

Status of SiPM tests and setups

2023/07/11

Photosensor WG Meeting

M. Pozzato on behalf of Bologna Group

Received Strips



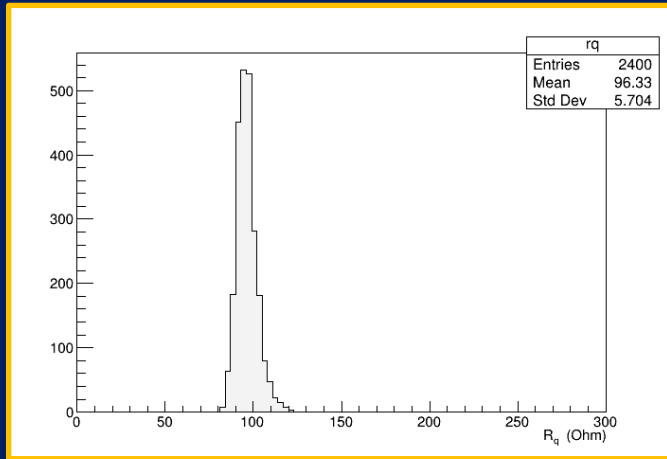
Performed Tests:

- IV @ T_{ROOM}
- IV @ T_{LN}
- Thermal Stresses
- DCR
- Extended IV (up to $V_{BD} + 10V$)

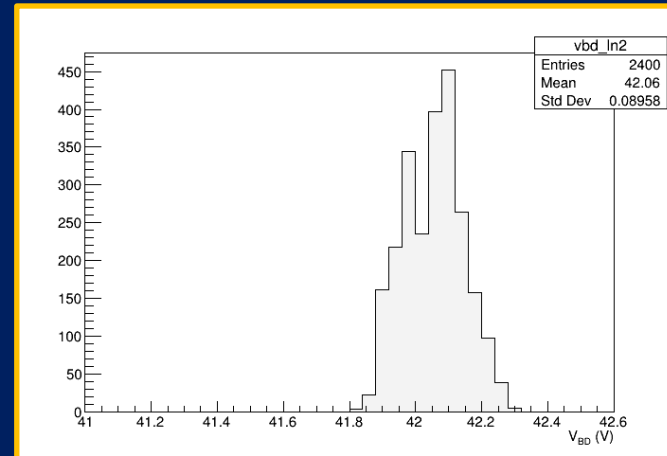
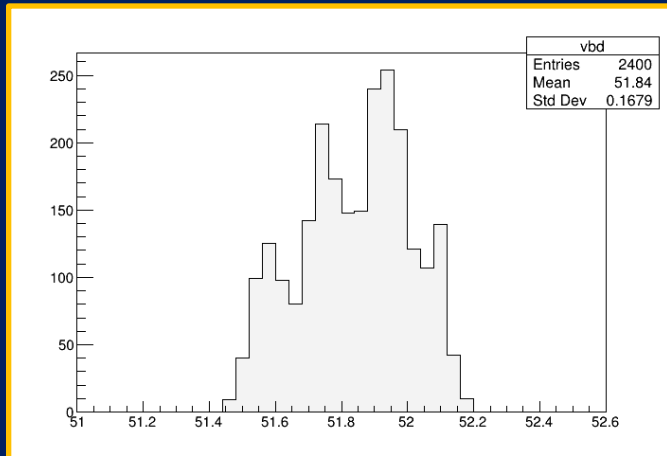
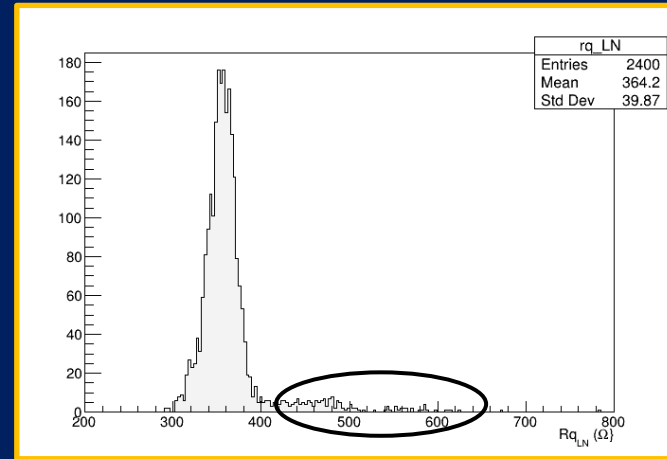
Delivery	Box #	New Box #	Trays	Boards/Box	Trays reorder	Mechanical meas	TX Date	To	FedEx Tracking #
1	7		58-63, 73-75, 94-96, 103-114	400	73-96	OK	09/03/2023	Bologna-Alessandro	771504684879
1	5		10-30, 118-120	400	25-48	OK	08/05/2023	Bologna-Alessandro	772055783250
2	11		49-72	400		OK	22/06/2023	Bologna-Alessandro	772524663191

