Status report

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What I have done

- Measured temperature dependence of another PMT with an incubator.

- Checked time dependence of that PMT in 14℃.

Temperature dependence of dark rate

"Dark Current Rate" is defined as follows:

$$\text{Dark Current Rate} = \frac{\text{the number of PMT's signals}}{\text{Real Time (600 s)}}$$
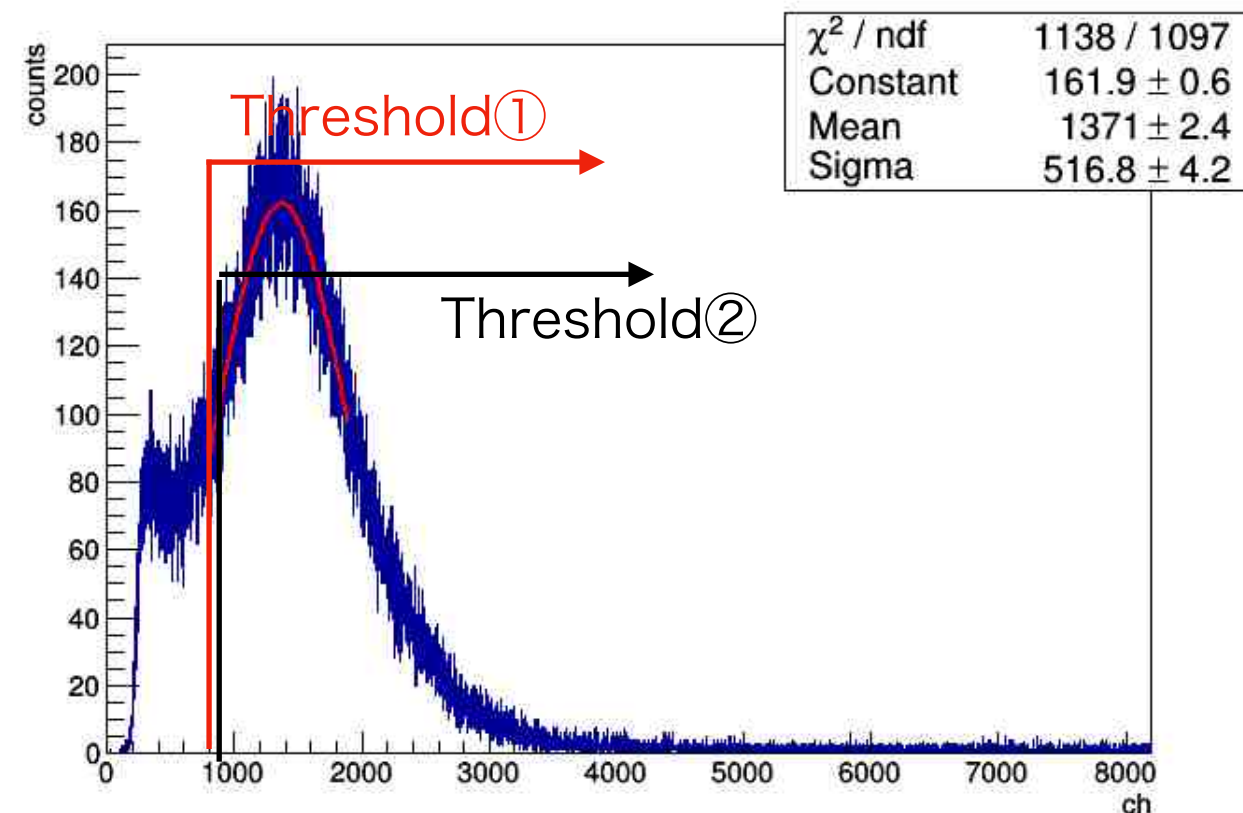
"the number of PMT's signals" is the counts above the threshold.

