Pixel pedestal variation

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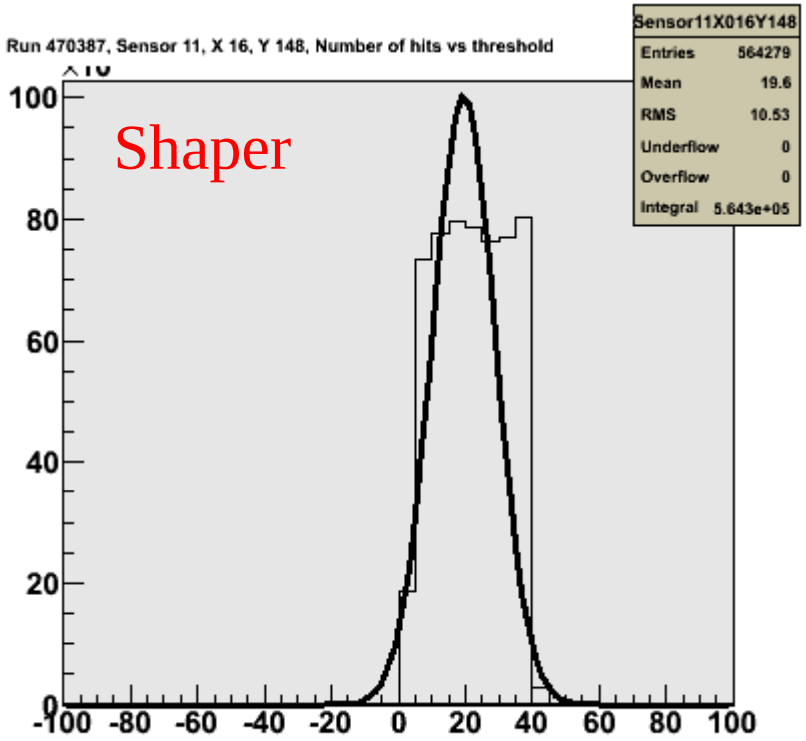
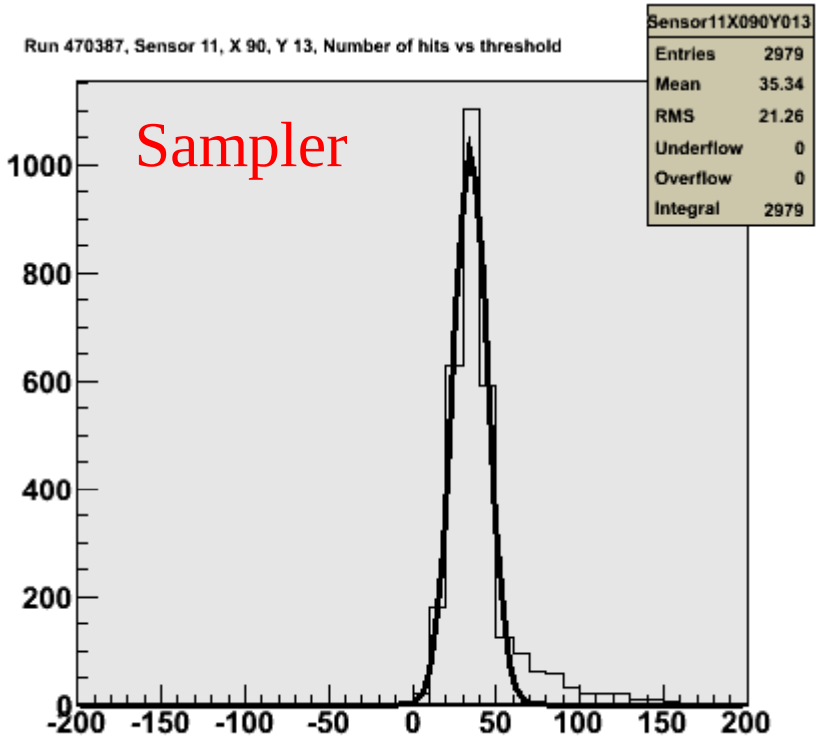
Look at response at low thresholds

