

PMT mapping

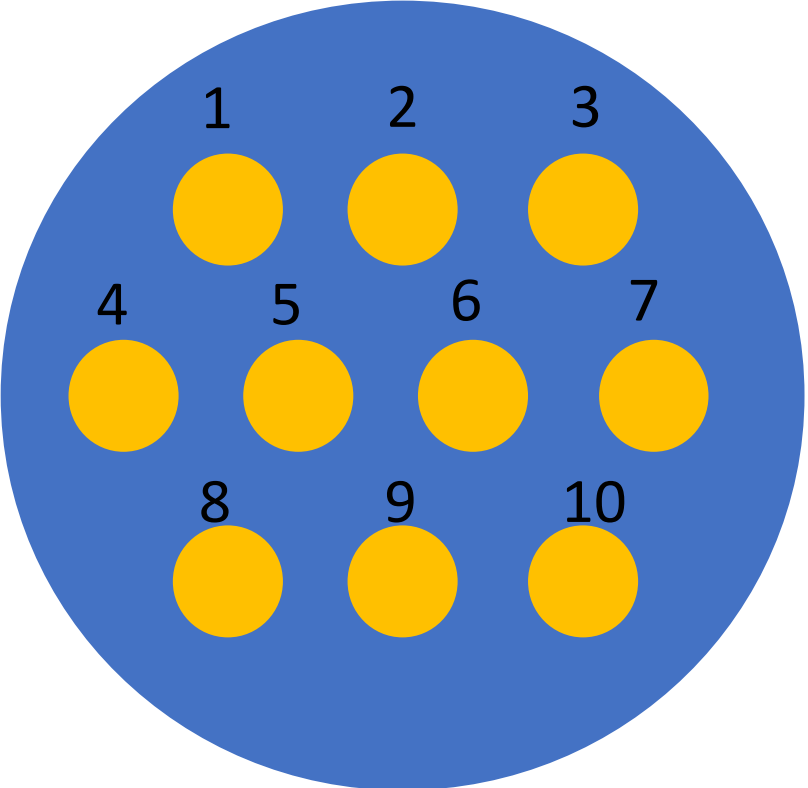
My understanding

Aiwu, 04/02/2020

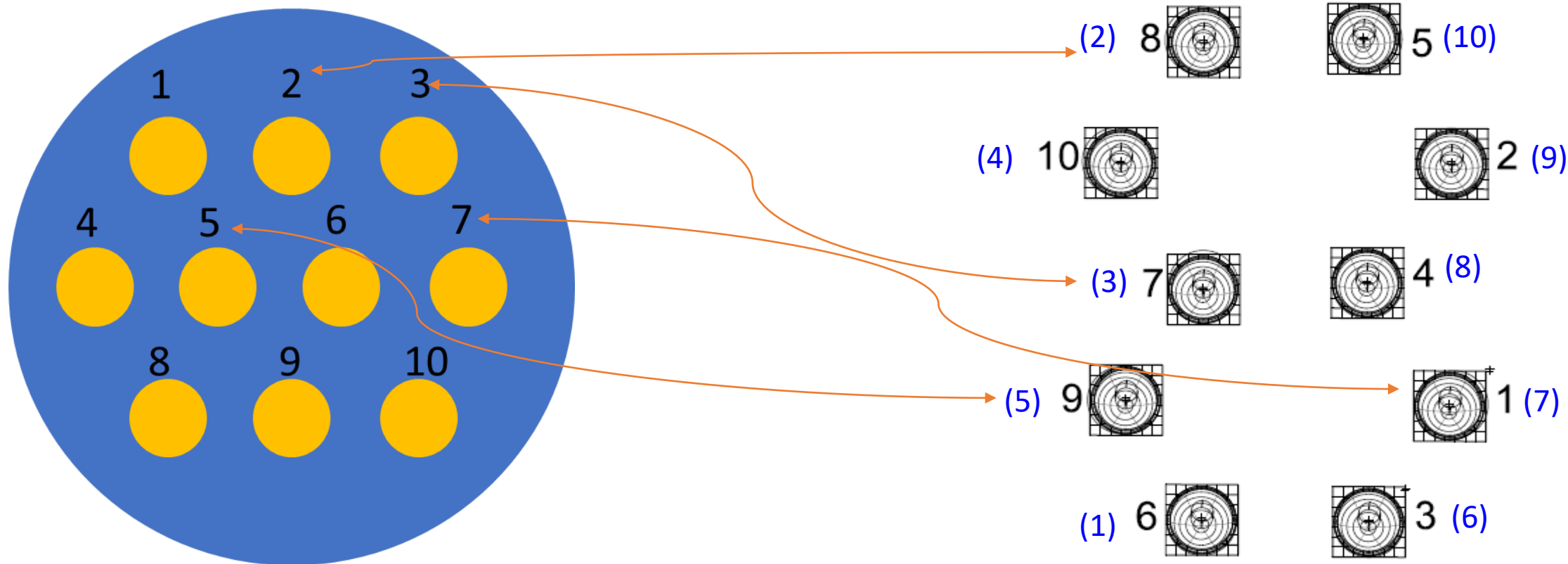
Looking from outside the detector, we only see the chimney and the flanges

