

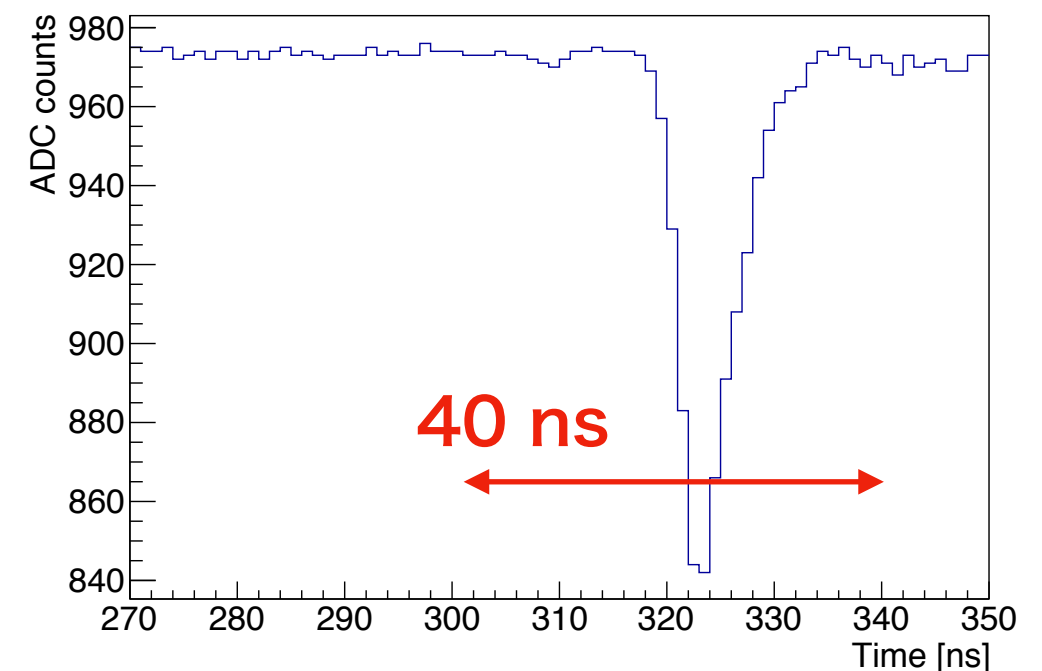
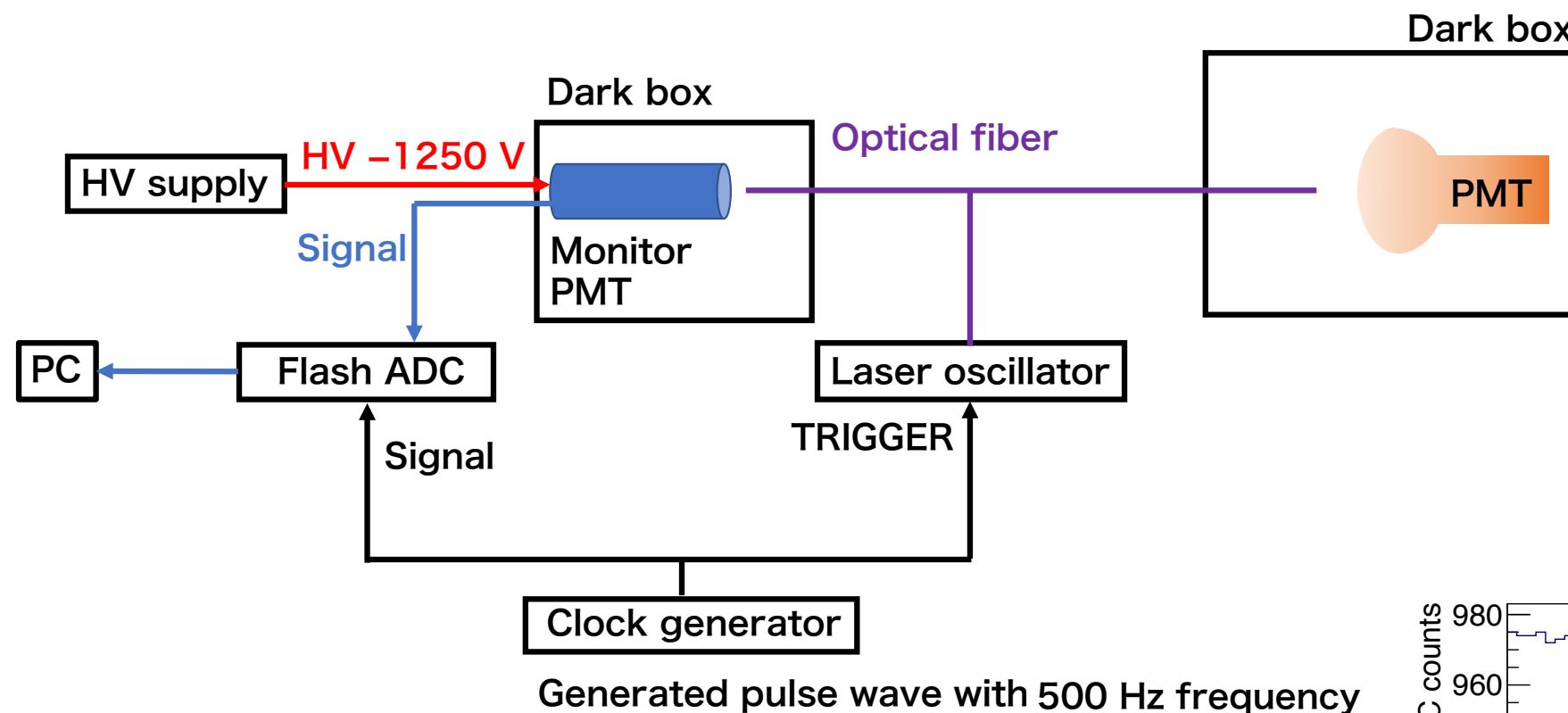
Status report

