

# Electronics related to BEC report

- major step

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weekly meeting  
2023-03-07

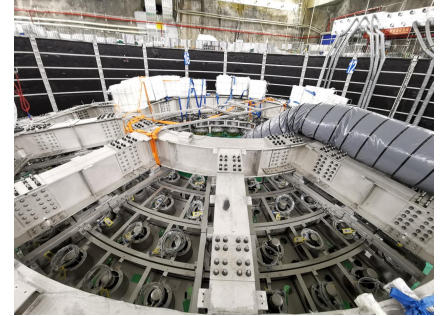


# Electronics work status

- Electronics room
  - All GCU power super (LV) is repaired.
  - 160 BECs are on, 4 backup BECs are off.
  - Jianmen----WR module TTIM repair next week - 'jianmen report'
- Installation
  - 20 UWB are installed.
  - next batch is planed on 20th, March. around 200 UW boxes will be installed(11-9 layer).
- SAB
  - UW box test is ongoing.

## Up to (2022-12-16), (2022-12-14 biweekly meeting)

- all 40 modules, 124 PMTs in the first ring of truss, are finished.
- 20 electronics UWBs(19 connected to PMT)
- A test of the installed LPMTs performed on Dec. 9, to make sure the functionality  
**all lights in the hall turned off**  
**57 PMTs (connected with 19 GCUs) tested**
- Test results
  - all 57 PMTs applied to the operating HV successfully
  - dark count rate (DCR) and waveforms acquired, distribution understandable



*covid situation, so no more worker can assistant PMT's operation.*

*before new year, no more PMT work onsite*

# WR modification: Jianmeng in eleroom - March 15, 16

problem found during loop test and long term monitoring

- mini-WR module issue: communication between PC and TTIM.

other found by Jianmeng

- for some TTIM/BEC, clock can't lock by mini-WR when transfer large data.

solution -Jianmeng:

The mini-WR produced a large voltage drop when the common mode(CM) choke processing the network packet. From oscilloscope there is a voltage fluctuations.

- by removing the CM choke, no packet loss, no clock not lock.

After removing the heat sink of mini-WR, remove the common-mode choke coil and short-circuit the power supply pins together.



# BEC status 2023-03-29

- reflection test using blue cable and power supply cable without yellow cable
- final test:
  - for last year installation's 20 GCU box, they did final test last year and redo again at 2023-03-17. BEC no problem.
  - for this 200 box, not yet test, but in plan
- BEC status:
  - just before installation, we did loop test.
  - last year loop test are done.
  - Jianmen is there to support

# BEC status 2023-03-29

- all mini-WR are `repaired`.
  - ping all BECs and check the sl parameters
    - 4 BECs: not able to get sl parameters
    - 6 BECs: not able to pass ping check(not check the WR/CT fiber port yet)
  - loop test of 14 BECs.
    - prbs error happens on 4 BECs, after loosening the screw between BEC and TTIM, no error.
- a review from Jianmeng of this repair `failed`.
  - problem: the pressure from screw to BEC.
    - a plastic spacer should be used between screws and BEC.
  - another review is needed after finishing UWB boxes installation.
- current status:
  - all BEC are off.
  - no measurment in ele room during installation.

# onsite installation status(LPMT+electronics)

-----[3.20 to 4.7 all Veto+CD finished].

## Electronics

JUNO docdb: 9742



- In the past two weeks, 230 LPMT UWBs have been installed, including 10 veto and 220 CD UWBs.
- Currently, there are a total of 250 electronic boxes on steel shells, and 238 electronic boxes connected with PMT.
- We have checked the connection one by one.

238's box have done final test, only one GCU box's yellow cable has problem, they will change the box later.

Installation of LPMT is in progress currently ~800 PMTs installed, installation ongoing for the 4<sup>th</sup> layer started two shifts for installation, ~30 modules (150 PMTs) per day PMT module assembly and test at the surface, then transported to underground





# onsite installation status(sPMT+electronics)



## SPMT installation

- 672 (42 groups) PMTs already installed in layer 9-11, 612 in position, the rest 60 in layer 7-8 later
- 7 additional UWBs were installed in layer 9
- Total now is 10 UWBs installed in layer 9
- Electric test and leakage test passed
- 672 PMTs connected = 42 connectors

### Note for future :

- Workers should use electric screwdrivers in order to speedup UWB installation → **Increase efficiency**
- Worker must use secured headlamps on their helmet when connecting PMTs → **Connector safety**

