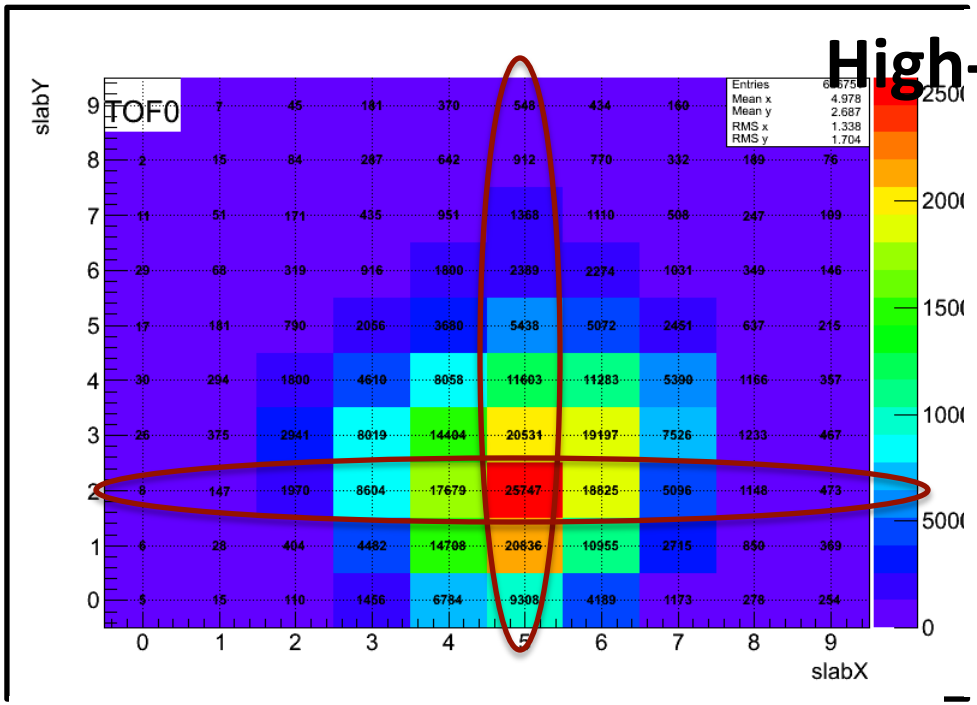
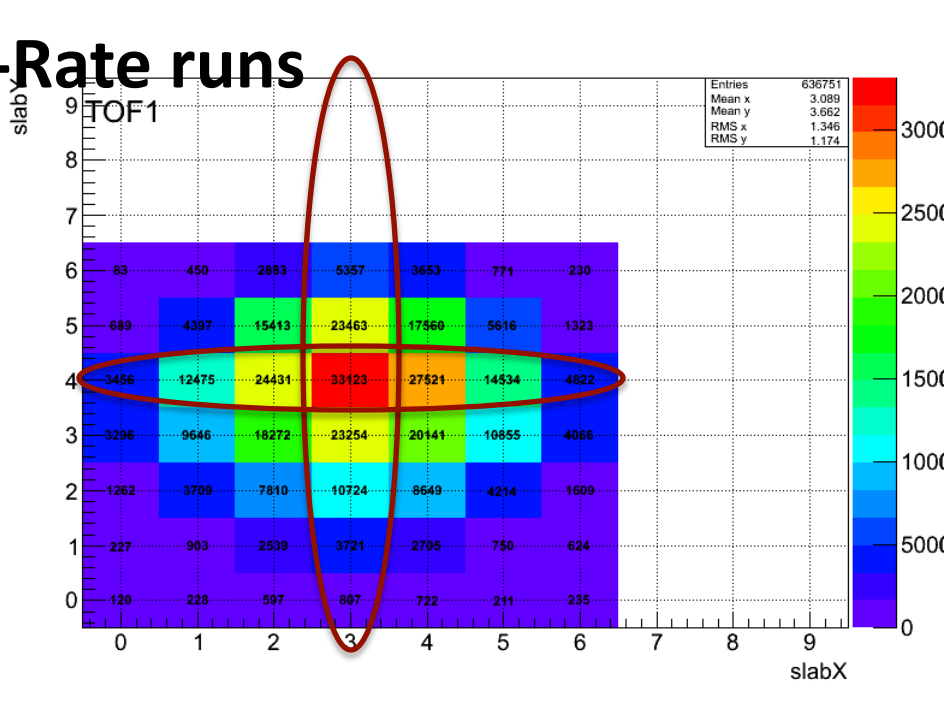
TOF rate effect update

