

AC-LGAD Feb2021 Testbeam

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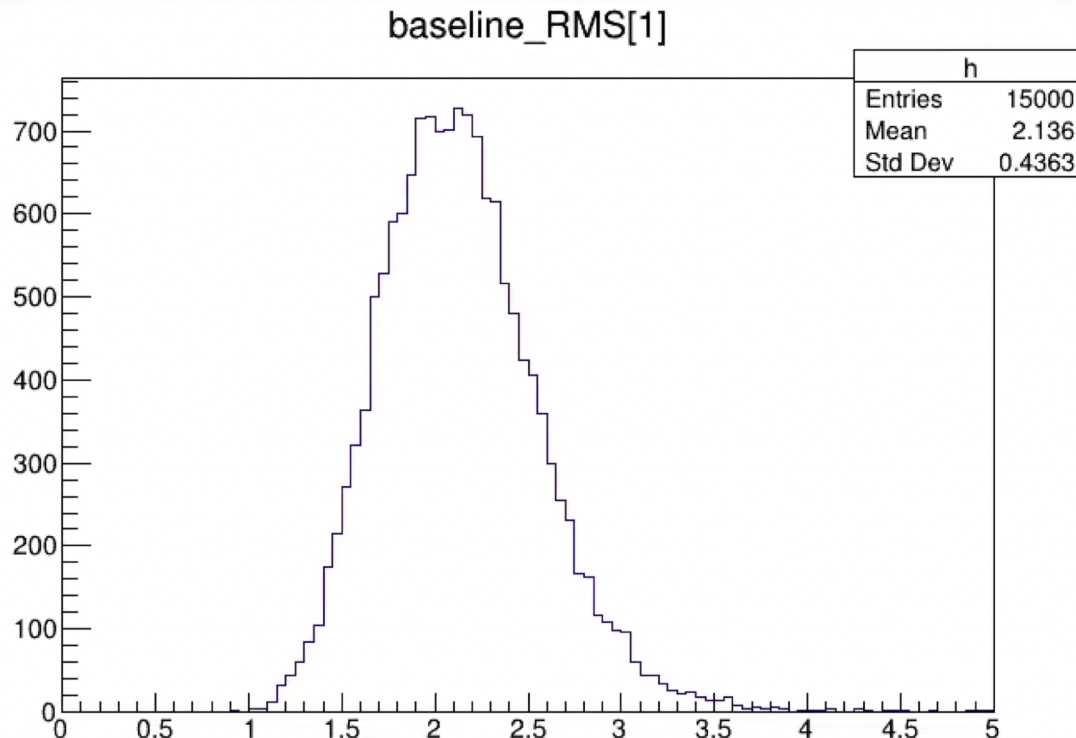
???

03/30/2021

Noise

Baseline RMS peaked at 2mV – checked that each channel (1-6 for BNL2020 sensor) all have the same baseline RMS

- The DC guard ring (ch0) had baseline RMS = 2.6mV



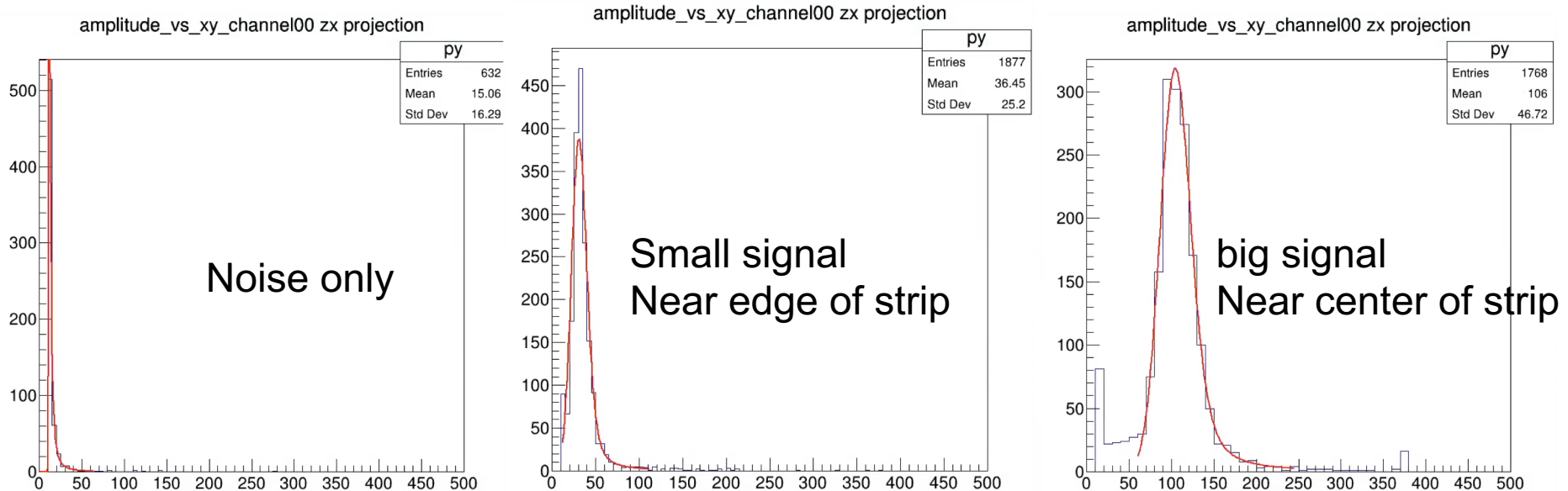
Let's try to go to 3x baseline RMS = 6mV threshold

