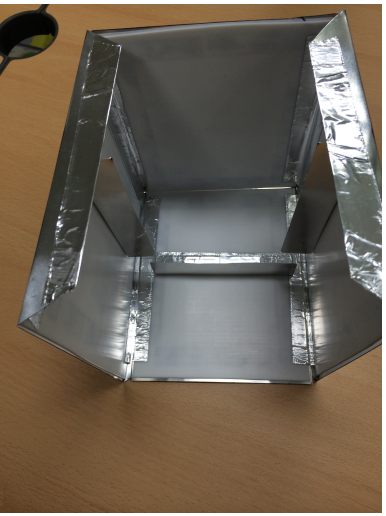
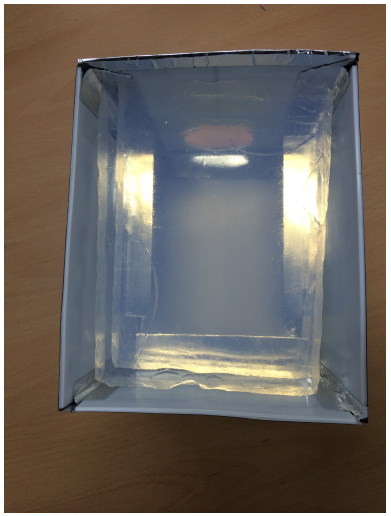
Cosmic test of FAC basic model

Teflon sheet is used for reflector(diffuse reflection).

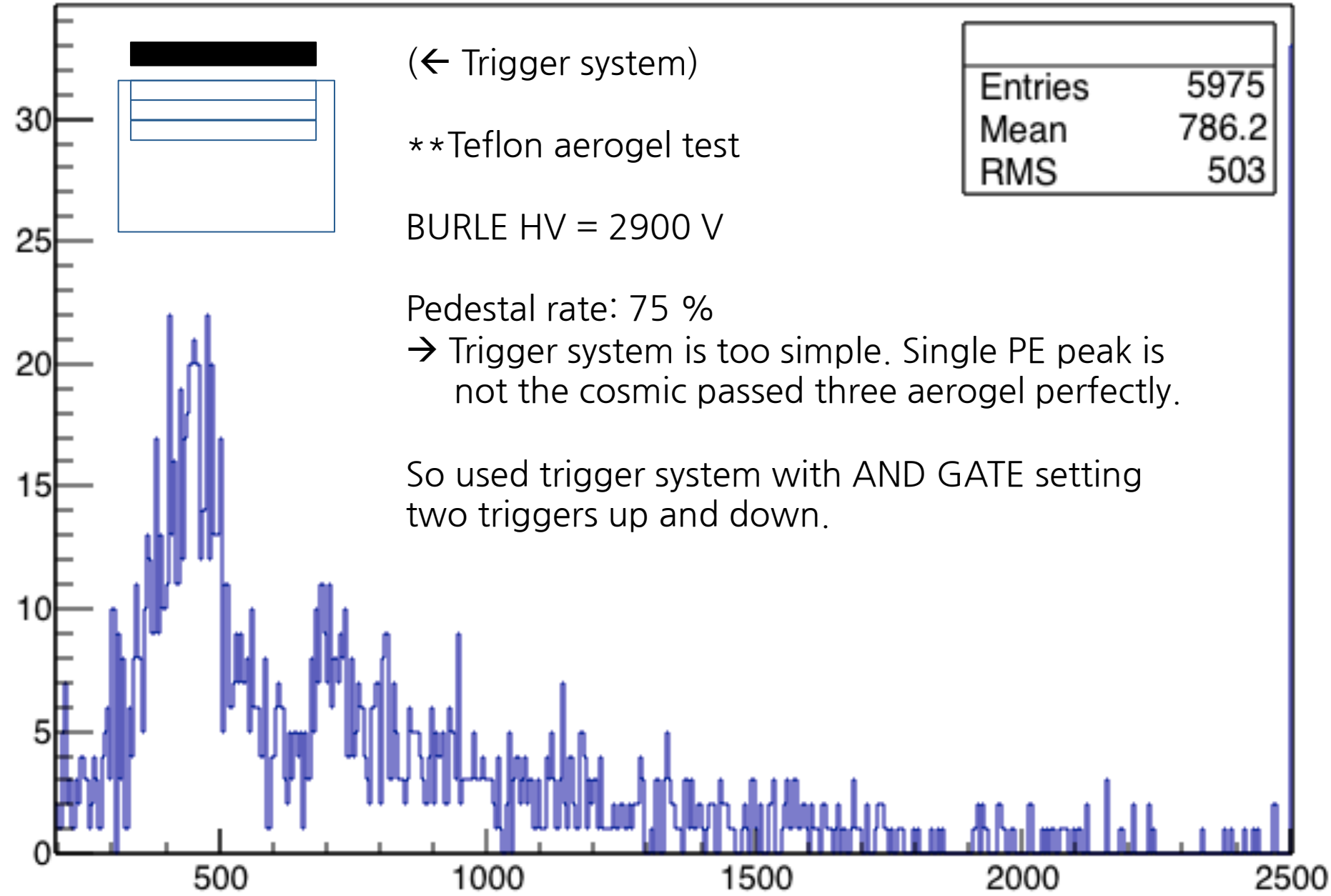
It will be tested this afternoon.

