Status Update

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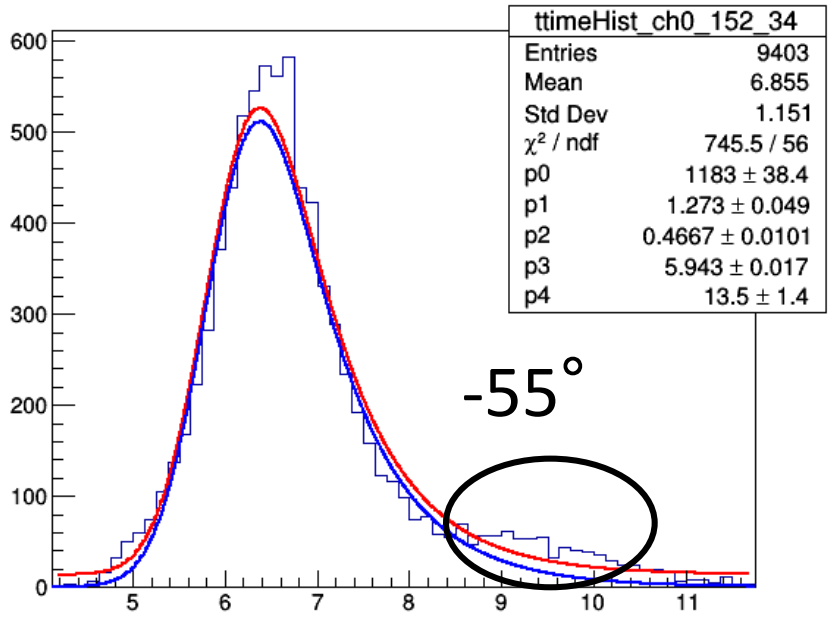
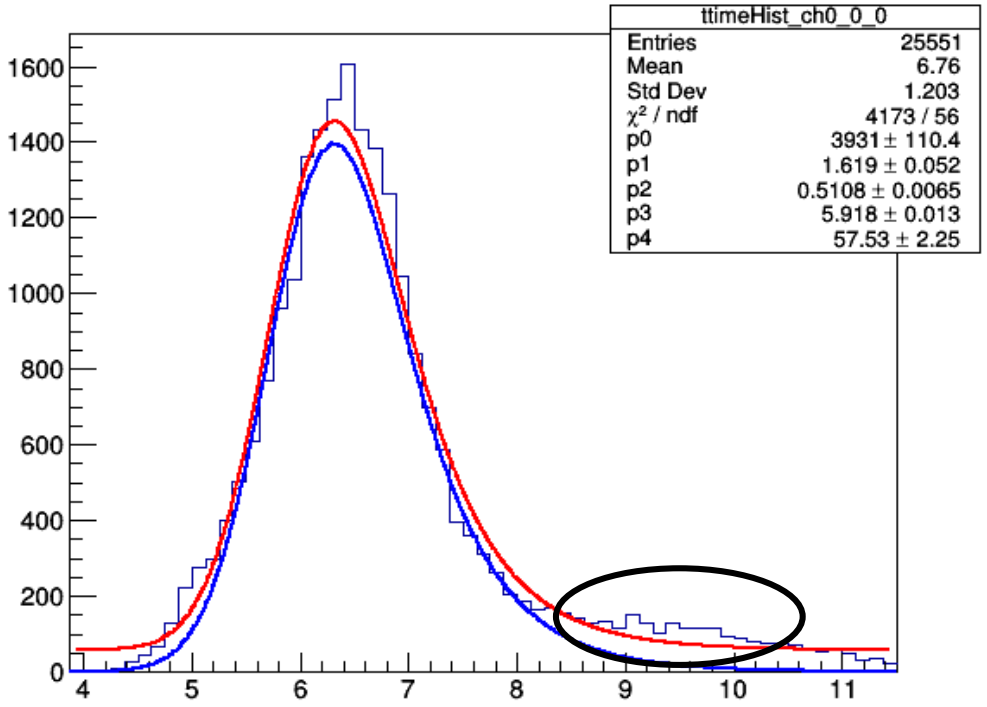
Delayed signal

