

Quick ARA Clock Alignment Check

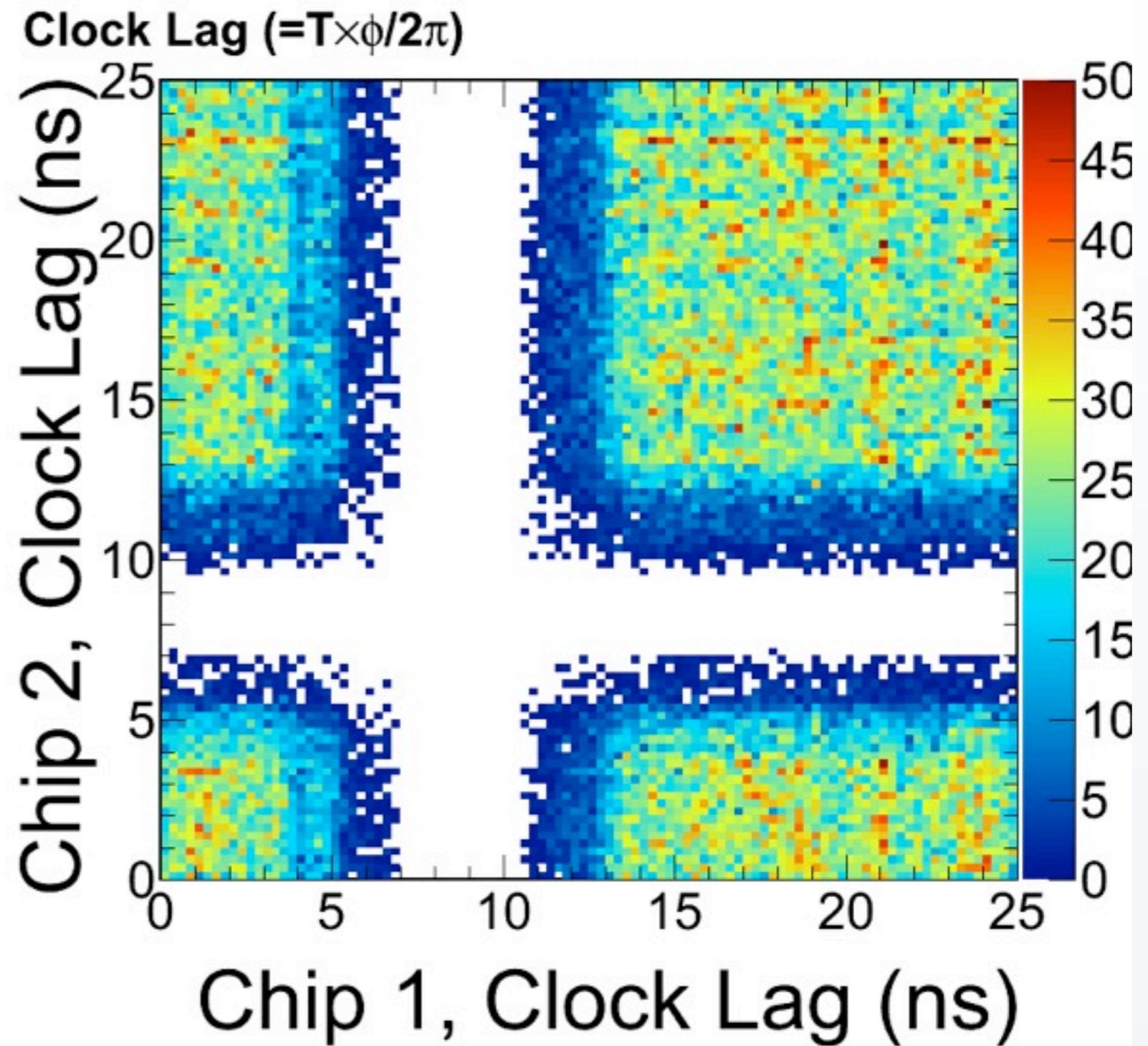
Ryan & Jonathan

Clock Alignment

- There have been questions raised over the performance of the clock alignment procedure
- The plots in the talk select calibration pulser events (using the rubidium clock and a cut on correlation) from runs 1000-1600.
- All plots are comparing only two lab chips (A & B or 1 & 2)

