

Aerogel A1 study

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Find the performance of Aerogel A1 in Both sides

- A Side

- 1.Setup for taking the cosmic data.
- 2.Using a initial high voltage (for example 2430V) for every PMT to take data and get ADC raw signal.
- 3.Through adjusting the high voltage to align the ADC raw signal.
- 4.After almost aligning the ADC signal, we get the performance distribution for every individual channel in different position.

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Continuing

5. We took data in four different positions and got the performance distribution

- B side

Same procedure as A side

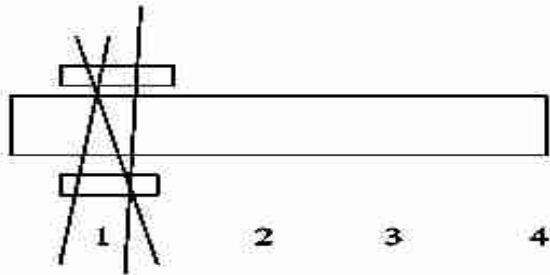
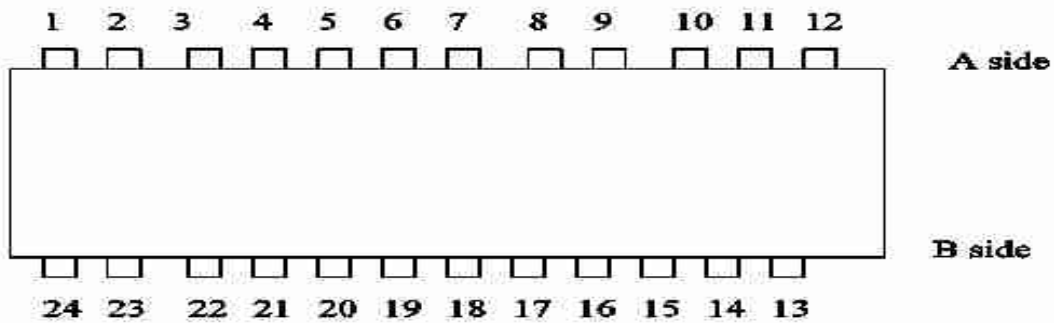
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The result of A side and B side as the following:

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The result of A side and B side as the following:

