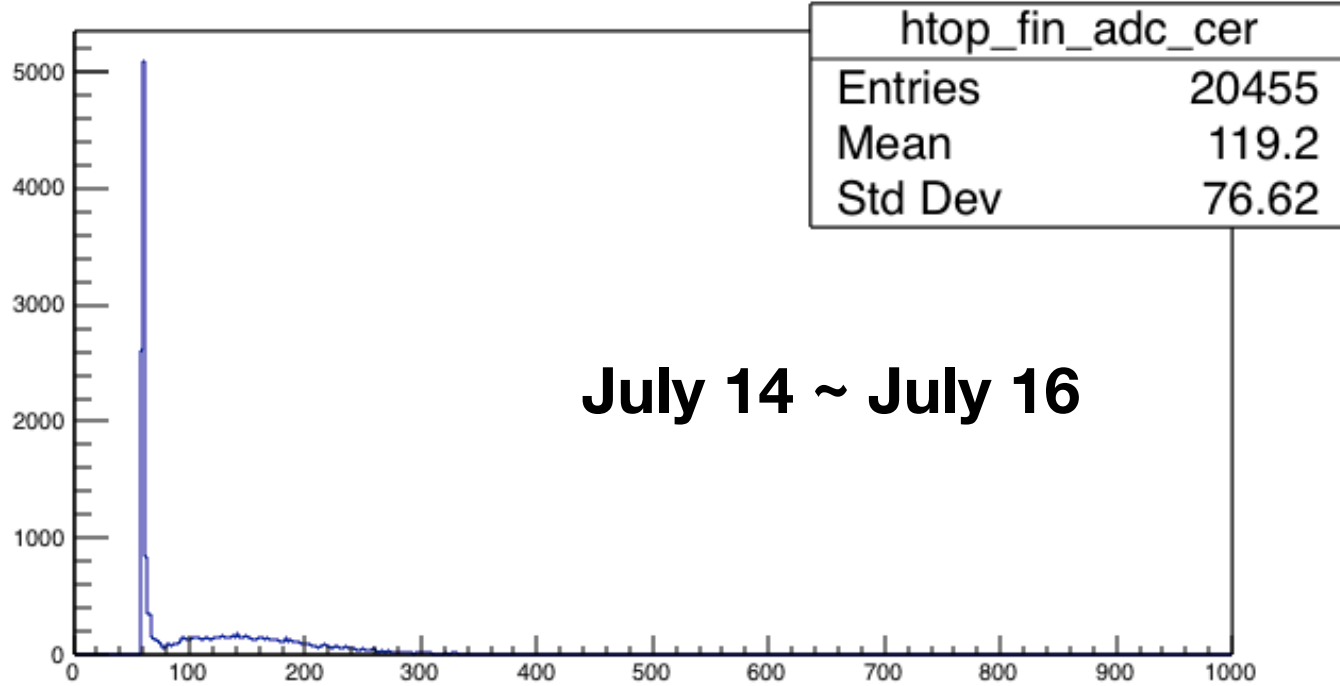
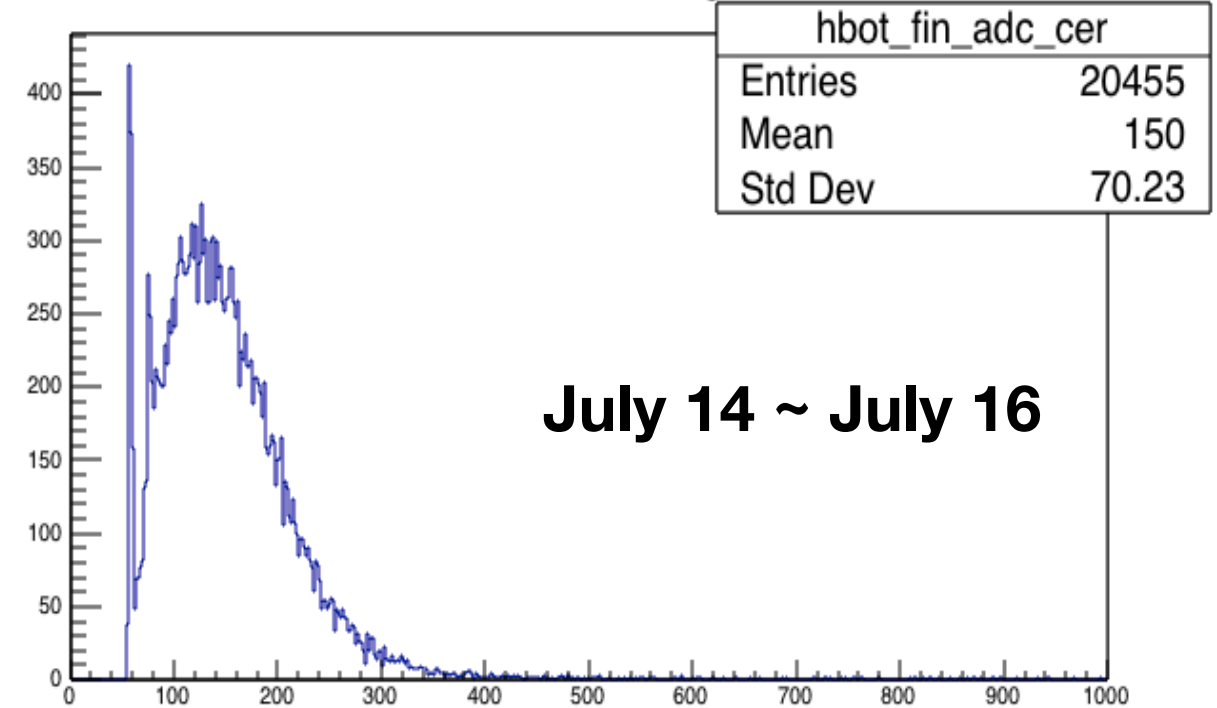