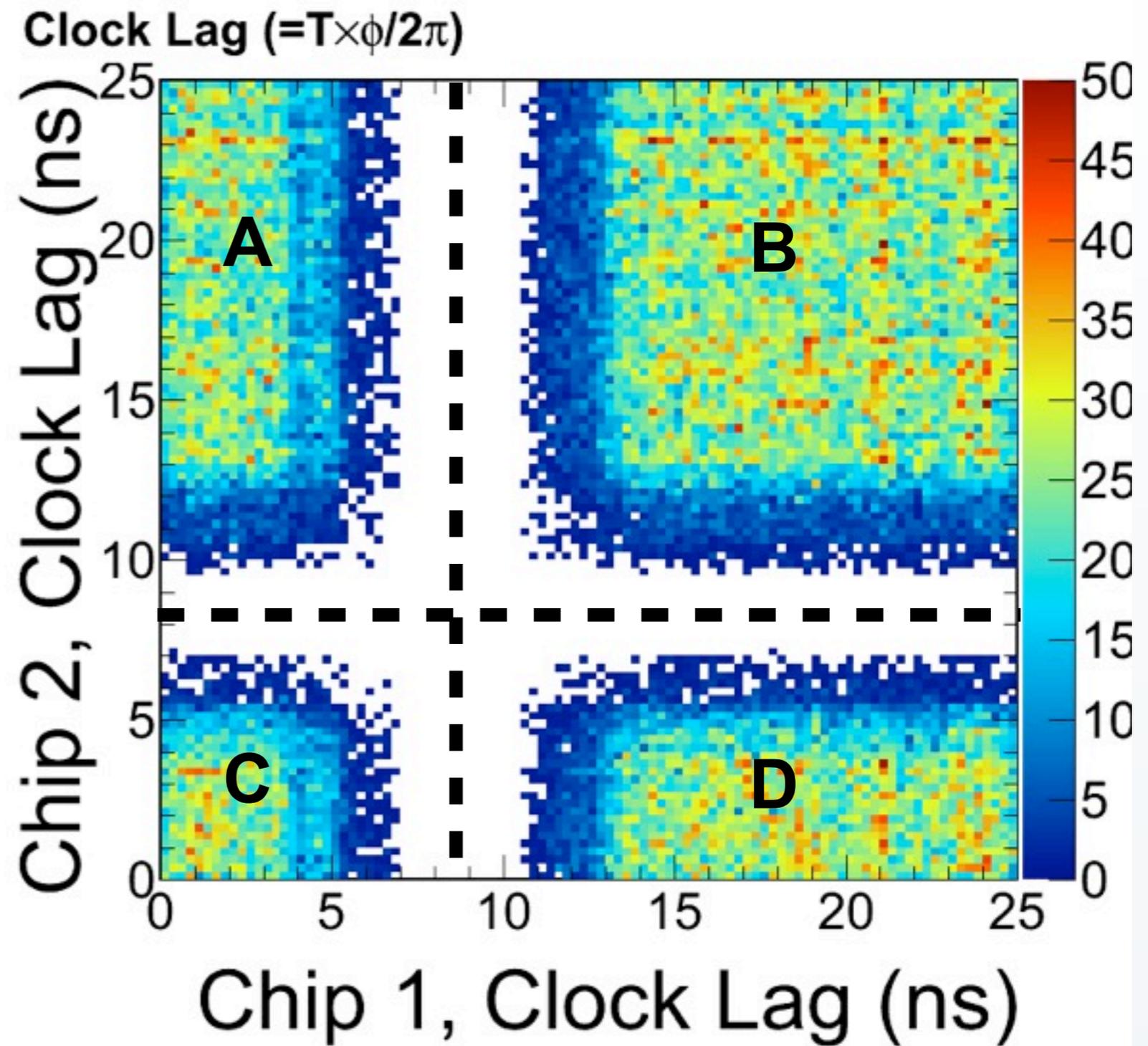
Crazy Flag Plot

- The phase of the clock relative to the first sample of the waveform is expressed as a lag between 0-25 ns
- There is very strange structure in the plot with unallowed values



Crazy Flag Plot

- However this structure allows the resolution of cycle ambiguity
- Assuming that the clock alignment should always be small (and is $\text{lag}_2 - \text{lag}_1$)
 - A need to add 25ns to chip 1
 - B&C are in the same cycle
 - D need to add 25ns to chip 2