And will test one more basic model including mirror. → Aerogel prototype test

→ will prepare mockup light box.

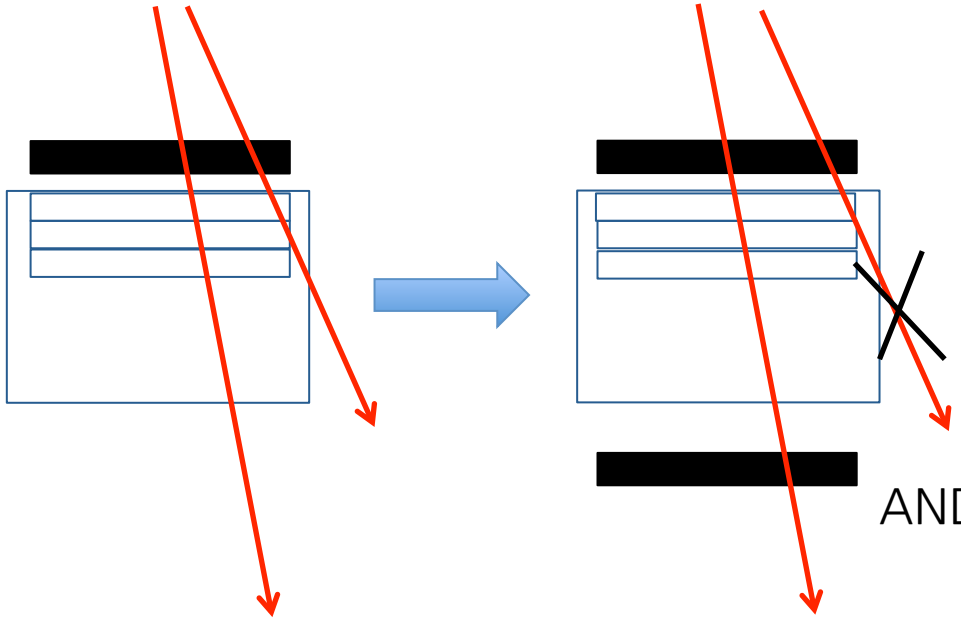
→ If it is prepared without delay, will test using E14 beam at J-PARC.