First Box - 2400 SiPMs

ROOM

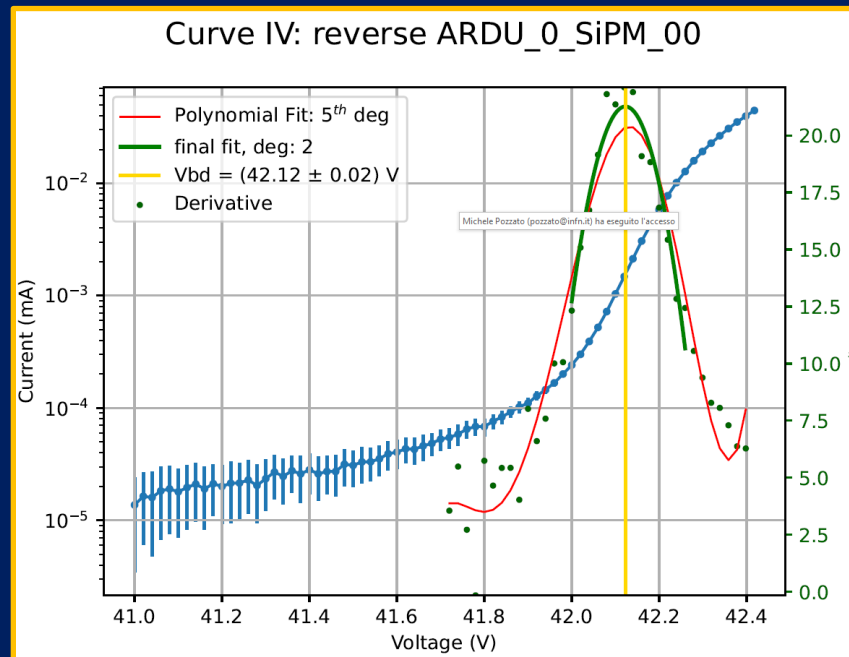
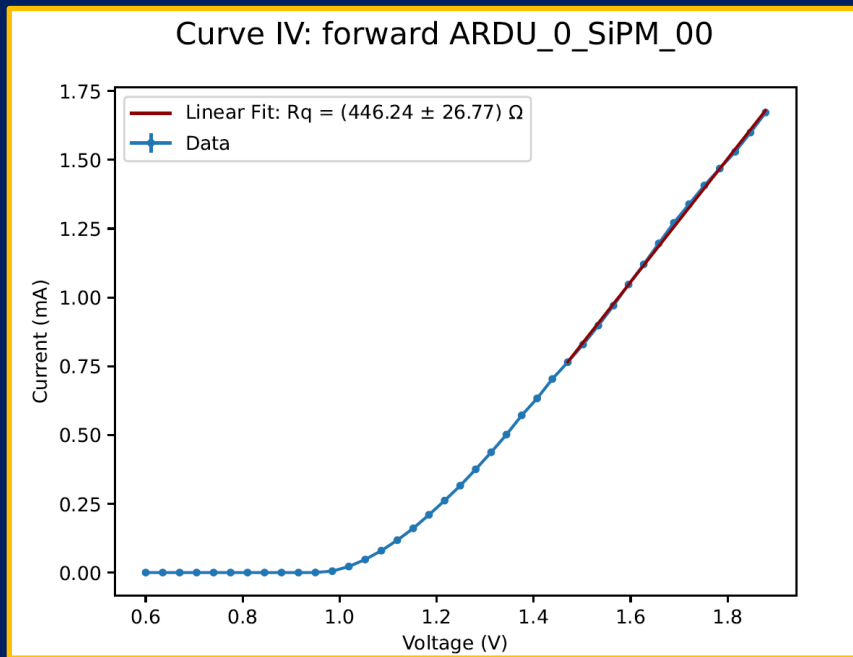


