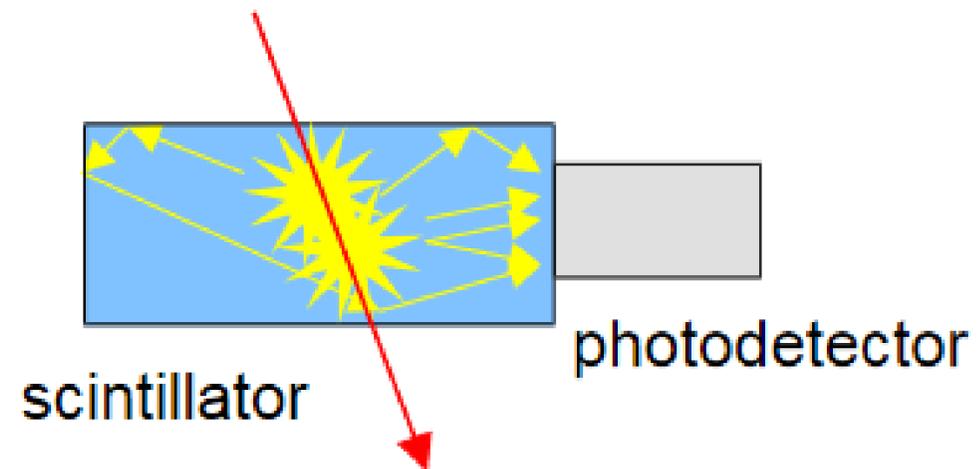


Figure 1 - Schematic of a scintillator detector

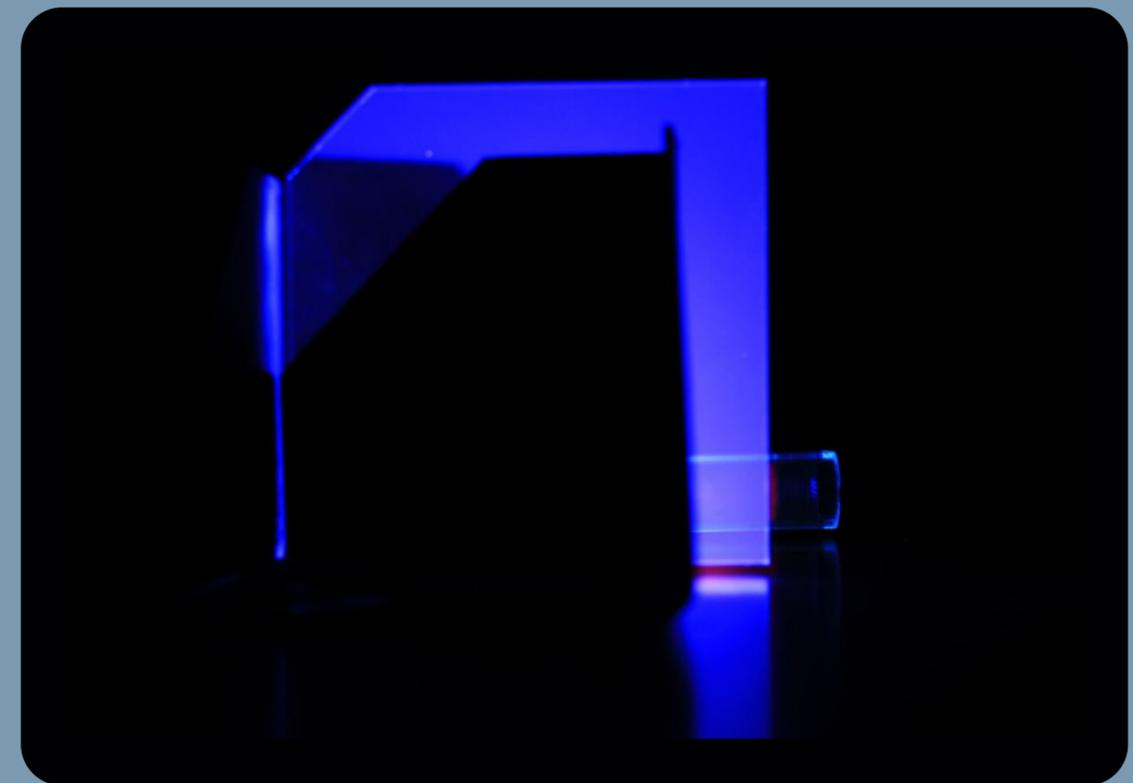


Figure 2 - Scintillating material