Teflon reflector model

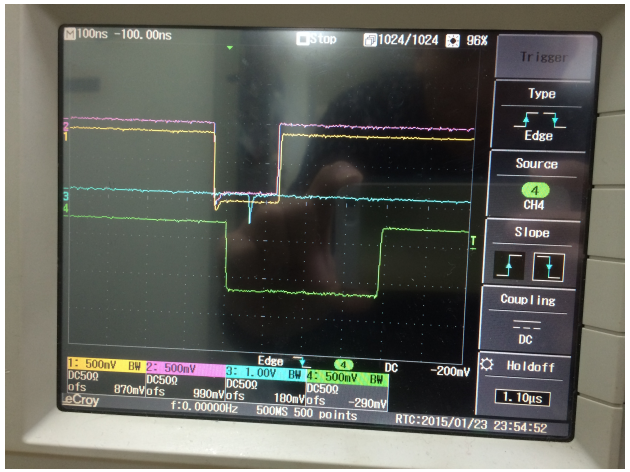


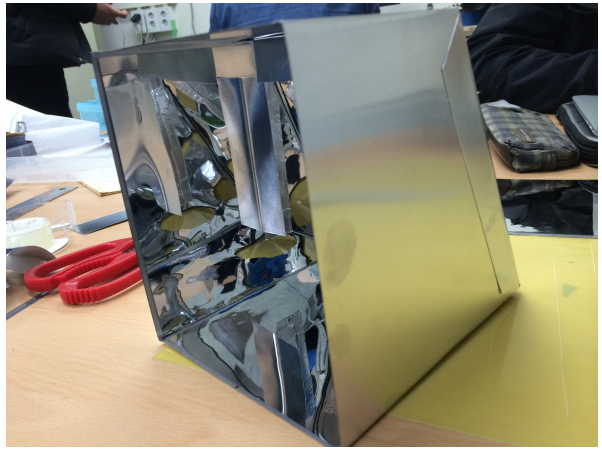
Teflon vs Al refelctor

Tested two reflector setup(Al and Teflon).



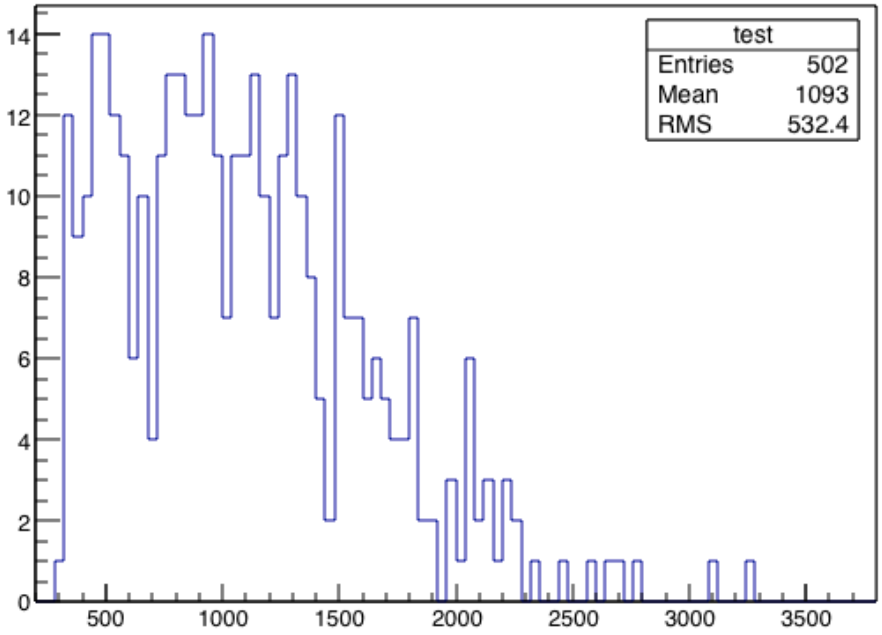
AND GATE





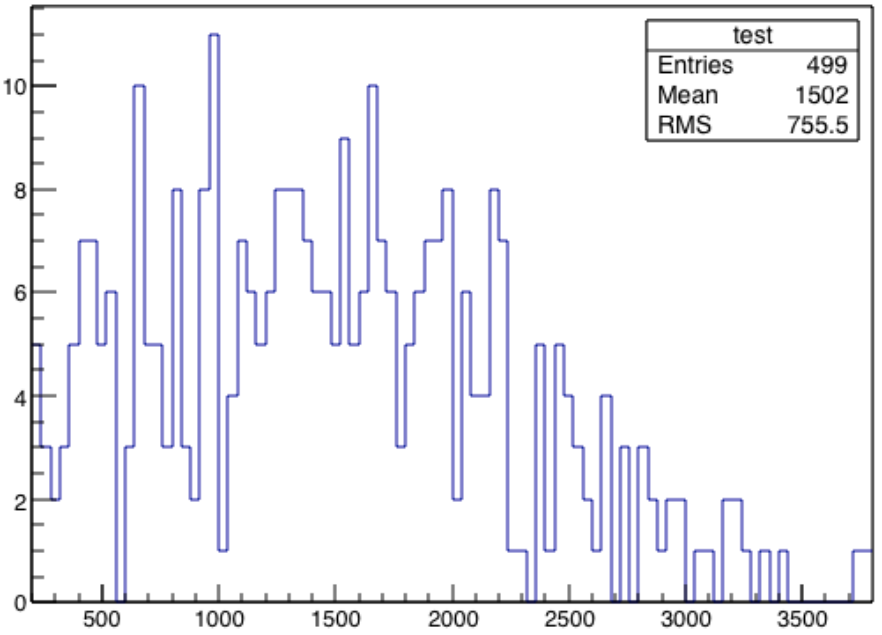
For more effective light collection, tilted the backside plate about 25°.
(Since all cosmic don't cross the aerogel vertically, don't have to use 45° slope.)

