Data Quality Check of Container System

about theNew DAQ

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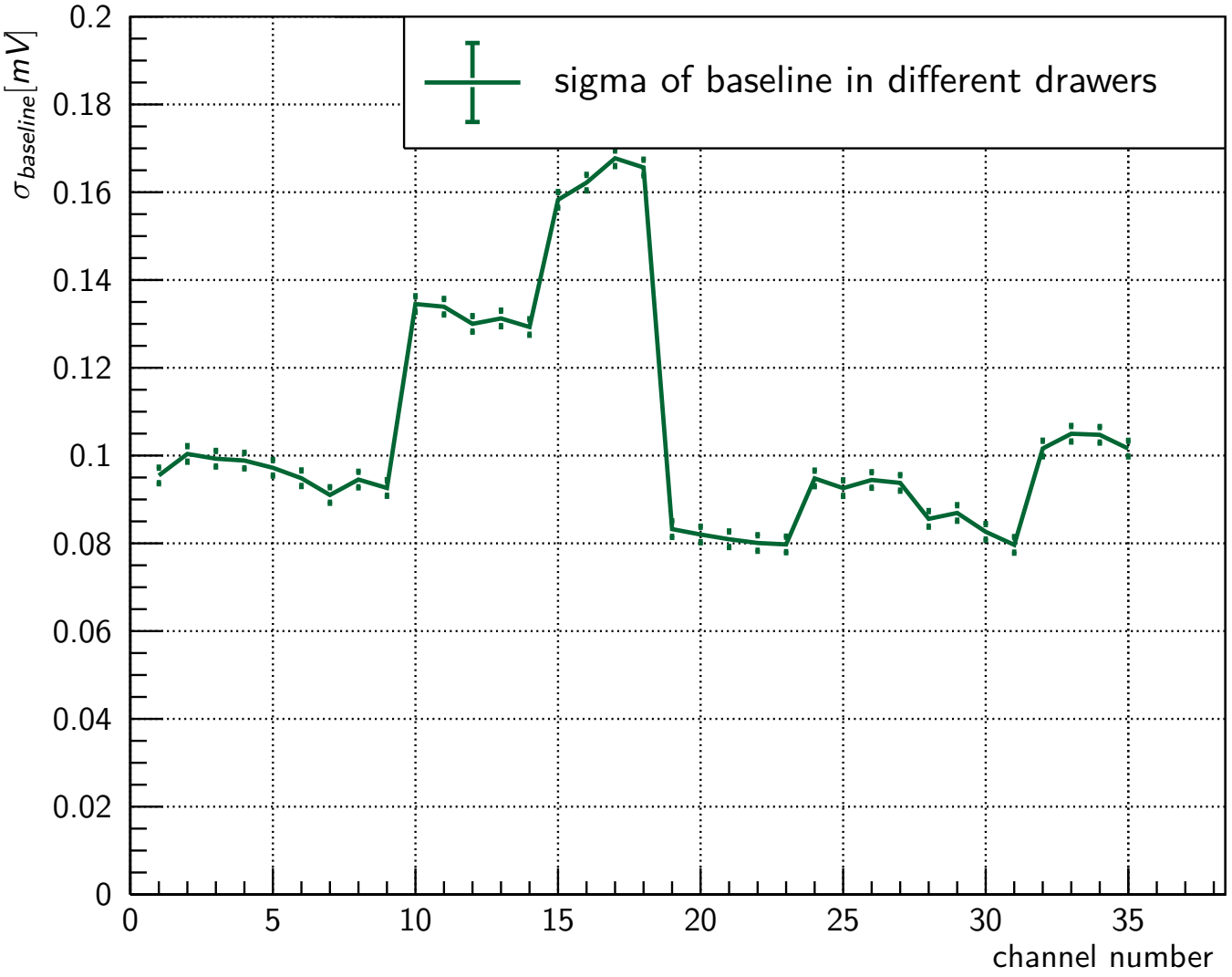
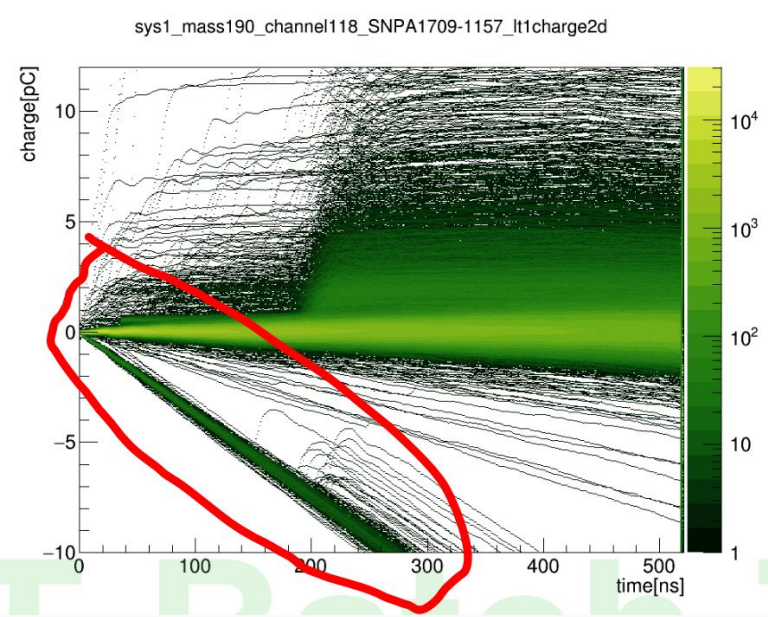
new DAQ