- Unmask one pixel per region row (of 42) at a time
- Note, did all x=0, then x=1, etc, so may have some neighbour effects
- Vary threshold from −100→100 for shapers, −200→200 for samplers, in steps of 5 or 10, respectively (40 steps total)
- Total 42×40=1680 variations
- Run for 19 bunch crossings per bunch train so never lose hits due to memory filling
- Histogram number of (noise) hits per setting for every pixel
- Only sensitive to pedestal (and noise); not to gain variations
- All done on sensor #11

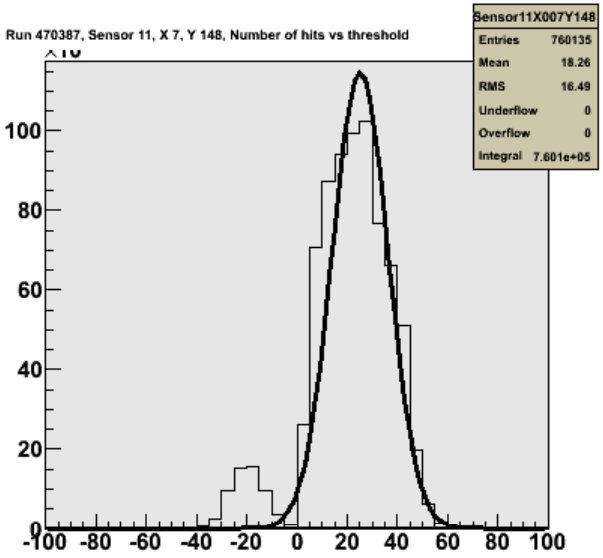
Typical responses

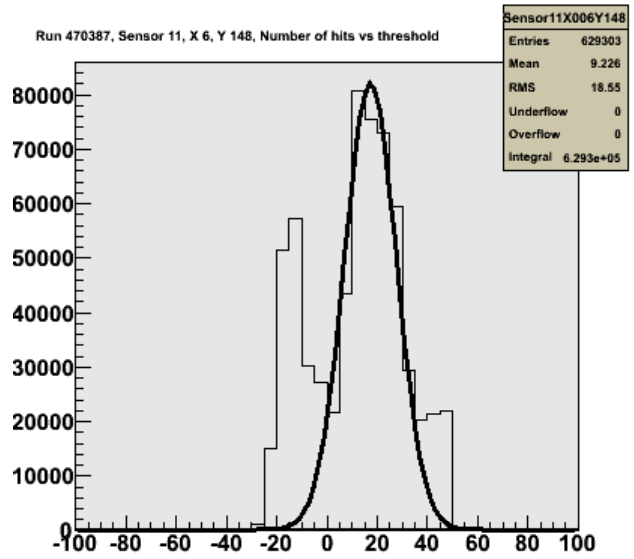


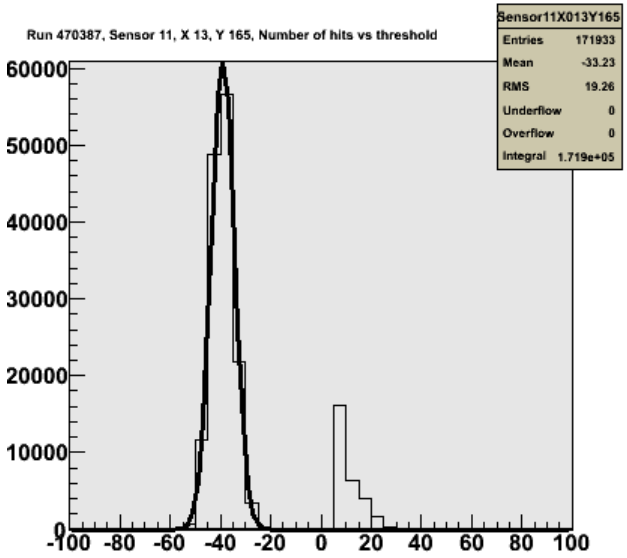


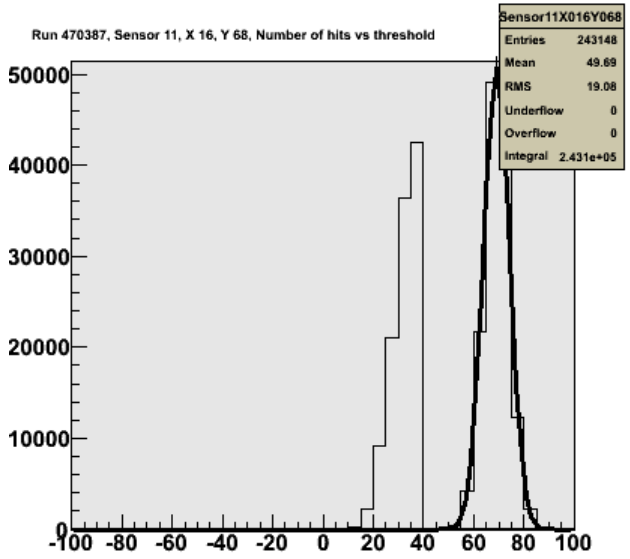
Fit is to a Gaussian; interpretation of width needs care but mean is probably OK

