

Testing Fermilab PoF system in LAr VI (Nov 25,2020)

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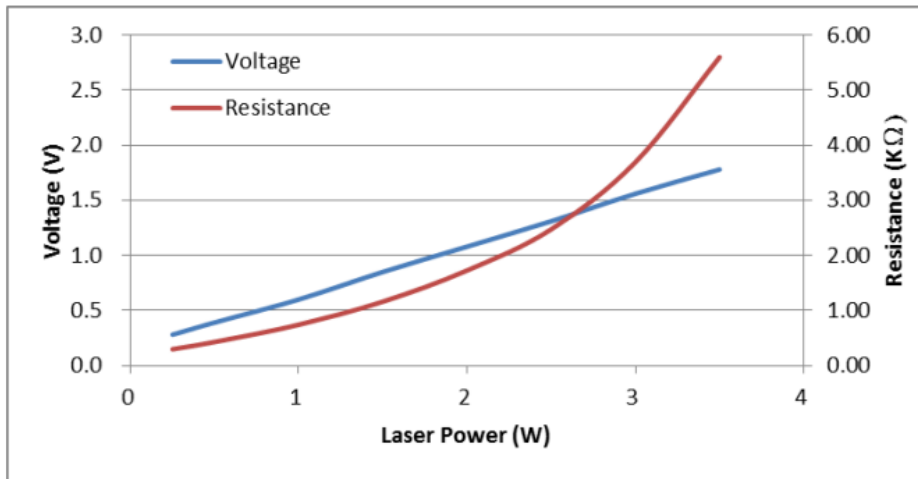
Specifications of the Laser Power Module

Device Type: 3W PPM
 Part Number: PPM-003C50-3
 Serial Number: 094398
 Date: 2020.09.30

Laser Power Settings *

Laser Power (W)	0.25	0.50	1.00	1.50	2.00	2.50	3.00	3.50
Setting Voltage (V)	0.28	0.39	0.60	0.85	1.08	1.31	1.56	1.78
Resistance (K Ω)	0.30	0.43	0.74	1.16	1.73	2.47	3.69	5.60

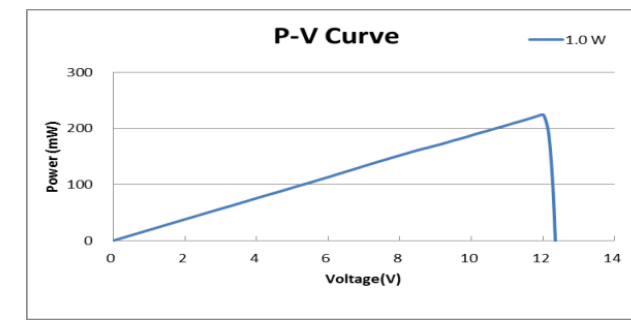
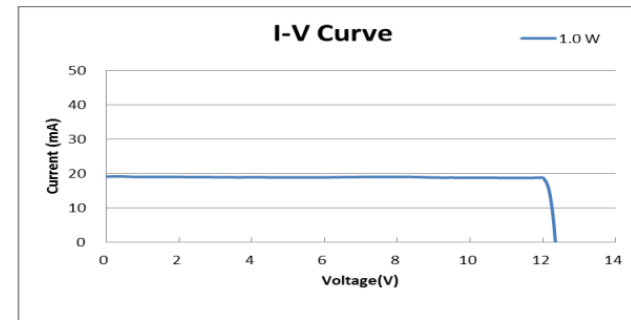
* Voltage setting between Pin 1(LIS) and Pin 4(GND) to adjust laser power
 * Tested with 3 meter 62.5um fiber at 25 °C ambient



Specifications of Power converter in LN2

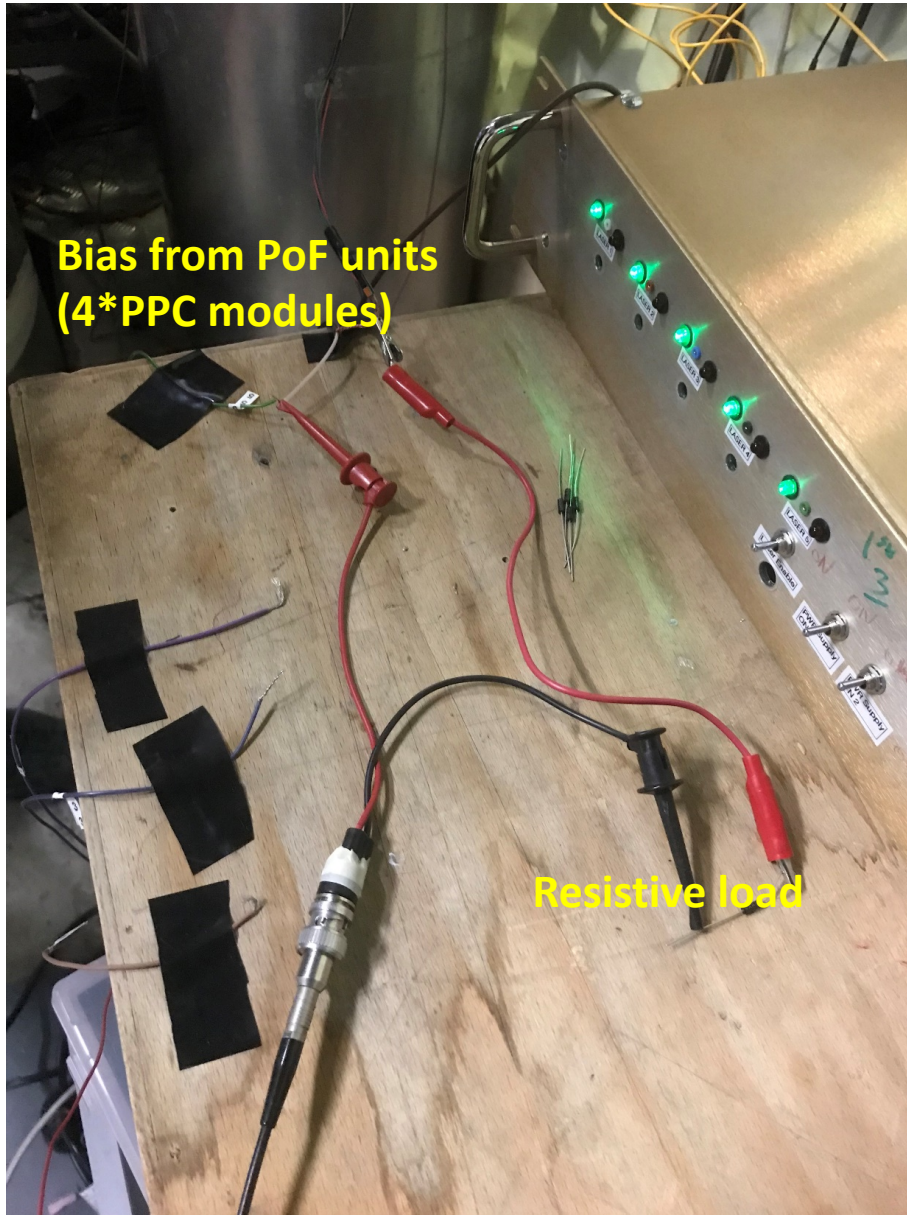
Electrical Characteristics *

Optical Power (mW)	1000
Pmax(mW)	223.3
Vmax(V)	12.0
I _{max} (mA)	18.6
Efficiency (%)	22.3%



- We get 48 Volts by use of four PPC in series
- We expect to have 4*19 mA maximum current
- It is important to understand maximum power we could get from the PoF system

- For the following measurement we have used 360 ohm resistors



Used resistive loads:

