

Status report

2019/05/10

Michitaka Inomoto

What I have done

- Measured temperature dependence of dark rate.

“Dark Current Rate” is defined as follows:

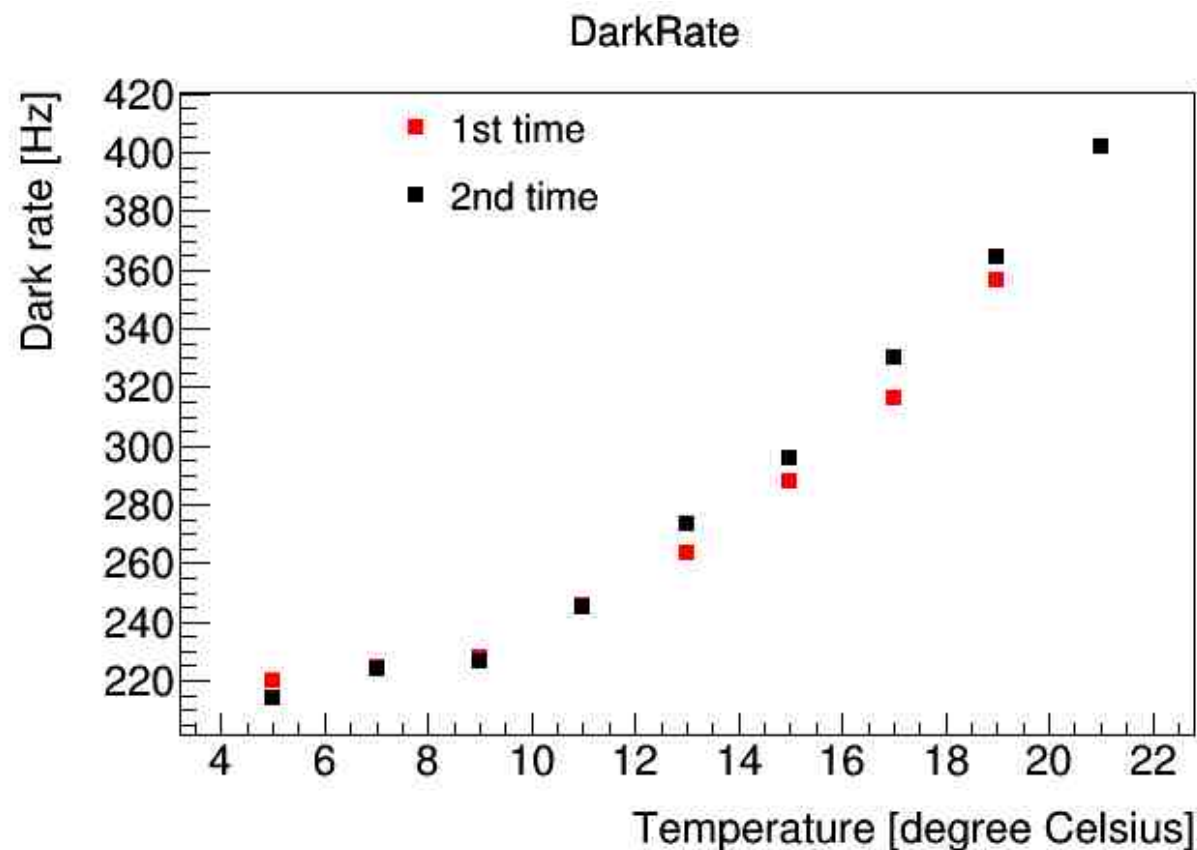
$$\text{Dark Current Rate} = \frac{\text{the number of PMT's signals}}{\text{Real Time (600 s)}}$$

“the number of PMT's signals” is the counts above the threshold.

- Checked the dependence of the gain.
I saw the mean of 1 photoelectron to check the gain.

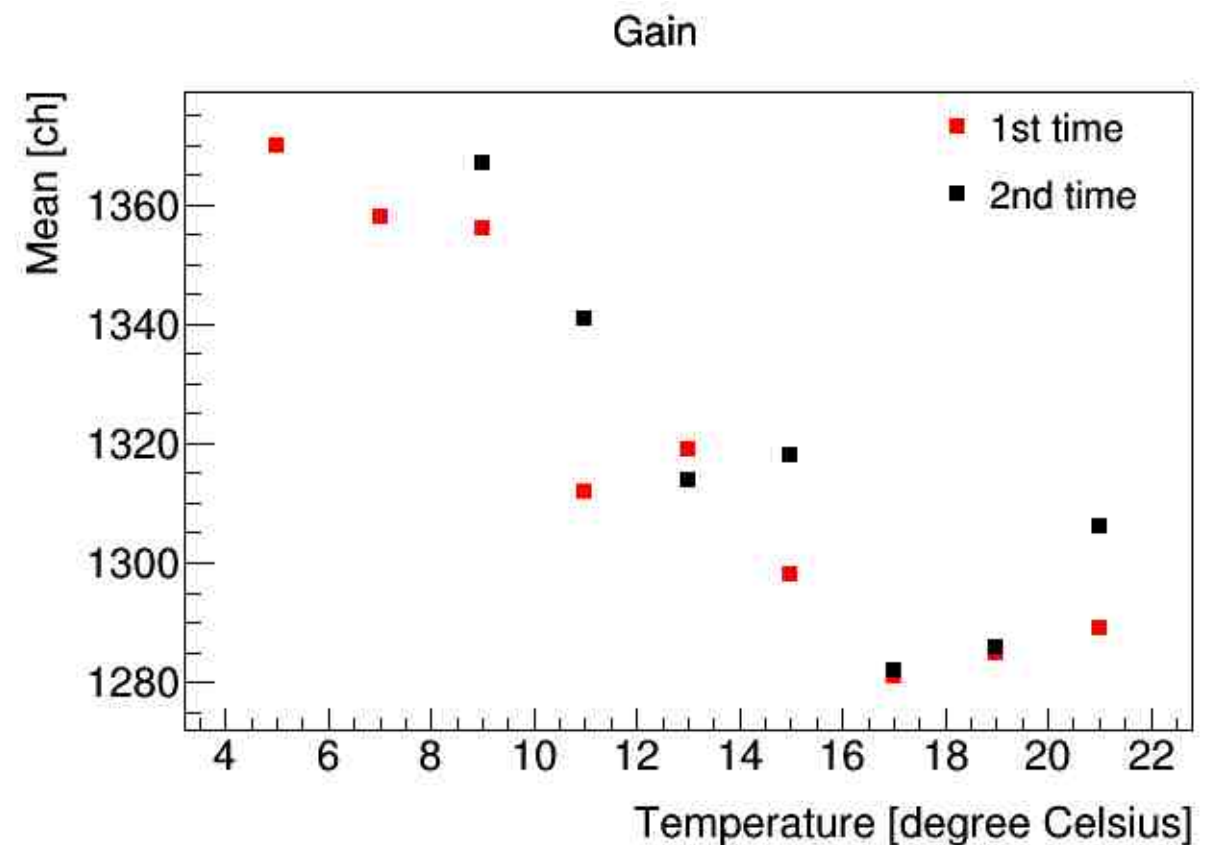
Temperature dependence

- Changed temperature (5 °C-21 °C) with an incubator, and checked changes in dark rate and gain.