We number the channels from 1 to 10 looking from the front of the flanges.

- This was what I am used to when I started in 2019



Then, I learned that inside the detector, the PMTs are arranged in a hexagonal format as seen in the right picture



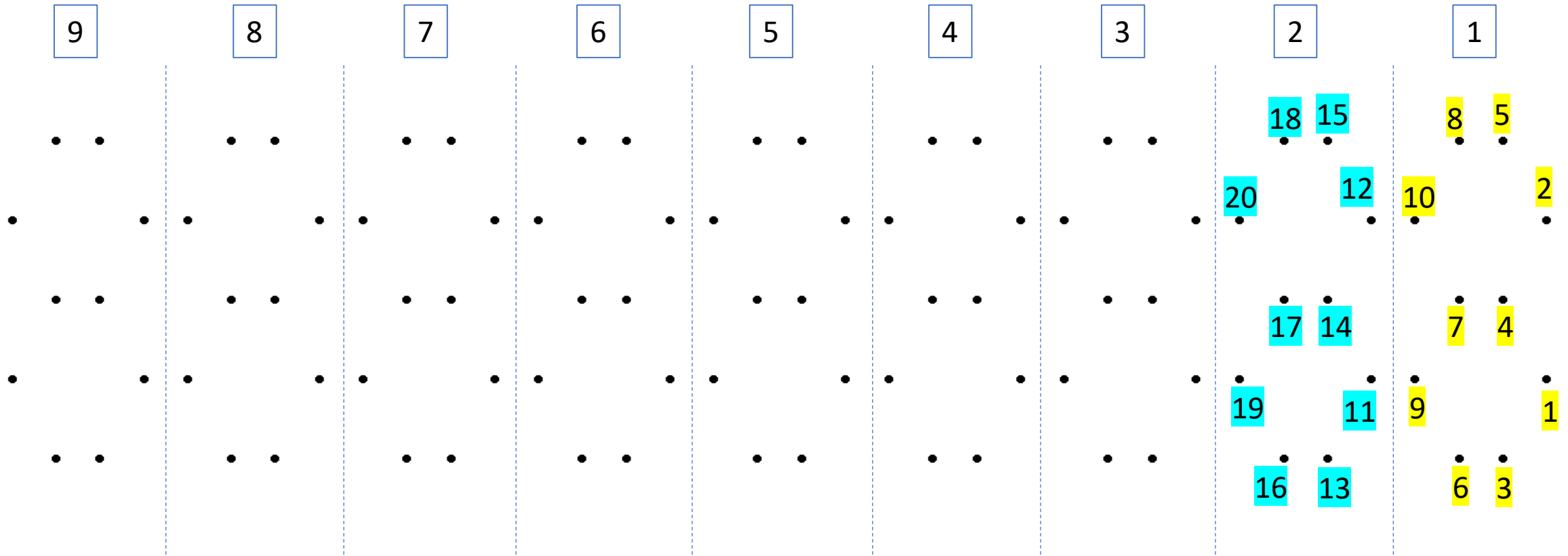
We call here the numbers spigot or connector numbers

