

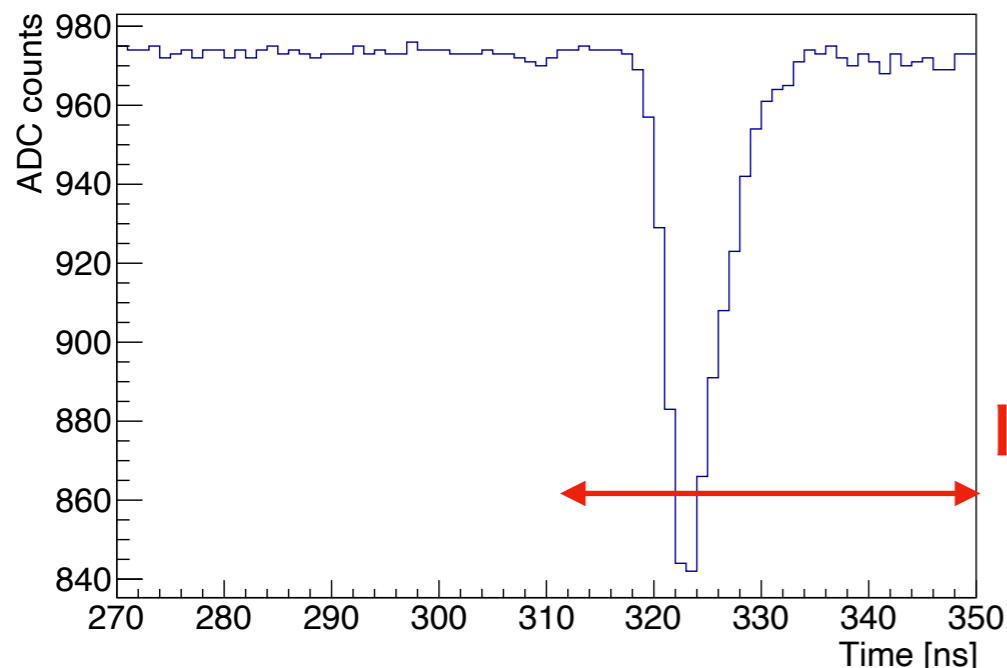
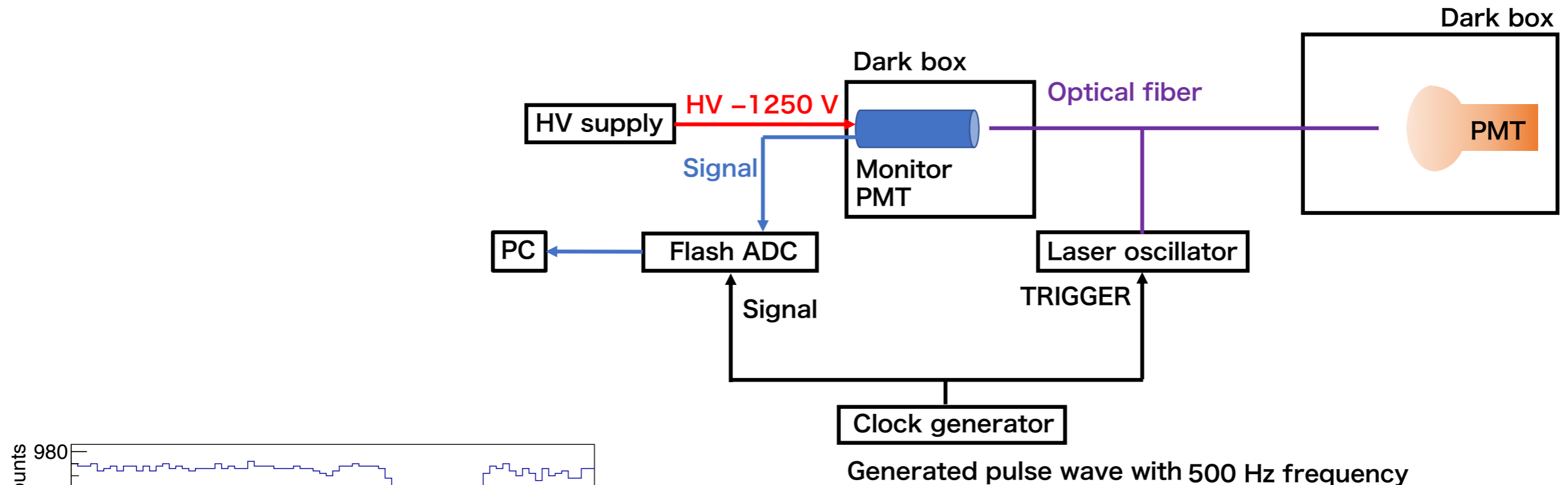
Status report

