PE Gain Calibration

Oct 27, 2005

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Outline

- Old table of the FD gains
- Substantial changes since Nov 2003
- LISummary Software Package
- Selection of good stripends
- Gain table old vs. tentative new
  - Gains and GainErrors
  - Number of PMTs with good stripends
- Summary

Old table of the FD gains

- Jeff Hartnell inserted the FD gain table into the DataBase on November 26, 2003

- This table uses the following method to estimate the gain of the PMT pixel
  → gain = rms*rms/mean

- Use data collected from the Light Injection system

Substantial changes since Nov 2003

- There are the new PMTs at the north end
- Code updated?
- For example, Gain error calculation
  - It is the sum of the relative errors of rms*rms/mean but does not include the error on the fudge factor, 0.8
- What else?

LISummary Software Package

Reconstruction (LISummaryModule.cxx)

Analysis (LIAnalysis.cxx)

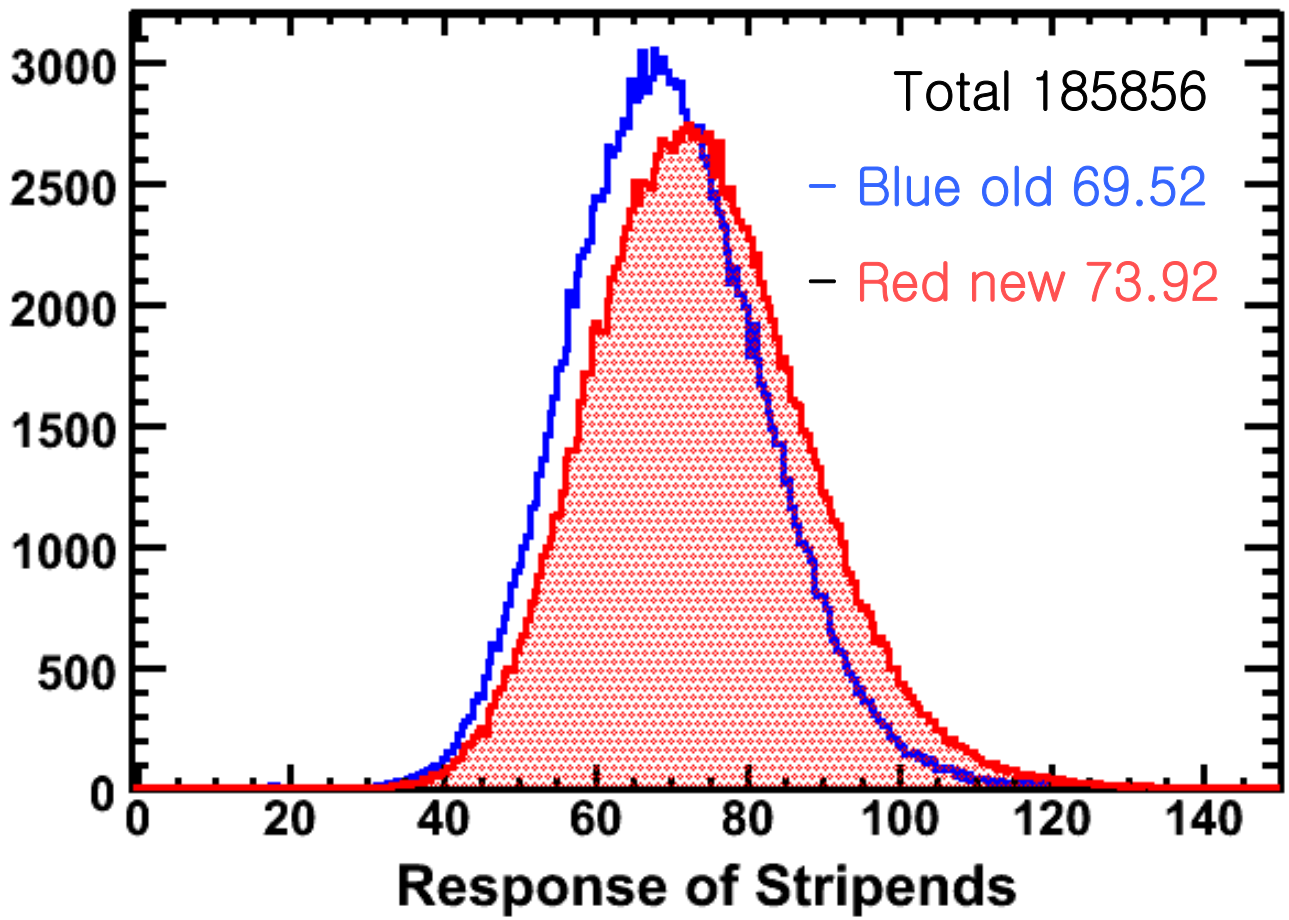
Read and Write table (LIPlexMaps.cxx)

