

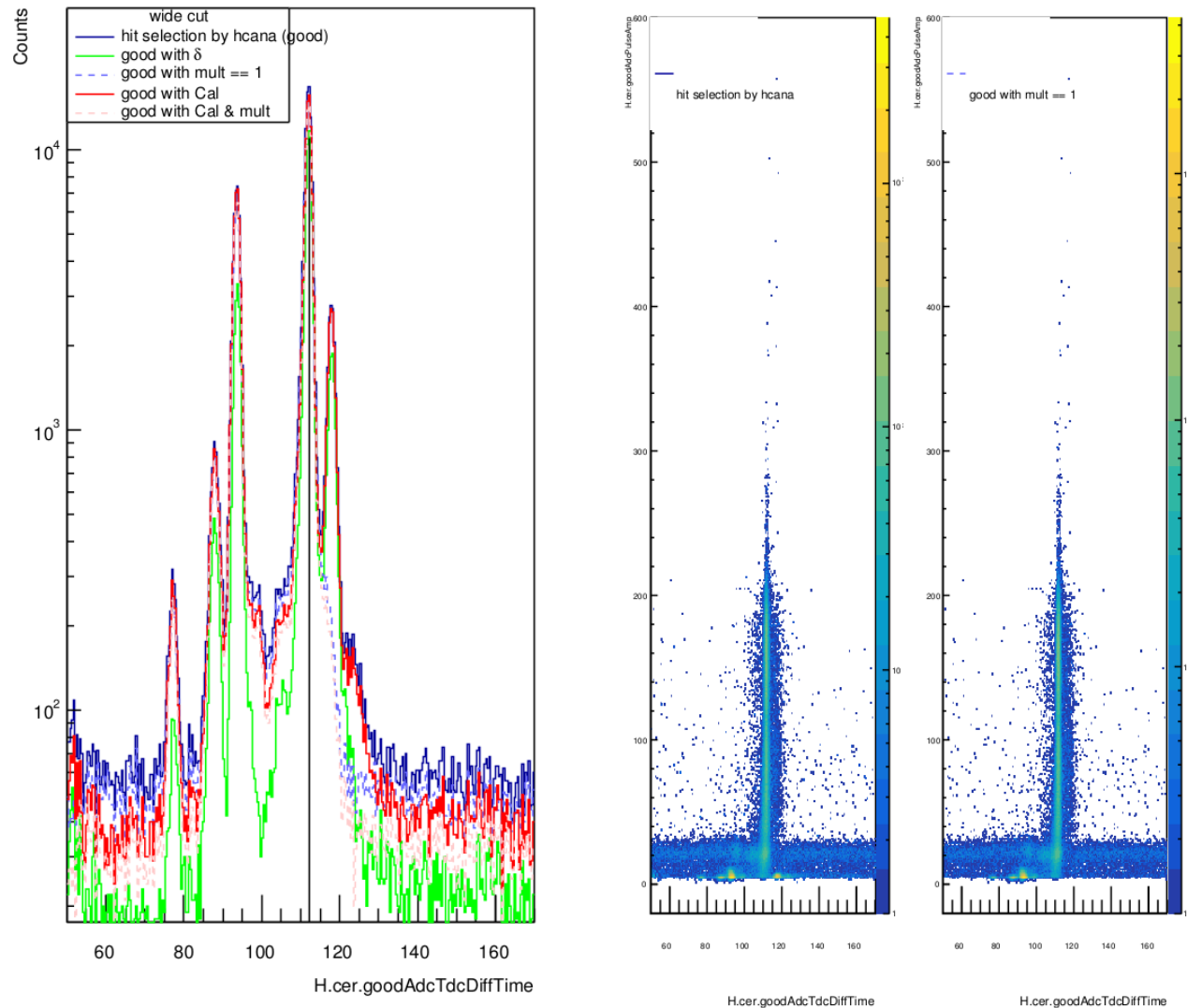
Timing Window for HMS and SHMS Detectors

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HMS GAS Cherenkov : Good ADC TDC Time