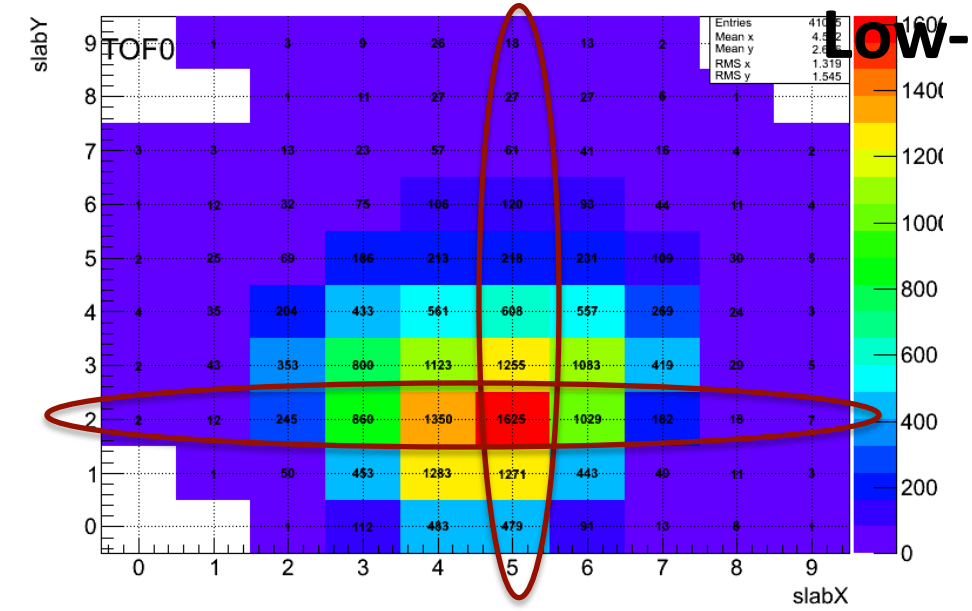
1. Look @ uncalibrated time
   - Uncalibrated times do not have any time-walk and trigger calibration corrections. Hence, there are no effects due to the shaper or the calibration procedure
   - Time between a single pixel in TOF0 and a pixel in TOF1
   - Time between a single slab in TOF0 and slab in TOF1
   - Compare the distributions for low-rate and high-rate runs
2. Look @ dependence on time-since-previous-hit

