

Update on Feature Investigation

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Working Hypothesis

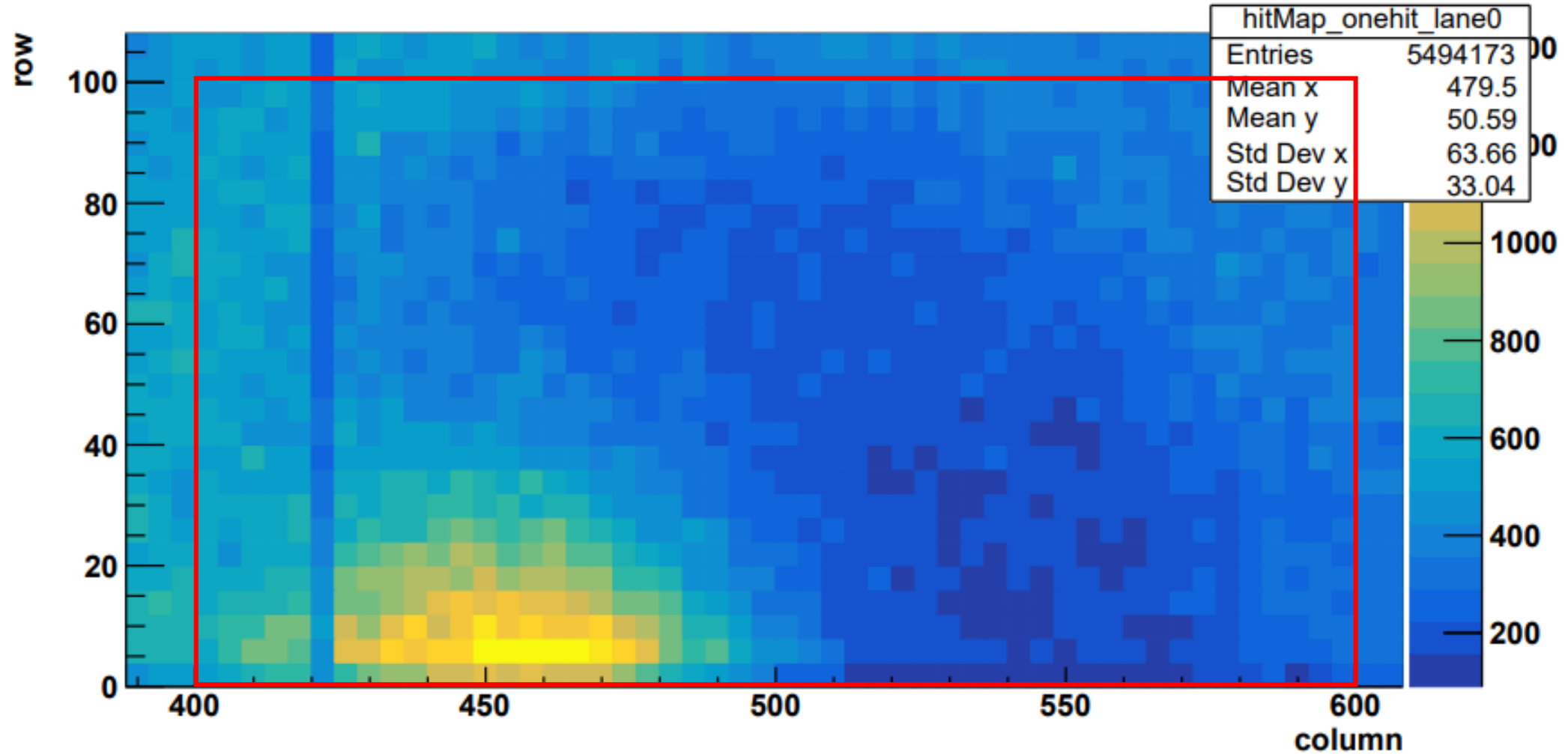
- Feature is caused by inefficient triggering.
- This inefficiency should be reduced as the number of particles in an event increases
- Feature should be more distinct if all particles enter in the feature region, rather than having a mixture in and out of the feature region, but still reduced compared to the overall effect.

