

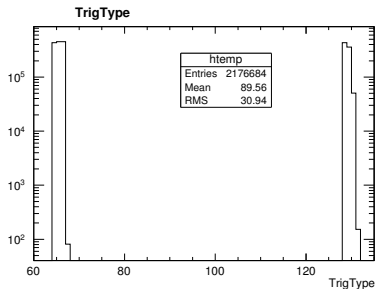
Water Pool Dry Run data peek (II)

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Dayabay Collaboration

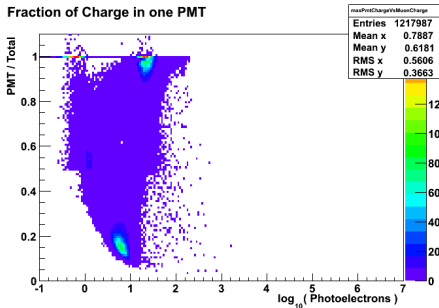
- Random (80Hz) + NHit(>6 for WPI and >5 for WPO) + ESum (>5) trigger
- Run time: 94 min



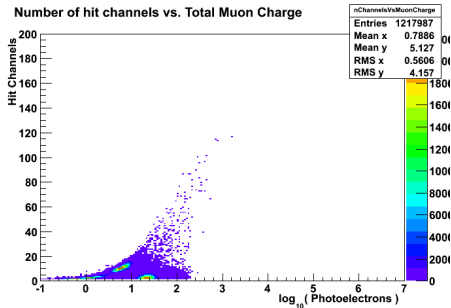
Trig	number	fraction(%)	Rate (Hz)
IWS random	432573	32.4	77
IWS Esum	451643	33.8	80
IWS Multi	451481	33.8	80
TrigType 67	81		
OWS random	432614	51.4	77
OWS Esum	357636	42.5	63
OWS Multi	50504	6.0	9
TrigType 131	152		

WPI offline data monitor plots

Fraction of Charge in one PMT

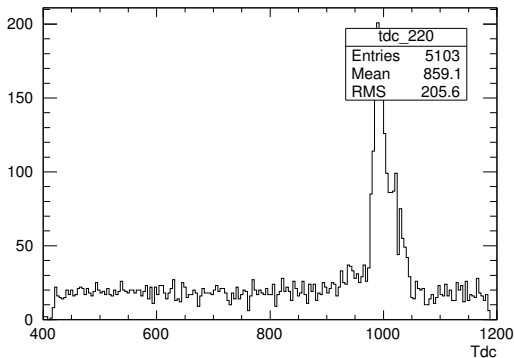


Number of hit channels vs. Total Muon Charge



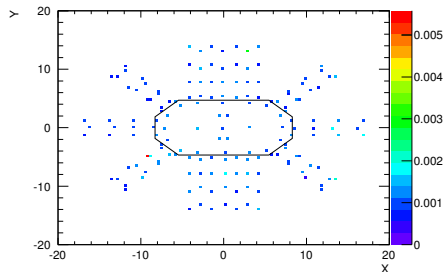
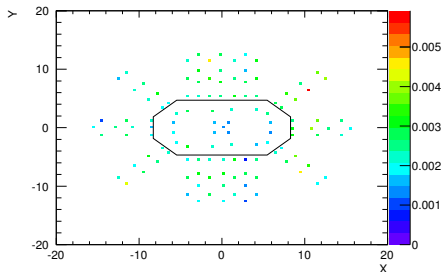
- The three type of triggers are well separated into 3 regions
- The first is random trig, the second is nHit trig, the third is Esum trig.

Tdc cut & Calibration



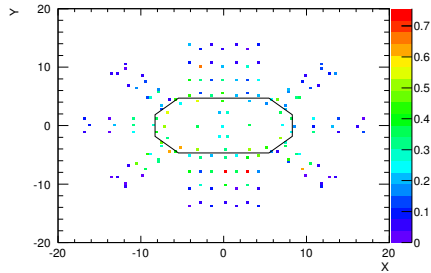
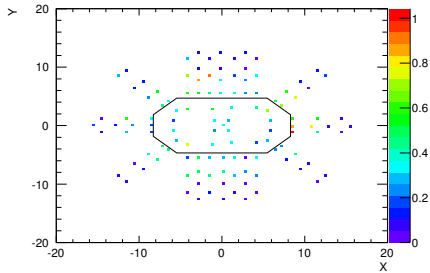
- All the following analysis only consider hits with $900 < Tdc < 1050$
- Hits are calibrated with $\text{gain} = 22 \text{ Adc/PE}$