Shapers show some variation



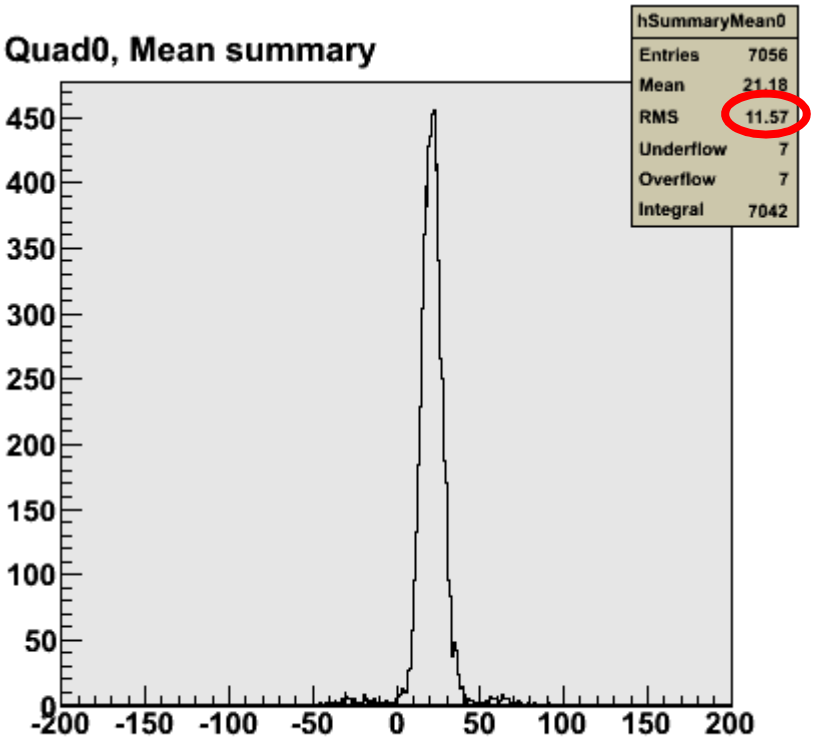


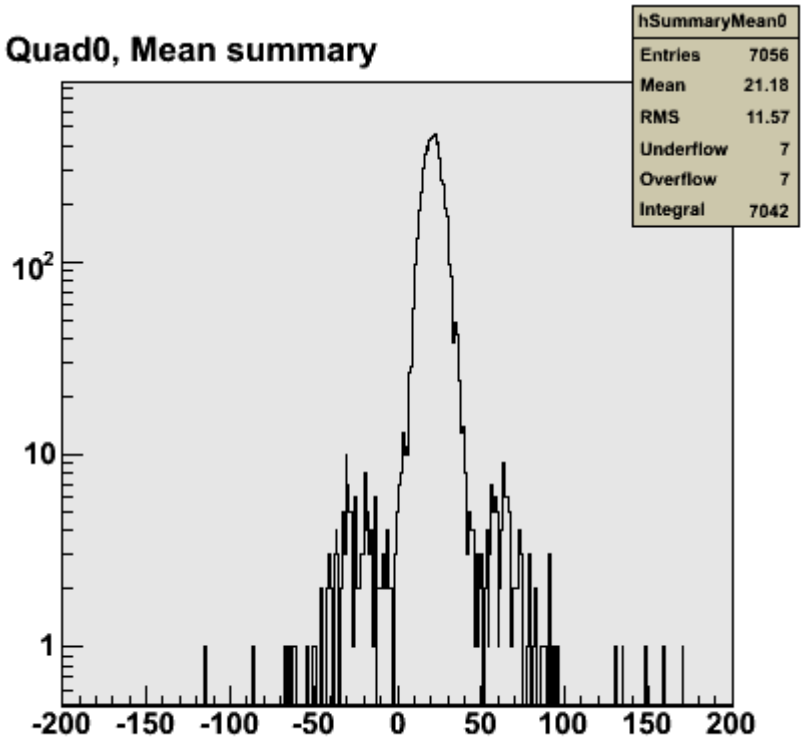




Mainly centred on ~ +20TU but also see peaks at ~ −20TU and +70TU

Distribution of means for quadrant 0



