

# AD1 & AD2 Muon comparison

Qing He

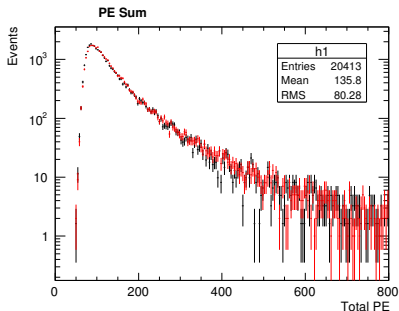
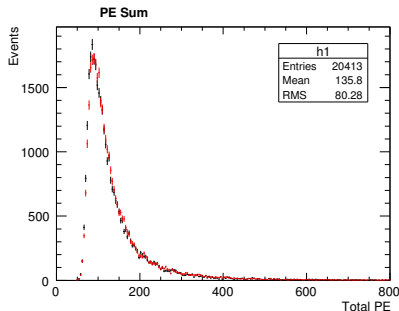
Princeton University

Dayabay Collaboration

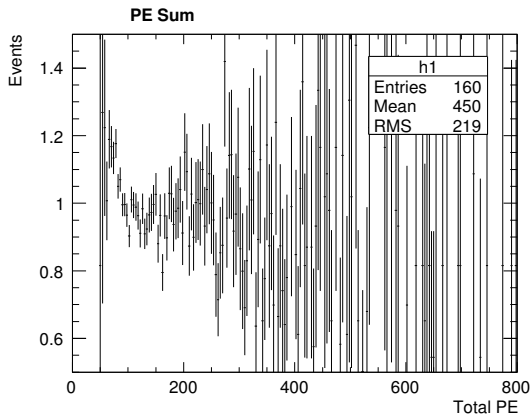
- AD1
  - Run 5213: Physics run,  $N_{Hit} \geq 50$
- AD2
  - Run 5480: Physics run,  $N_{Hit} \geq 50$
  - Run 5764: Physics run,  $N_{Hit} \geq 50$
- Calibration
  - Use preAdc as Adc pedestal
  - Use dark noise to fit SPE peak(Doc 5323)
- Tdc cut:  $900 < Tdc < 1050$

# Comparing run 5213 & run 5764

# PE sum comparison

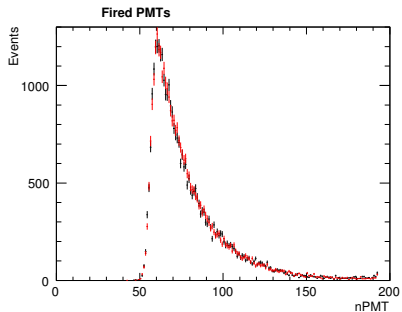


- Black line is AD1, Red line is AD2.
- Histograms are normalized based on time length.
- AD1 muon rate:  $754.6 \pm 5.3$ ; AD2 muon rate:  $758.1 \pm 4.1$

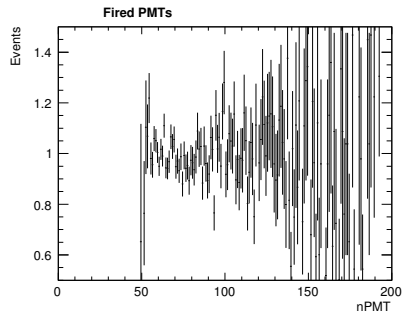


- The excess at less than 100 is related to trigger threshold.

# Number of fired PMTs

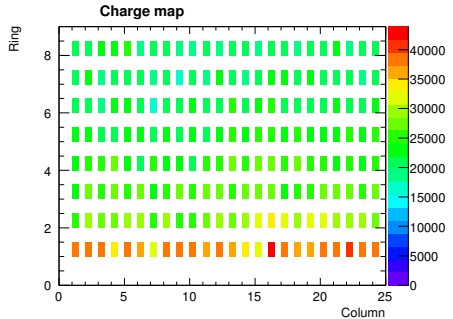
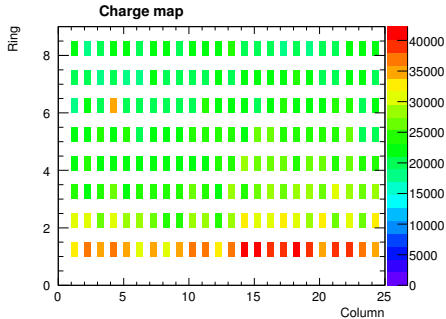


Black line is AD1, Red line is AD2.