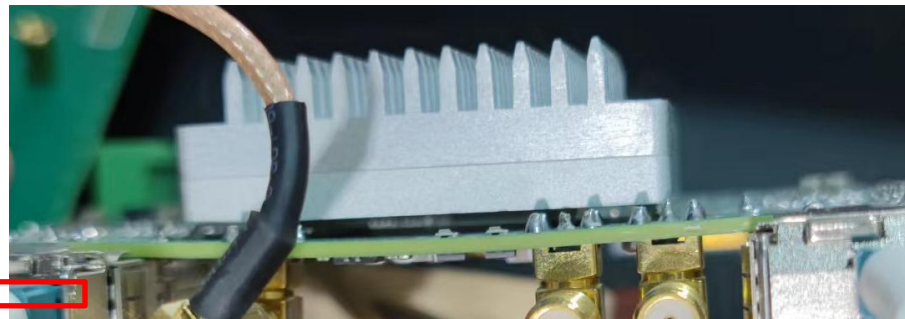
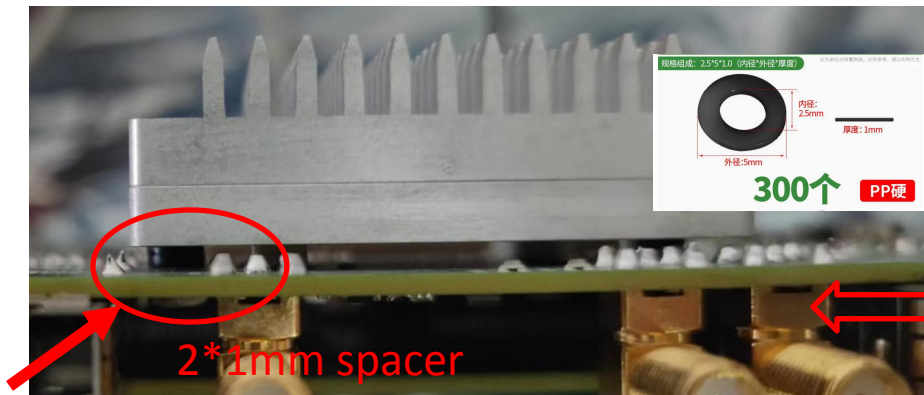


10 UW box are installed



# BEC updating 2023-04-18

- WR-repair reviewing : 2023-04-07
- remain problem:
  - screw between TTIM and base board is too tight make the board bending.
  - prbs error during loop test after last repair due to the board bending. loosen the screw, BEC pass the test.
- solution: put spacer on screw



## BEC updating 2023-04-18

- WR-repair reviewing : 2023-04-07
- repair plan:
  - for the repaired BEC(mini-WR) last time
    - open the box, put space between TTIM and mini-WR.
  - for the BEC(mini-WR) has not been repaired, open the box,
    - open the mini-WR, remove the common choke and the fuse next it. only one BEC(backup from kunshan)'s fuse is removed.
    - put space between TTIM and mini-WR.
- test plan: loop test for all repaired BEC
- note: only BEC in SAB/storage(9) not repaired from 7thApril.

## BEC updating 2023-04-18

- Jianmen repaired at 2023-04-18
  - how:
    - open BEC box, loose TTIM from base board, loose mini-WR board from TTIM.
    - put space between TTIM and base board, install them back.
  - how many repaired?
    - EleRoom 1 is finished at 2023-04-18 by worker(安得远通) with Jianmen's 'supervisor'
    - EleRoom2 is finished at 2023-04-19 by worker(安得远通)
- test situation
  - ping+ Temperature reading is done.
  - loop test not yet, will done at least before the installation.

# BEC updating 2023-04-18

- BEC update information:
  - BEC's latest status: <https://docs.qq.com/sheet/DVG5YbVB6VnBSc2p5?tab=2vqh3f>
  - GCU connect to BEC: <https://www.kdocs.cn/l/cnOxwa3LRFjp>

position	dcx_no	bec_no	IP	trig_section	connected_	ctu_ch	RMU	RMU_ch	fw_version	mini-WR_fw
1-1-1-1	1	61	192.168.10.71	54	48	1	1		3.1	gmii
1-1-1-2	2	169	192.168.10.179	56	43	2	1		3.1	gmii
1-1-1-3	3	12	192.168.10.22	57	43	3	1		3.1	gmii
1-1-2-1	4	33	192.168.10.43	13	44	4	1		3.1	gmii
1-1-2-2	5	112	192.168.10.122	33	45	5	1		3.1	gmii
1-1-2-3	6	86	192.168.10.96	34	46	6	1		3.1	gmii
1-1-3-1	7	41	192.168.10.51	53	47	7	1		3.1	gmii