1st time: 04/19/2019 11:50- 04/24/2019 19:59

Measurement order: 5, 7, 9, 11, 13, 15, 17, 19, 21



2nd time: 04/24/2019 20:12-04/26/2019 00:06

Measurement order: 21, 19, 17, 15, 13, 11, 9, 7, 5

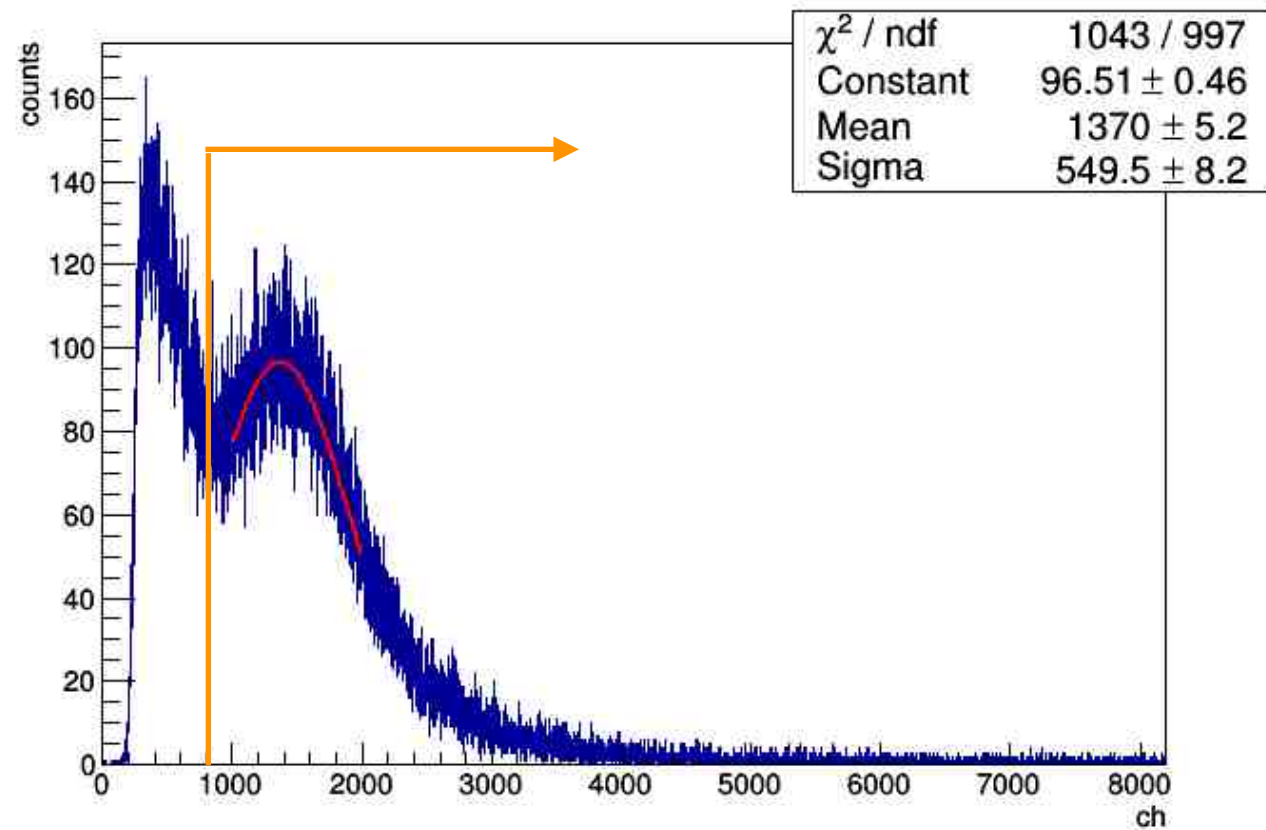
- As the temperature decreases, the dark rate decreases.
- As the temperature decreases, the gain tends to improve.

Next

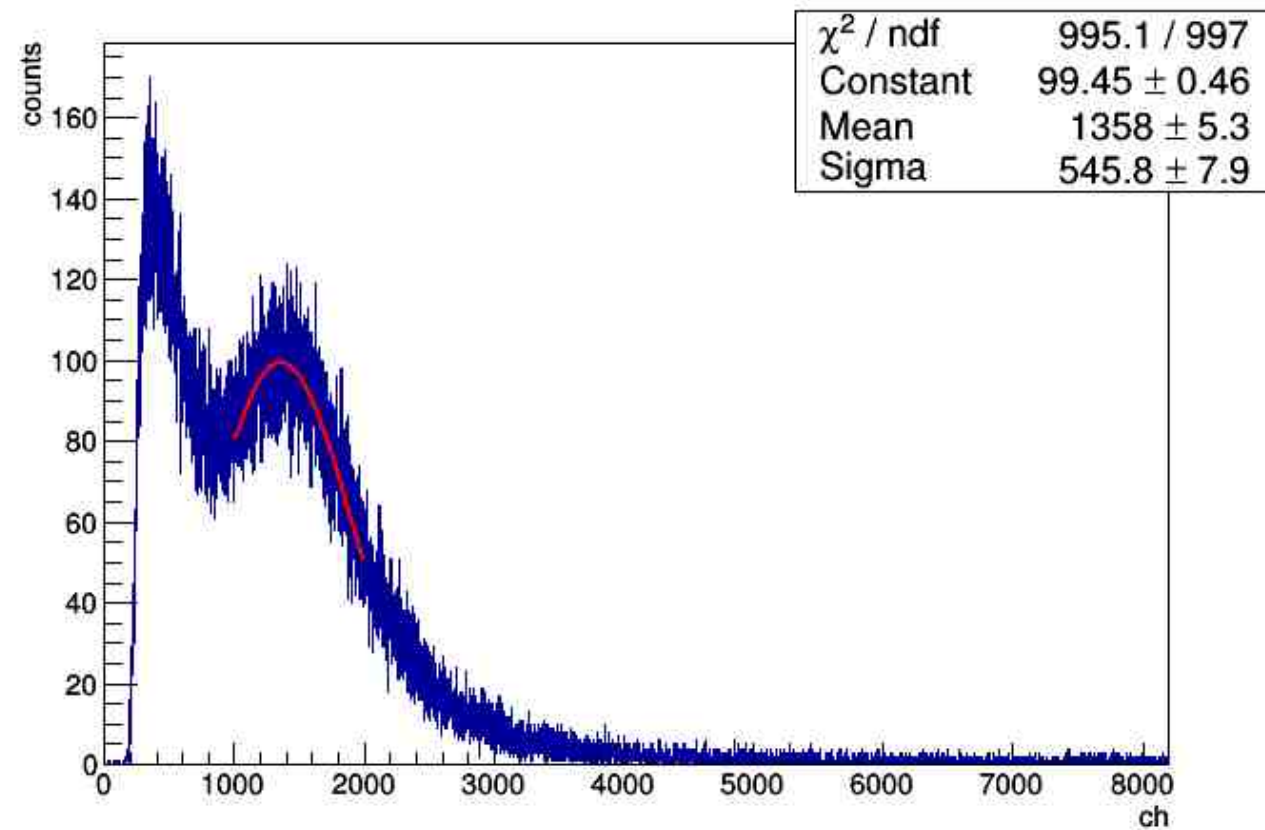
- Will perform following experiment to obtain PMT's signals from which noise due to the incubator has been removed.

1. Stabilize temperature with the incubator.
2. Turn off the incubator, and measure the dark rate.
3. After the rate measurement, measure the temperature.