LN



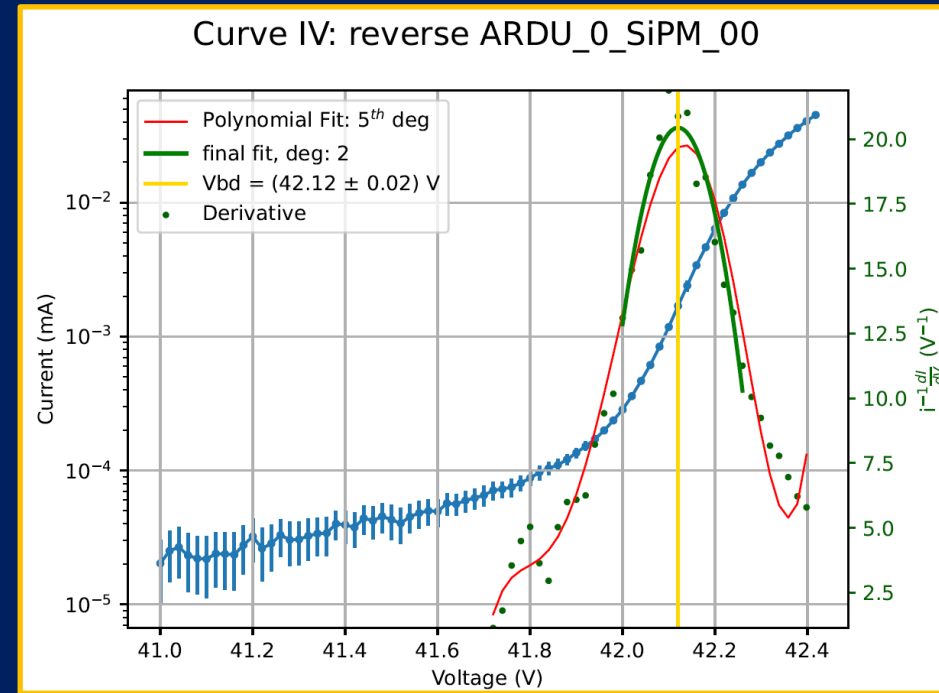
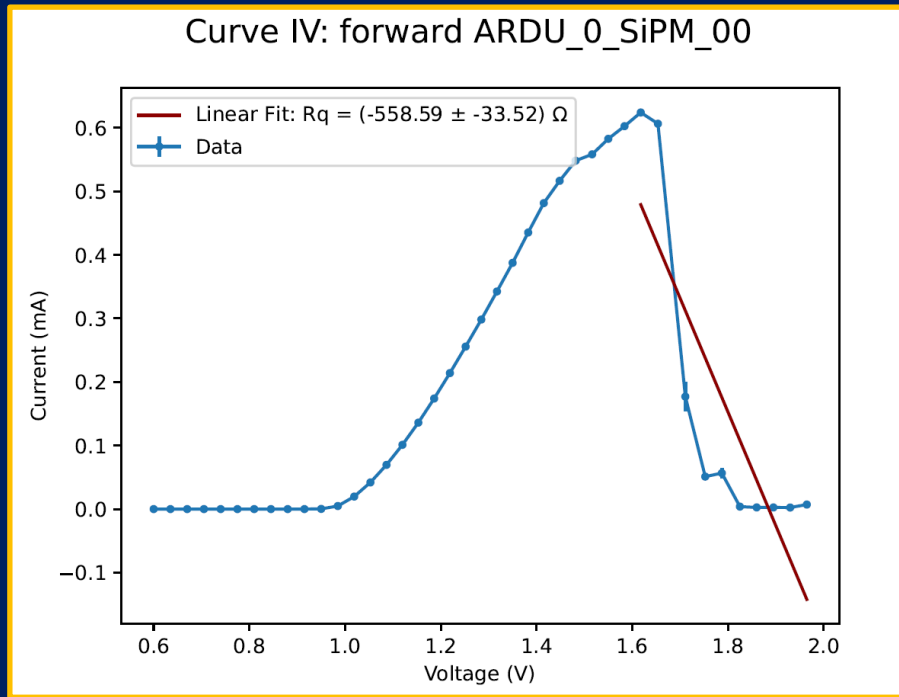
Problem in V_{bias} Electrical Connection
→ Fixed after changing the cable