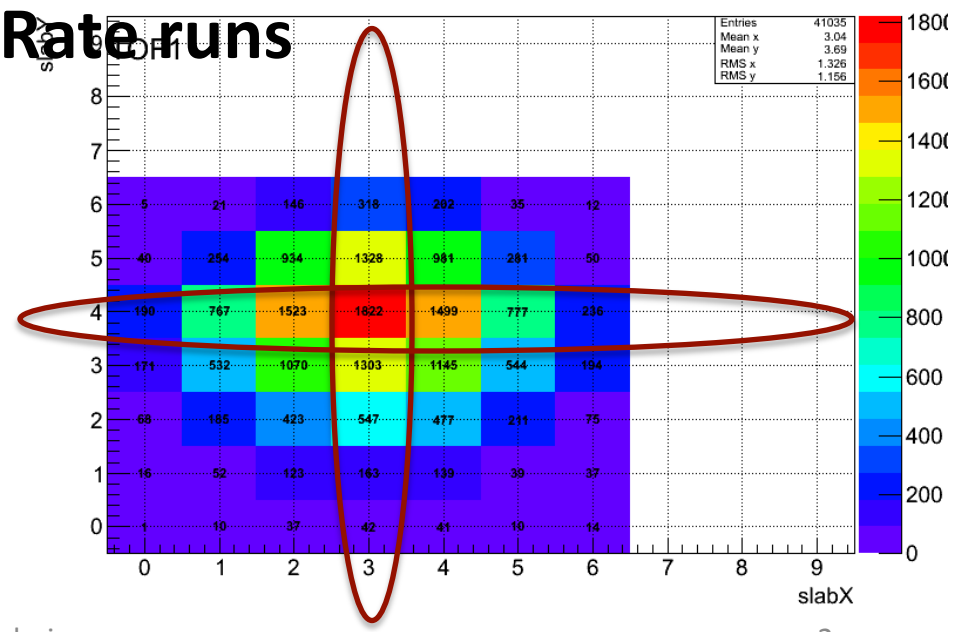
High-Rate runs



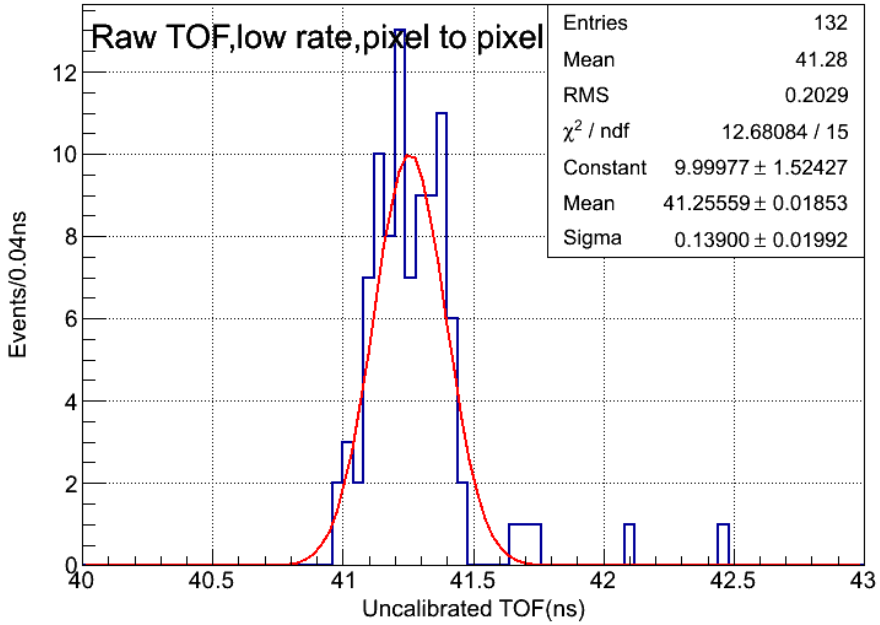


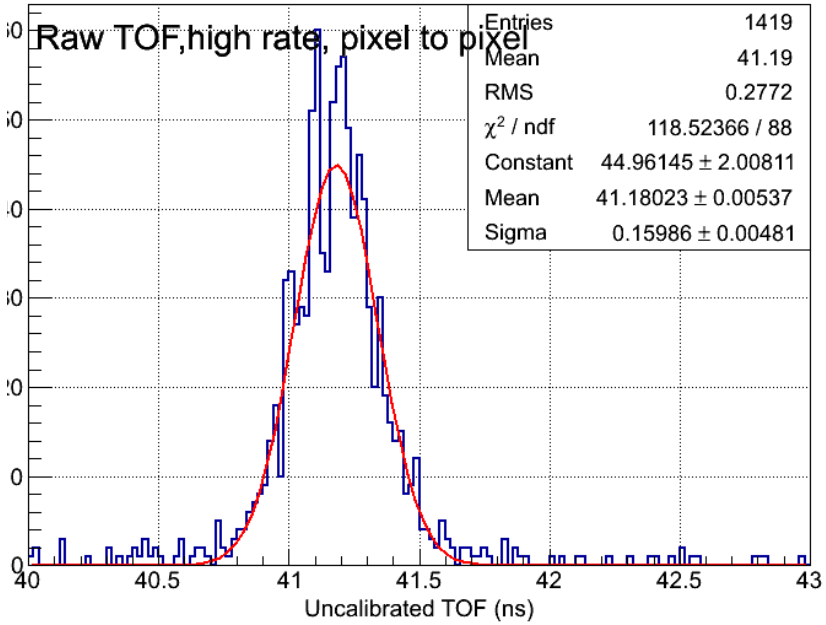
Low-Rate runs



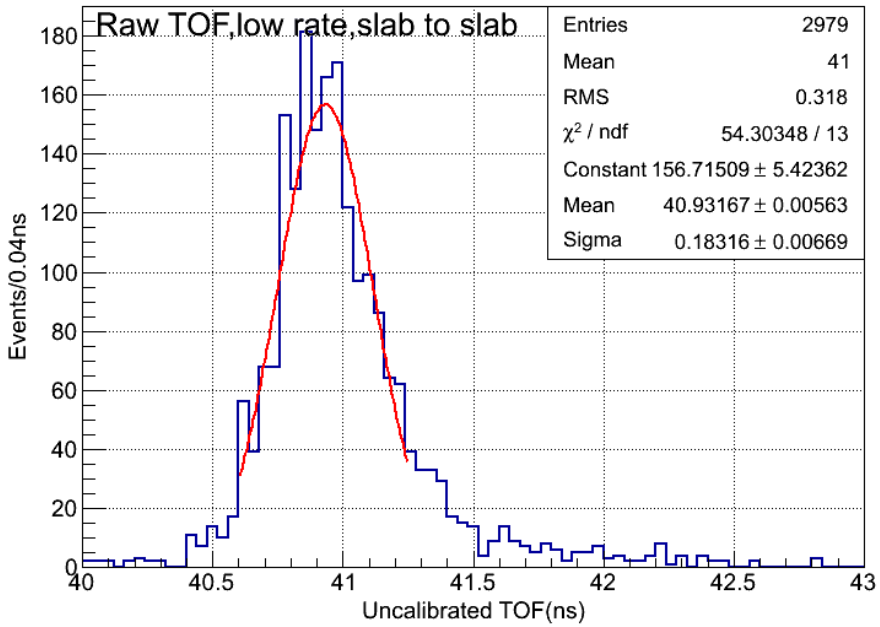