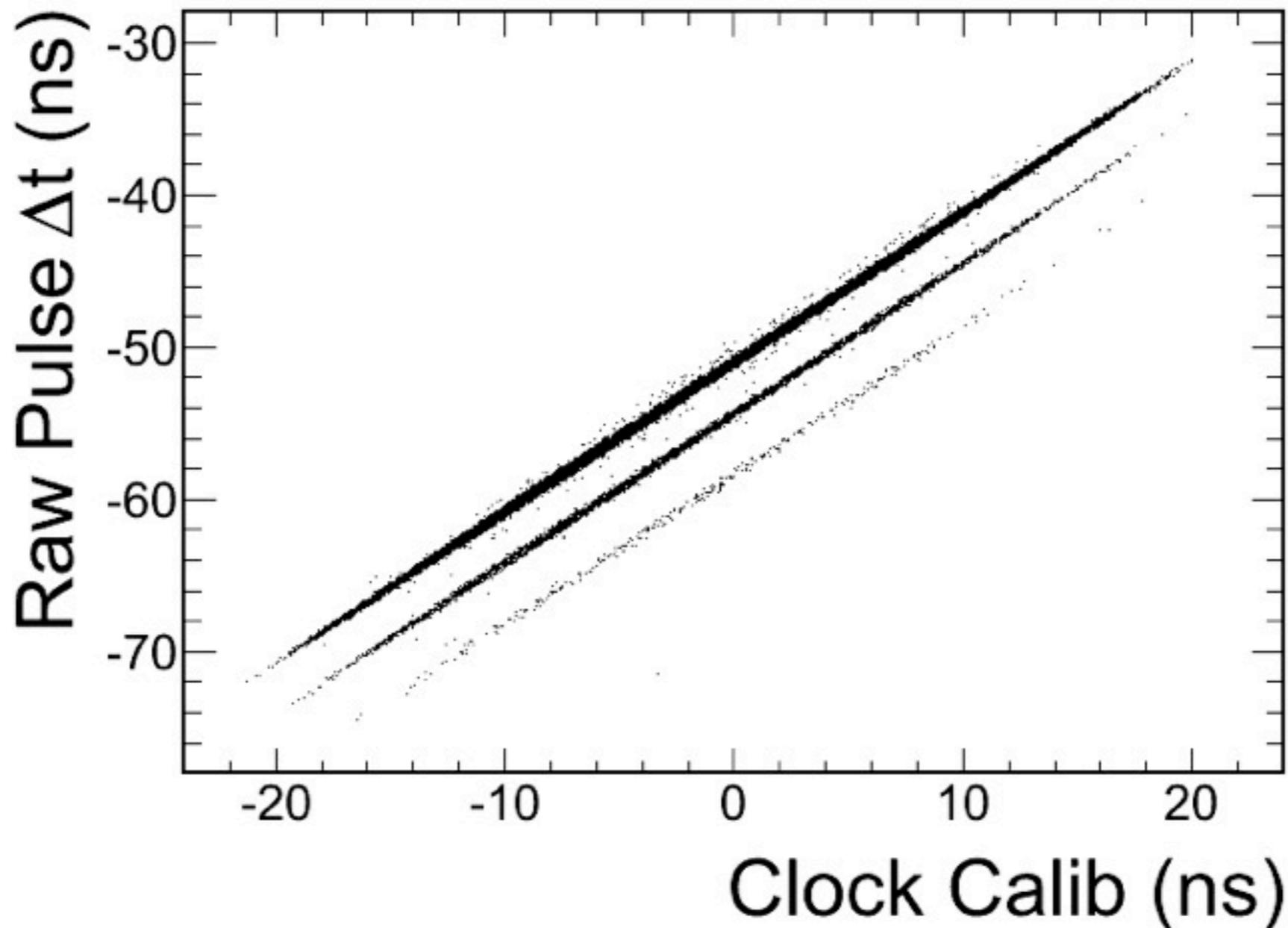


Does the alignment work?