2020/01/27

Michitaka Inomoto

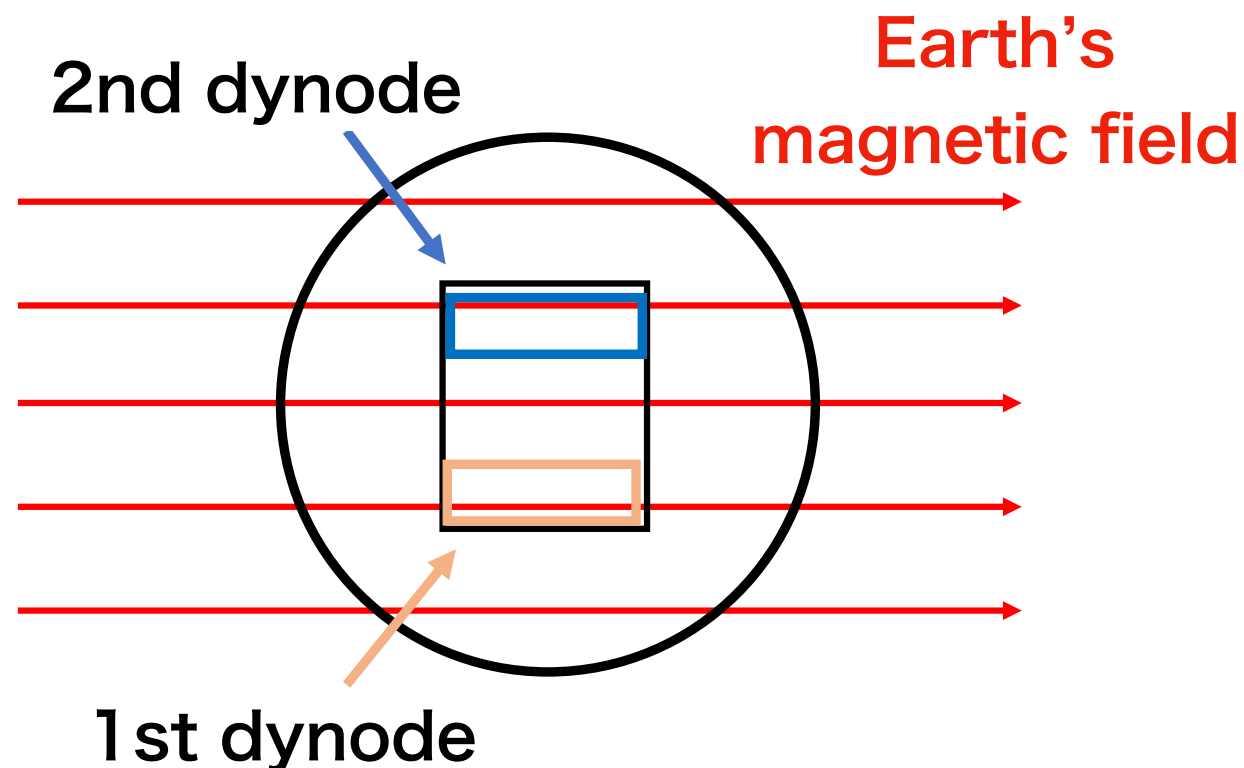
Magnetic field effects

- I measured the magnetic field dependence of the efficiency and the gain of the 3-inch PMT.

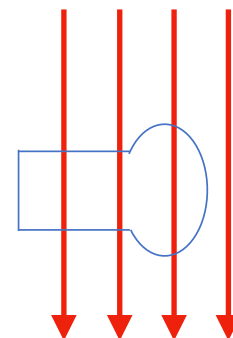


Magnetic field effects

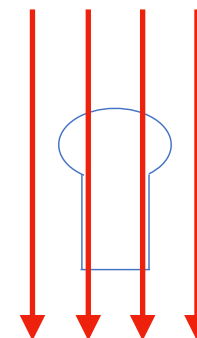
- I checked the efficiency and the gain of the 3-inch PMT.
- Earth's magnetic field in the laboratory is about 0.03 mT.
- I measured the gain in three types of PMT's angles to Earth's magnetic field.
 - The angles : -90° , 0° , 90° .