If it's too low, then we go to 5x baseline RMS = 10mV threshold

Langaus fits

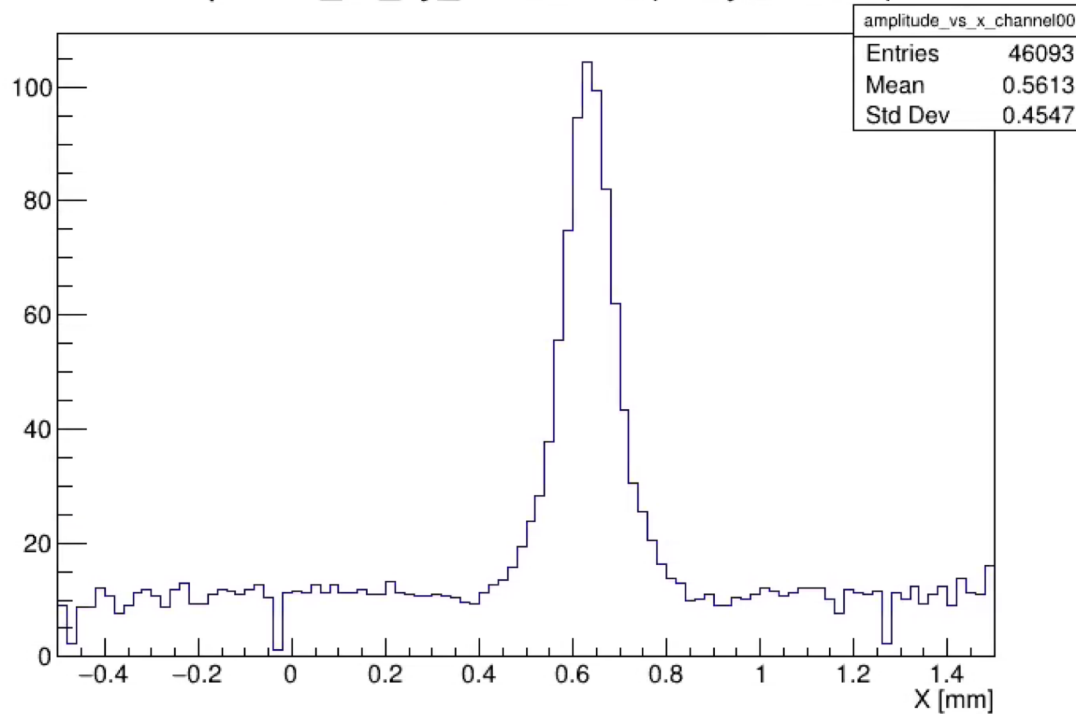
To make amplitude vs X plots, we take the 3D histogram (amp/X/Y), project to 2D (amp/X), and then take slices in X. Then we fit the amp histogram in each slice with a langaus, in the range (histMean – histRMS , histMean + 3*histRMS)

