Daily Work

workrecord

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2018 年 6 月 27 日

bad PV of container2

The bad P/V of container2 is caused by a small "bump" in the QDC spectrum,which appears around the valley area.

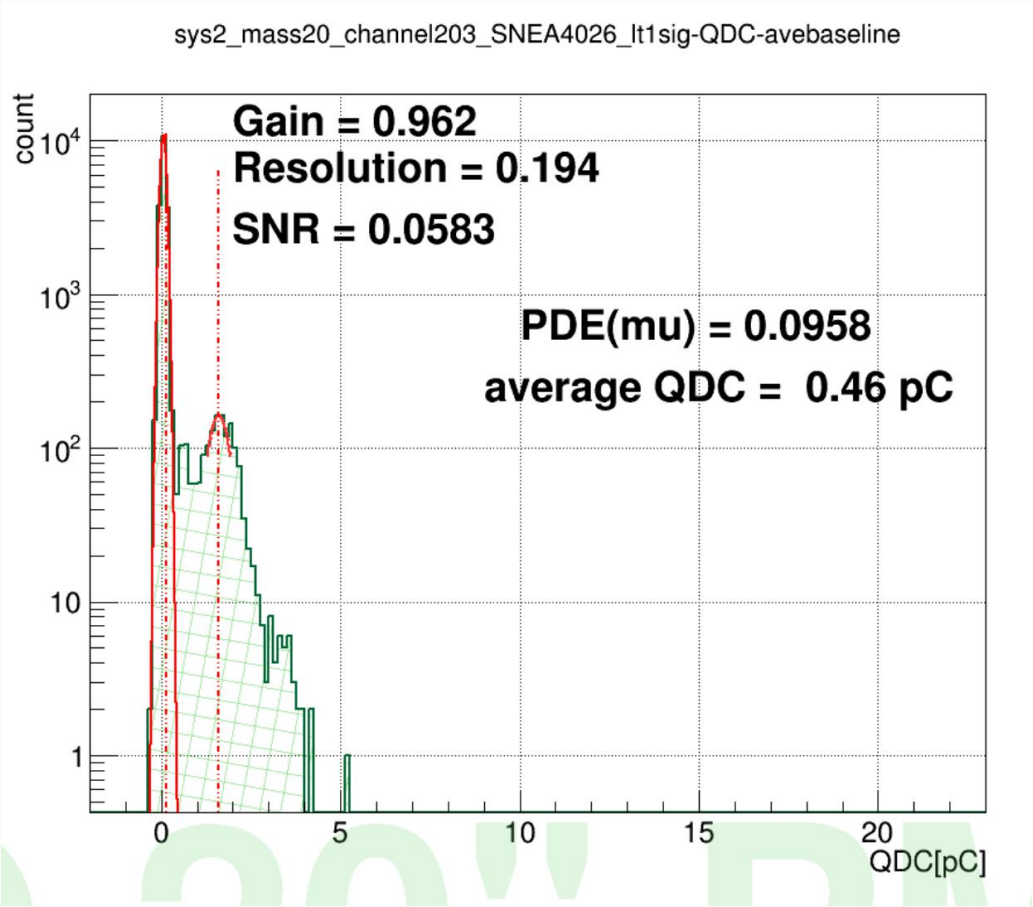


图 1: charge spectrum of EA4026

check the waveform

As shown in the figure 2,this nnn is not a PMT signal but will contributue to the charge spectrum.

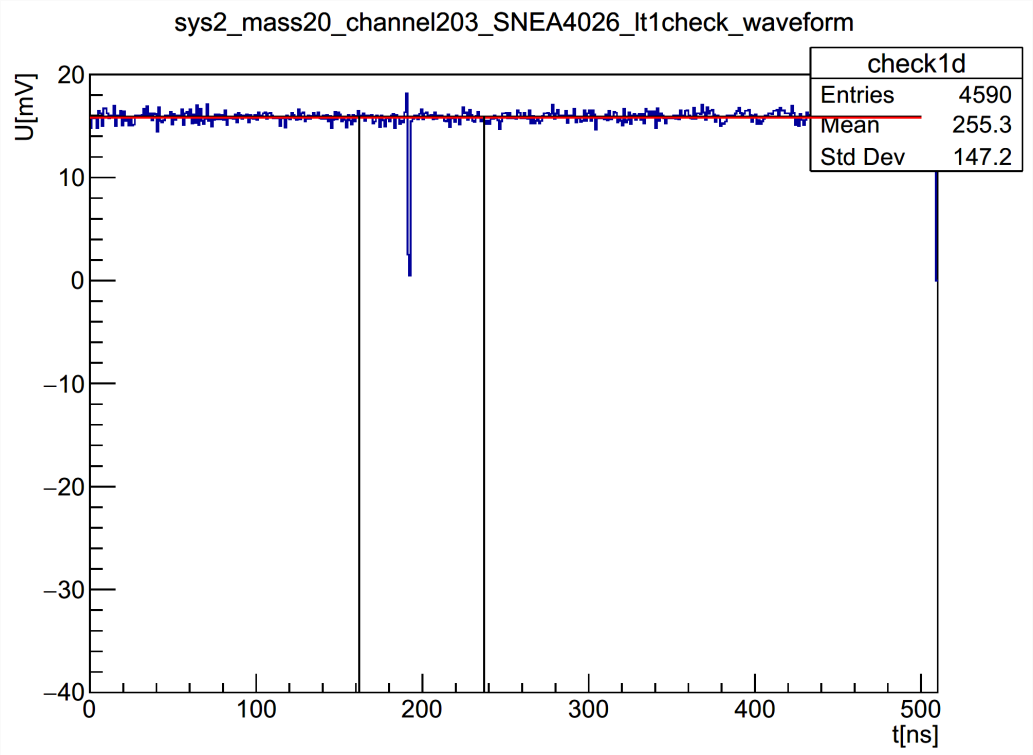


图 2: one waveform of EA4026 with nnn

good PV of container2

If we correct these signals by soft,then the "bump" in charge spectrum will disappear.