Now making text file instead of writing to DB, in order to compare new with old gains

Selection of good stripends

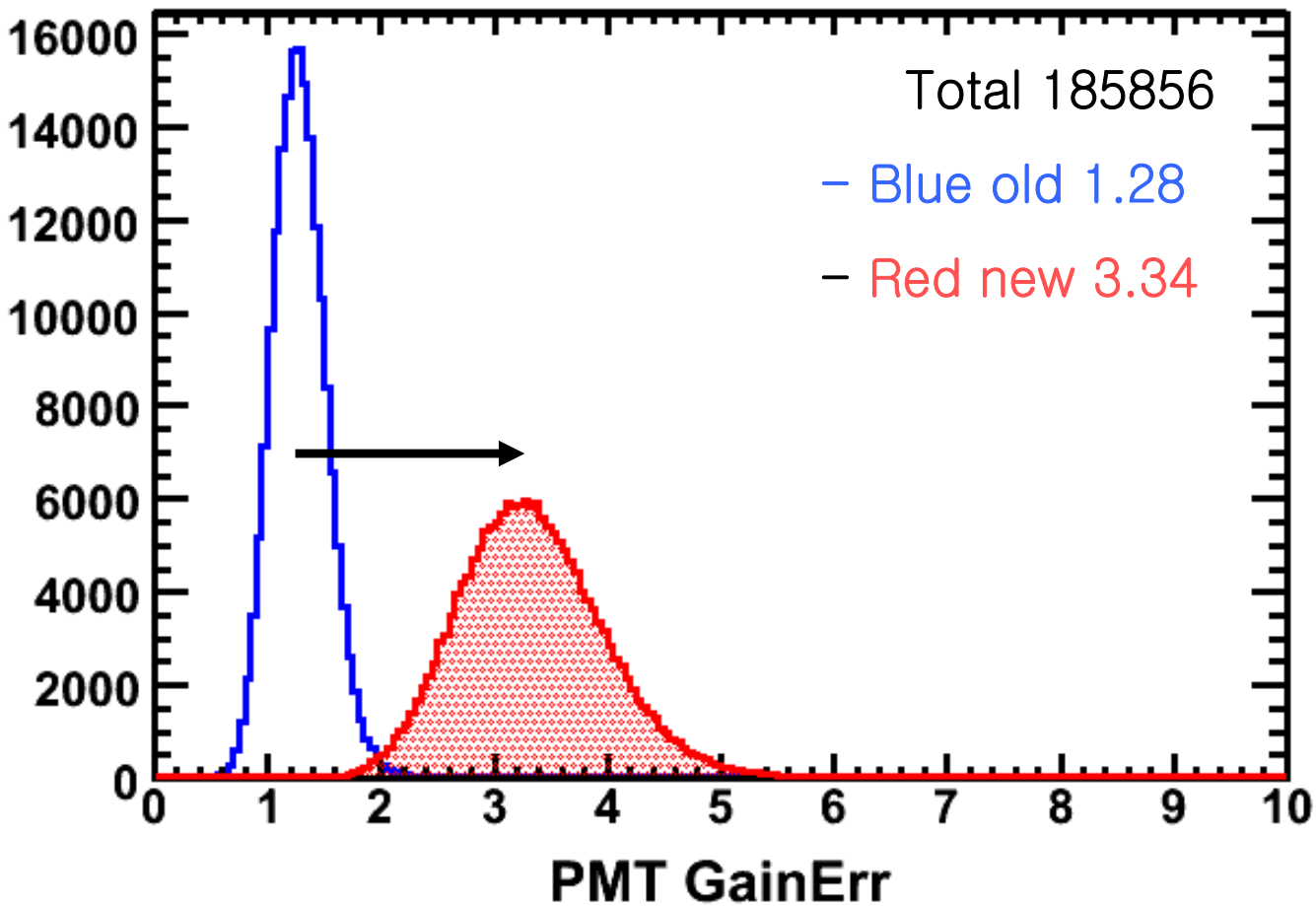
- Look at Far detector
- Take hits due to LI
- 400<ADC<8000 and Number of hits>400
  - Use either planeNearEnd or planeFarEnd
  - Use substitutes if both are bad
    - average of pixel or nearest neighbors or whole detector
- Correct the error for the secondary emission, fudge factor for M16 = 0.8
- Probably more... (for details)