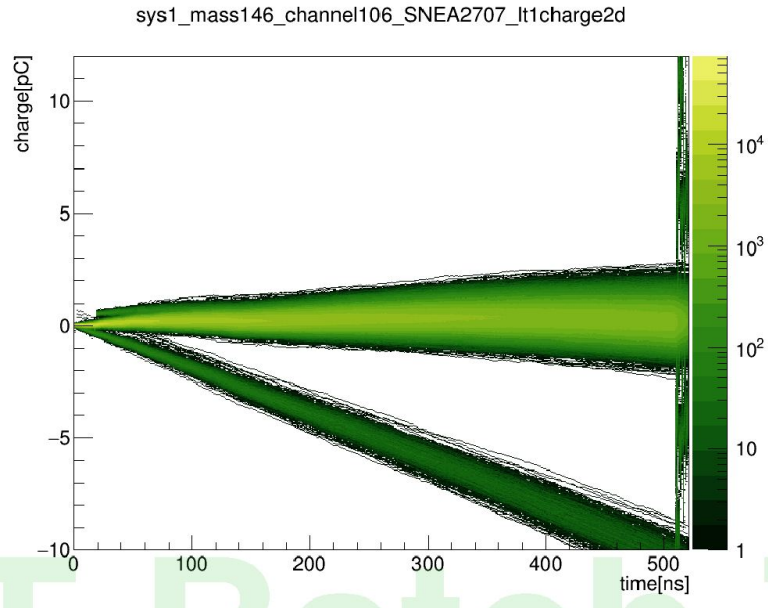
baseline quality Channel Distribution

$\sigma_{baseline}$ of each drawer is the average of mass190-mass199



Baseline drift



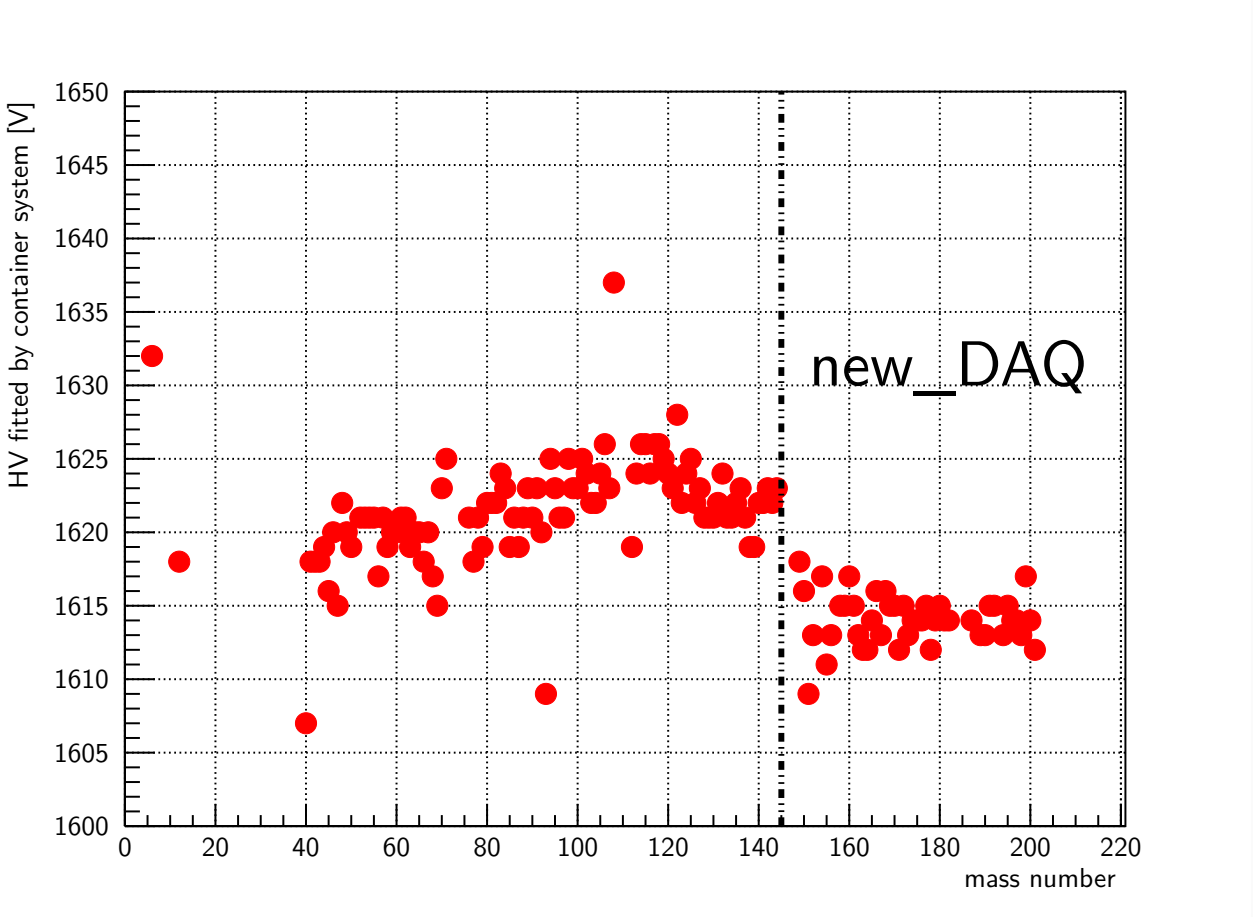


By adding up the amplitudes of each waveform with time,and then plot all the signal line in one figure.We find that