Cosmic-ray Test Current Setup

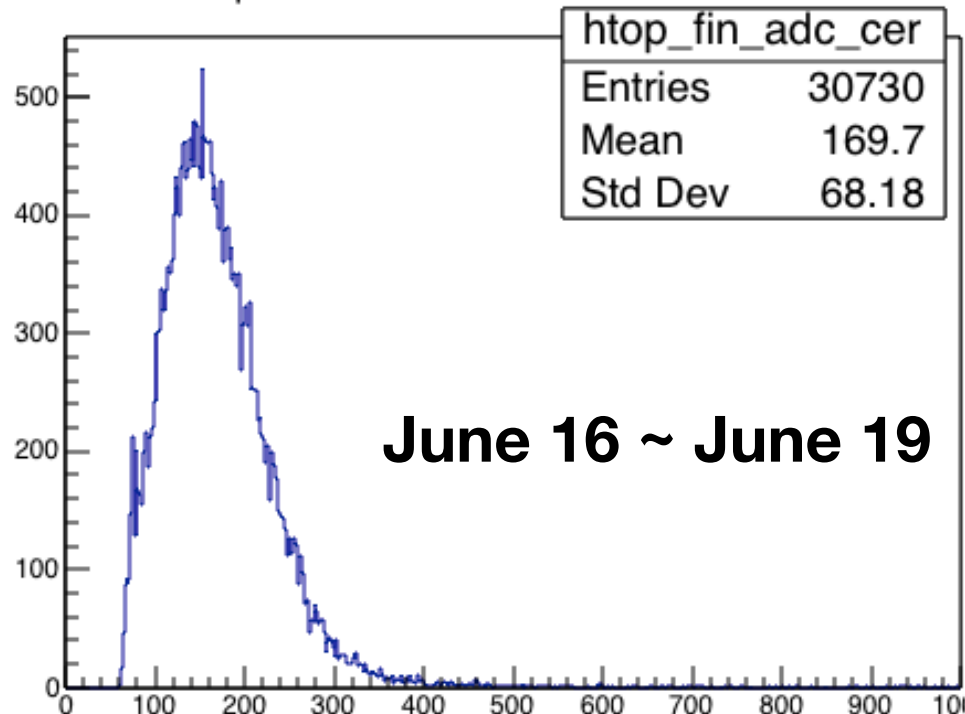
Cerenkov Final ADC Histogram_Top



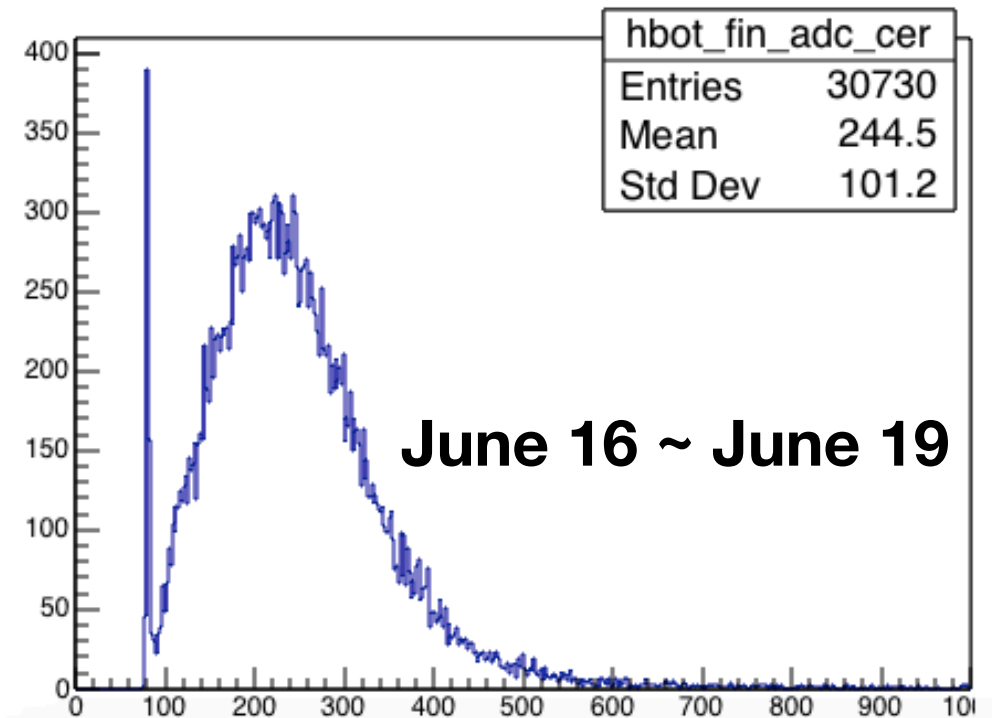
Cerenkov Final ADC Histogram_Bot



Top Cherenkov ADC Distribution



Bottom Cherenkov ADC Distribution



PMT Response Function

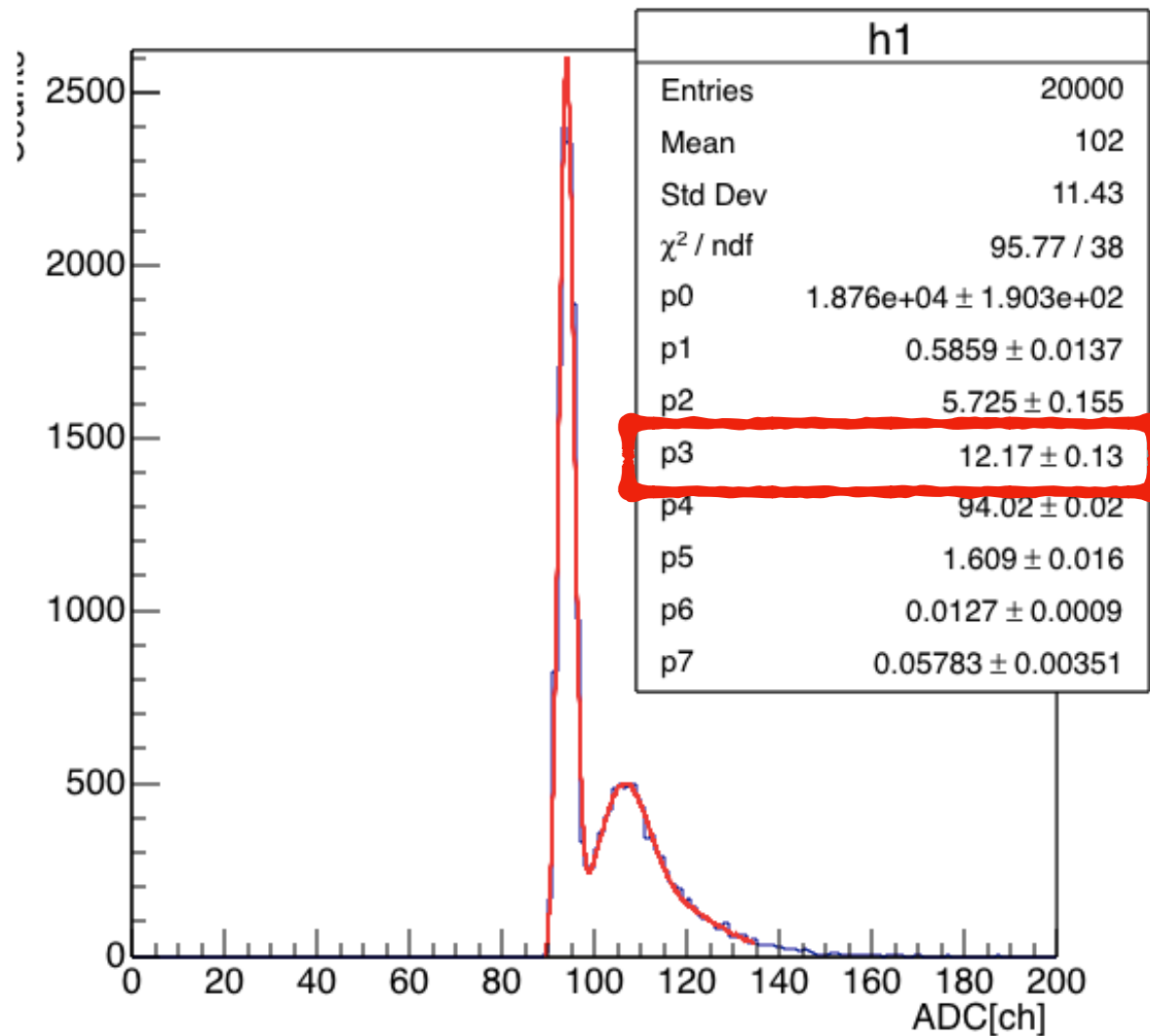
- Fitting Function for PMT Response

$$S_{real}(x) = const. \times \left[\left\{ \frac{1-w}{\sigma_0 \sqrt{2\pi}} \exp\left(-\frac{(x-Q_0)^2}{2\sigma_0^2}\right) + w\theta(x-Q_0) \times \alpha \exp[-\alpha(x-Q_0)] \right\} e^{-\mu} \right. \\ \left. + \sum_{n=1}^{\infty} \frac{\mu^n e^{-\mu}}{n} \times \frac{1}{\sigma_1 \sqrt{2\pi n}} \exp\left(-\frac{(x-Q_0-nQ_1)^2}{2n\sigma_1^2}\right) \right]$$