Teflon vs Al reflector



Teflon

VS



Al

Al reflector shows better light collection(This agrees with another experimental group's simulation result. Al gives shorter flight length for light due to slope.).

But actually trigger length is a little longer than aerogel dimension.

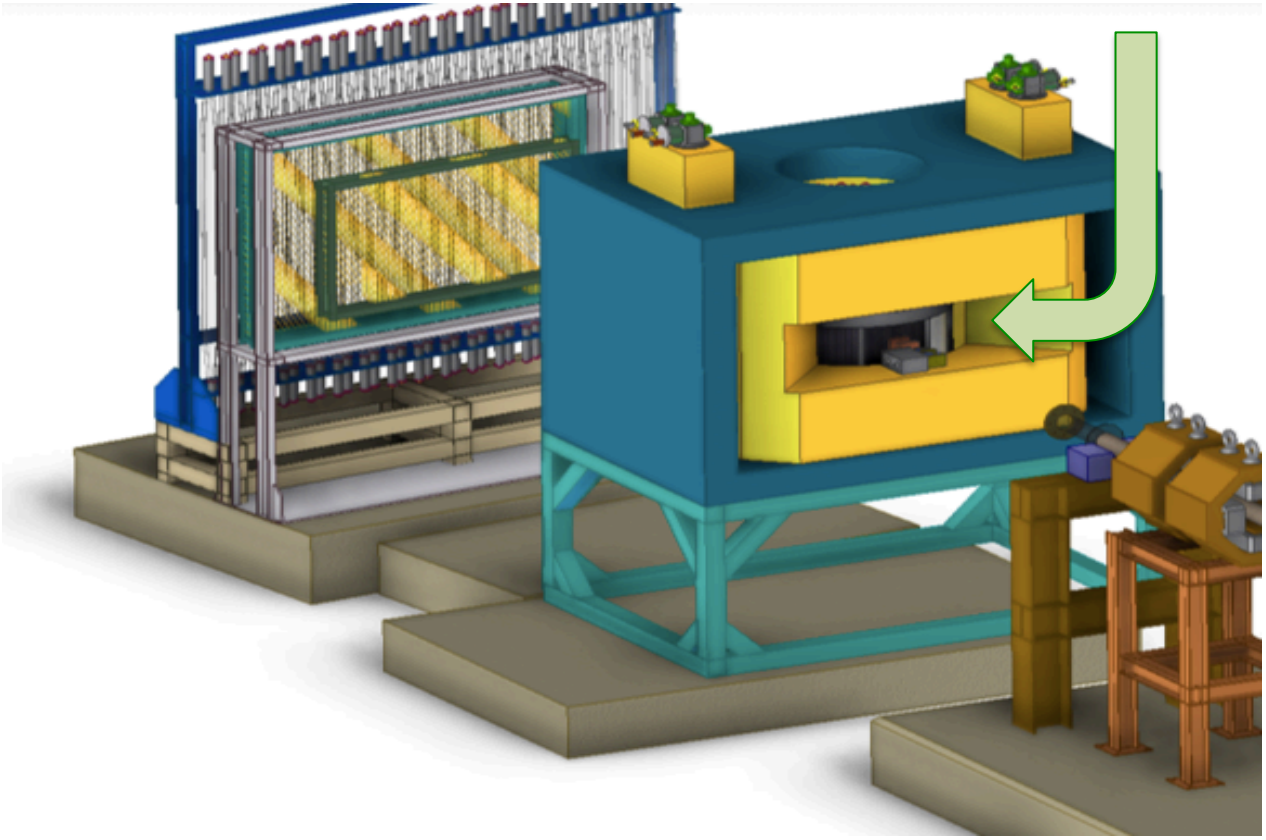
→ One more trigger for 3 AND GATE is needed.

