

Status report

Ryotaro Tsuchii
CIDEr-ML collaboration meeting
March 27, 2026

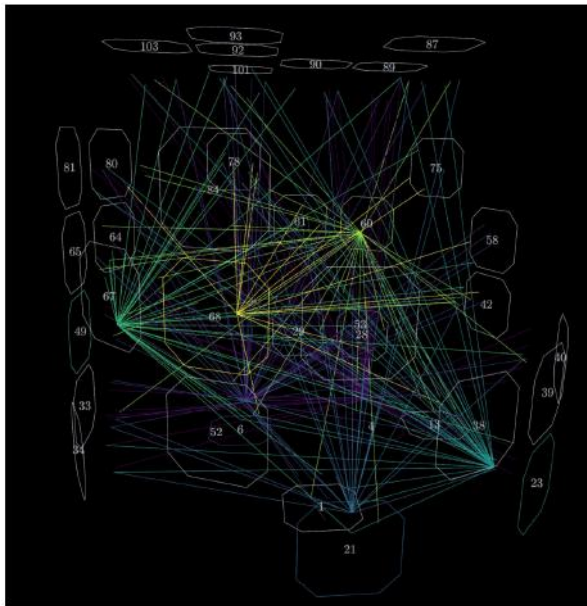
WCTE LED data



Diffuse LED

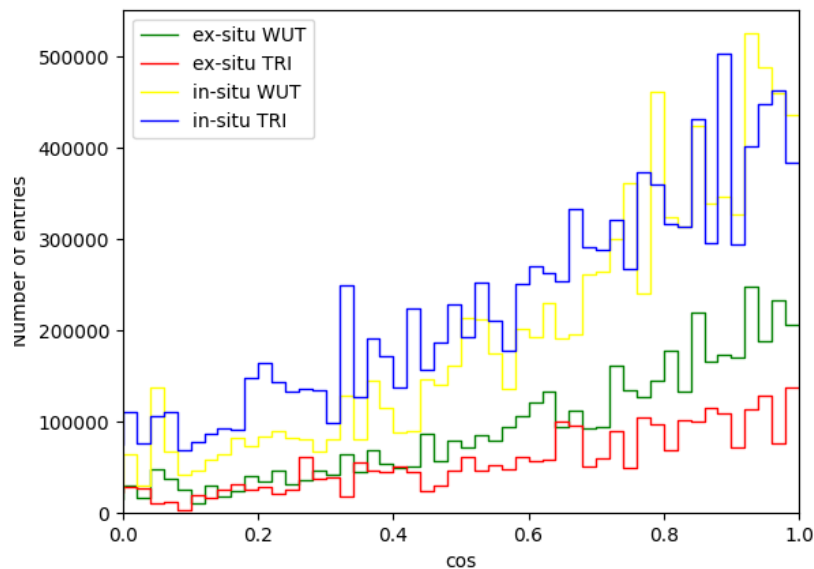
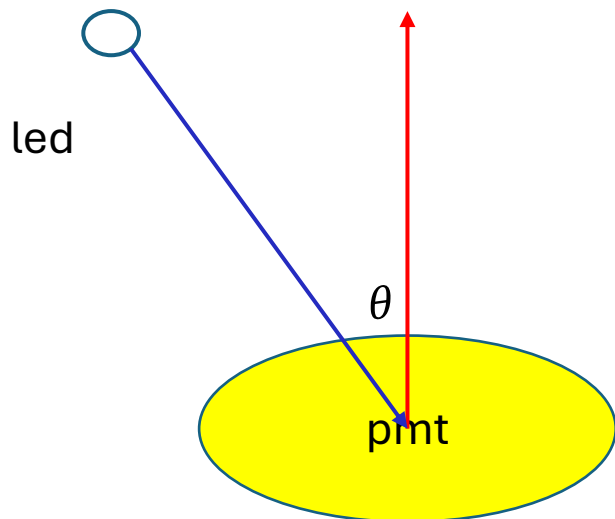
Collimated LEDs

- Three LEDs in each mPMT.
 - Wave length: 365 nm, 405 nm, 470 nm
- There are 2 types of mPMTs:
 - Ex-situ: two 15° collimated, one diffuse
 - In-situ: two 30° collimated, one diffuse
- Calibrate:
 - PMT relative timing
 - 1 p.e. gain, charge distribution (this study)