2020/02/14

Michitaka Inomoto

Magnetic field effects

- In addition to the previous measurement (01/30/2020), I measured the magnetic field dependence of the efficiency and the gain of the 3-inch PMT three times.

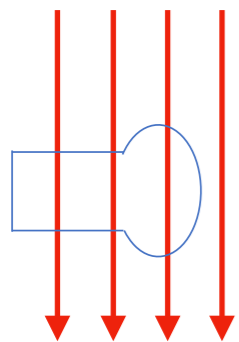


Integrated region (40 ns)

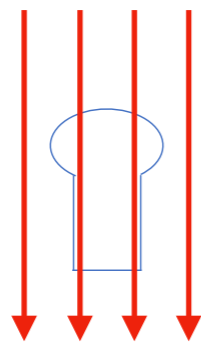
Magnetic field effects

- I checked the efficiency and the gain of the 3-inch PMT.
- Earth's magnetic field in the laboratory is about 0.03 mT.
- I measured the gain in three types of PMT's angles to Earth's magnetic field.
 - The angles : -90° , 0° , 90° .

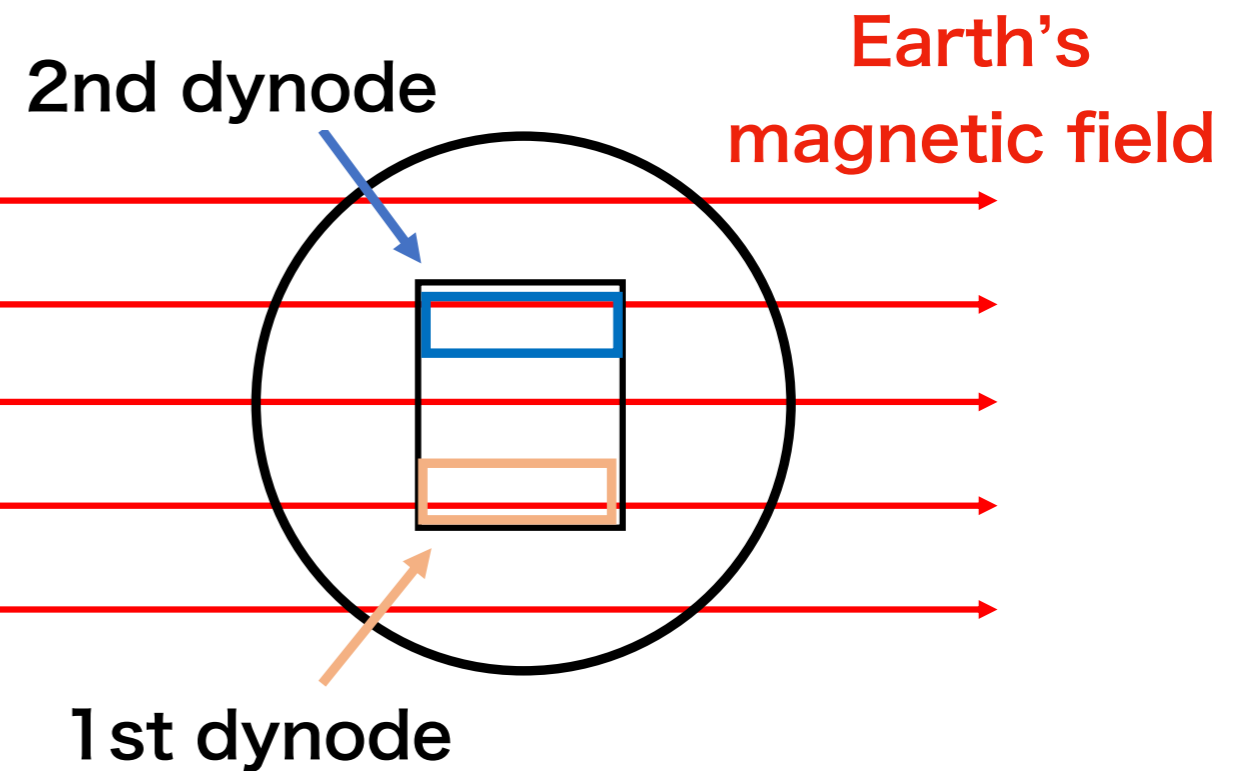
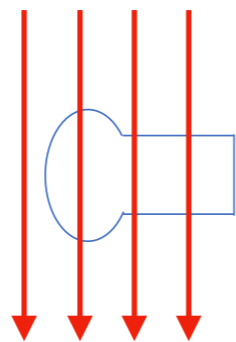
-0.03 mT