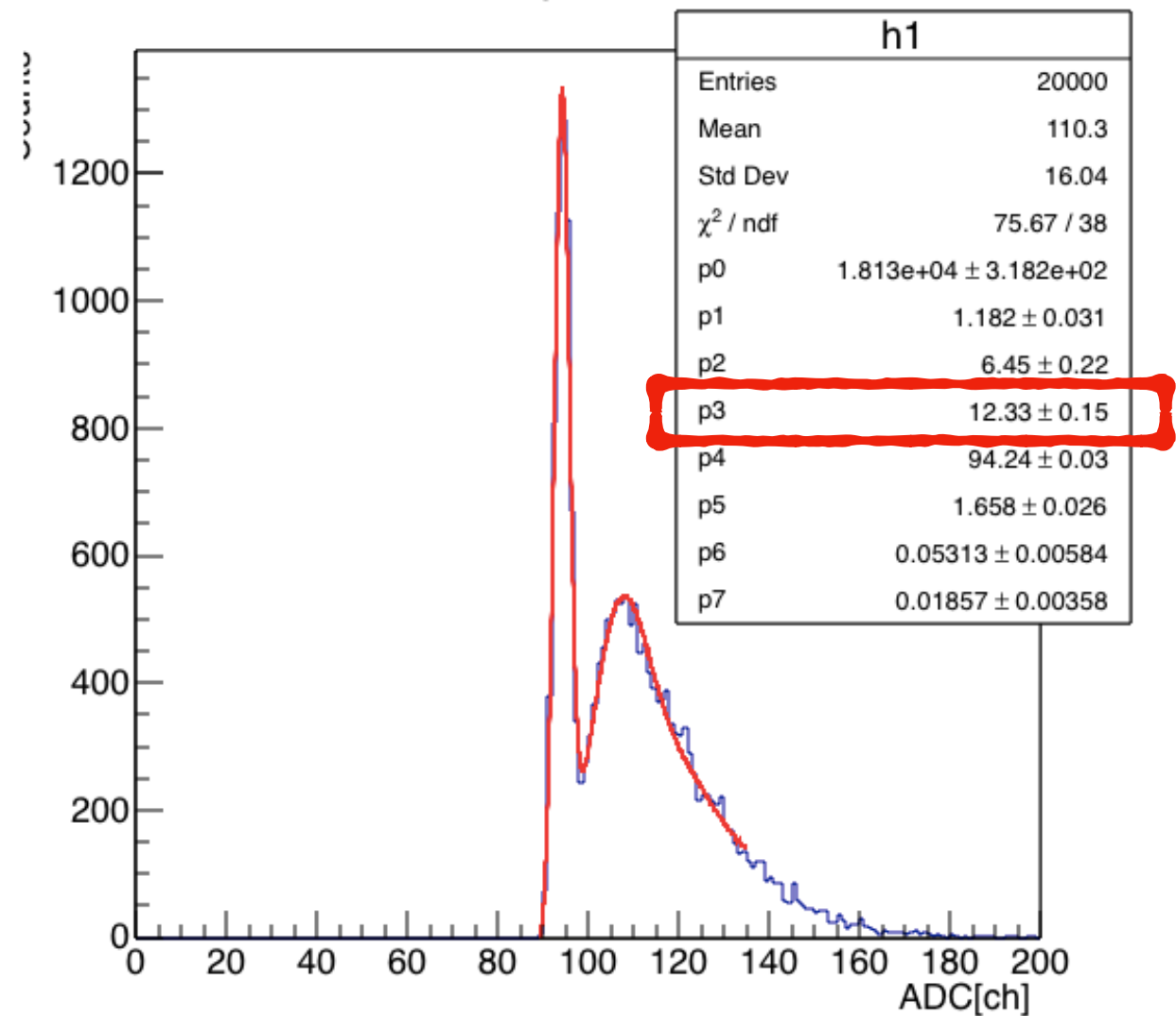
Fitting Params.	Meanings	Params.
const.	Constant	p0
μ	Expectation Value of Poission Distribution	p1
σ_1	1st Peak's Standard Dev.	p2
Q_1	Gain	p3
Q_0	Pedestal	p4
σ_0	Standard Deviation of Pedestal	p5
w	Probability of Background Process	p6
α	Procedure of Background Procedure	p7

Top PMT Test with LED

- Applied HV : -2300 V.
- LED : Scanned starting from 1.63 V to 1.65V, every 0.05 V, 100 Hz, 20 ns



