

Status Setup CACTUS Milano-Bicocca

CACTUS@MILANO-BICOCCA

DUNE Photosensor WG Meeting (DUNE-SP-PDS)

December 5th, 2023

- We are testing the second box:

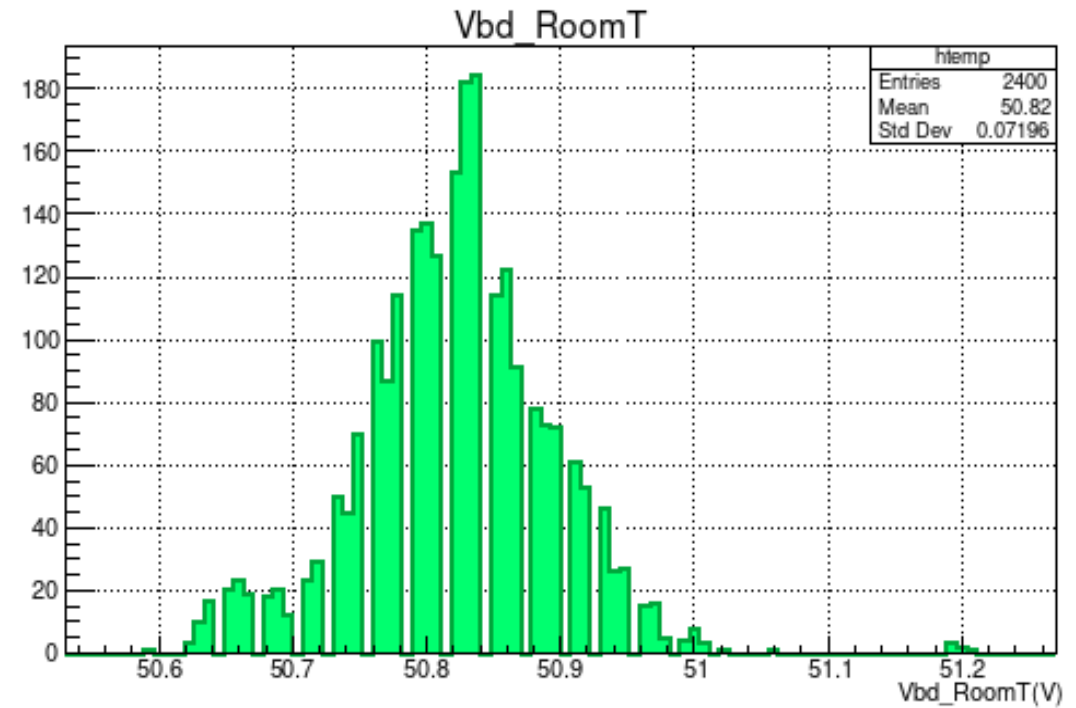
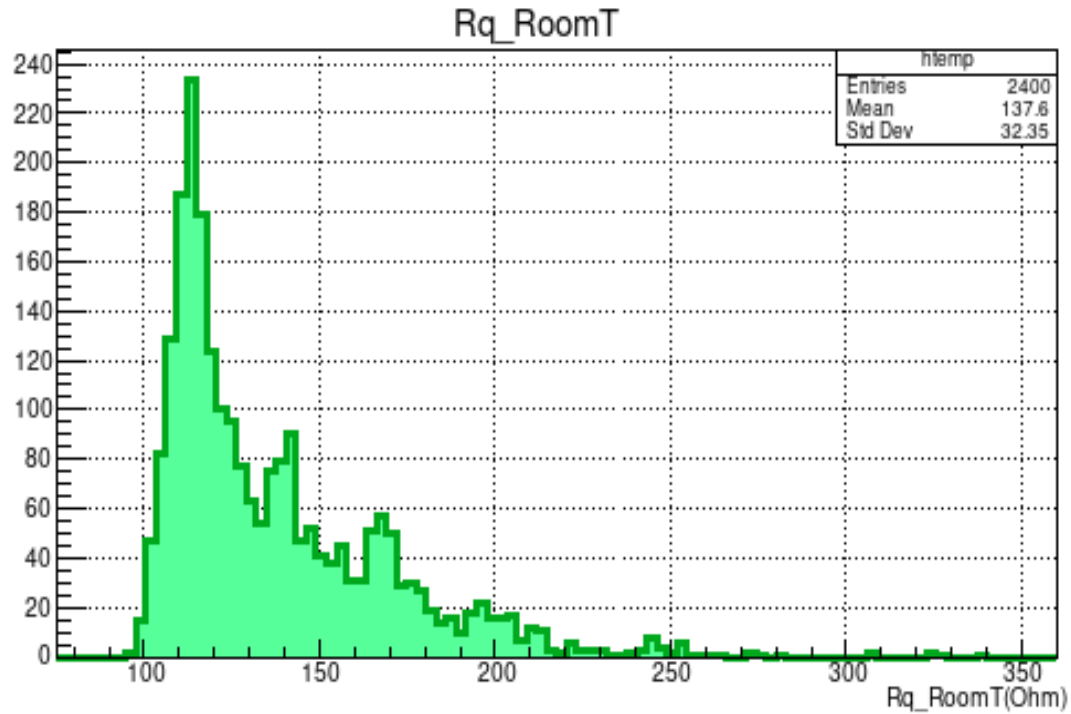
Delivery	Box	Tray	Status
2	9	1-24	Completed
2	12	73-96	In Progress