0 mT



0.03 mT



Relative efficiency

Relative efficiency is defined as follows:

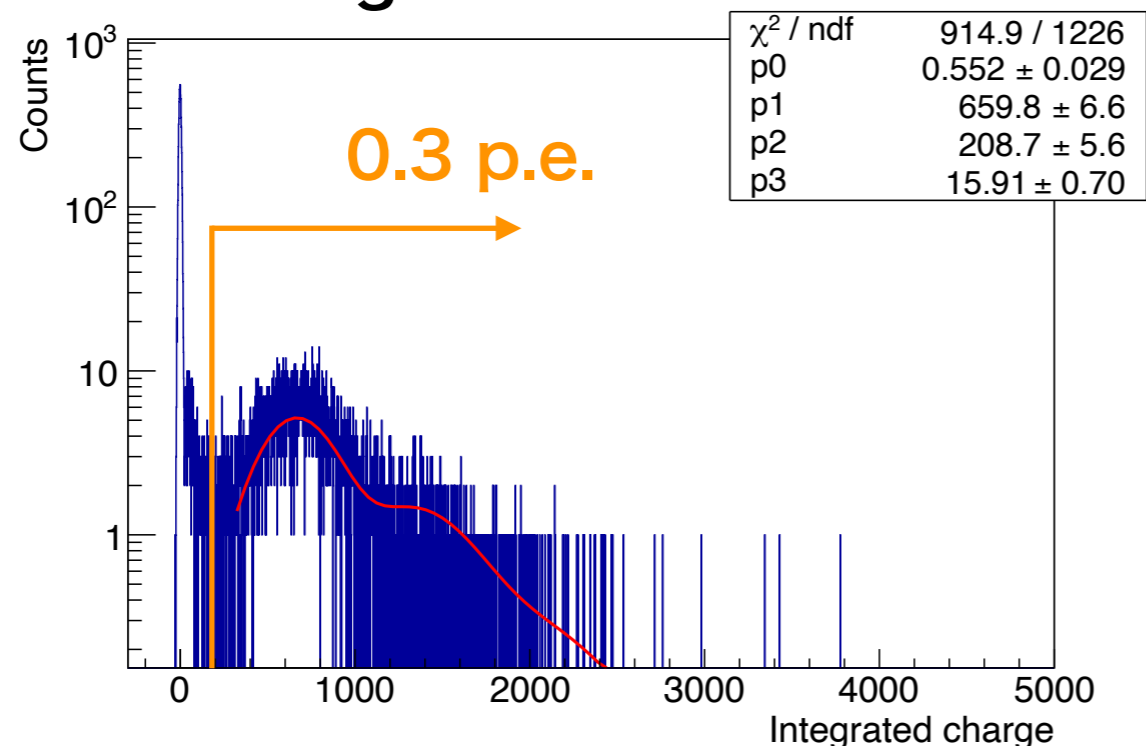
$$\text{Relative efficiency} = \frac{\text{3-inch PMT efficiency}}{\text{Mean of monitor PMT integrated charge}}$$