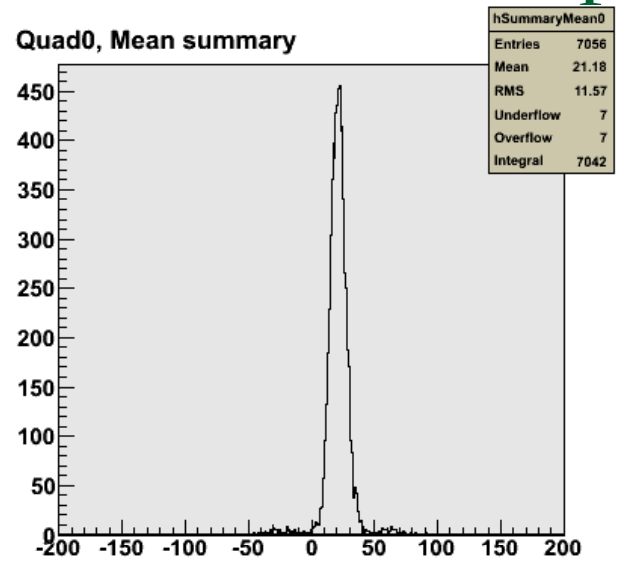


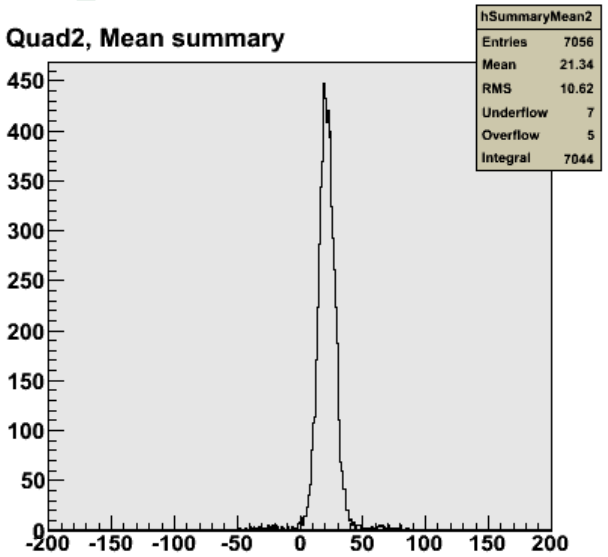
Quad2	Quad3
Quad0	Quad1

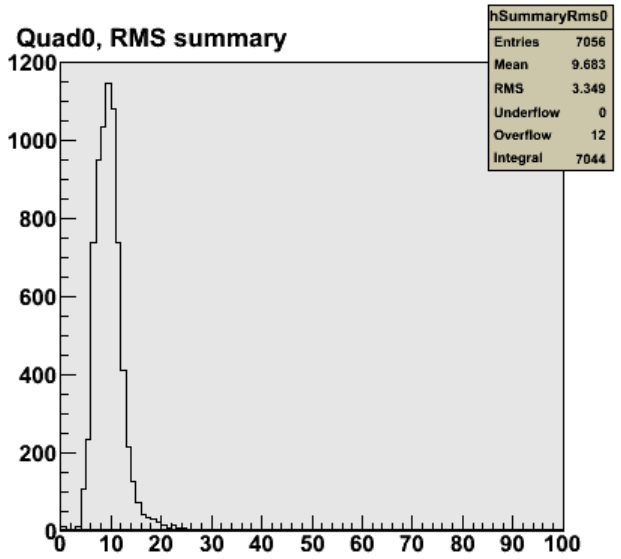
With 1TU ~ 30eV ~ 8e^-, then expected noise ~ 40e^- ~ 5TU