Random trig charge map



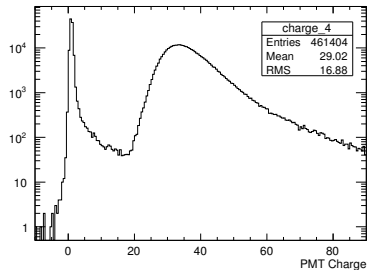
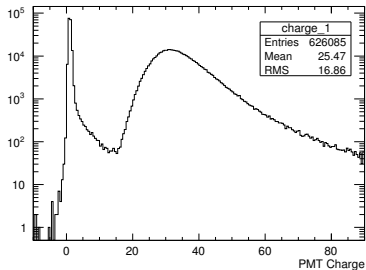
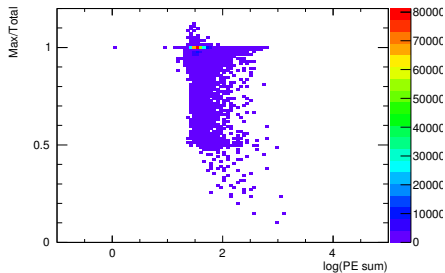
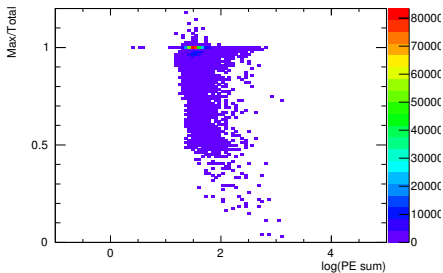
- Charge evenly distributed.
- Higher rate for inner pool, consistent with dark noise measure

Esum trig

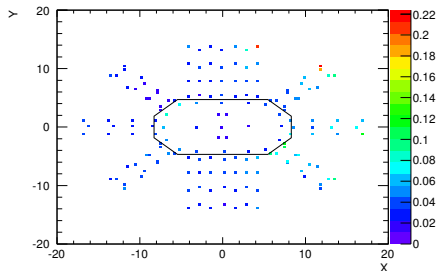
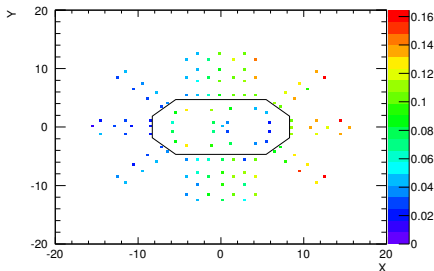


- More hits at the bottom

Esum trig

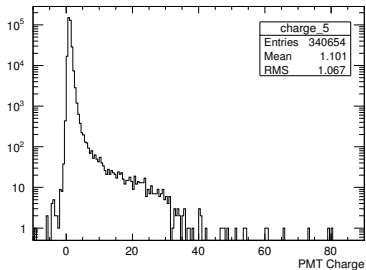
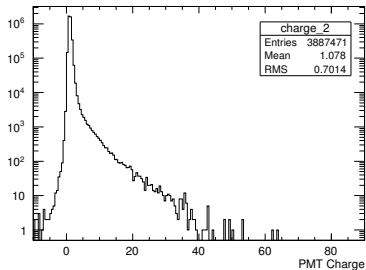
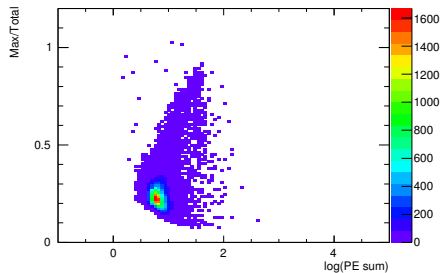
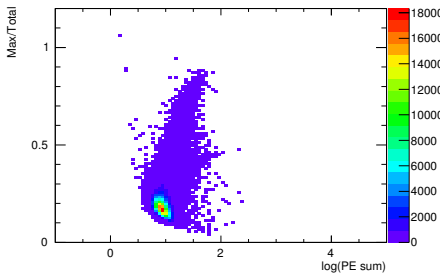


Multiplicity trig

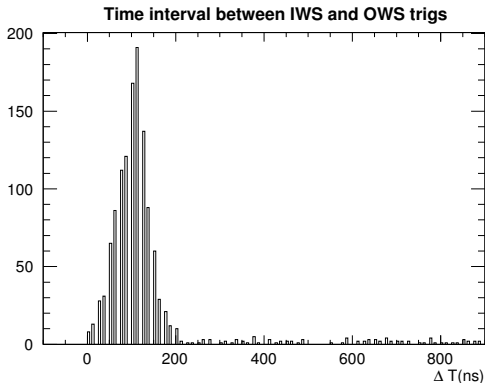


- Right hand side has higher hit rate.
- Muon? Unlikely, since the top has more hits
- Only one AD sit inside effect?