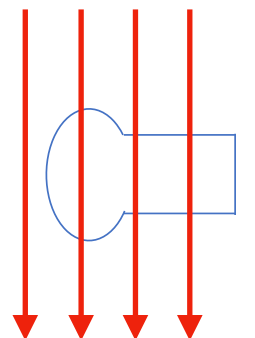
-0.03 mT



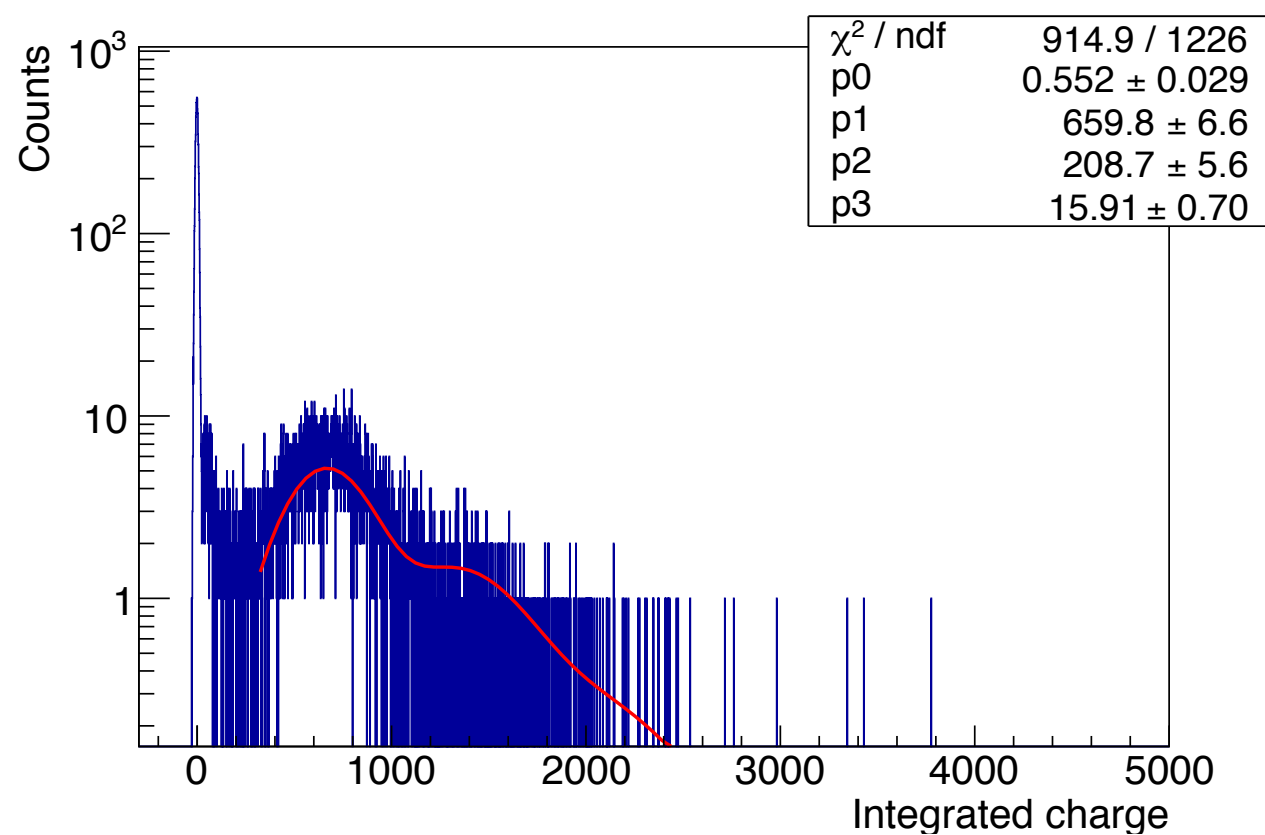
0 mT



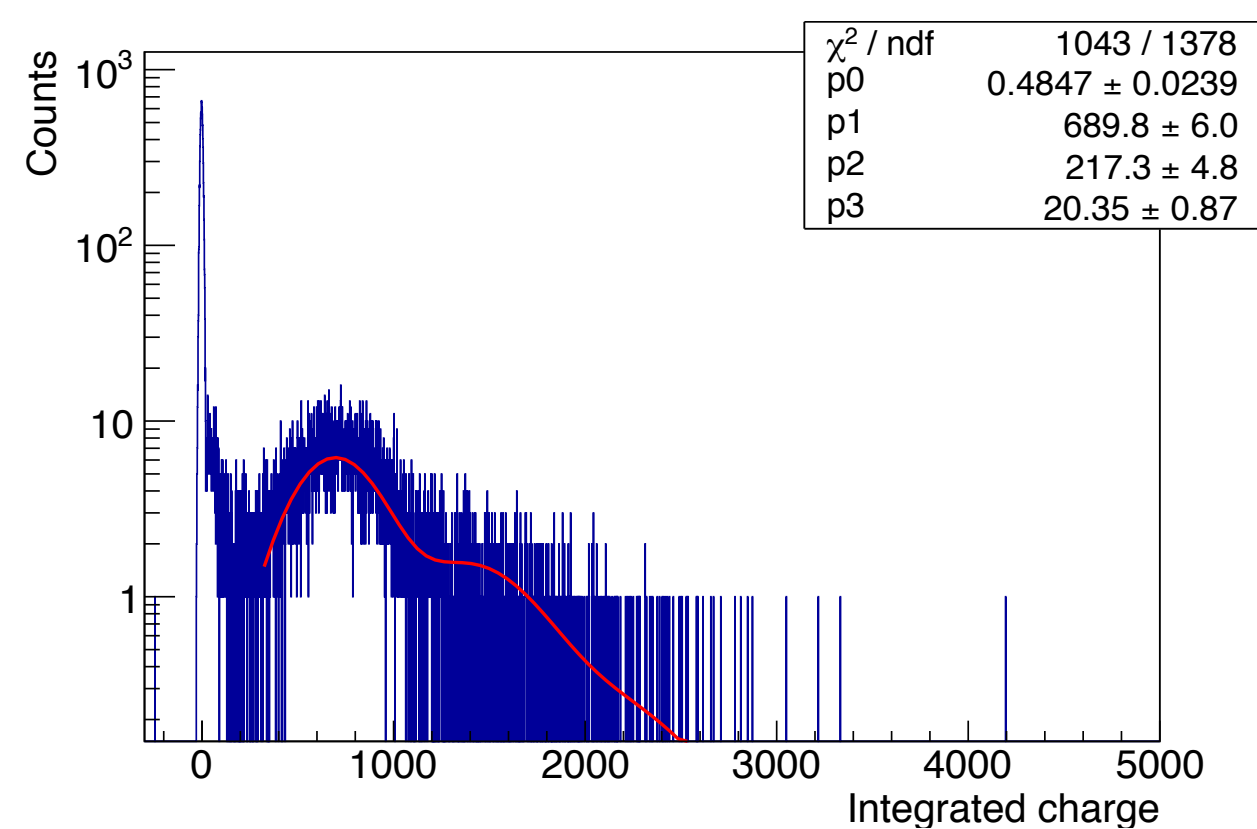