- Seems to work pretty well in majority of cases



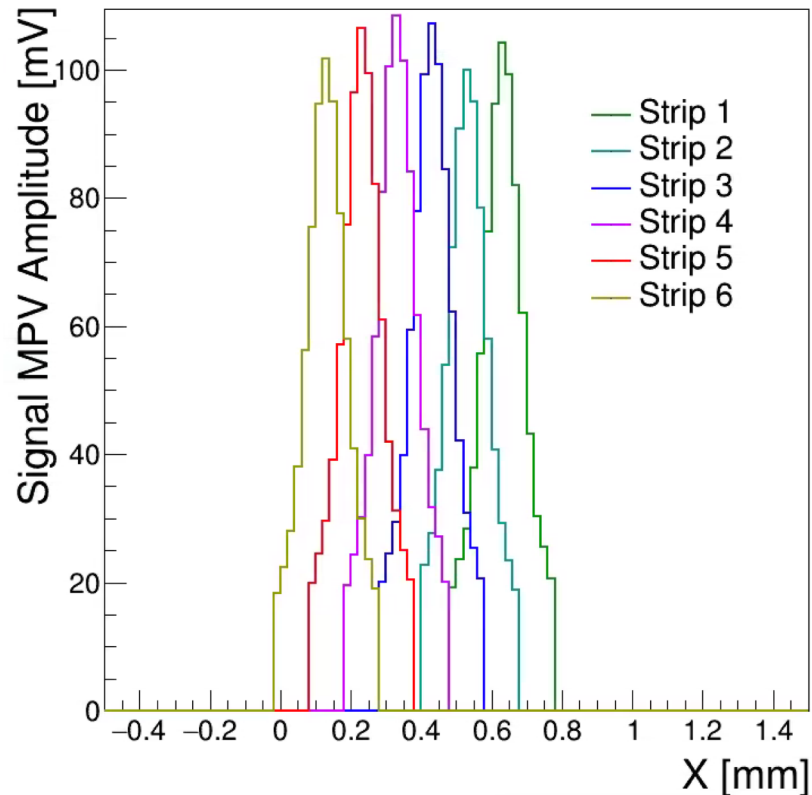
Amplitude vs X

amplitude_vs_xy_channel00 (Projection X)



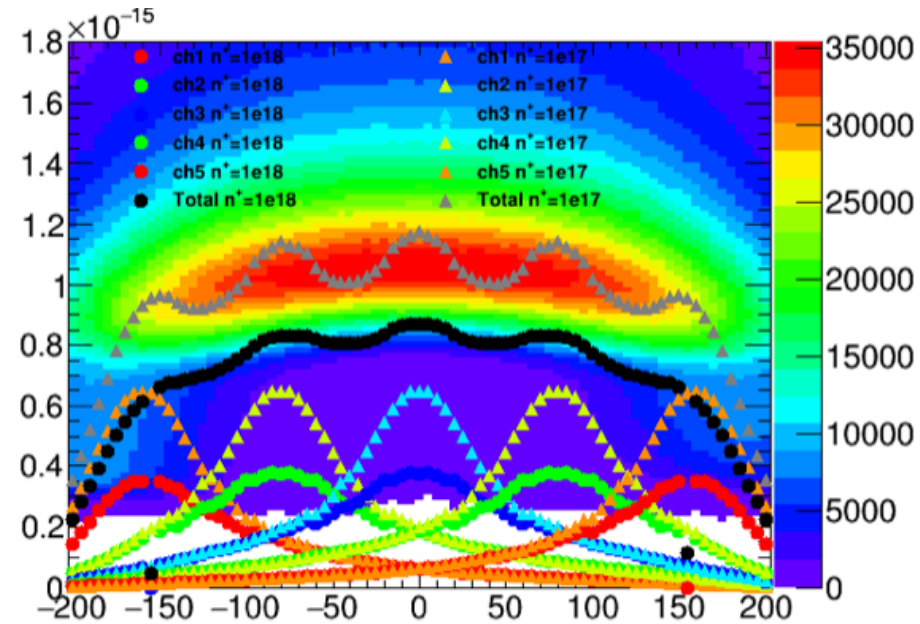
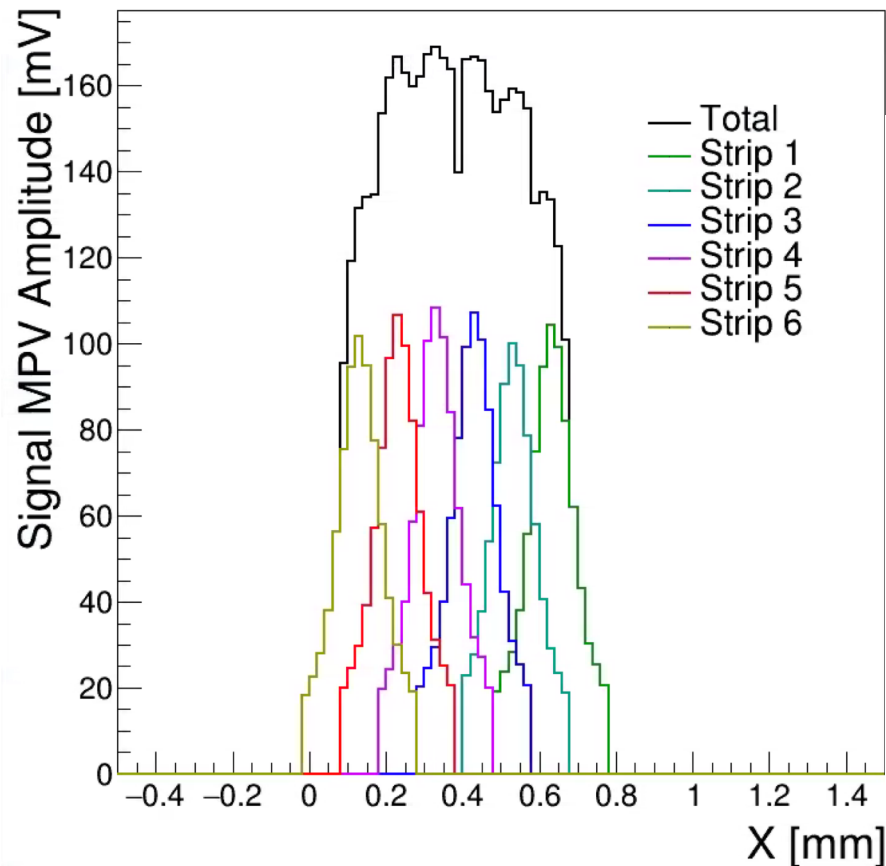
Looks pretty good, but the noise presents a baseline at around the 10mV threshold

