Reflection Property of Electroplated Lead Plate

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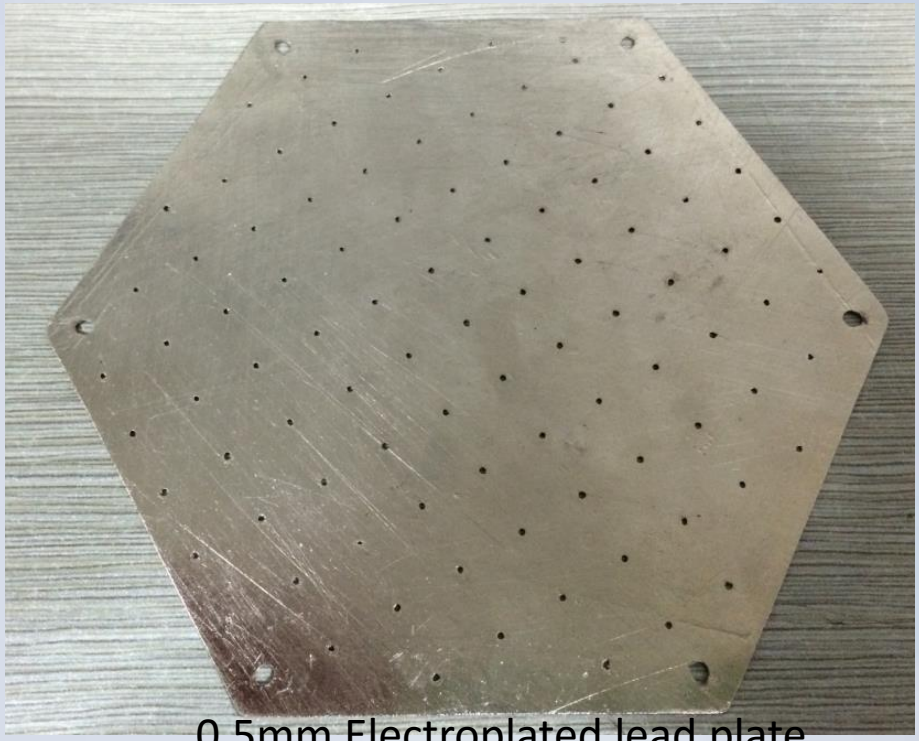
Purpose of Electroplated Lead Plate

- Intend to replace Tyvek paper in Shashlyk module, which will make assembly easier.

Existing electroplate material provided from company:

- Sn(Stannum)
- Double Cu layers +Ni(Nickle)
- Single Cu + Ni
- Cr(Chrome)



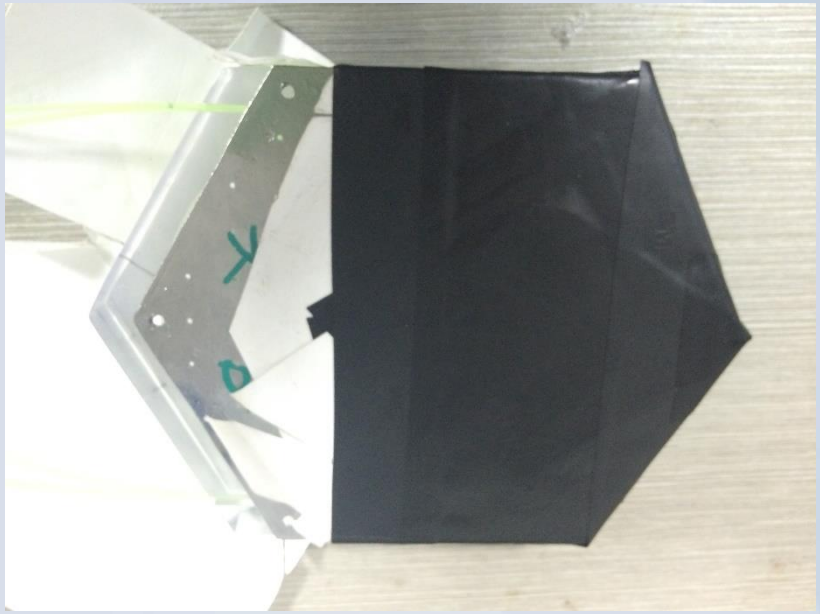
0.5mm Electroplated lead plate

Test Method

Test the collected photo-electron number of preshower scintillator between covered by Tyvek paper and one layer covered by electroplated lead plate. And the plate is placed at the bottom of scintillator.