3-inch PMT efficiency is defined as follows:

$$\text{3-inch PMT efficiency} = \frac{\text{3-inch PMT signals}}{\text{Clock generator signals}}$$

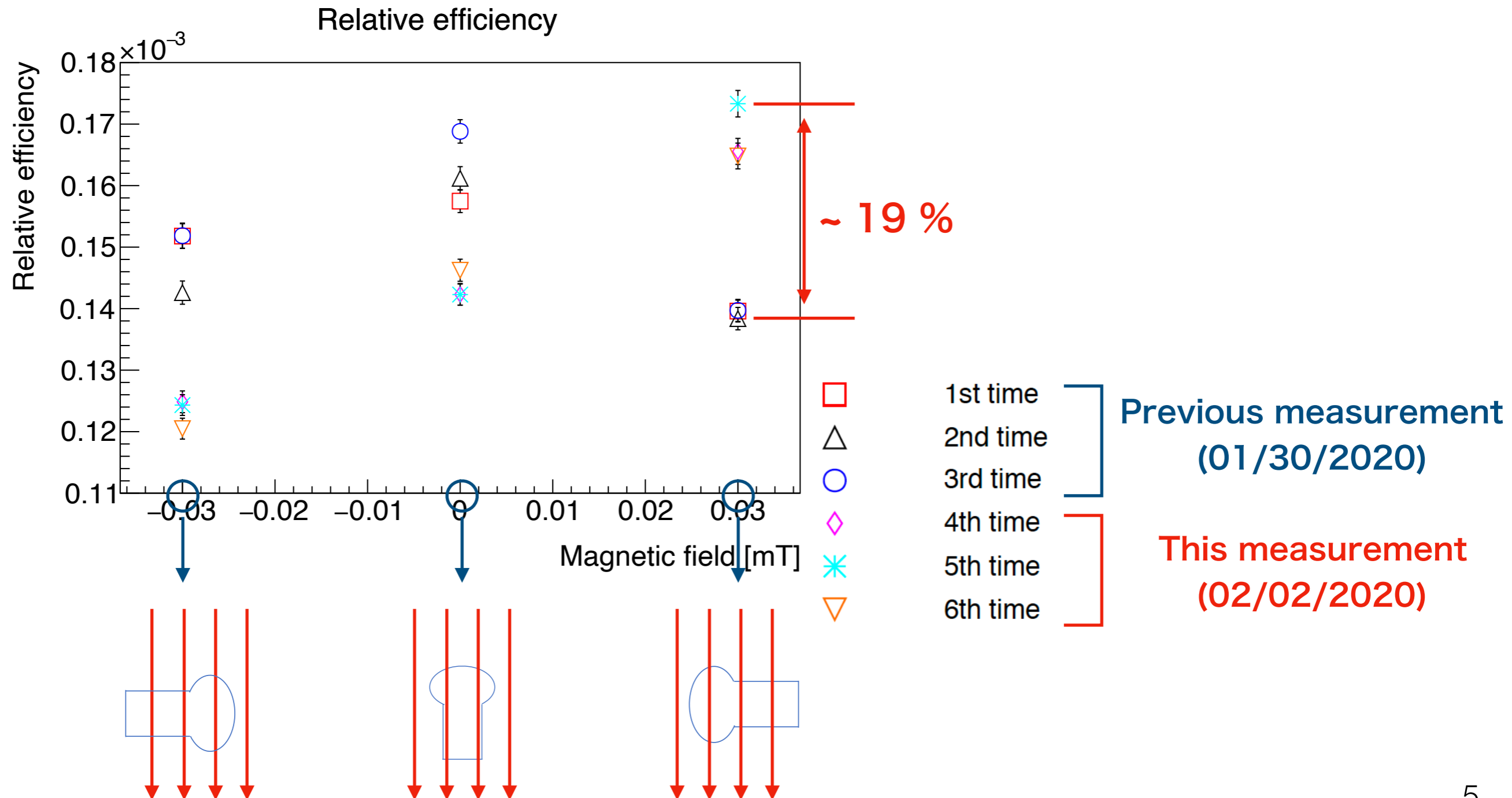
“3-inch PMT signals” is the counts above the threshold (0.3 p.e.).