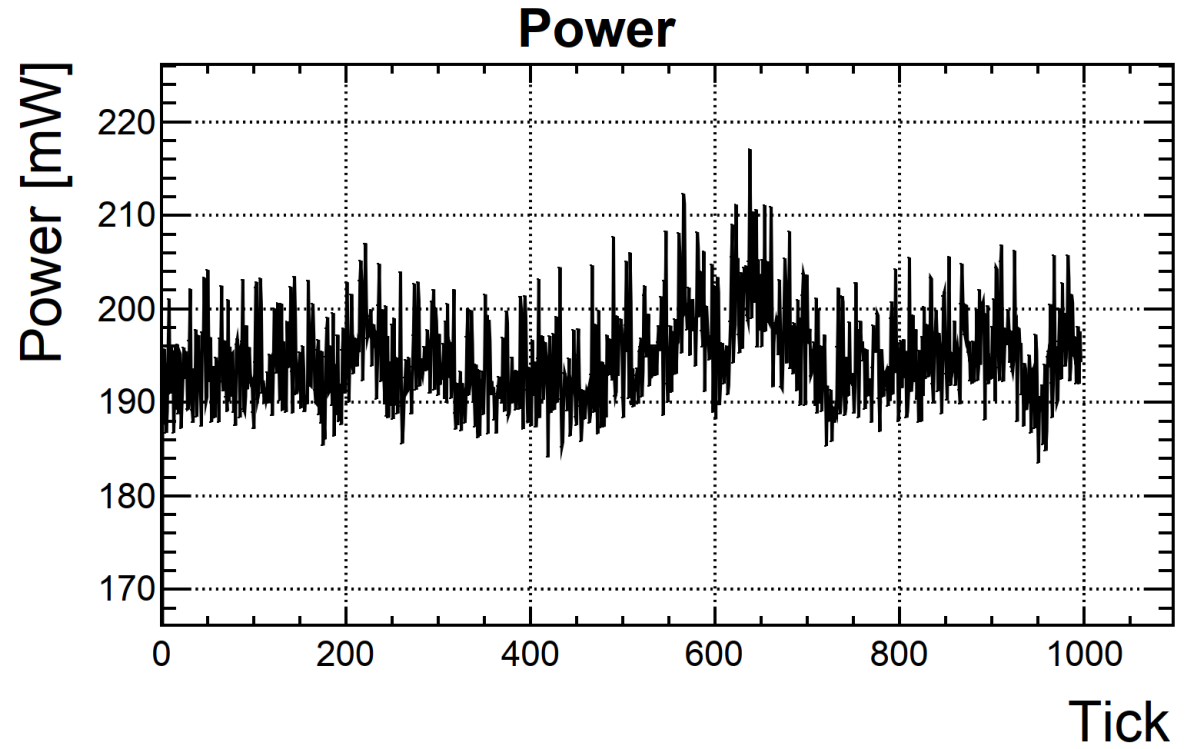
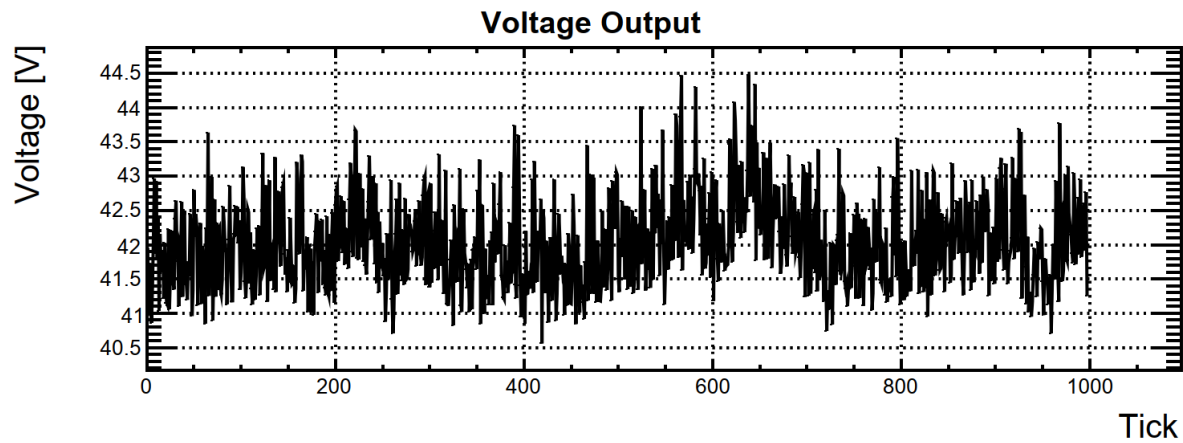
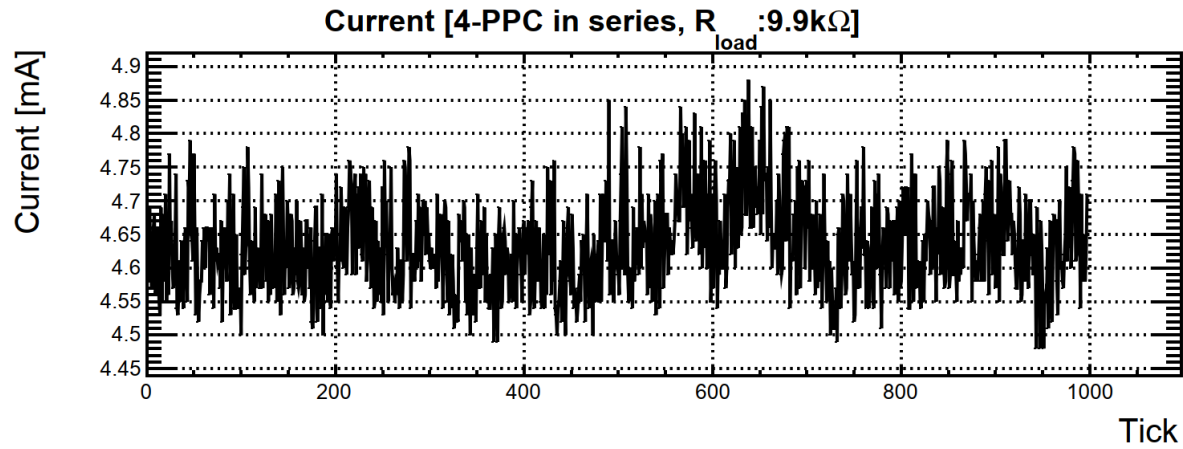
2, 9.9, 12, 18.5, 24.9, 28.8, 57.4, 86.2 k Ω

- Current and Voltage read out with Agilent and Keithley modules
- Data acquired with LabView.
- We check the stability of the output voltage @48Volts
 - Keep in mind, in previous measurements we show that performing the test with PCB board the fluctuations on the output voltage reduced from 200mV to O(10mV) level.

