PMT Afterpulses

Daniel, Dawei,Qing, Wei

How to Pick out Afterpulses?

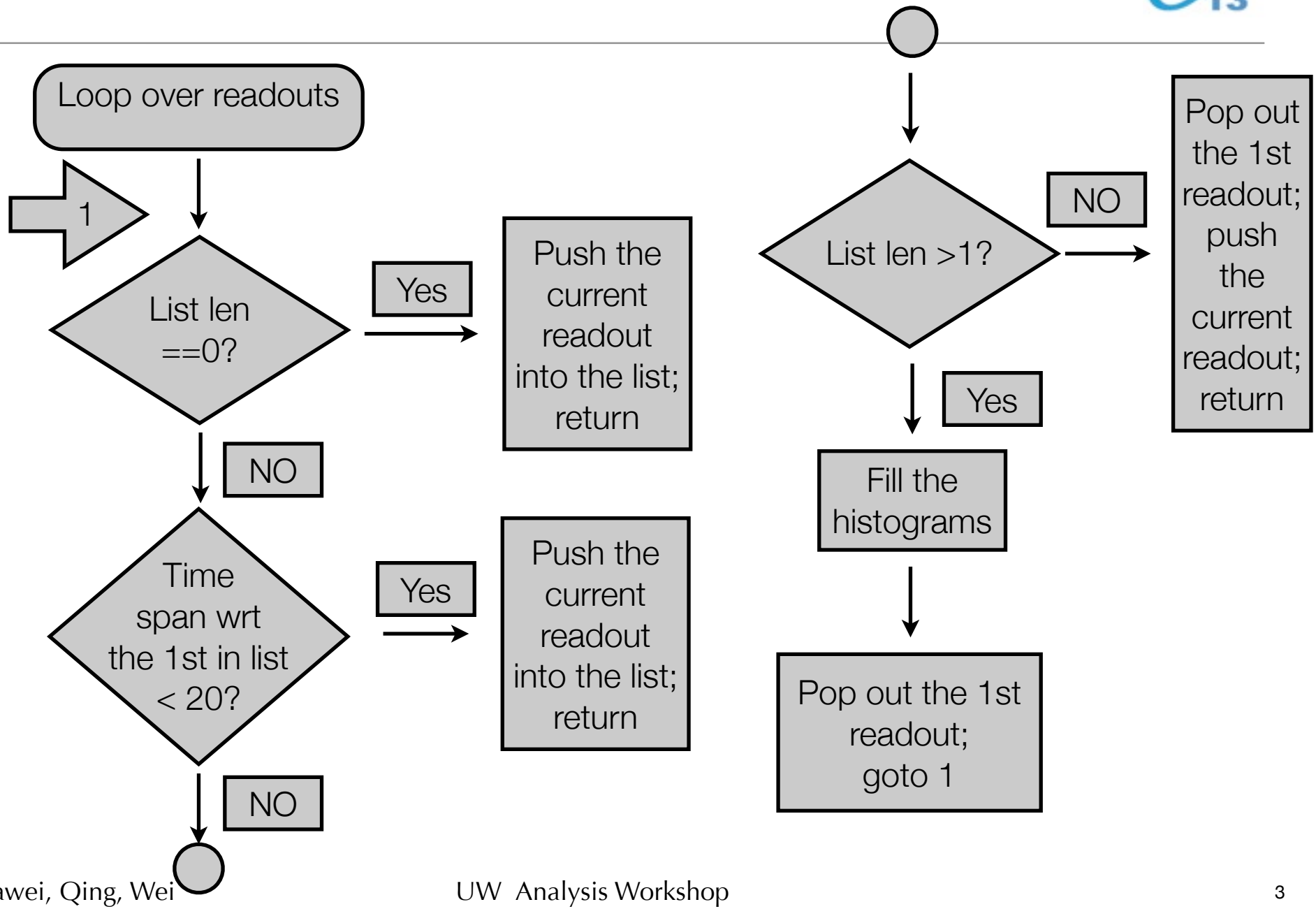
- The time between afterpulse and its primary pulse is of ~10μs
- We slide a time window of 20μs along all the readouts. We call this collection readouts a "cluster"
  - Since they are within 20μs, the later readouts are probably the afterpulses of the first readout
  - For each hit PMT, we histrogram its charge and the hit time difference w.r.t its hit time in the first readout

★Problem: the first readout in this cluster is not guaranteed to be the primary pulse.