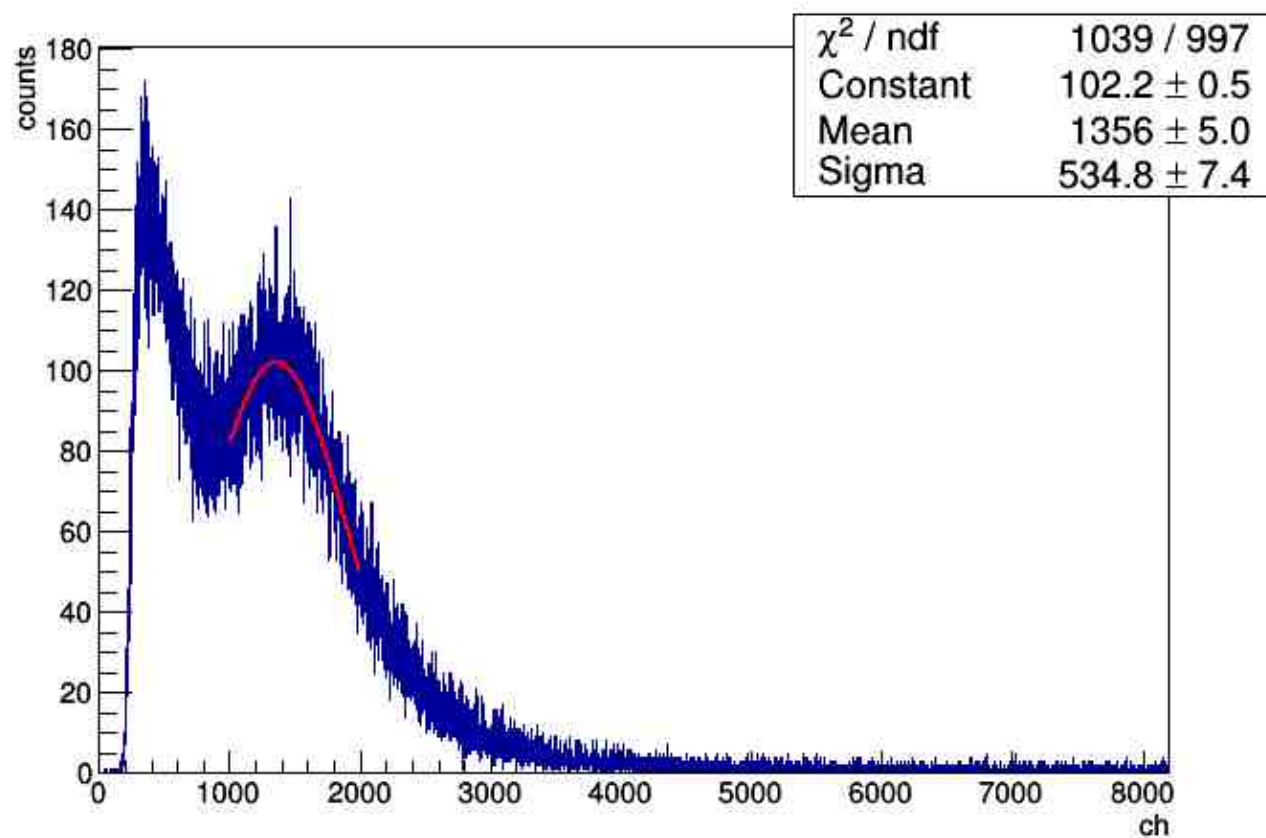
1st time



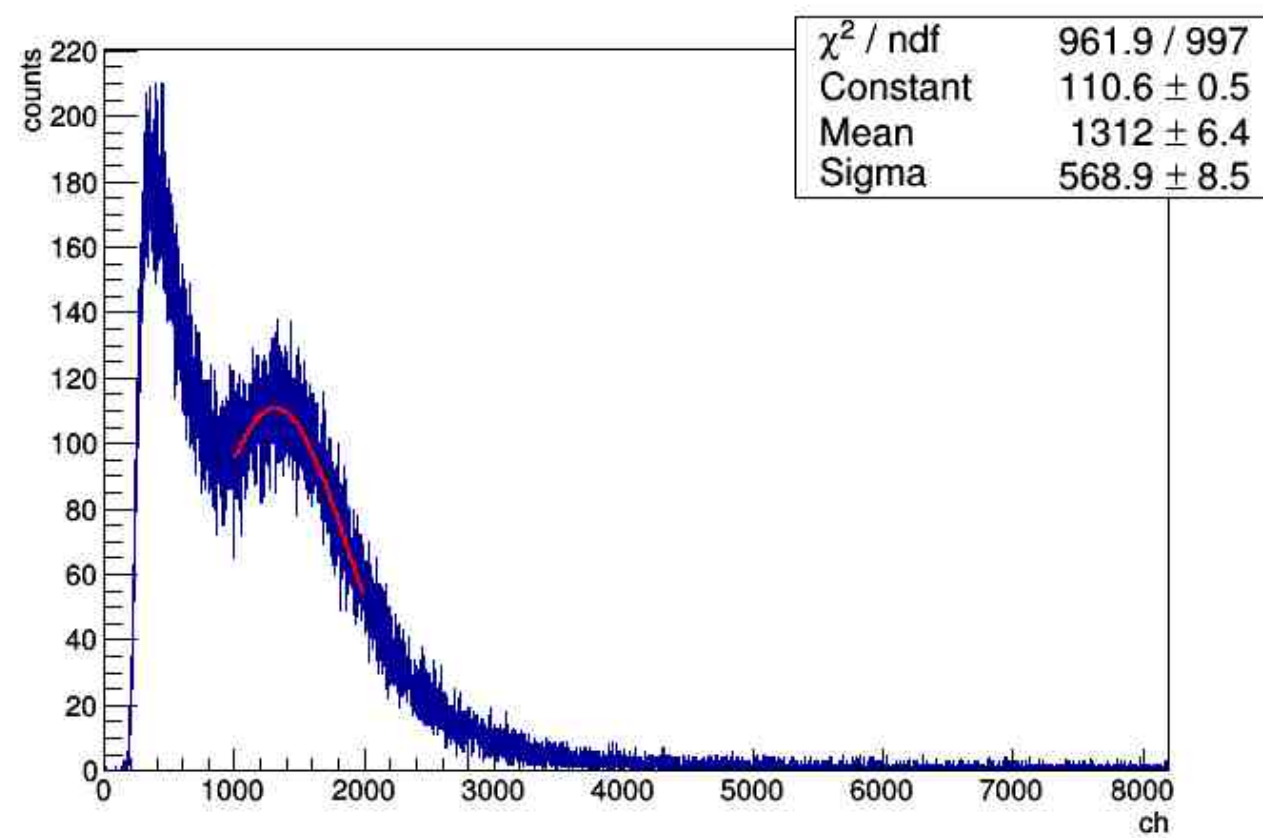
5 °C



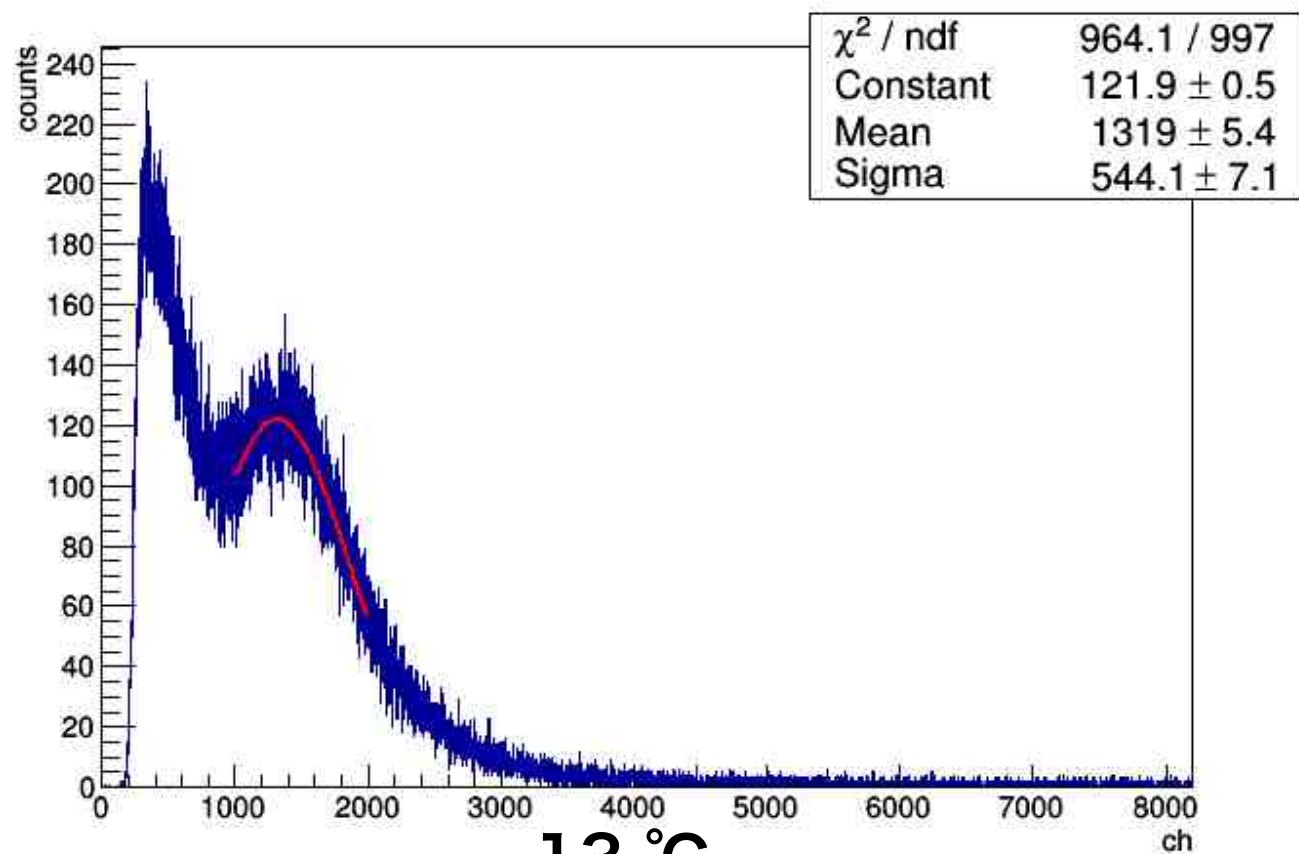