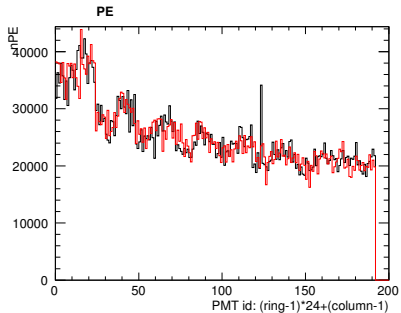


Ratio

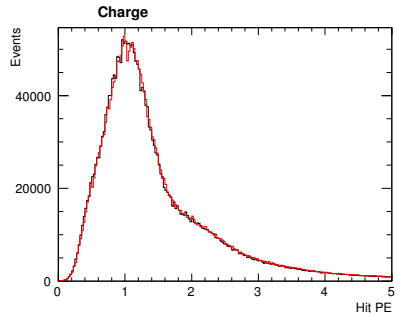
# Charge map



- Left: AD1; Right: AD2



PE collected per PMT.



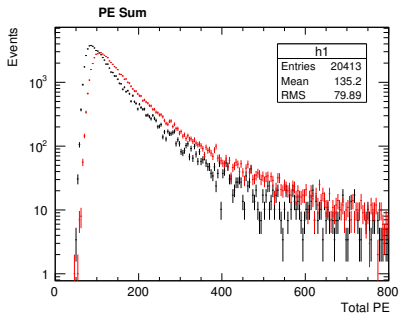
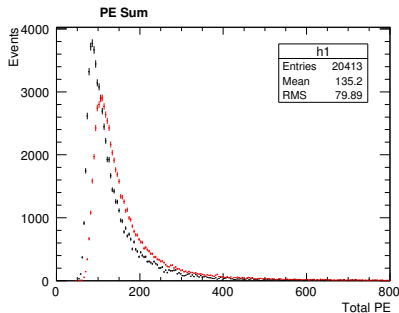
Single hit distribution.



# Comparing run 5213 & run 5480

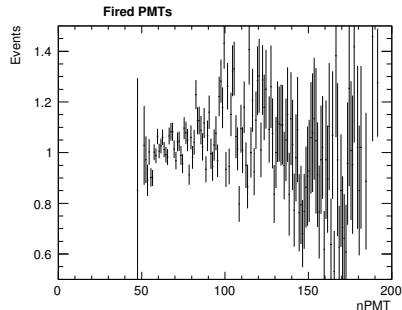
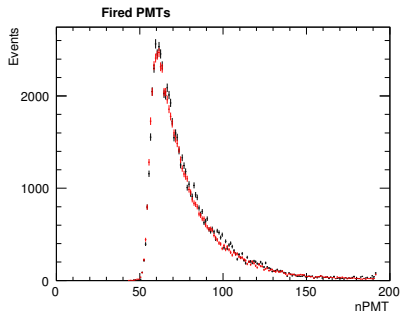
(some PMTs in run 5480 have wrong HV settings, see the elog)

# PE sum comparison



- Black line is AD1, Red line is AD2.
- Histograms are normalized based on time length.
- There is significant difference between run 5213 and run 5480.
- AD1 muon rate:  $754.6 \pm 5.3$ ; AD2 muon rate:  $728.1 \pm 2.8$