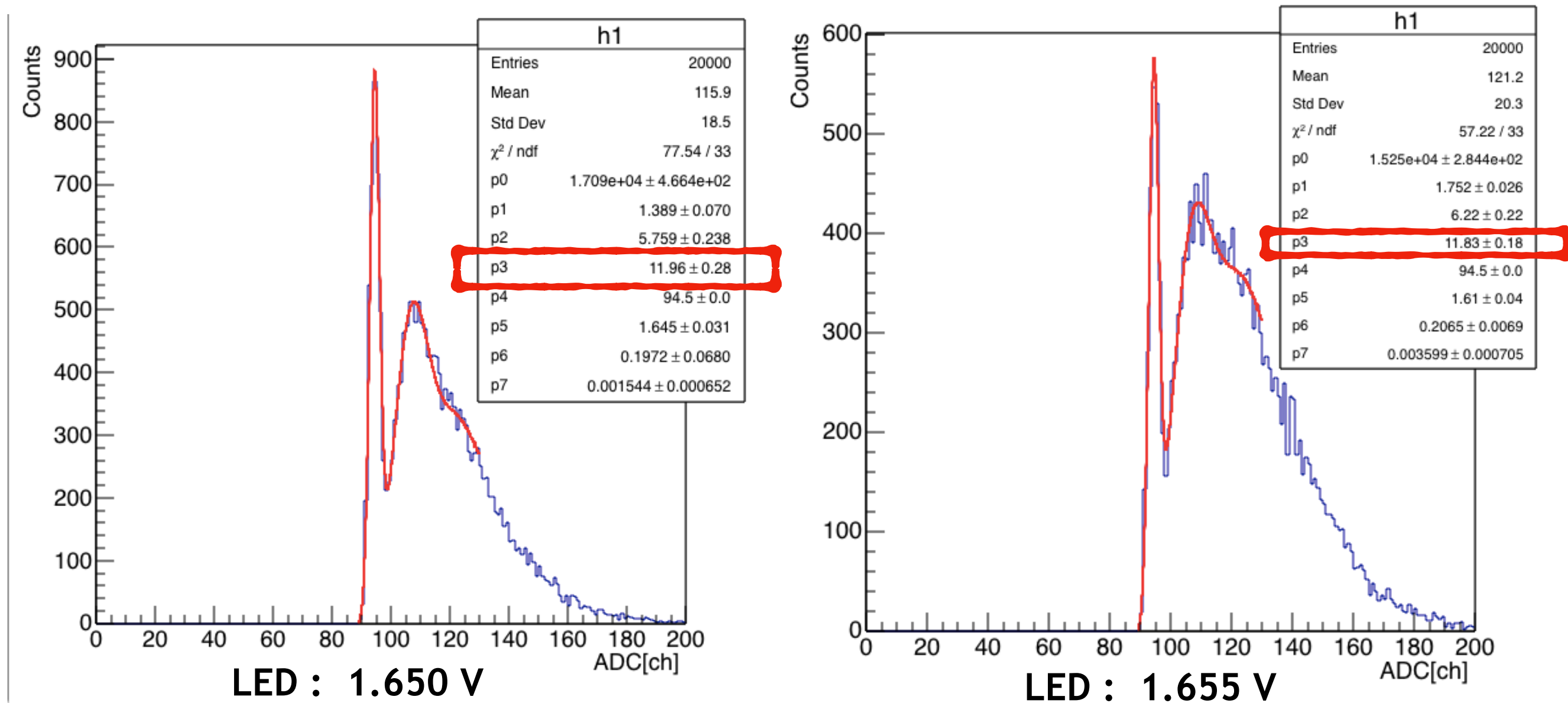
LED : 1.640 V



LED : 1.645 V