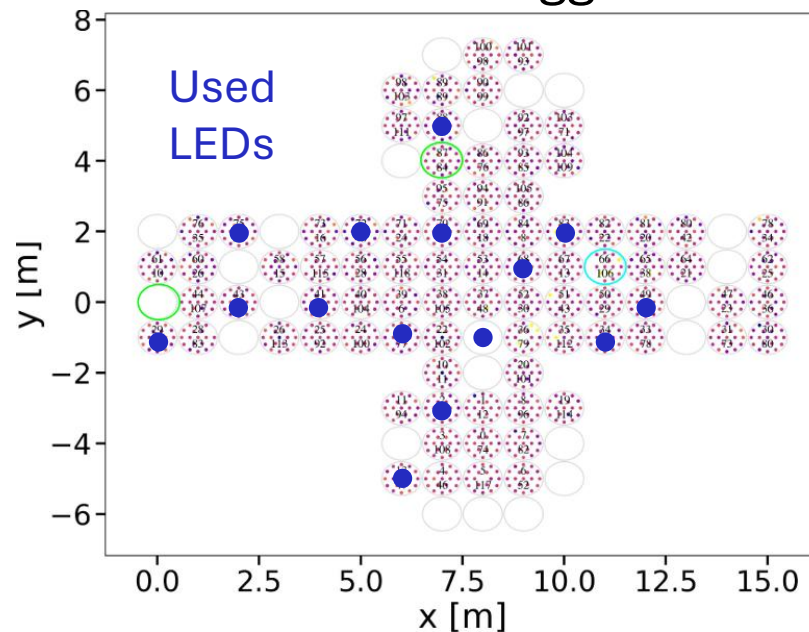


- LEDs fire at ~2 kHz.
- mPMTs measure the signals from each LED.
 - Most data: self-trigger
 - Some data: software trigger, hardware trigger
- We can use source positions and wave shapes for each fire.

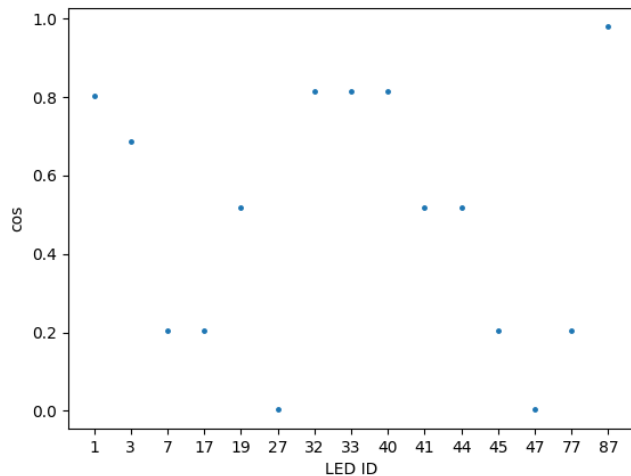
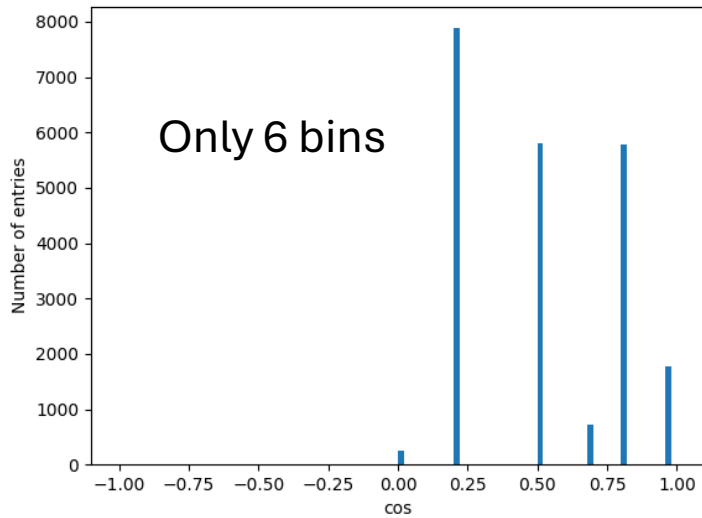
LED data check