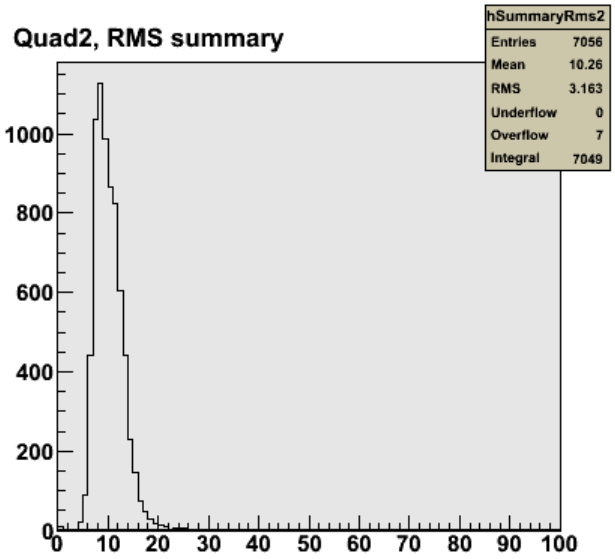
Mean spread ~ 2×noise

Similar for both shaper quadrants 0 and 2

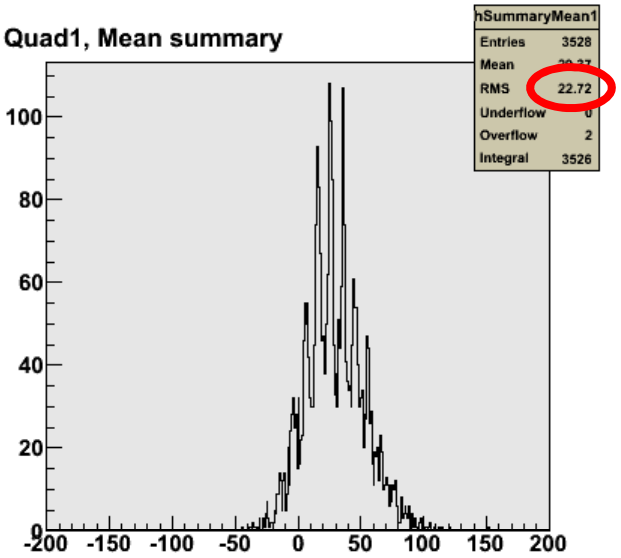


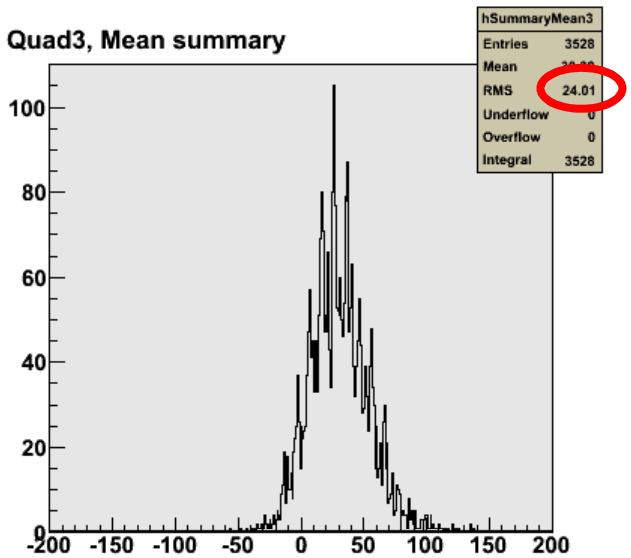


