Light loss from WLS to clear fiber (silicone grease coupling)

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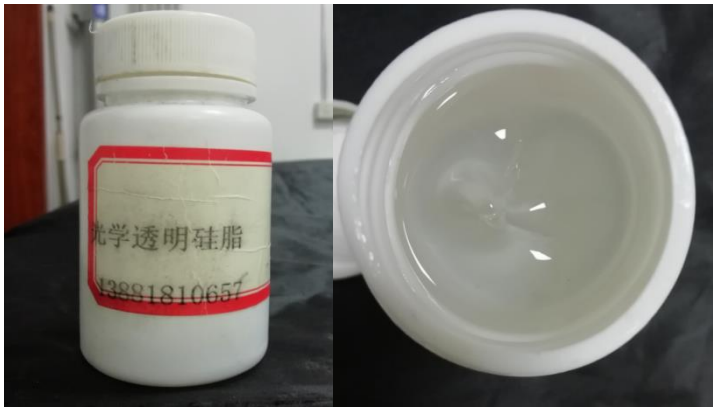
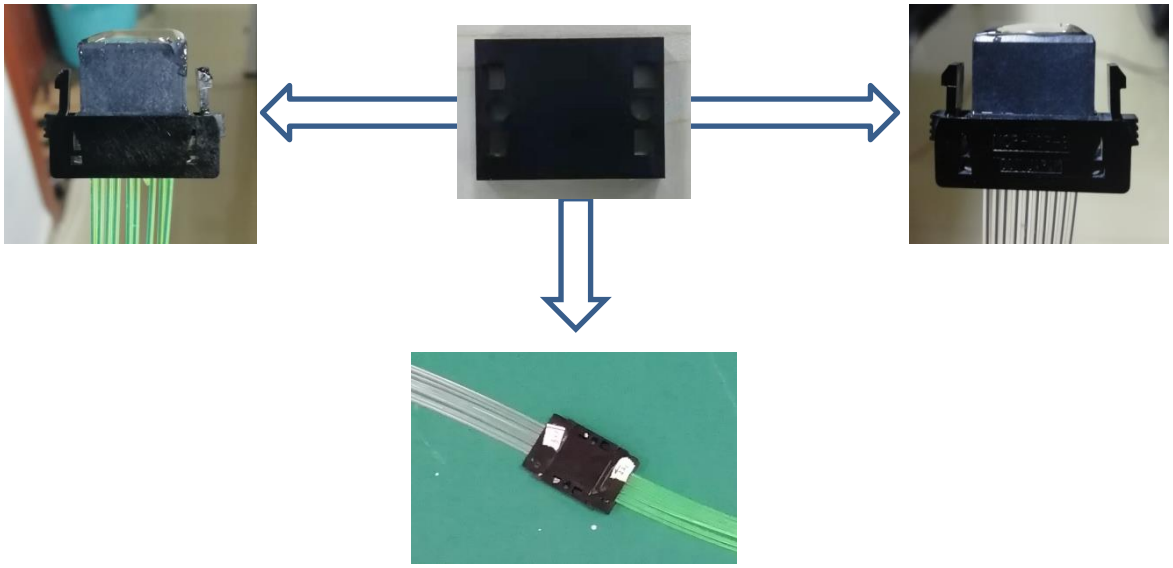
WLS to clear fiber through silicone grease coupling