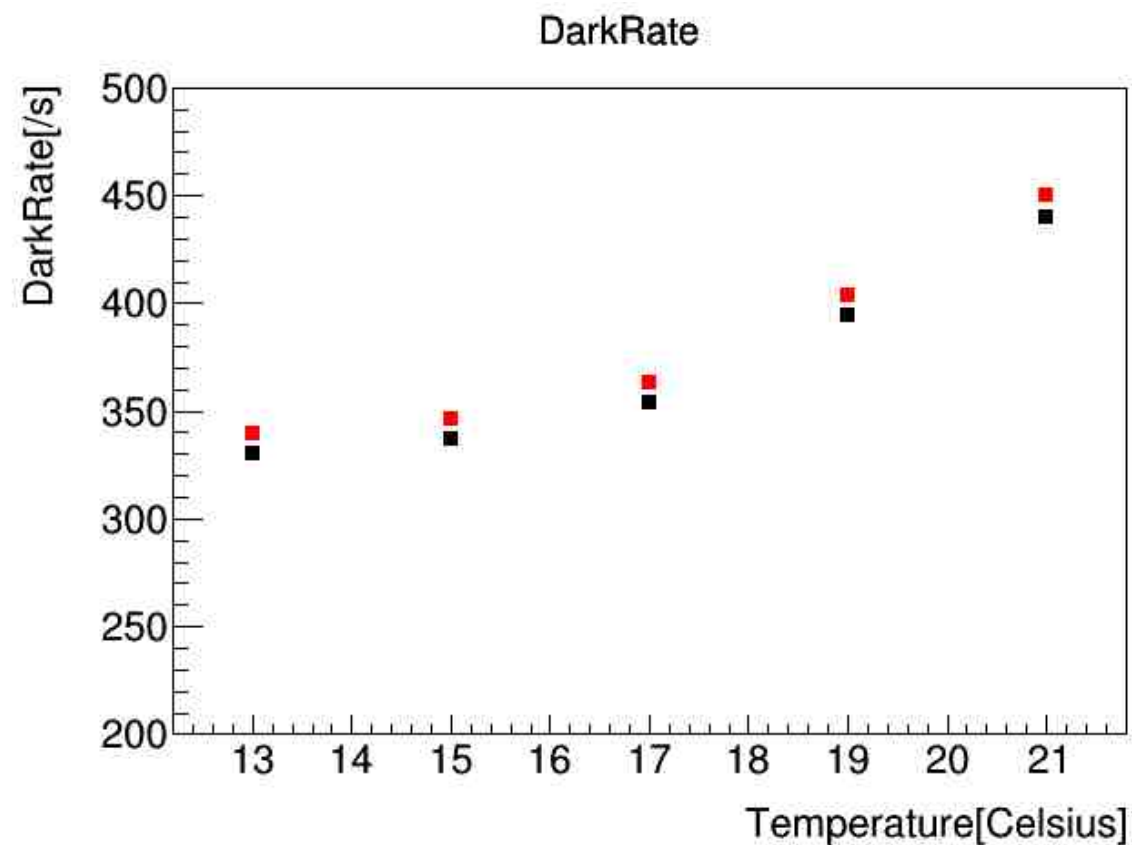Threshold① is defined as follows

Threshold①
=Constant threshold (ch 800)