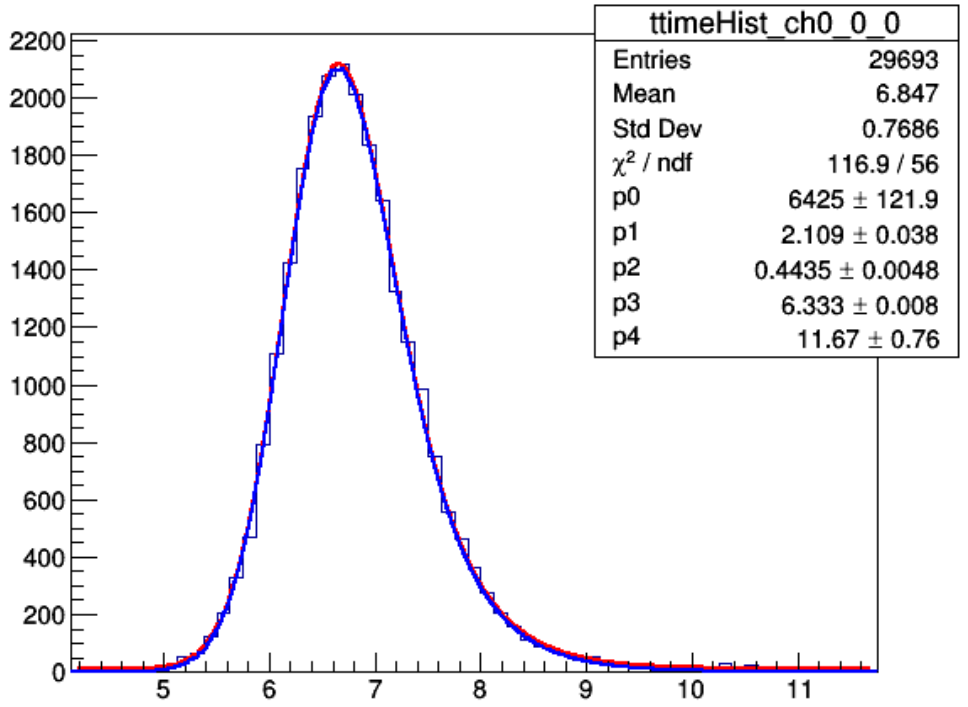
- There are some delayed signals in the time histogram at large angles.
- I'm trying to find out how the delayed signals occur.
- I took the same measurement again with more events. (10000 events → 25000 events)