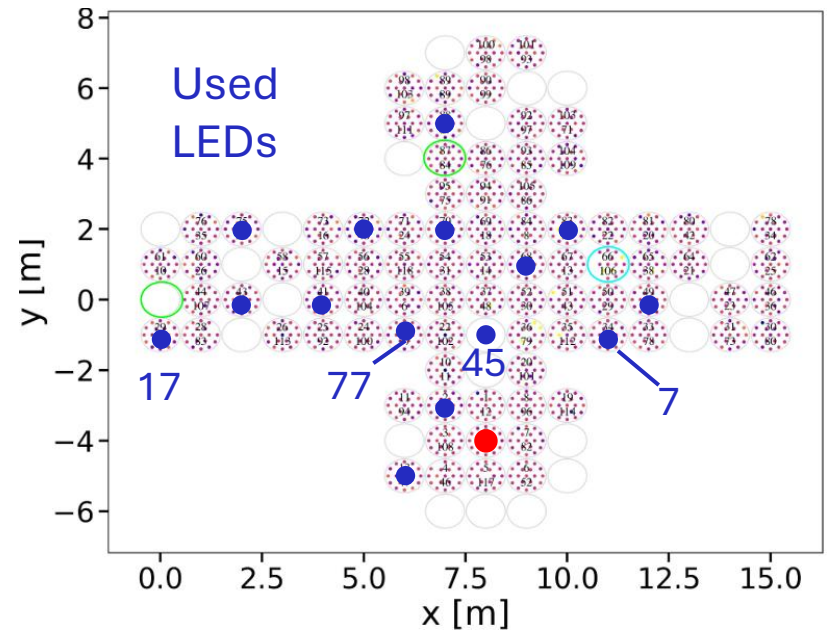
- I am checking software trigger data of one run.
 - We have only 470 nm data in the software trigger runs...
- To check the angular coverages of all the PMTs, I am making the distribution for each PMT.
- 15 LEDs × 10000 triggers.



LED data check

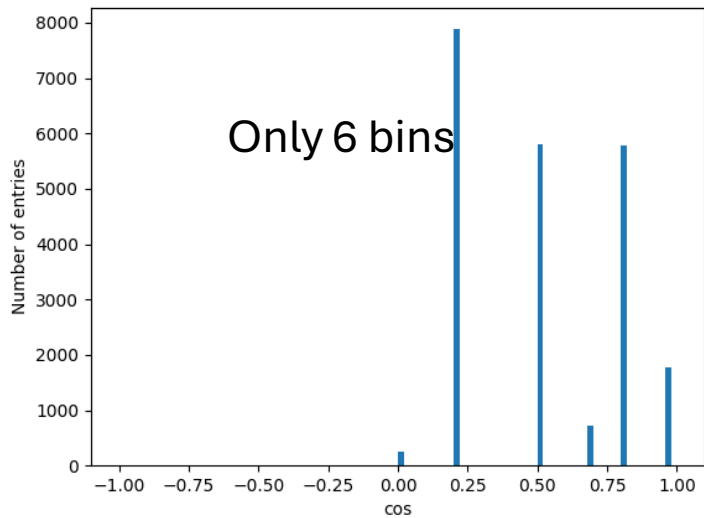


- **PMT0 in mPMT0**
- 15 LEDs fired, but there are only 6 bins that have entries.
- I checked LED v.s. cos focusing on one LED.
 - From the view of the bottom mPMT, the barrel PMTs are at the same height, so their angles are very close.

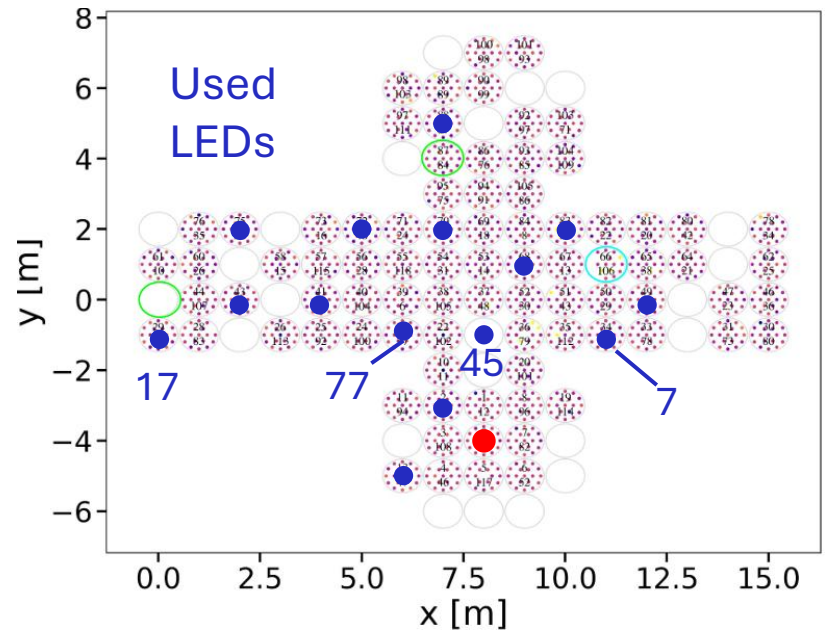
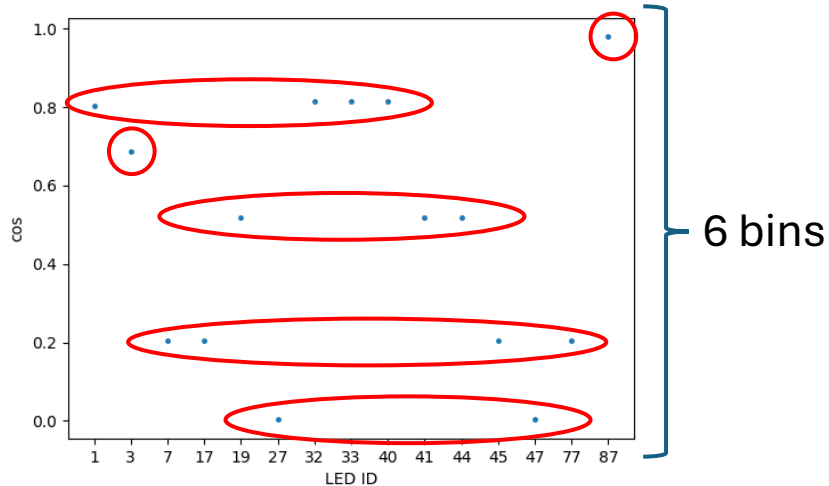