Threshold② is defined as follows

Threshold②
$= \text{Mean} - \sigma$

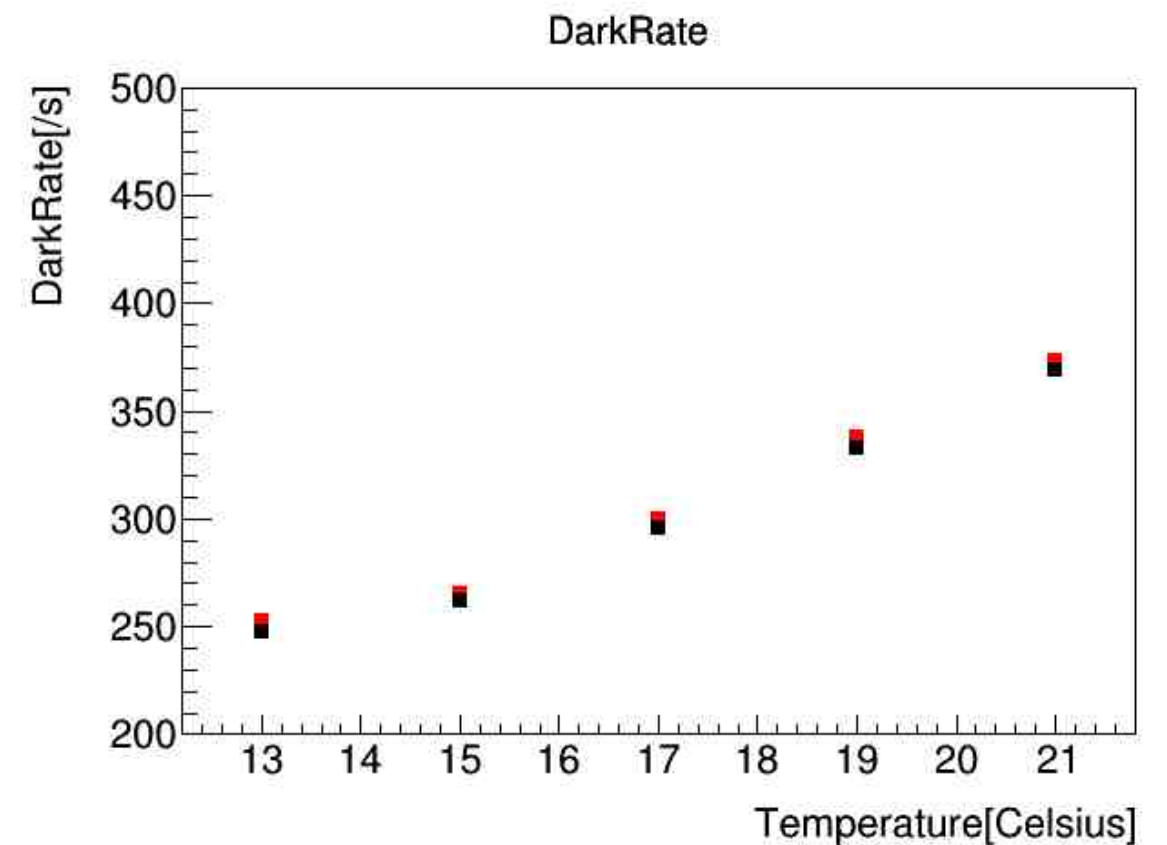| χ^2 / ndf	1138 / 1097
Constant	161.9 ± 0.6
Mean	1371 ± 2.4
Sigma	516.8 ± 4.2

Threshold①

Threshold②

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1st time: 3/28/2019 12:44~15:08