Integrated charge distribution of 3-inch PMT



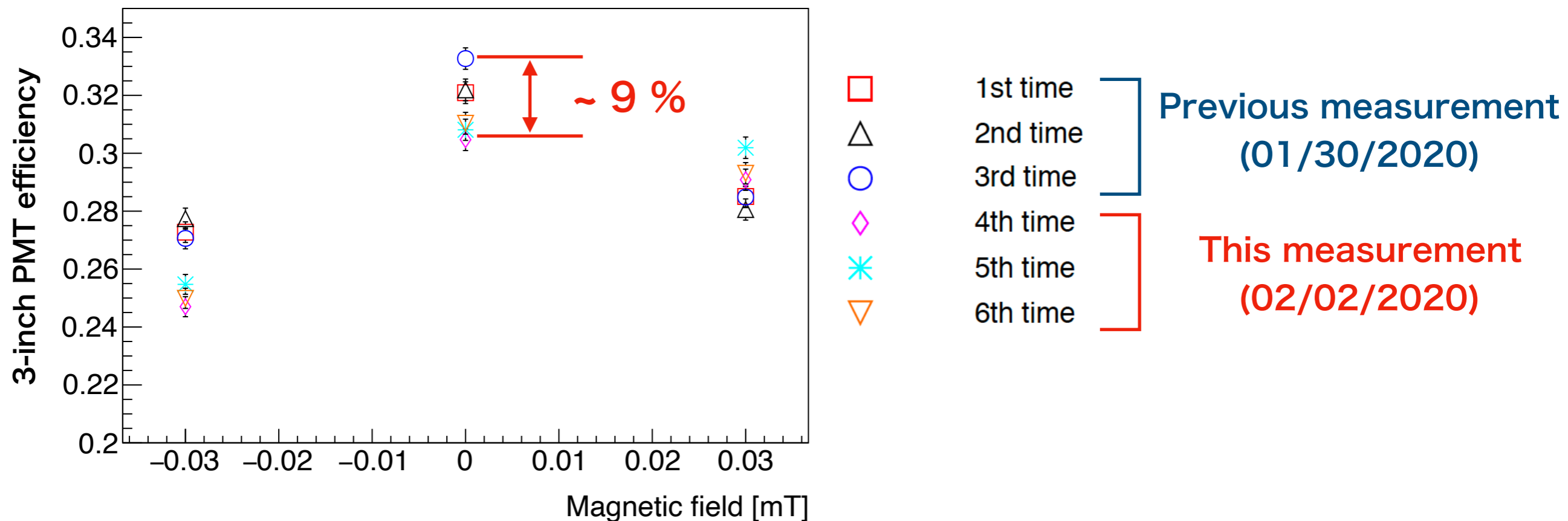
Relative efficiency

- I checked the magnetic field dependence of the relative efficiency.
- There is difference between 6 times.



3-inch PMT efficiency

- Next, I removed the mean of monitor PMT integrated charge from the correction.
- I checked 3-inch PMT efficiency.
- This graph shows the similar efficiency between 6 times.
- There is a possibility that the mean of monitor PMT integrated charge is unstable.