***Test performed:**

- I-V curves** at T_{room} and T_{LN2}
 - In the last trays we used heat gun during the second and third cycle, this improved the high value of the quenching resistance that was generated by the humidity in the connectors (Bias cables) -> leakage current.
- Thermal cycle.**
- I-V extend** at $V_{bd}+9V$ of OV, without light.
- DCR** with a time window of 120 seconds and the Bias Voltage= $V_{bd}+3V$
 - The DCR did not show noisy SiPM. A noisy channel was observed on the Arduino zero "in some Trays (random)", without exceeding the limit of 200 mHz/mm².
 - It was verified by changing the position boards and checking the number of accounts in other trays.

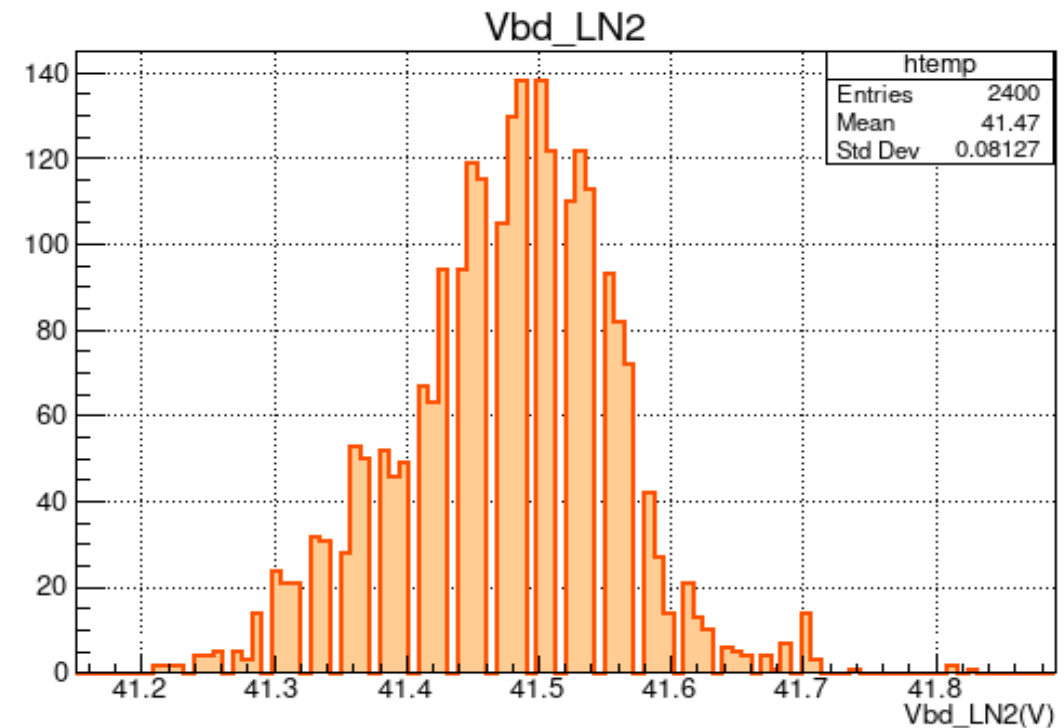
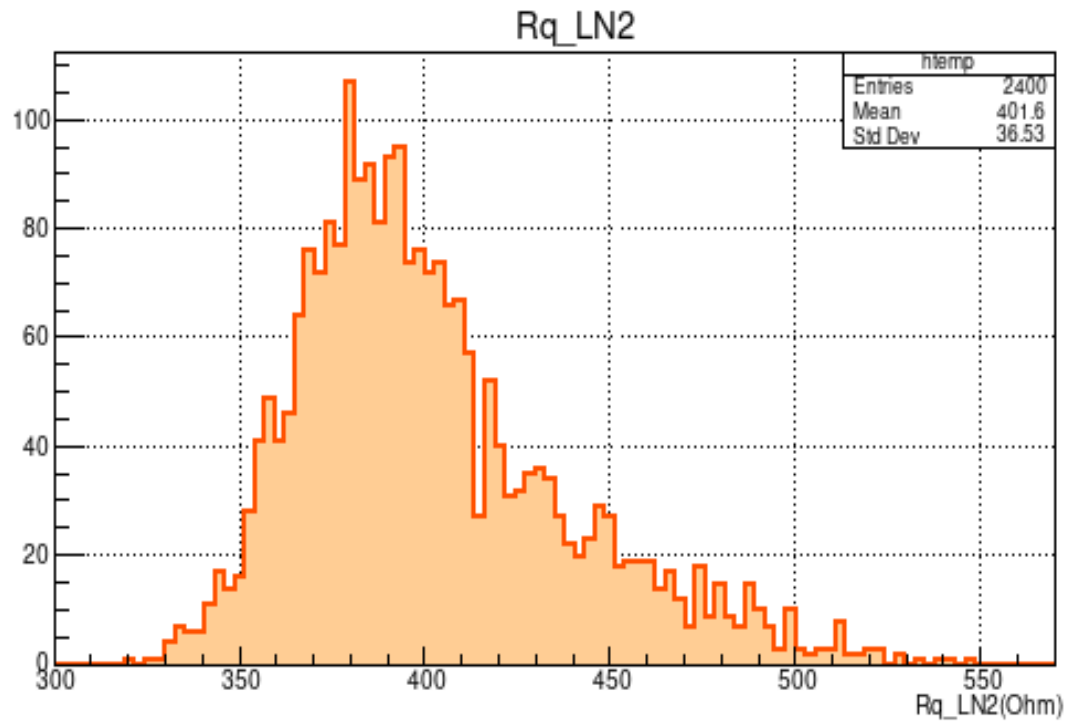