ADC is recorded in broad range.

→ Lower PMT HV voltage is needed.

→ For the comparison of light yield of n=1.04 and n=1.03 aerogel

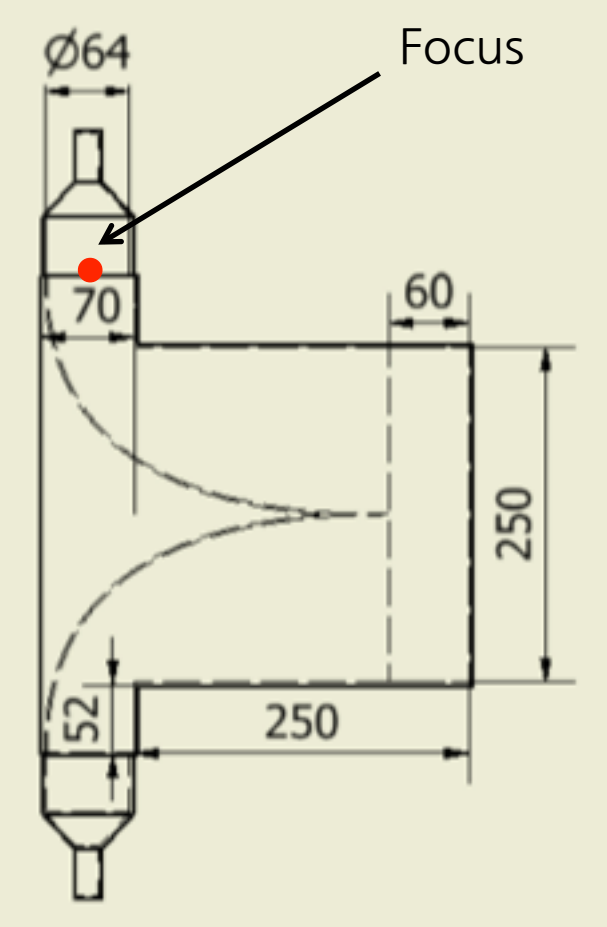
FAC design(with Al reflector)