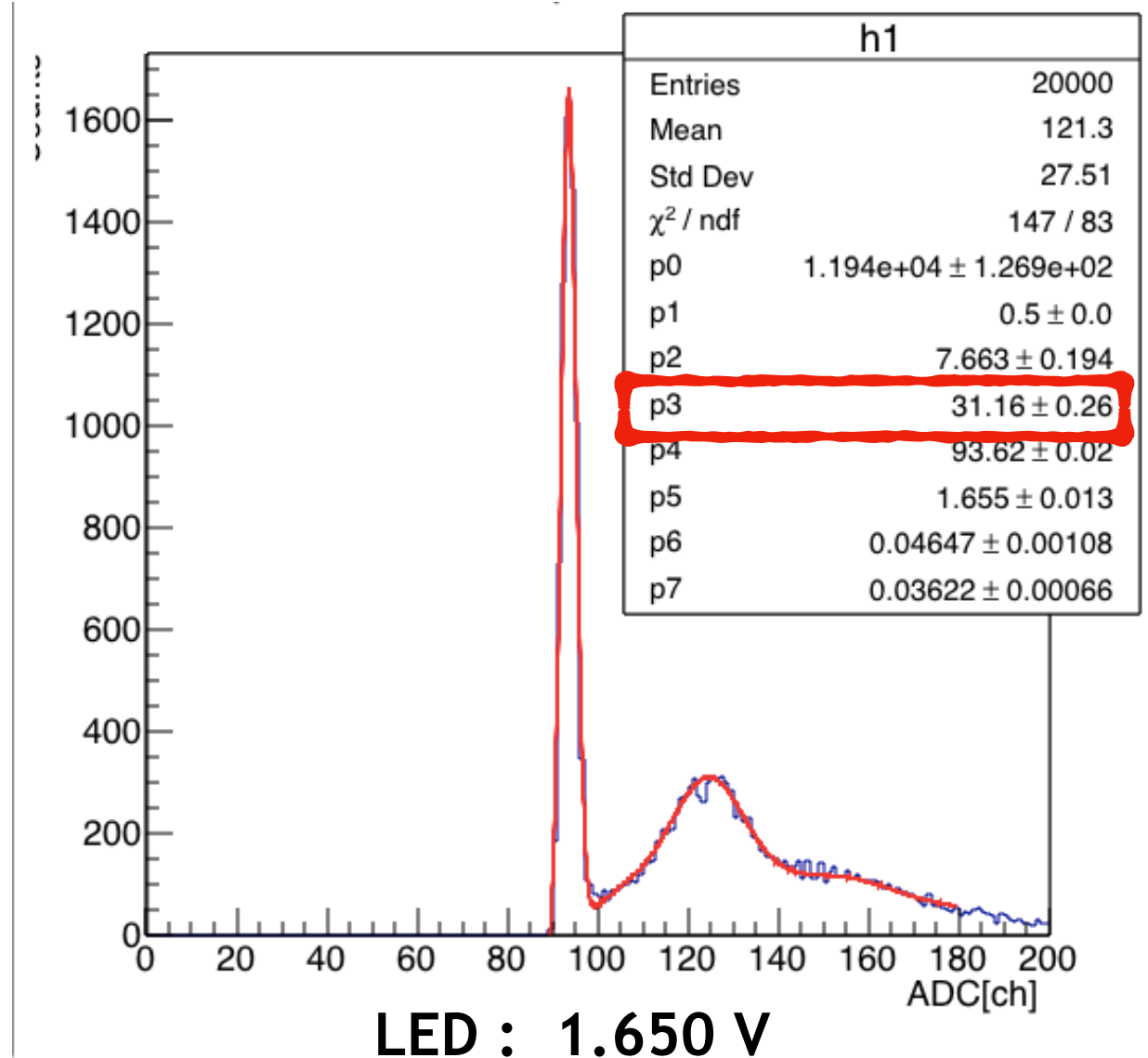
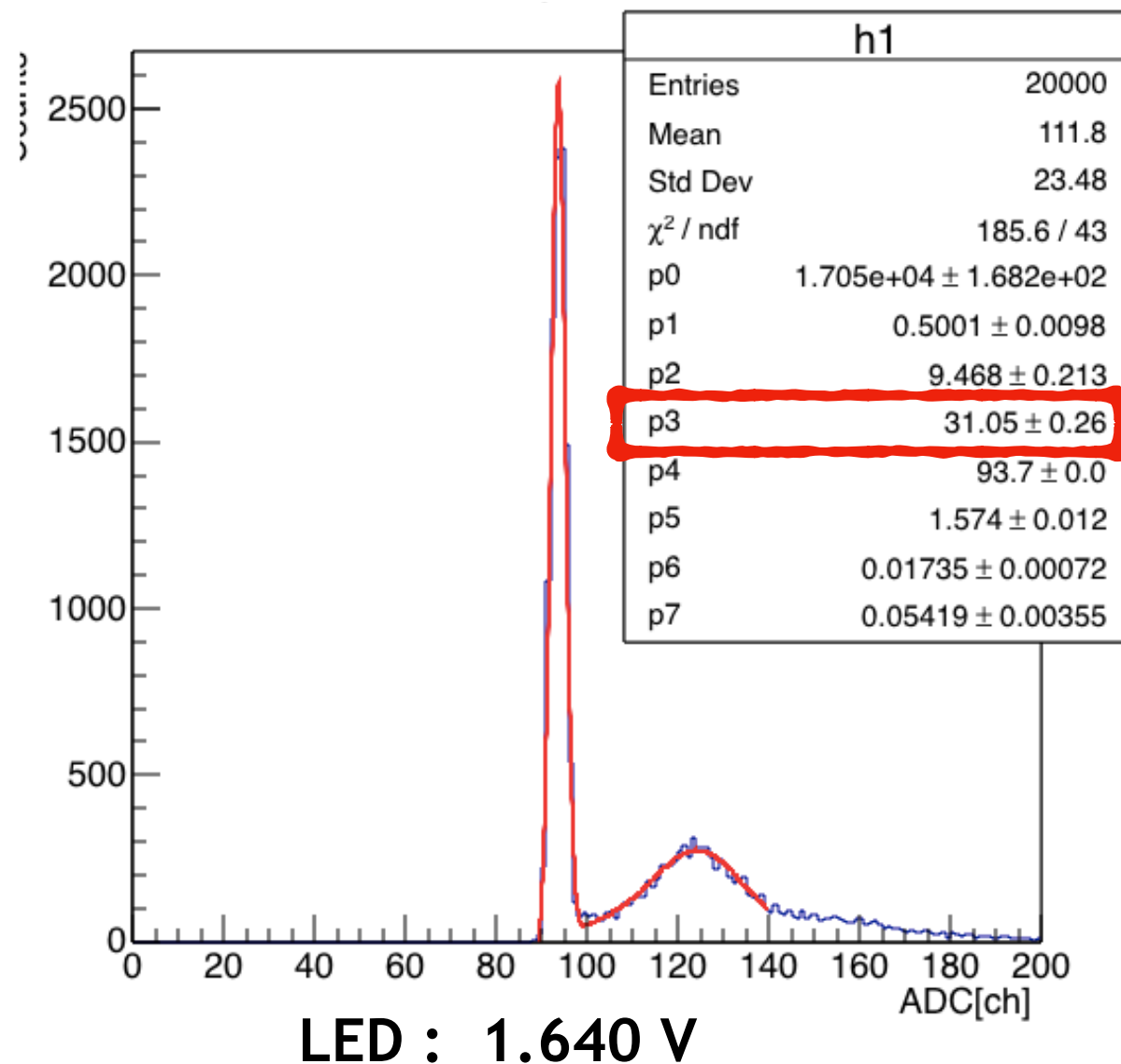
Top PMT Test with LED