Tray	Strip ID	SiPM position (1-6)	Ardu	Channel counts	DCR (mHz/mm ²)	Tray	Strip ID	SiPM position (1-6)	Ardu	Channel counts	DCR (mHz/mm ²)	Tray	Strip ID	SiPM position (1-6)	Ardu	Channel counts	DCR (mHz/mm ²)
008	0000003573	2 0 7	44	10.19		011	002483 2	0 7 33	7.64			013	002464 2	0 7 55	12.73		
008	0000003573	1 0 6	29	6.71		011	002483 1	0 6 24	5.56			013	002464 1	0 6 31	7.18		
008	0000003571	6 0 5	48	11.11		011	002478 6	0 5 51	11.81			013	002459 6	0 5 47	10.88		
008	0000003571	5 0 4	47	10.88		011	002478 5	0 4 45	10.42			013	002459 5	0 4 37	8.56		
008	0000003571	4 0 3	188	43.52		011	002478 4	0 3 81	18.75			013	002459 4	0 3 242	56.02		
008	0000003571	3 0 2	46	10.65		011	002478 3	0 2 58	13.43			013	002459 3	0 2 51	11.81		
008	0000003571	2 0 1	54	12.5		011	002478 2	0 1 39	9.03			013	002459 2	0 1 37	8.56		