Multiplicity trig

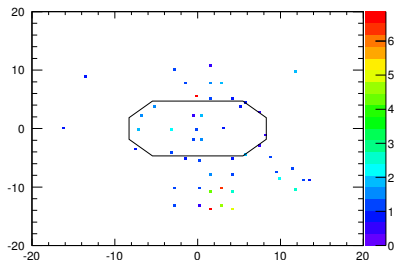
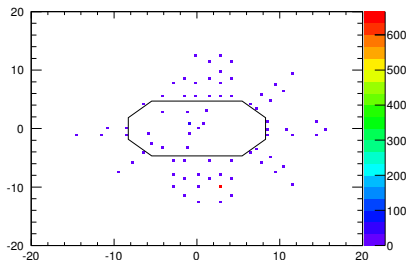


Any correlated events?



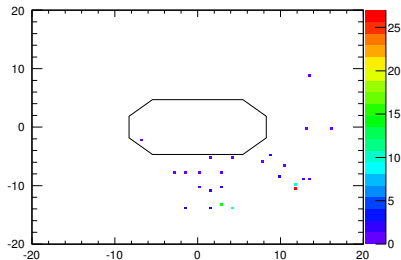
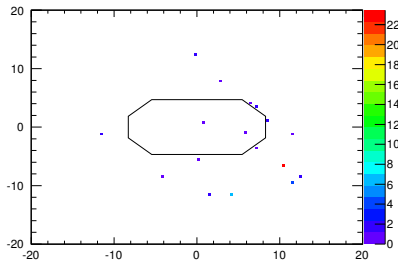
- Δt (ns) distribution between IWS and OWS trigs (the two consecutive trigs must be one from IWS and one from OWS)
- Random triggers are excluded.
- There are correlated events! Muons? PMT flashing (because of the light leak between IWS and OWS)?

Potential physics event in version 1



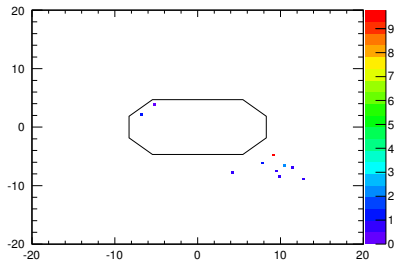
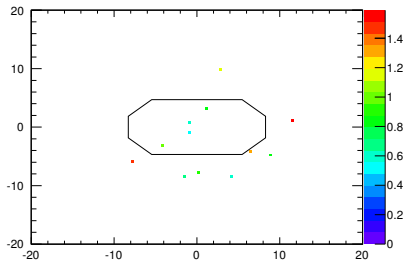
- In the previous version of this document, I give the right plot and call it a potential physics event. Now it looks like muon event.
- Left: IWS Esum trig, Trig Time
(sec,nanosec)=(1303271181,777236187)
- Right: OWS multiplicity trig, Trig Time
(sec,nanosec)=(1303271181,777236300)

Muon event? (1)



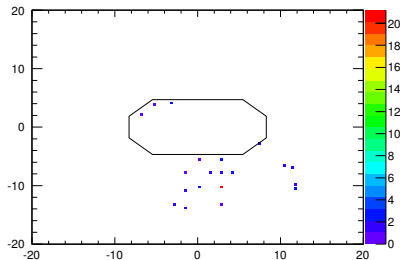
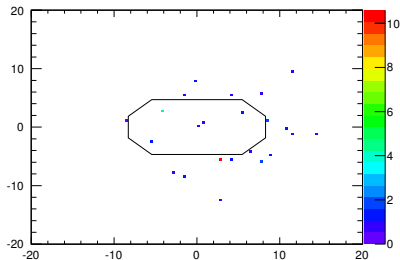
- Left: IWS multi trig, Trig Time
(sec,nanosec)=(1303270378,604622050)
- Right: OWS multi trig, Trig Time
(sec,nanosec)=(1303270378,604622075)

Muon event? (2)



- Left: IWS multi trig, Trig Time
(sec,nanosec)=(1303270512,582799600)
- Right: OWS multi trig, Trig Time
(sec,nanosec)=(1303270512,582799675)

Muon event? (3)



- Left: IWS multi trig, Trig Time
(sec,nanosec)=(1303270908,112253912)
- Right: OWS multi trig, Trig Time
(sec,nanosec)=(1303270908,112254000)

Summary

- Bottom PMTs have high Esum trig rate. Most Esum trig are single PMT hit with charge between 20~80.
- Behavior of IWS and OWS is similar, but OWS has much lower nHit trig, which probably means IWS nHit trigs are not dark noise coincidence. (There are lots of factors to consider here: IWS has higher dark rate, but less number of PMTs)
- nHit trig has high hit rate at the right handside top PMTs, related to the single AD sit inside?
- There are correlated events, and they look like muon events.