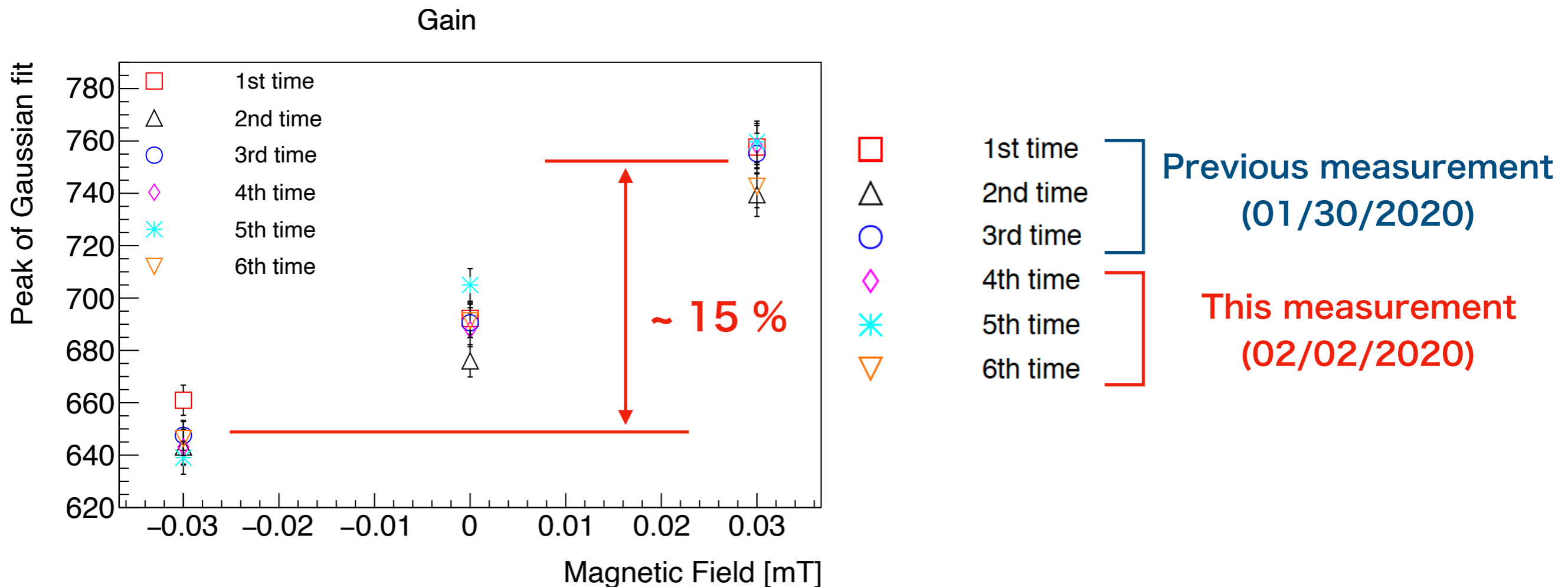
To do

- I will use another 3-inch PMT as the monitor PMT.
- I will measure relative efficiency with another 3-inch PMT.