Measurement order: 13,15,17,19,21
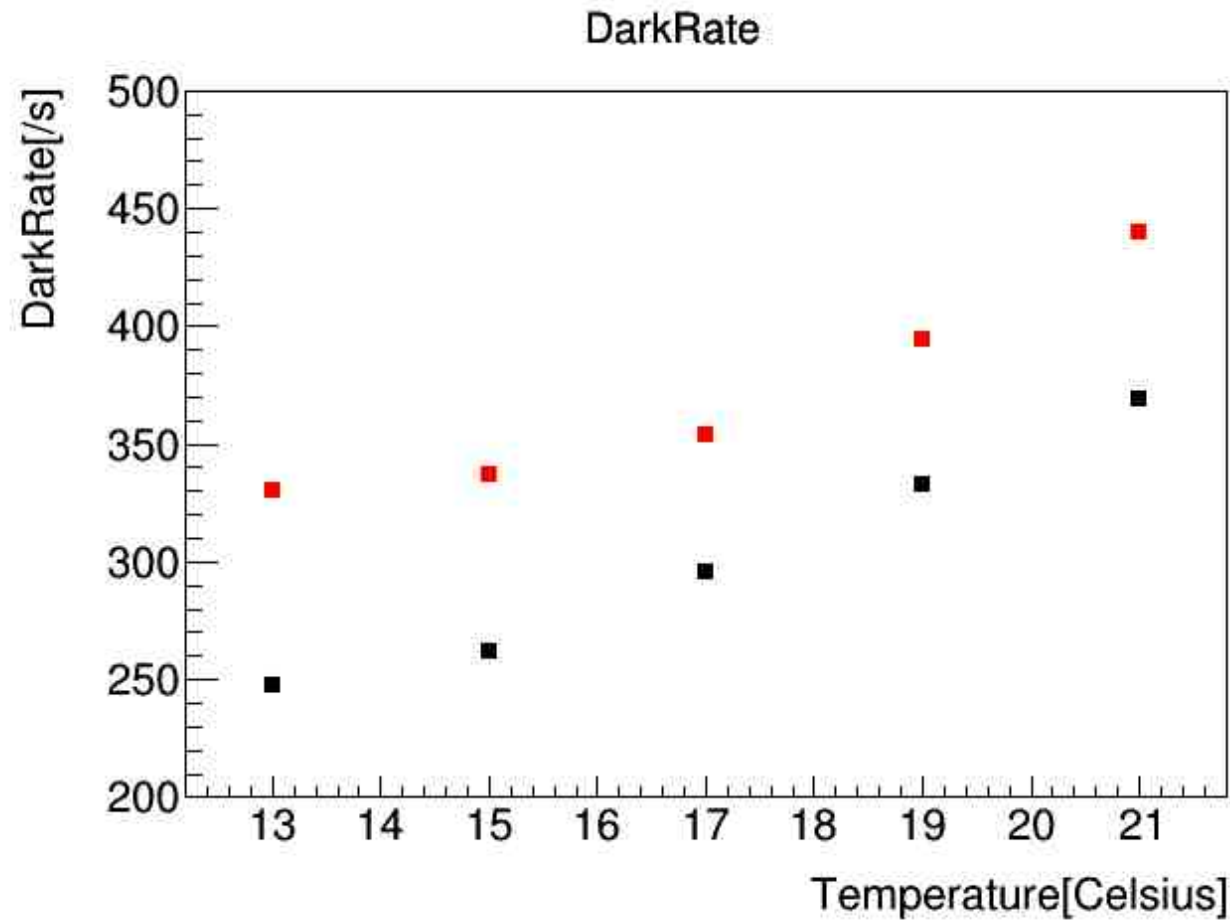