In the following pages I present the correct mapping from inside PMTs to digitizer channels

The numbers here are for PMT positions, they are not mapped to the left picture:

- Black is the position code
- Blue is the mapping to the left (for 1L-1)
- Note the above mapping is not true for all, a few sectors have slightly difference

The numbering to the PMTs (I “think” this is we want to use)



South

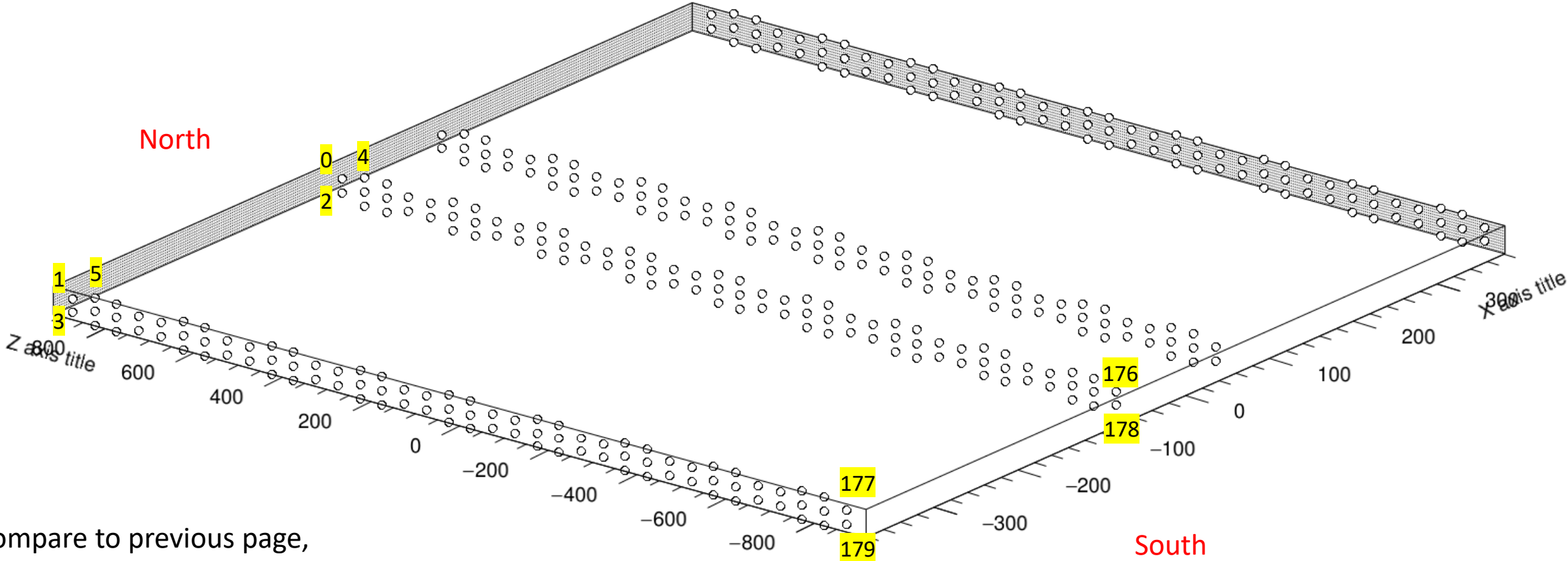
North

WW or 1L, from 1 to 90, counting from north to south;
 WE or 1R, from 91 to 180, also from north to south;
 EW or 1L, from 181 to 270;
 EE or 2R, from 271 to 360

Here, the number sequence 1, 2, 3, ..., indicates the pattern.

The previous mapping is not the same as used in the simulation

The mapping in the simulation:



Compare to previous page,

The same: Counted from north to south

The diff:

- counted WW and WE together (in previous WW, then WE)
- from 0 to 179 for the west, and 0 to 179 again for the east (in previous, 181 to 360 for the east)

From the PMTs to the digitizer channels ...

