

WLSF attenuation with different PD packages

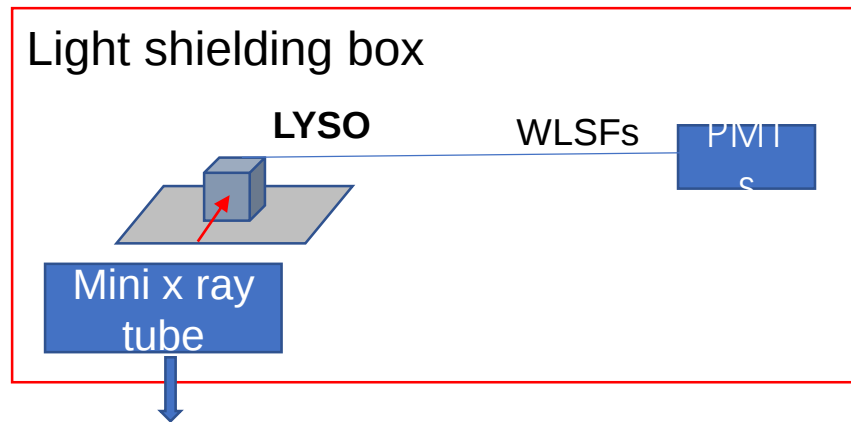
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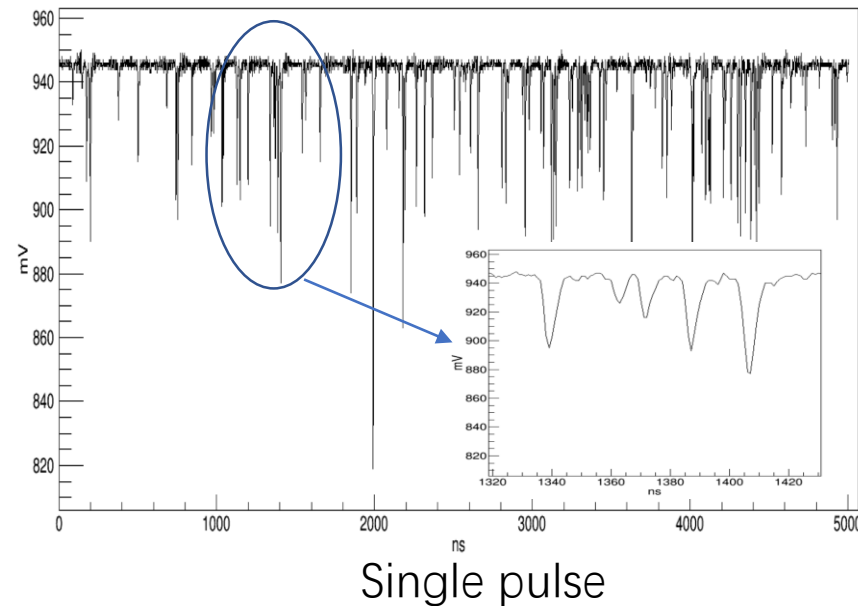
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WLSF measurement