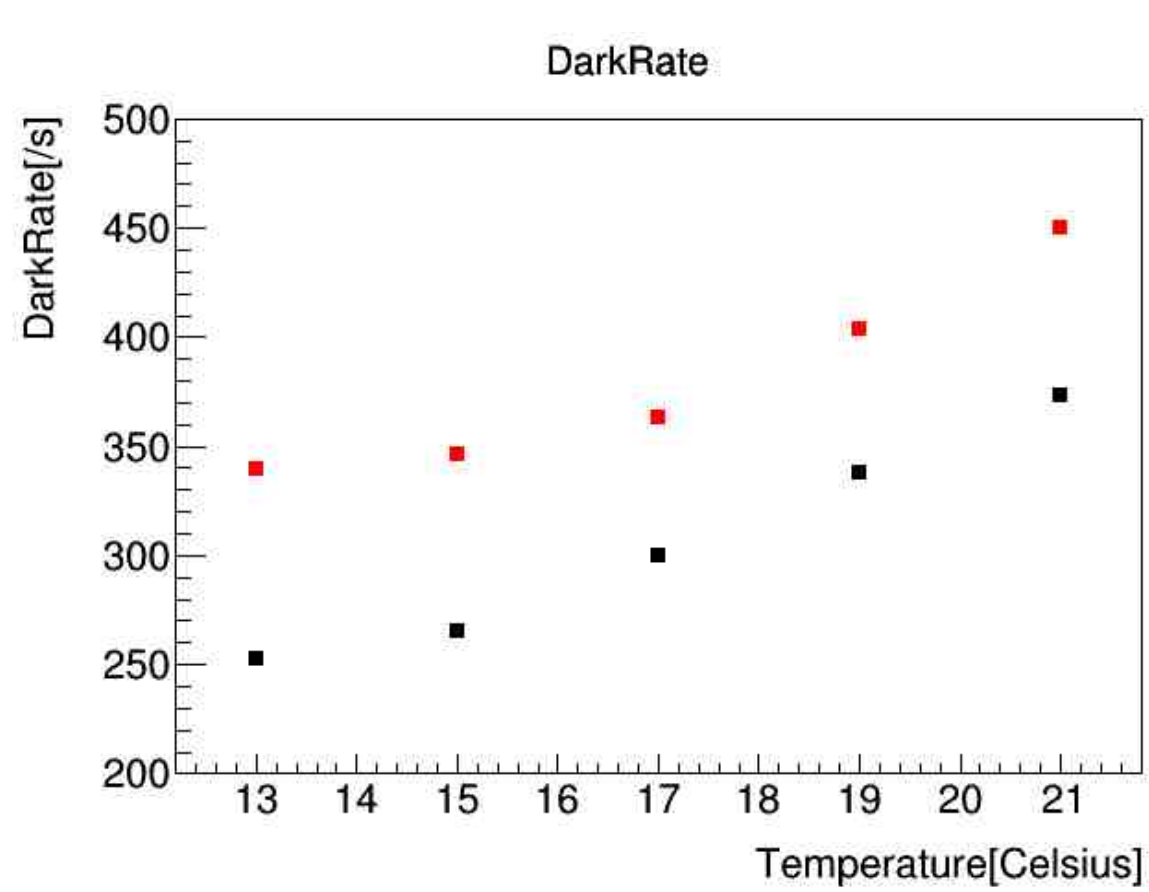
2nd time: 3/29/2019 10:05~13:13