7 °C



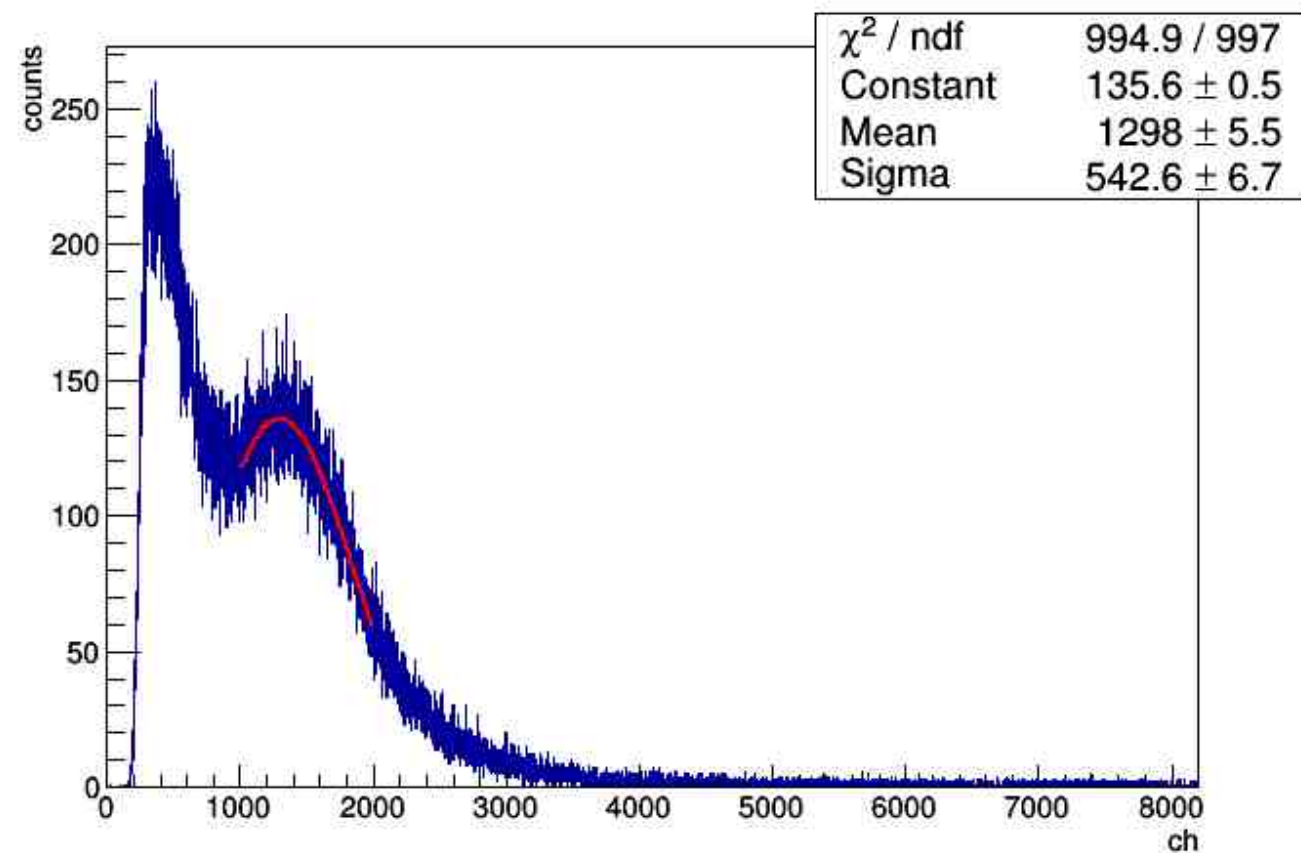
9 °C



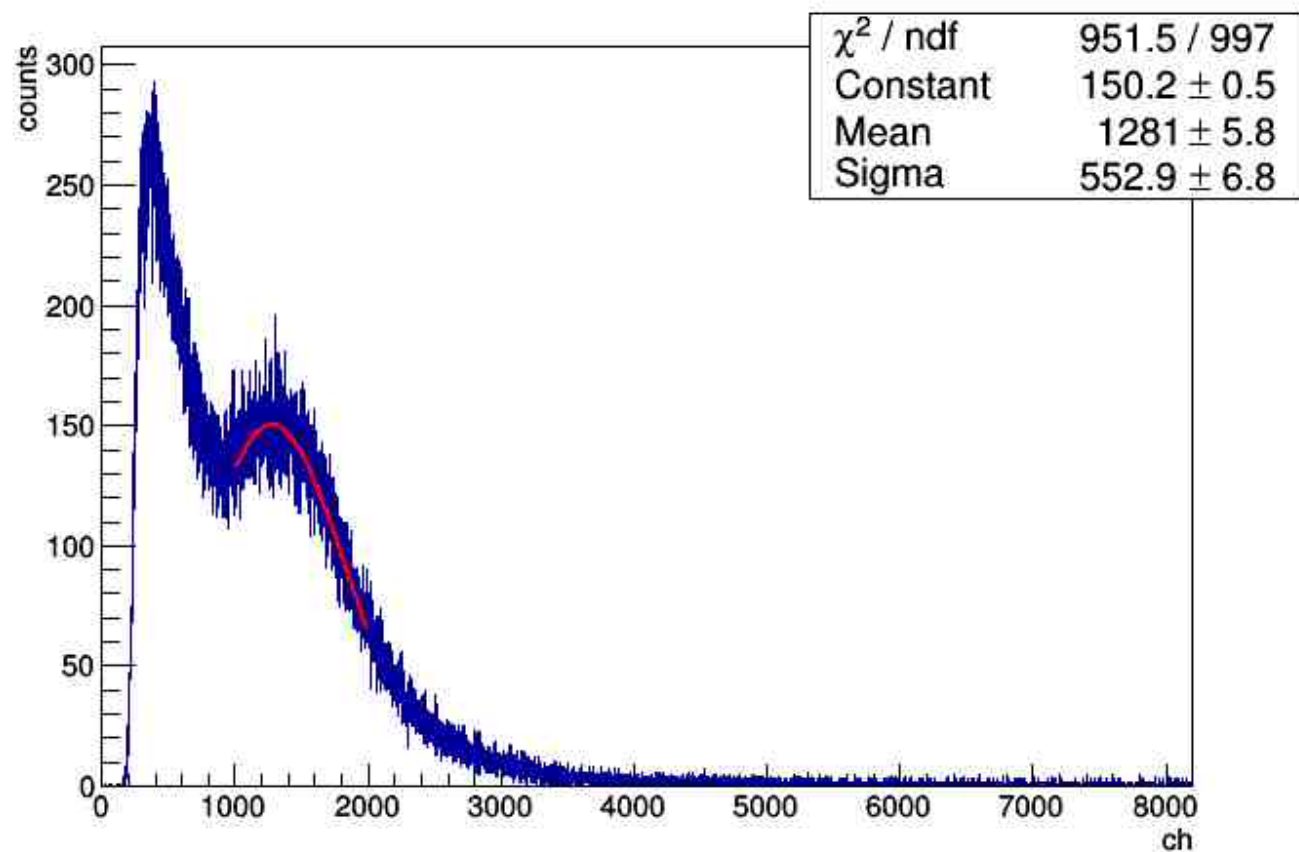
11 °C



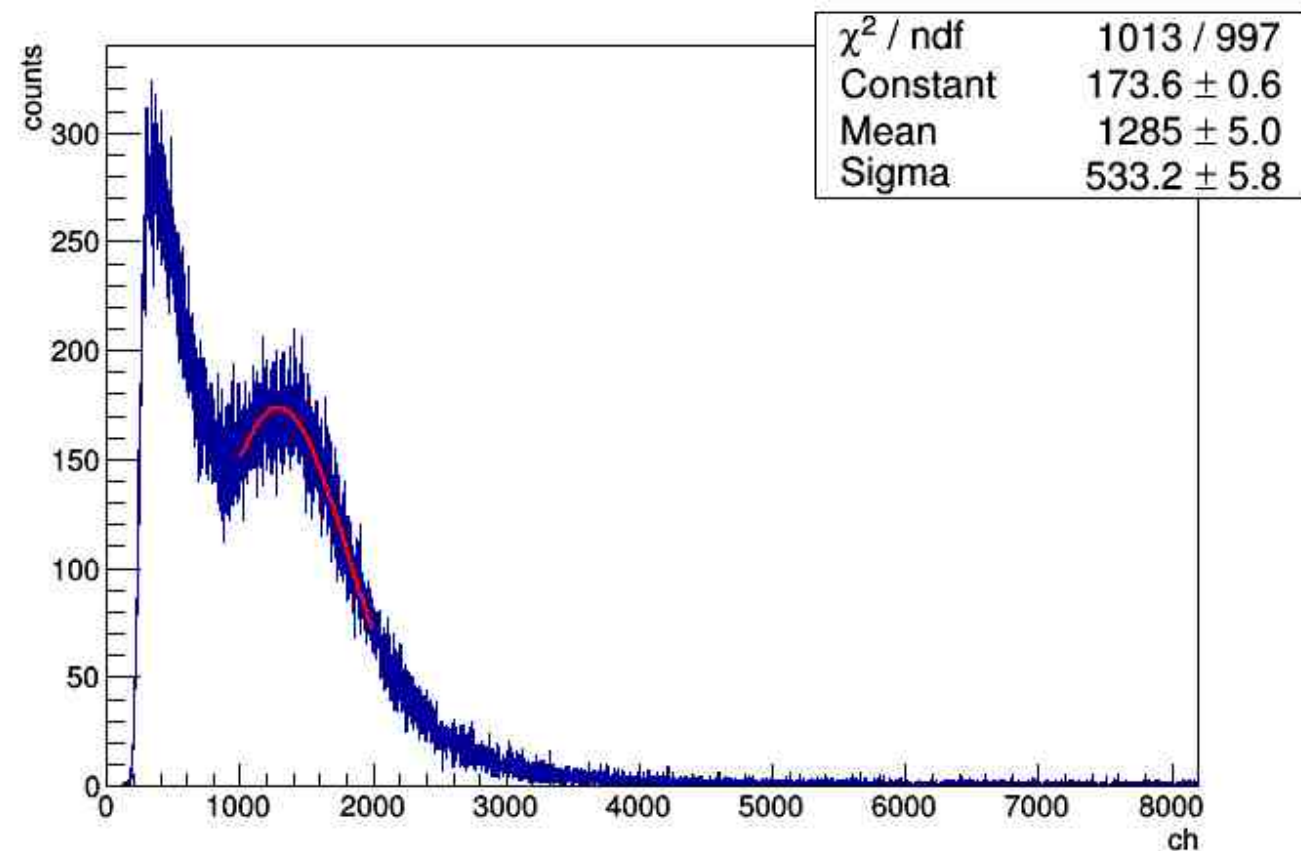