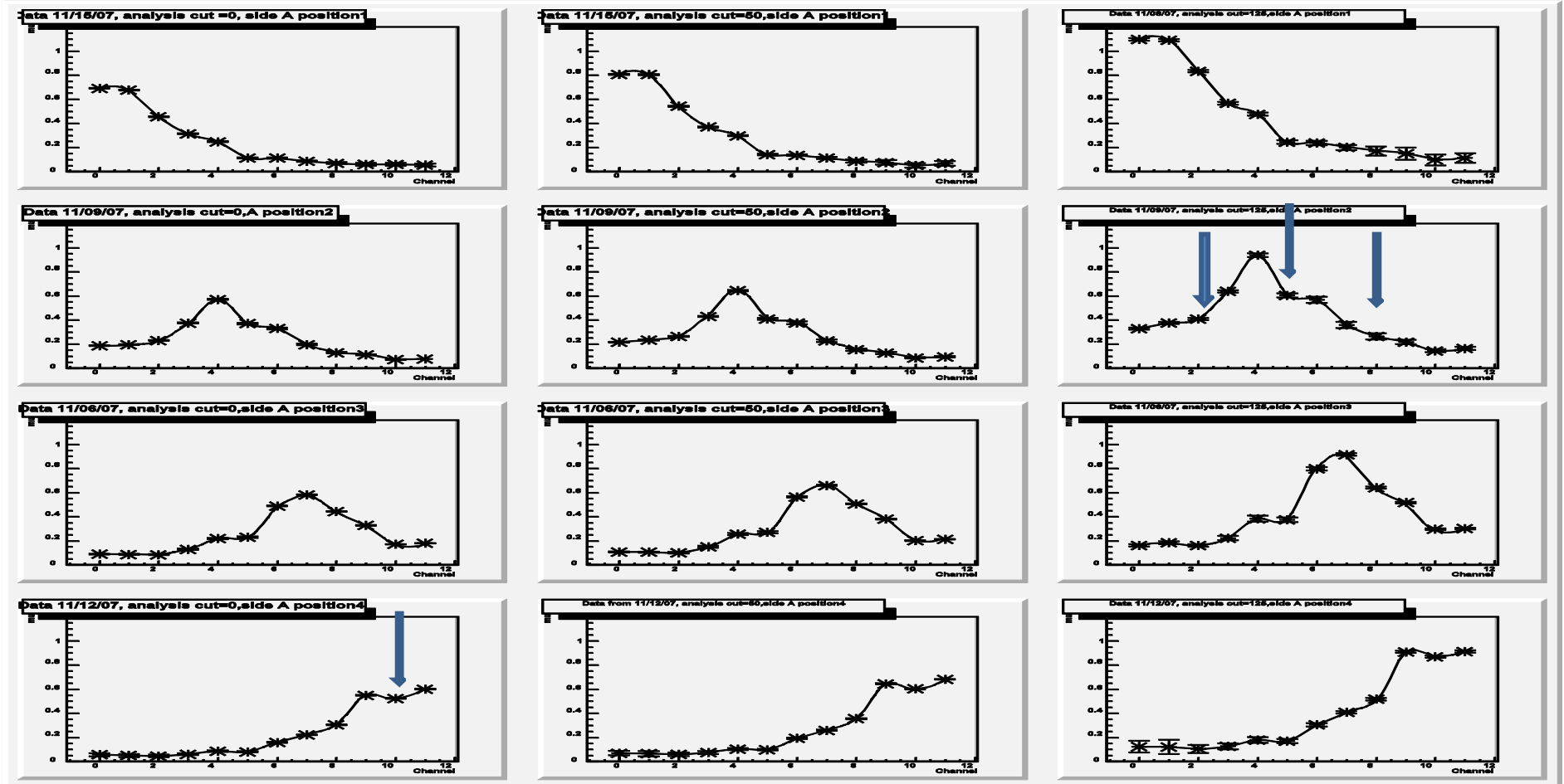
Before changing PMTs, the total performance of the Aerogel A1



	1	2	3	4
Aside	2.86	2.93	2.98	2.86
Bside	2.95	2.85	3.13	2.75

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A side of performance before replacing PMTs