0.03 mT



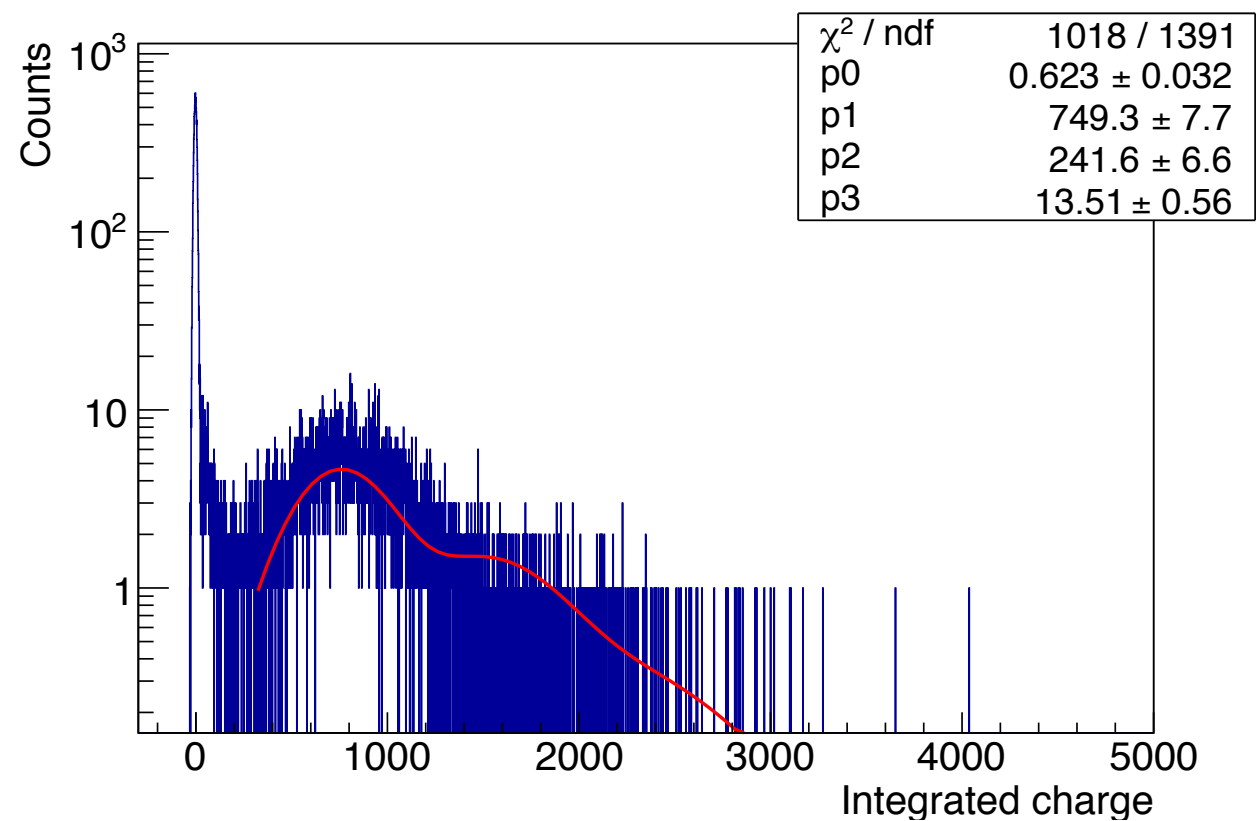
-0.03 mT



0 mT

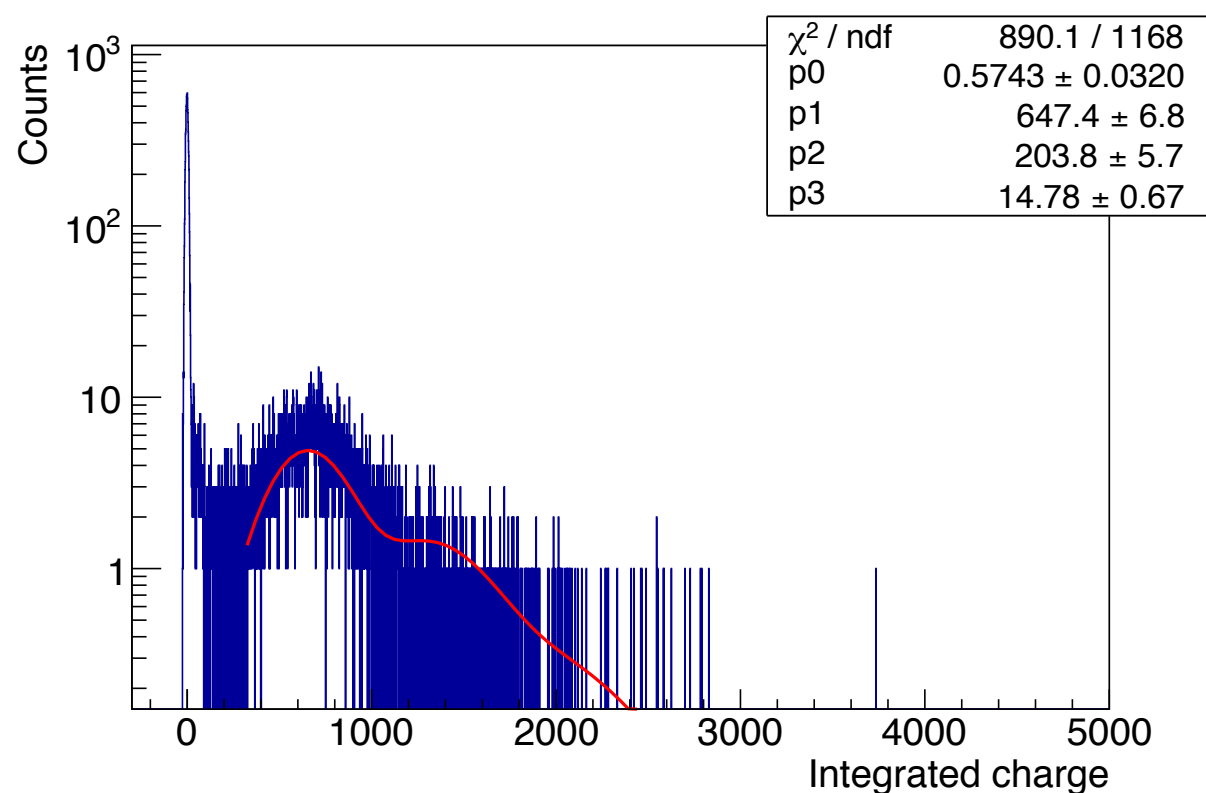


0.03 mT

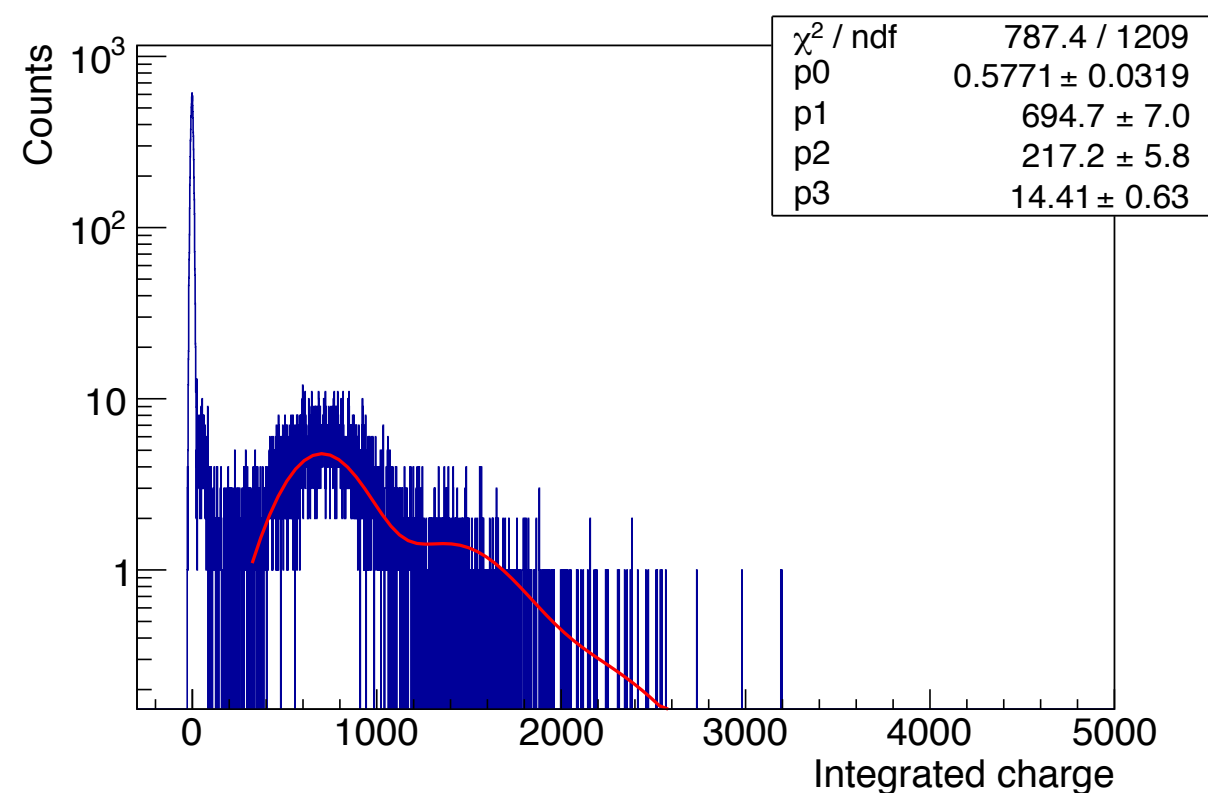