- signal baseline drifts every 128 frames(waveforms) in each drawer after the new DAQ deployed.
- the baseline σ is positively correlation with the the drift distance
- may worsen the p/V
- more clearly from the empty channel

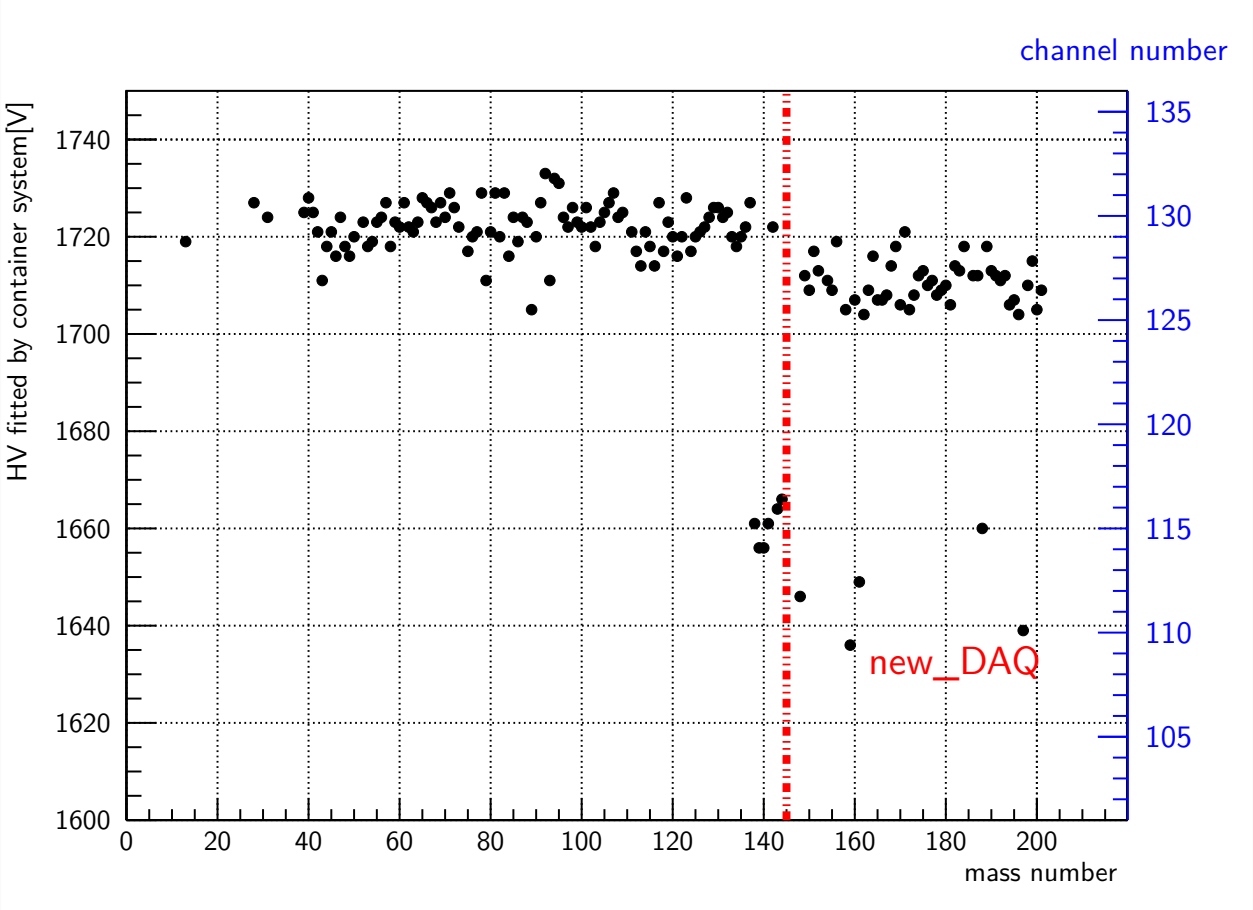
Fitted HV of EA0339

The PMT EA0339 was always placed in channel 101,its HV decreased about 10V after the new DAQ was deployed. The vendor HV is 1580V.