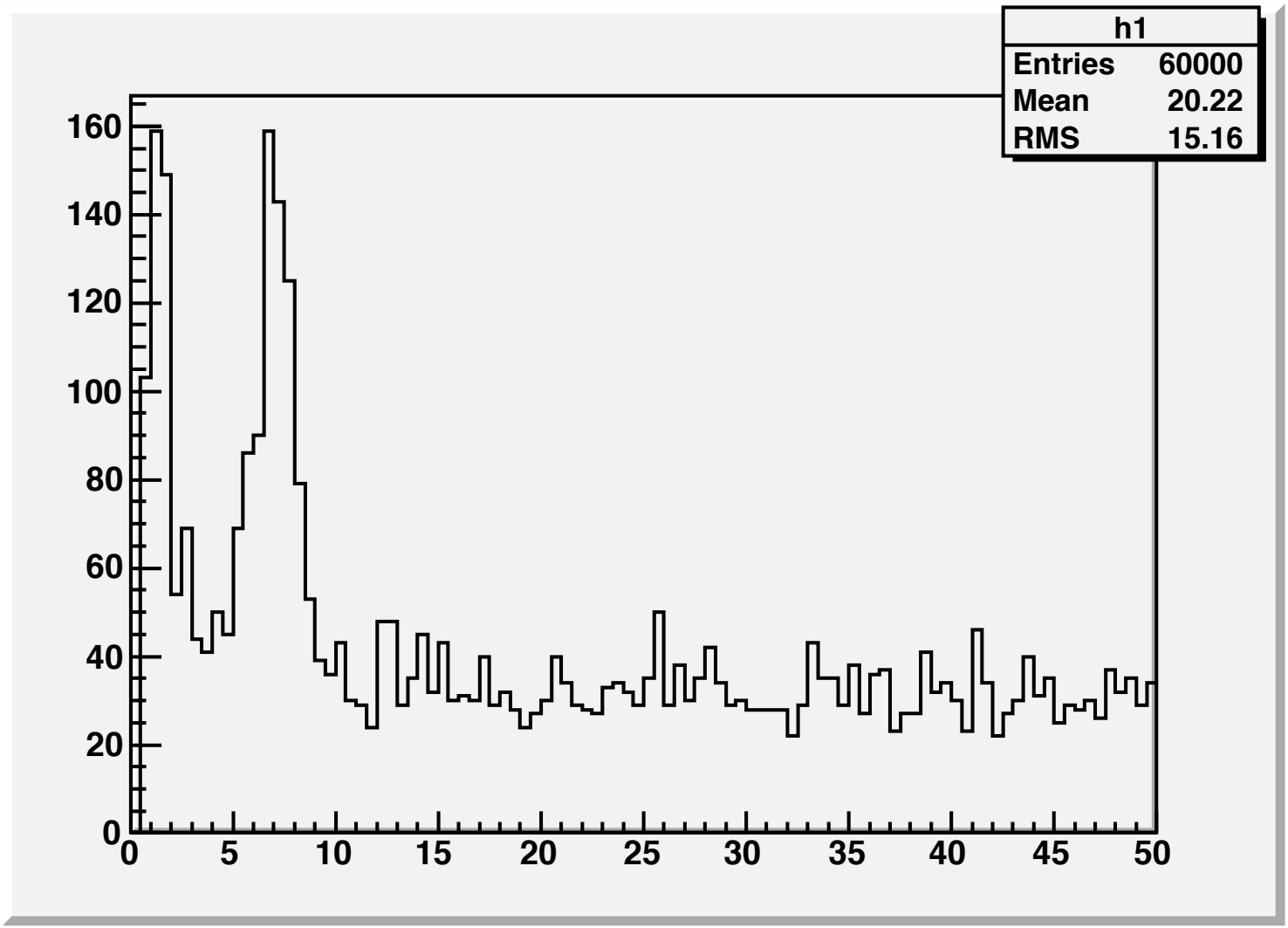
★However, if there is no time correlation with the first readout, the time difference distribution should be white noise.