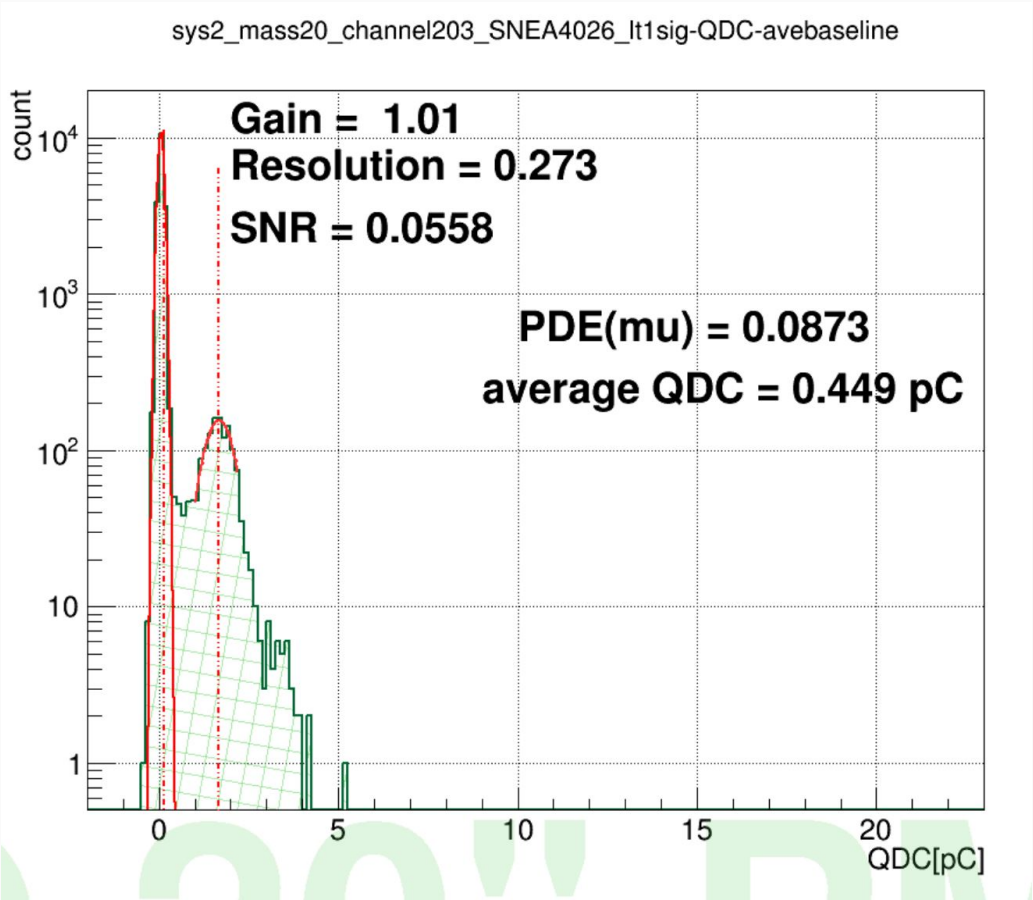


图 3: good charge spectrum of EA4026

about PV problem

These nnn have the proportion less than 0.01 and they are stable in shape, so there are two possible ways to sovle this problem:

- check the source of nnn, if it is hardware issue(for example crosstalk) try to fix it.
- correct these waves using algorithm, e. g. select the nnn signal and set their QDC to be zero.

check data of one mass

I have written a script on the directory:
/home/pmthome/containerdata/SYSU_ana
the onsite shifter can run it through —> bash masstoday.sh

- takes about 3 minutes to run the data of whole batch.
- will output 72 png files which contain 36 0.1pe figures and 36 setpoint3000 figures.
- the shifter can also open the root files in the folder 'results' if they need.

update of the main program

recent update of the main program:

- a new doucument about the main program in details is written,make it easier to be used by others.
- correction of MCP pv and resolution according to base type.
- add the error of some fit results.(pedestral mean,1pe mean,valley position,gain,PDE)
- renewed the correlation factors of μ and vendor QE.
- add logo of JUNO and SYSU to the output figure.
- the latest output figure is shown in the next slide.