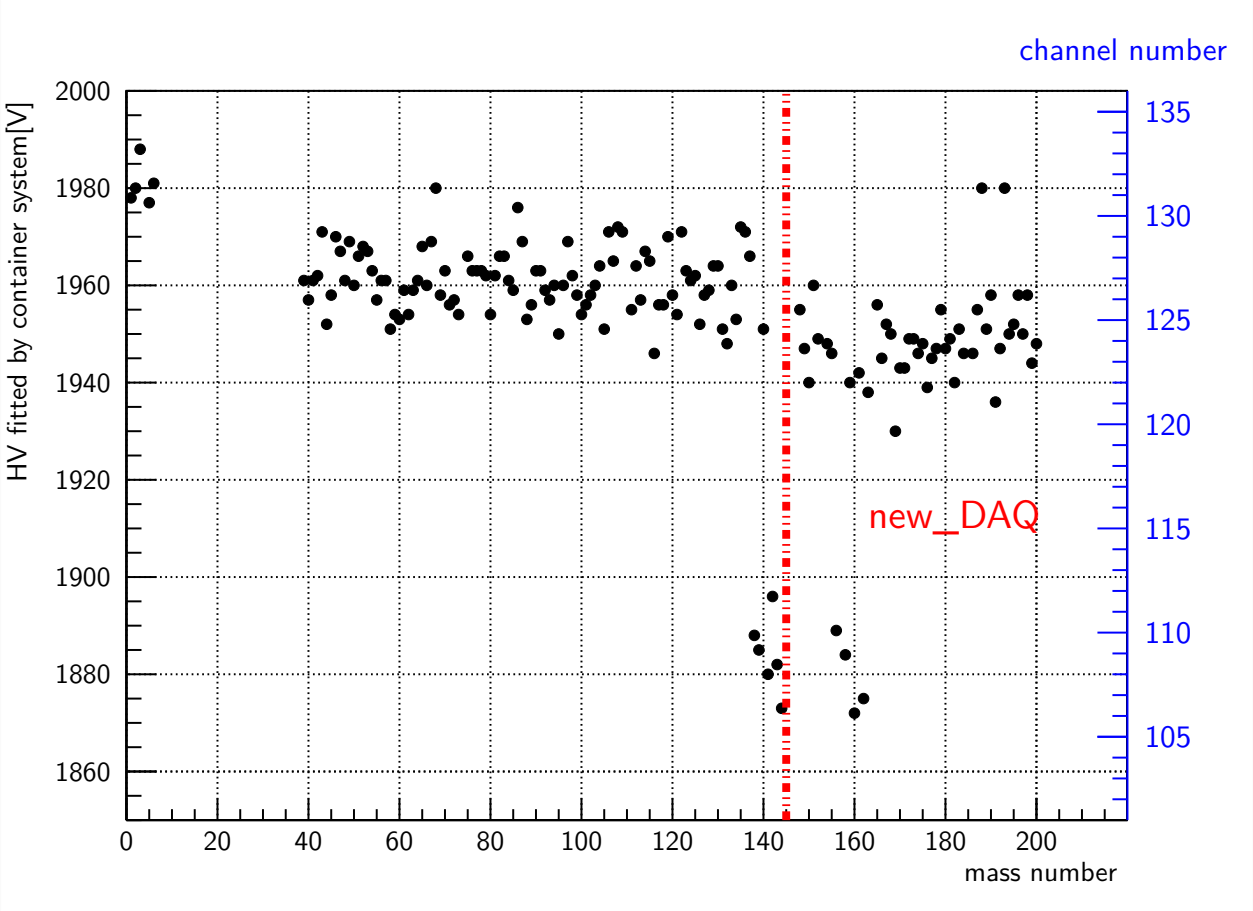
Fitted HV of EA0419

The PMT EA0419 was circulated around all the channels,its HV decreased about 10V after the new DAQ was deployed.The vendor HV is 1660V.



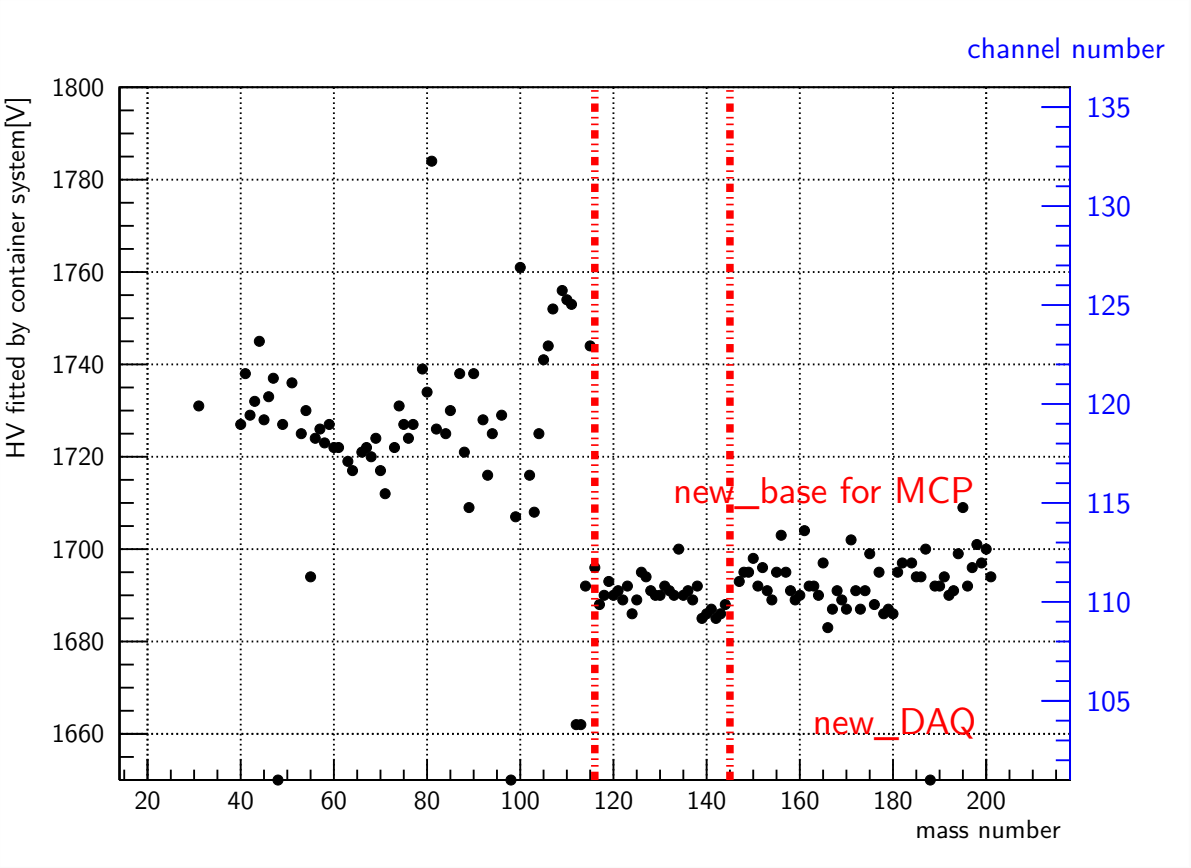
Fitted HV of EA1578

The PMT EA1578 was circulated around all the channels,its HV decreased about 10V after the new DAQ was deployed.The vendor HV is 1980V.