Amplitude vs X



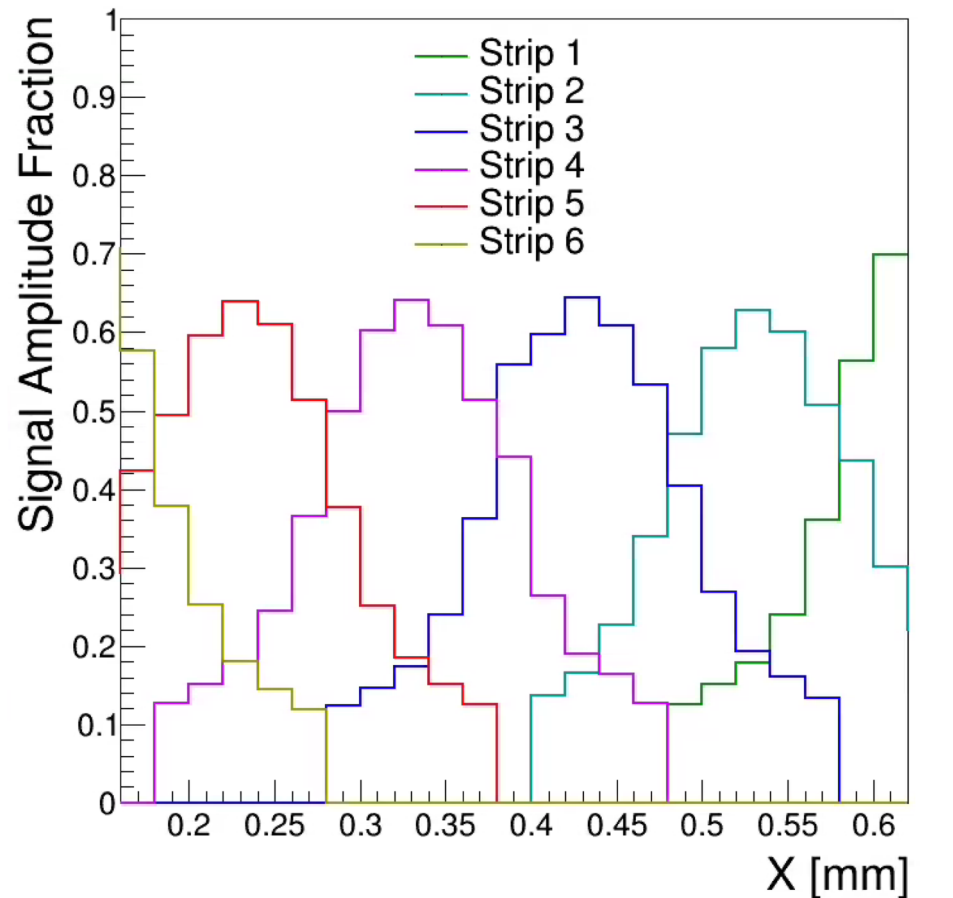
We're zero-suppressing the noise floor at about 18mV