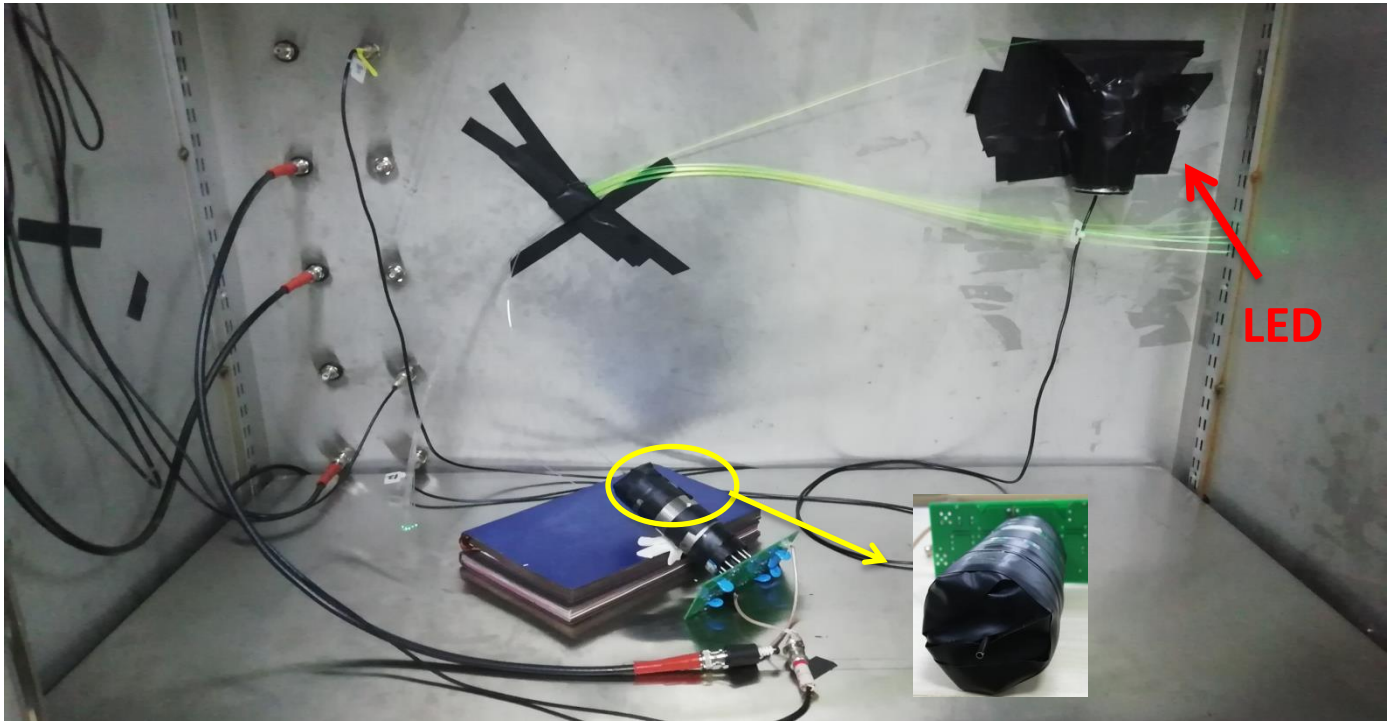
Add silicone grease to the fiber end





Testing configuration

PMT → Clear fiber → WLS fiber → LED



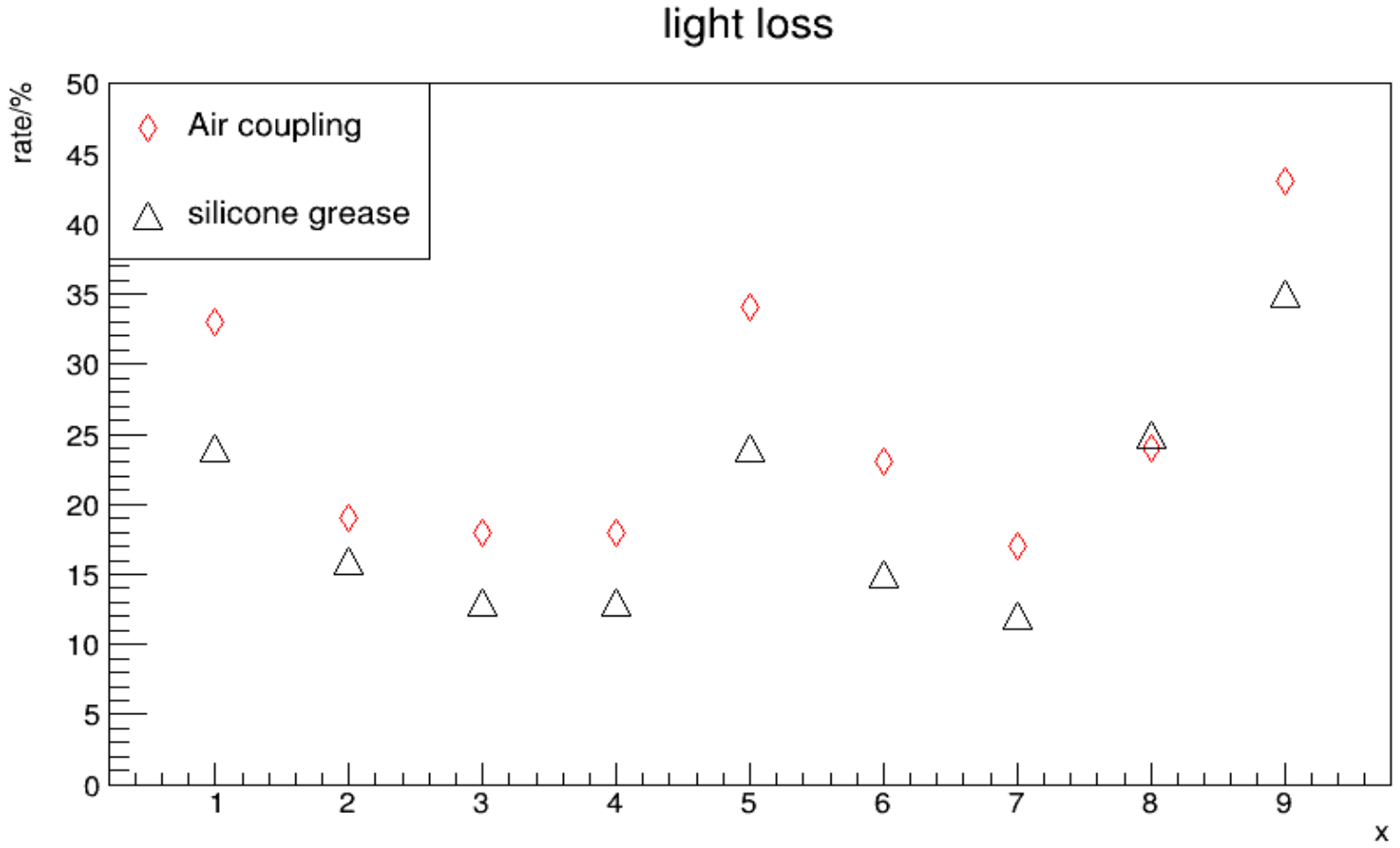
To fix the LED , then replace the WLS fiber and clear fiber ,finally record the ADC channel count.

Result

Fiber	WLS fiber	Clear fiber (air coupling)	Light loss (air coupling) (WLS –clear(air) /WLS)	Clear fiber (silicone coupling)	Light loss (silicone coupling) (WLS –clear(silicone) /WLS)	Relative rate (air-silicone/air)
1	672	446	0.33	446	0.23	0.29
2	607	489	0.19	489	0.16	0.19
3	591	483	0.18	483	0.13	0.28
4	599	492	0.17	492	0.13	0.30
5	761	502	0.34	502	0.24	0.30
6	601	464	0.23	464	0.15	0.34
7	593	490	0.17	490	0.12	0.29
8	656	494	0.24	494	0.25	-0.01
9	809	456	0.43	456	0.35	0.19

After adding the silicone grease ,the light loss is reduced by 24% relative to air coupling

Light loss (distribution)



The light loss varies from different fiber, and some vary too much (fiber? thickness of silicone grease?) Need more study .

Next step

- Do more modules(wls fiber to clear fiber) by ourself
- Add different medium to the junction, then comparing the results
- Find out the best scheme of coupling wls fiber and clear fiber