1st time

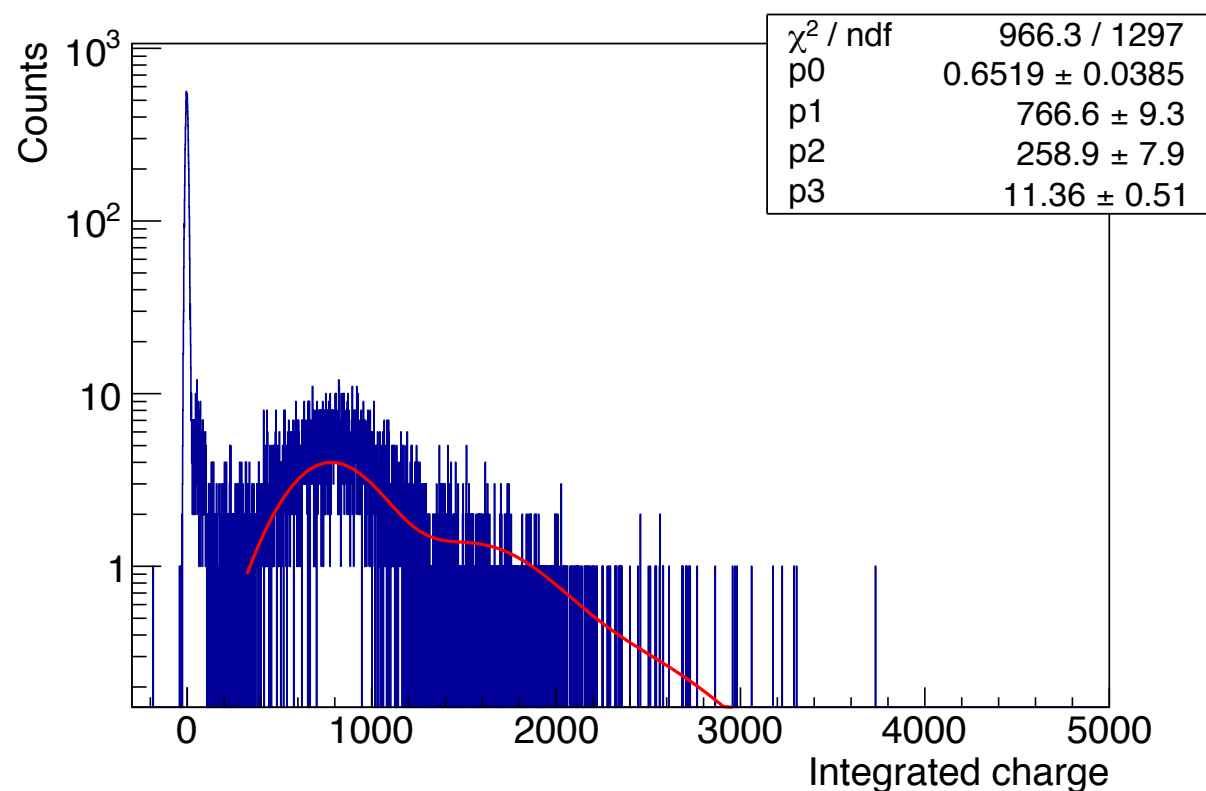
-0.03 mT



0 mT

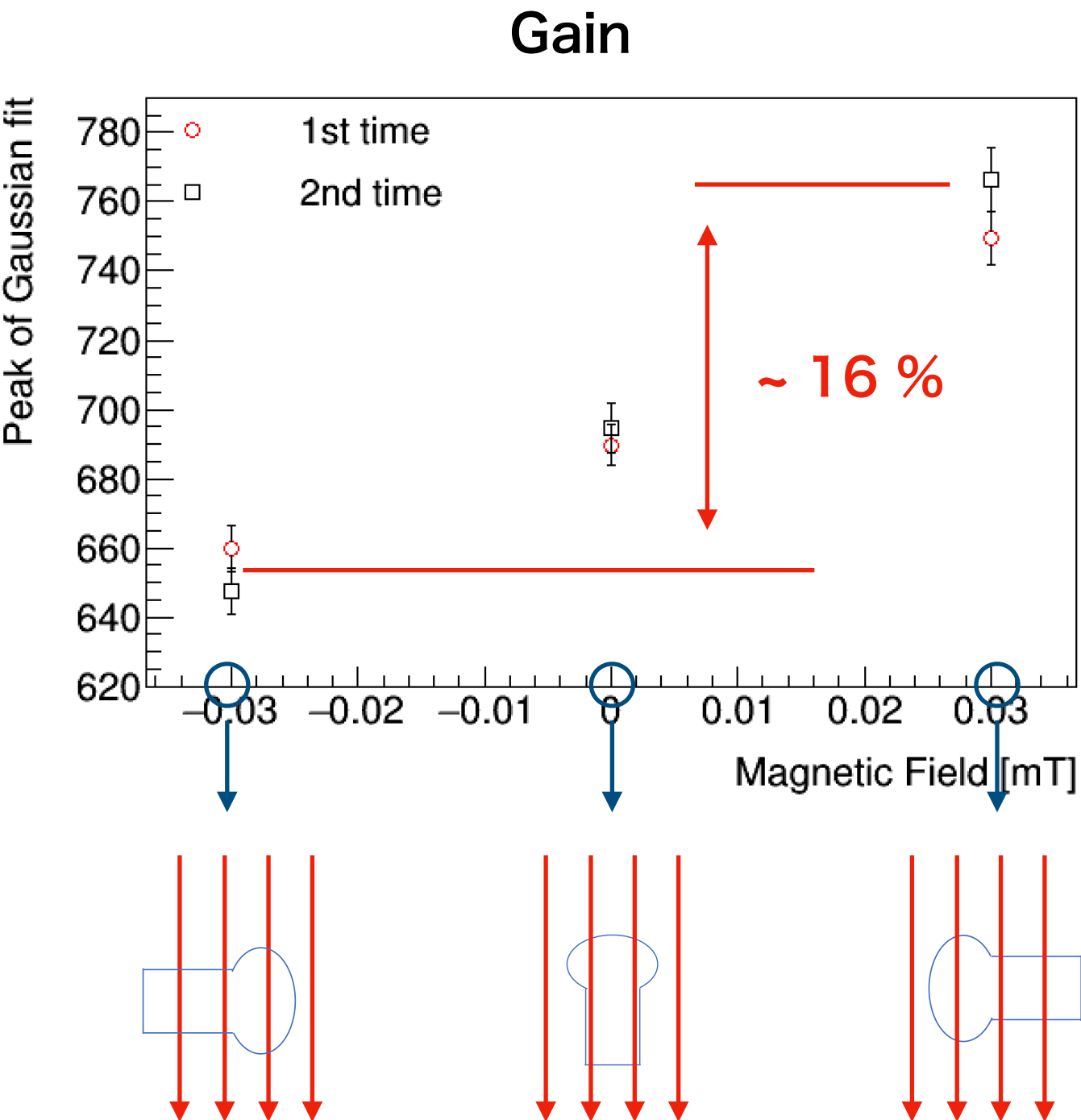


0.03 mT



2nd time