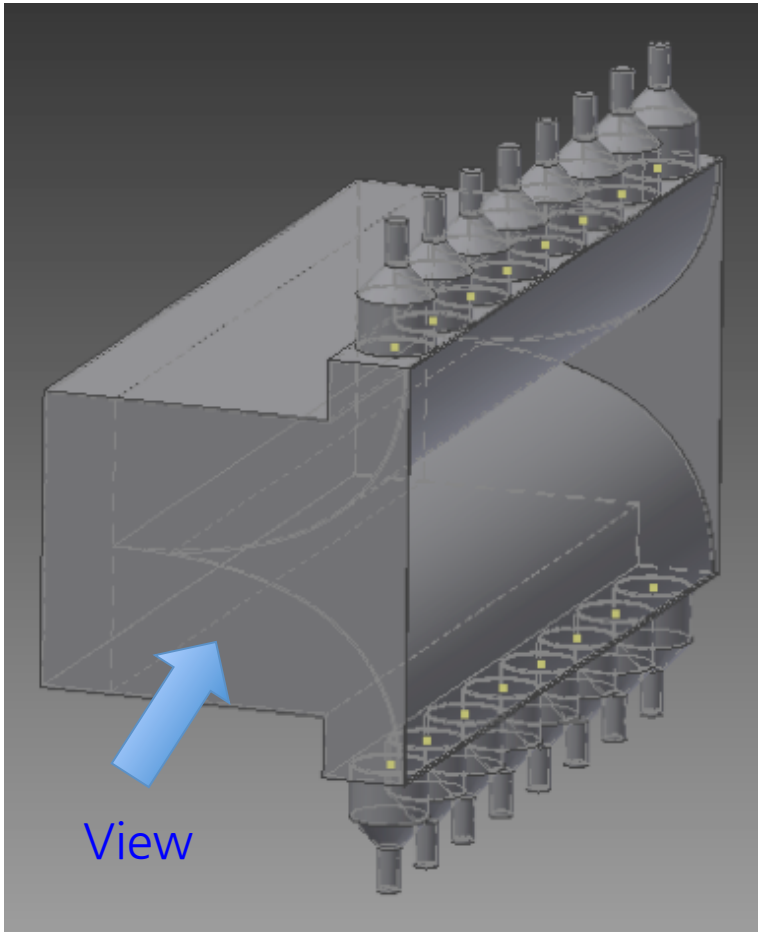


To minimize the area π, K are passing through, we should set the FAC inside the magnet.

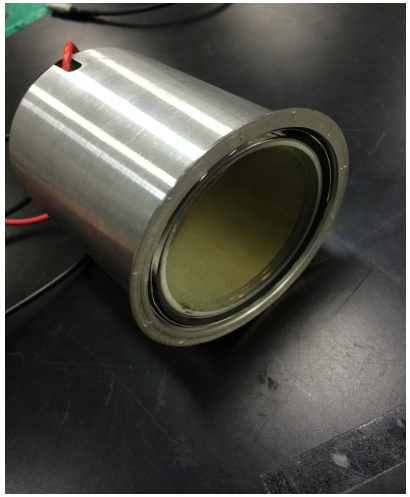
We can use curved surface instead of simple slope for more effective light collection.

FAC design(with Al reflector)