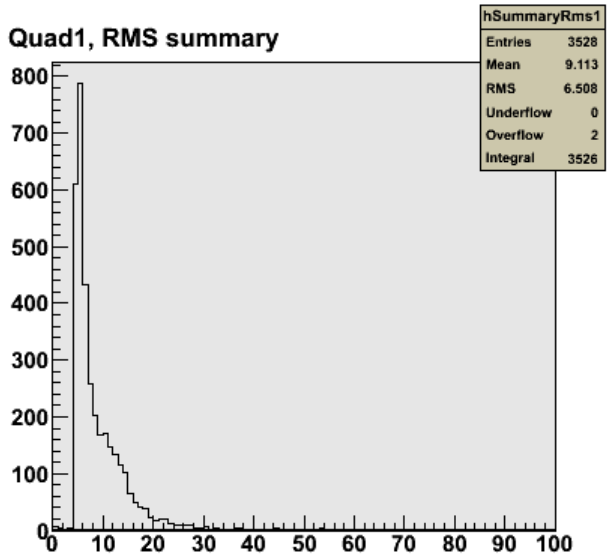


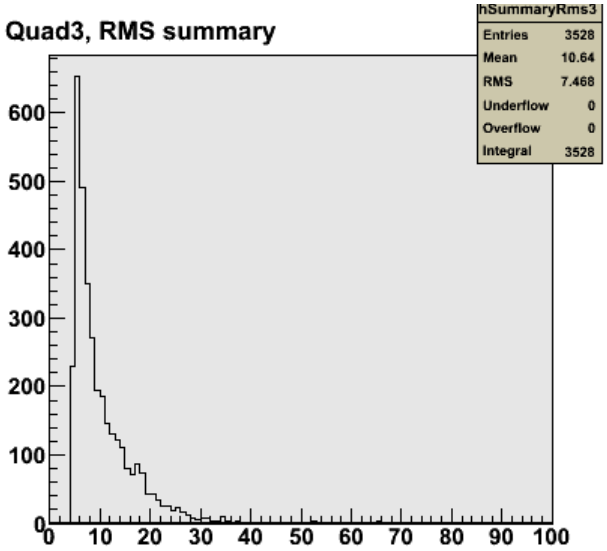


Samplers show different structure







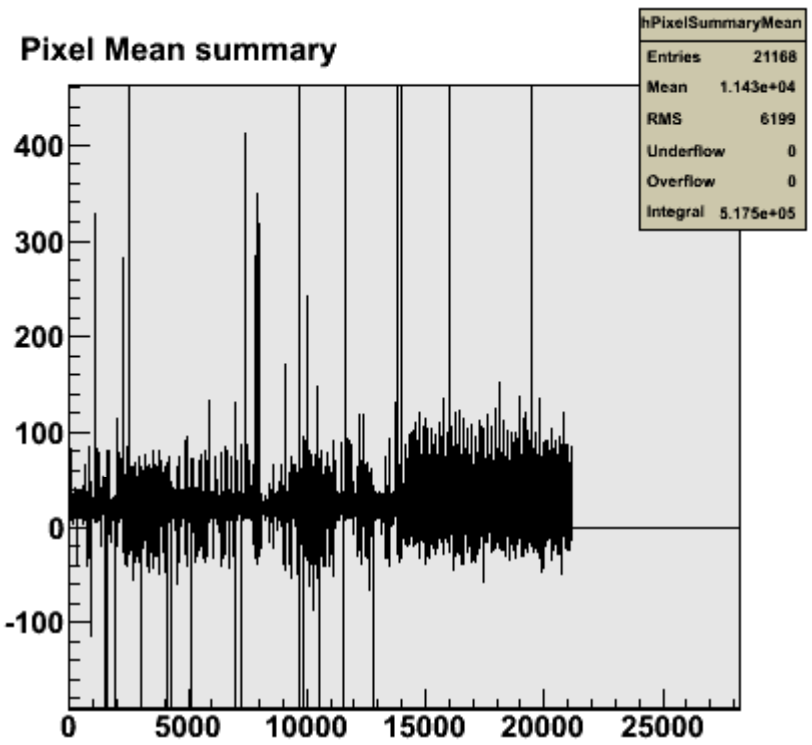


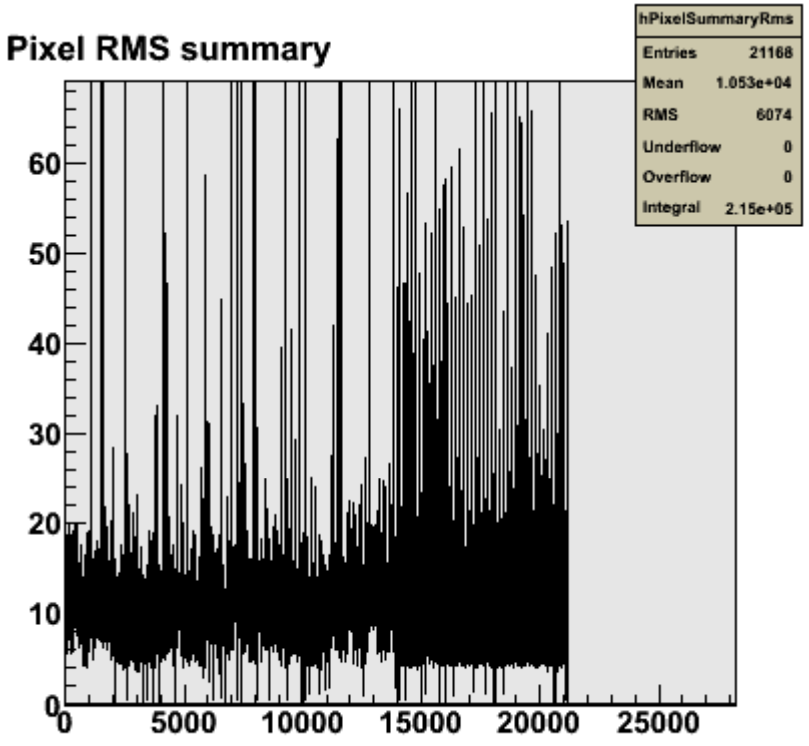
Peaks separated by ~ 10TU

With 1TU ~ 15eV ~ $4e^-$, then expected noise ~ $40e^-$ ~ 10TU

Mean spread ~ 2×noise

Summary over whole sensor





X axis = 168×x + y

No readout for x>=126 upwards; not understood