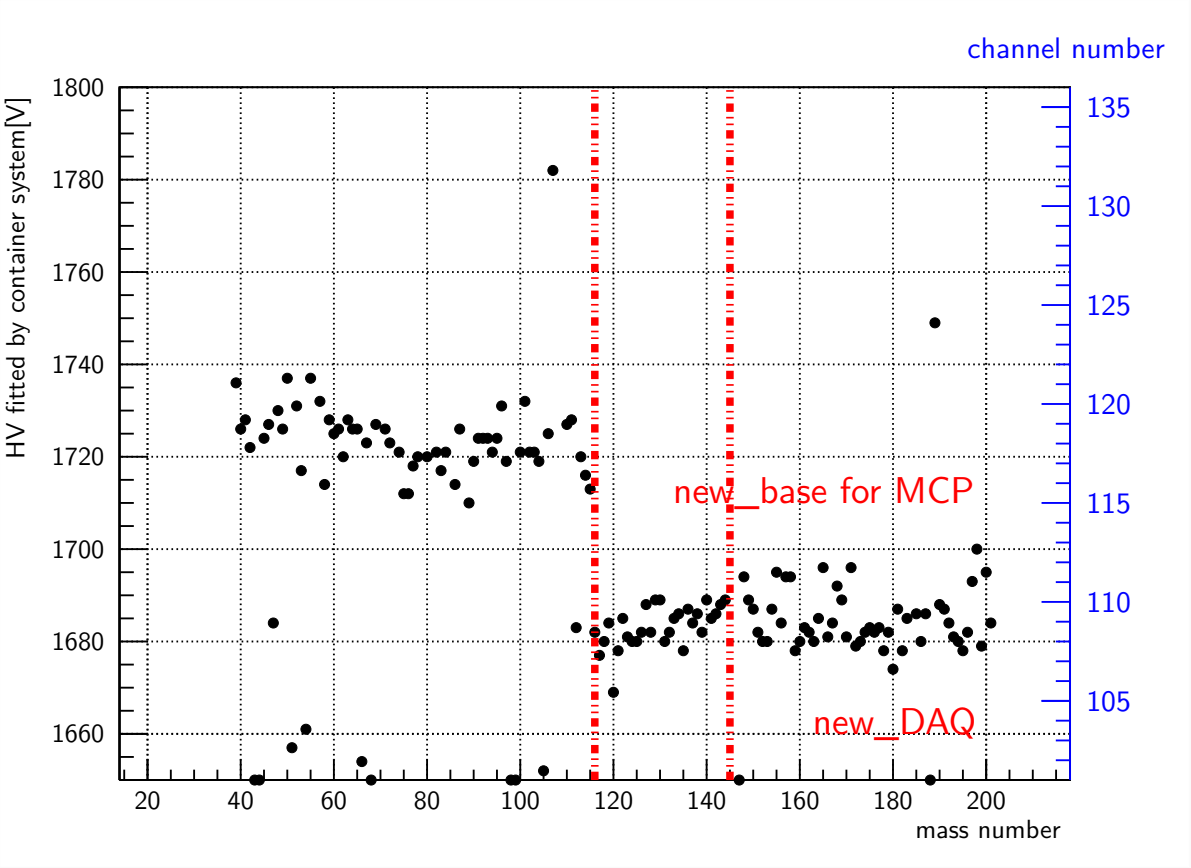
Fitted HV of PA1704-731

The PMT PA1704-731 was circulated around all the channels,its HV decreased about 30V with new MCP base and then increased about 3.5V after the new DAQ was deployed.The vendor HV is 1650V.



Fitted HV of PA1705-117

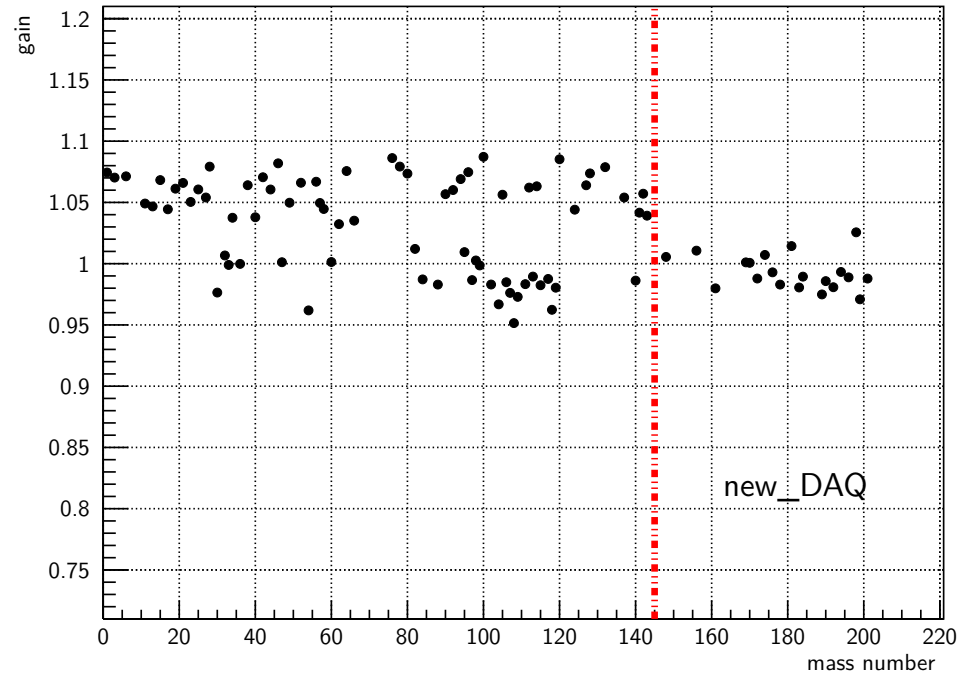
The PMT PA1705-117 was circulated around all the channels,its HV decreased about 30V with new MCP base and then increased about 2.3V after the new DAQ was deployed.The vendor HV is 1650V.