✓After pulses should stand out in the time distribution

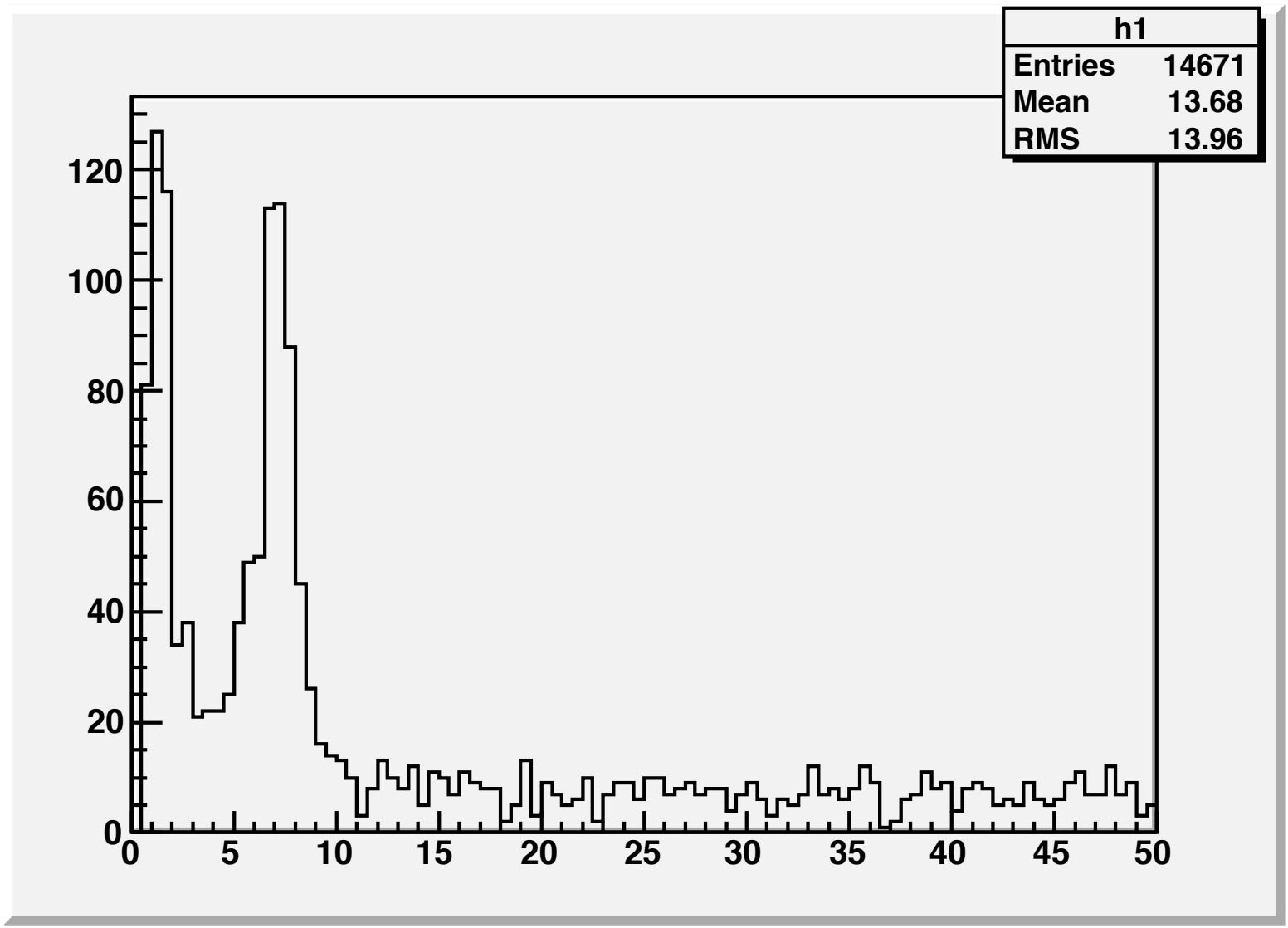
Flow Chart


Loop over readouts
1
List len ==0?
Yes
Push the current readout into the list; return
NO
Time span wrt the 1st in list < 20?
Yes
Push the current readout into the list; return
NO
List len >1?
NO
Pop out the 1st readout; push the current readout; return
Yes
Fill the histograms
Pop out the 1st readout; goto 1