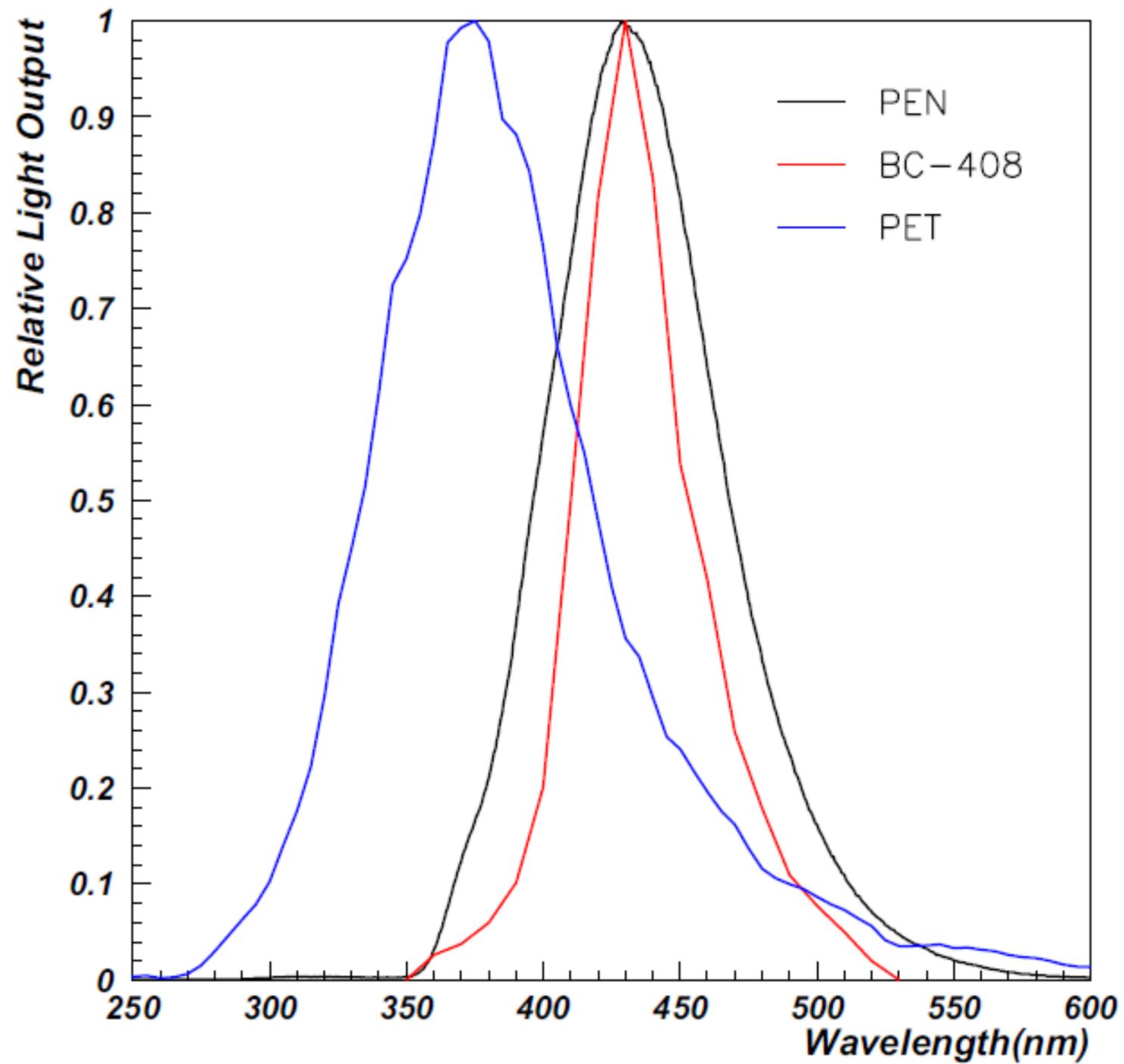
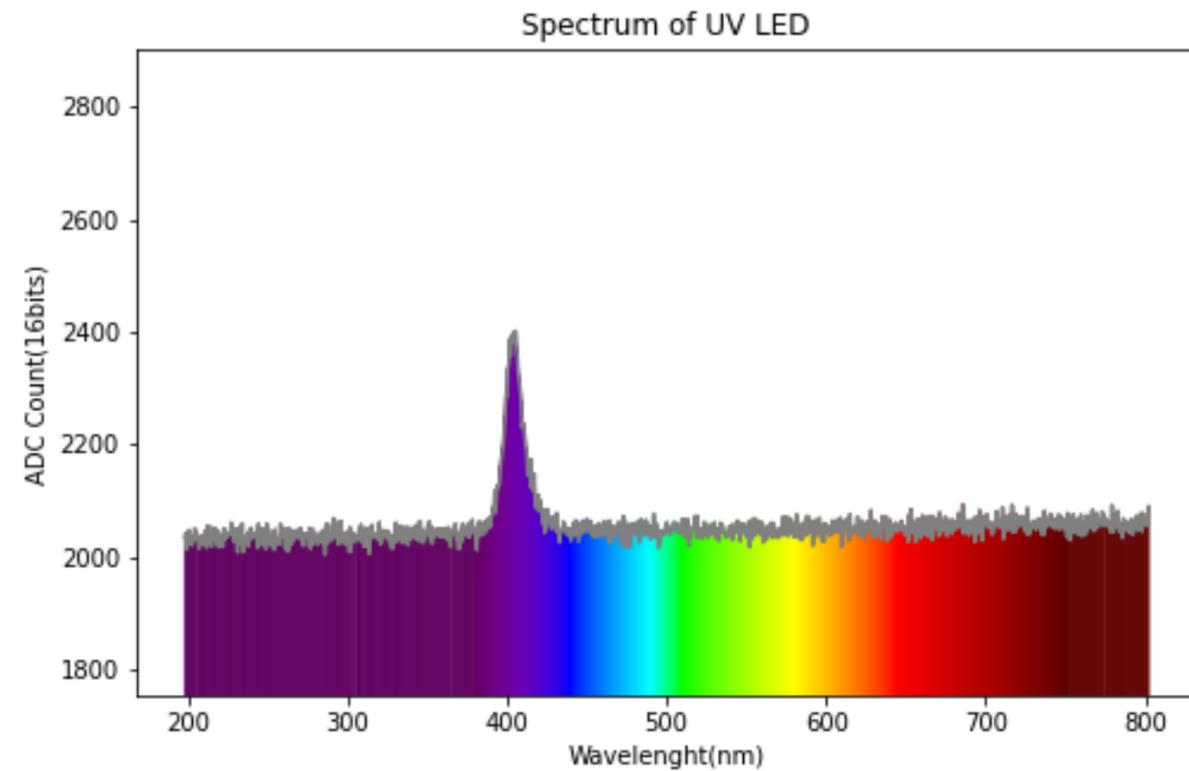
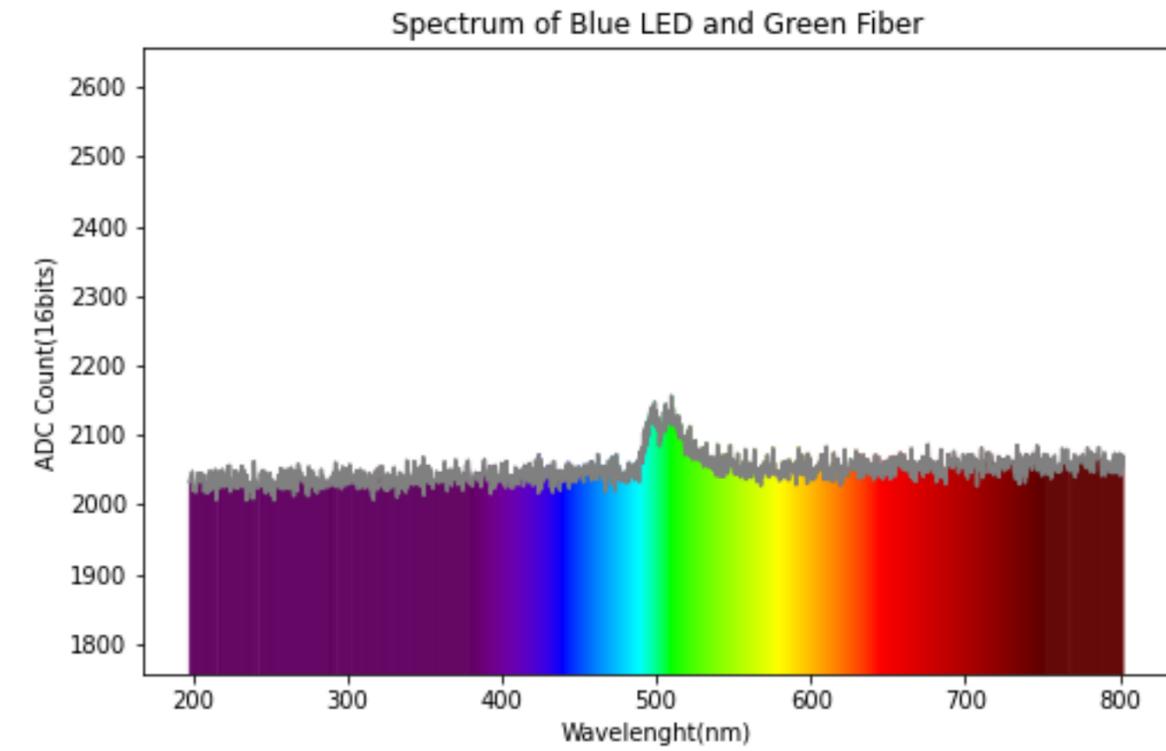
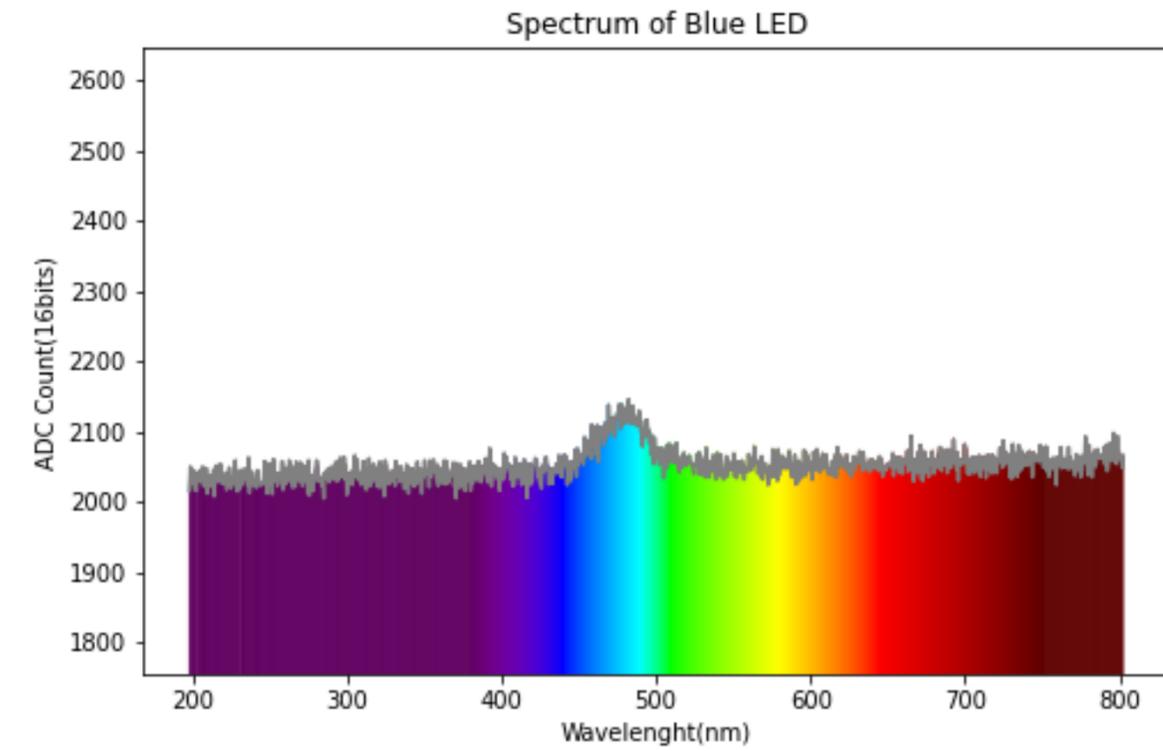