13 °C



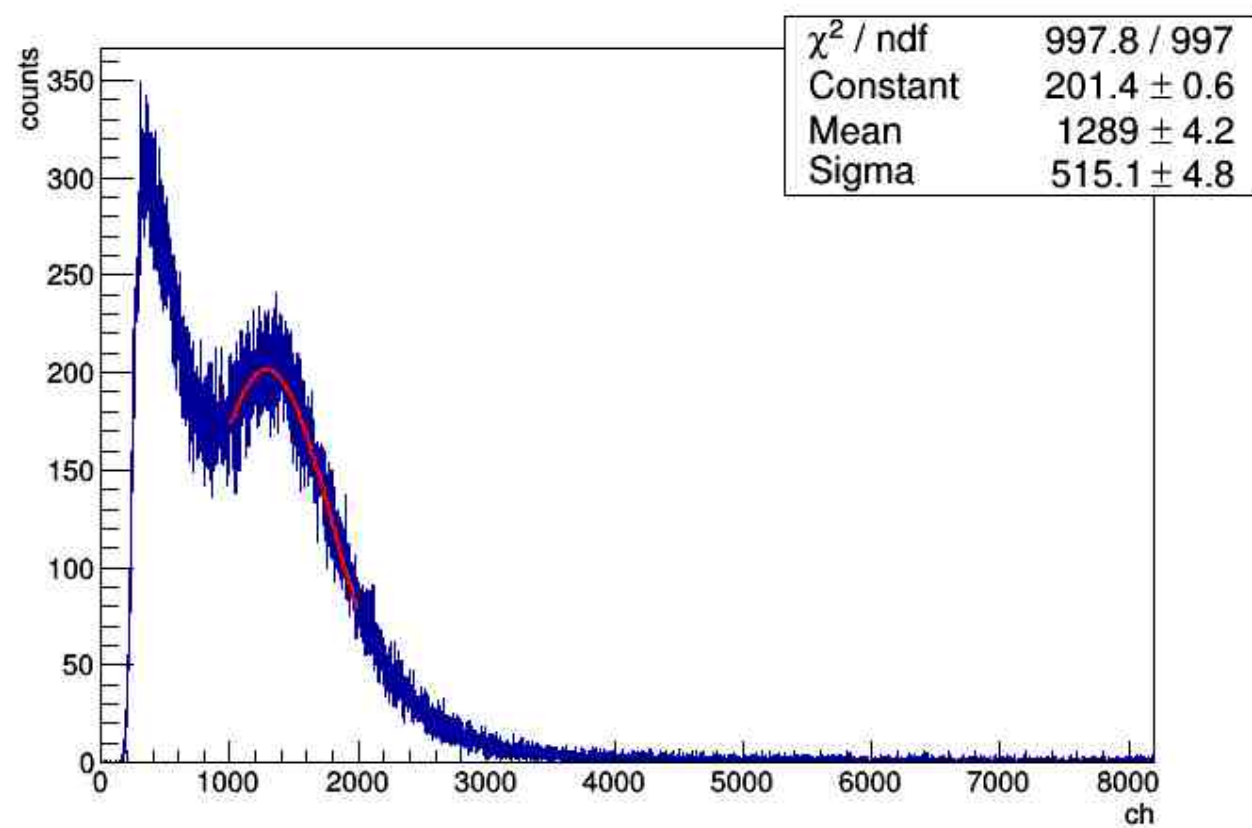
15 °C



17 °C

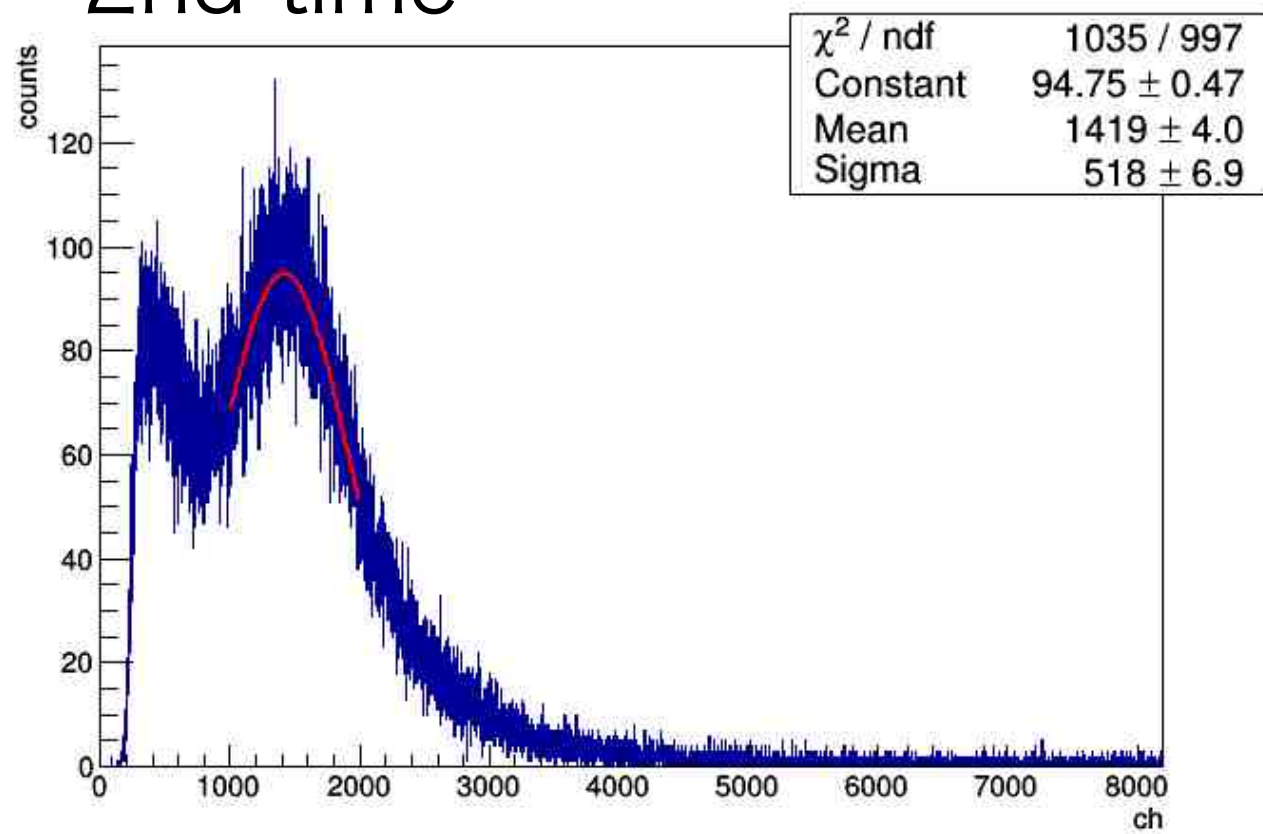


19 °C