	A	B	C	D	E	F	G	H	I	J
	RUNNO	BEC No.	Port No.	GCU	MAC	IP	GCU scan	Date		
	1	45	1	3608	0E:18	14. 24	GU3608	2022/11/30	2-1-7-3	
	2	45	2	4085	0F:F5	15. 245	GU4085	2022/12/1	2-1-7-3	
	2	45	3	7323	1C:9B	28. 155	GU7323	2022/12/1	2-1-7-3	
	3	45	4	5848	16:D8	22. 216	GU5848	2022/12/2	2-1-7-3	
	3	45	5	2986	0B:AA	11. 170	GU2986	2022/12/2	2-1-7-3	
	3	45	6	2964	0B:94	11. 148	GU2964	2022/12/2	2-1-7-3	
	3	45	7	3245	0C:AD	12. 173	GU3245	2022/12/2	2-1-7-3	
	3	45	8	3329	0D:01	13. 1	GU3329	2022/12/2	2-1-7-3	

# BEC distrubution 2023-04-18

## #1

	1柜	2柜	3柜	4柜	5柜	6柜	7柜	8柜	9柜	10柜
1排	61	33	41	46	144	51	142	95	78	58
	169	112	65	34	159	59	87	2	129	107
	12	86	82	44	72	120	125	40	103	83
2排	117	42	91	152	50	115	84	13	5	3
	122	128	168	155	127	64	23	38	4	35
	111	167	148	70	92	173	73		16	15
3排	31	135	174	176	123	137	24	53	85	
	132	179	170	43	71	146	172	164	141	
	10	163	109	80	57	14	62	49	79	

## #2

	1柜	2柜	3柜	4柜	5柜	6柜	7柜	8柜	9柜	10柜
1排	9	175	67	88	75	162	36	178	133	
	27	131	157	20	158	48	47	77	105	
	19	8	100	101	166	165	45	69	94	
2排	145	160	39	32	11	74	76	56	124	
	29	108	102	177	114	147	153			
	119		81	154	93	156	121			
3排	52	143	149	126	104	25	68	136	134	
	37	63	90	60	110	161	30	106		
	54	151	130	98	28	139	99	17		

Note

orange = CD  
134

purple = VETO  
21

blue = sPMT  
5



GCU connected to 12 BEC



spmt electronics box 2 BEC

# BEC used channel(LPMT) 2023-04-18

- Installed up to April, 24 BECs are used, 239 channel are used.
- remain channel on used BEC

position	dcx_no	bec_no	IP	trig_section	connected_chs	RMU	x	y	room	installed-April	remain ch
1-1-5-3	15	<b>72</b>	192.168.10.82	2	45	1	4	10	1	<b>18</b>	<b>27</b>
1-2-5-1	43	<b>50</b>	192.168.10.60	4	44	4	4	7	1	<b>32</b>	<b>12</b>
1-2-7-2	50	<b>23</b>	192.168.10.33	V6	44	8	6	6	1	<b>1</b>	<b>43</b>
1-2-7-3	51	<b>73</b>	192.168.10.83	V1	45	8	6	5	1	<b>2</b>	<b>43</b>
1-3-6-2	76	<b>146</b>	192.168.10.156	1	44	3	5	1	1	<b>41</b>	<b>3</b>
1-3-6-3	77	<b>14</b>	192.168.10.24	3	44	3	5	0	1	<b>27</b>	<b>17</b>
2-1-7-2	106	<b>47</b>	192.168.10.57	75	40	5	6	11	2	<b>24</b>	<b>16</b>
2-1-7-3	107	<b>45</b>	192.168.10.55	73	44	5	6	10	2	<b>40</b>	<b>4</b>
2-2-5-1	125	<b>11</b>	192.168.10.21	76	44	7	4	7	2	<b>28</b>	<b>16</b>
2-2-5-2	126	<b>114</b>	192.168.10.124	74	44	7	4	6	2	<b>24</b>	<b>20</b>
2-2-7-1	131	<b>76</b>	192.168.10.86	V17	47	8	6	7	2	<b>1</b>	<b>46</b>
2-2-7-3	133	<b>121</b>	192.168.10.131	V12	34	8	6	5	2	<b>1</b>	<b>33</b>

## BEC used channel(sPMT) 2023-04-18

- Installed up to April, 2 BECs are used, 10 channel are used.
- remain channel on used BEC

position	dc_s_no	bec_no	installed-April	remain ch
1-2-2-1	34	42	5	41
2-2-2-1	117	160	5	41



Where BEC are now	BEC amount	repaired-CM choke	add spacer
JUNO-detector	160	March	April
JUNO-bacup-eleRoom	4	May	April
OSIRIS	1	May	April
eleRoom-test	2	May	April
SAB-test	2+2	April(except 1 for sPMT)	April(except 1 for sPMT)
JUNO-fromKunshan	3	April	April
onsite-Total	174		
Tsinghua	2-1	May	
SJU	1(from Tsinghua)	May	
France	1		
Belgium	1		
IHEP	1		
Italy	1		
total	180		