Figure 3 - Emission spectra of PEN (black line); commercial organic scintillator (BC-408, red line); PET (blue line) [1]

Materials	PEN	BC-408	PET
Light Output (photons/MeV)	~10500	~1000	~2200
Wavelength Max. Emission(nm)	425	425	380

Figure 4 - Properties of PEN, Commercial Organic Scintillator (BC-408), PET[1]

[1] H. Nakamura et al 2011 EPL95 22001



Analysis Software coded in Python to characterize the equipment

Figure 5 -Spectrum of Blue LED, Blue LED and Green Fiber and UV LED

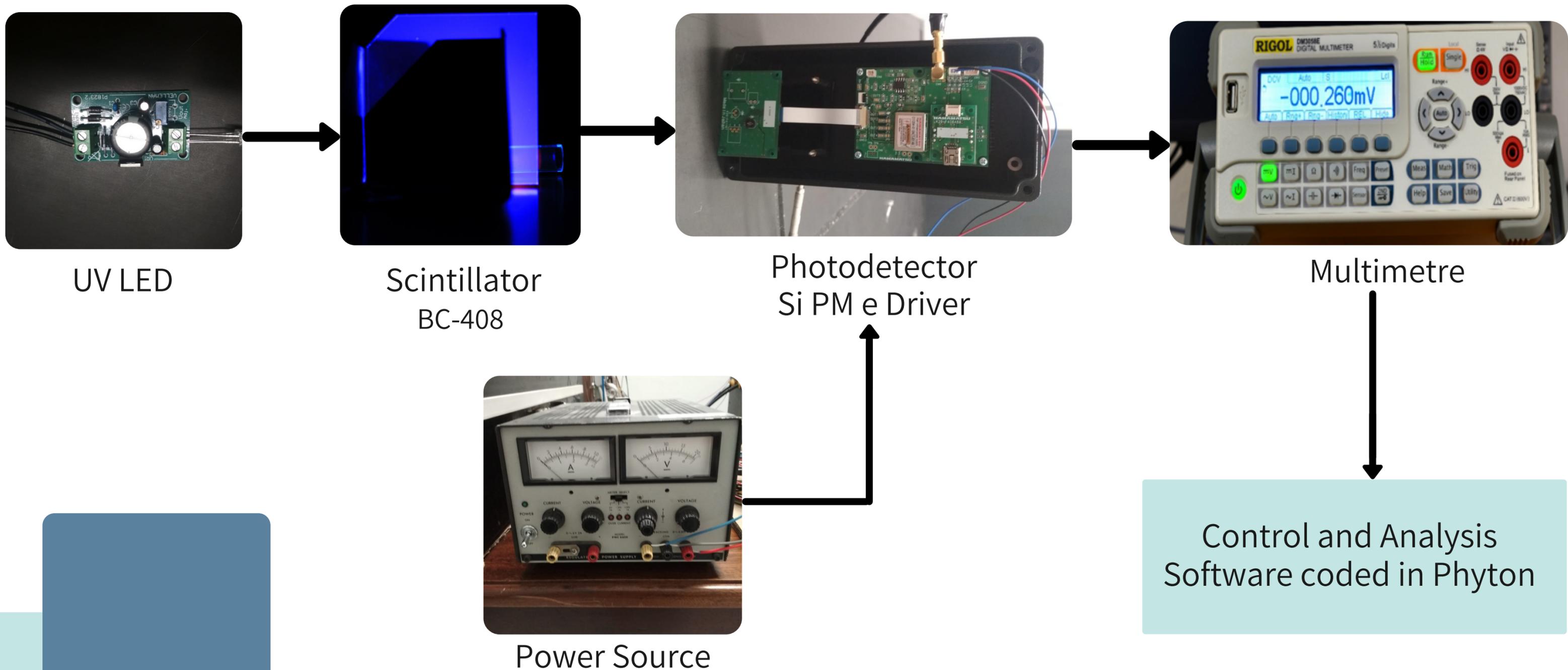


Figure 6 -Schematic of the assembly of the portable device that detects scintillation from samples of scintillators