Gain



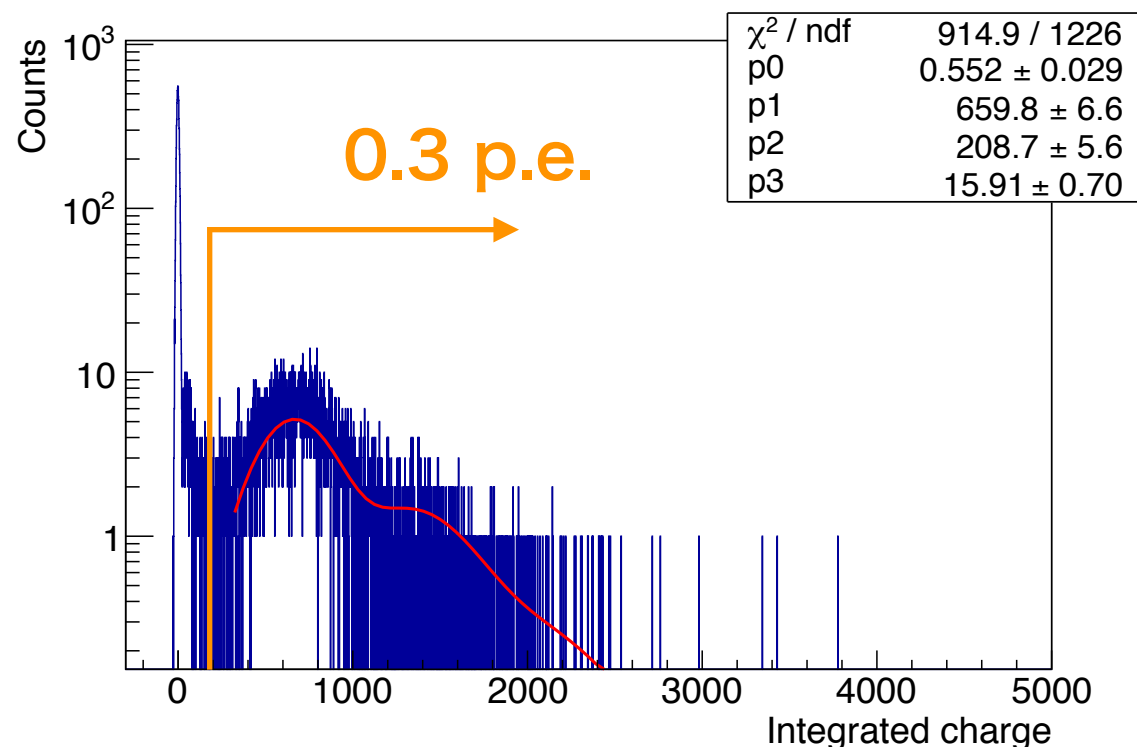
- As the magnetic fields increases, the gain increases.
- The variation of the gain is about 16 %.