Gain table old vs. tentative new (Nov 2003 vs. Oct 2005)



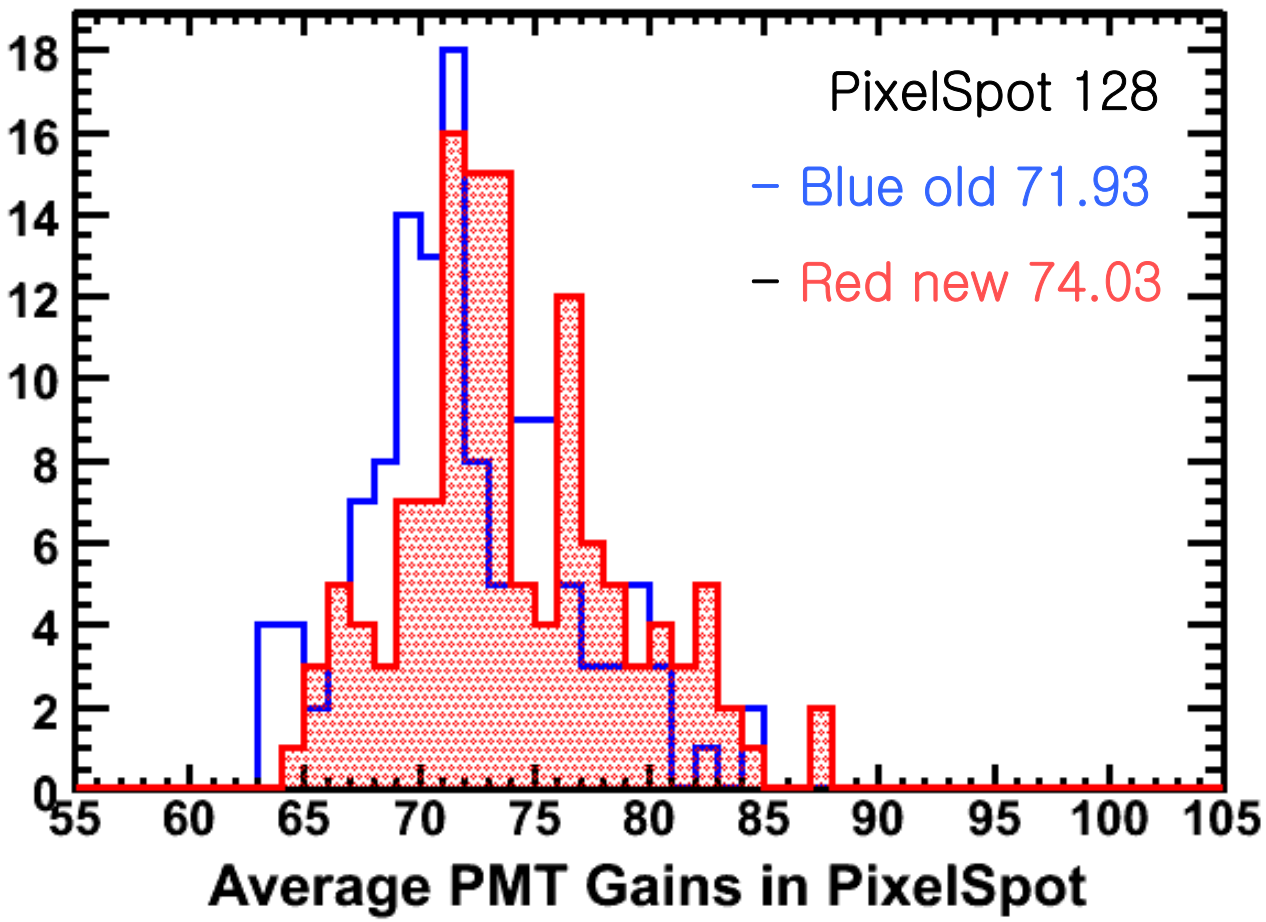
➔ Slightly shift (~5%)