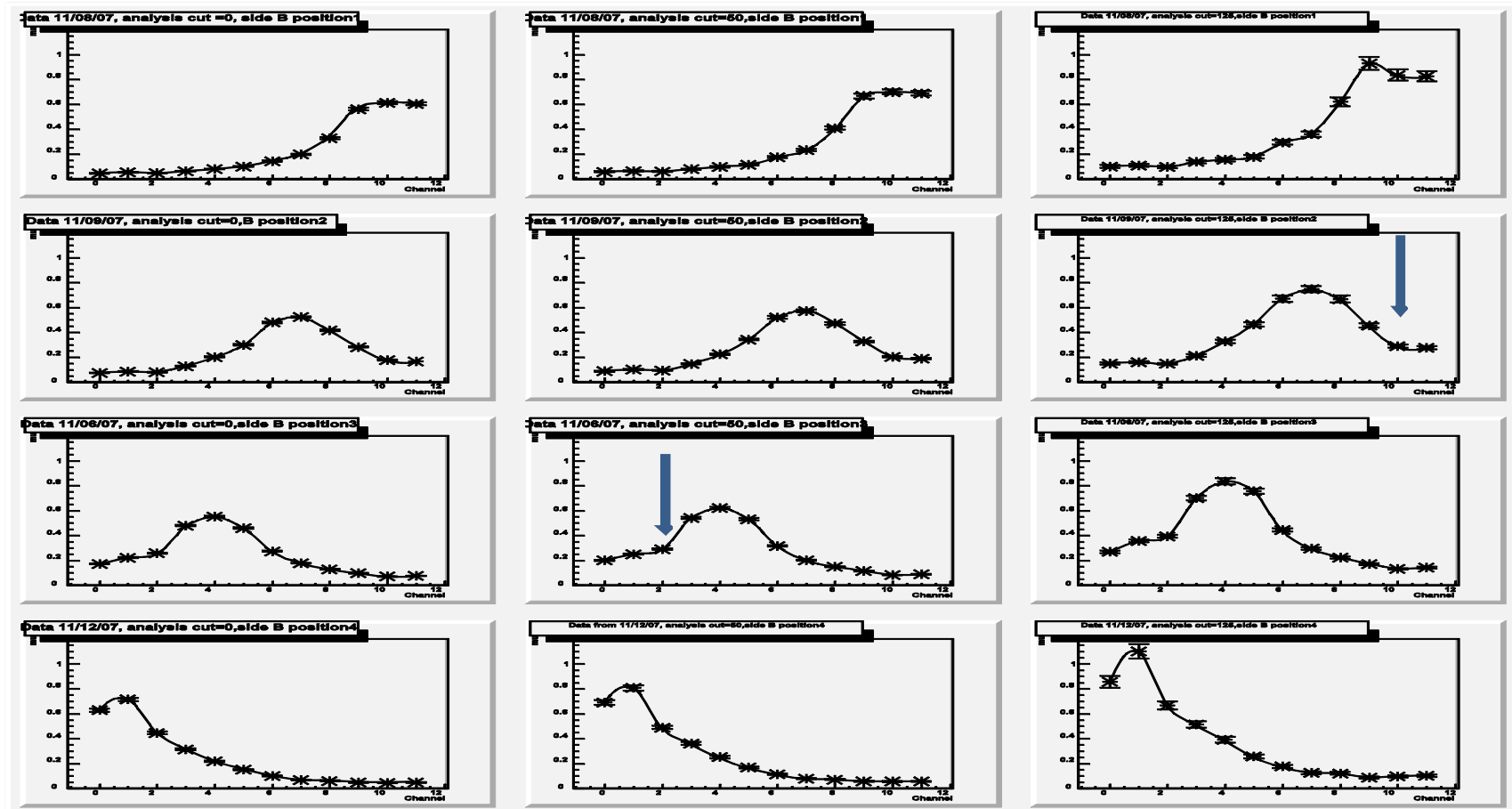


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B side of performance before replacing PMTs



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We found the A side looks not so good, we need modify lots on A side, fortunately the B side is much better than A side, but we still need to make some improvement in side B as the arrow pointed out in the previous diagrams.

So, we check and modify the A side first.

1. Because we do not plan to buy new PMTs, we try to find some relative good PMTs in the old PMTs.

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2. First we replaced the Channel No. 6 PMT (because it is the worst channel) using an old PMT, we found the performance in Channel No. 6 was also not good (some reference data and diagrams), because I use 5 old PMTs to replace it, and the result was almost the same during that time, so I suspected the Aerogel in channel No. 6 has some problems or all the five old PMTs are not good.

3. Lingyan Zhu recommended me to exchange the PMTs between the channel No. 1 and No. 6, and let the good PMTs in the middle position.