current ouput png file

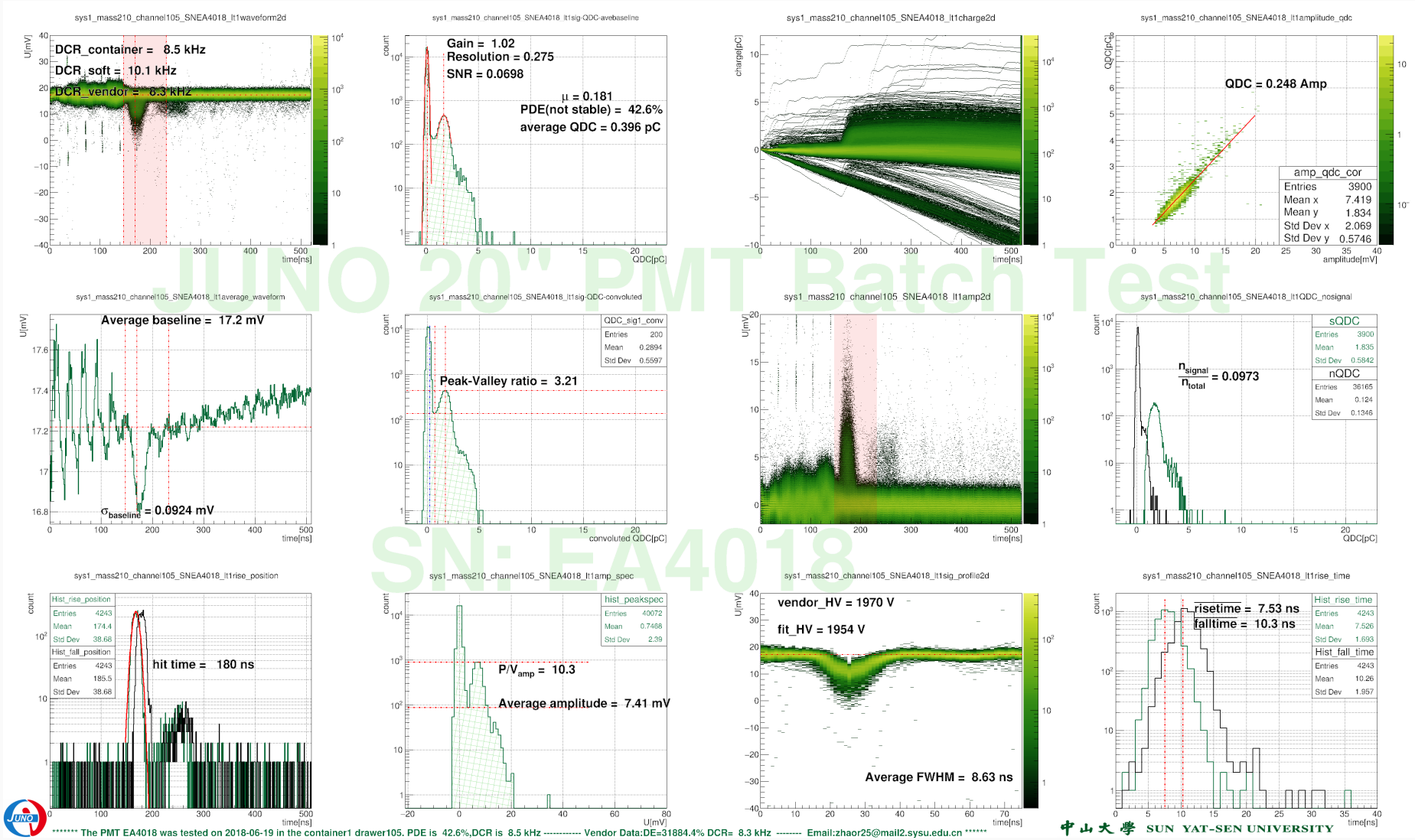
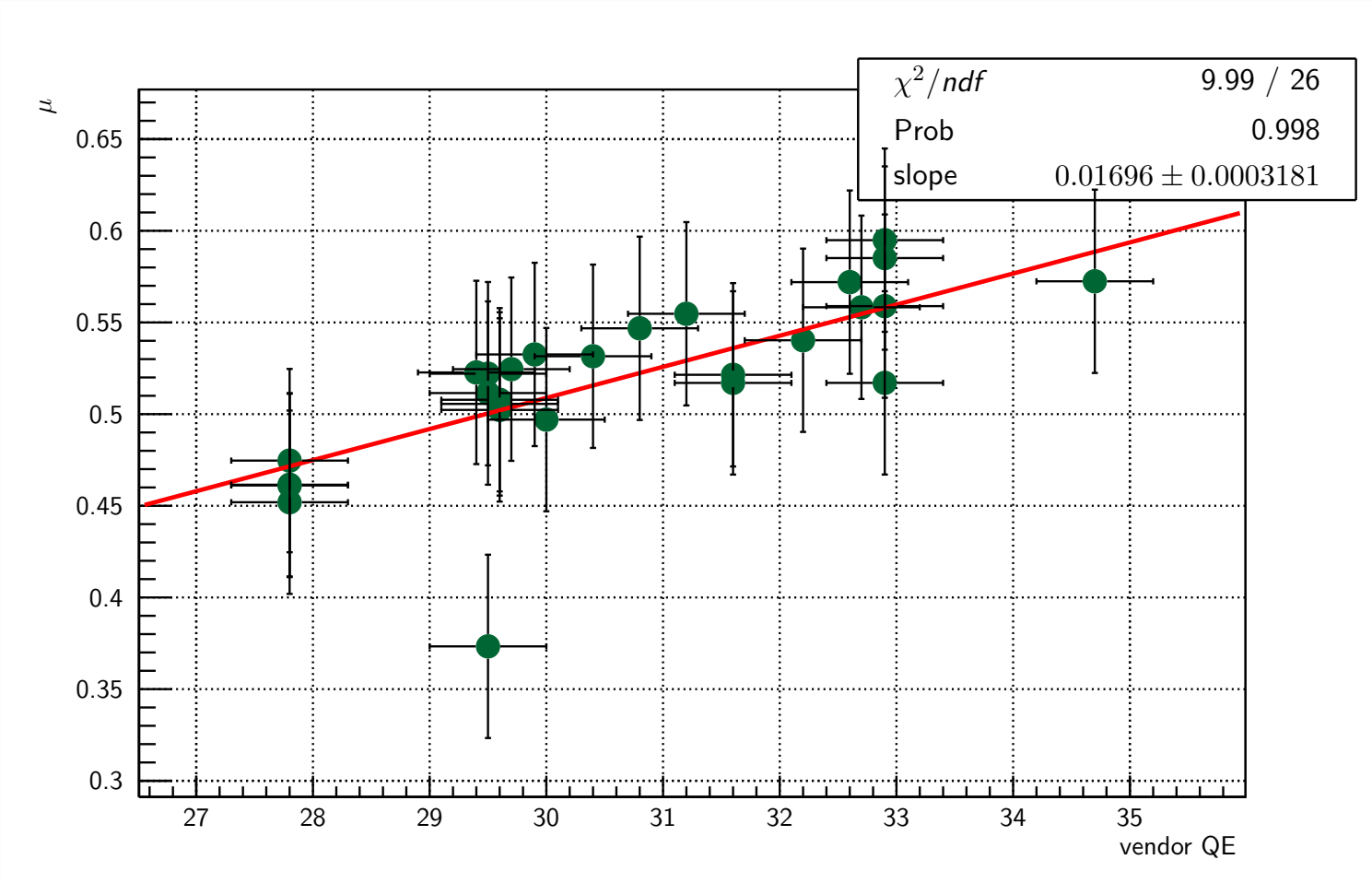