Difference Hit Selection (CSV Run 6263)

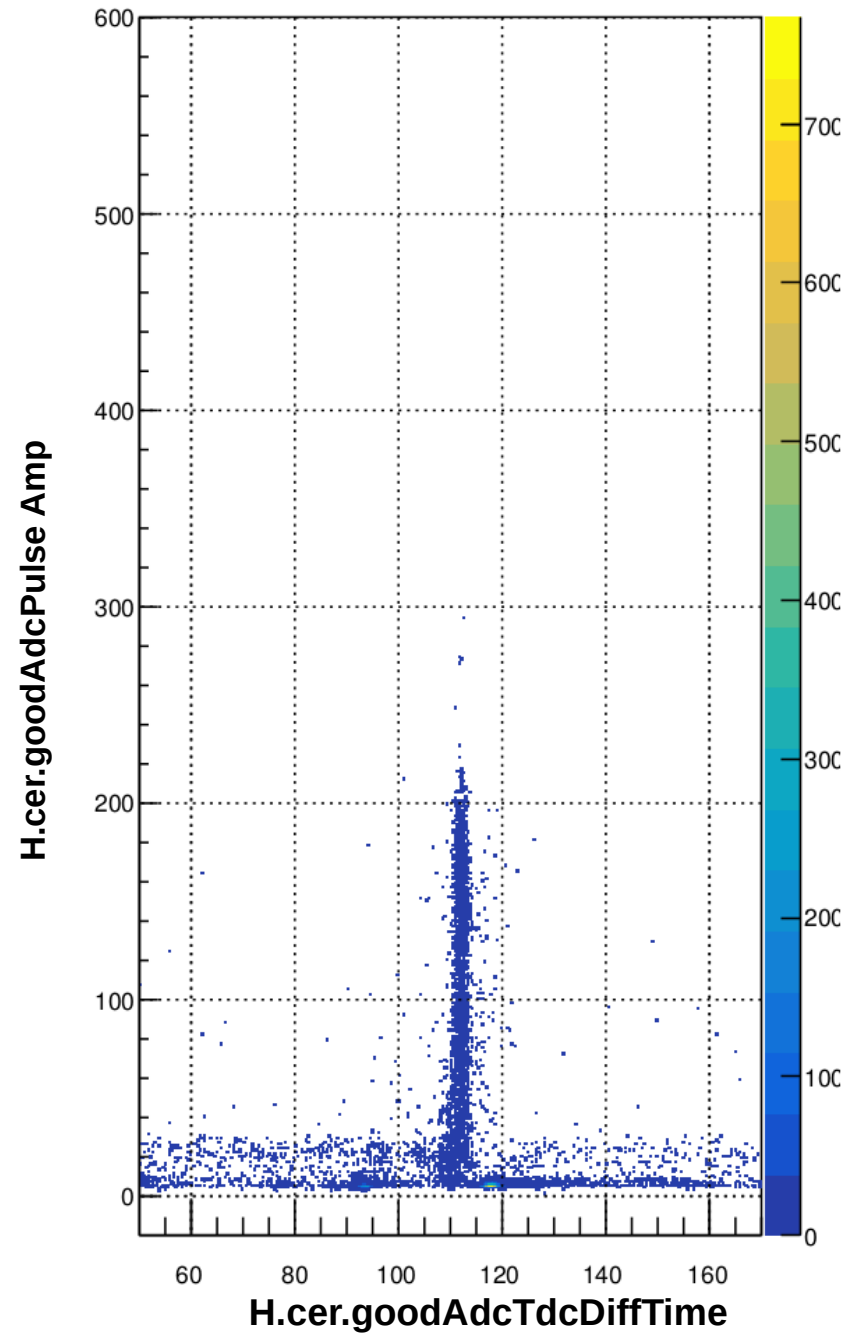
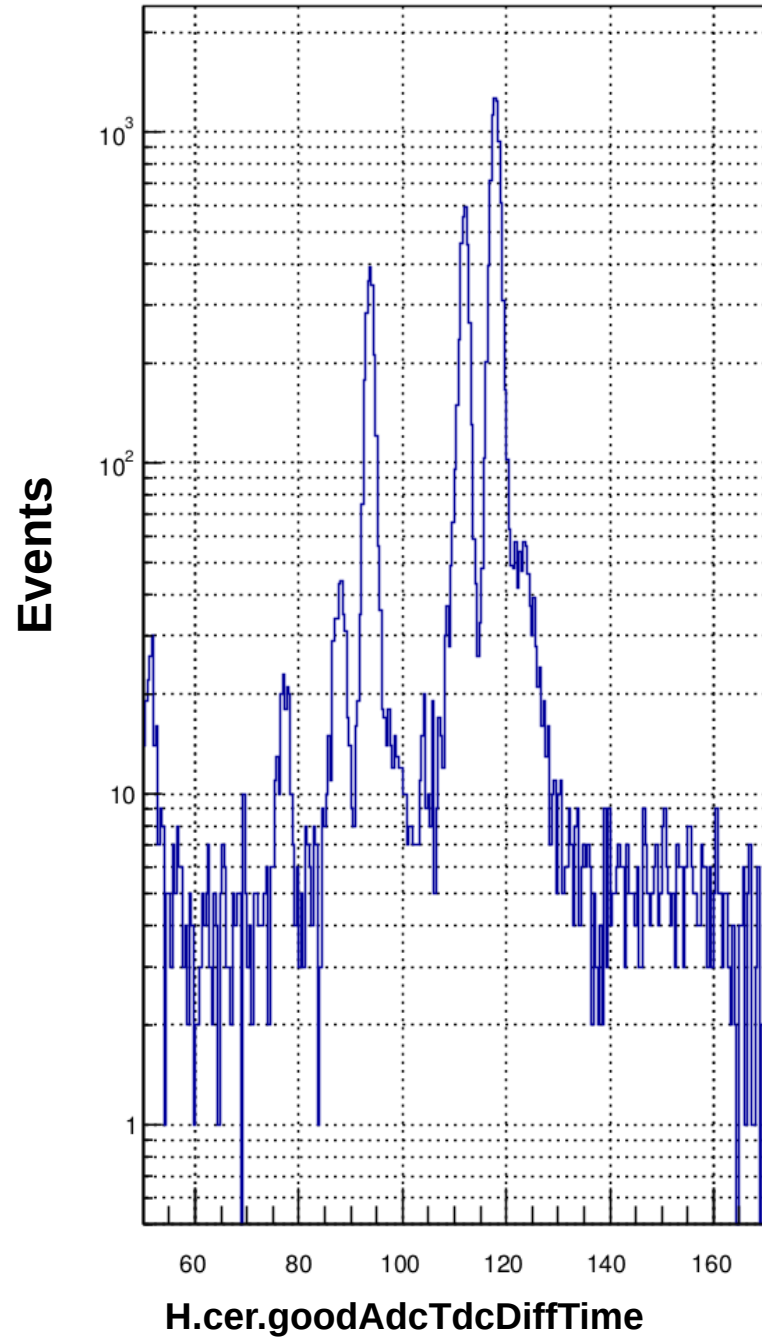
PMT 1 Old HCANA (from Abishek)

If we applied a multiplicity cut $\neq 1$ (Dotted Blue) if we are still seeing those little peaks, this means that the events in these peaks are not from multiple hits (i.e. events are from the same hit).