4. The result is that the performance in channel No. 6 looks good.

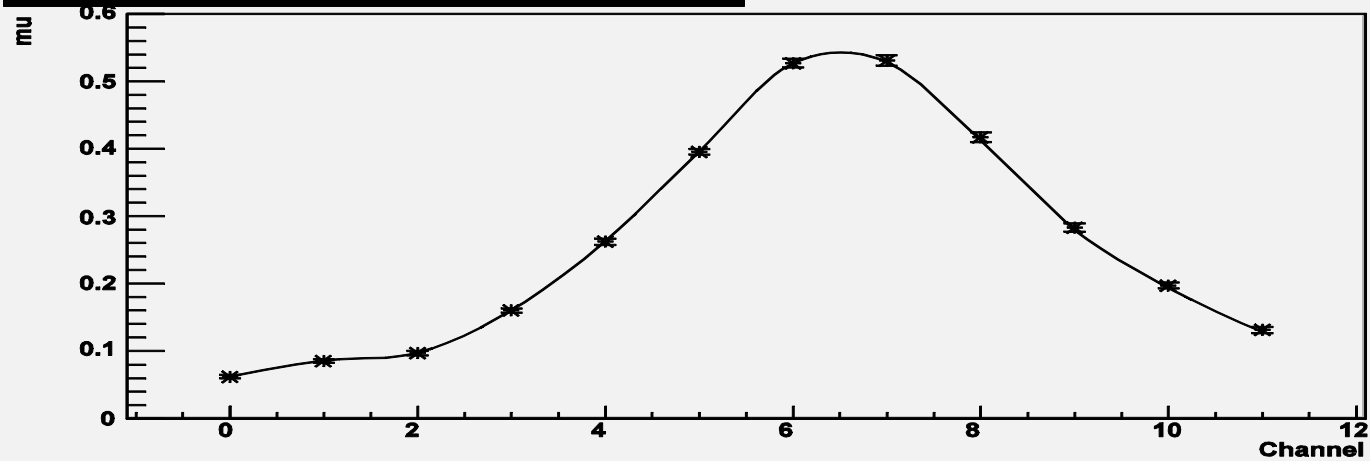
5. That means the five old PMTs are not good.

6. I exchange PMTs between channel No. 2 and channel No. 8, and we can find the performance distribution looks good in position 3, we also took data in position 2, and we found it is not good in channel 1, 2, and 3.

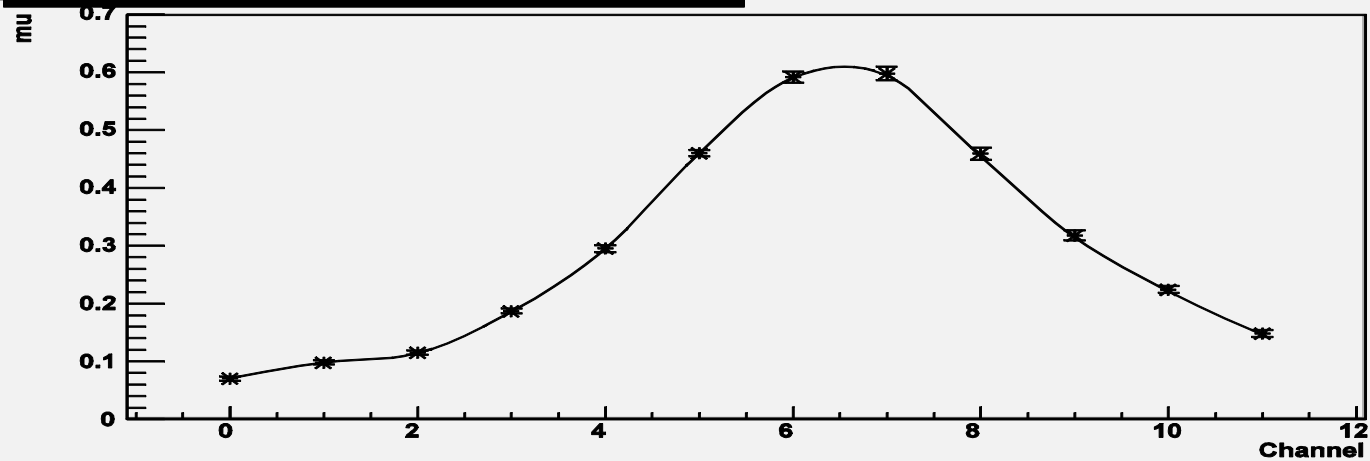
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A side position 3, individual channel performance