Measurement order: 21,19,17,15,13

Red : Dark rate is defined by threshold①

Black: Dark rate is defined by threshold②

The dark rate is defined by threshold①　　The dark rate is defined by threshold②

1st time: 3/28/2019 12:44~15:08
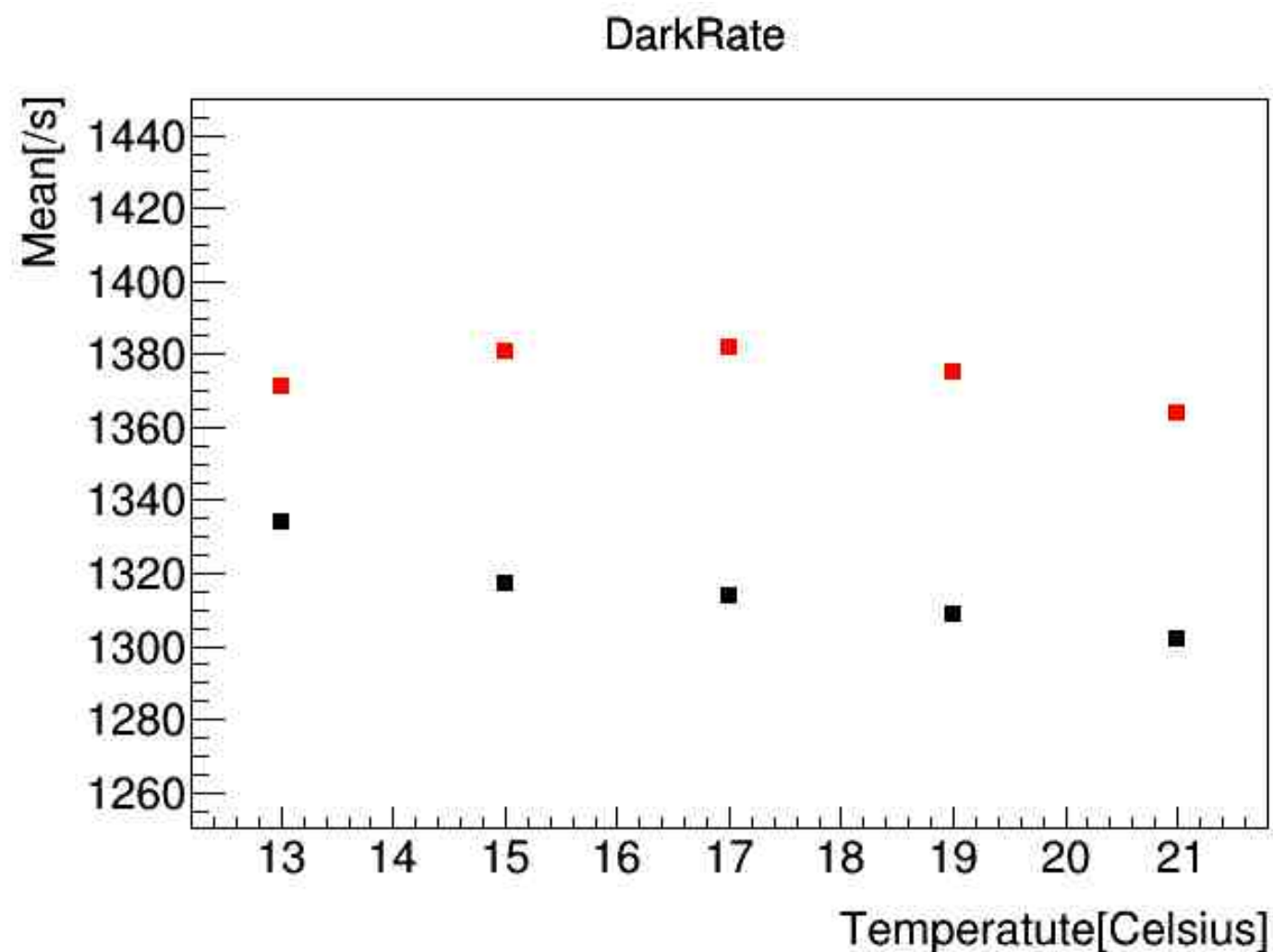Measurement order: 13,15,17,19,21