Gain table old vs. tentative new
(PMT Gain error)



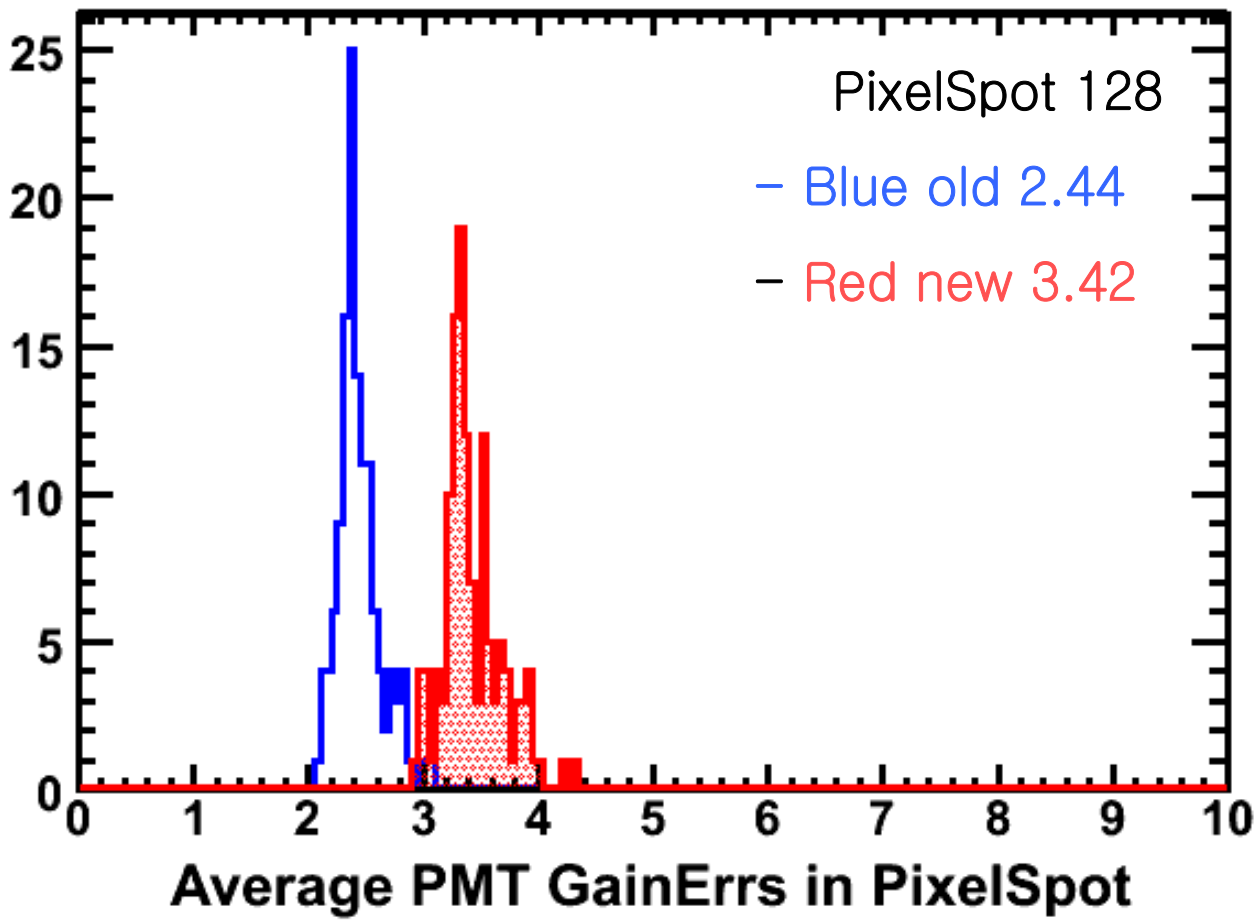
➔ What happened?