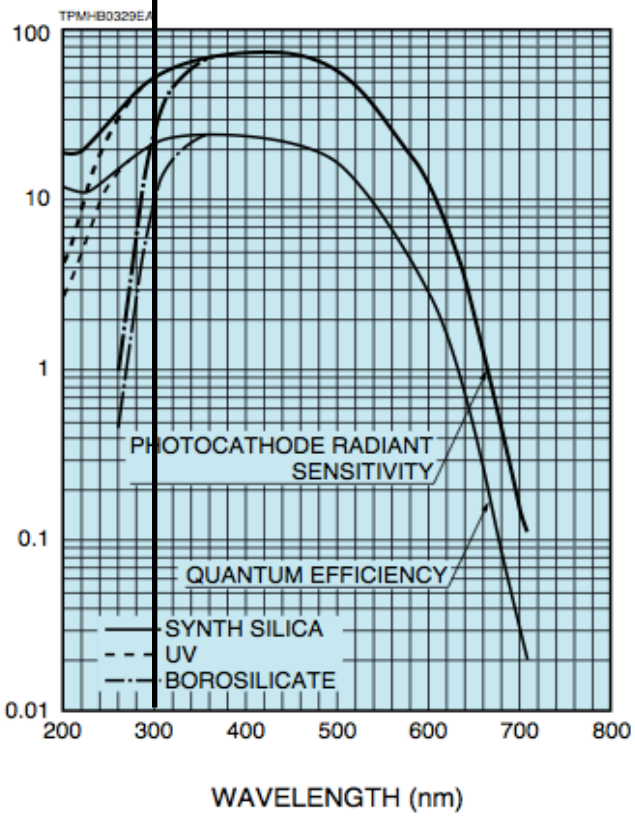
FAC PMT; Fine mesh PMT

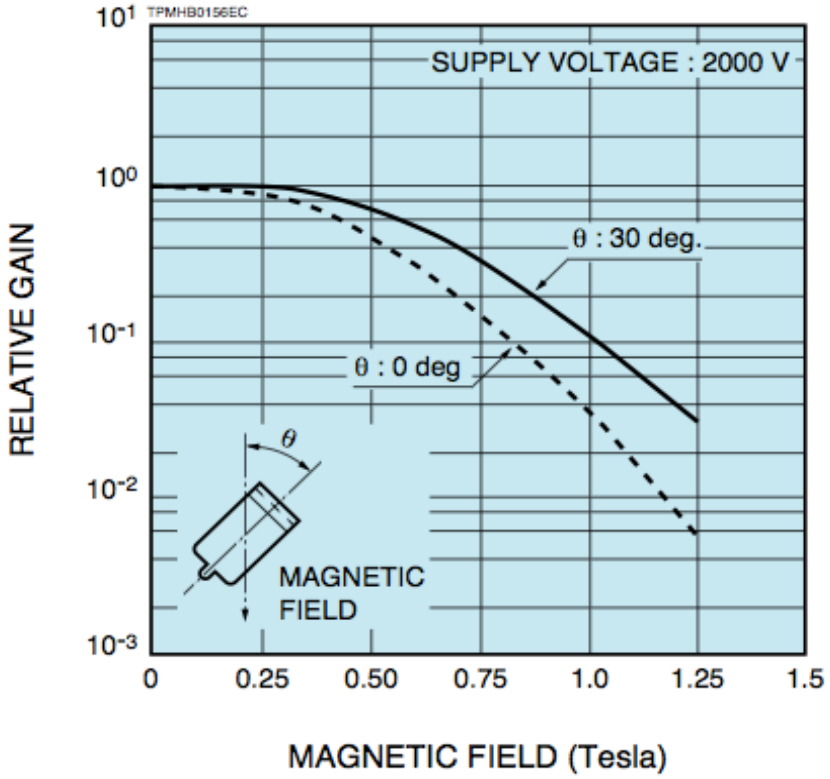


ϕ: 64 mm.

- It is insensitive to B-field up to 0.25 T.

- It is sensitive to wavelength of UV range, not worse than UV PMT. And B-field is too high for magnetic shielding of UV PMT(~0.1 T).

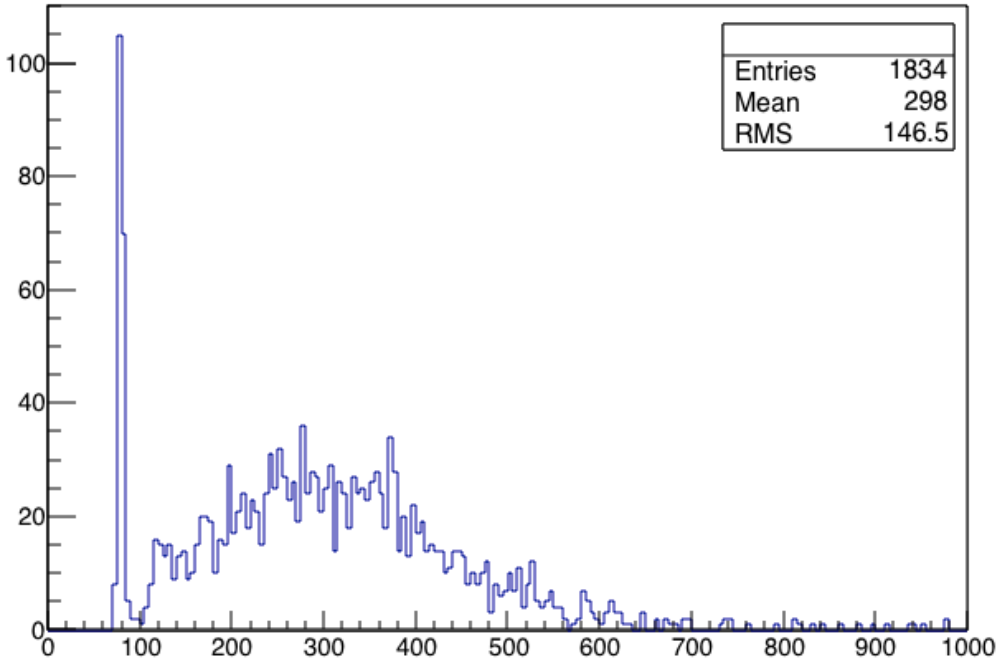




n=1.03 vs n=1.04

** 그동안의 문제점

Trigger들의 Discri threshold를 각각 개인적으로 오실로스코프를 보면서 잡아주었다. 그런데 trigger들의 신호를 모두 오실로스코프로 봤을 때 AND로 나오는 신호들은 반, 혹은 반 이상이 threshold보다 낮은 신호들이었다.(thin scin trigger라서 에너지를 많이 남기지는 않는다, 4×4 cm^2 trigger는 거의 다 threshold보다 낮은 신호들이었다.)
그래서 AND로 나오는 신호들을 오랜시간 보면서 threshold를 다시 잡아줌.