- Applied HV : -2300 V.
- LED : Scanned starting from 1.63 V to 1.65V, every 0.05 V, 100 Hz, 20 ns



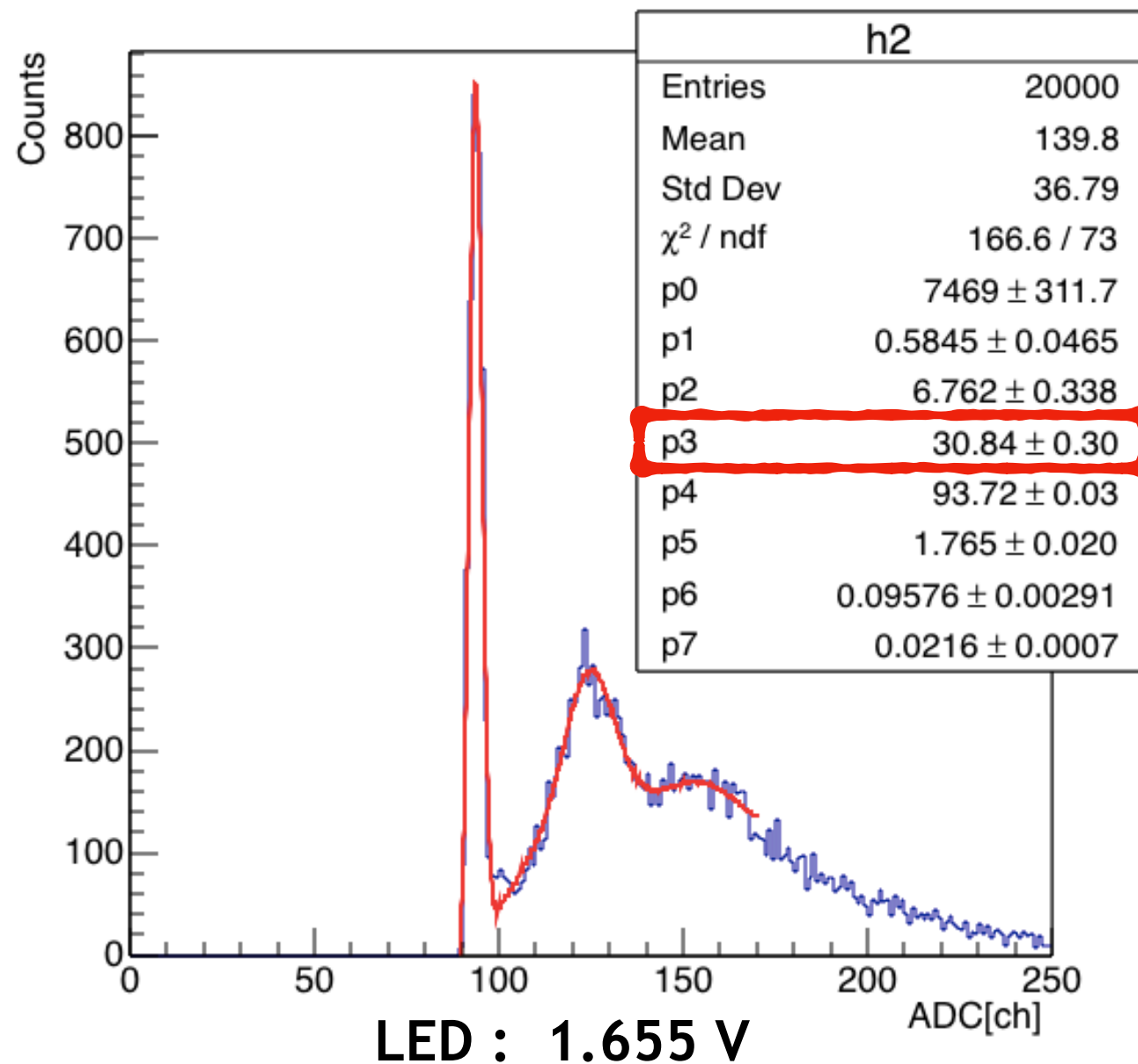
Bottom PMT Test with LED

- Applied HV : -2300 V.
- LED : Scanned starting from 1.63 V to 1.65V, every 0.05 V, 100 Hz, 20 ns