Time histogram at 55 degrees



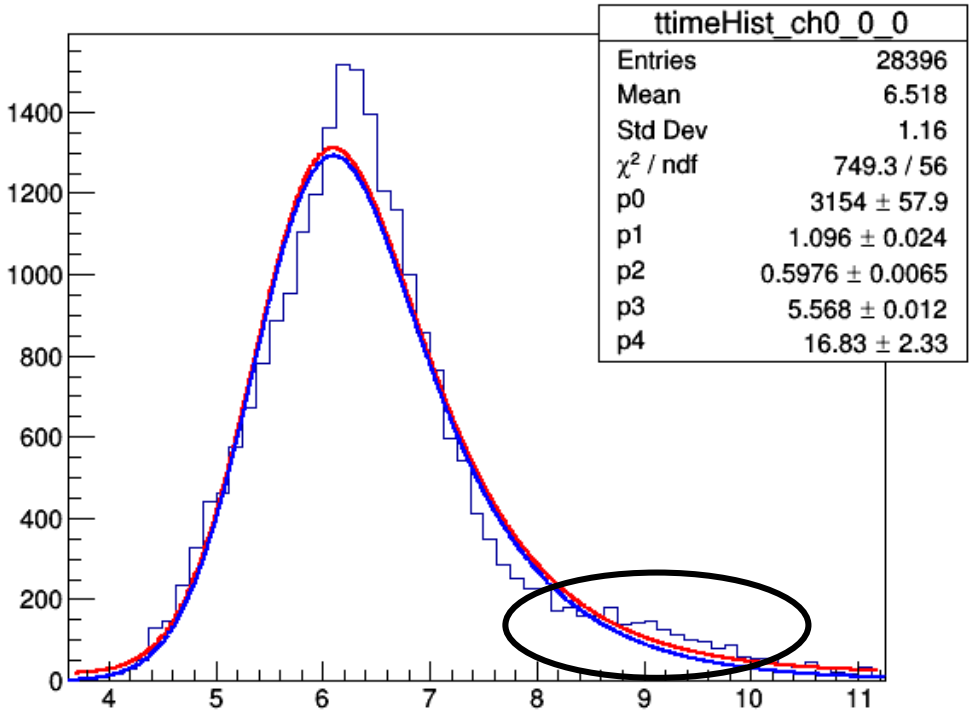
Before rotation



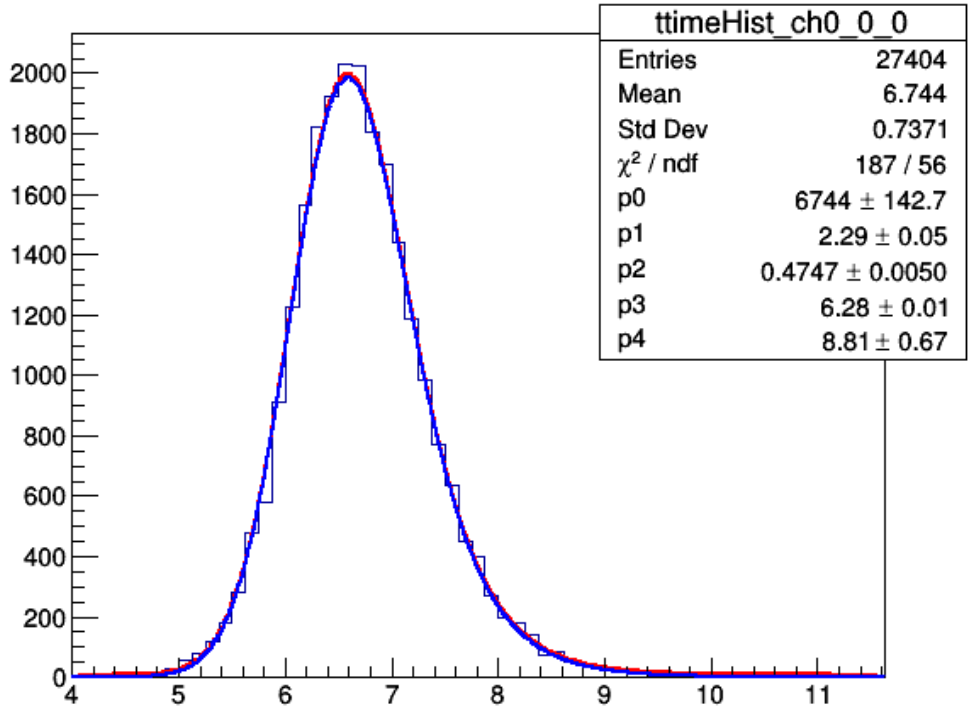
After rotation

Delayed signals appeared before rotation, but they did not after rotation.