Problems on V_{BIAS} distribution



Not «visible» by looking at data: R_q is higher than «normal» but no hint on problems

Reverse is normal



Visible by looking at data in forward polarization
Reverse polarization is normal

Fixed by changing cables

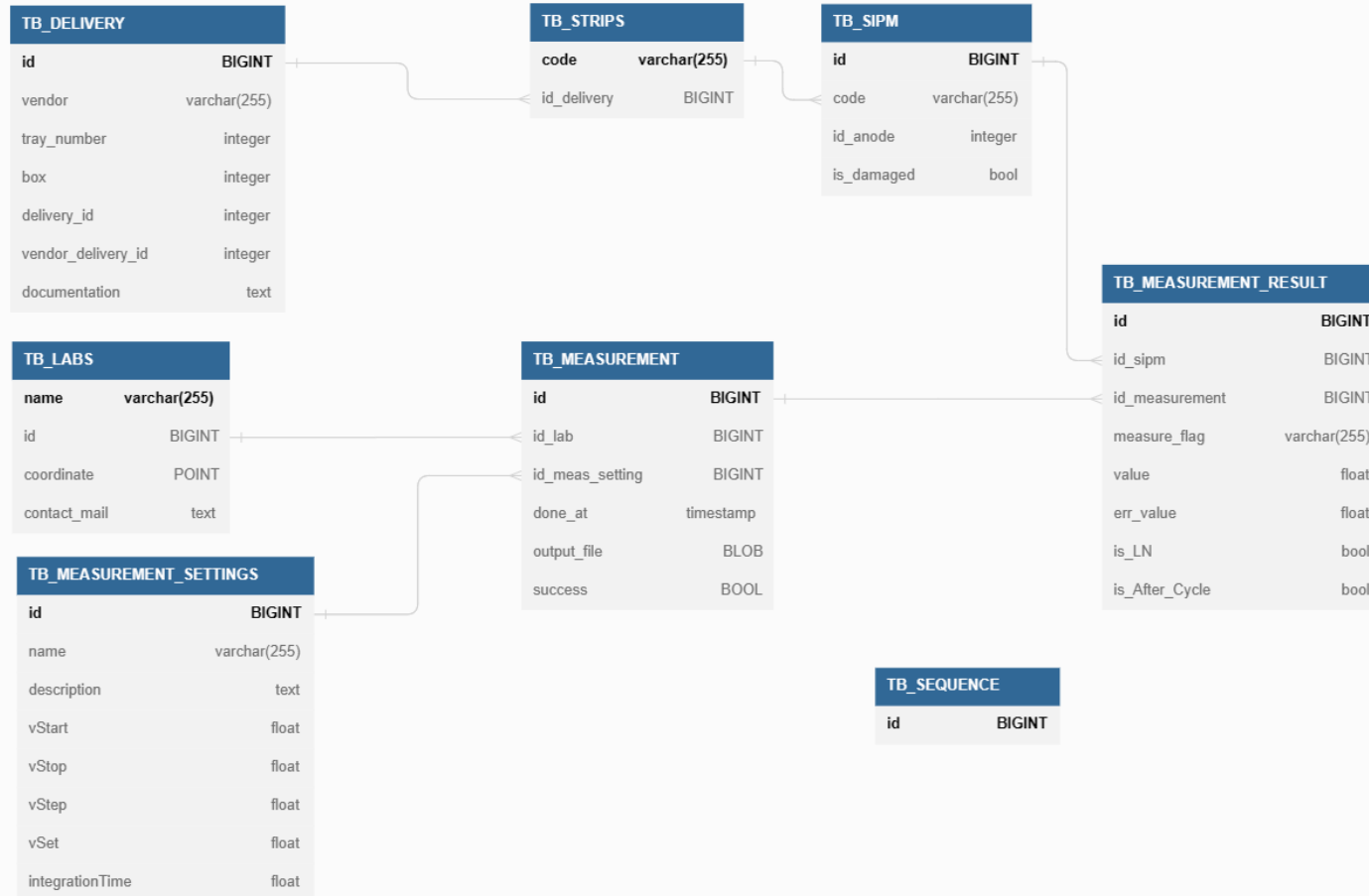
DCR - examples

- CACTUS setup is near to INFN mechanical workshop
- Some channels are noisy (here below one of them)

```
Wed May 24 14:41:19 2023
ARDU [0-3]      SiPM [0-29]      ARRAY ID      SiPM position [0-5]      Counts
2      3      Strip10 3      194
2      2      Strip10 2      106
2      1      Strip10 1      86
2      0      Strip10 0      115
2      24     Strip14 0      137731
2      25     Strip14 1      83
2      26     Strip14 2      109
```