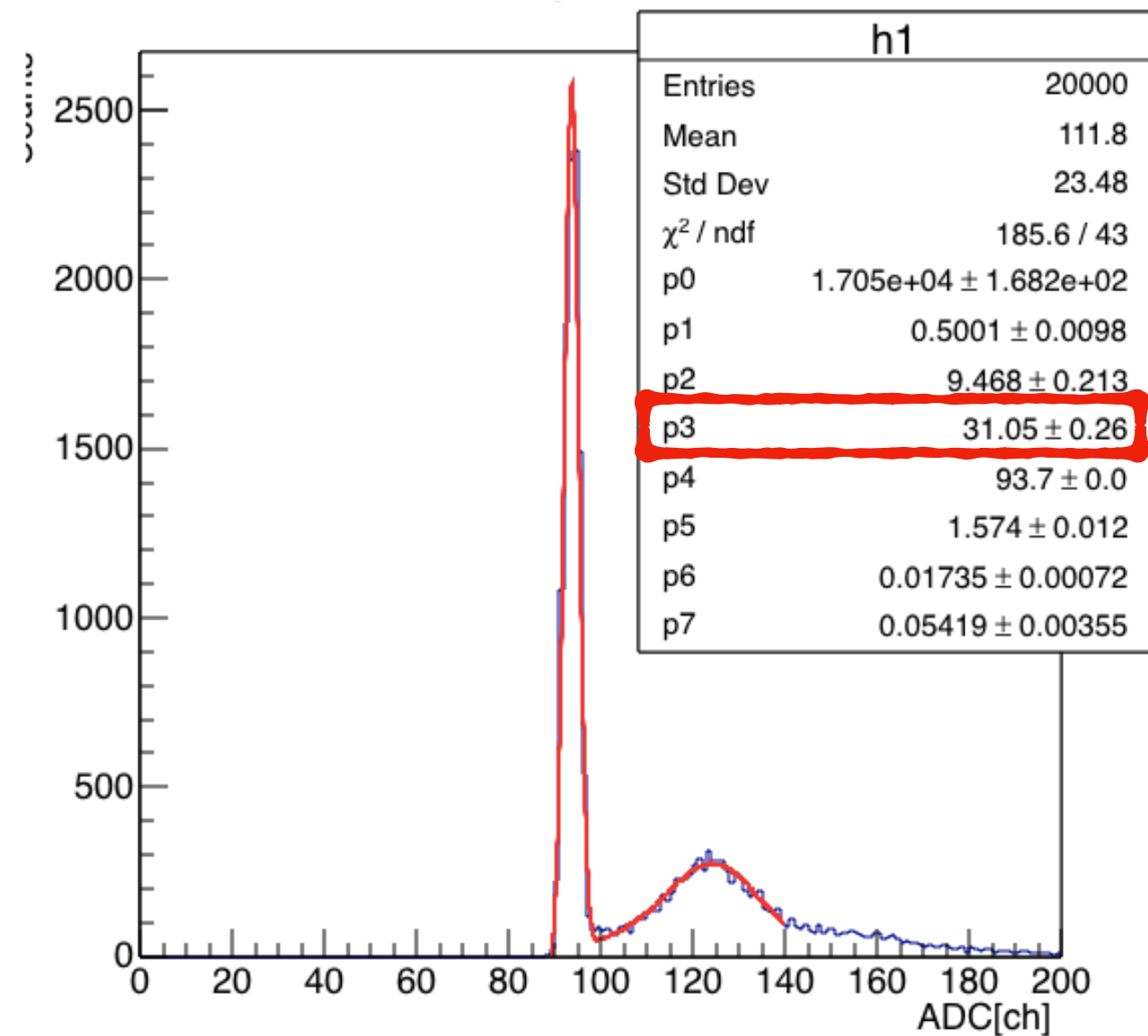
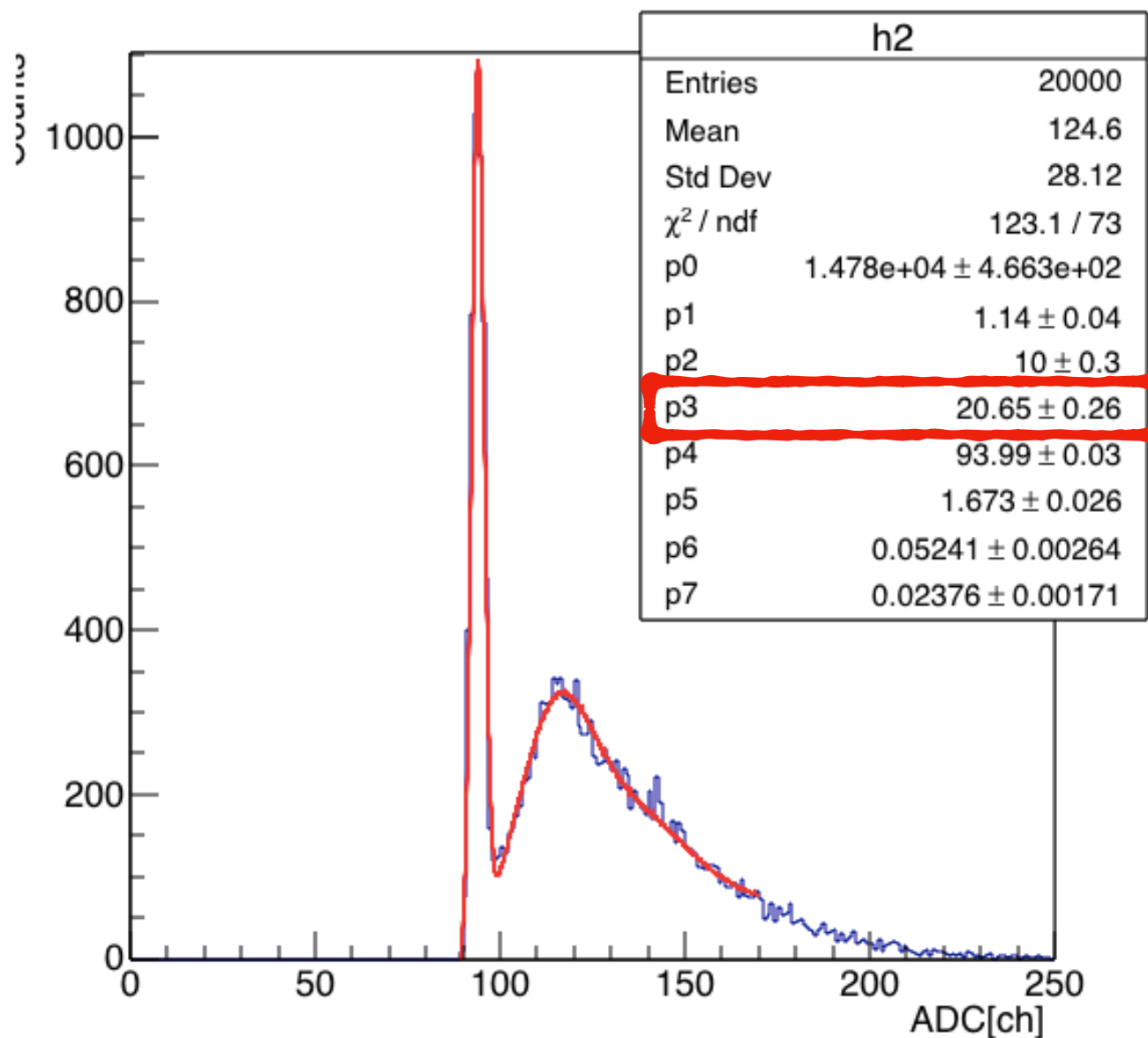
Bottom PMT Test with LED

- Applied HV : -2300 V.
- LED : Scanned starting from 1.63 V to 1.65V, every 0.05 V, 100 Hz, 20 ns



PMT Gain Matching

- Applied HV : -2400 V for Top PMT, -2300 V for Bottom PMT
- LED : 2.5 V, 20 ns width of frequency 100 Hz



- Needs further adjustment.

Work Plan

- Fixing R&D Plan and determine the details
 - Design and Material Selection
 - Purity of Water (Refractive Index, Contamination etc..)
 - Support Frame
- Precise Gain Matching of Two PMTs
- Cosmic-ray Test of 1st Prototype and 2nd Prototype
- Simulation Work