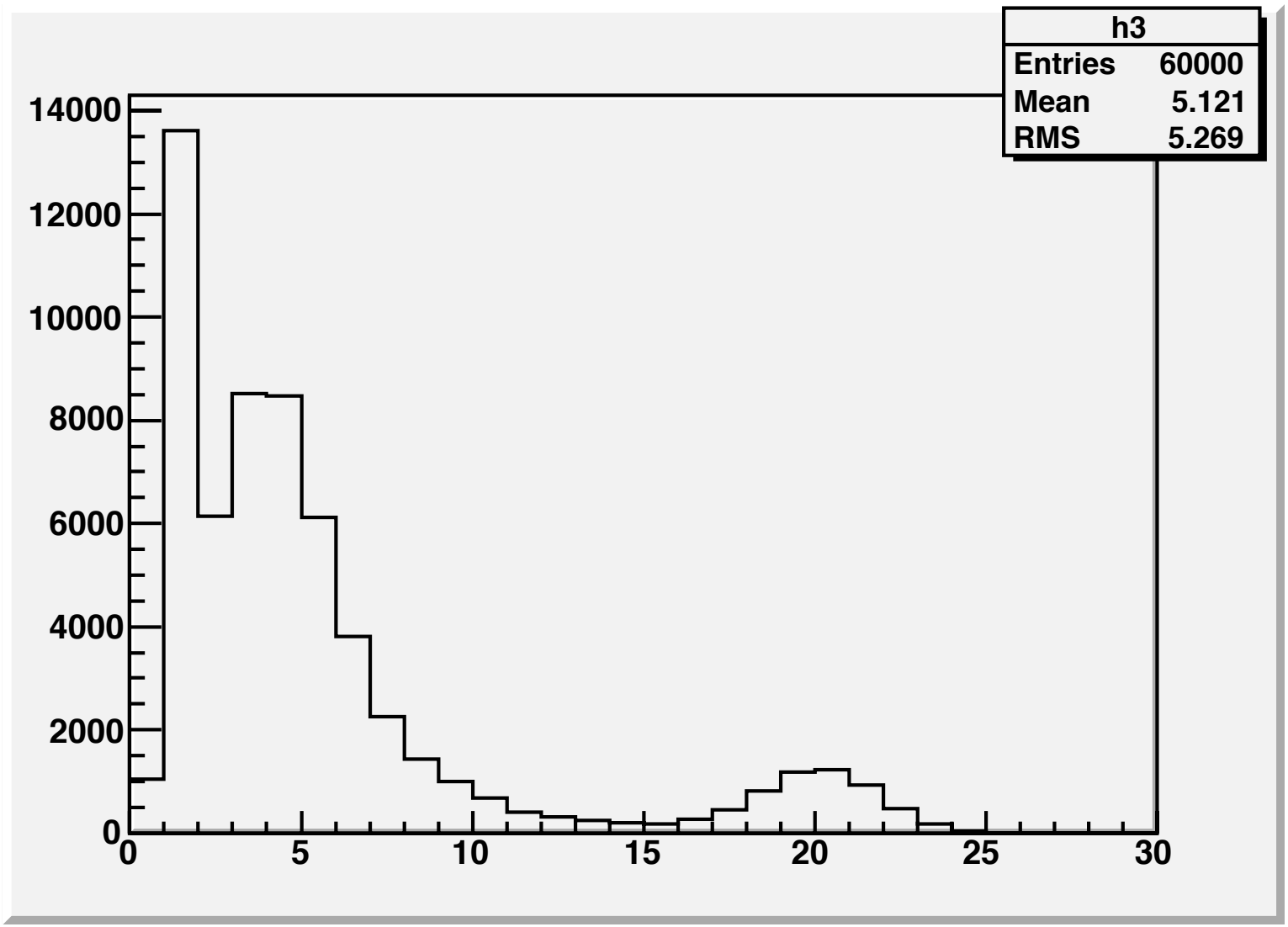
Time Difference before Cut (nPMT==1,delT<50us)