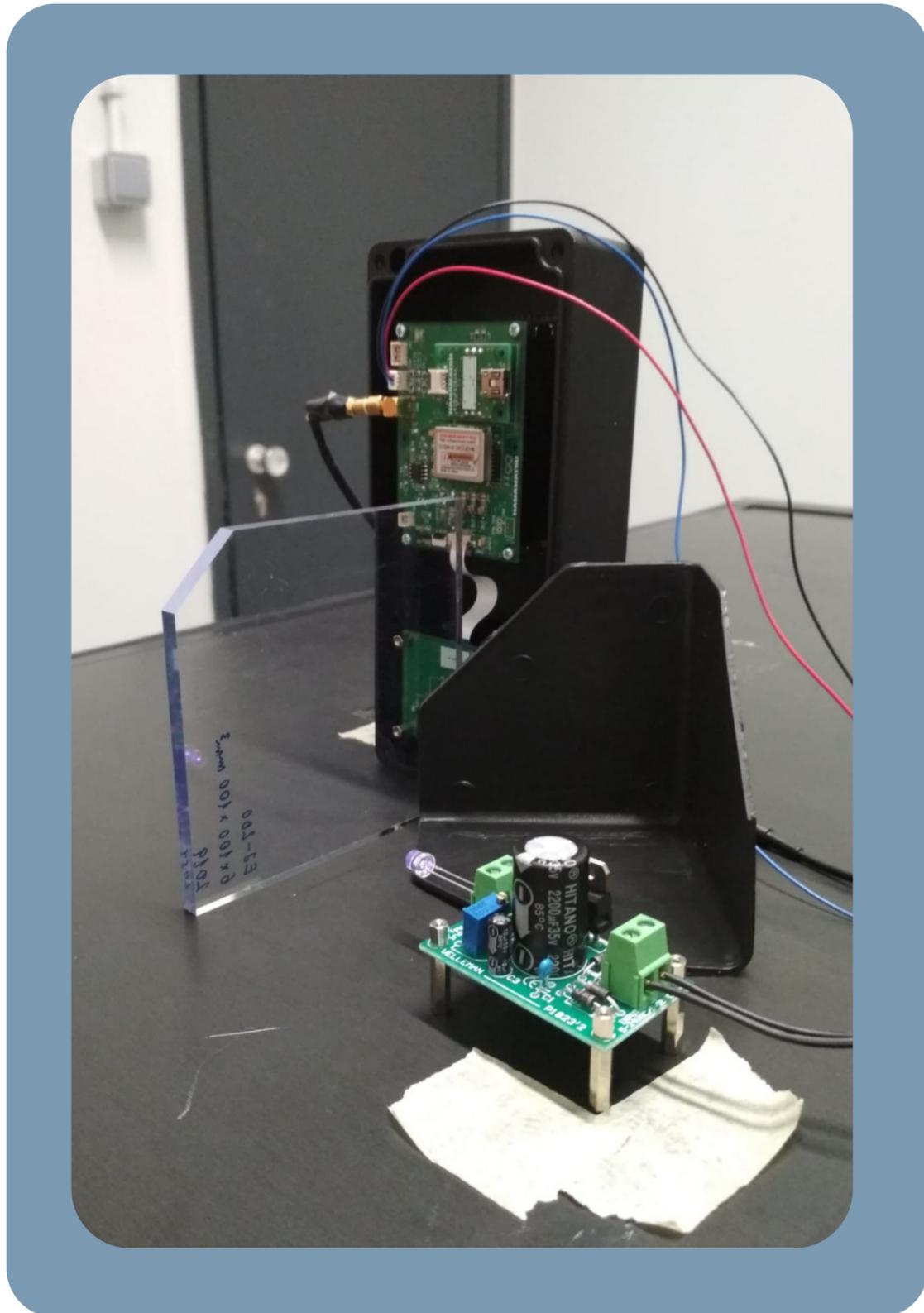


Figure 6 - Present Assembly

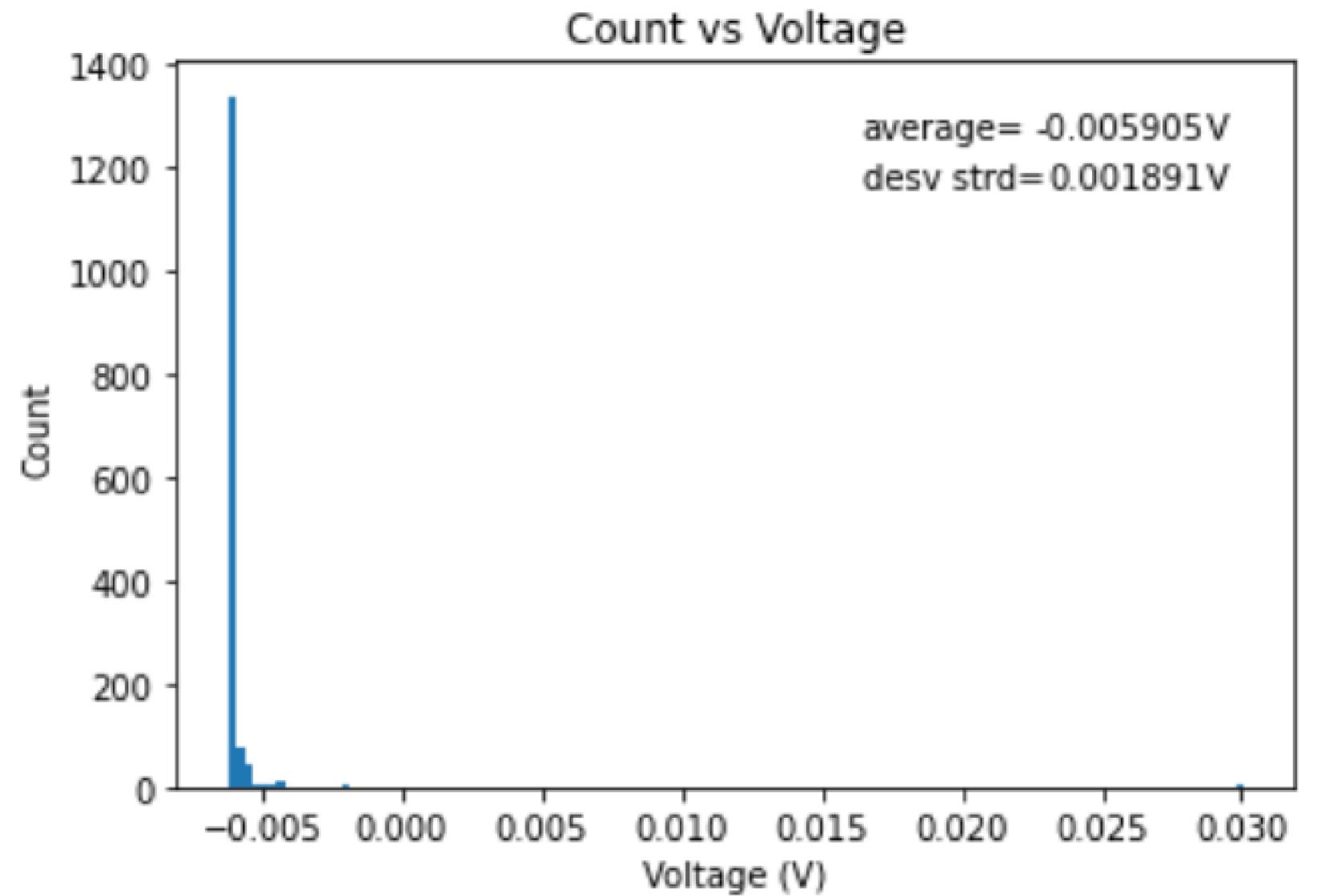


Figure 7 - Noise measurement of the present assembly

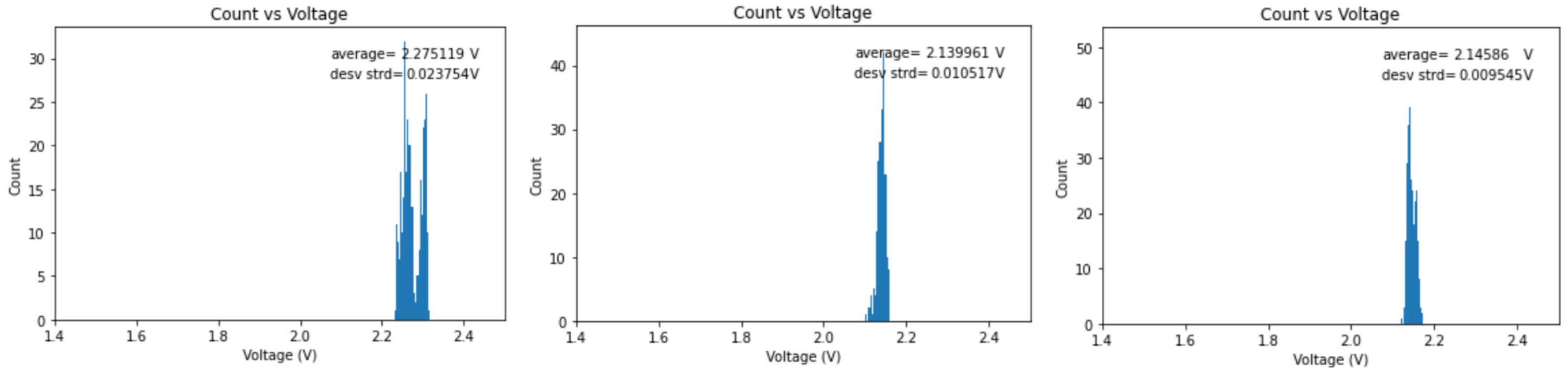


Figure 8 -Test of Setember 1st, at 12h03, at 13h09 and at 13h28, respectively.