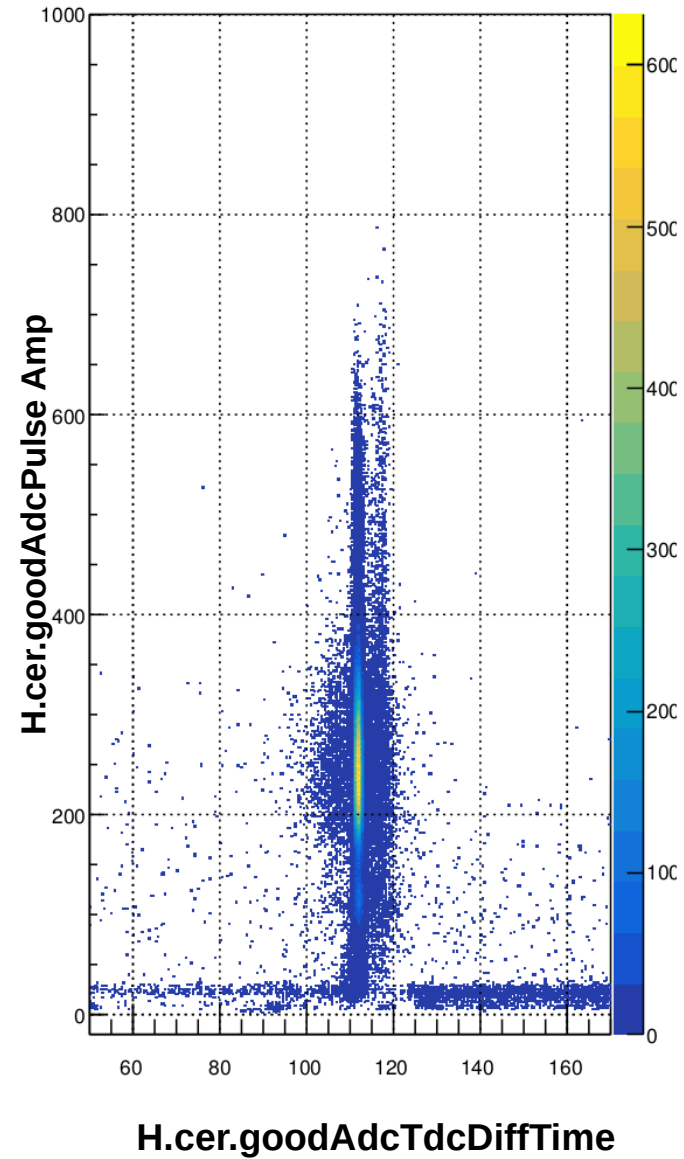
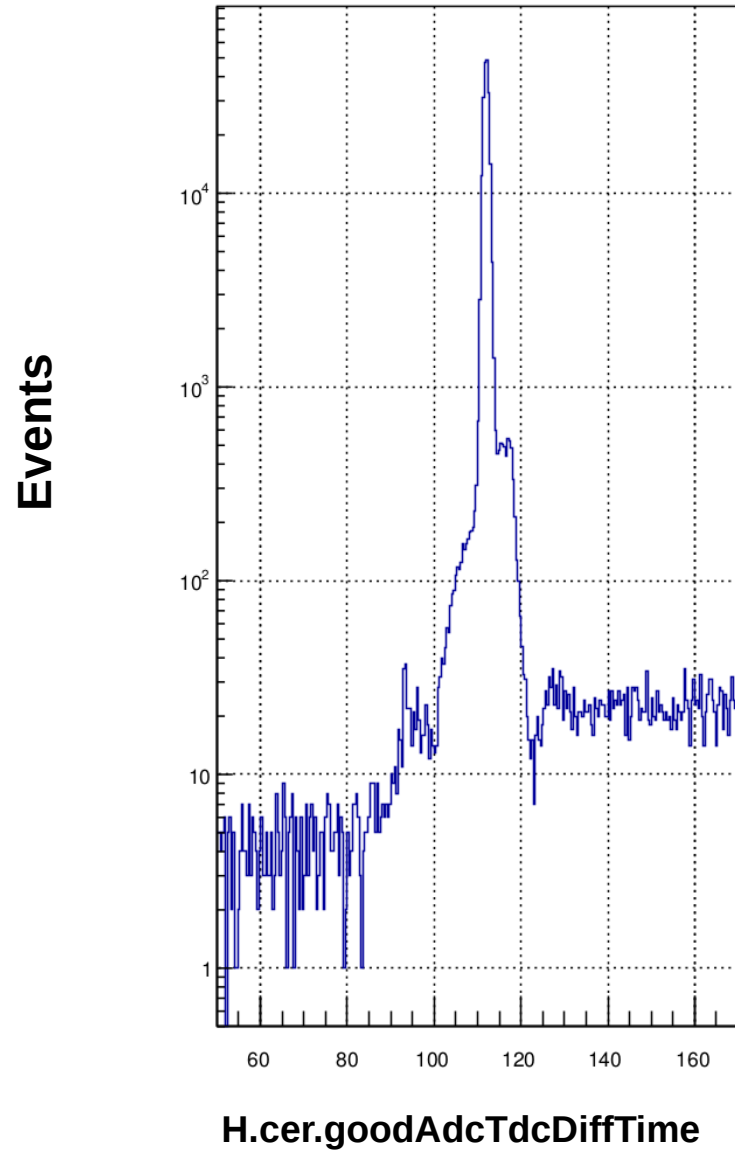


If multiplicity $\neq 1$ excluded this little peak, then the events in this peak are from multiple hits.