led: 7, cos: 0.20553232173353458
led: 17, cos: 0.20553322068245983
led: 45, cos: 0.20553232173353472
led: 77, cos: 0.20553322068245997

LED data check

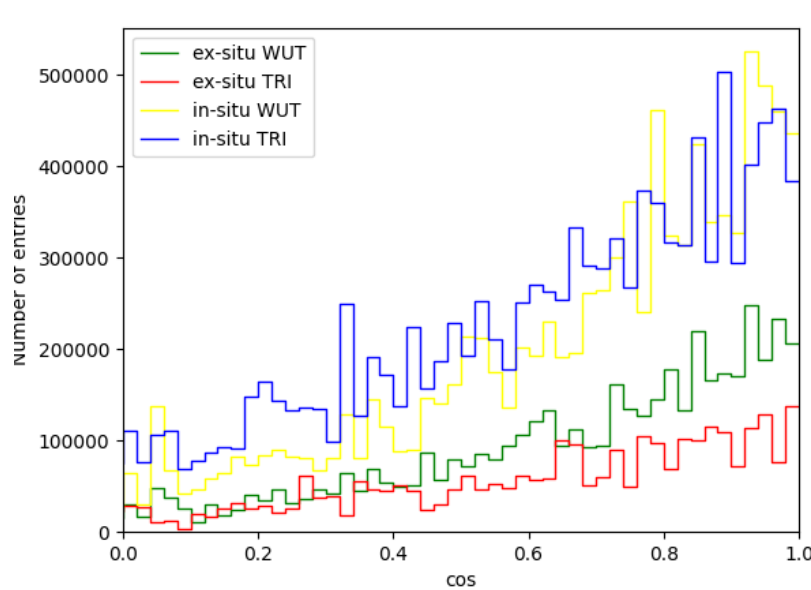


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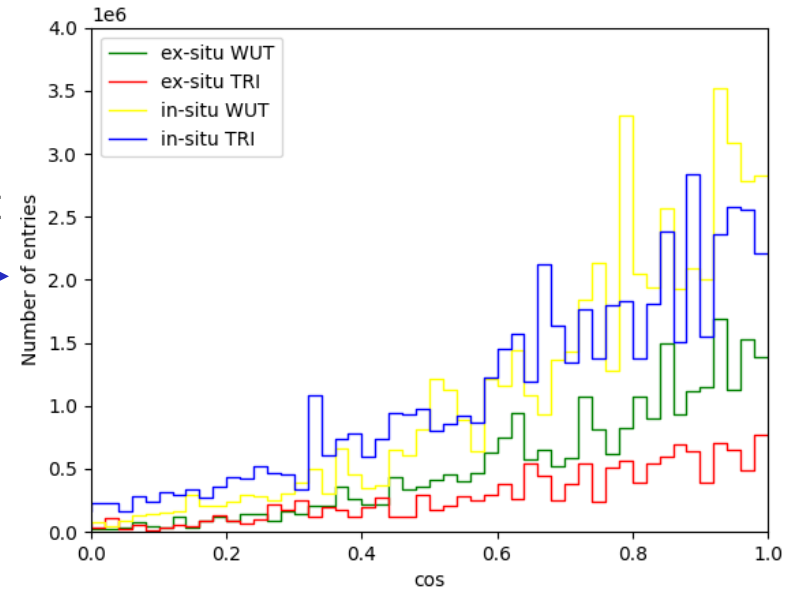


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Correction by expected number of photons



correct



- Divided by this factor and filled to correct the acceptance.

$$\text{corr} = \left(\frac{r_0^2}{r^2} \right) (r_0 = 1 \text{ m}).$$

- It seems no significant change.
- ToDo:
 - Compare these data with MC (like Ka Ming's plot)
 - He said the bug of LED MC was fixed.
 - Evaluate the number of p.e. per frash for each led and pmt.