Time histogram at 60 degrees



Before rotation



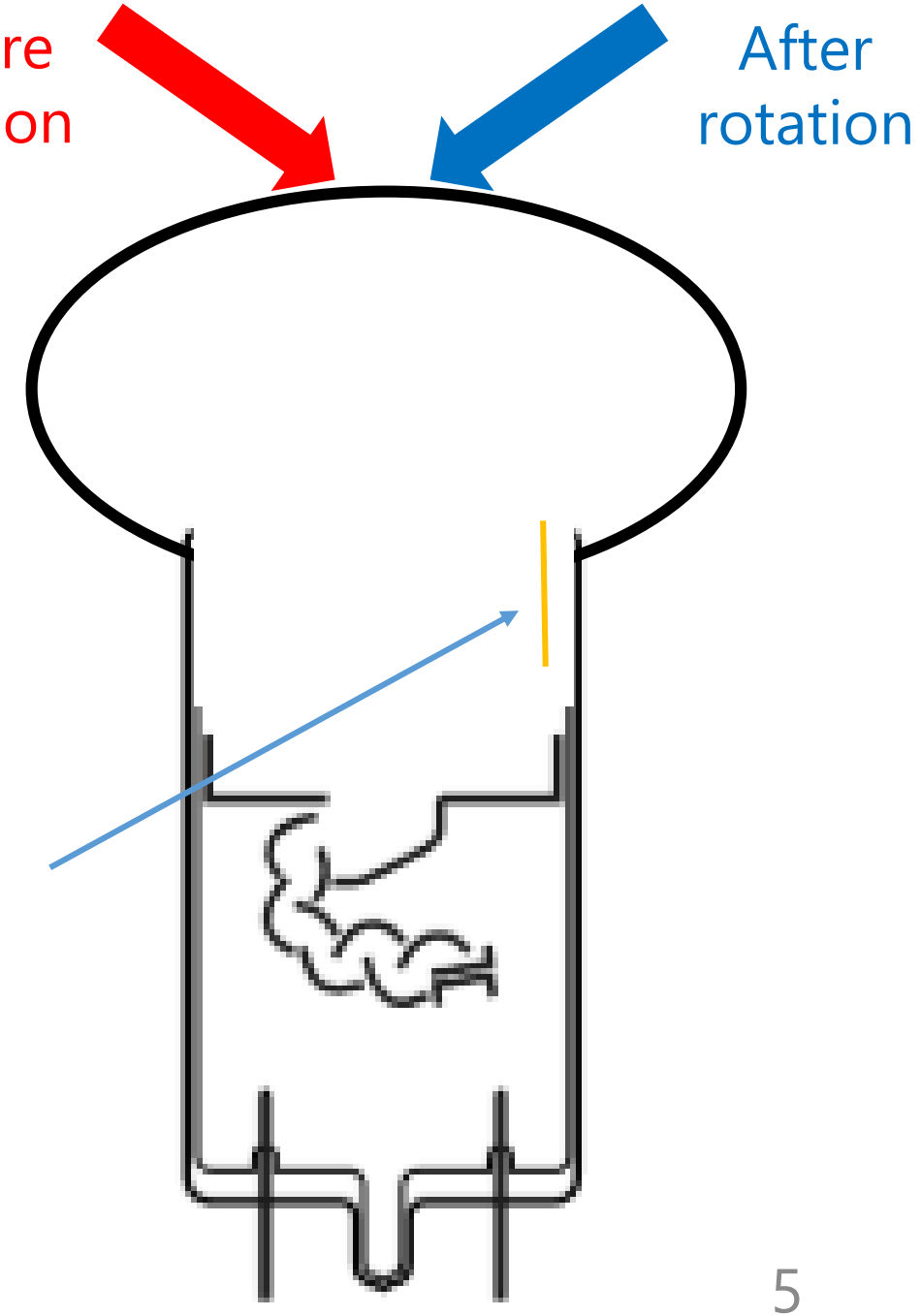
After rotation

The delayed signals appeared before rotation also at 60 degrees.

Delayed signal

- The delayed signals only appeared before rotation.

- It can be suggested that there is something inside the PMT that causes reflection.