I-V Room T



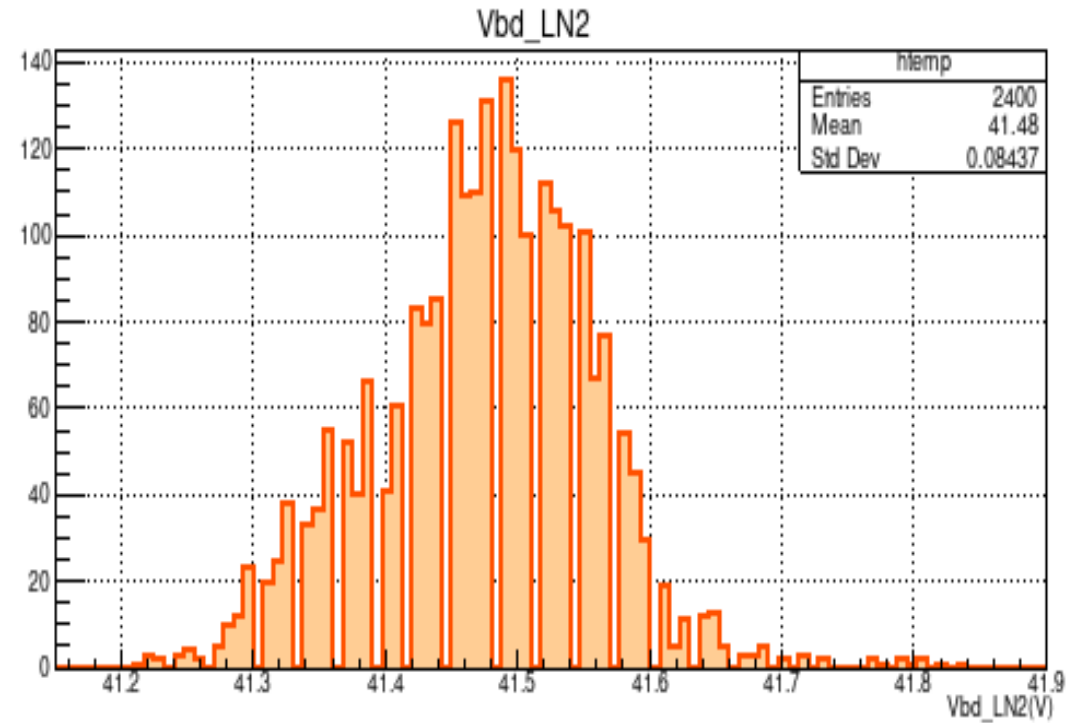
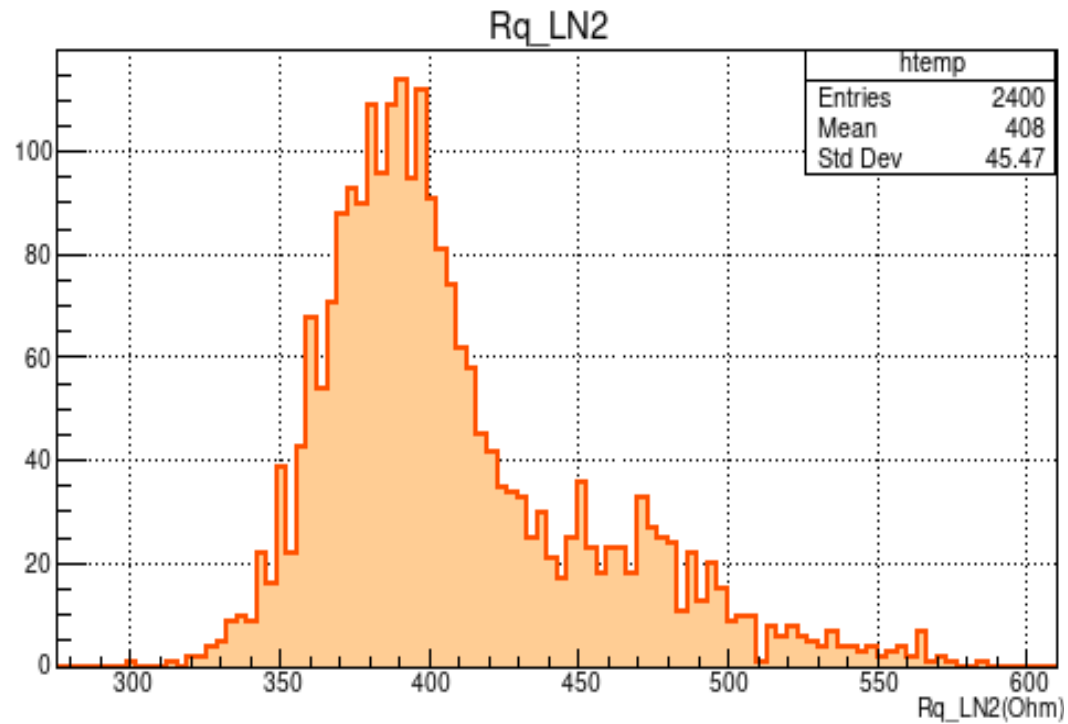
- Vbd in agreement with Hamamatsu data (~ 51 V).