图 4: curreent out put png

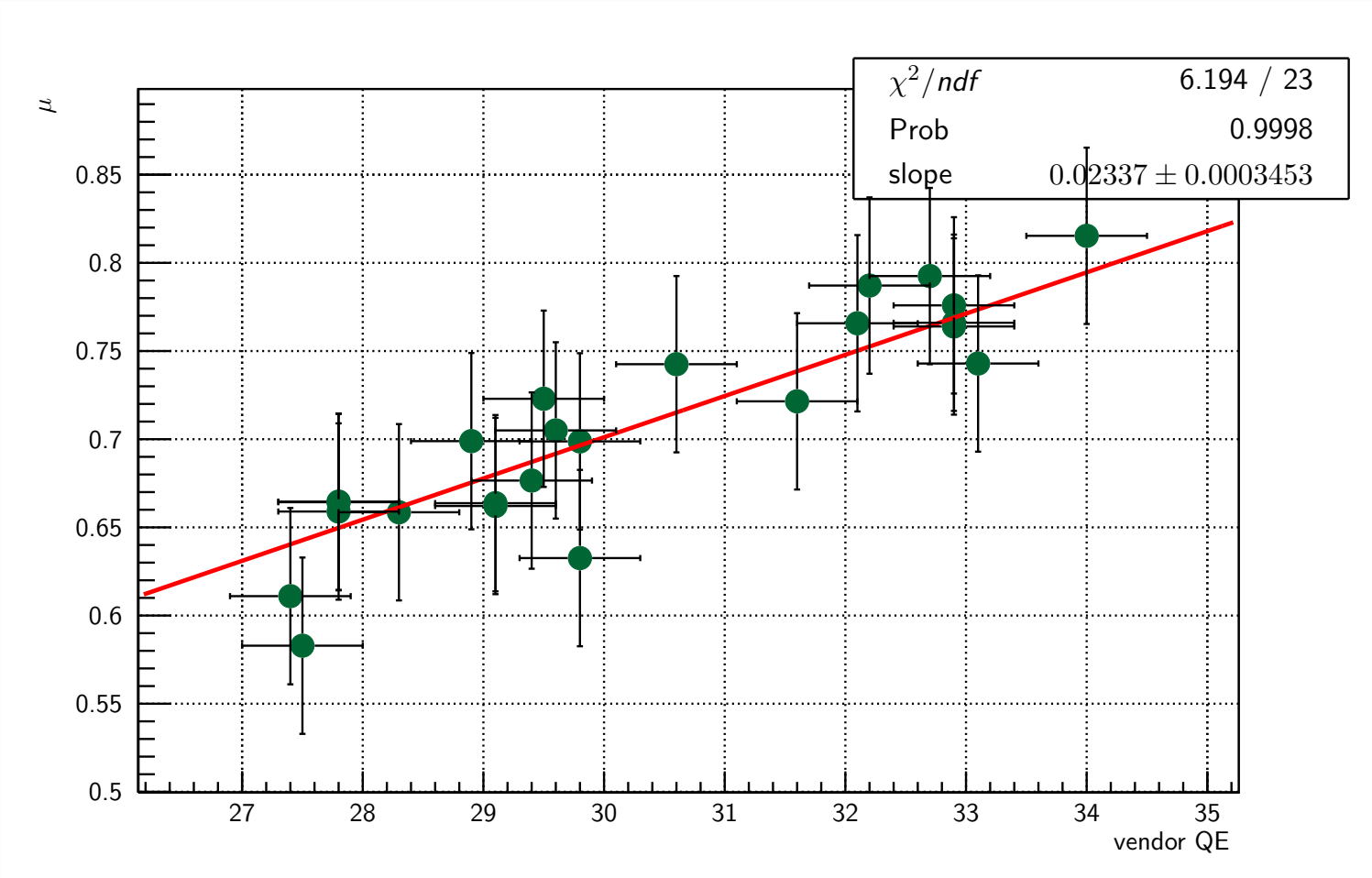
drawer 115

using 26 HAMAMATSU PMTs



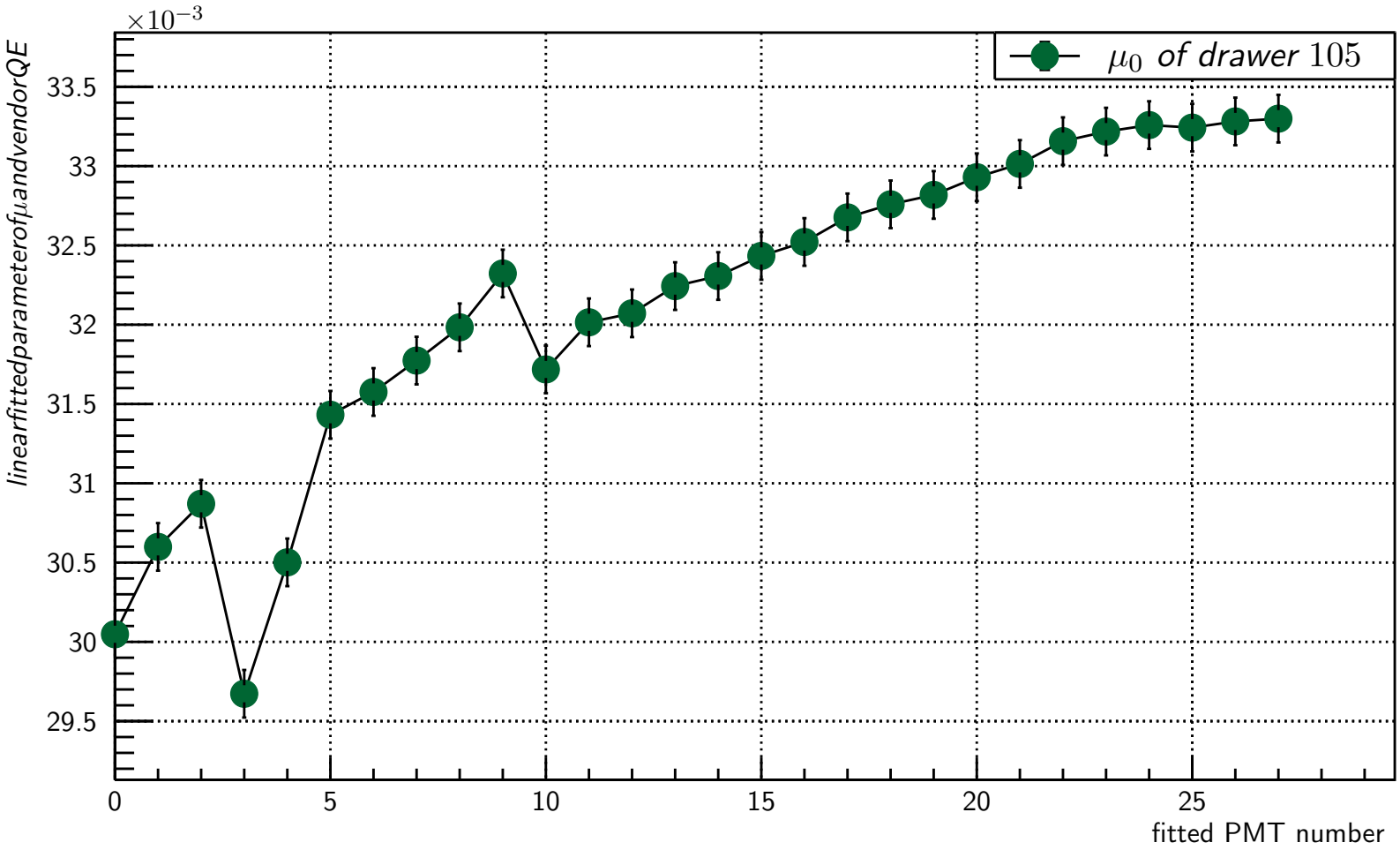