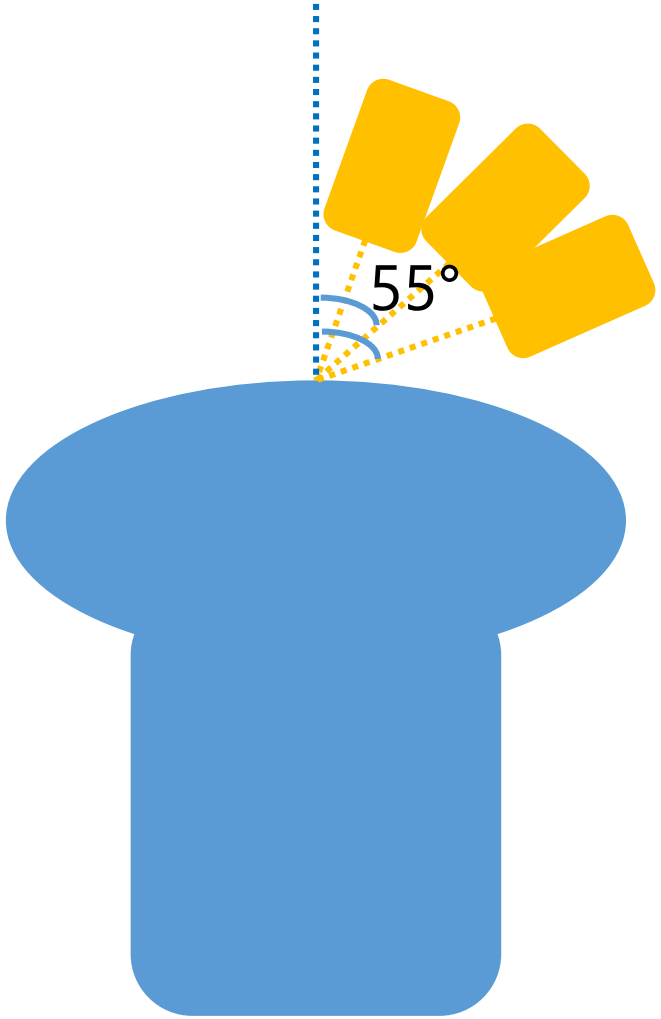


Future plan

- Take the angle measurement

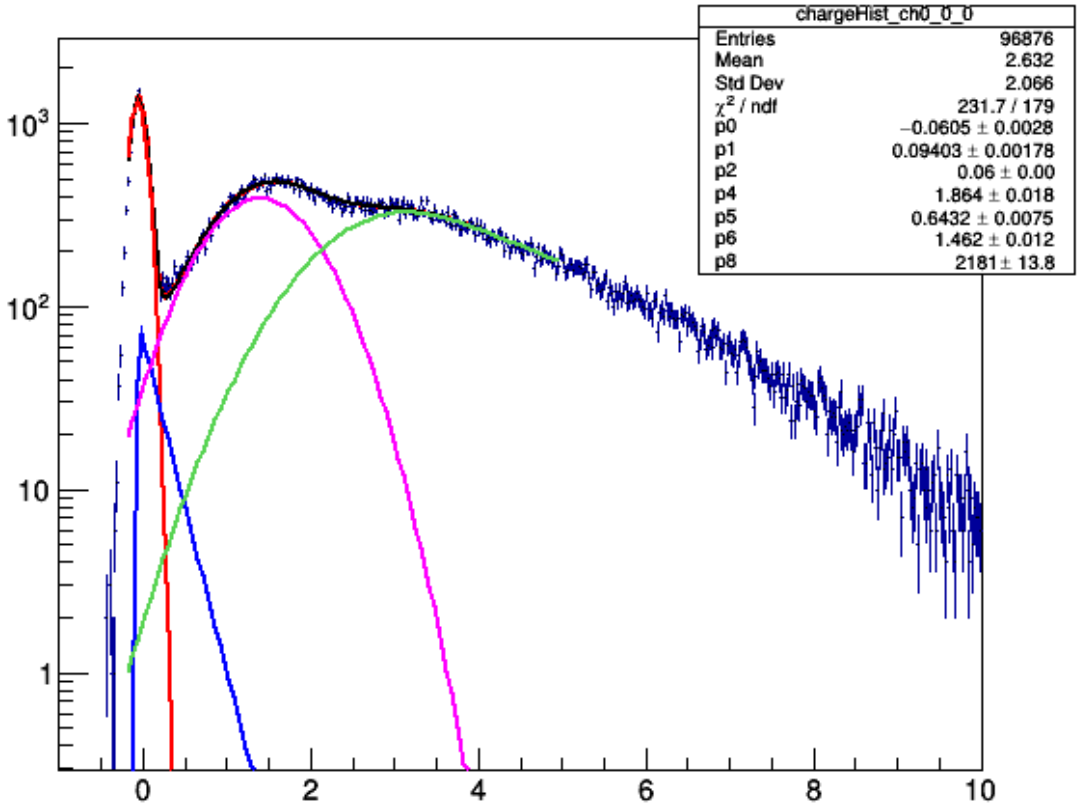
➢55 degrees with respect to the axis of the PMT