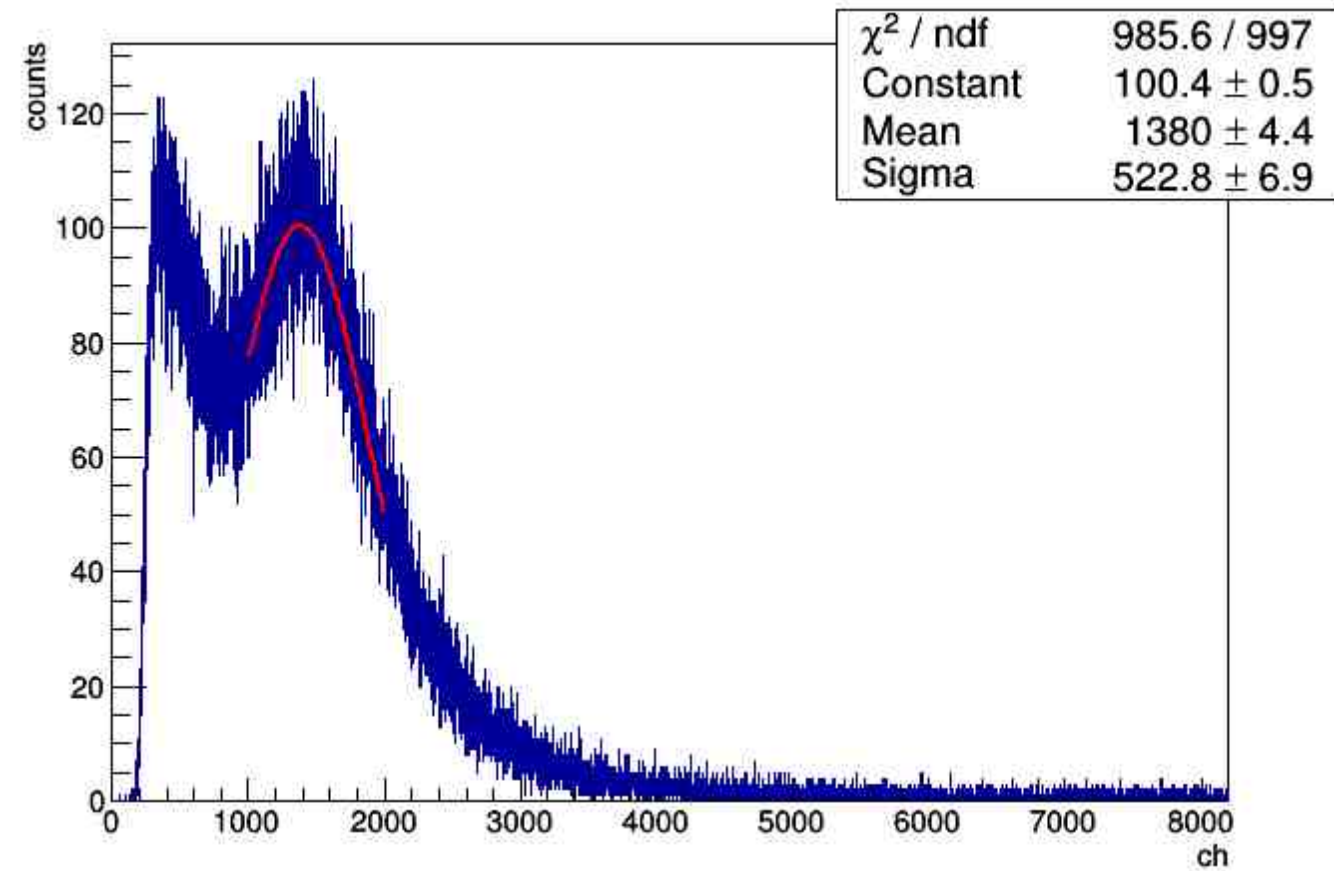


21 °C

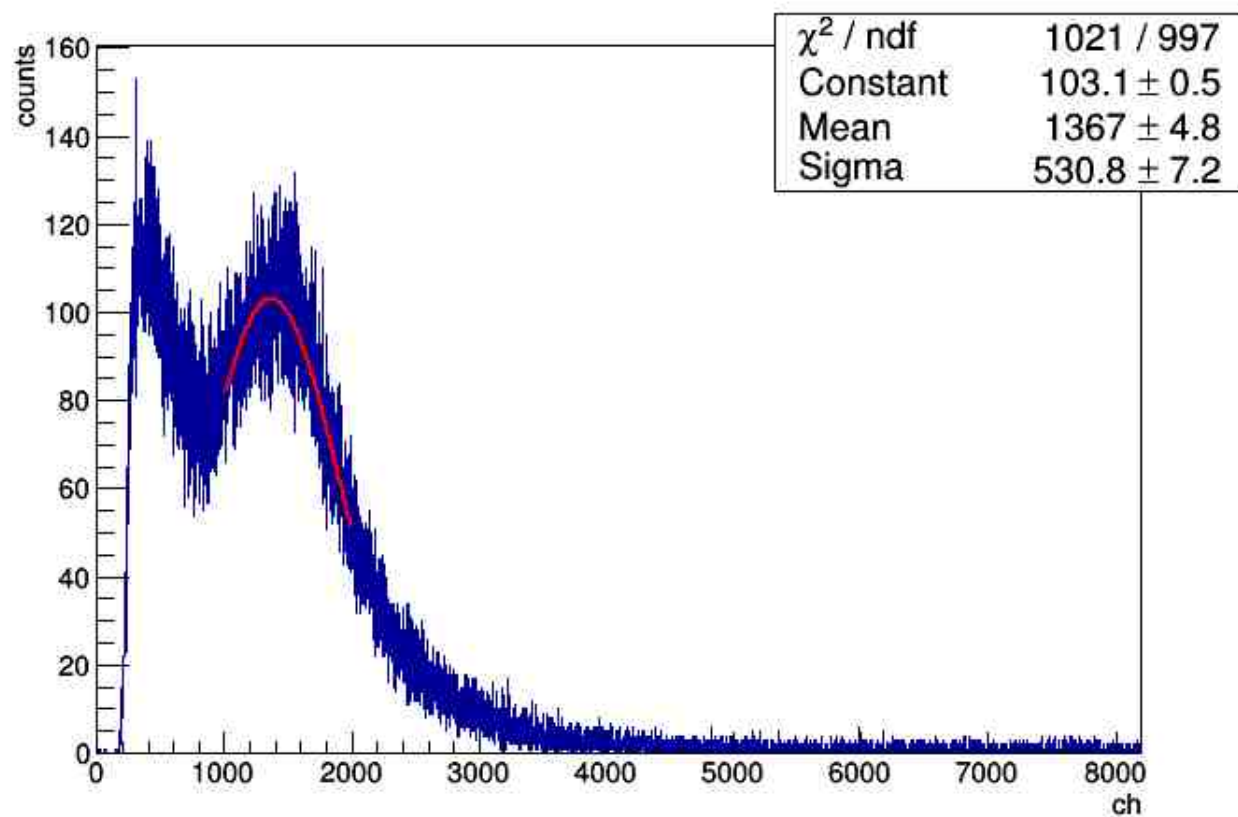
2nd time



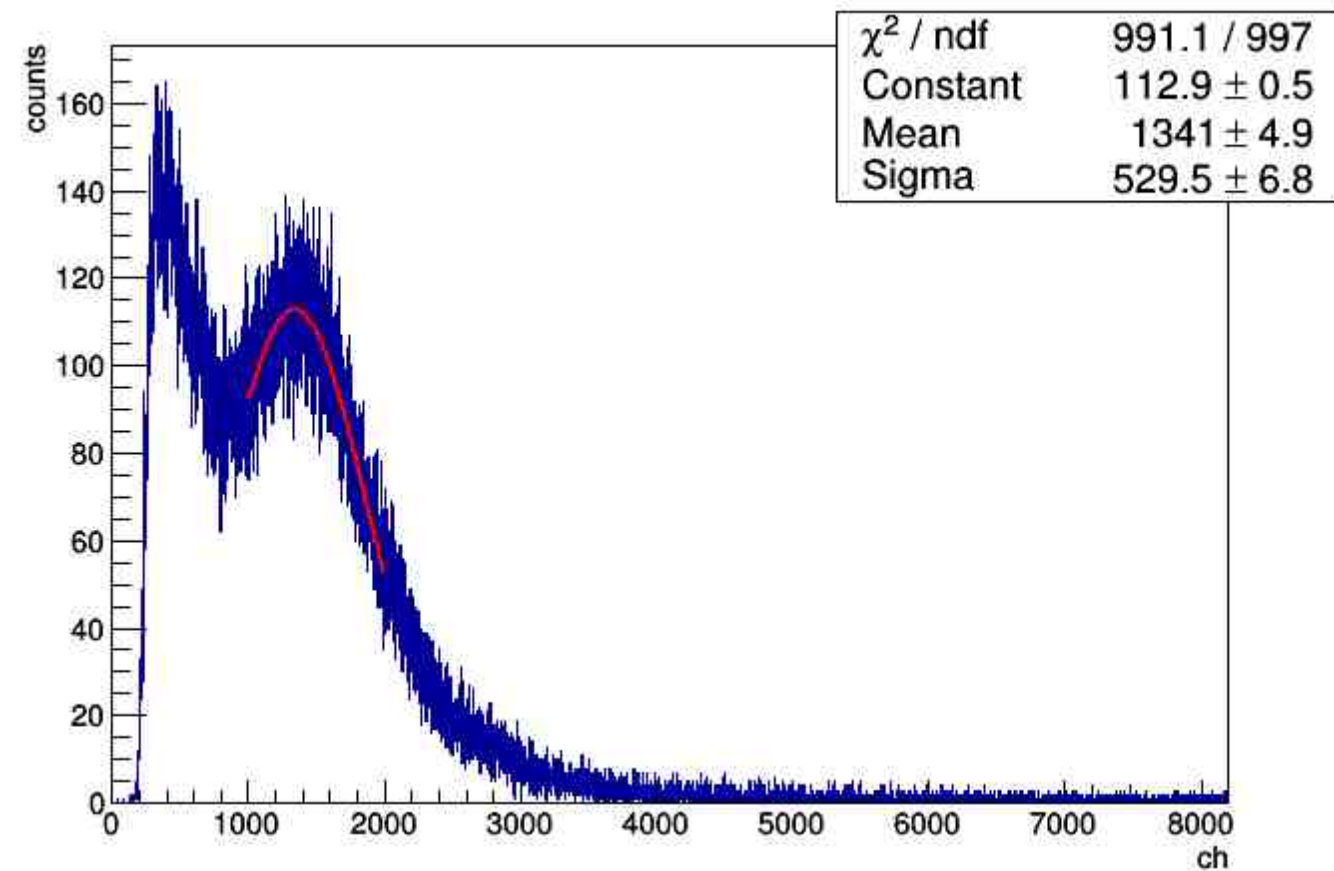