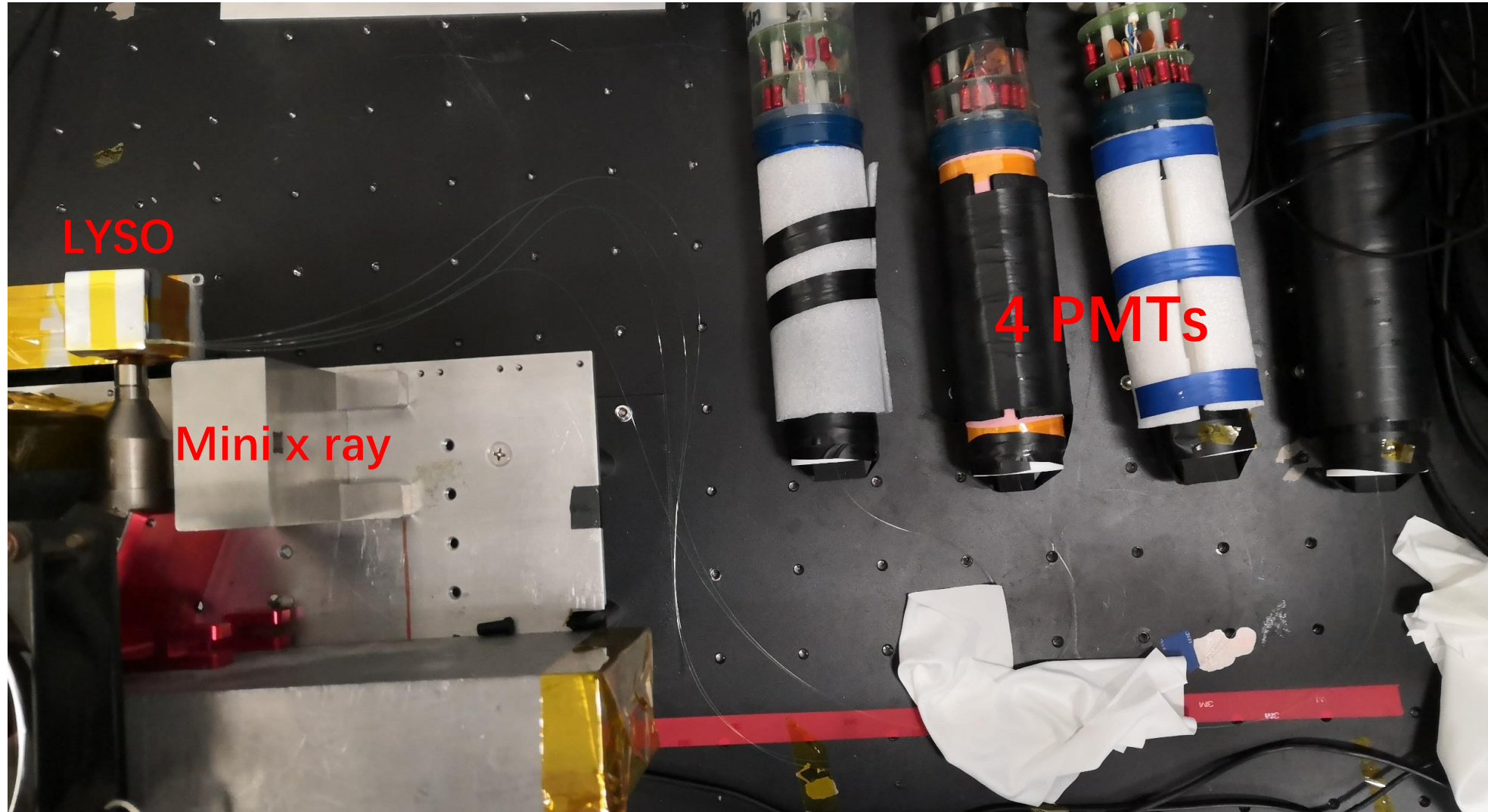
- **Amptek Mini x ray tube(Max HV 50kV)** irradiated LYSO
- Four PMTs XP2020 collected WLSFs light and analyzed by CAEN DT5751
- Mini x ray tube work on **continuous mode** , an external 150Hz signal triggered DT5751 acquire in pulse mode
- The pulse is discrete single P.E. waveshape in PMT linear range
- **Counting number of P.E. of every pulse instead of charge integration**



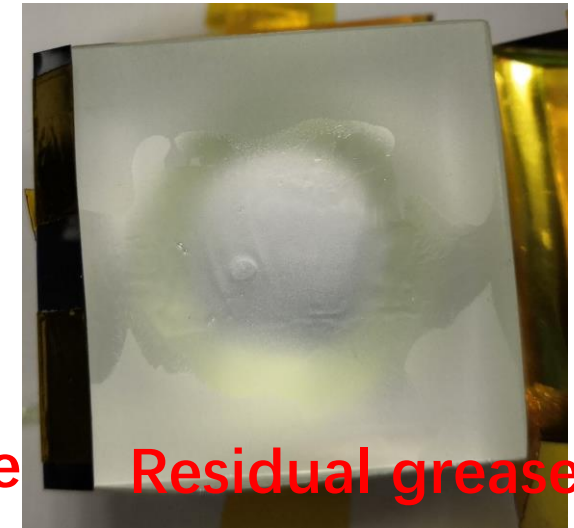
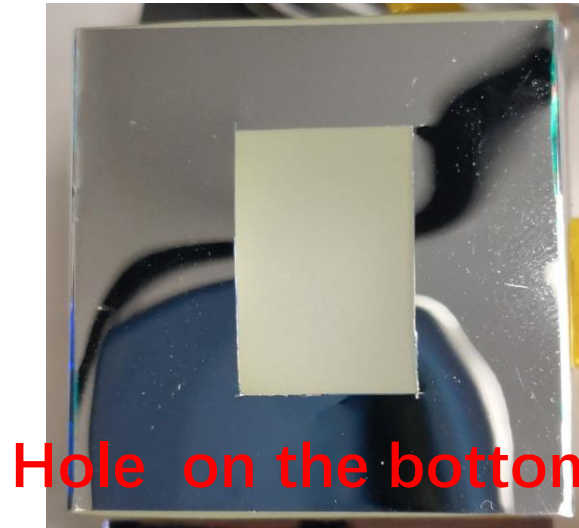
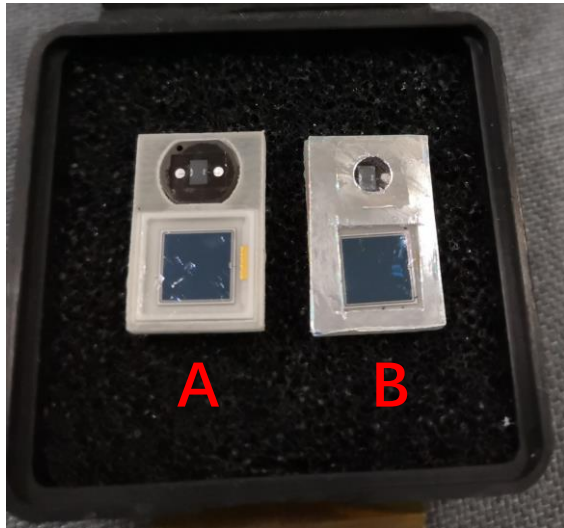
Spot diameter is 2mm after installed collimator