➢moving in the ϕ-direction

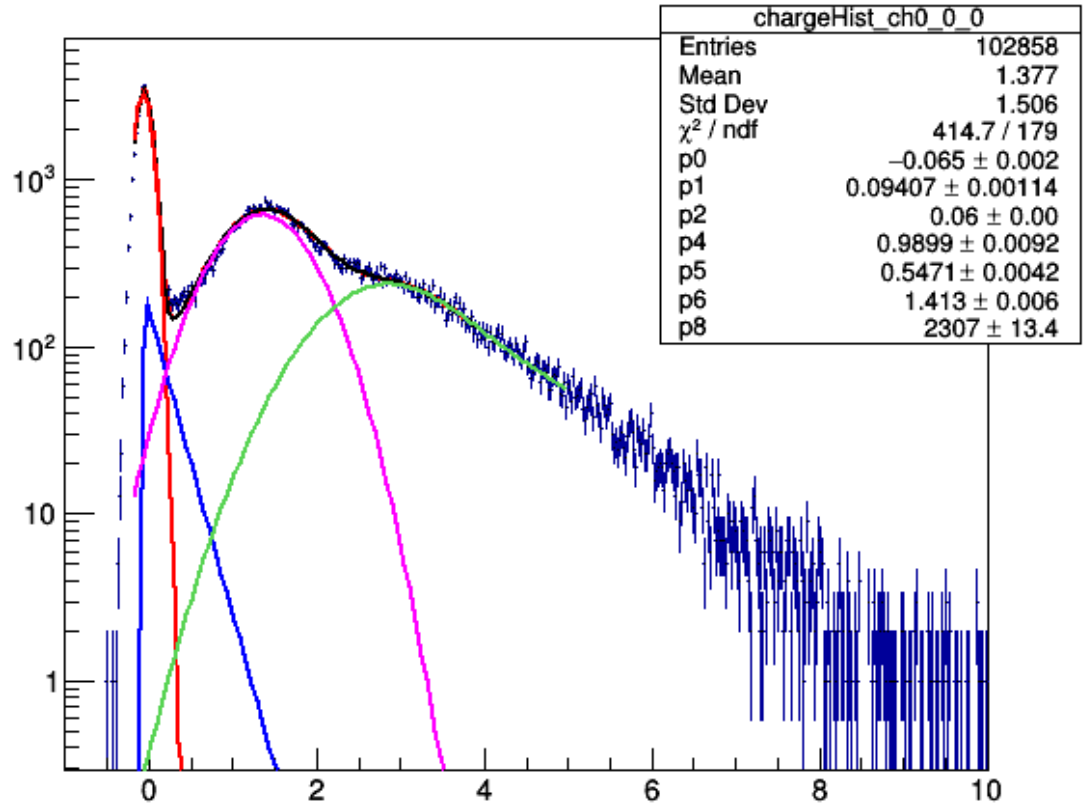


Backup

before rotation



after rotation



velocity

- Assume that the distance from the photocathode to the first dynode is about 5 cm.
- Assume that the potential difference between the photocathode and the first dynode is about 200 V.

- The velocity of the electron when it arrives at the first dynode can be calculated as

$$E_k = \frac{mc^2}{\sqrt{1-\frac{v^2}{c^2}}} - mc^2$$

$$v = c\sqrt{1-\frac{m^2c^4}{(E_k+mc^2)^2}} \simeq 2.5 \times 10^8 \text{ m/s}$$