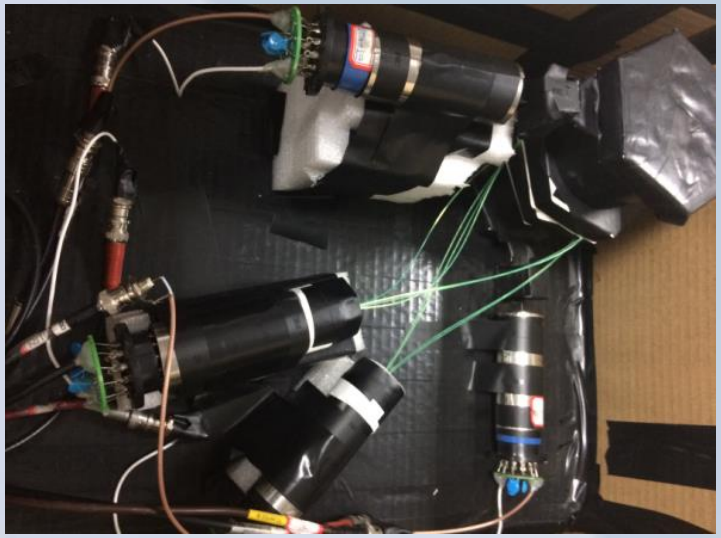
Scintillator property:

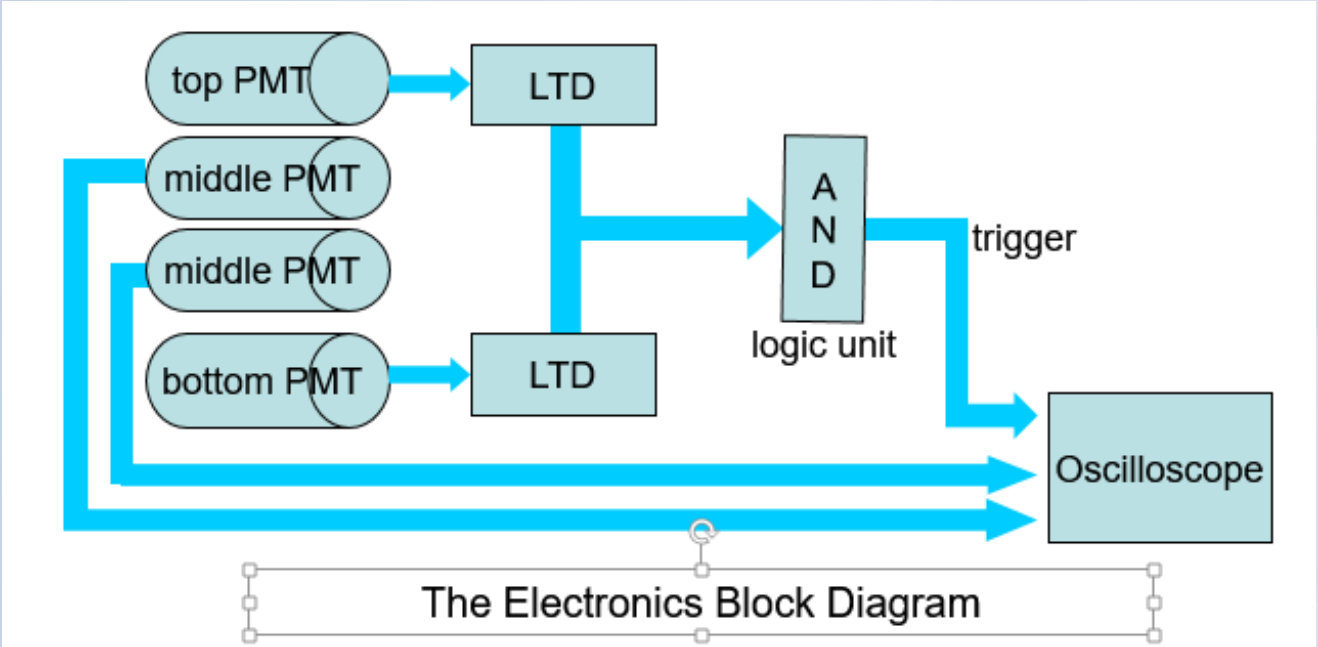
- Hexagon preshower scintillator with 2cm thickness and 6mm deep groove.
- Two 1.2m*Φ1mm WLS fibers, 5 circles in scintillator in all.
- Covered by one layer of 0.24mm Tyvek paper