Gain table old vs. tentative new
(Gain in Average Detector PMT)

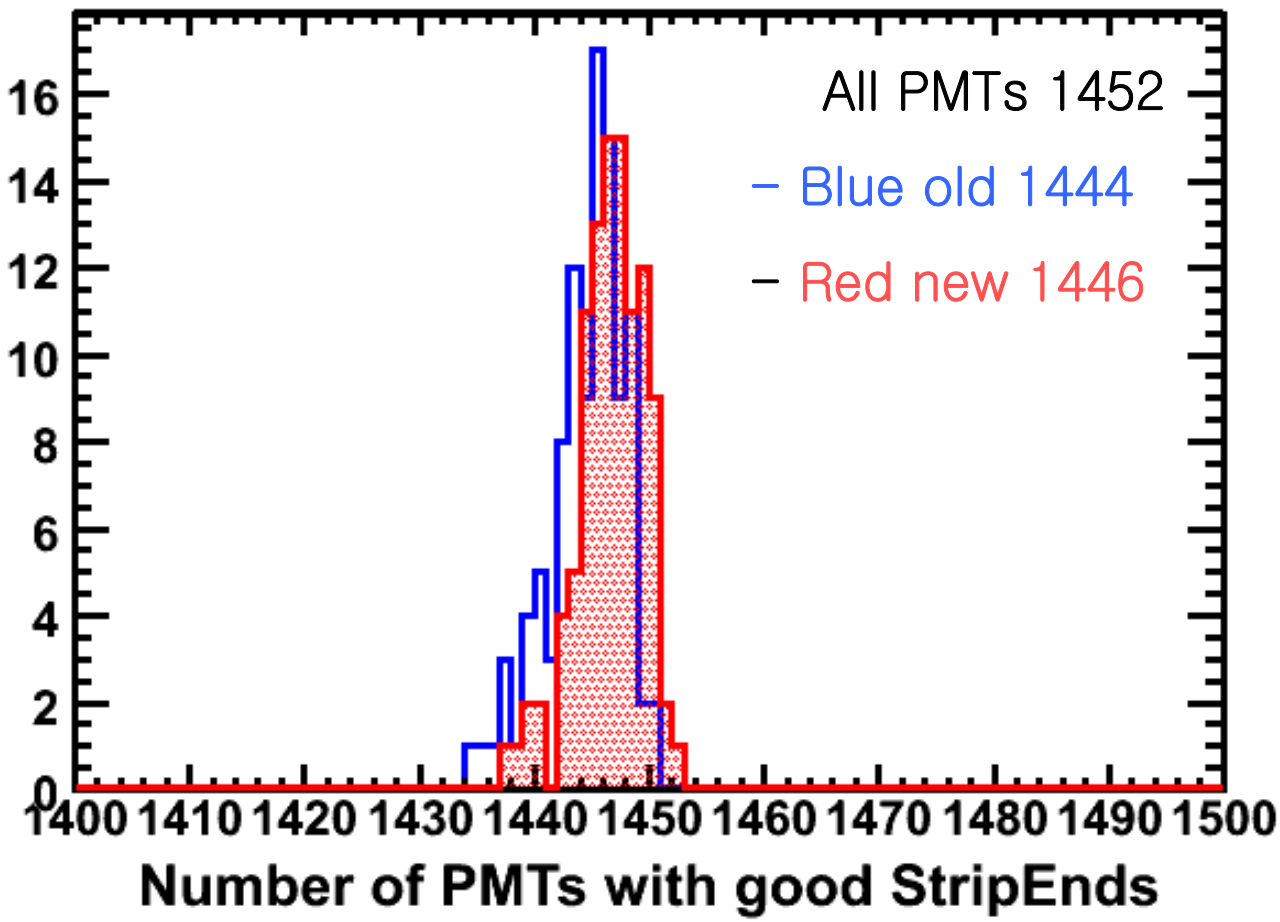


➔ Pixel*PixelSpot=16*8

Gain table old vs. tentative new
(GainErr in Average Detetcor PMT)