Relative efficiency

Relative efficiency is defined as follows:

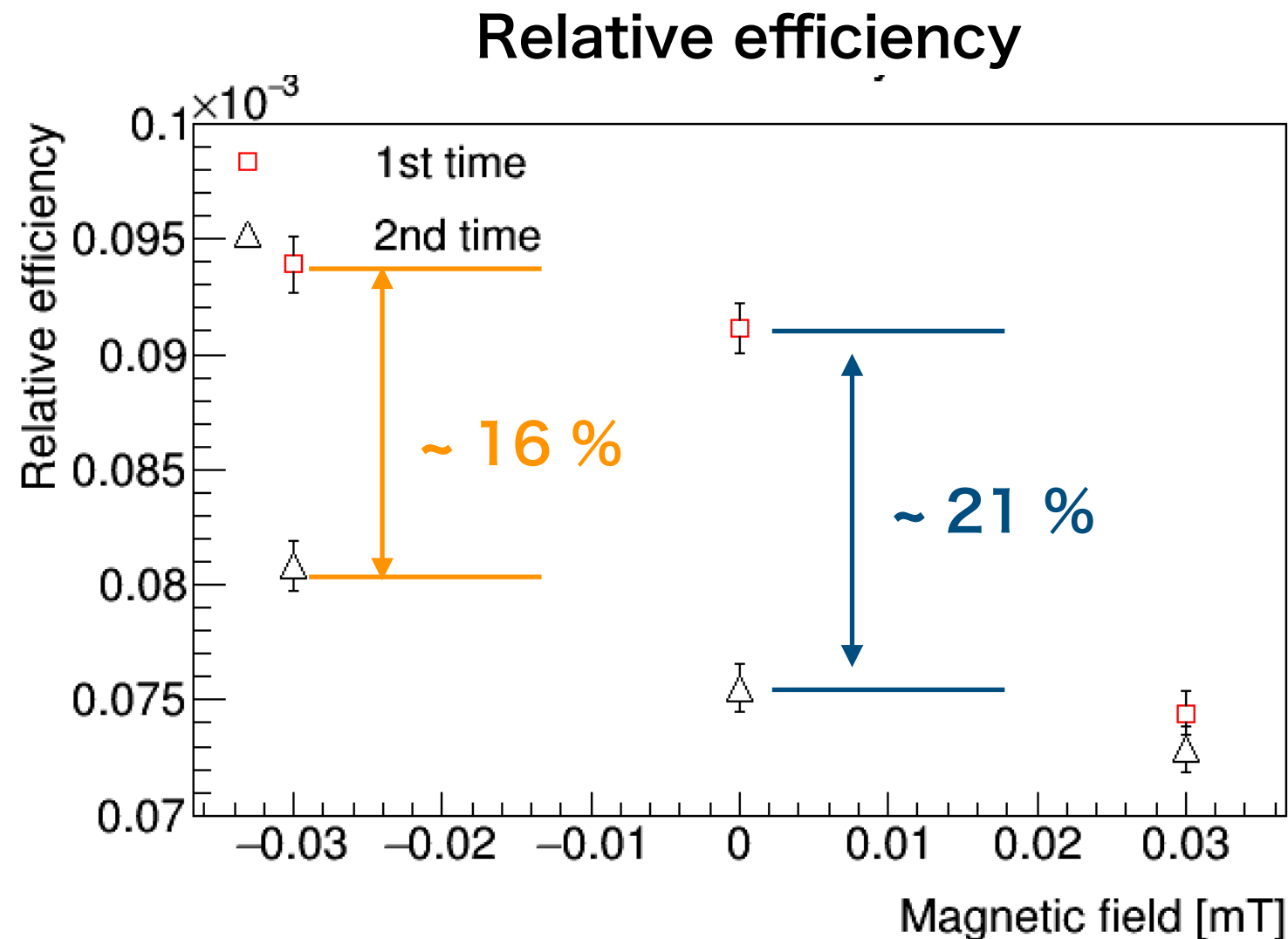
$$\text{Relative efficiency} = \frac{\text{3-inch PMT efficiency}}{\text{Mean of Monitor PMT integrated charge}}$$