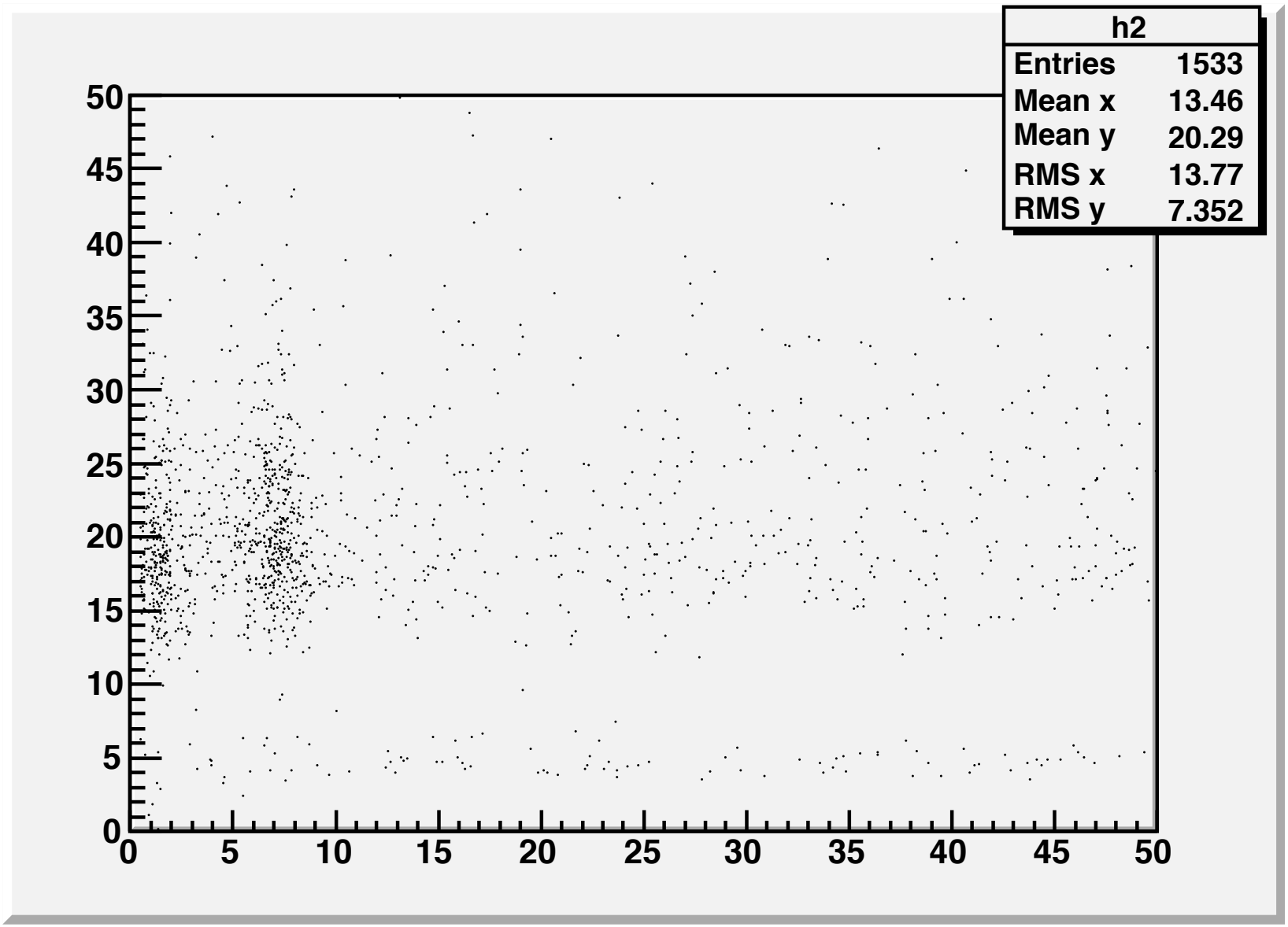
Time Difference Distribution



Number of Hits



Charge vs Time Difference



TDC vs Time Difference