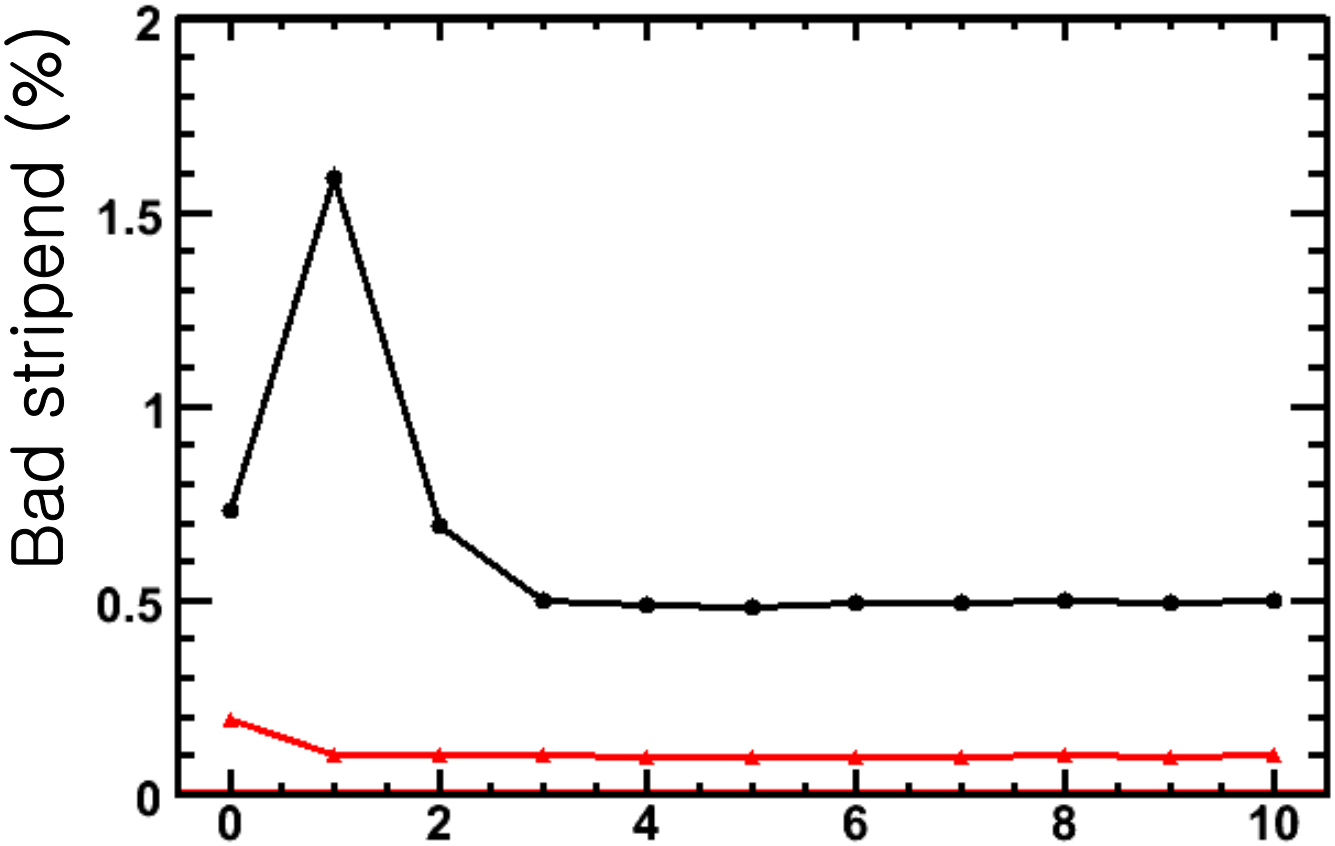


Gain table old vs. tentative new (Number of PMTs with good StripEnds)



➔ Next page will show the number of bad stripends

How many bad stripendd?