Data 11/28/07, analysis cut =0, side A position3



Data 11/28/07, analysis cut=50, side A position3

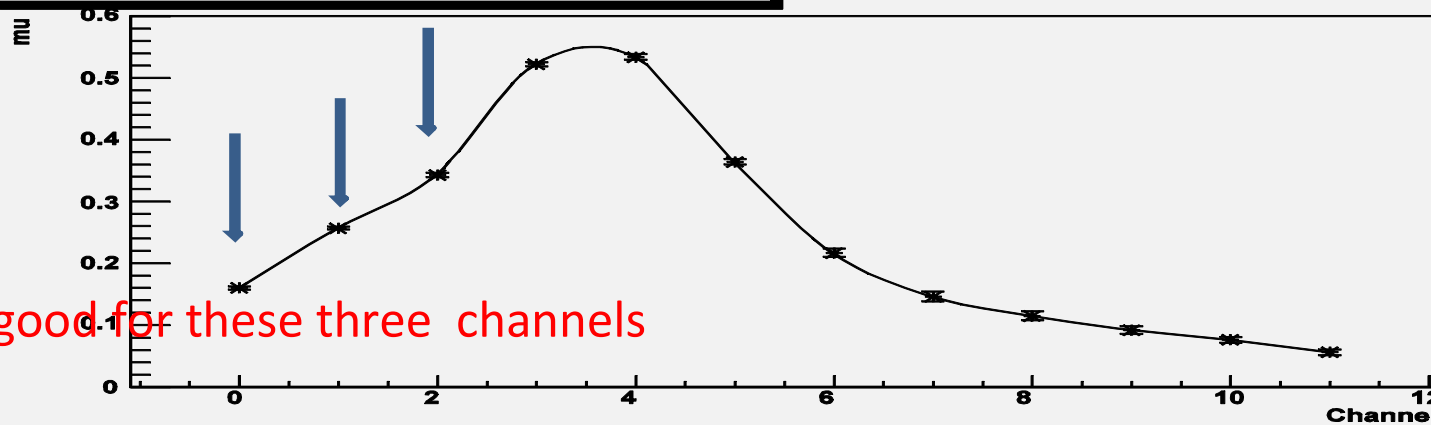


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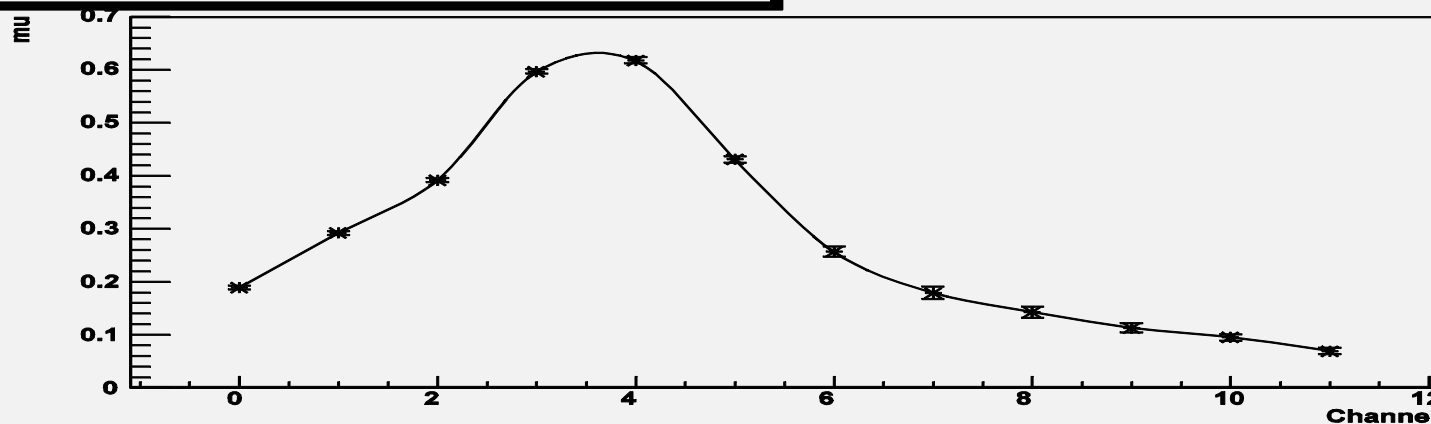
A side position 2, individual channel performance