2nd time: 3/29/2019 10:05~13:13
Measurement order: 21,19,17,15,13

Temperature dependence of gain

 I fitted with Gaussian function above the threshold and saw the mean.

The mean shows peak of 1 photoelectron.

1st time: 3/28/2019 12:44~15:08

Measurement order: 13,15,17,19,21

2nd time: 3/29/2019 10:05~13:13

Measurement order: 21,19,17,15,13

Time dependence of dark rate
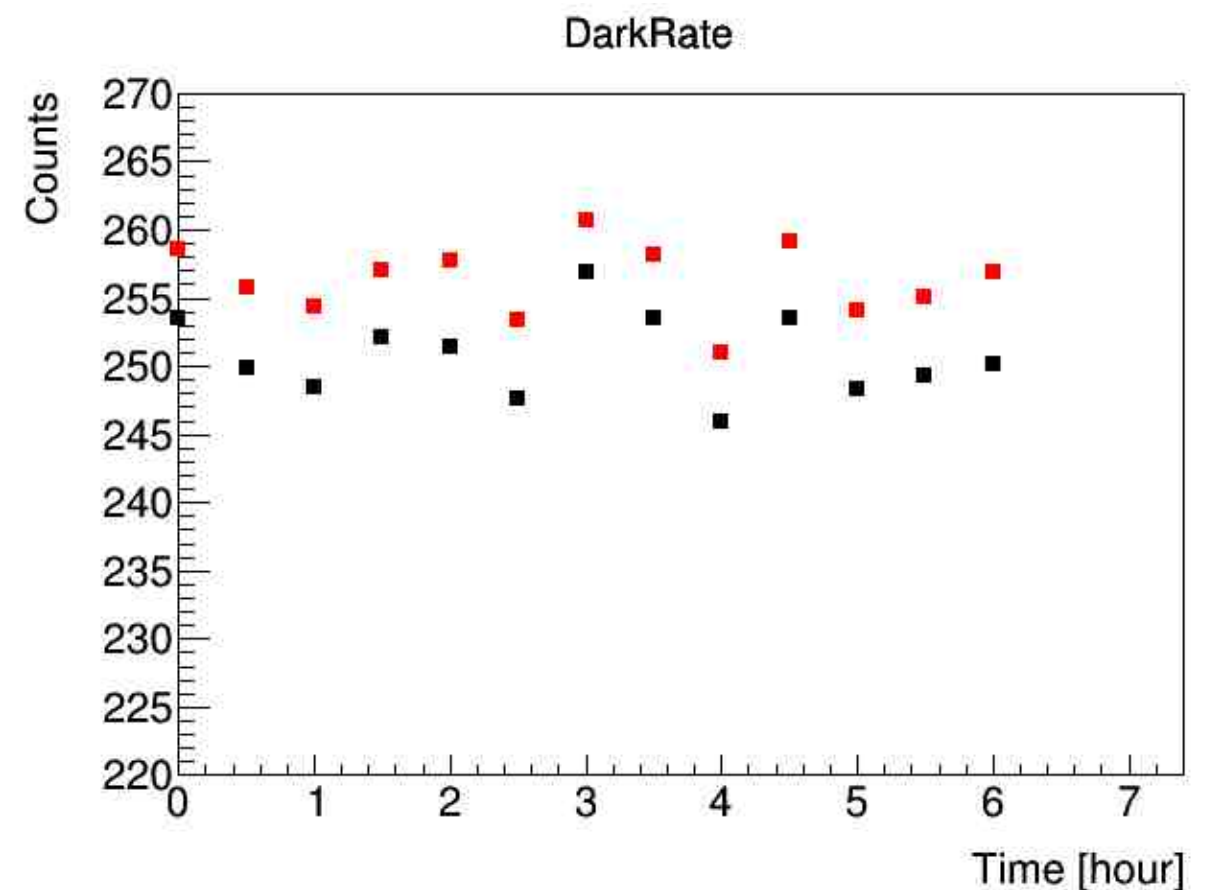
I checked time dependence of the dark rate.
I measured the rate after keeping the PMT in the incubator for 6 hours.