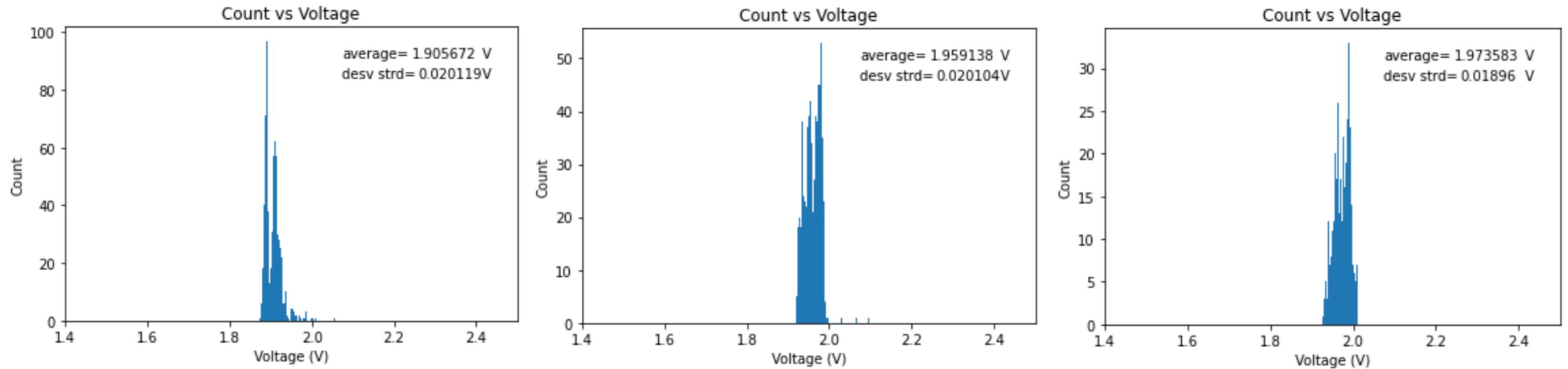


Figure 9 -Test of Setember 1st, at 12h56, at 13h47 and at 14h35, respectively.