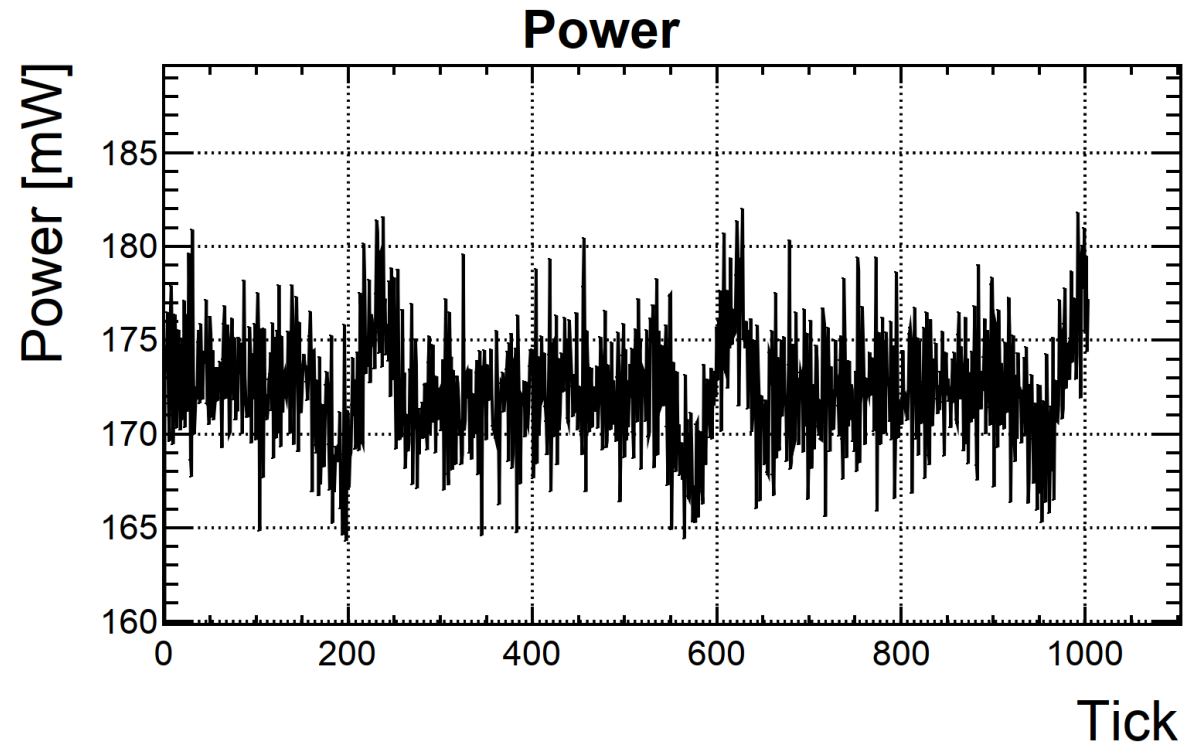
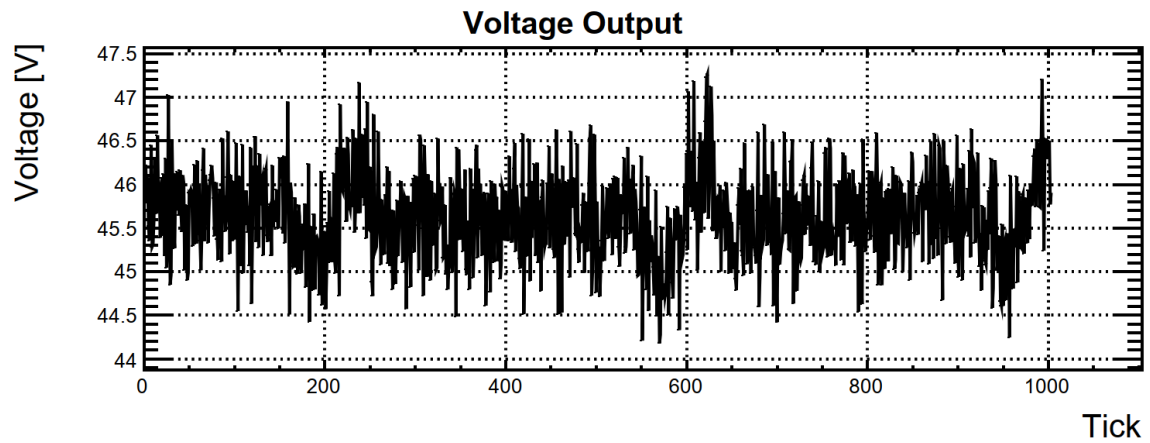
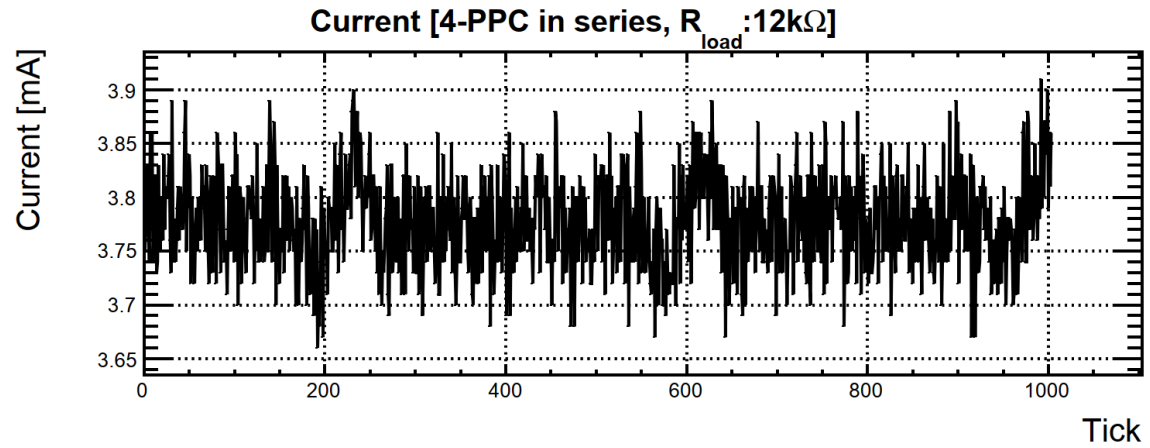
Results:

Load	Voltage [Volts]	Current [mA]	Power [mW]	comment
2 k Ω	11.6	5.5	64	Do not get correct voltage
9.9 k Ω	12	4.6	55	Do not get correct voltage
12 k Ω	46	3.80	175	Do not get correct voltage
18.5 k Ω	48.0	2.56	125	Not stable
24.9 k Ω	48.4	1.93	93	
28.8 kΩ	48.5	1.69	82	
57.4 k Ω	48.6	0.842	41	
86.2 k Ω	48.6	0.563	27	

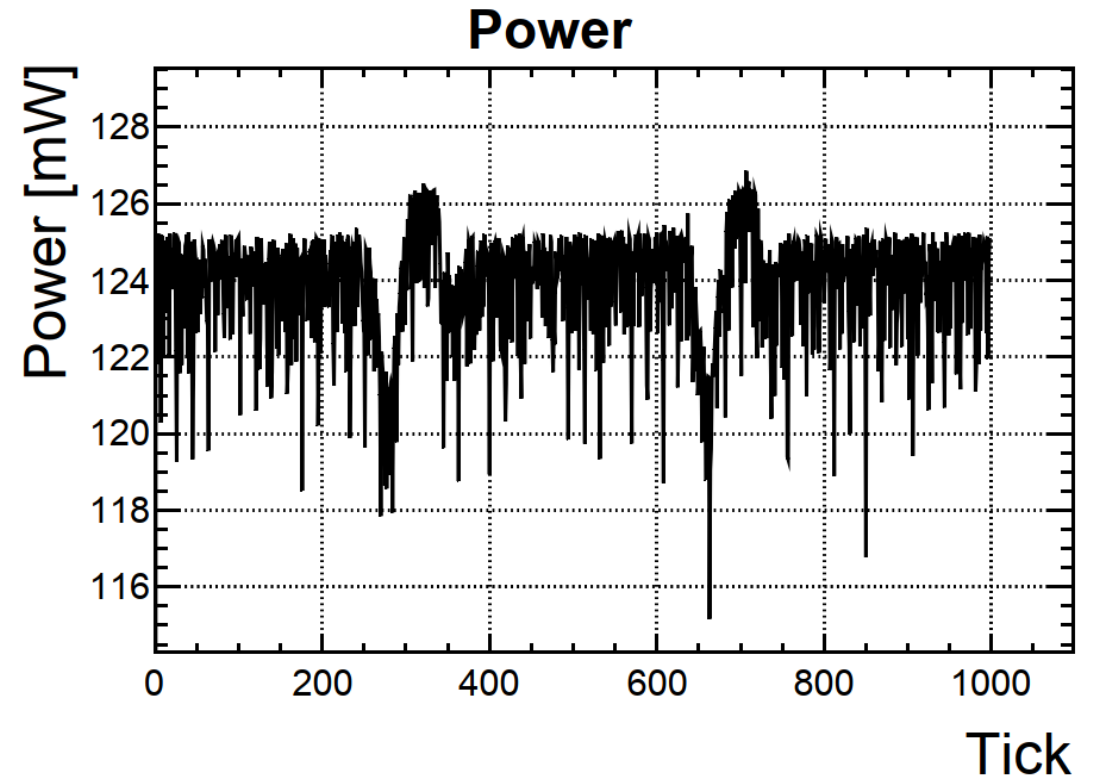
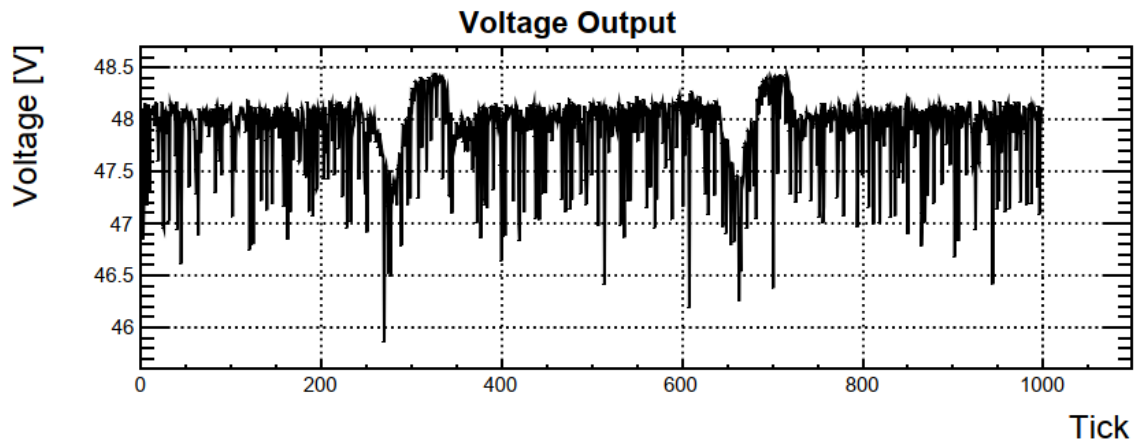
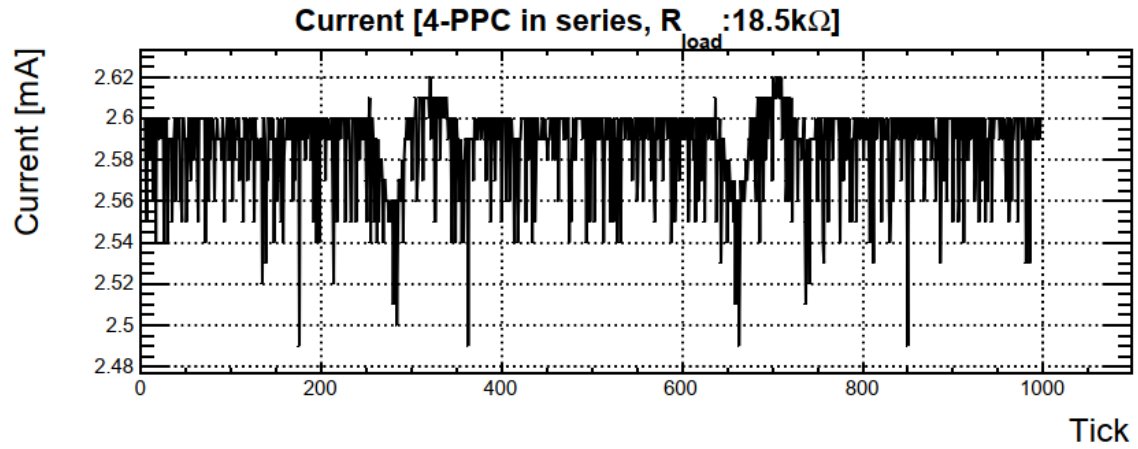
$$R_{Load} = 9.9k\Omega$$