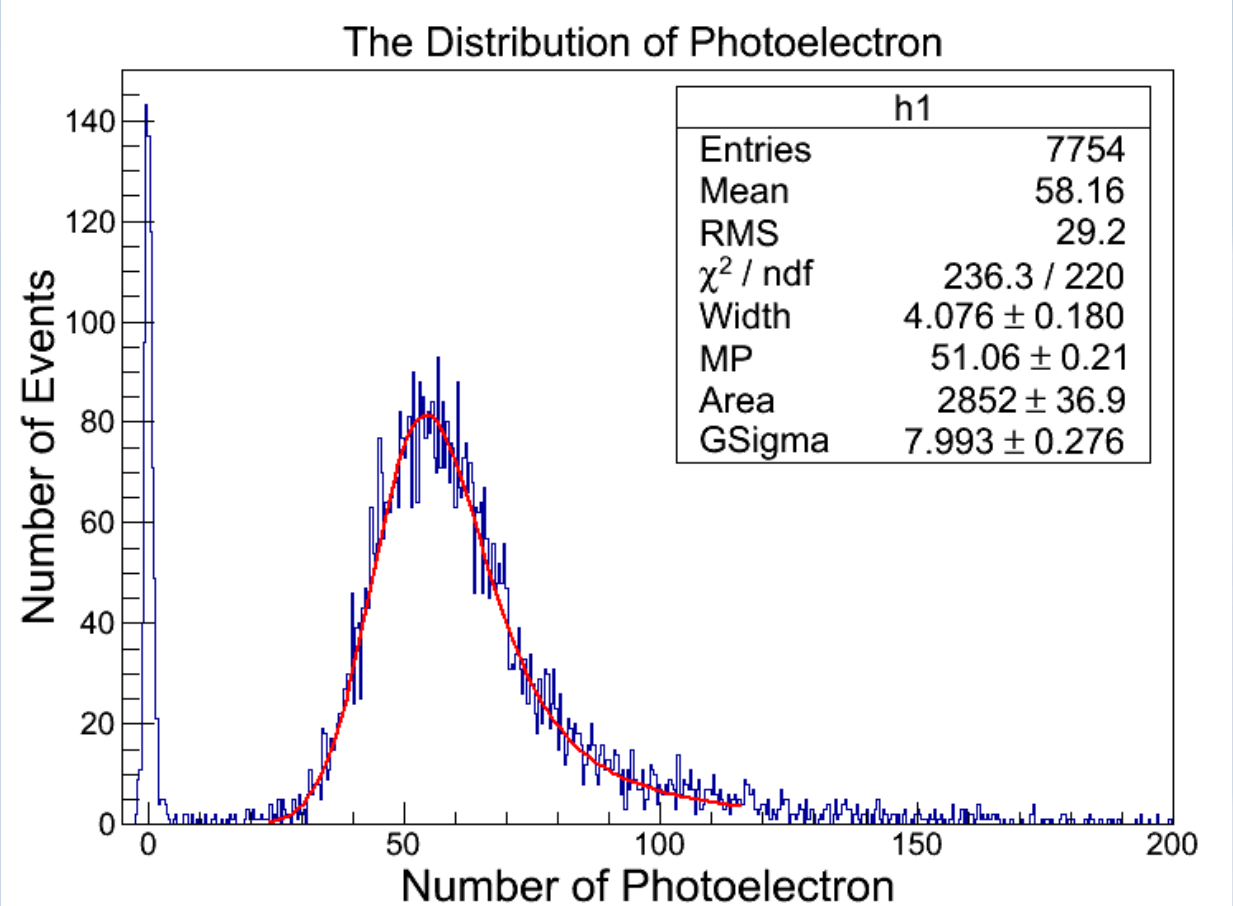
Test Equipment

- Trigger is gotten from top and bottom PMT.
- Tested scintillator is coupled to up middle PMT, the lower middle PMT and scintillator is used for monitoring.





Typical Result and Fitting



Npe(number of photo-electrons) is considered as the peak of fitting curve.

Test Result

Electroplated material	Npe(number of photo-electrons)	Compared to paper
None(Tyvek)	65.86	
Sn(Stannum)	54.23	82.3%
Double Cu layers +Ni(Nickle)	51.51	78.2%
Single Cu + Ni	52.96	80.4%
Cr(Chrome)	53.14	80.7%
Two layers Up: Double Cu +Ni(nickel) Down: Sn	43.1	65.4% (82.3% * 78.2%= 64.3%)

Tips:

- ✓ Sn and Cu can be easily oxidized.
- ✓ Considering one layer lead just cover one third surface of scintillator, reflection property of electroplated plate is about 50% (0.8^3) compared to Tyvek paper.