Threshold① is defined as follows:

Threshold①
=Constant threshold (ch 800)

Threshold② is defined as follows:
Threshold②
$= \mathrm{Mean} - \sigma$

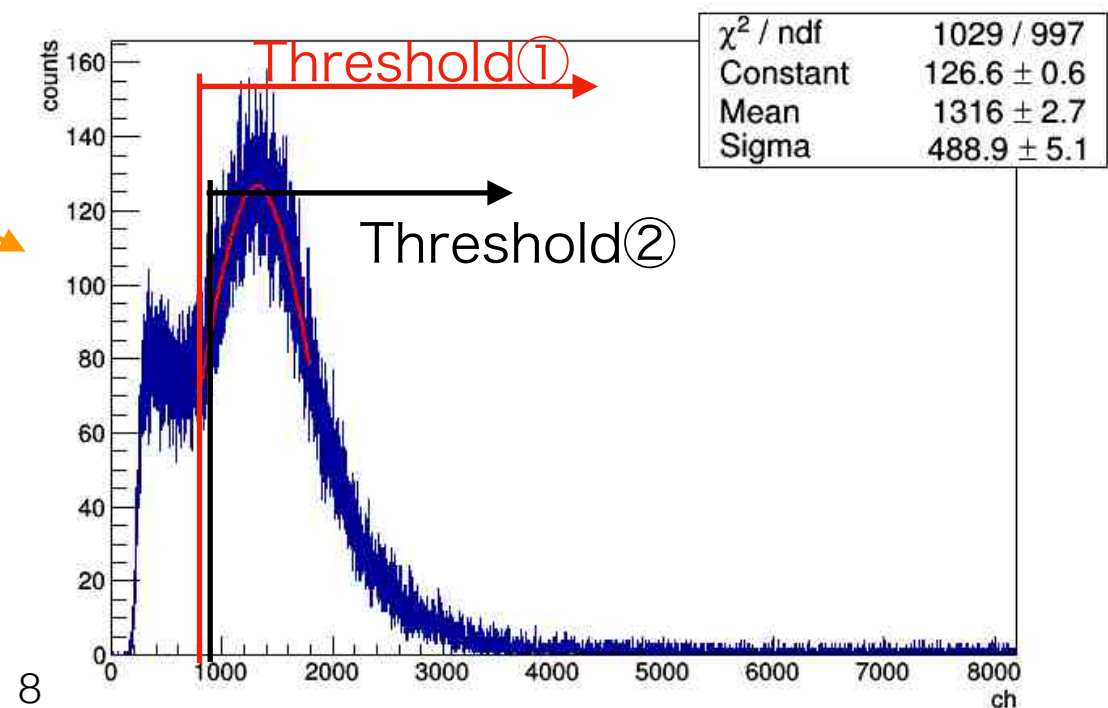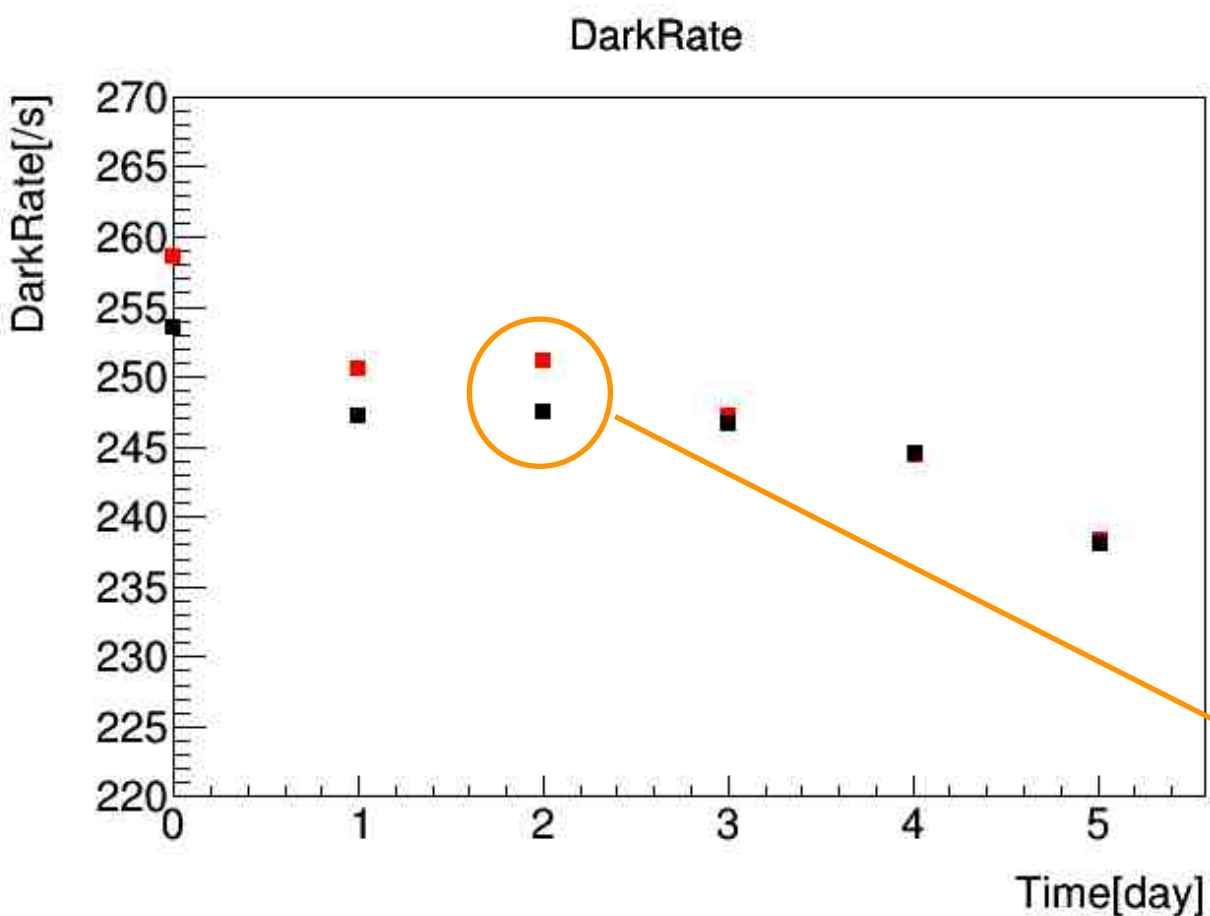Start time: 2019/3/29 14:34:00
End time : 2019/3/29 20:44:00

I measured the rate after keeping the PMT in the incubator for 5 days.

Threshold① is defined as follows:

Threshold①
=Constant threshold (ch 800)

Threshold② is defined as follows:

Threshold②
$= \mathrm{Mean} - \sigma$

χ^2 / ndf	1029 / 997
Constant	126.6 ± 0.6
Mean	1316 ± 2.7
Sigma	488.9 ± 5.1

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Next

- Check the temperature dependence and time dependence of previous PMT.