5 °C



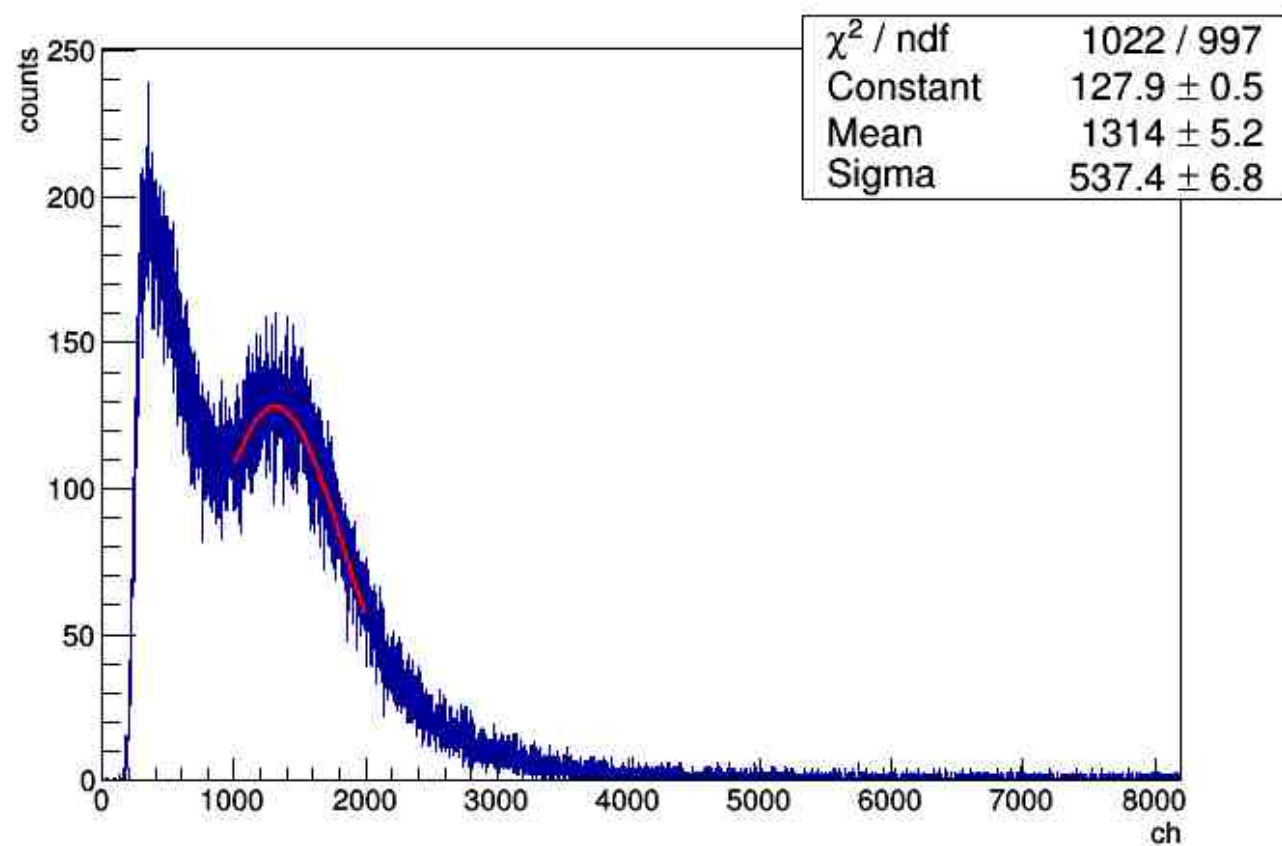
7 °C



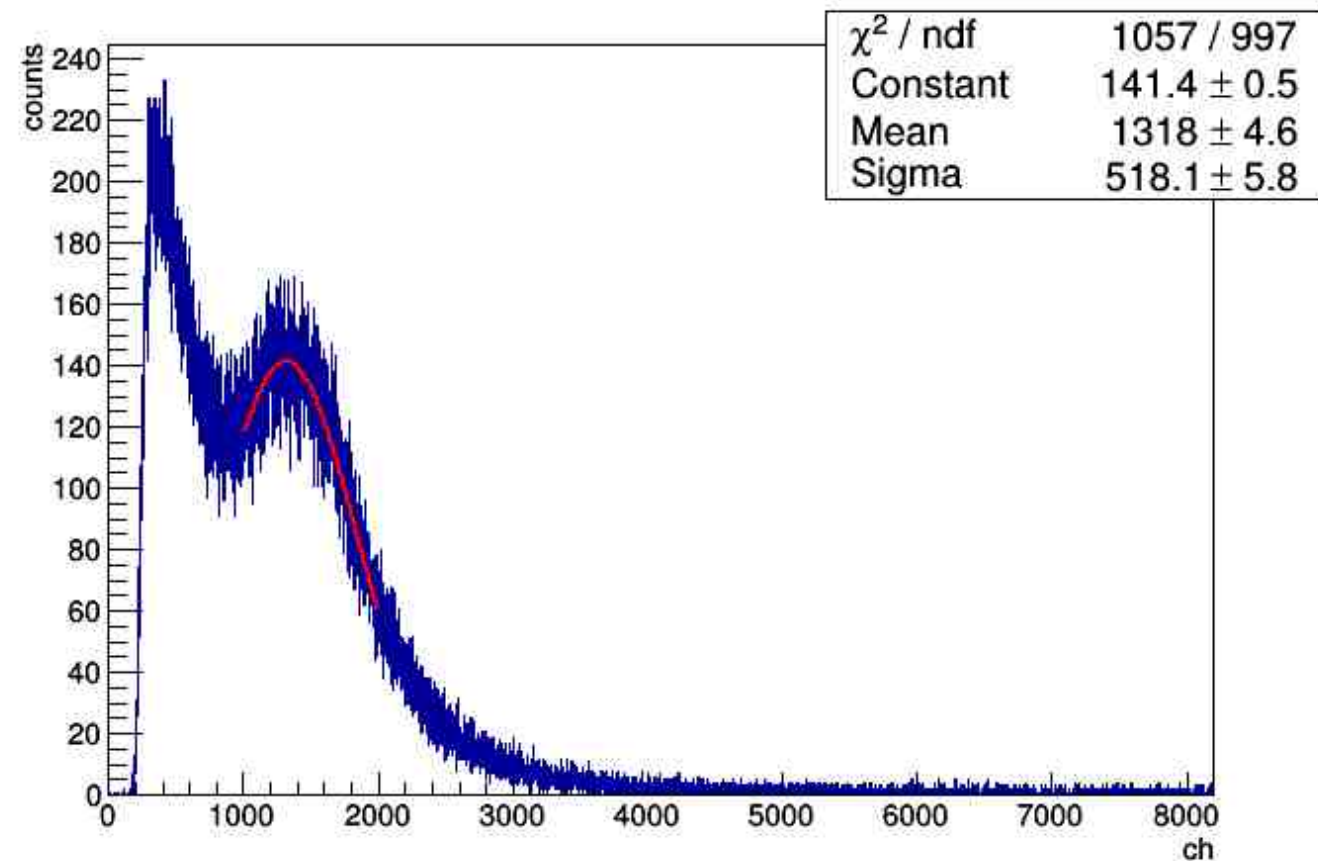
9 °C



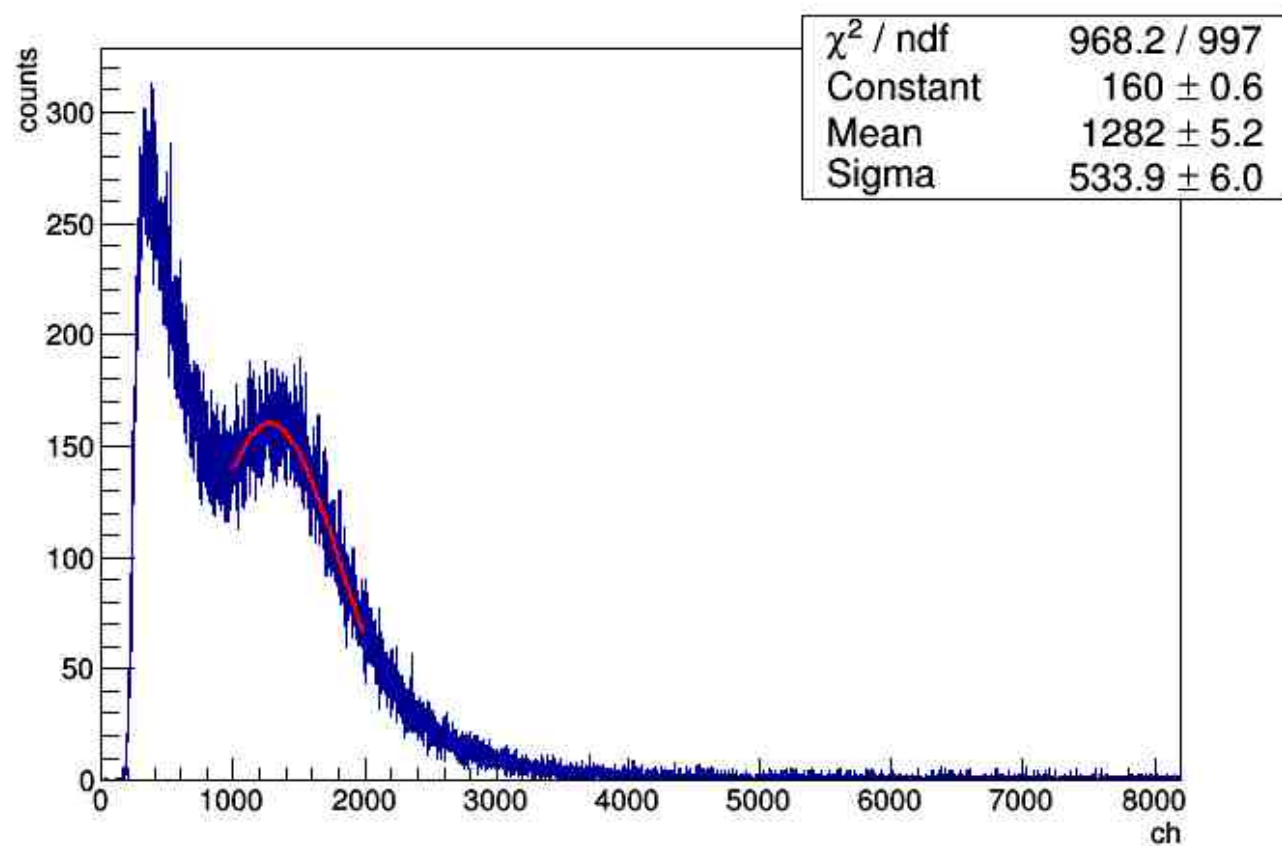