- We can compare the clock alignment constants to the ΔT obtained from the peak of the correlation of pulser events (always the same two channels)

No 25ns ambiguity evident

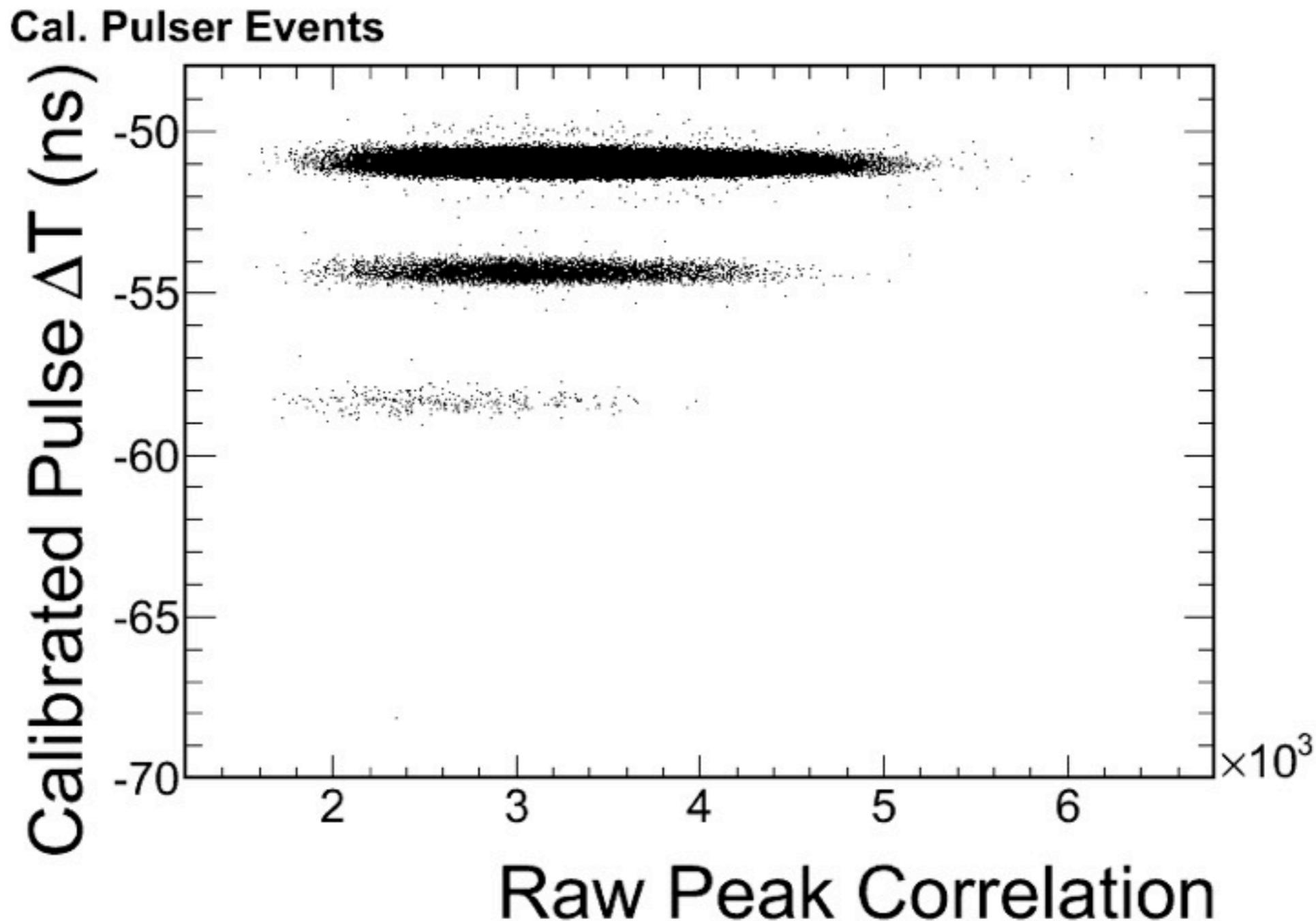
Cal. Pulser Events



There are bands separated by ~ 4 ns

The three bands?

- Do not know for sure, but my suspicion is bands come from events where the second or third cycle of the correlation fluctuated up... not sure why it is one way



Caveat

- All these plots were made with standalone test routines rather than the routines in AraEventCalibrator
 - Possible but unlikely that there was a transposition error in porting the algorithms from the standalone code to the framework