I-V First Th-Cycle



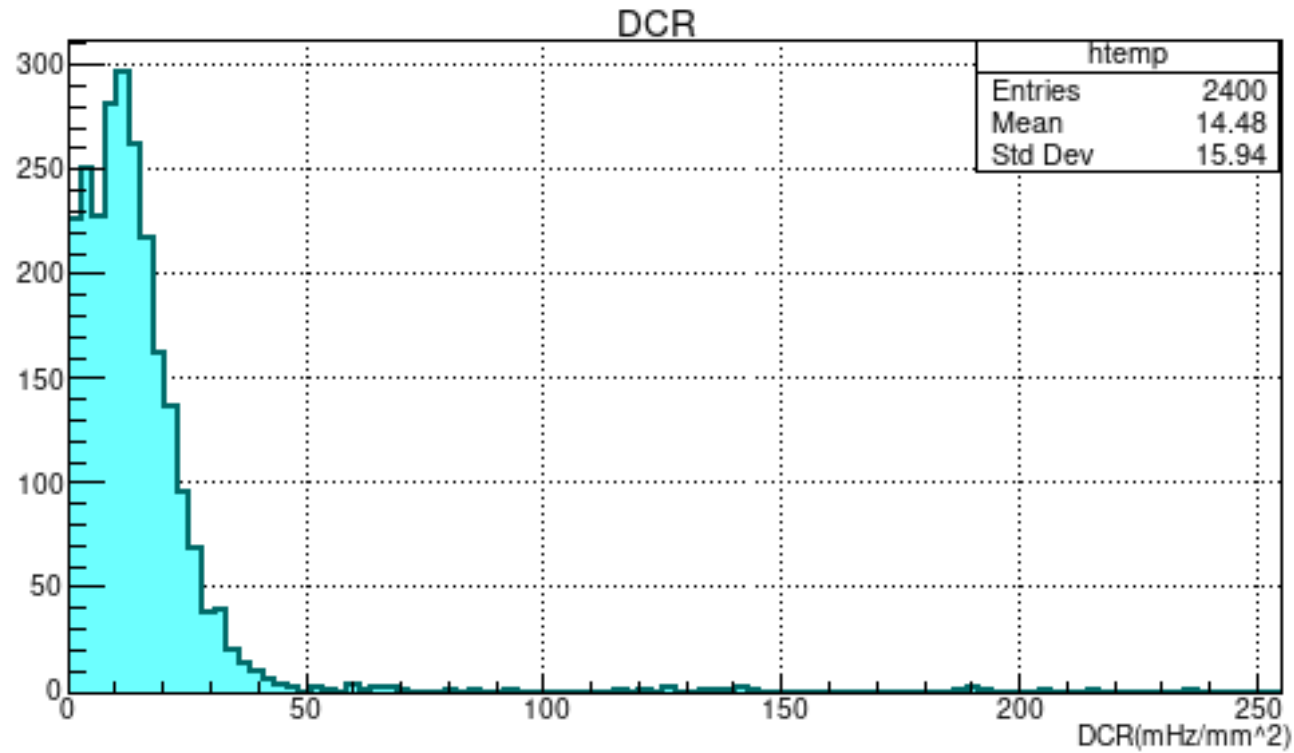
- Some trays have high Rq values due to humidity in the connector (Bias).
- "Thanks to Ferrara for the new bias connectors, we will change them to improve contact at cold temperatures."

I-V Third Th-Cycle



- The results are compatible in both cycles.

DCR



- All results are >200 mHz/mm² without light problems inside the black box