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	pmt_id	pmt_sn	sector_label	ch_number	pmt_position_c	hv_cable_label	signal_cable_la	light_fiber_labe	digitizer_label	digitizer_ch_nu	hv_supply_labe	hv_supply_ch_number	
2	1	FB0218	1L-1	7	1	B23-07	A10-07	1	WW-Top-A	7	PMT1-RA1	7	
3	2	FB0193	1L-1	9	2	B23-09	A10-09	1	WW-Top-A	2	PMT1-RA1	9	
4	3	FB0228	1L-1	6	3	B23-06	A10-06	1	WW-Top-A	8	PMT1-RA1	6	
5	4	FB0216	1L-1	8	4	B23-08	A10-08	1	WW-Top-A	13	PMT1-RA1	8	
6	5	FB0177	1L-1	10	5	B23-10	A10-10	1	WW-Top-A	1	PMT1-RA1	10	
7	6	FB0178	1L-1	1	6	B23-01	A10-01	1	WW-Top-A	10	PMT1-RA1	1	
8	7	FB0163	1L-1	3	7	B23-03	A10-03	1	WW-Top-A	14	PMT1-RA1	3	
9	8	FB0180	1L-1	2	8	B23-02	A10-02	1	WW-Top-A	3	PMT1-RA1	2	
10	9	FB0181	1L-1	5	9	B23-05	A10-05	1	WW-Top-A	9	PMT1-RA1	5	
11	10	FB0158	1L-1	4	10	B23-04	A10-04	1	WW-Top-A	4	PMT1-RA1	4	
12	11	FB0182	1L-2	7	1	B29-07	A33-07	2	WW-Top-A	11	PMT1-RA1	17	
13	12	FB0190	1L-2	9	2	B29-09	A33-09	2	WW-Top-A	6	PMT1-RA1	19	
14	13	FB0194	1L-2	6	3	B29-06	A33-06	2	WW-Top-A	12	PMT1-RA1	16	
15	14	FB0174	1L-2	8	4	B29-08	A33-08	2	WW-Top-A	15	PMT1-RA1	18	
16	15	FB0154	1L-2	10	5	B29-10	A33-10	2	WW-Top-A	5	PMT1-RA1	20	
17	16	FB0191	1L-2	1	6	B29-01	A33-01	2	WW-Top-B	8	PMT1-RA1	11	
18	17	FB0173	1L-2	3	7	B29-03	A33-03	2	WW-Top-B	15	PMT1-RA1	13	
19	18	FB0254	1L-2	2	8	B29-02	A33-02	2	WW-Top-B	1	PMT1-RA1	12	
20	19	FB0229	1L-2	5	9	B29-05	A33-05	2	WW-Top-B	7	PMT1-RA1	15	
21	20	FB0206	1L-2	4	10	B29-04	A33-04	2	WW-Top-B	2	PMT1-RA1	14	
22	21	FB0025	1L-3	7	1	B26-07	A13-07	3	WW-Top-B	9	PMT1-RA1	27	
23	22	FB0207	1L-3	9	2	B26-09	A13-09	3	WW-Top-B	4	PMT1-RA1	29	
24	23	FB0230	1L-3	6	3	B26-06	A13-06	3	WW-Top-B	10	PMT1-RA1	26	
25	24	FB0248	1L-3	8	4	B26-08	A13-08	3	WW-Top-B	13	PMT1-RA1	28	
26	25	FB0171	1L-3	10	5	B26-10	A13-10	3	WW-Top-B	3	PMT1-RA1	30	

A full list can be seen at

https://docs.google.com/spreadsheets/d/1r4G8MaU09J3WB_N5FxFgdtMwahzgpSIUHfENAhT-Nlc/edit?usp=sharing

Summary

- It will be simpler if we just make a one-to-one mapping: mapping each PMT directly to a digitizer channel. This has been done.
- It will be better if we use the same mapping, currently I defined a different one compare to what is used in the simulation
- What's used in the simulation looks a little weird to me, but maybe that's a better way, we need to understand it.