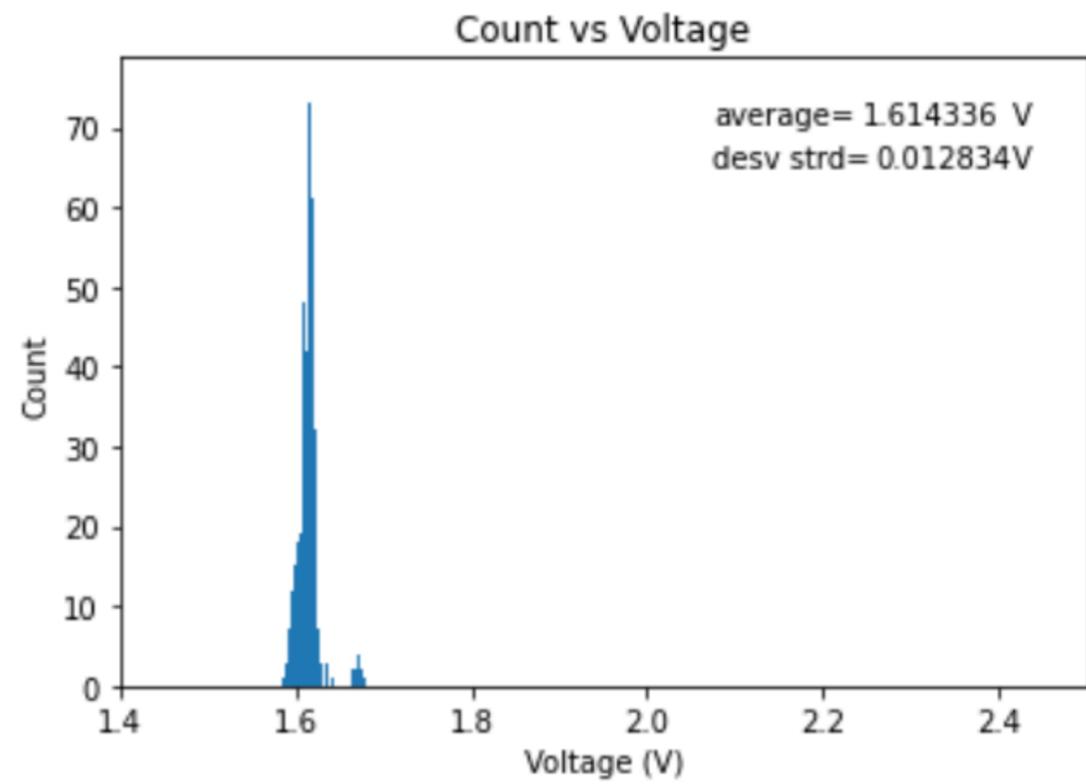


Figure 10 -Test of Setember 7th at 12h40 at 23.95°C

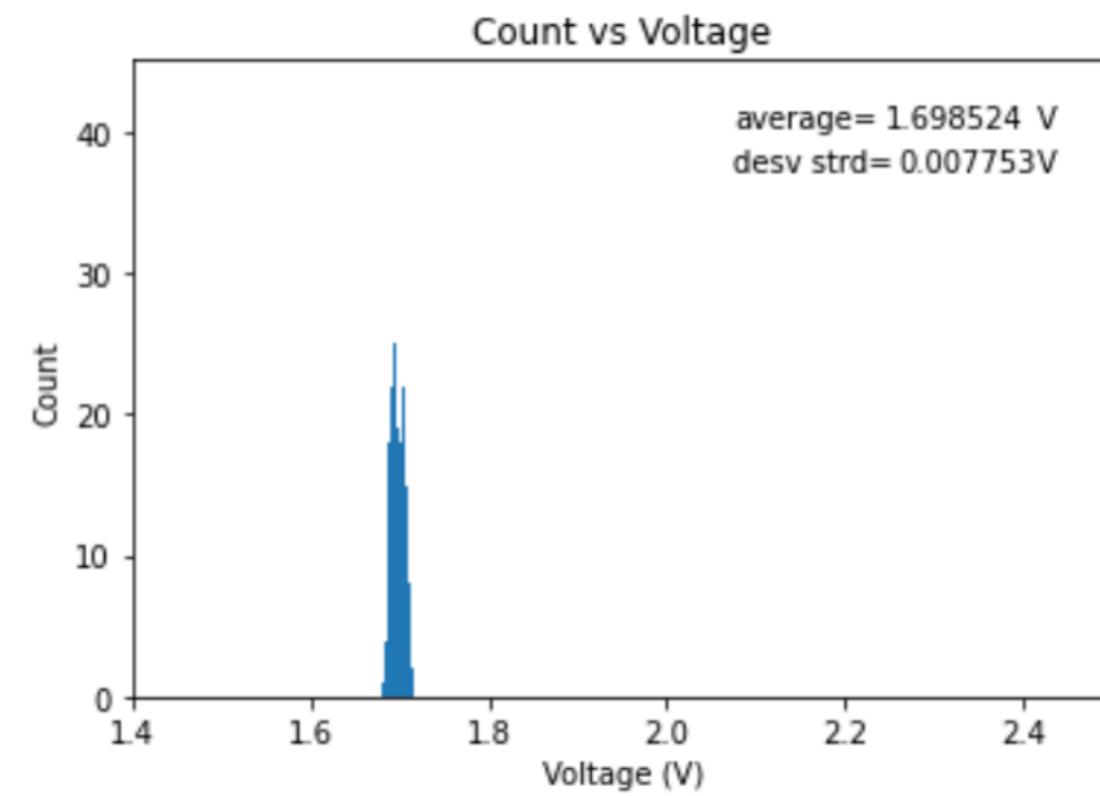


Figure 11 -Test of Setember 7th at 15h50 at 23.97°C

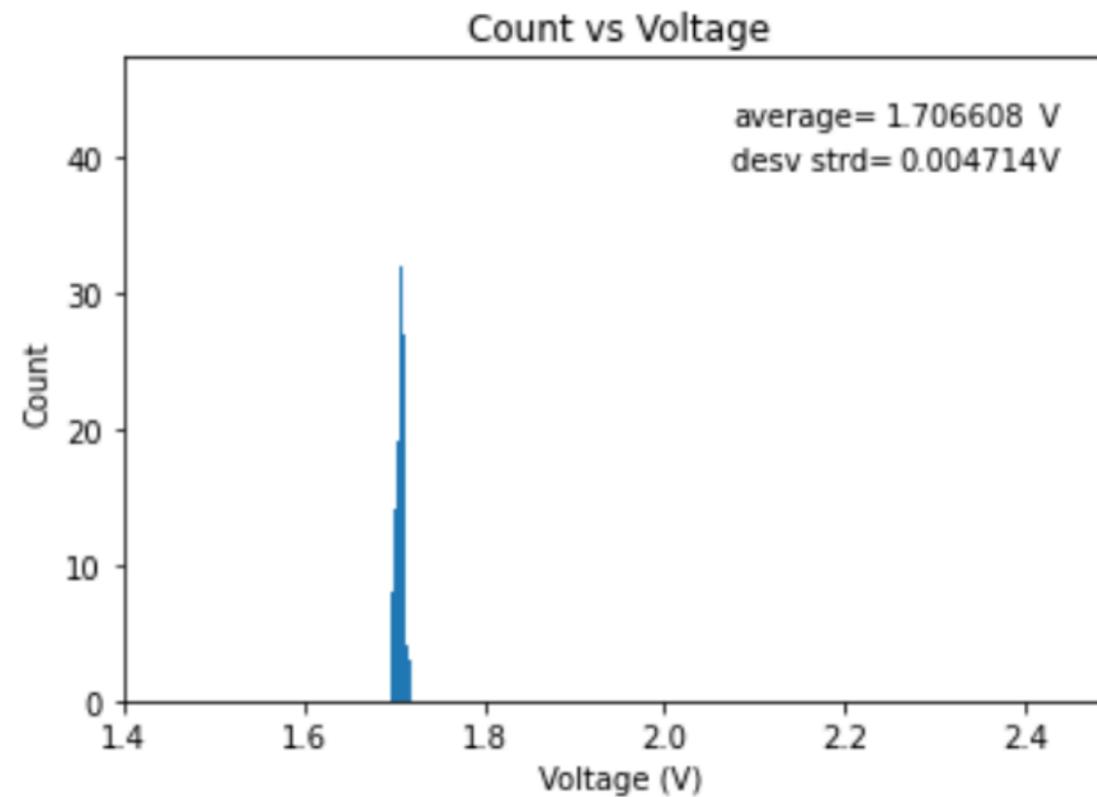


Figure 12 -Test of Setember 7th at 16h03 at 23.83°C

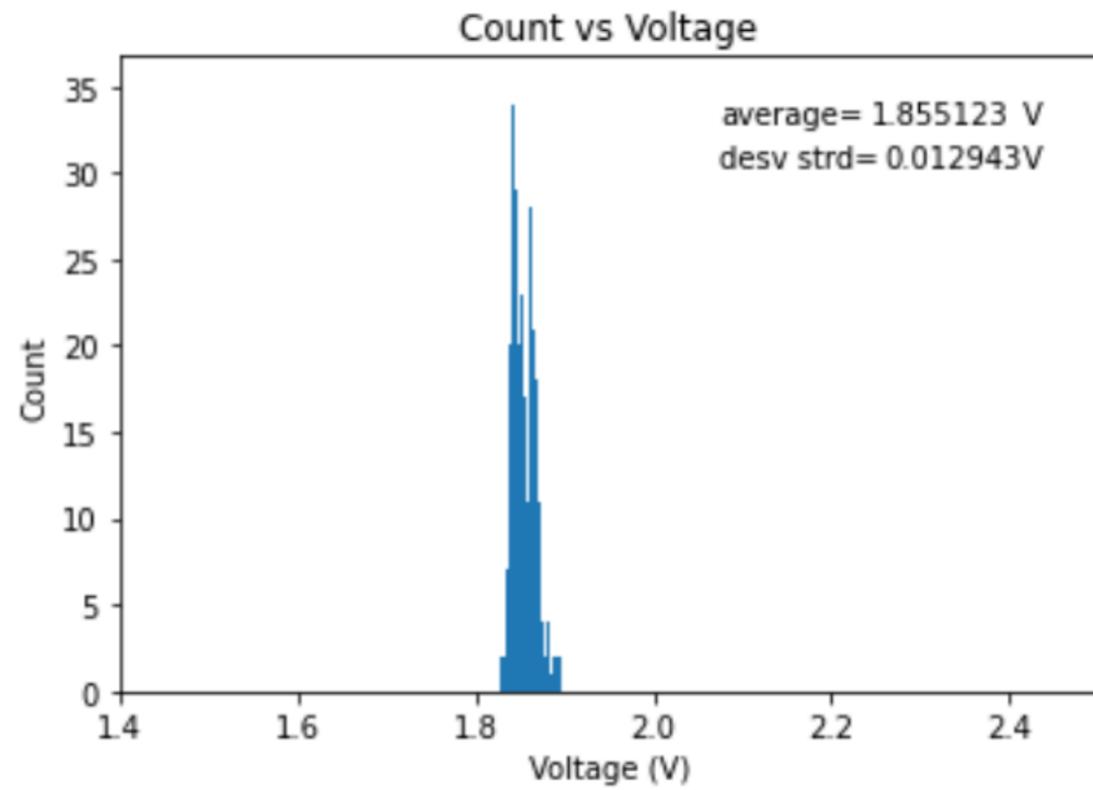