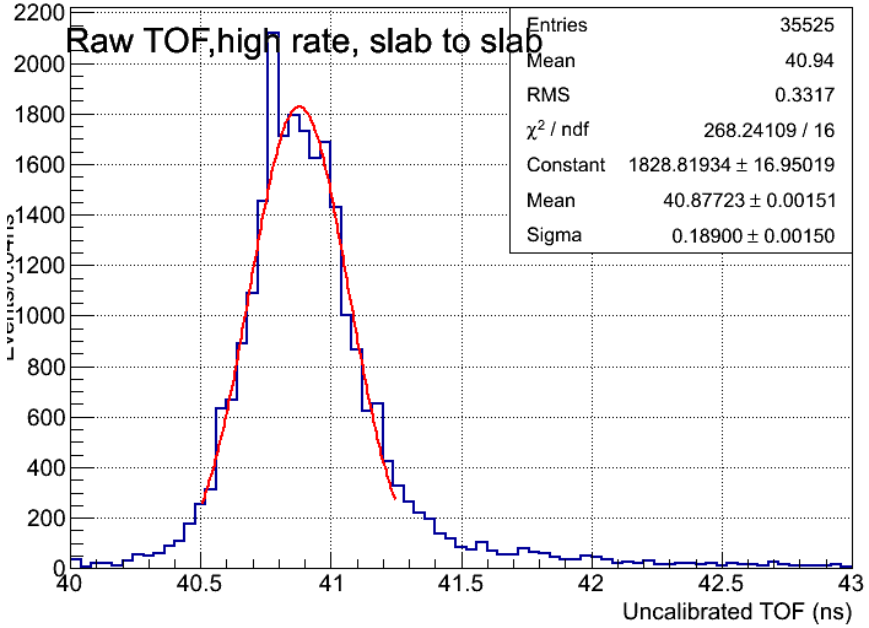
- Uncalibrated time pixel-to-pixel
  - Between a pixel (x=5,y=2) in TOF0 and a pixel (x=3,y=4) in TOF1
- A shift of ≈ 75 ps between low-rate (left) and high-rate (right) data