From Nov 2003 to 10 runs on Oct 2005

- total bad stripend 0.5% level
- hot spot (>150) 0.1% level

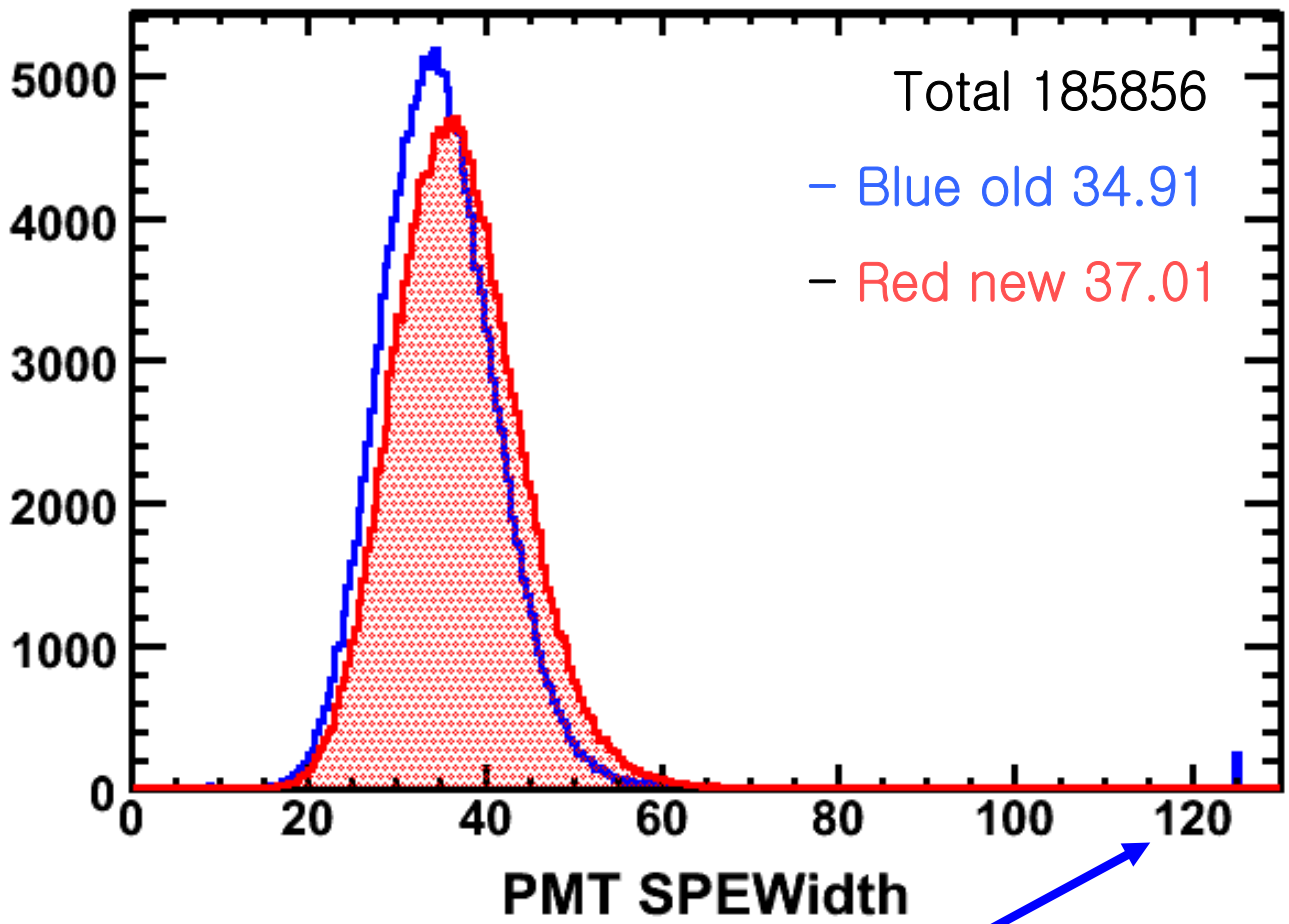
Summary

- Compared old gain with new
  - They look fine except gain errors
  - Do we expect any improvement?

- Total good stripends ~99%
  - Higher bad stripends sometimes
    - ➔ Q: how about runs on Sep or Aug?
      A: looked at just one run per month and found 0.5%
  - Hot spot (>150) ~0.1%

- Plan : Writing new to DB

Gain table old vs. tentative new
(Single PE Width = 0.5*gain)



old gain has hot spots