Figure 13 -Test of Setember 8th at 15h55 at 23.63°C

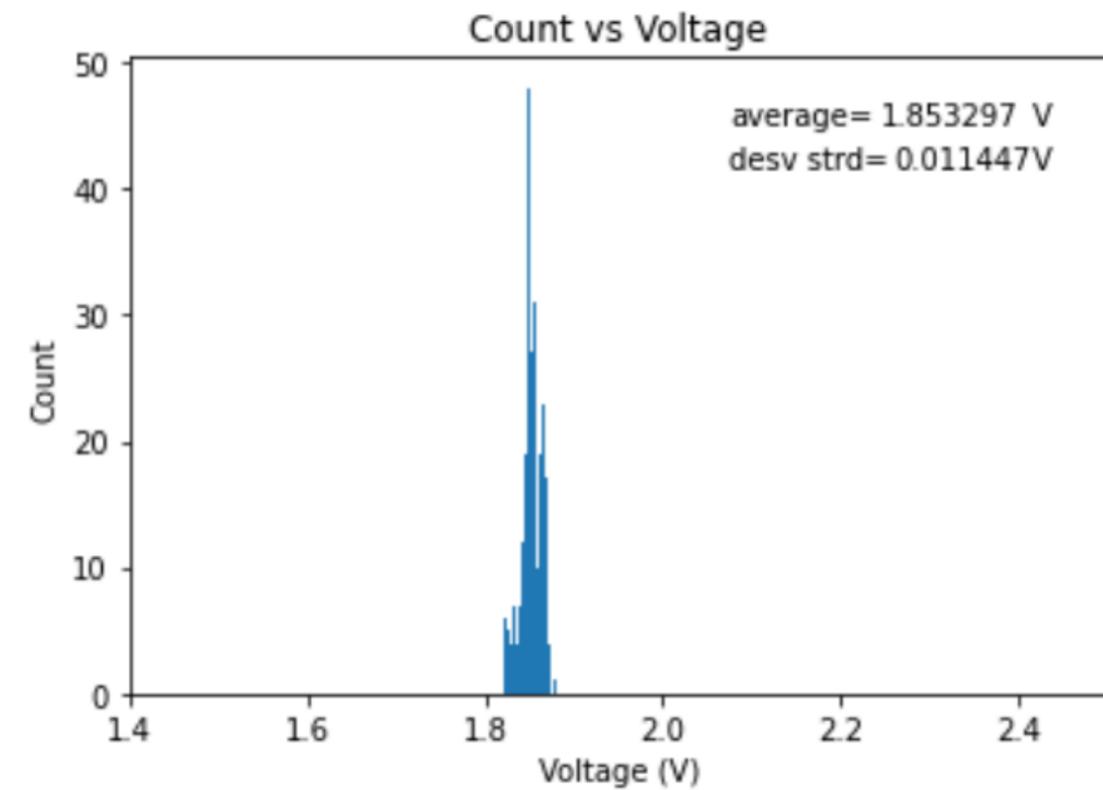


Figure 14 -Test of Setember 8th at 16h50 at 23.76°C

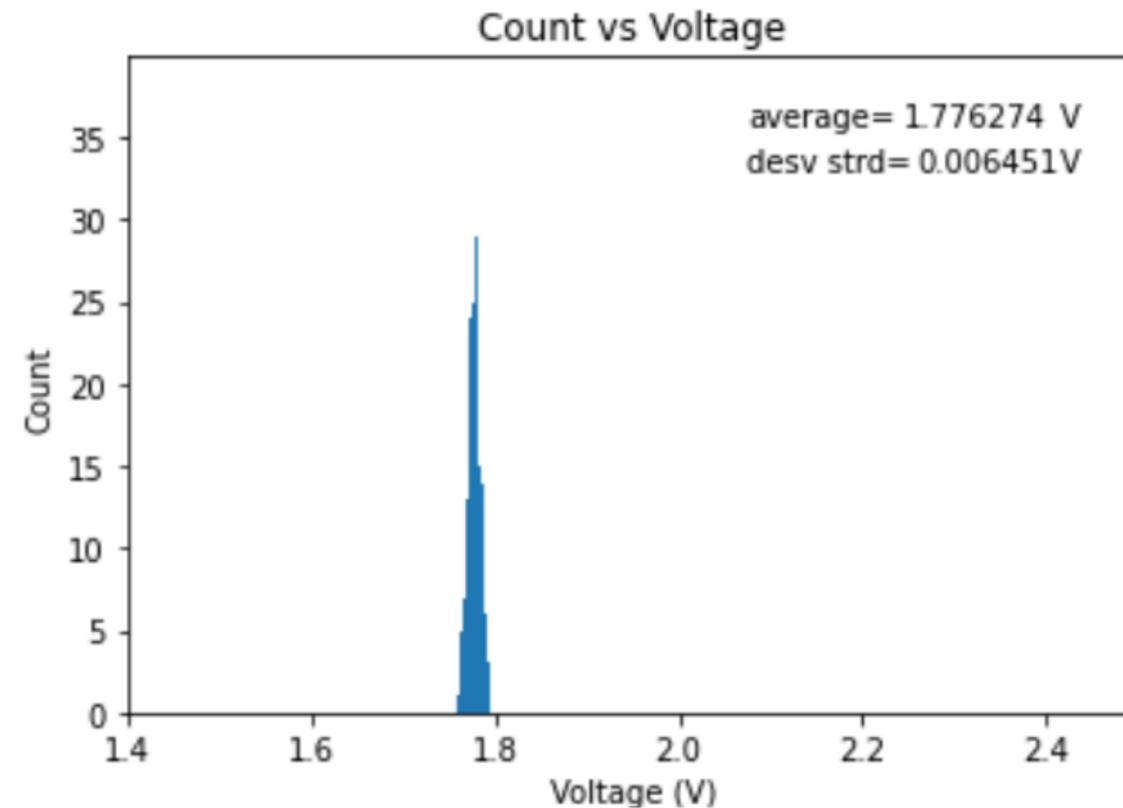


Figure 12 -Test of Setember 8th at 17h39 at 23.79°C

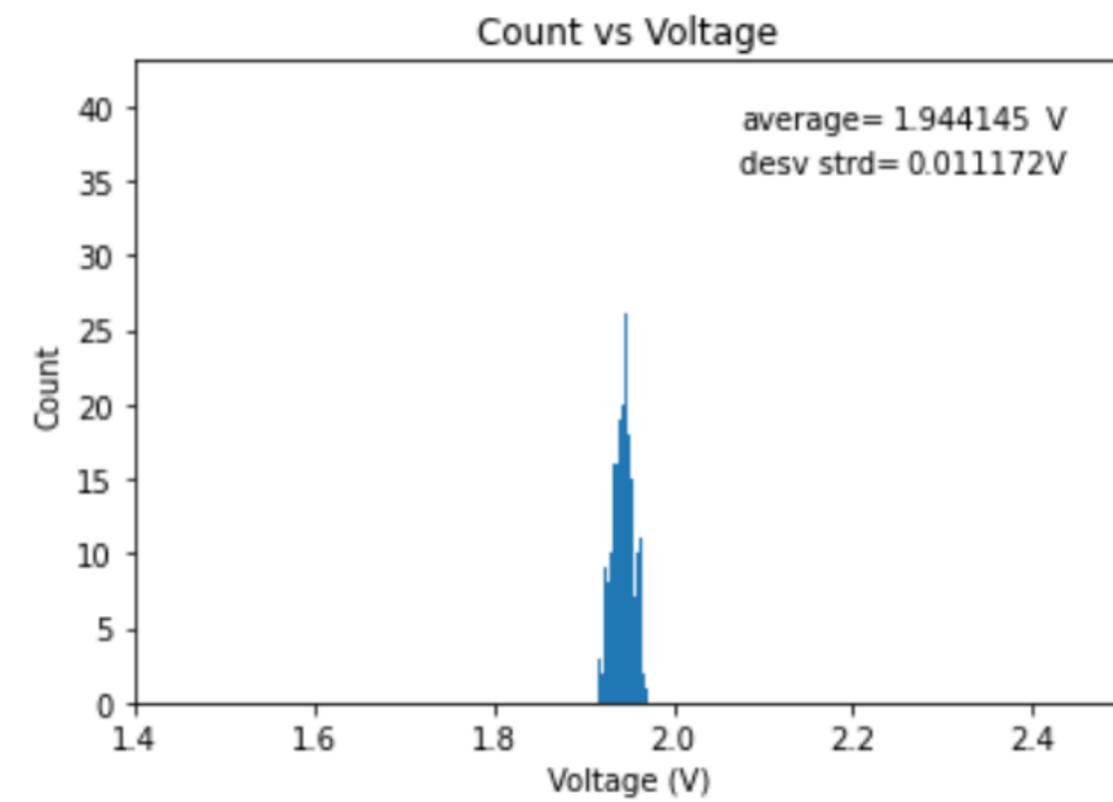
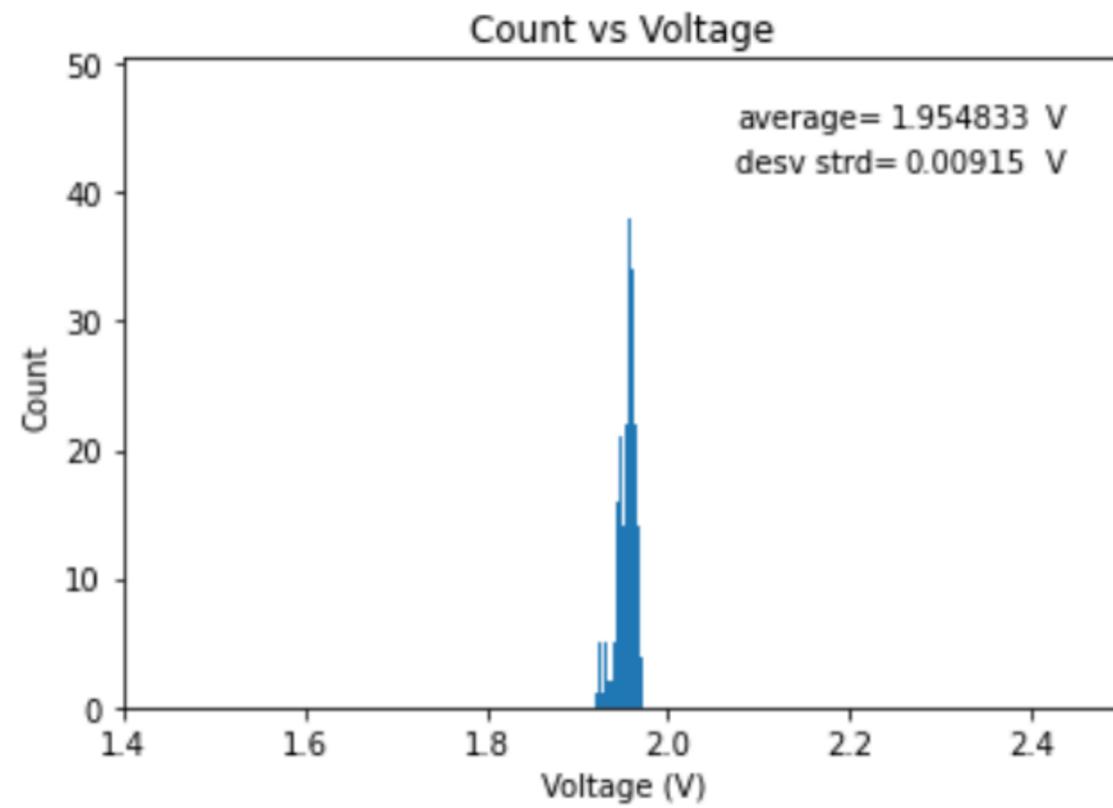