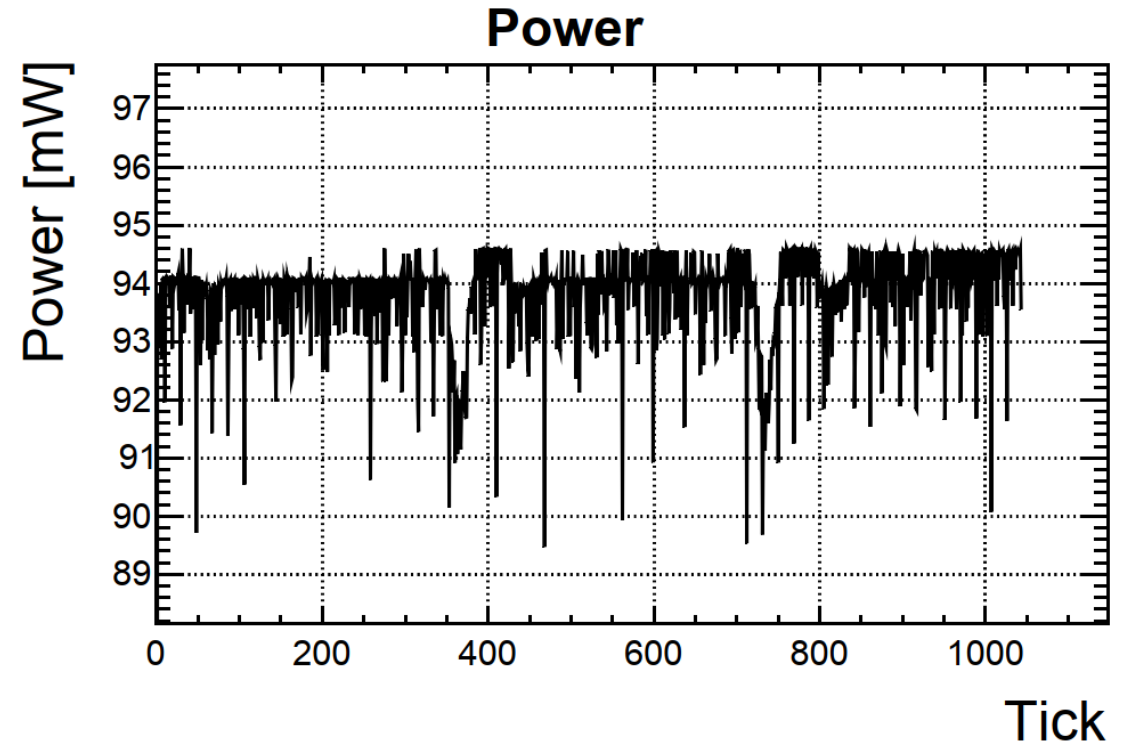
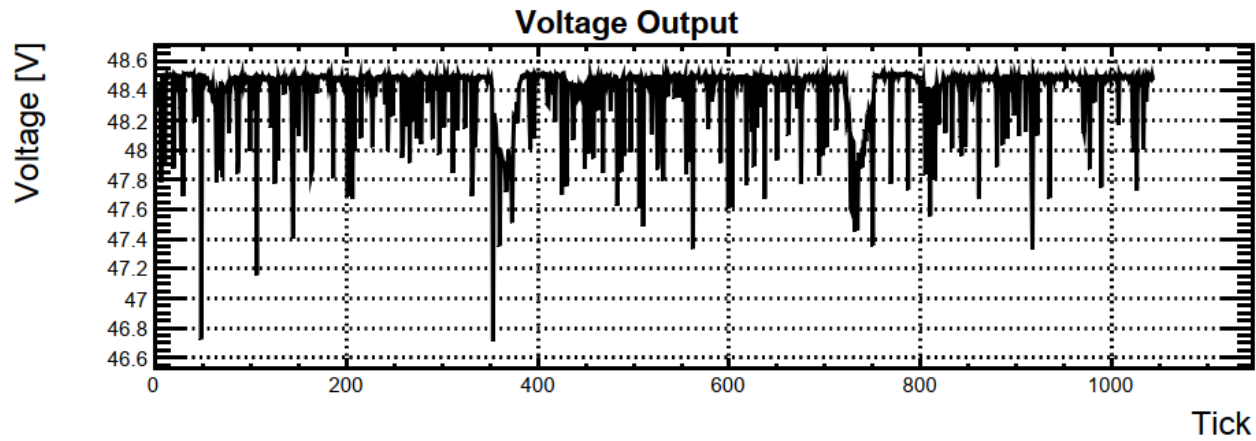
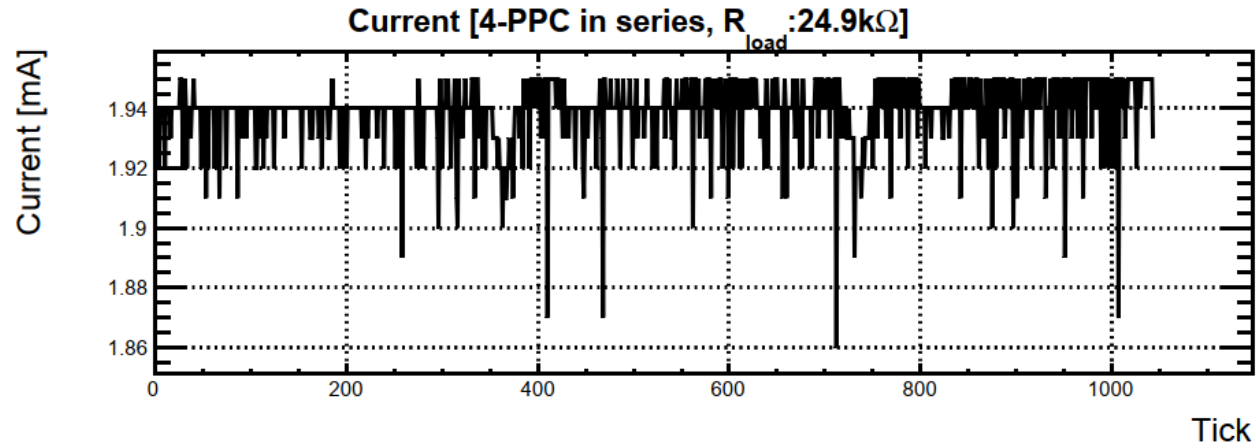
$$R_{Load} = 12k\Omega$$