Amplitude vs X



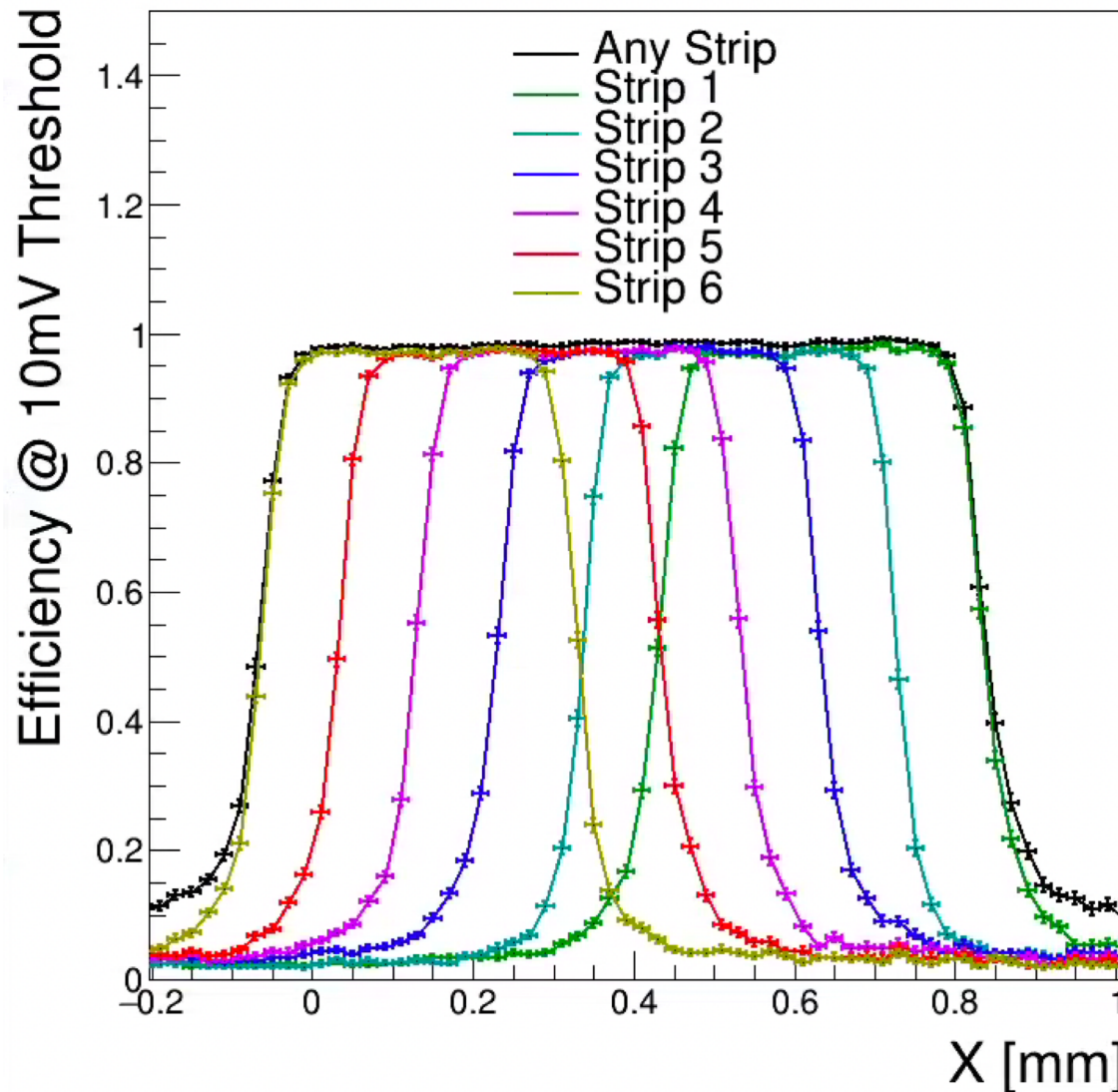
We do see indication of the wiggles in between the strips