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



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

Relative efficiency

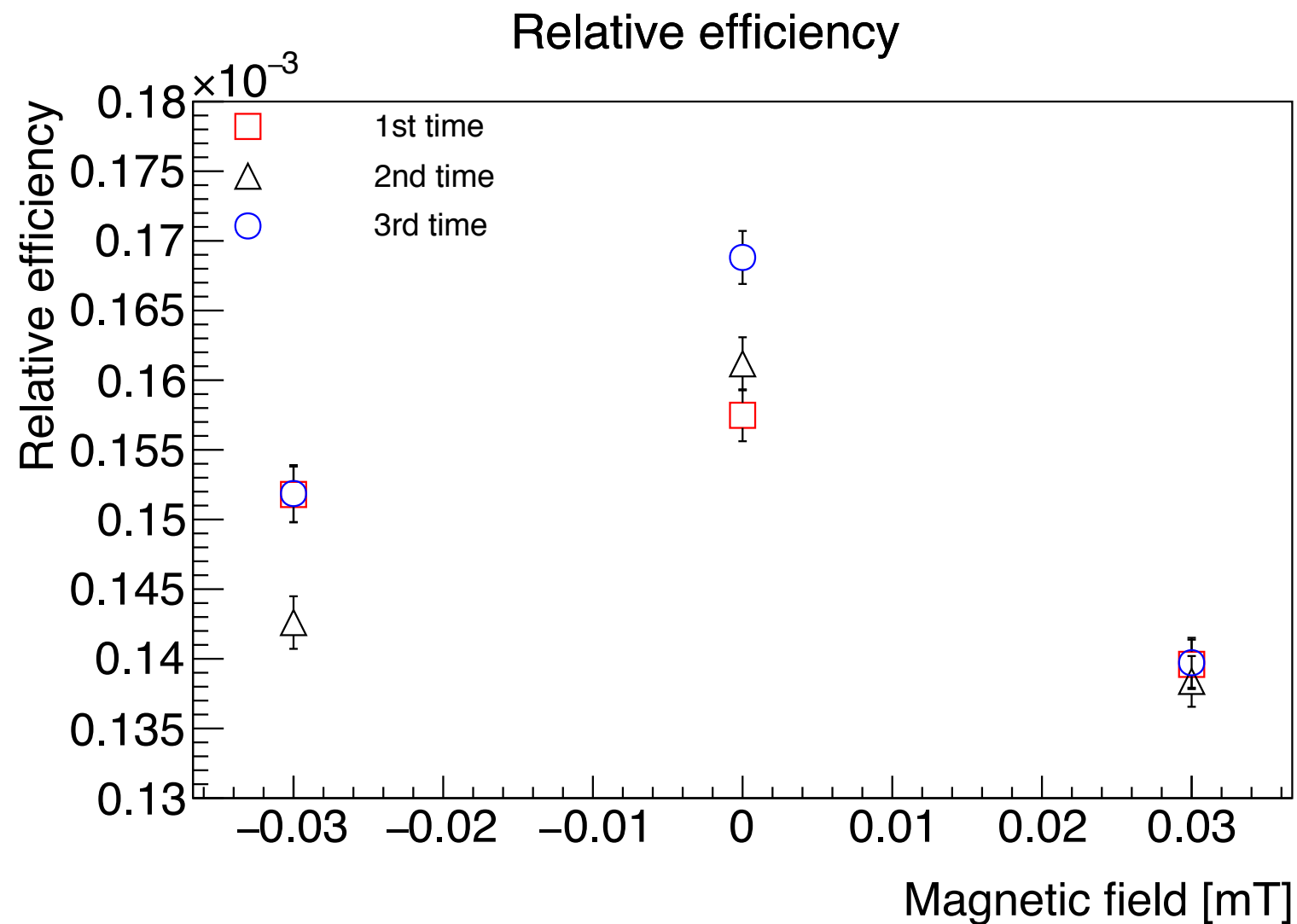


- 1st measurement order
-0.03 mT, 0 mT, 0.03 mT
- 2nd measurement order
0.03 mT, 0 mT, -0.03 mT

- There is difference between 1st result and 2nd result.
- One of the causes is moving the setup to rotate.

Relative efficiency

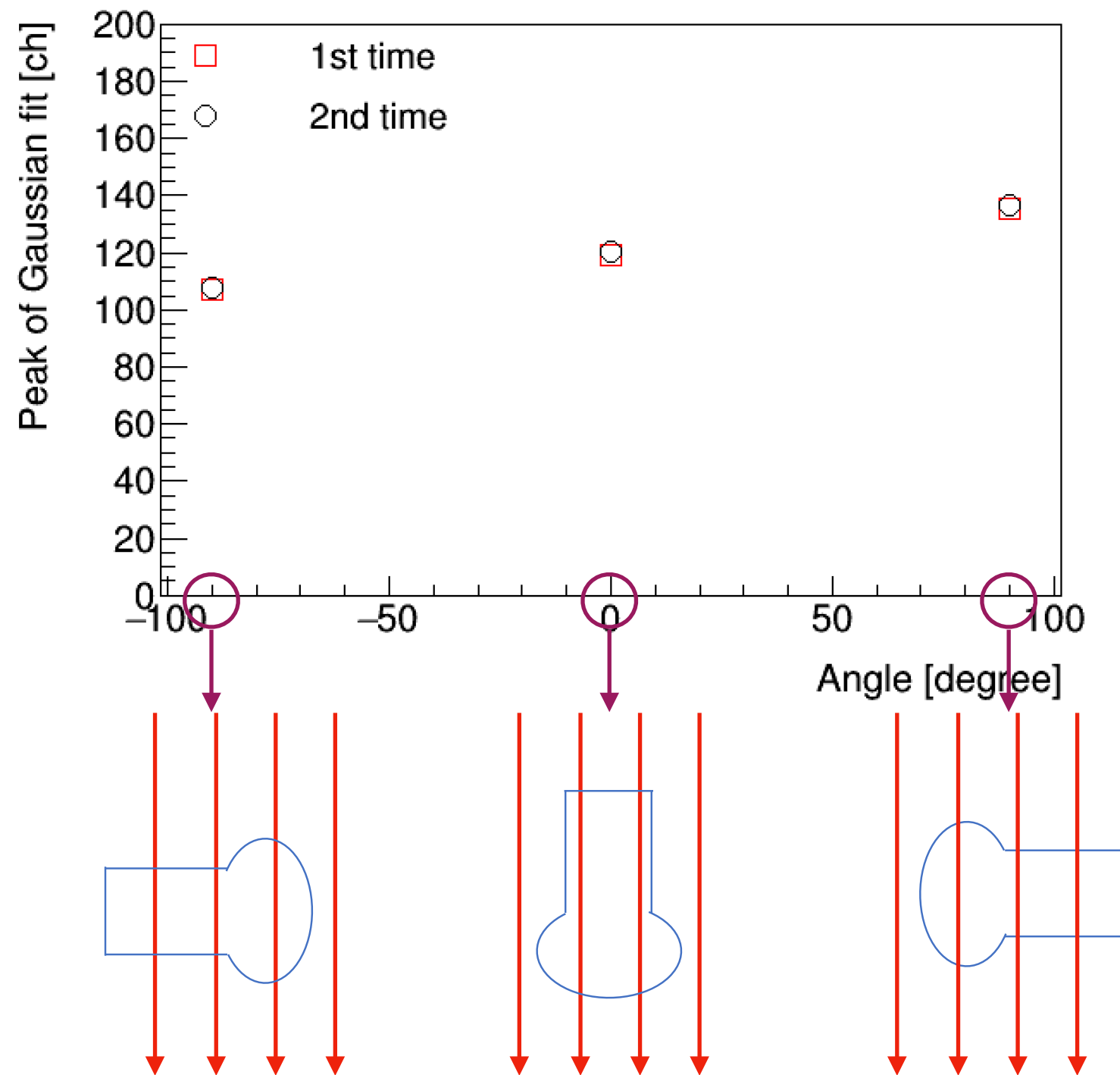
- I changed the measurement order.
 - I measured the relative efficiency three times on each B-field.
- I checked whether moving the setup affects the efficiency.



- There is difference between three times.
- I will resolve this issue.

Backup

Previous experiment



- The result shows that Variation of the gain is about 20 %.