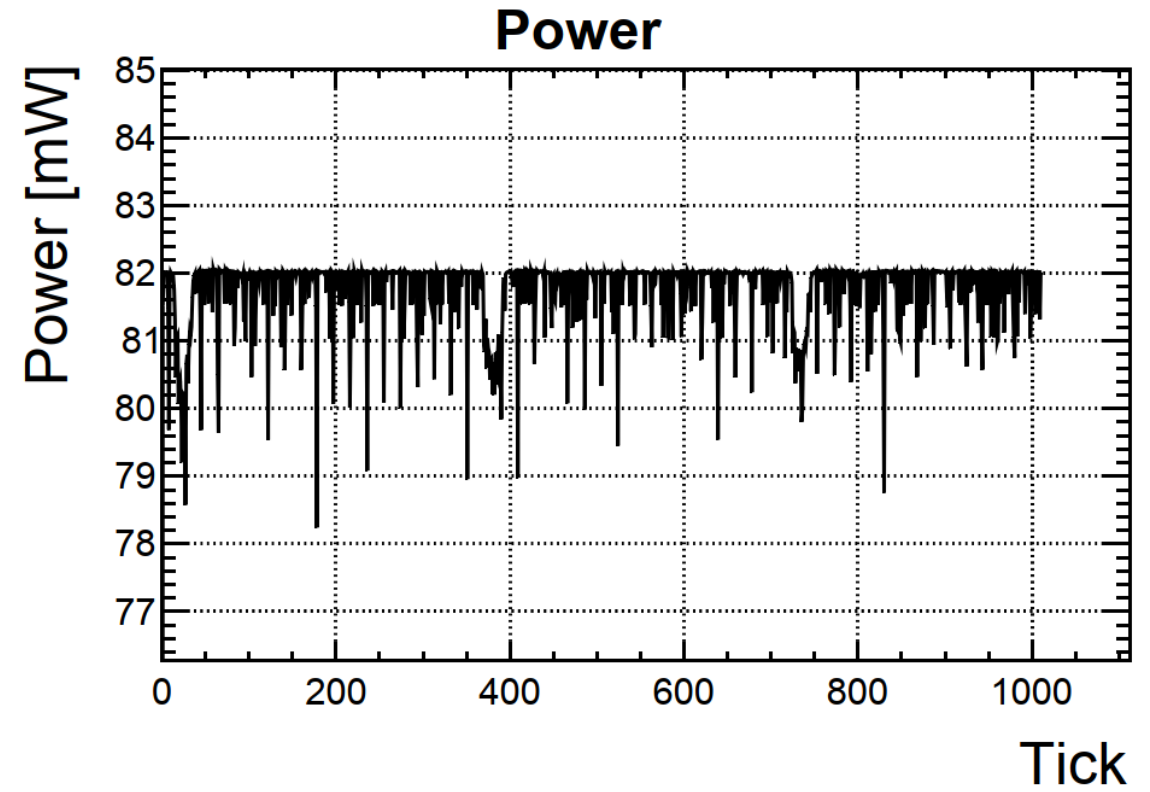
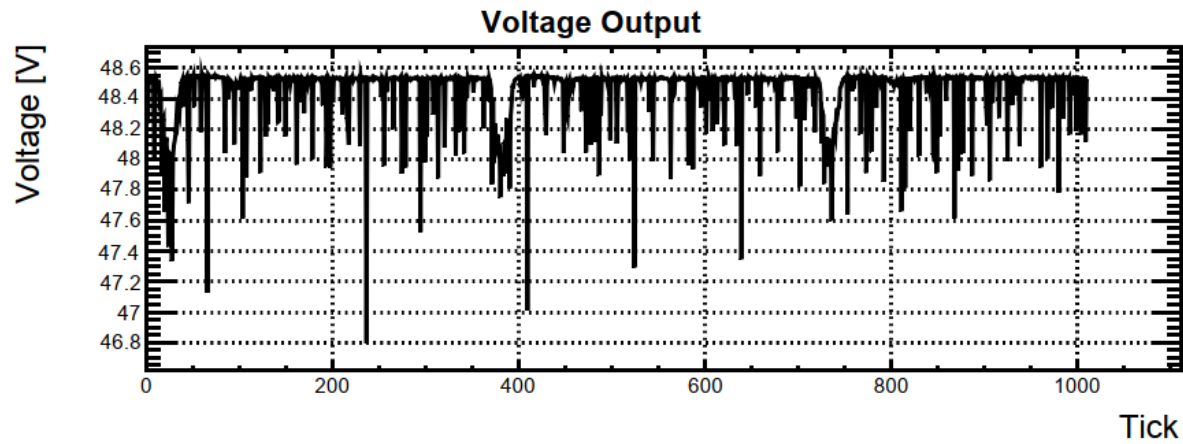
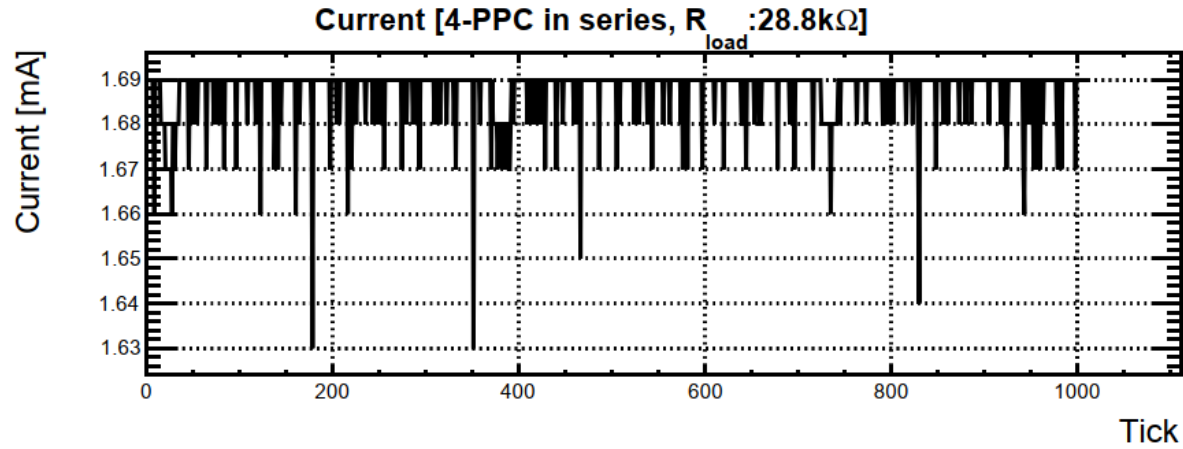
$$R_{Load} = 18.5k\Omega$$