Figure 13 -Test of Setember 9th at 13h25 at 23.35°C

Figure 14 -Test of Setember 9th at 14h20 at 23.48°C

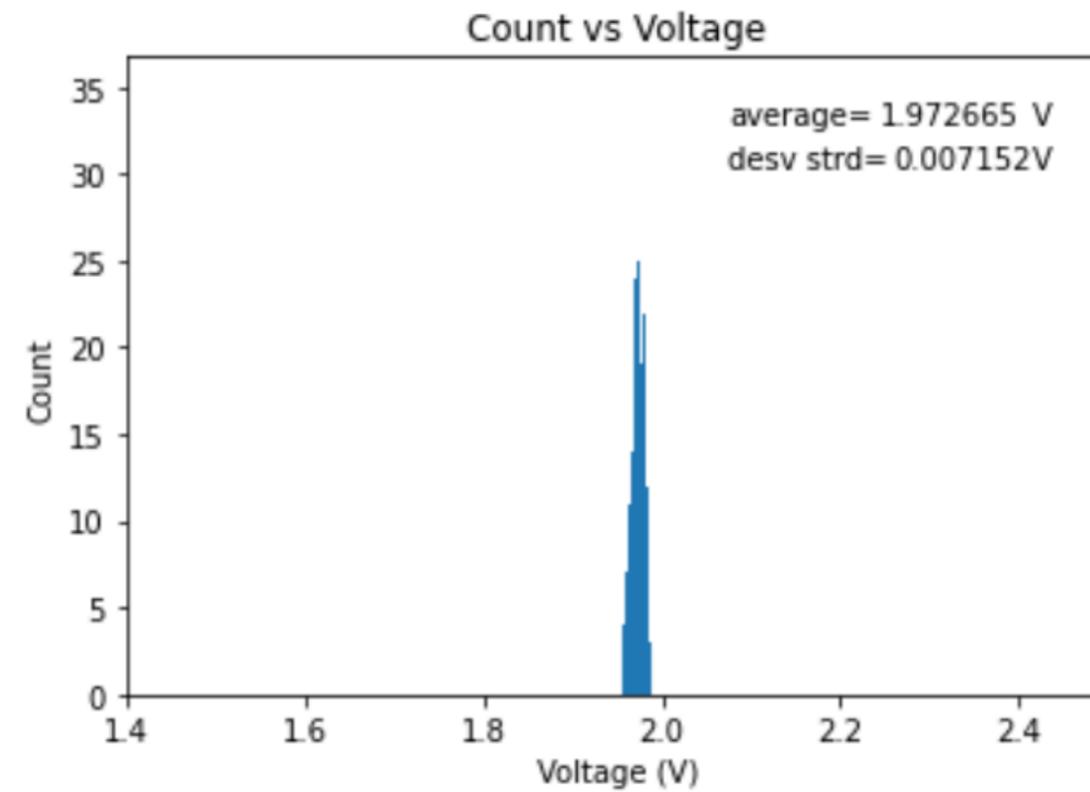


Figure 15-Test of Setember 9th at 15h20 at 23.56°C

In Conclusion

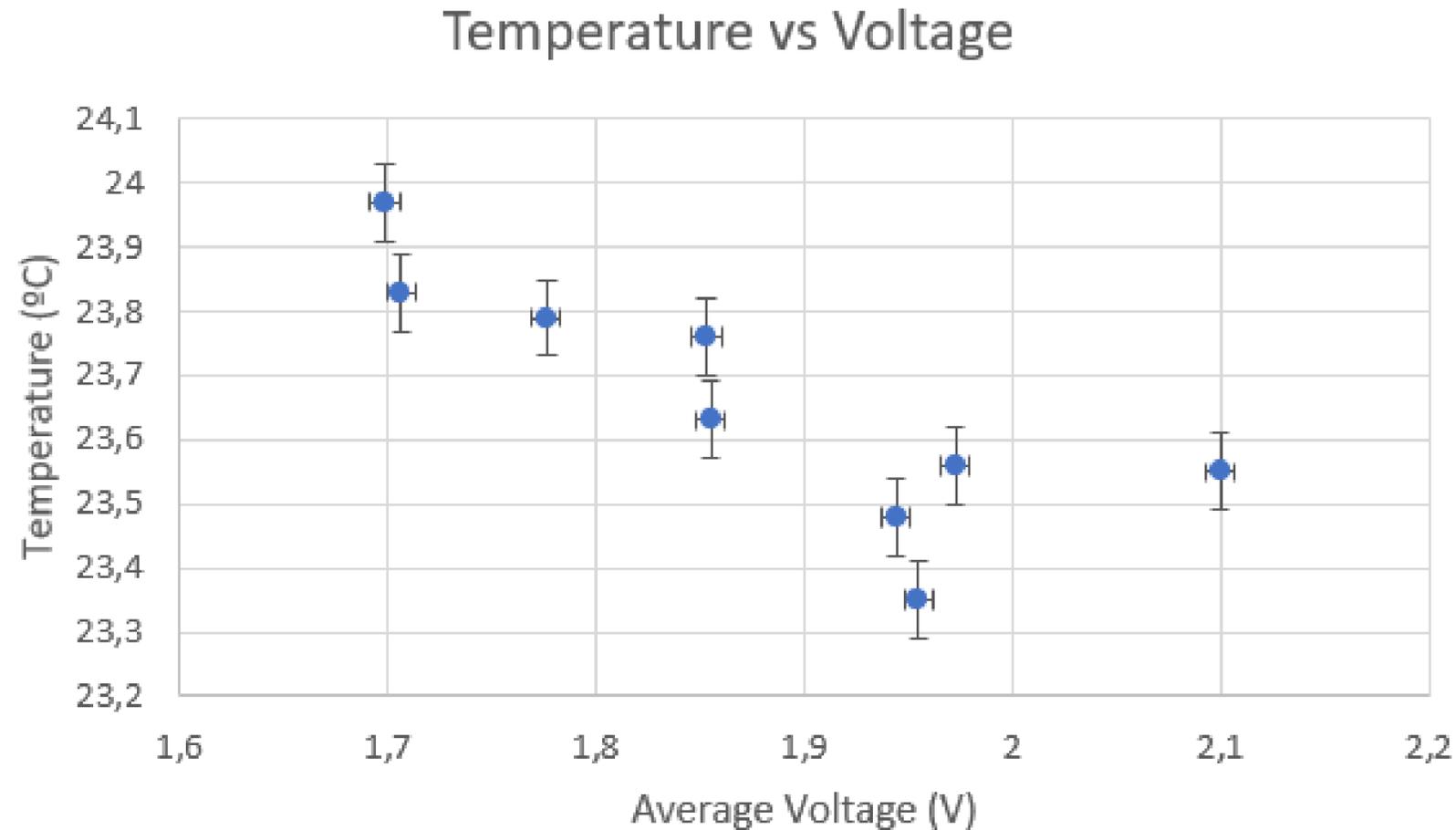


Figure 16-Dependency between temperature and average voltage

It was possible to test a spectrometer in order to measure the wavelength emission. To assemble and test a system that allows the detection of scintillation.

Futhermore, it is suggested the inclusion of a calibration module with a reference scintillator sample, in order to dismiss the dependency of the temperature .