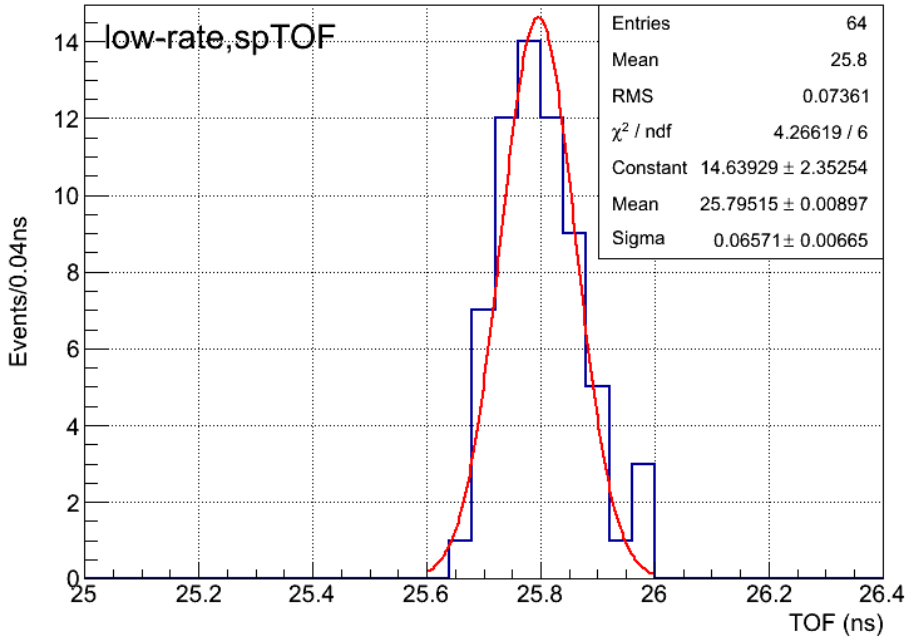


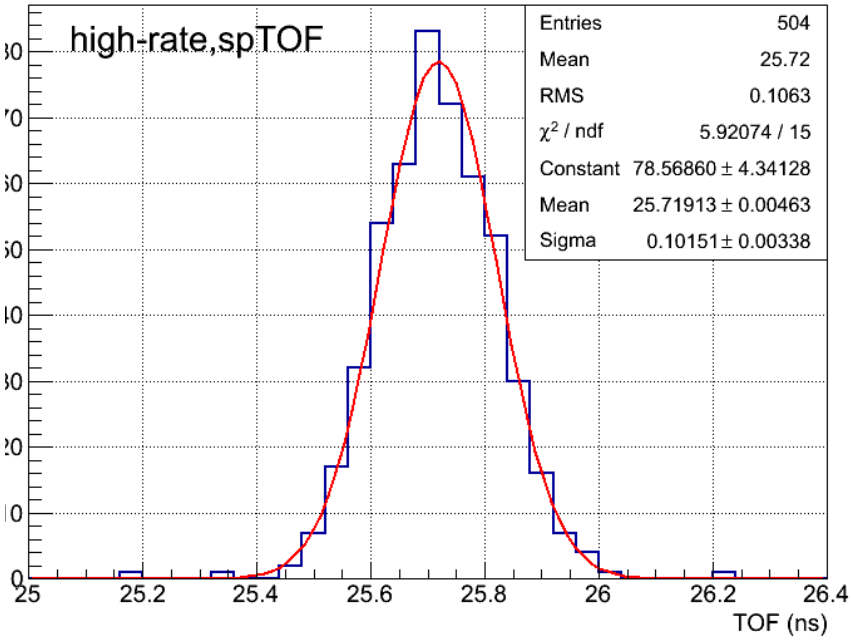
- Uncalibrated time slab-to-slab
  - between a slab (x=5) in TOF0 and a slab (x=3) in TOF1
- A shift of ≈ 55 ps between low- & high-rate data
- That the uncalibrated raw time shows a difference between low and high rate data seems to indicate the problem is at the PMT-level – rather than with the shaper (?)
  - It is possible there are other/further effects introduced by the shaper