drawer 125

using 24 HAMAMATSU PMTs



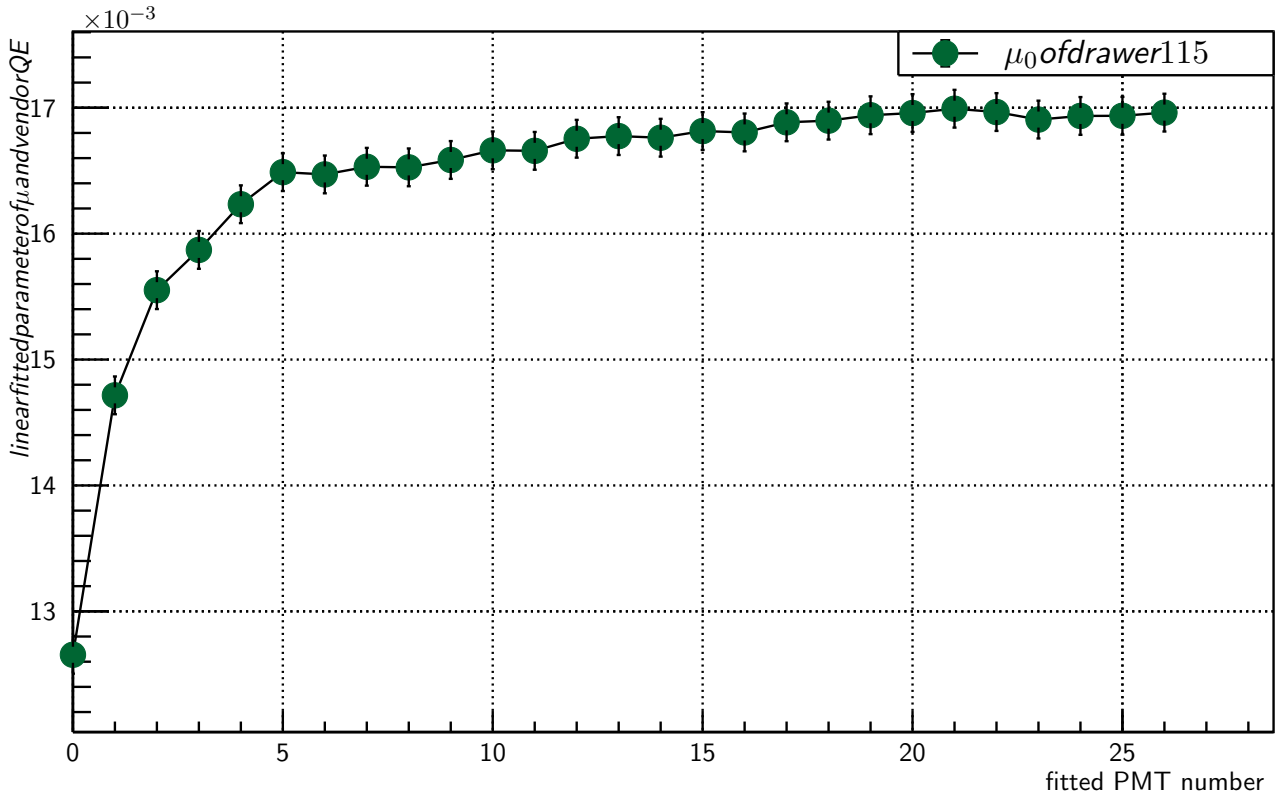
fit result of μ and vendor QE in drawer 105