- NOT due to SiPMs with high dark current:
 - Checked by applying 0 V to the SiPMs and by changing SiPMs positions

My SQL Database



Example on extracted data

247 • `select * from vw_summary where box =5 and tray_number=25;`

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

vendor	tray_nt	box	qr_code	id_anode	rqTroom	errRq_troom	vbdTroom	errVBD_troom	rqLN	errRqLN	vbdLN	errVBD_tLN	rqLN2	errRqLN2	vbdLN2	errVBD_tLN2
HPK	25	5	000484	1	85.01	5.1	52.07	0.03	308.53	18.51	42.24	0	308.56	18.51	42.23	0.01
HPK	25	5	000484	2	89.02	5.34	52.06	0	330.78	19.85	42.16	0.02	330.7	19.84	42.16	0.02
HPK	25	5	000484	3	93.93	5.64	52	0	361.91	21.71	42.19	0.01	361.9	21.71	42.18	0.02
HPK	25	5	000484	4	91.91	5.51	51.96	0	348.31	20.9	42.15	0.01	348.07	20.88	42.14	0.02
HPK	25	5	000484	5	93.14	5.59	51.92	0	350.4	21.02	42.19	0.01	350.25	21.02	42.19	0.01
HPK	25	5	000484	6	92.9	5.57	51.9	0	350.11	21.01	42.21	0.01	349.92	20.99	42.21	0.01
HPK	25	5	000488	1	89.71	5.38	52.09	0.01	347.11	20.83	42.19	0.01	347.57	20.85	42.2	0.03
HPK	25	5	000488	2	92.99	5.58	52.06	0	359.08	21.54	42.21	0.01	359.04	21.54	42.2	0.02
HPK	25	5	000488	3	90.1	5.41	51.97	0.01	347.83	20.87	42.17	0.01	347.75	20.86	42.17	0.01
HPK	25	5	000488	4	90.24	5.41	51.95	0.01	344.67	20.68	42.16	0.02	344.59	20.68	42.16	0.02
HPK	25	5	000488	5	86.18	5.17	51.93	0.01	311.57	18.69	42.19	0.01	311.4	18.68	42.19	0.01
HPK	25	5	000488	6	92.78	5.57	51.91	0.01	358.58	21.51	42.12	0.02	358.41	21.5	42.12	0.02
HPK	25	5	000489	1	91.58	5.49	52.06	0	352.27	21.14	42.2	0.02	352.22	21.13	42.19	0.01
HPK	25	5	000489	2	91.99	5.52	52.05	0.01	347.08	20.83	42.24	0	346.93	20.82	42.23	0.01
HPK	25	5	000489	3	90.24	5.41	51.98	0	341.22	20.47	42.21	0.01	341.08	20.46	42.2	0
HPK	25	5	000489	4	92.1	5.53	52	0	352.07	21.12	42.24	0	351.89	21.11	42.24	0
HPK	25	5	000489	5	91.29	5.48	51.95	0.01	346.95	20.82	42.18	0.02	346.81	20.81	42.17	0.01
HPK	25	5	000489	6	89.91	5.39	51.87	0.03	337.76	20.27	42.1	0.02	337.65	20.26	42.1	0.02
HPK	25	5	000493	1	87.15	5.23	52.11	0.01	331.97	19.92	42.24	0	331.76	19.91	42.23	0.01
HPK	25	5	000493	2	85.61	5.14	52.02	0	322.1	19.33	42.18	0.02	321.76	19.31	42.18	0.02
HPK	25	5	000493	3	87.81	5.27	52.01	0.01	335.43	20.13	42.19	0.01	335.27	20.12	42.18	0.02

Conclusions

- CACTUS @Bologna working well:
 - 120 SiPMs /day
 - First box completed;
 - Second box (50% completed)
 - To be completed by the end of this month
 - Third box received
 - We had some problems in the Vbias distribution → solved
 - We experience some noise in the DCR measurements
 - Extended IV doesn't show problematic sipms
- Local DB created in order to:
 - Backup data;
 - Create .csv files to push into DUNE DB