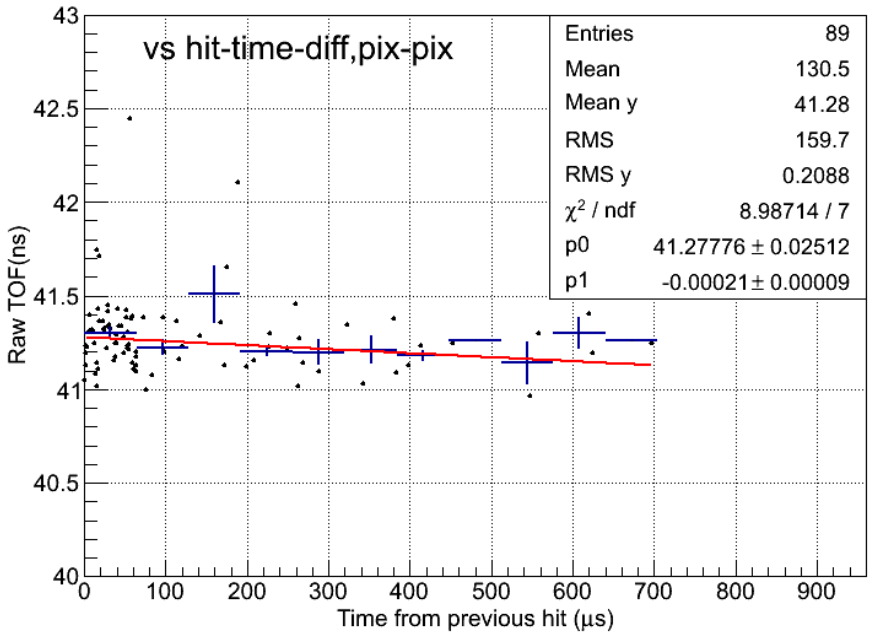


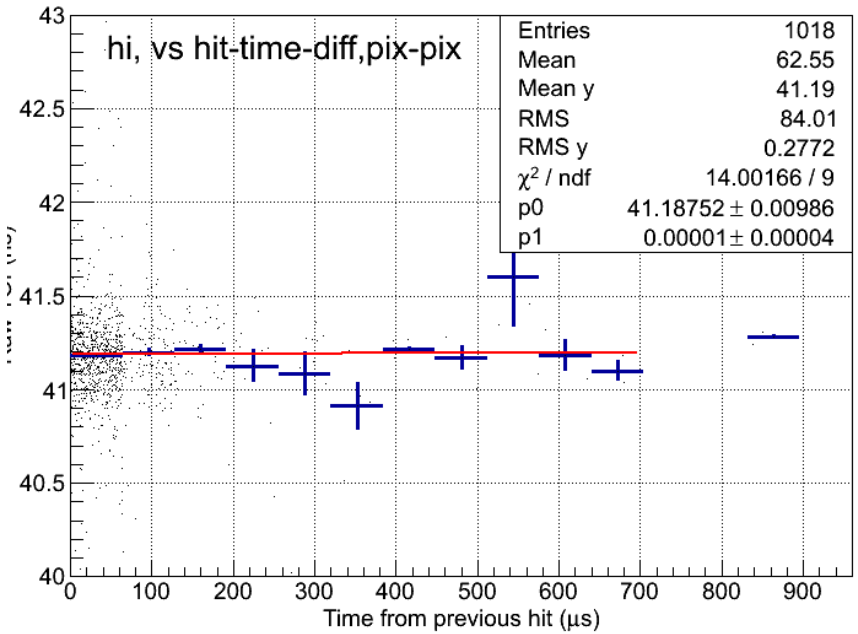
- Calibrated space-point times pixel-to-pixel for low and high rate runs show similar effect – a shift of ≈ 75 ps