Amplitude Fraction

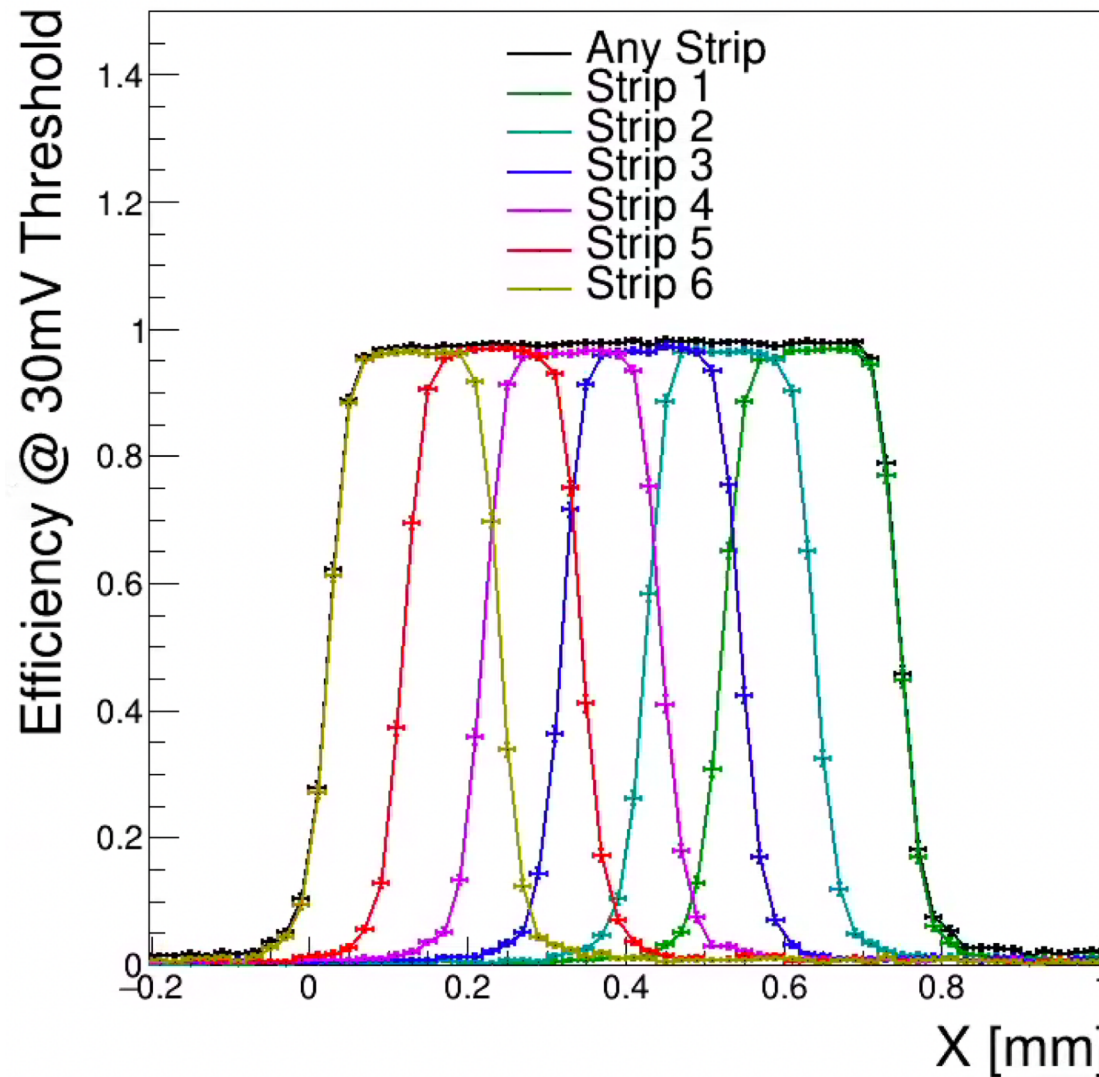


Looks pretty good

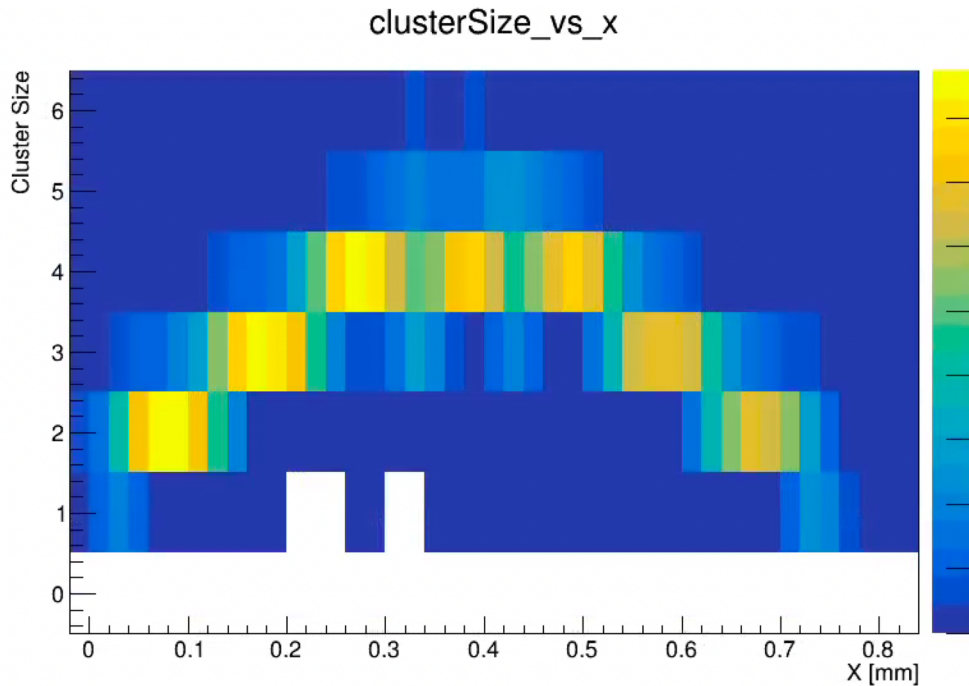
Efficiency (10mV Threshold)