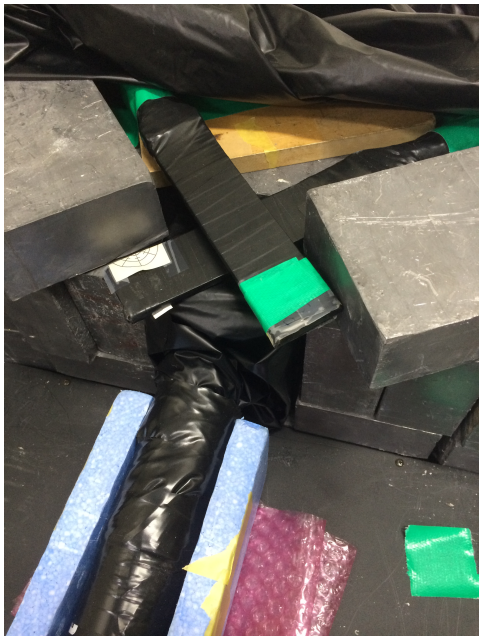
Lower pedestal rate than past ; About 10 %.

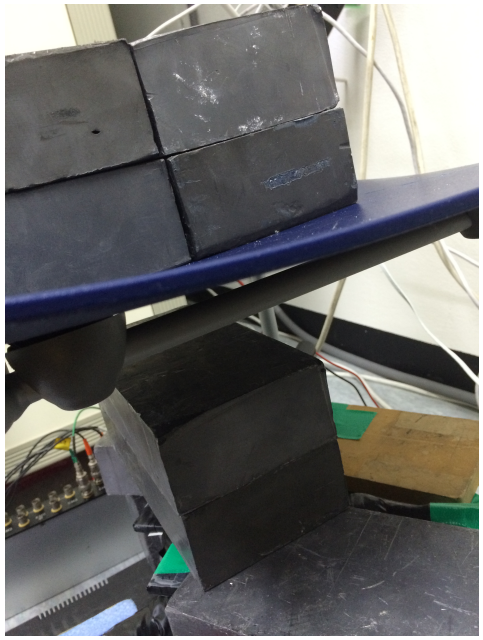
But showed the NPE by cosmic of broad range of momentum.

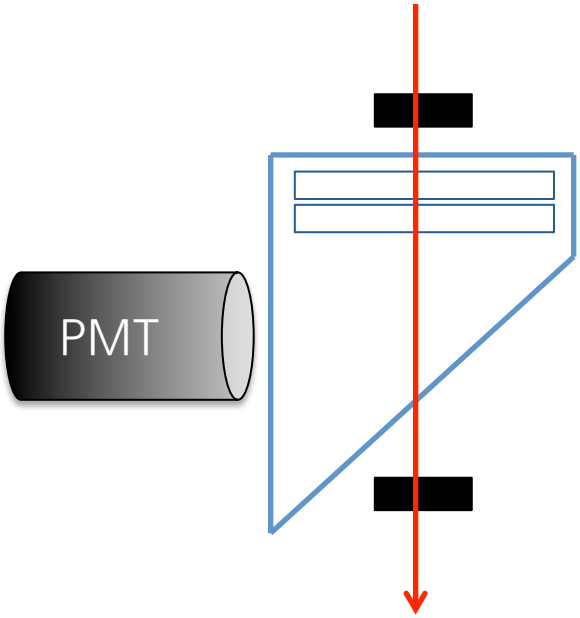
n=1.03 vs n=1.04

So tested cosmic test with Pb for cosmic of higher momentum.

If cosmic of same momentum pass the aerogel, NPE of n=1.04 should be 1.5 times than n=1.03(proportional to $\sin^2\theta$).







Plan

- Will study and test the FM-PMT.
- Compare the NPE of n=1.03 and n=1.04 aerogels.