Data 11/29/07, analysis cut =0, side A position2



Not good for these three channels

Data 11/29/07, analysis cut=50,side A position2



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We still need to replace the PMTs in Channel 1,2,3 in A side. So we need to find relative good PMTs in the old PMTs(or buy new PMTs, but the new good PMTs will be too good to compare with the other PMTs, Yi Qiang said.) We have already taken the other 17 old PMTs from the physical building, and we need to check them and find relative good ones.

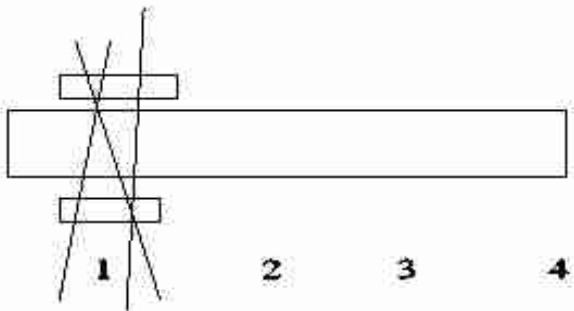
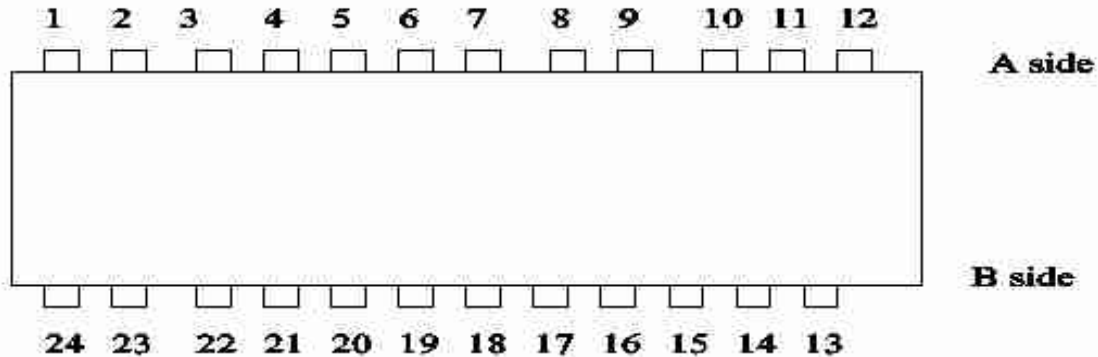
Good news: we need not change Aerogel, but we need to find relative good PMTs to replace the bad ones. Or we just leave the not good ones in both end channels, and make sure the performance of middle channels are good.

Because B side is better than A side, we only need to replace PMTs at channel 15 and channel 23, we have already exchanged between channel 15 and 13 and between channel 23 and 24, but we need further time to process the procedure, and make sure it is relatively ok or we need to replace those PMTs of bad performance.

In side B, if the performance distribution looks good(we need time to check it the previous looks ok for our experiment), the overall performance meets the requirement for our transversity experiment. In side A, the performance distribution already looks good, but because all the not good PMTs gather in the channel 1,2,3(one side), we need to replace these PMTs(1,2,3) or just exchange PMTs between channel 3 and channel 12.

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After changing PMTs, the total performance of the Aerogel A1



	1	2	3	4
A side				
		2.88	3.15	
B side				

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Acknowledge

- Thank Bogdan for instructions and Albert's help.
- Thank Yi Qiang for verification.
- Thank Vahe for test procedure.