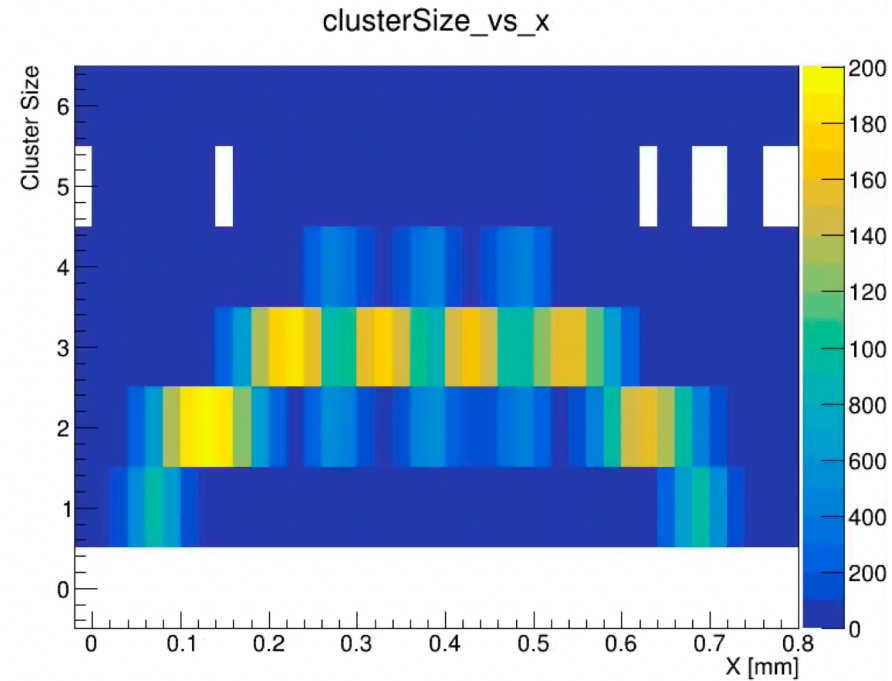
Efficiency (30mV Threshold)



Cluster Size



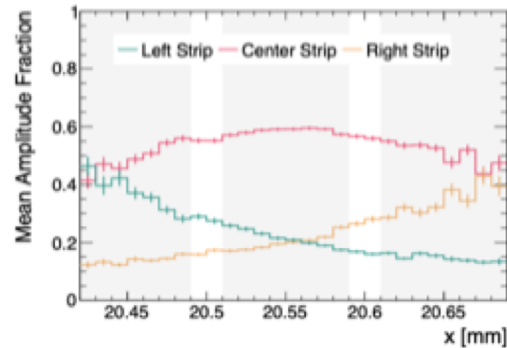
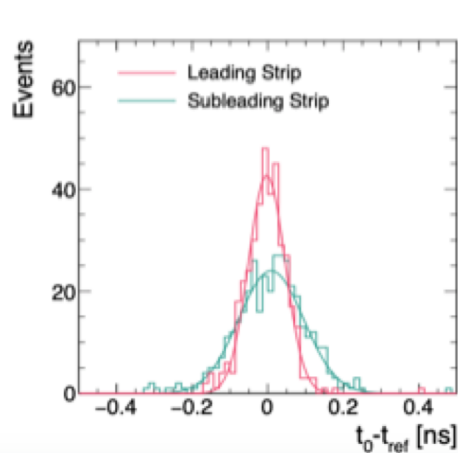
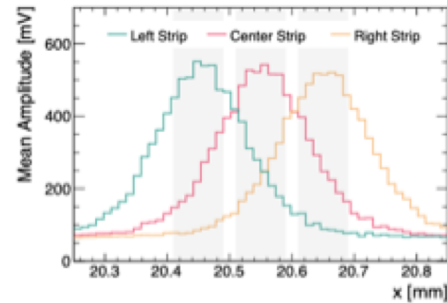
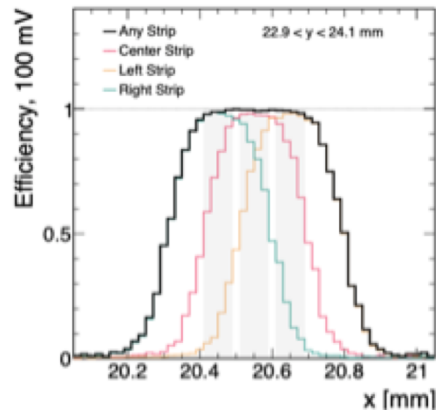
30mV threshold on primary strip,
10mV signal on secondary strips