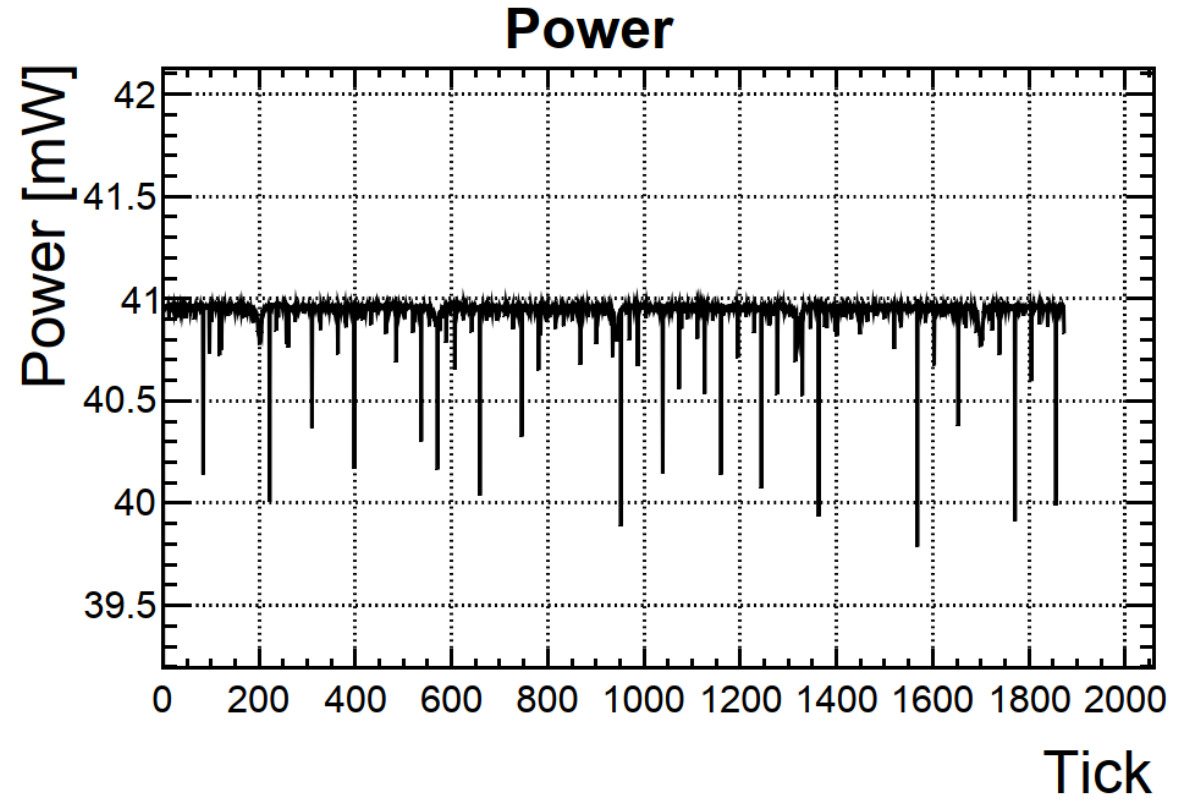
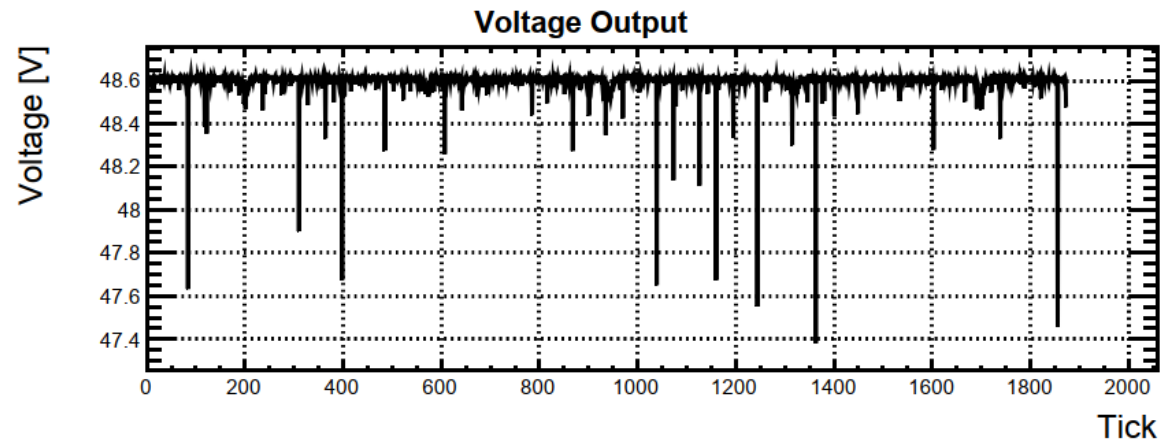
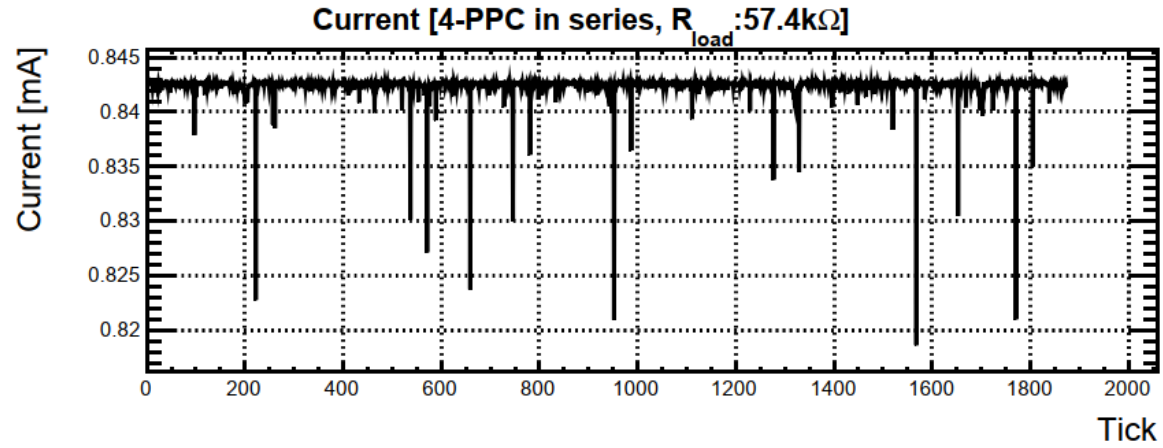
$$R_{Load} = 24.9k\Omega$$