This figure shows the fit parameter μ_0 of channel 105.



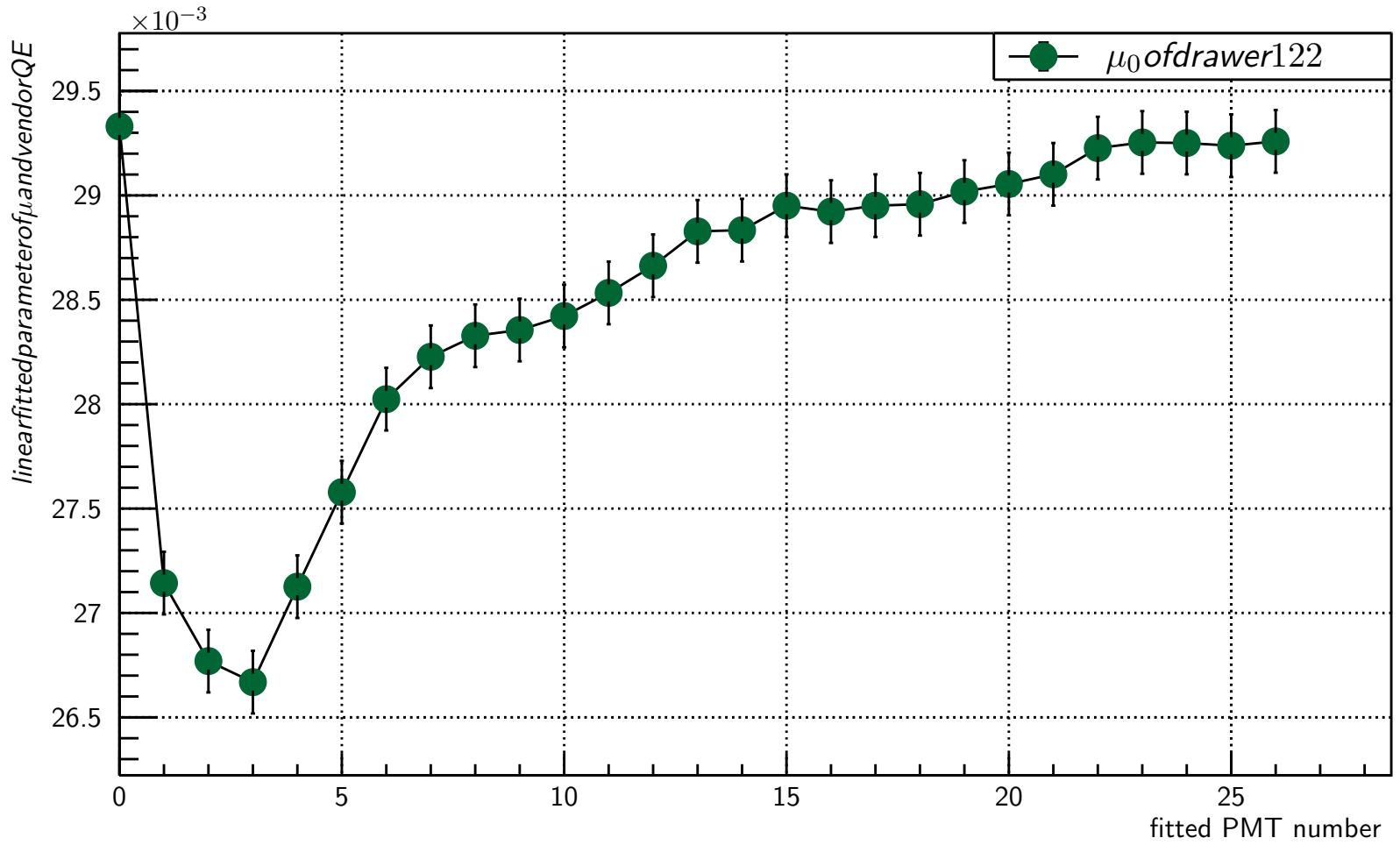
fit result of μ and vendor QE in drawer 115