# Number of fired PMTs

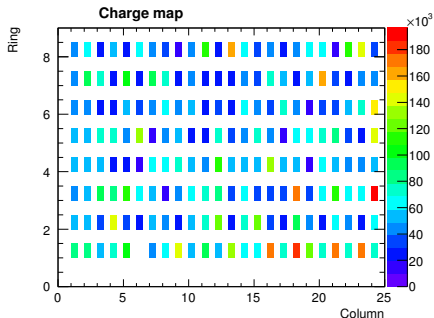
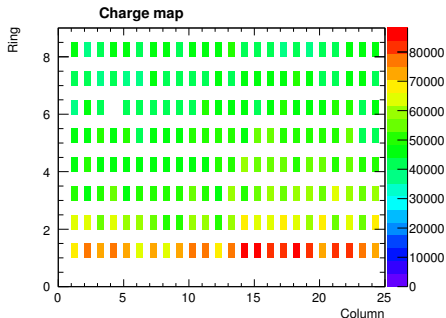


Black line is AD1, Red line is AD2.

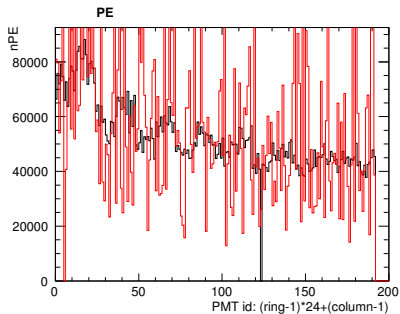
- Consistent in number of fired PMTs.

Ratio

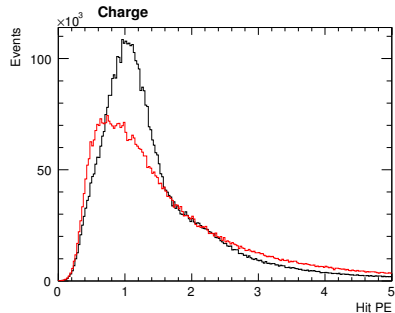
# Charge map



- Left: AD1; Right: AD2 (run 5480)
- run 5480 has strange charge distribution among PMTs.



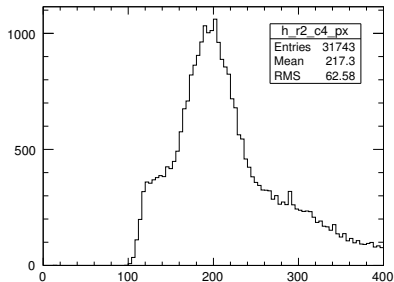
PE collected per PMT.



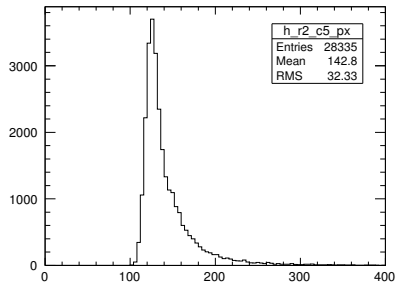
Single hit distribution.

- Black histogram: Run 5134; Red histogram: Run 5480.

# Something wrong with run 5480



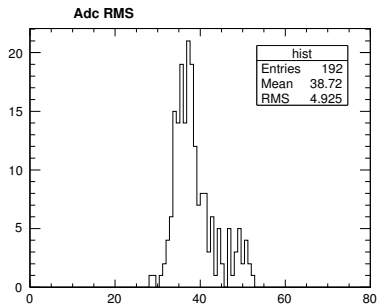
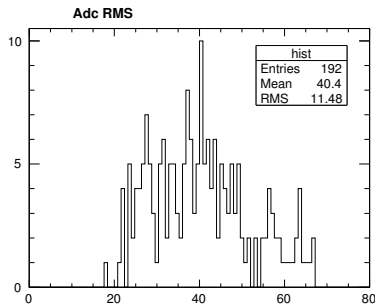
Adc distribution for ring 2 column 4  
(strange)



Adc distribution for ring 2 column 5  
(normal)

- (some PMTs in run 5480 have wrong HV settings, see the elog)

# PMT Adc distribution RMS value



- Left: Run 5480; Right: Run 5764
- Run 5480 has a large fraction of PMTs behave strangely, most likely due to wrong HV setting for some PMTs.