Backup

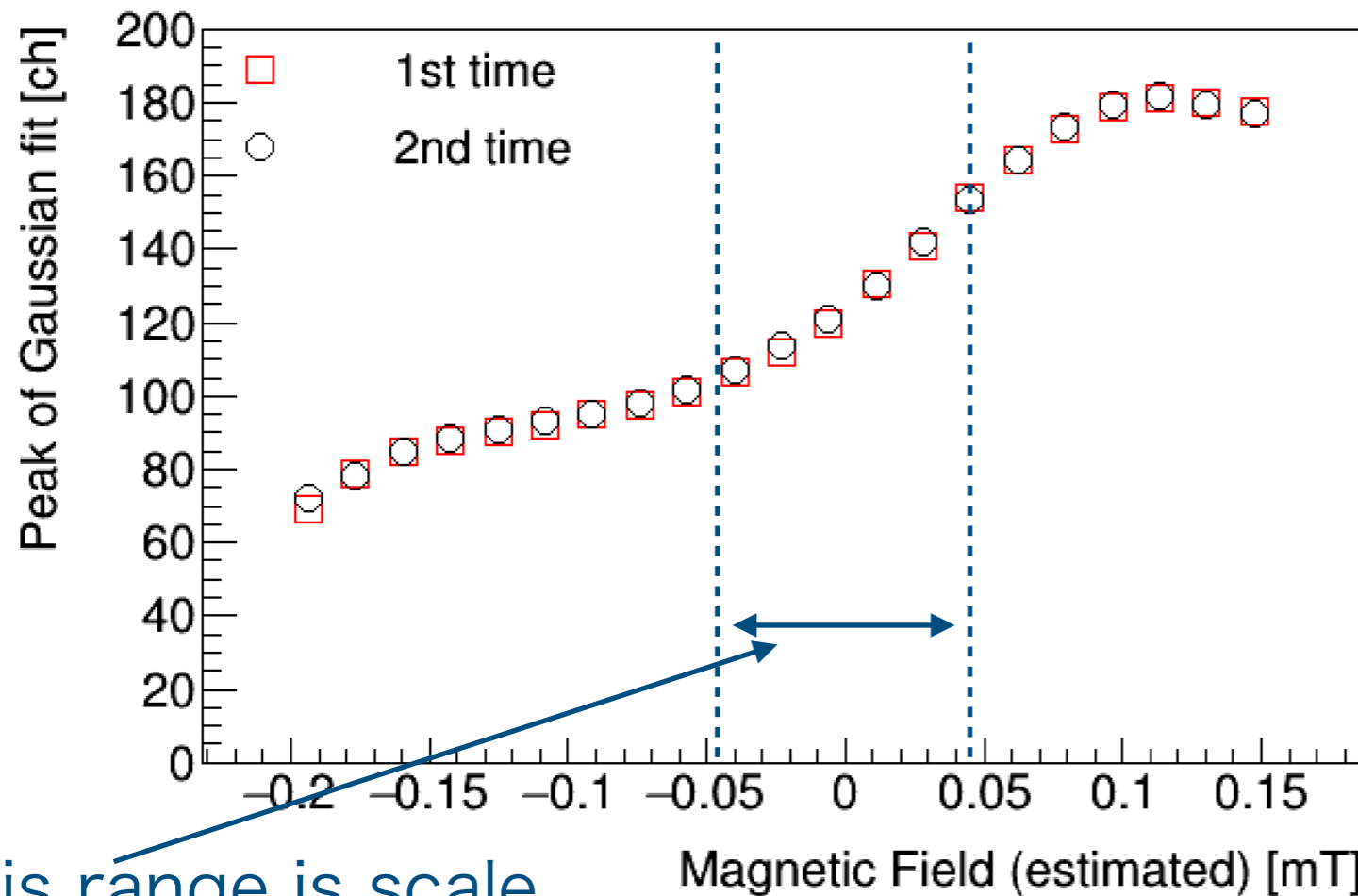
Gain

- I checked the magnetic field dependence of the gain.
- The variation of the gain is about 15 %.



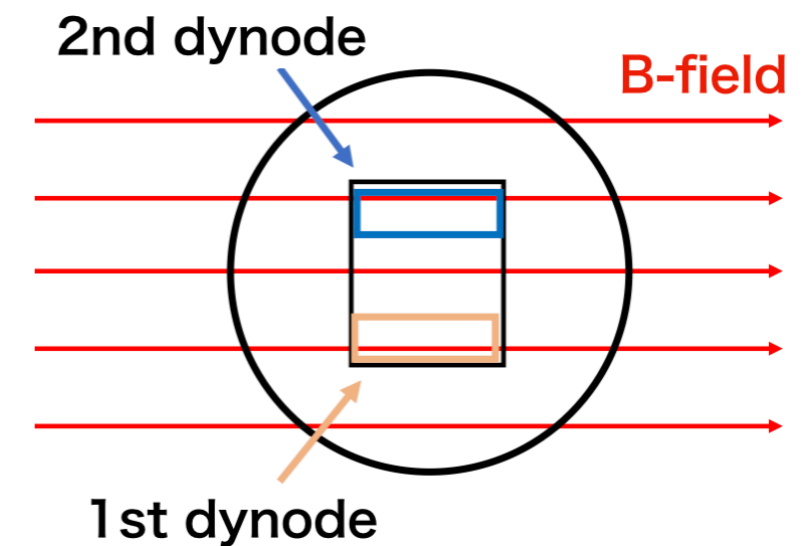
Previous measurement (09/06/2019)

- I checked gain variation in previous measurement.
- I used another 3-inch PMT.