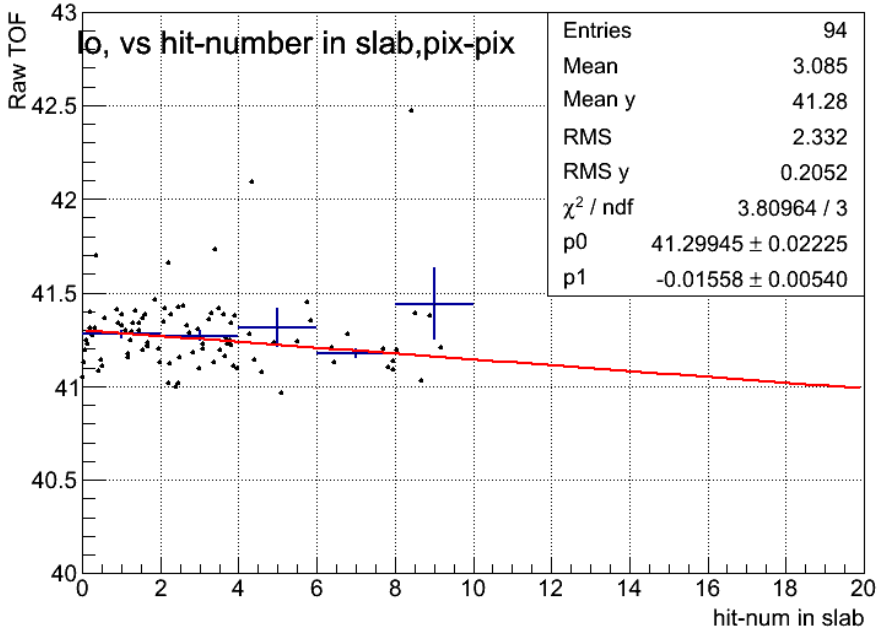


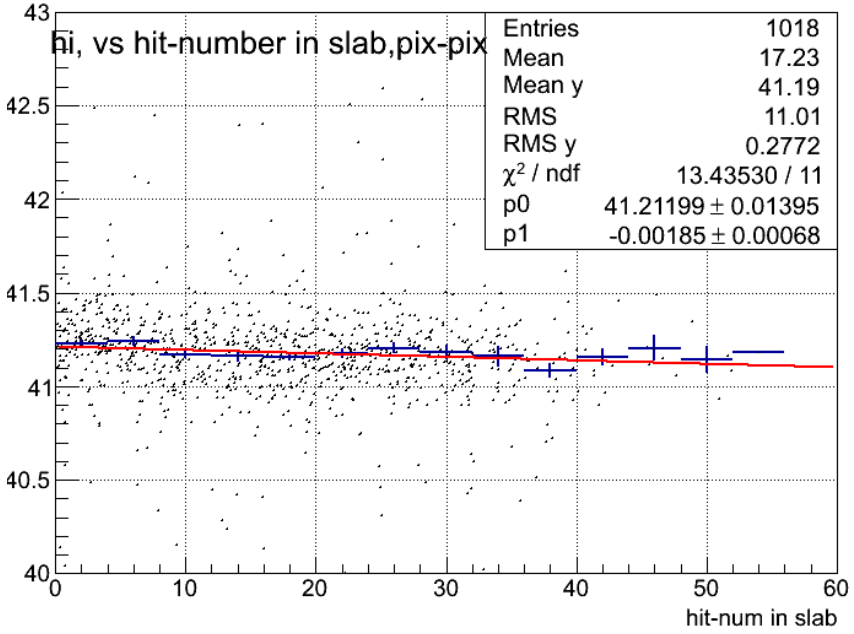
- Is there any dependence on the time difference between hits?
  - i.e on time since the previous hit.
- For each slab hit, track the time since this slab was hit previously
- There seems to be a repeating structure?
  - Is it real? Spill structure? Something with the TDC?





- Dependence of raw-tof on the hit-number for this slab





- Could also look at the charge – but since the uncalibrated times are independent of the ADC, I don't know what we can learn.
- Comments, ideas, suggestions would be welcome.