check the GAIN

Gain of PMTs also changed slightly with the new_DAQ

The right figure shows the fitted gain of HAMAMATSU-PMT in drawer 121 from different masses,since these PMTs were selected randomly,the new DAQ is correlated with the gain decrease.



In other channels, the case is very similar,the gain of PMTs decreased systematically after the new DAQ applied.

Gain of EA0339 and PA1705-117

If we choose the two reference tubes,we can again meet the gain variation corresponding to HV change.

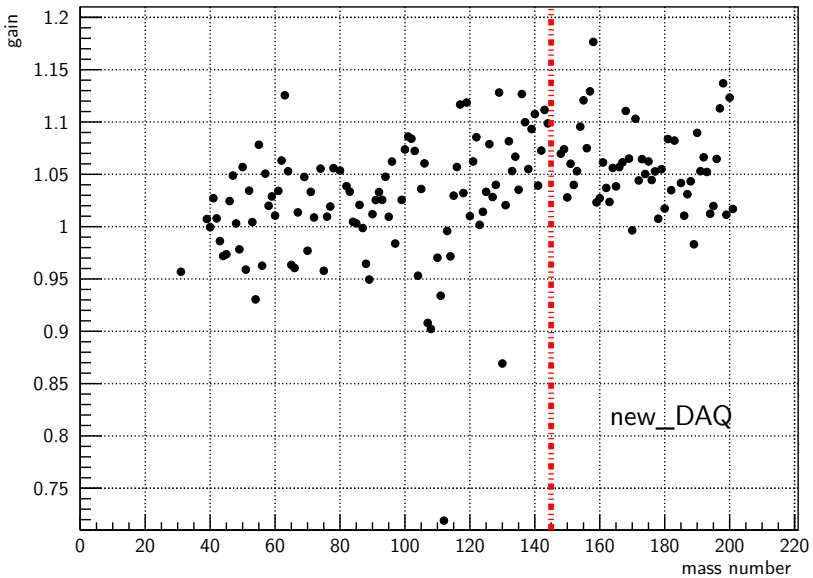


图 2: gain of PA1705-117

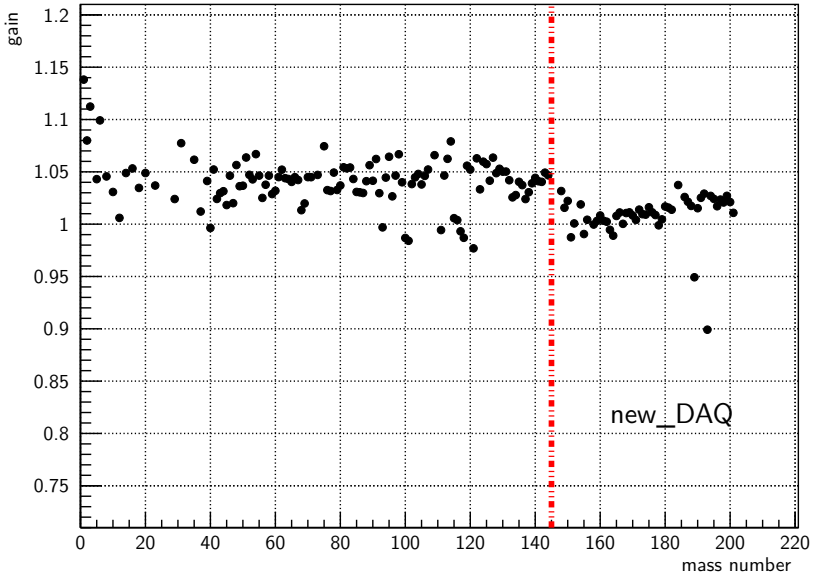
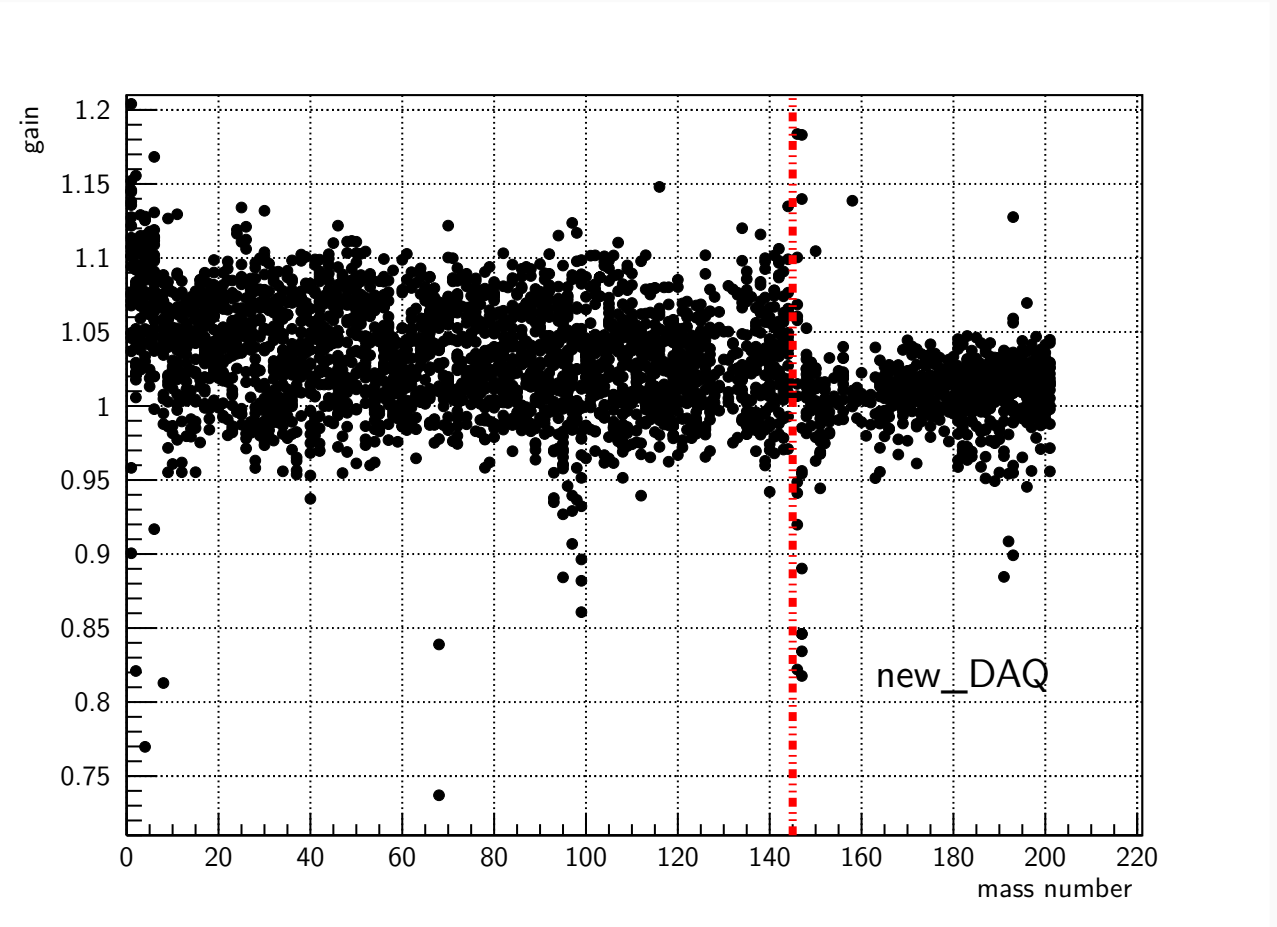