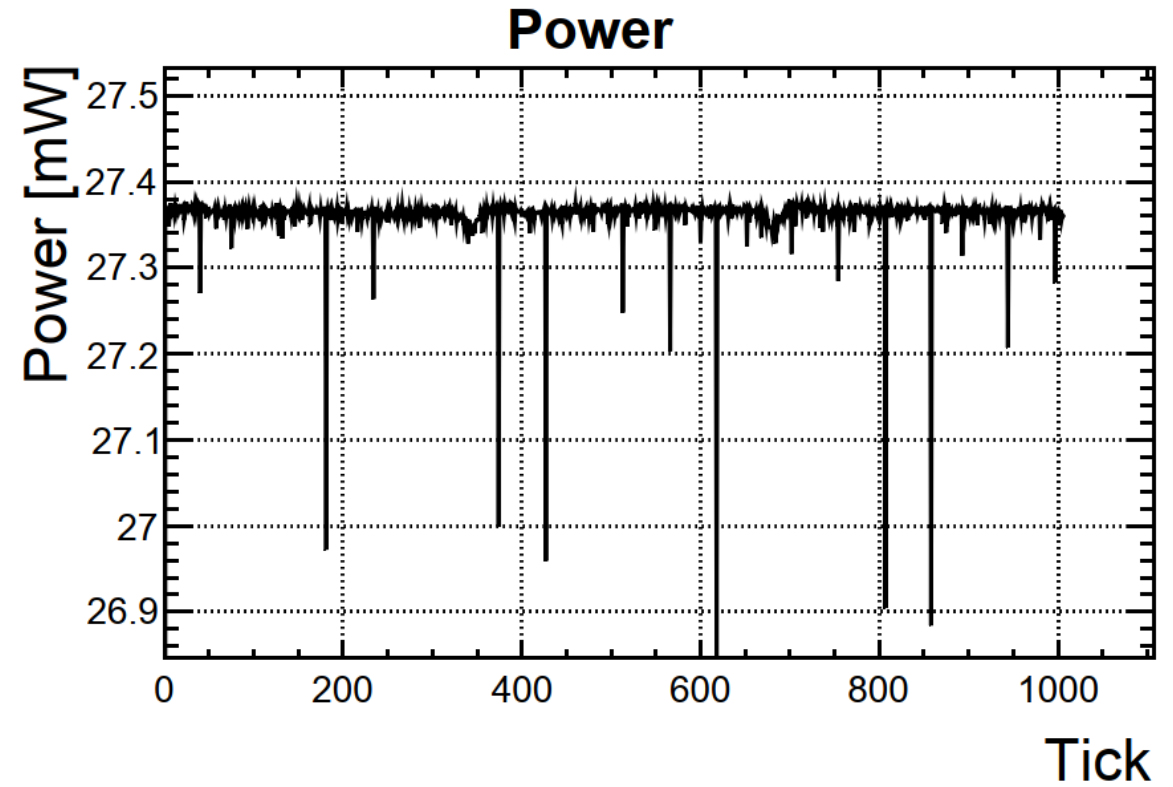
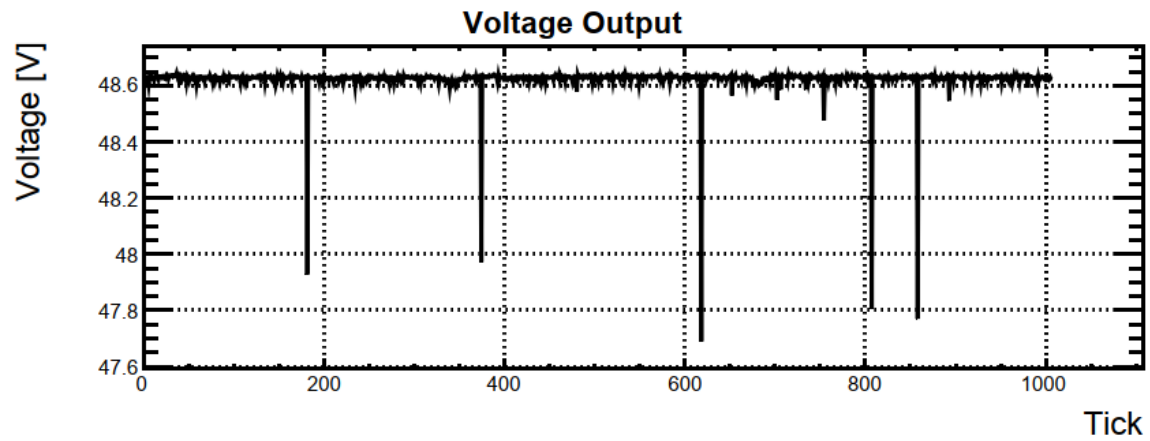
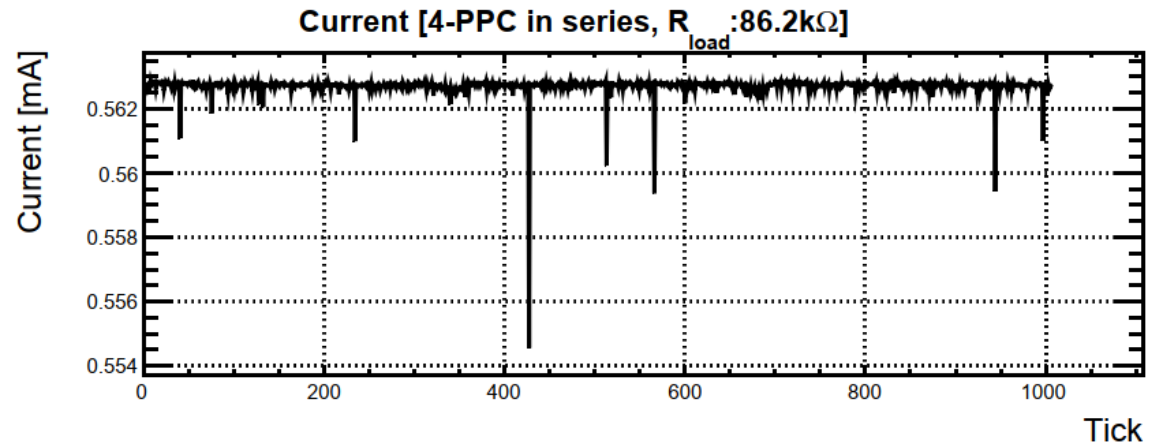
$$R_{Load} = 28.8k\Omega$$