In one drawer,we can accumulate more μ and vendor QE value with time,as we fit more PMTs, the coefficient mu_0 become more stable.The figure below shows the fit paramter of channel 115.



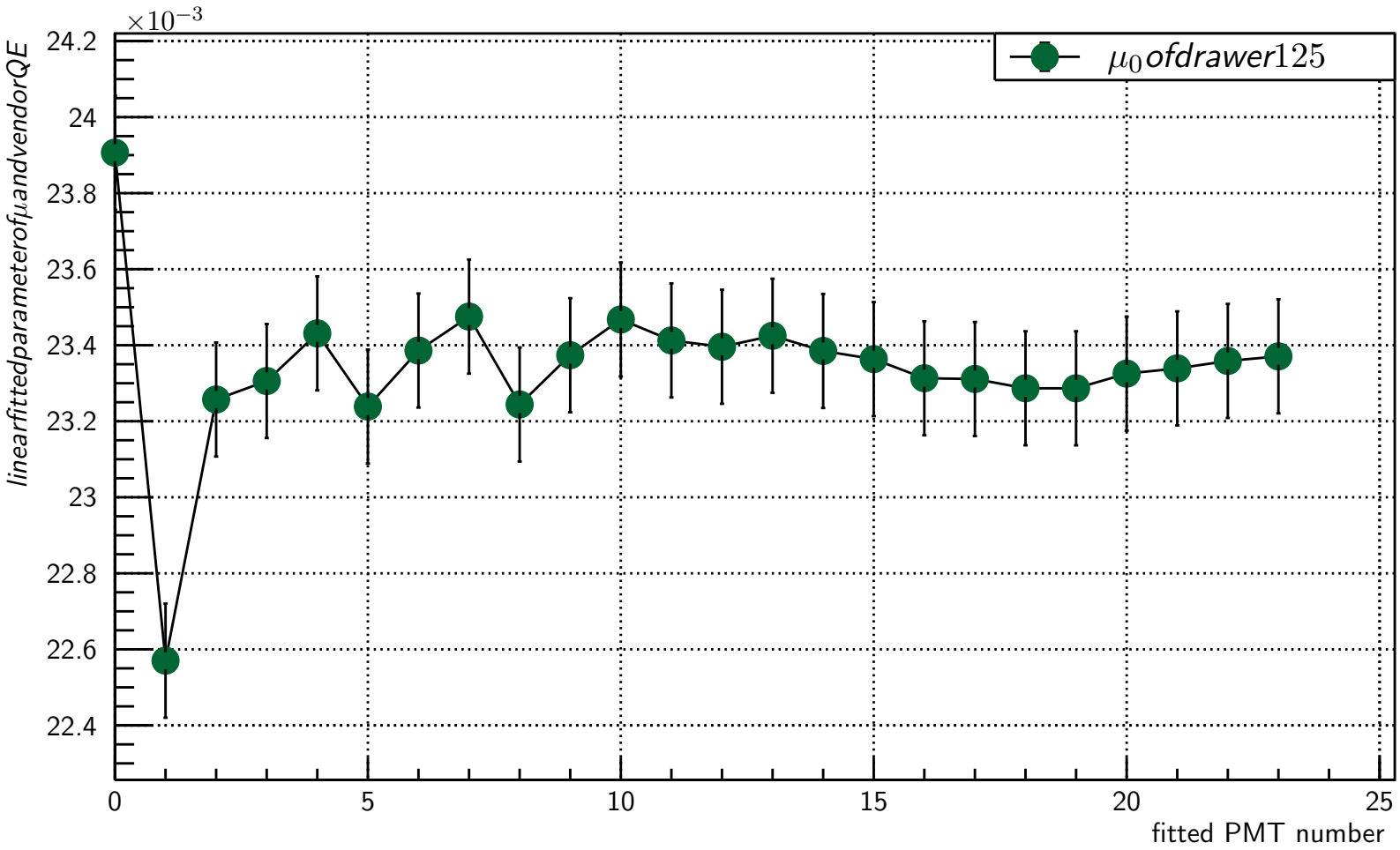
fit result of μ and vendor QE in drawer 122

This figure shows the fit parameter μ_0 of channel 122.



fit result of μ and vendor QE in drawer 125

This figure shows the fit parameter μ_0 of channel 125.



errors analysis of μ

We assumed the photo-electrons follow possion distribution and calculate μ using:

$$\mu = -\ln\frac{N_0}{N_{evt}} = \ln N_{evt} - \ln N_0 \tag{1}$$

where N_0 is the pedestral event number in the charge spectrum, μ is the parameter of possion distribution,and it means the average pe number per trig.So,the error of μ follows:

$$\delta_\mu = \frac{1}{N_0}\delta N_0 \tag{2}$$

In order to decrease the uncertainty of μ,we need to record more events and keep the light intensity low.

error of N_0

currently,we count N_0 in the charge spectrum with the cut QDC$<$0.4pC(corresponding to .25 pe);the main error come from those signals with a small bump in the trig window,they are not clear to be signal or noise.