Layout



5 configurations

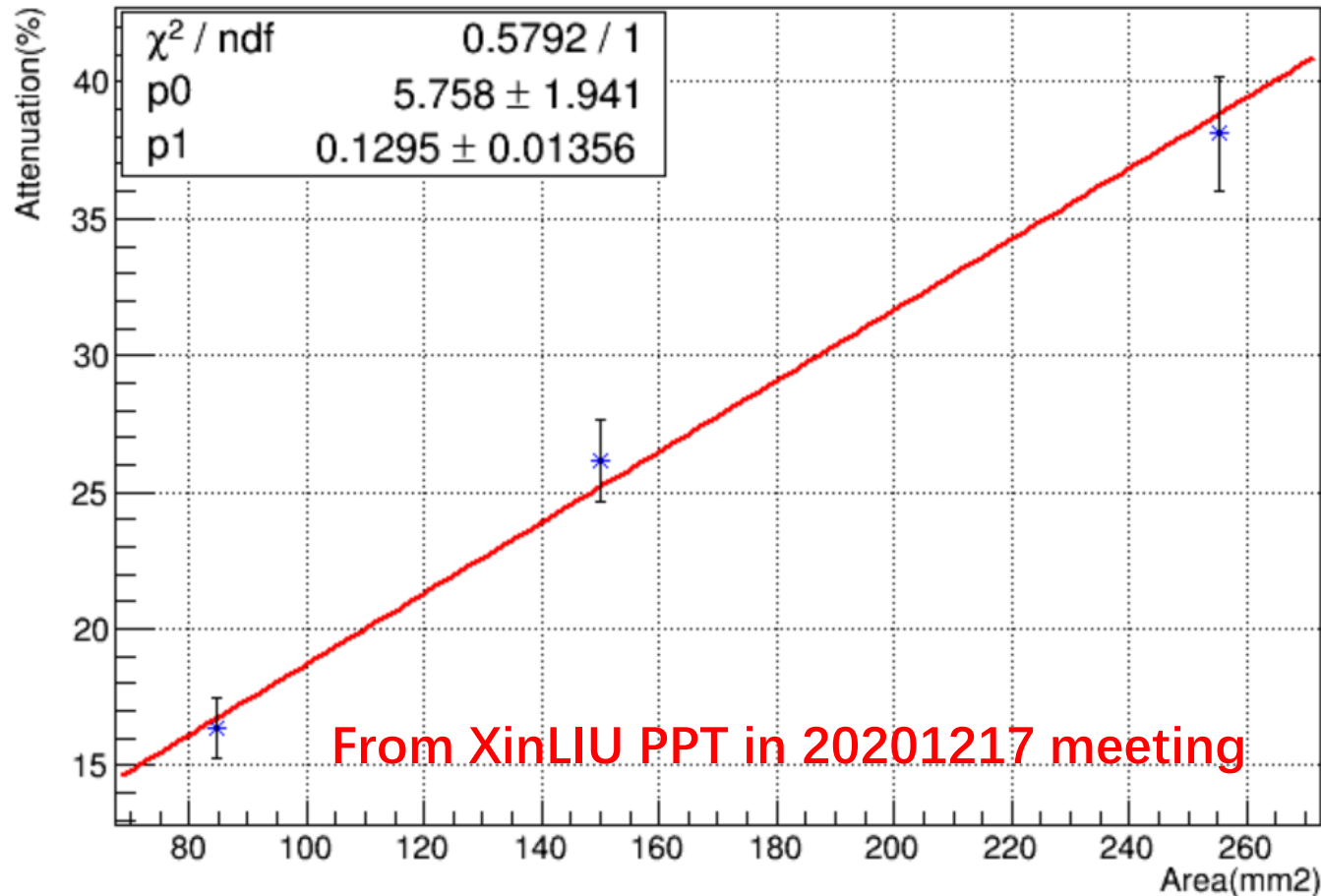


Setup	PD	Medium	$S(i)/S1$	WLSF Att.
S1	None	None	1	0
S2	A	Grease	0.76	0.24
S3	B	Grease	0.90	0.10
S4	None	Grease	0.97	0.03
S5	None	None	1	0

- ESR cover all sides
- The grease: EJ-550 Optical Grade Silicone Grease



Attenuation calculation



Package	Coupling size/mm	Coupling area/mm ²	WSLF attanuuation	
			Test	Cal.
A	15*10	150	0.24	0.25
B	6*6+φ3	43.065	0.10	0.11

Coupling PD area with sylgard 184 VS attenuation

✓ The attenuation may be linearity with coupling area

Summary

- WLSF intensity attenuate about 24% when coupling PD package area
- WLSF intensity attenuate about 10% when coupling PD effective area
- The test results are basically consistent with the calculated results
- Some medium like grease will decrease light collection efficiency of ESR film