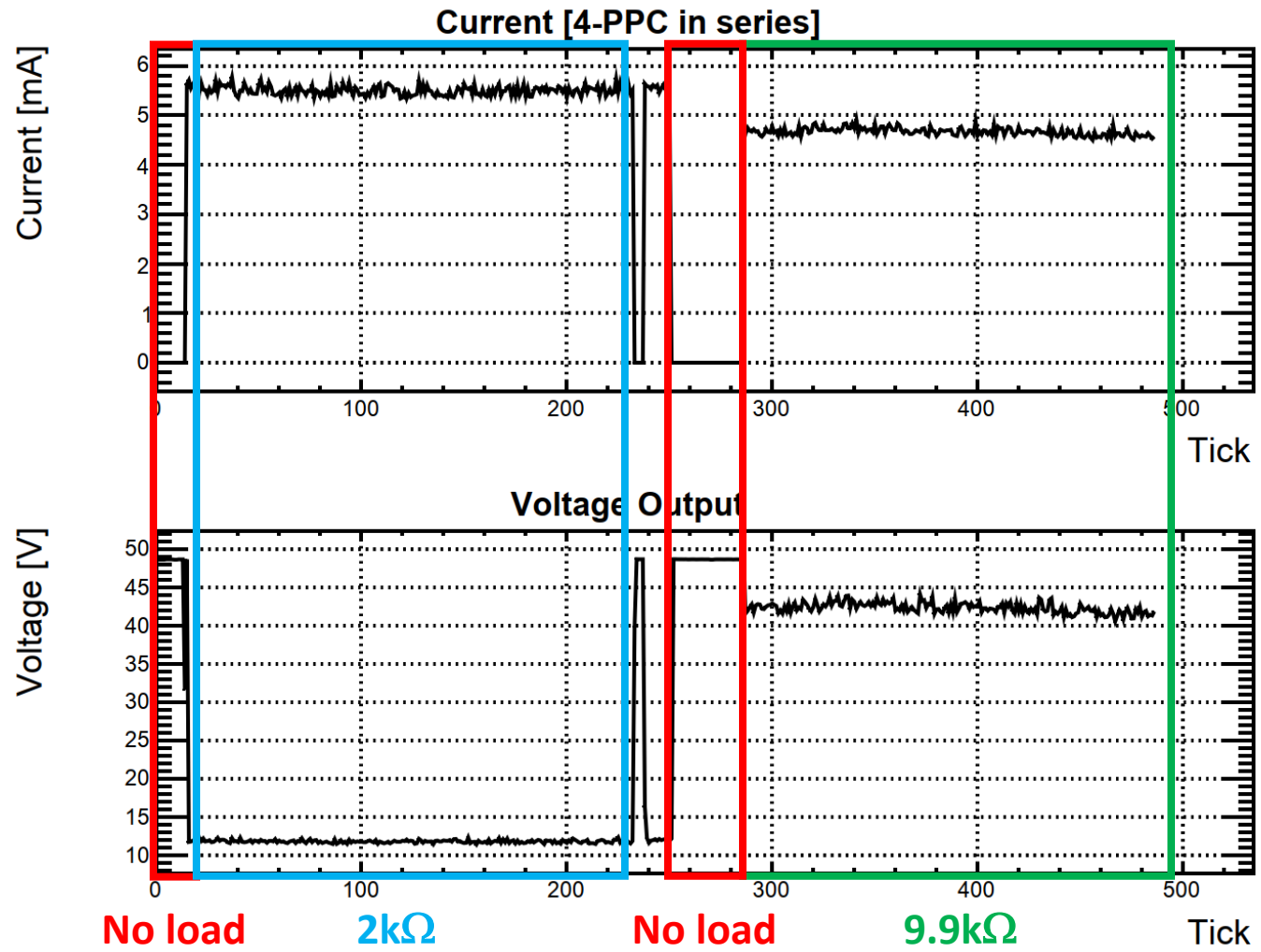


$$R_{Load} = 57.4k\Omega$$

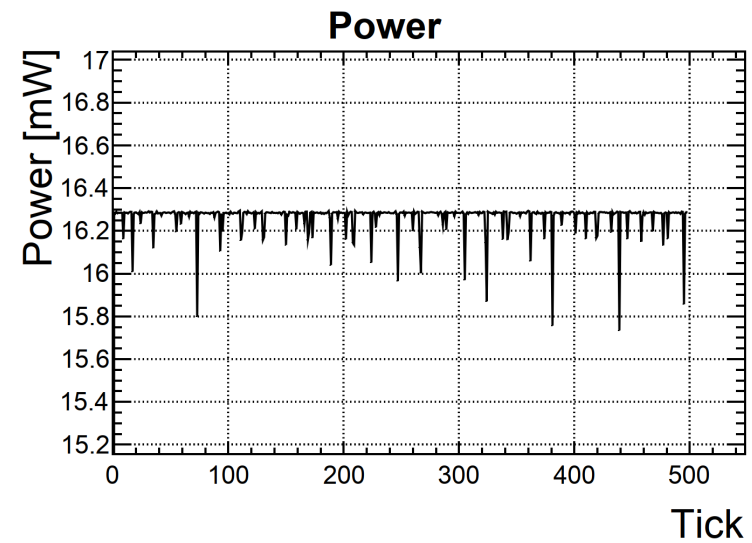
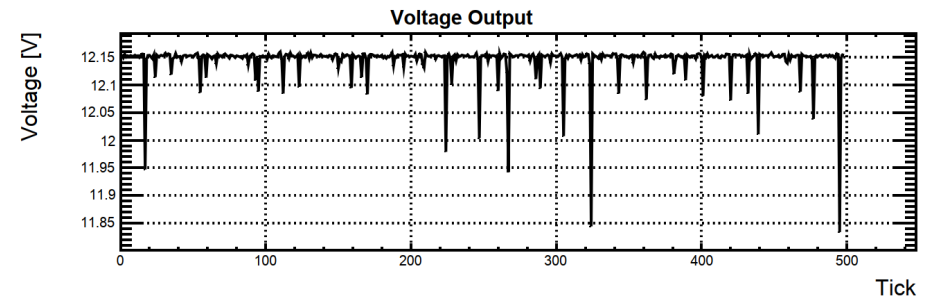
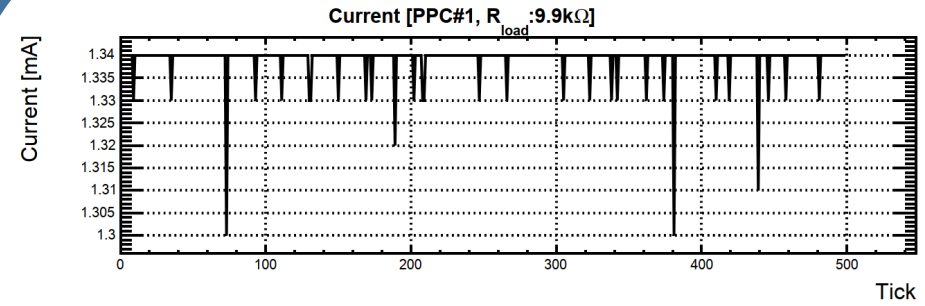
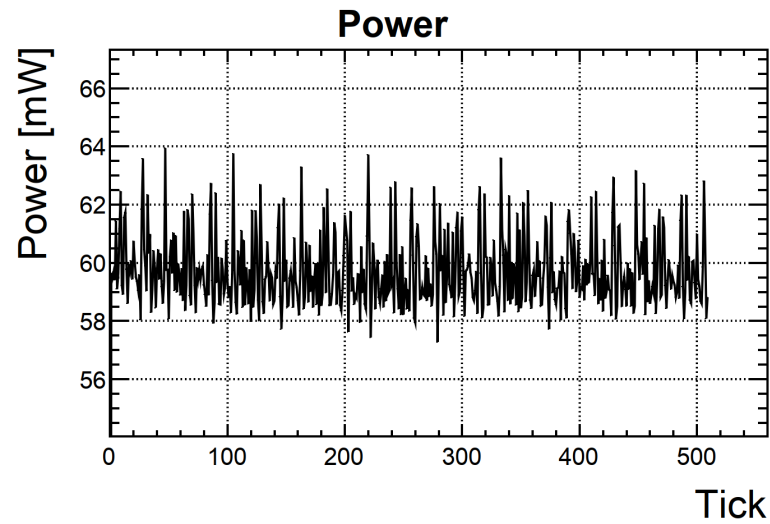
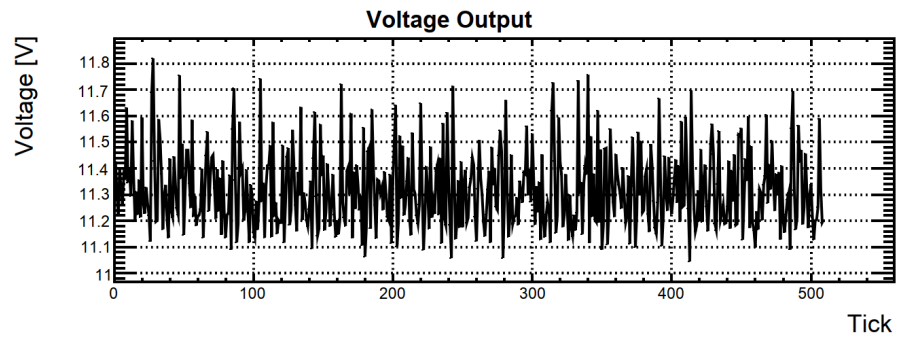
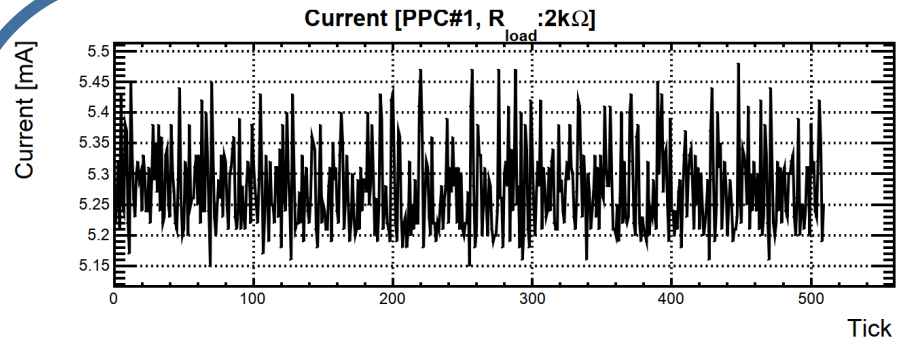


$$R_{Load} = 86.2k\Omega$$





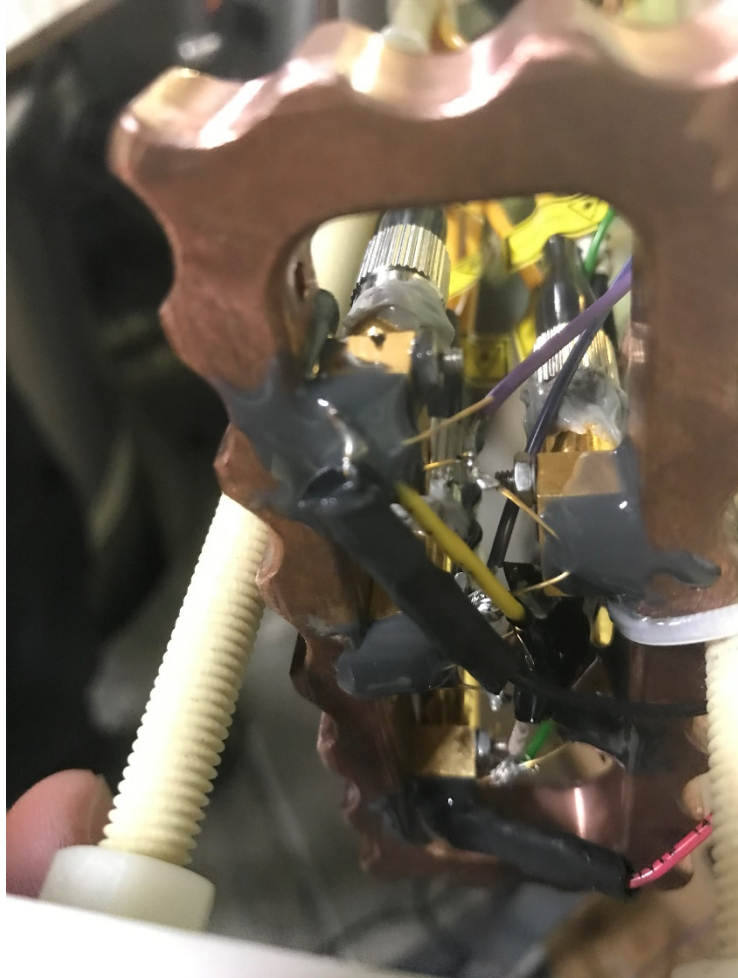
Checking single PPC module [PPC#1]:



Checking whether we still have bubbles or not?

We add more epoxy on the top of PPC.

Still getting bubbles from PPC modules!



Next steps:

Let us discuss all the results we get up to now.