To be conservative, we set the event number between .25pe and charge spectrum valley as the uncertainty of pedestral event number N_0.

When applied to the final PDE,the uncertainty of PDE is about 2%.

compare my results with haiqiong's results.

the laser intensity in container1

This is the latest results, the intensity of laser have been modified some time ago.

表 1: data of mass 215

Row & column	1	2	3	4	5	6	7	8	9
A	0.21	0.21	0.19	0.19	0.17	0.18	0.12	0.17	0.16
B	0.14	0.14	0.2	0.15	0.15	0.12	0.16	0.15	0.12
C	0.22	0.2	0.18	0.23	0.21	0.16	0.15	0.13	0.18
D	0.15	0.16	0.17		0.23	0.23	0.16	0.81	0.22

表 2: data of mass 200

Row & column	1	2	3	4	5	6	7	8	9
A	0.12	0.13	0.13	0.14	0.11	0.15	0.11	0.16	0.16
B	0.12	0.14	0.16	0.14	0.11	0.1	0.14	0.14	0.13
C	0.13	0.18	0.18	0.16	0.14	0.11	0.13	0.13	0.15
D	0.15	0.15	0.15		0.15	0.17	0.14	0.72	0.18

other things about container2

I found that some of the DCR channels not works:

- the zero channal(drawer 225) broken in the 3rd V895 board.It always ouputs 0 since the 1st mass test.This is believed to be a hardware problem.
- the 8 channel in the 3rd board(drawer 233) gives tiny output, which is not coincident with the input signal.

so,maybe we need to check the DCR system entirely.

It seems that MCP PMT have small proportion of after pulse at about 280ns or about 35ns?.

”reflection” signals in the container1

The figure below is from mass216,drawer 126.We have encountered similar problem in the mass215 drawer 125 PMT PA1708-1712 and mass167 drawer 107 with PMT PA1703-98

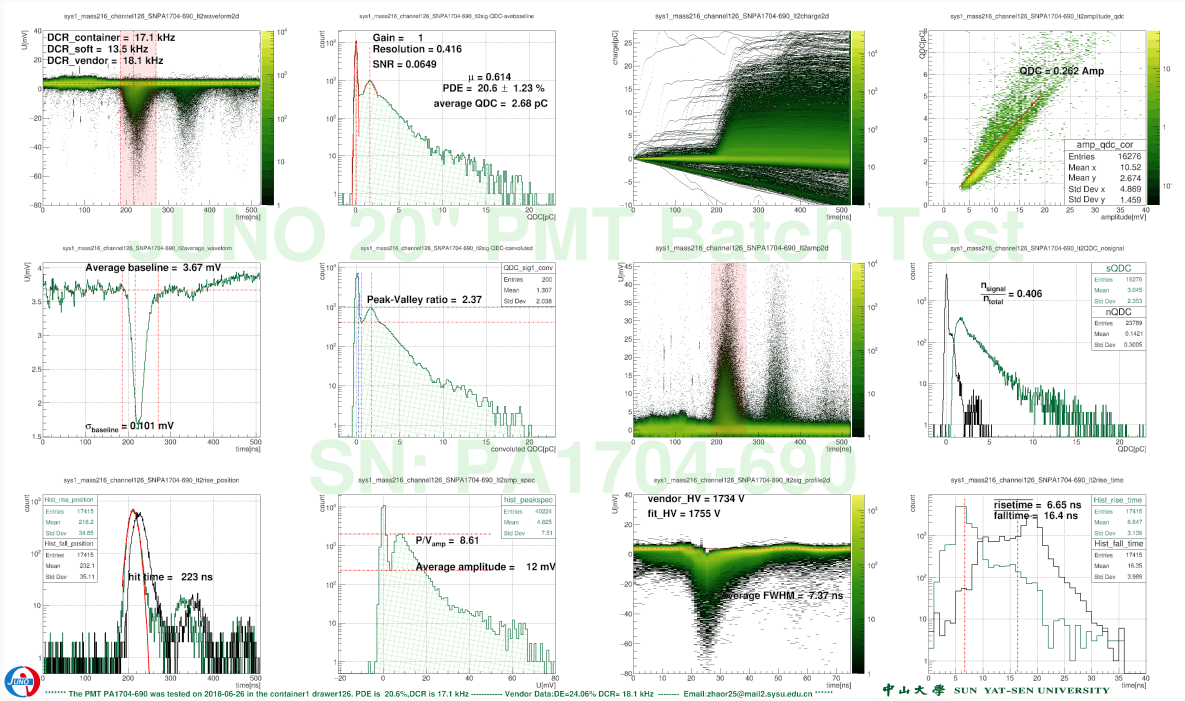


图 5: current out put png

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to do list

- a root file contains all the key information we care of all the tested PMTs.
- modify the script to be compatible with container 2.
- the relative intensity of laser.
- try to process the TTS data.
- a script to renew the calibration coefficient automatically.
- a script to renew the paramters statitics automatically.

BACK-UP