50mV threshold on primary strip,
20mV signal on secondary strips

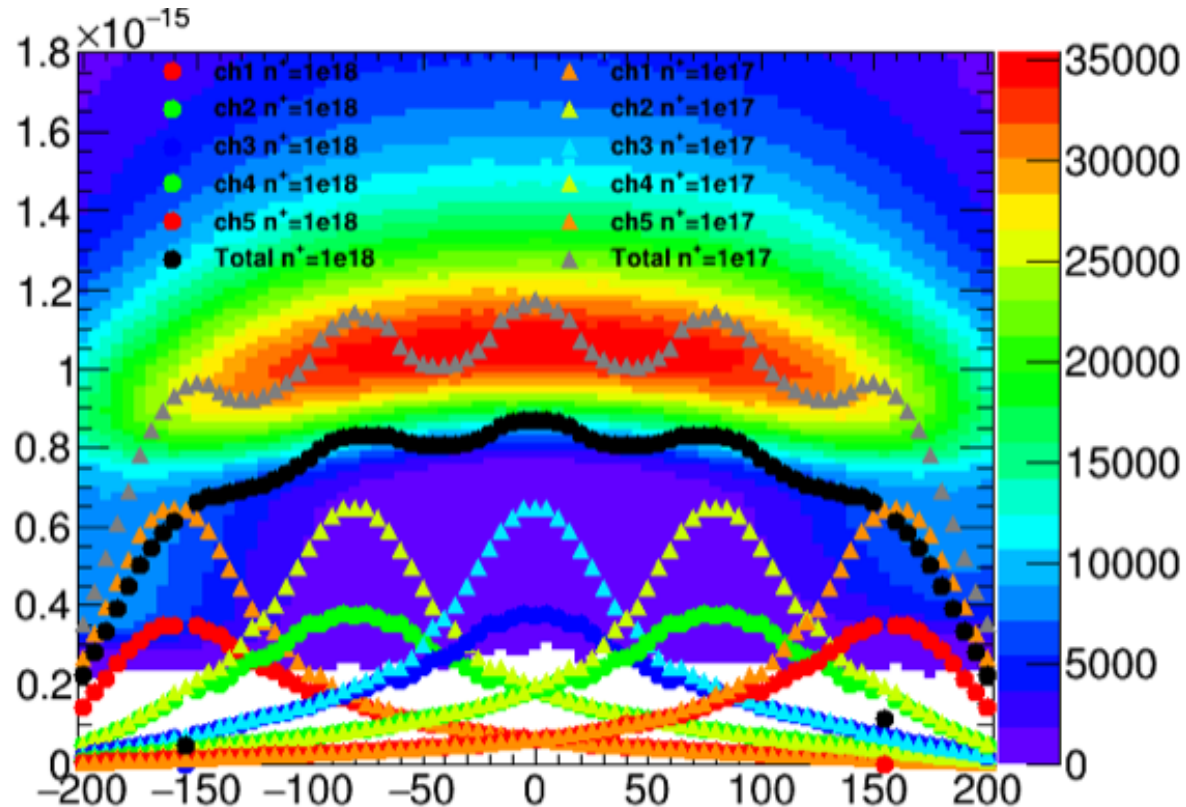
These are plots we need

We need Efficiency for primary threshold (max channel), and efficiency for secondary threshold (all the other channels)



These are plots we need

Total amplitude (of channels passing threshold) vs position



Should this be done with the landau peak at each X position, or should this be done event-by-event?

Backups