11 °C



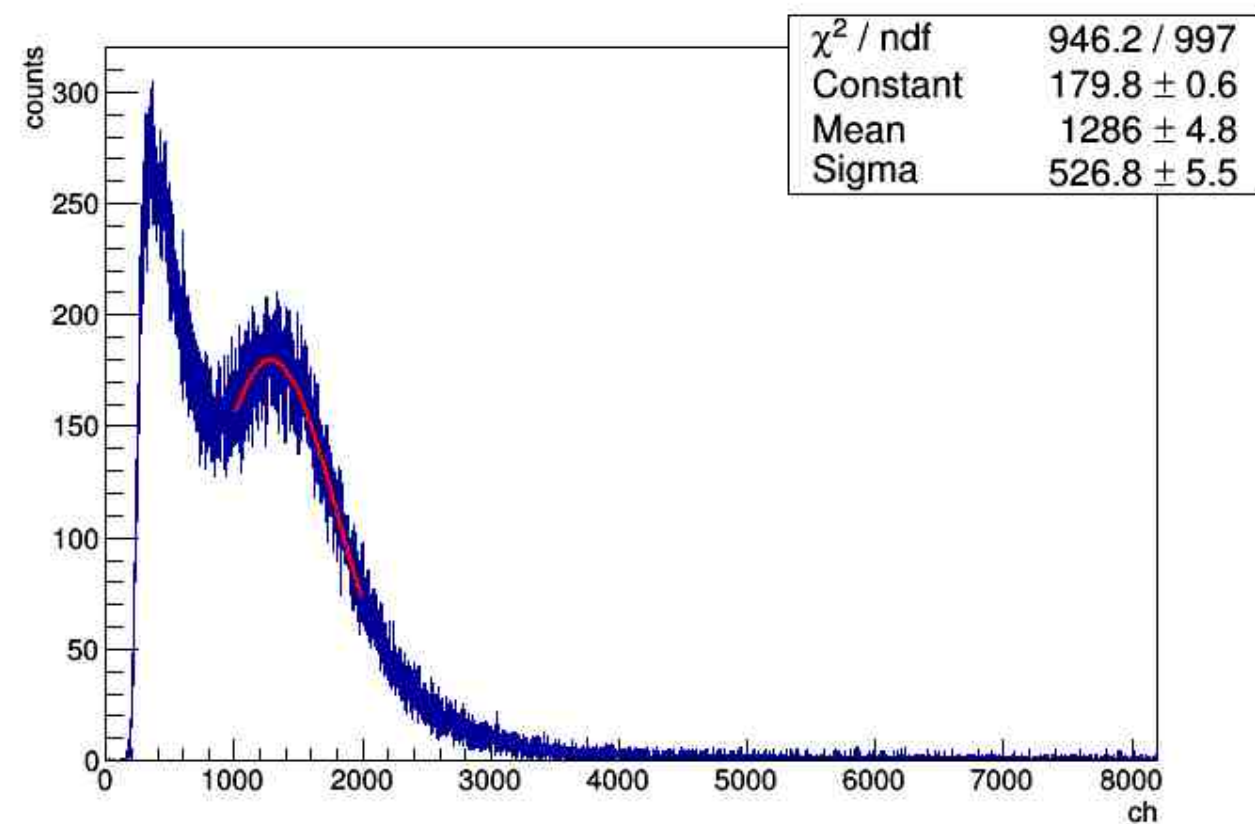
13 °C



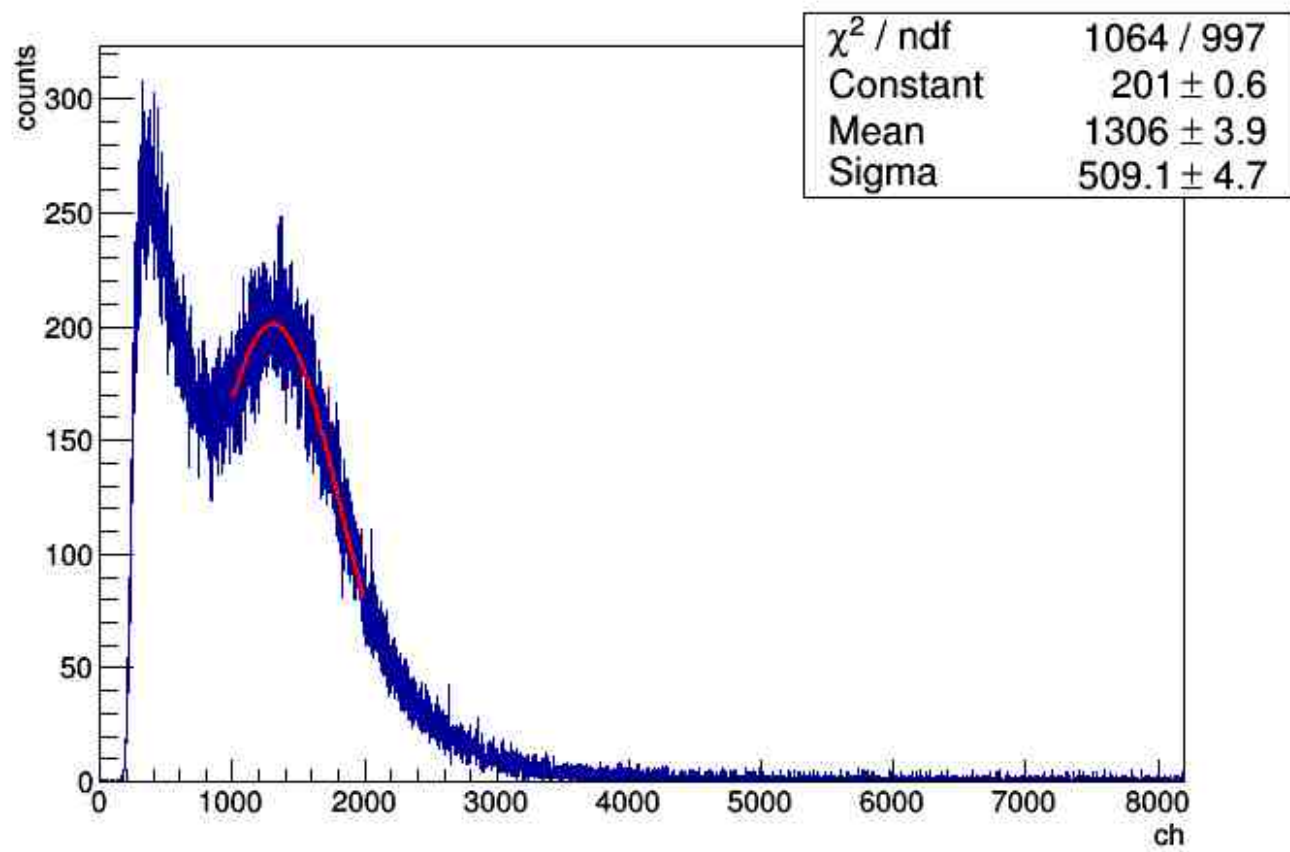
15 °C



17 °C



19 °C



21 °C