Dataset and Grouping

- All runs are 5GeV, central beam position, 20°C, 2 μ s strobe length
- Using runs 1223, 1245, 1250, 1261, 1308, 1339, 1398, 1413, 1414, 1422, 1428, 1429 (Run 1413 timed out, rerunning now) -> Total 3.7m events
- Groups:
 - One cluster in layer 0
 - Two clusters in layer 0
 - Two clusters in layer 0, all clusters inside the feature region
 - Two clusters in layer 0, at least one cluster inside feature region, and one cluster outside feature region
- Feature region from column 400 -> 600, and row 0 -> 100
- (Box drawn on plots around feature region)

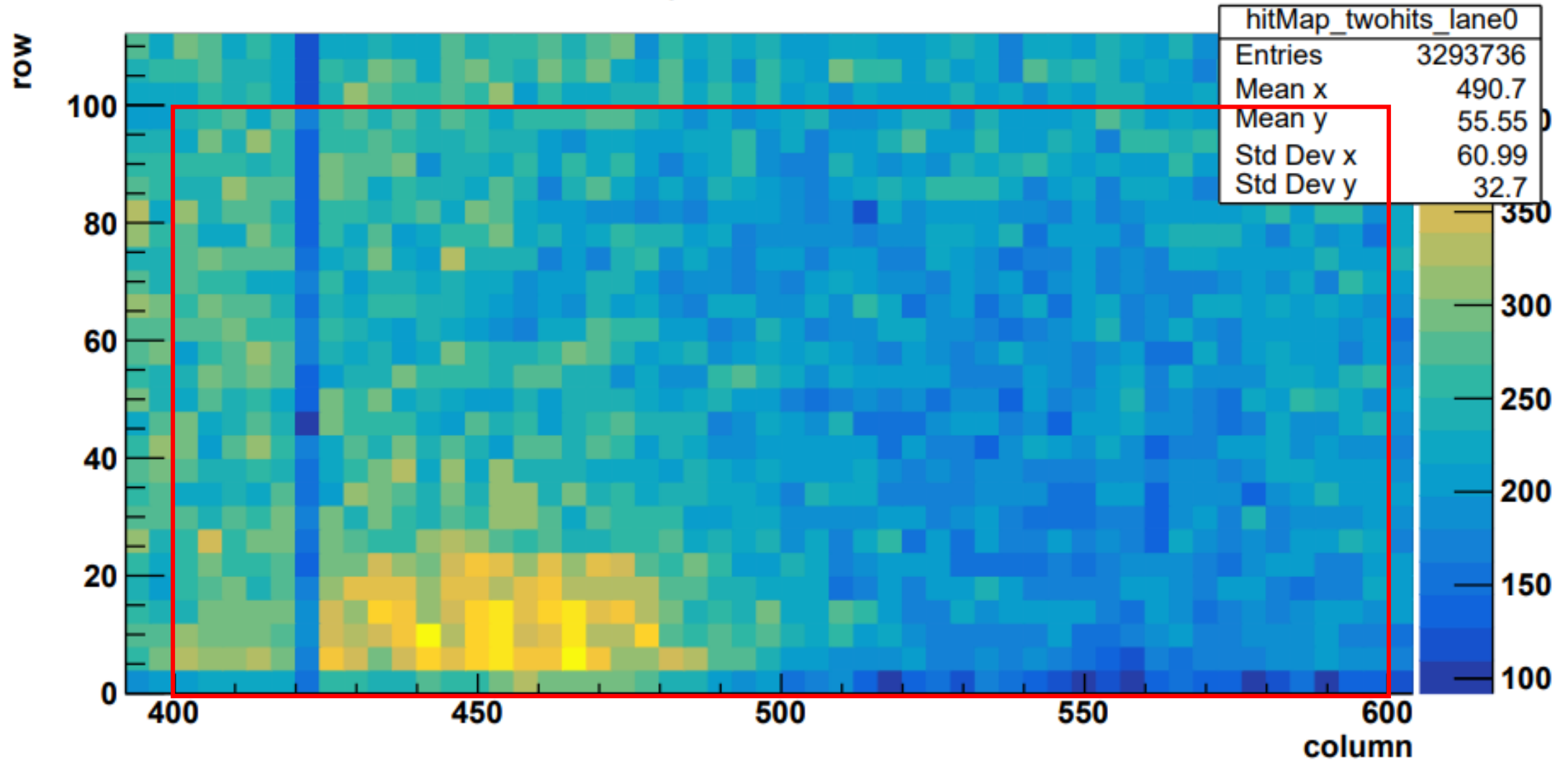
One cluster in layer 0

Hit Map One Particle



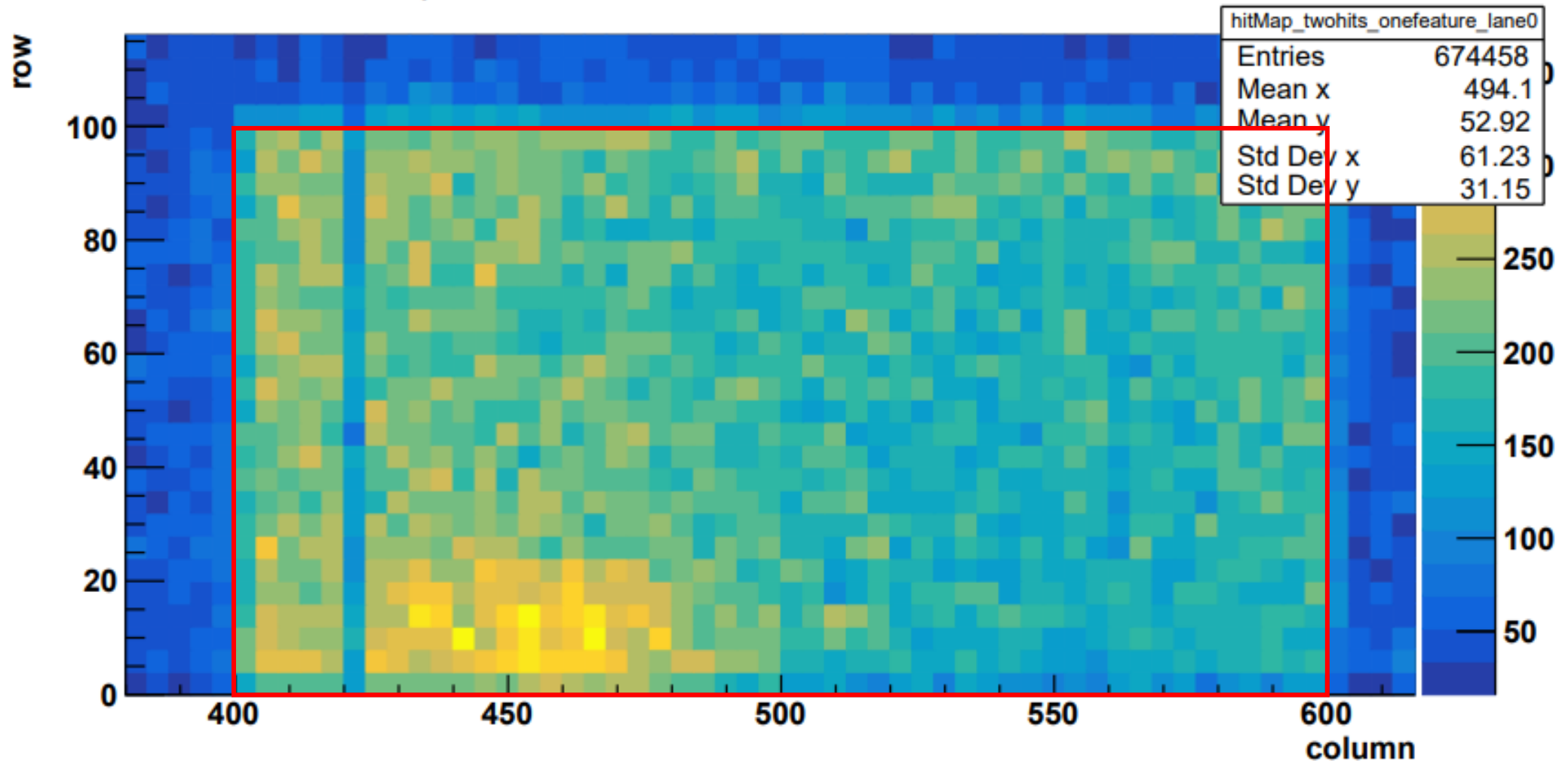
Multiple clusters, anywhere in layer 0

Hit Map Several Particles

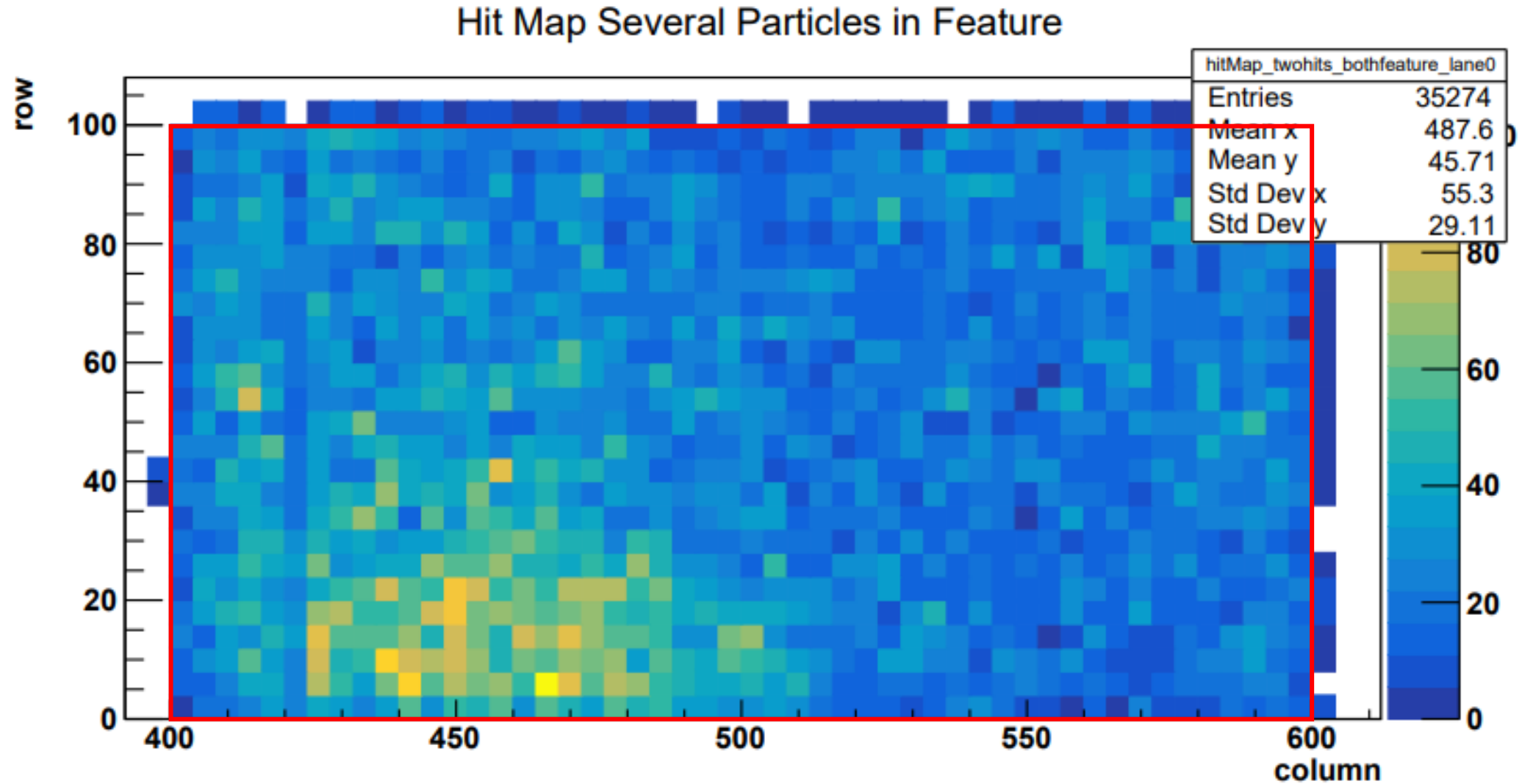


Multiple clusters in layer 0, at least one inside and one outside feature region

Hit Map Several Particles Mixed Feature or No Feature



Multiple clusters in layer 0, all clusters in feature region



Next steps

- Clear that feature is more diffuse in events with more than one cluster, which helps provide evidence that this is not a feature of the chips themselves.
- With last two plots, we would ideally like more statistics to give us more confidence that the feature is indeed reduced.
- Could also refine feature region used for selection, so we avoid including the beam centre in that region (see next slide) but end up cutting out some of the feature...

Potential Feature Region Update:

Hit Map One Particle

