



Time Window Script Updates

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22/10/19

Analysis Meeting Update

- Analysis meeting on 10/10/19 very useful, updates from Mark, Pete and Simona
- Extra peaks in HGC timing spectra look to be from crosstalk
- Ghost band - due to ADC screw up, mishandling some signals
- Signals it screws up easy to identify though, they have that the ref time pulse amplitude is 0
- Used this info in time window script
- This is not a long term fix though!

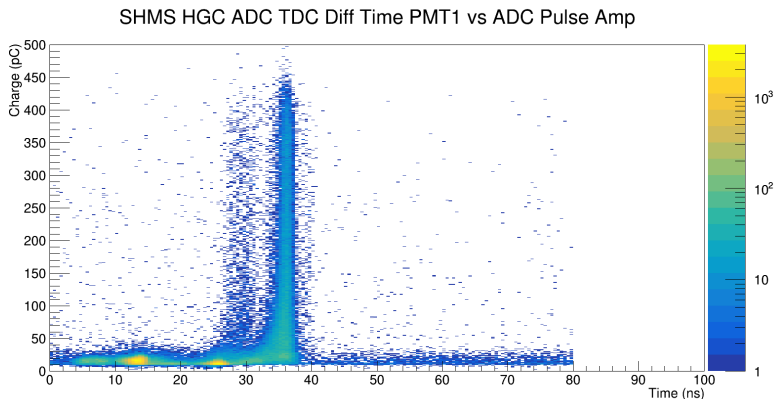
New Cuts

```
if(*T coin pFADC TREF ROC2 adcPulseAmpRaw > 0){  
    for (Int_t ipmt = 0; ipmt < 4; ipmt++){  
        if(P hgcer goodAdcMult[ipmt] == 1){
```

The cut applied on the SHMS ADC reference time amplitude. This is done before **any** further event selection and histogram filling for the SHMS.

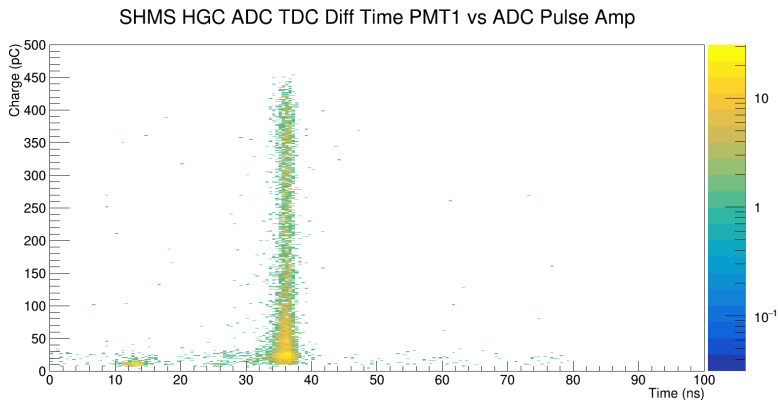
- Apply a cut as shown on the relevant ADC reference time amplitude
- For the HGC, also apply a requirement that only the PMT being examined sees a hit

SHMS HGC - Before Cuts



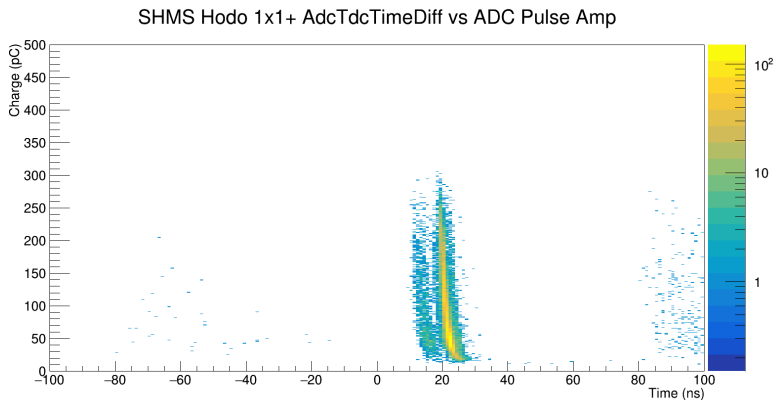
The HGC timing versus pulse amp spectrum before implementing the new cuts.

SHMS HGC - After Cuts



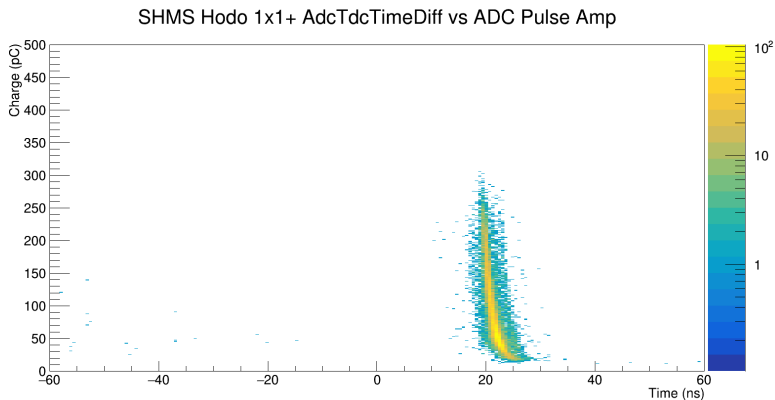
The HGC timing versus pulse amp spectrum after implementing the new cuts. Notice that there is still one “satellite” peak left however.

SHMS Hodo - Before Cuts



The SHMS hodoscope timing versus pulse amp spectrum before implementing the new cuts.

SHMS Hodo - After Cuts



The SHMS hodoscope timing versus pulse amp spectrum after implementing the new cuts.

Script Update

- So new cuts clean up spectra significantly, can set timing windows easily now
- Note, cuts are only applied to select the timing windows
- Also, the events in the “ghost” band are clearly potentially good events, hcana will need to be updated to handle these correctly
- For now though, can cut them out to set windows
- Also, band was never present or an issue in the Drift Chambers - they rely on TDCs only
- So can probably proceed with DC calibrations
- Script outputs windows it determines to .param files, can copy paste the lines into the relevant .param files elsewhere

Param File Output

```
[sjdkay@lark SHMS]$ pwd
/home/sjdkay/work/JLab/hallc_replay_lt/CALIBRATION/ref_times/SHMS
[sjdkay@lark SHMS]$ cd HGC/
/home/sjdkay/work/JLab/hallc_replay/CALIBRATION/ref_times/SHMS/HGC
[sjdkay@lark HGC]$ ls
total 8.0K
-rw-r--r--. 1 sjdkay sjdkay 176 Oct 18 13:53 phgcer_twin_6619.param
-rw-r--r--. 1 sjdkay sjdkay 176 Oct 18 13:54 phgcer_twin_8456.param
[sjdkay@lark HGC]$ more ph
phgcer_twin_6619.param  phgcer_twin_8456.param
[sjdkay@lark HGC]$ more phgcer_twin_8456.param
; SHMS Heavy Gas Cer Parameter File Containing TimeWindow Min/Max Cuts

phgcer_adcTimeWindowMin = 33.2, 31.5, 32.4, 32.6
phgcer_adcTimeWindowMax = 41.5, 41.7, 38.3, 38.7
[sjdkay@lark HGC]$
```

The location of the output files and an example of the windows determined for the HGC.

Next Steps

- Determine some detector time windows for each run period
- Two per period? Early/late?
- Can proceed with DC calibrations after that
- Should hold off on other detectors until ghost band events properly dealt with
- However, could see if adding this cut on the ADC reference time amplitude helps the Hodoscope calibration for the SHMS.