图 3: gain of EA0339

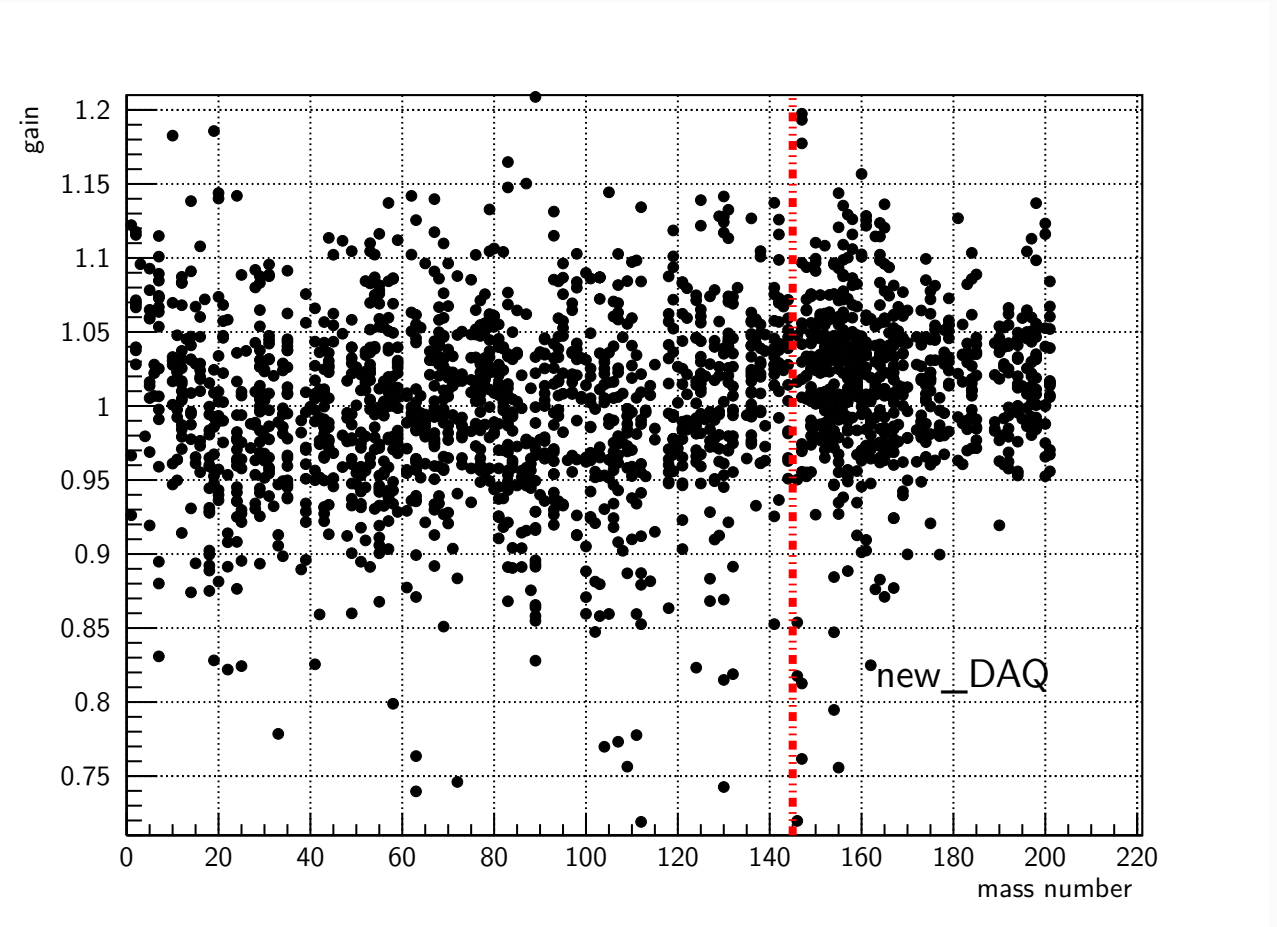
Gain of all the HAMAMATSU PMTs

The gain of HAMAMATSU PMTs decreased.



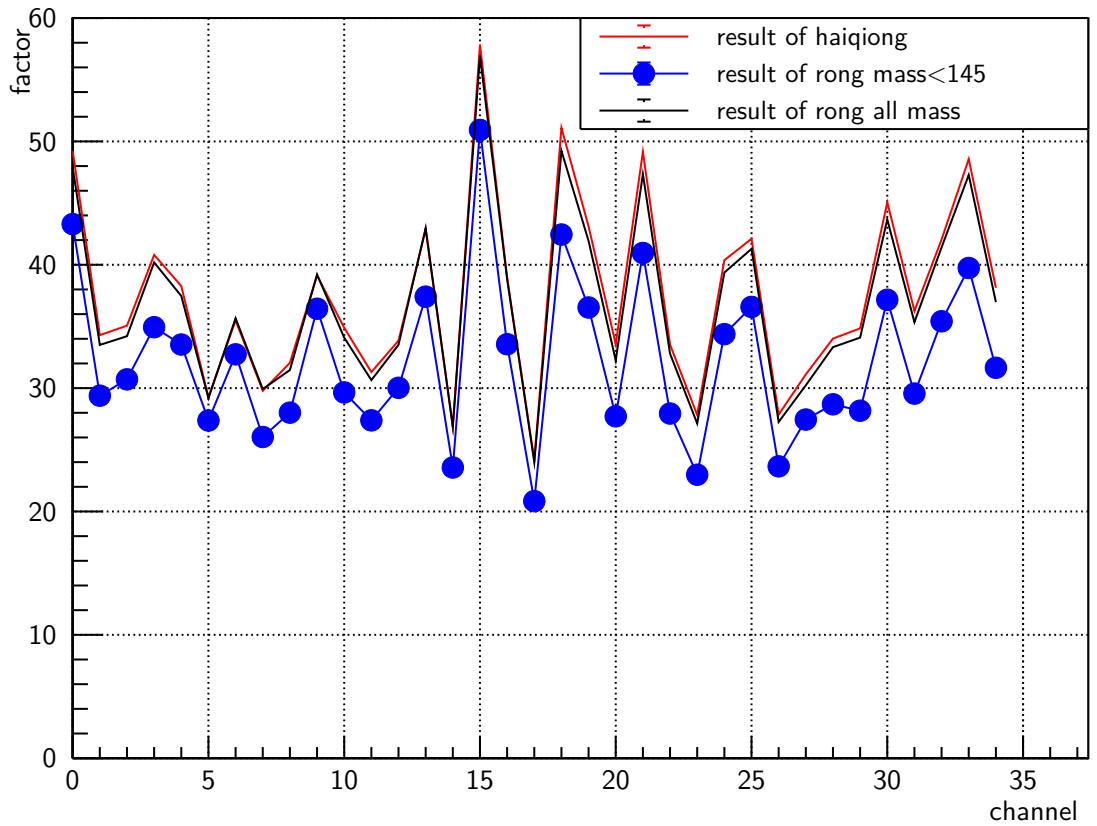
Gain of all the MCP PMTs

The gain of MCP PMTs increased.



Vendor DE and mu

Using all the HAMAMATSU PMTs with vendor DE, calculate the $\frac{PDE}{\mu}$ value of each channel.The below figure shows that new DAQ has (about 2.5%)smaller factors that before,and then need to be considerated in the PMT DE evaluation.



BACK-UP

summary

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- baseline drift periodically in the new DAQ
- new DAQ has changed the state of the system somehow
  - HV–HAMAMATSU PMT $\Uparrow$;MCP PMT $\Downarrow$
  - GAIN –HAMAMATSU PMT $\Downarrow$;MCP PMT $\Uparrow$
  - μ, PDE – increase a little bit.
- future work
  - find out the proper coefficient between μ and PDE.
  - ivestigate the performance of new DAQ in detail.

finished

- refine the ouput of main program:add new plot and errors of parameters
- the first fit of μ and PDE results
- preliminary statistical results of all PMT's parameters.

(续)

to do

- study the relation between μ and PDE
- a final script which can run one mass's data and give a quick data qualitycheck.
- a script to monitor the performance of reference tubes.