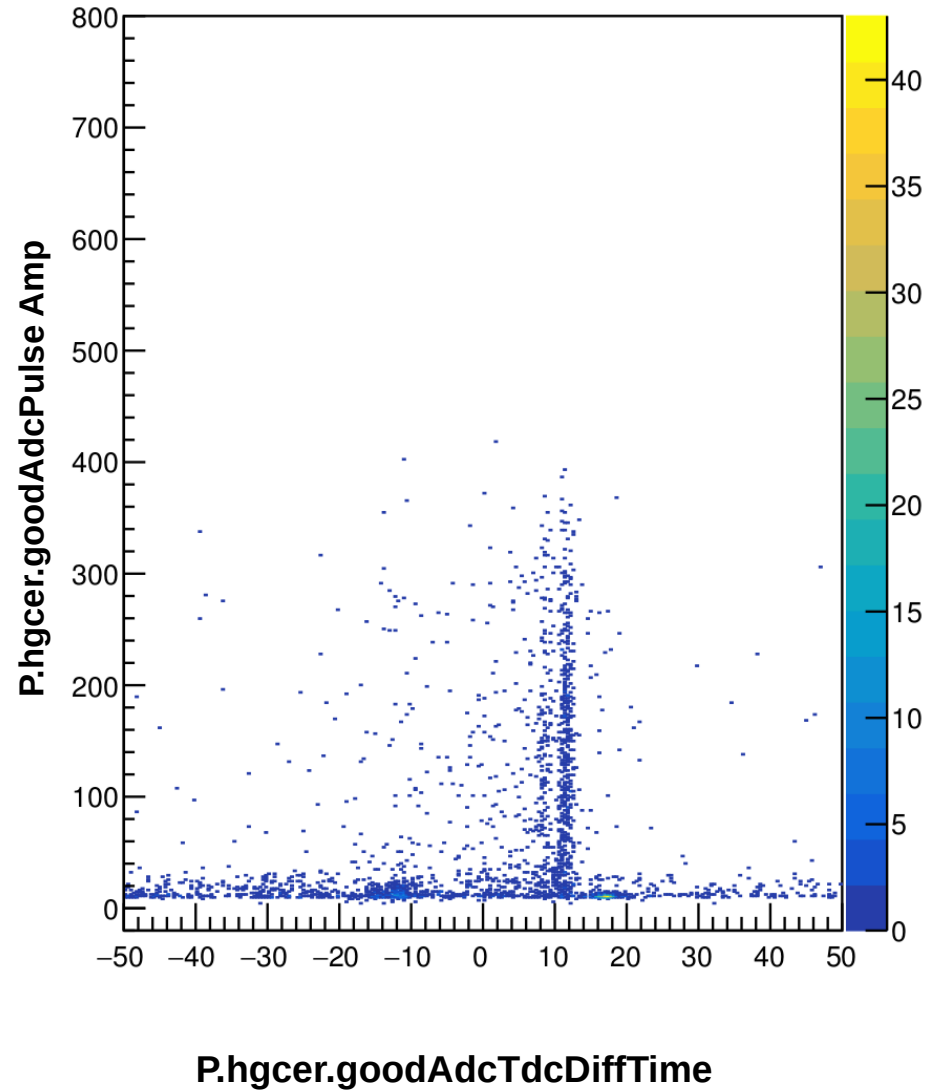
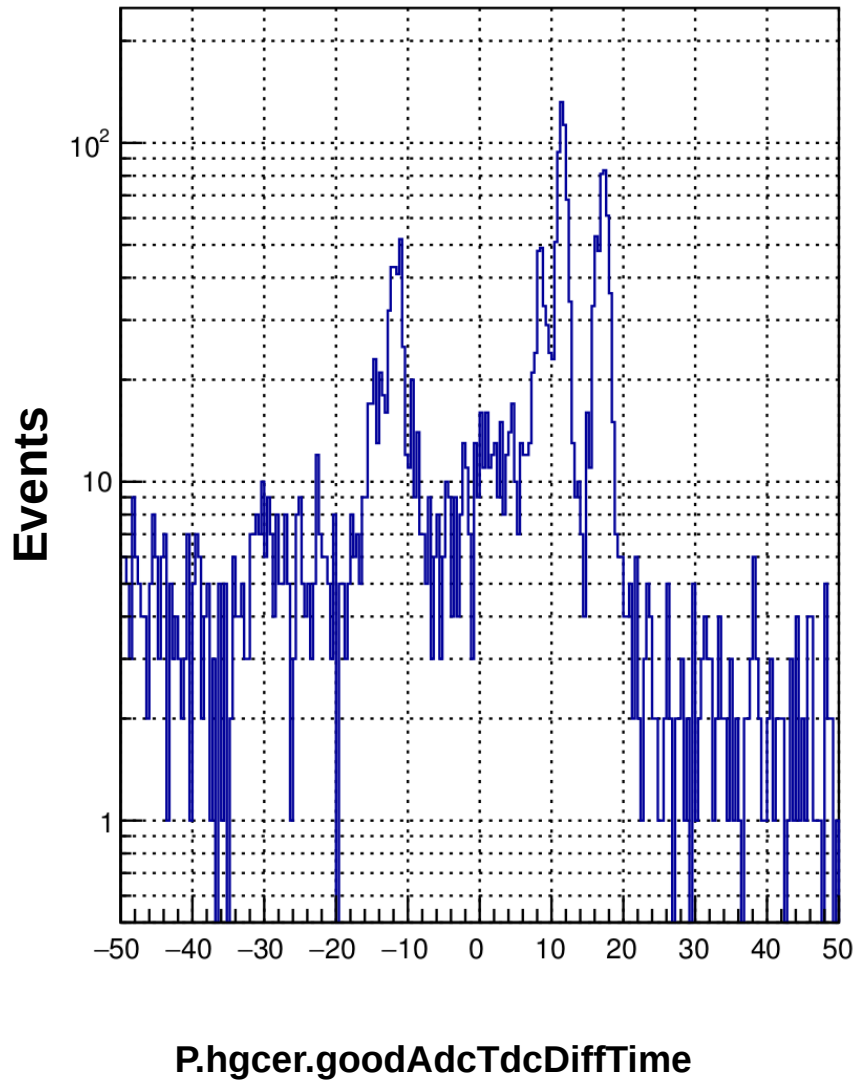
HMS CER PMT 1 Old HCANA with Multiplicity ≥ 2



HMS CER PMT 1 New HCANA with Multiplicity ≥ 2



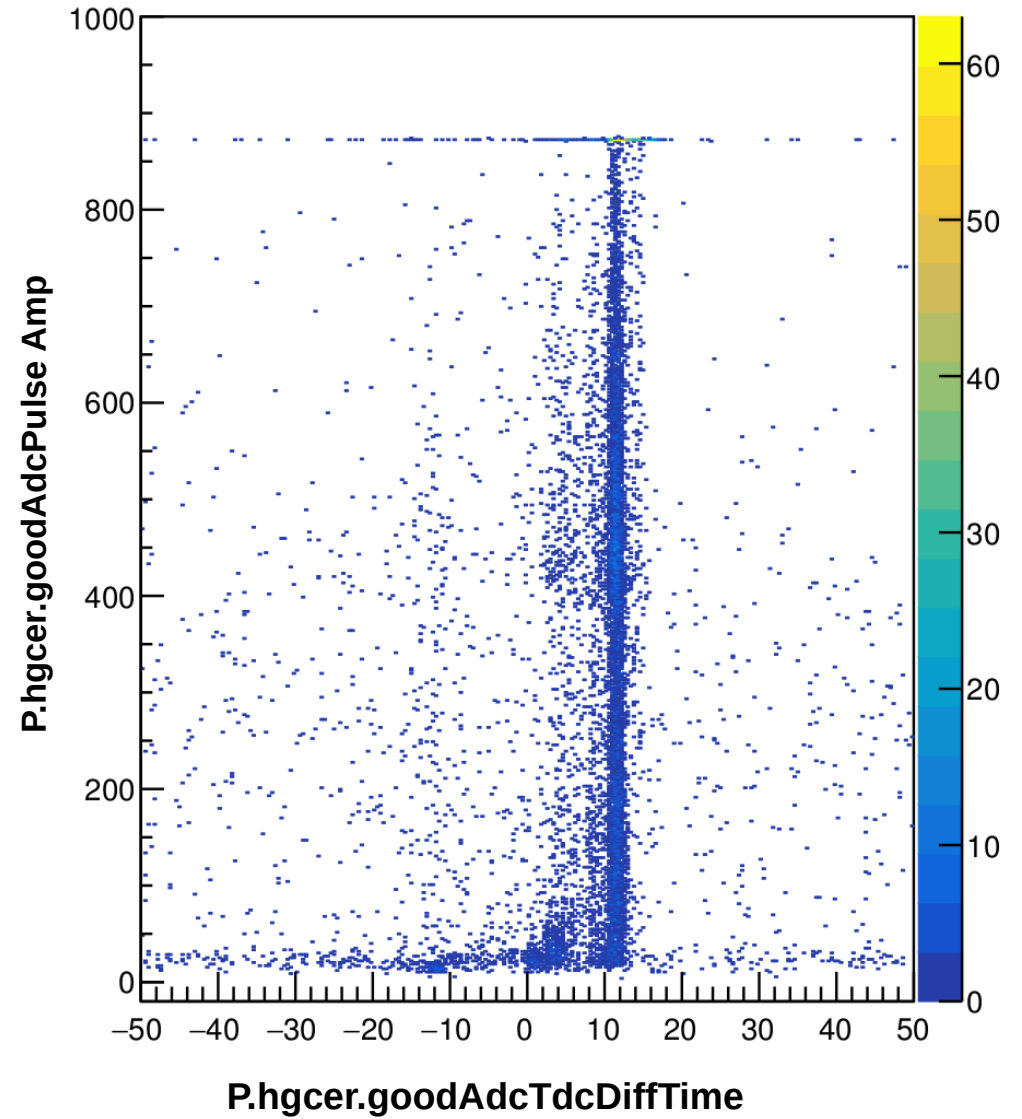
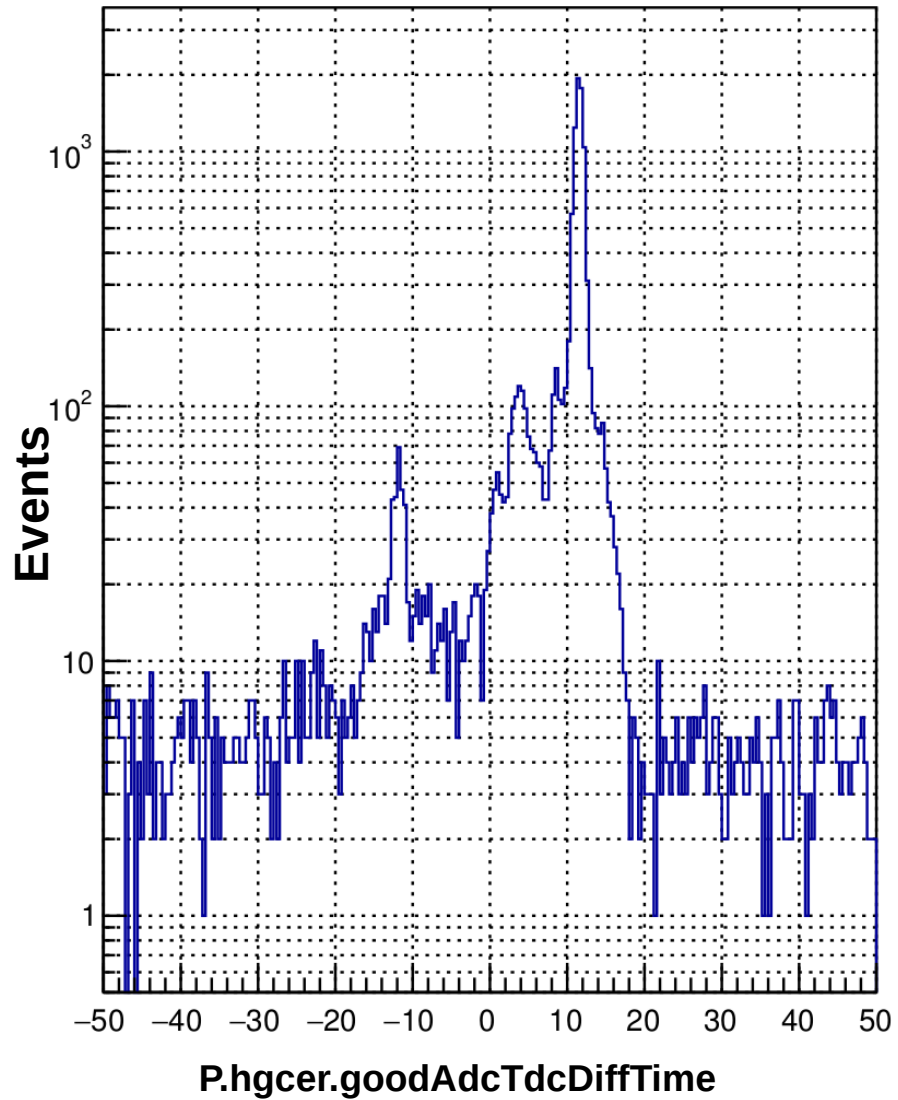
HGCER PMT 1 Old HCANA, Multiplicity ≥ 2



For Example,

Event	Total hits	TDC1(ns)	TDC2(ns)	TDC3(ns)	OLD Hcana (ns)	NEW HCANA
1 amp	3	-10 55	11 300	15 250	15	11
2 amp	2	-20 60	- -	11 310	11	11
3 amp	3	-15 57	11 305	17 257	17	11

HGCER PMT 1 NEW HCANA, Multiplicity ≥ 2



Summary

- As we observed many satellite peaks on either side of a good adc tdc time difference within a specific time window, we tried to understand whether they are real signals. We plotted the pulse amplitude vs pulse time. It is observed that for most of those little peaks there is almost negligible amplitude.
- We applied the multiplicity cut $=1$ to see if these multiple timing peak events are hits from same event or not.
- with multiplicity cut ≥ 2 , we saw multiple peaks, which suggests that these hits are coming from same event.
- Now, it is clear that we have events which has more than two hits, however the old version of HCANA used to pick the last hit within the time window.
- Now, Mark fixed the HCANA so that the hits which has maximum amplitude within the selected time window is picked.
- Mark is going to apply this method for other detectors as well.