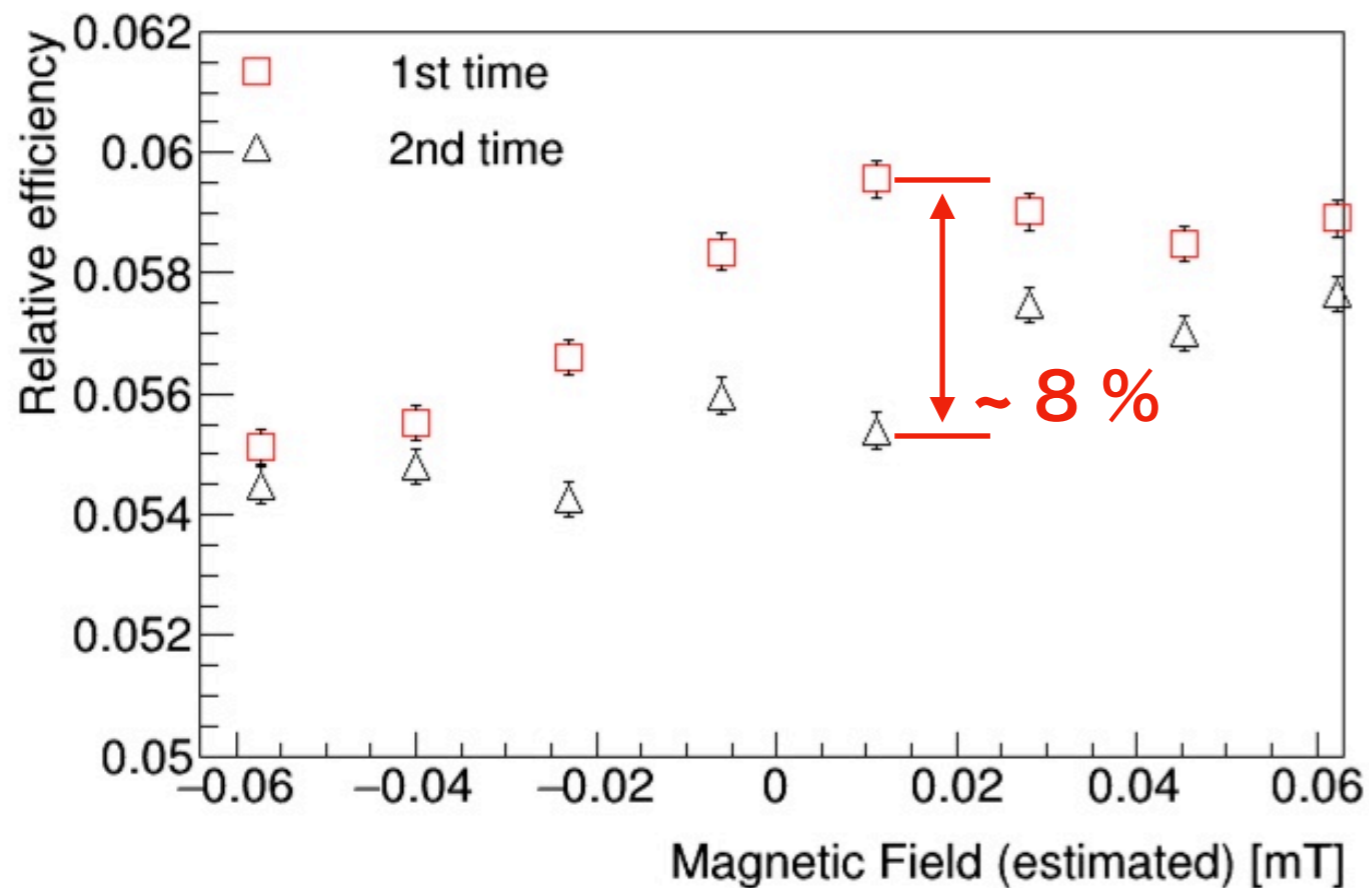
This range is scale
of Earth's magnetic field.

- The plot has 45% difference in the range of Earth's magnetic field.
- The plot has 26% difference in the range of 0.03 mT.



Previous measurement (09/06/2019)

- I checked the magnetic field dependence of the relative efficiency in previous measurement (09/06/2019).



- B-field parallel to photo-cathode.

