Pixel ToT precision study

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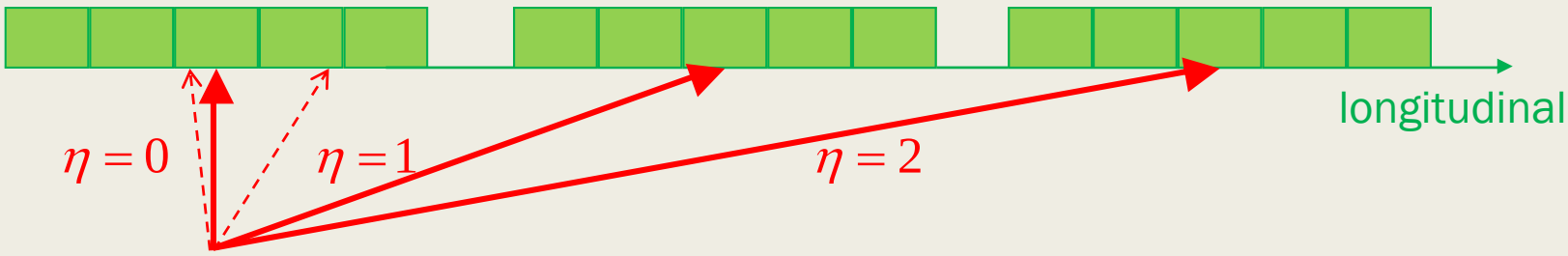
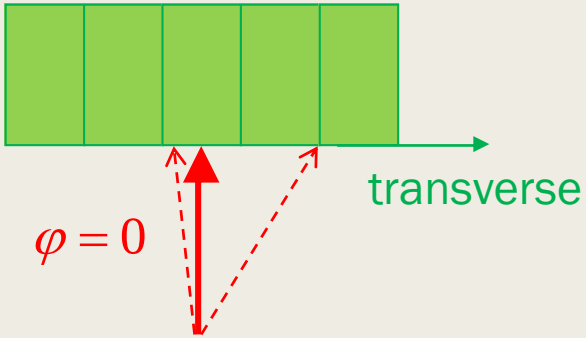
η and φ

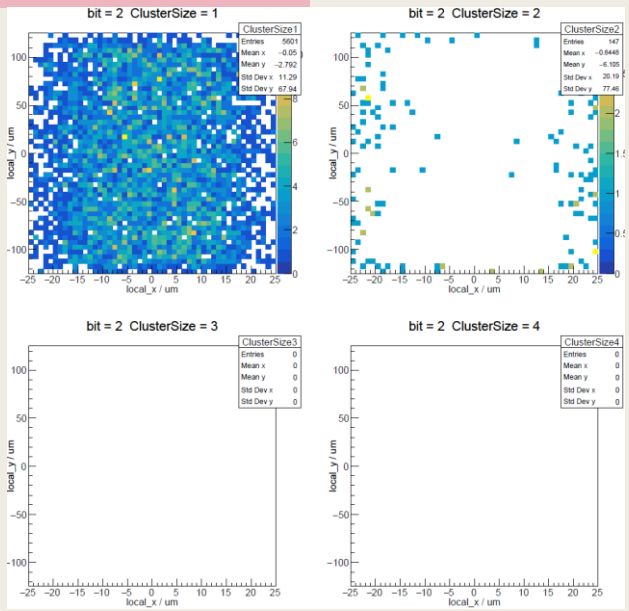




- In every η , classify between 1 particle and 2 particle.
- 1 particle: Randomly shot in the middle pixel
- 2 particle:
  - *1st randomly in the middle pixel*
  - *2nd randomly in nearby 5 × 5 pixels in training and with a fixed distance to the 1st in testing*

$\eta = 0 \quad \varphi = 0$ 1 particle

Bit=2



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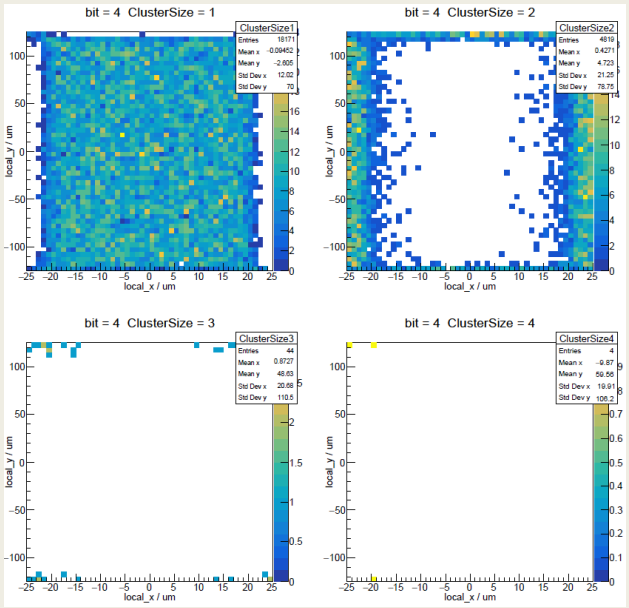

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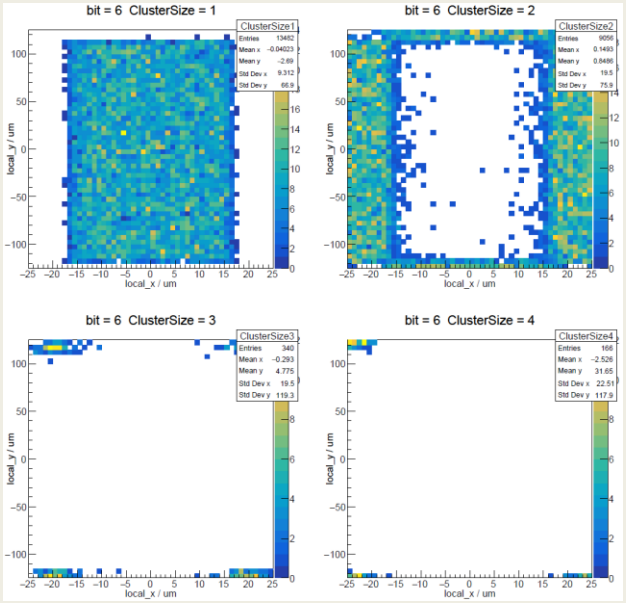

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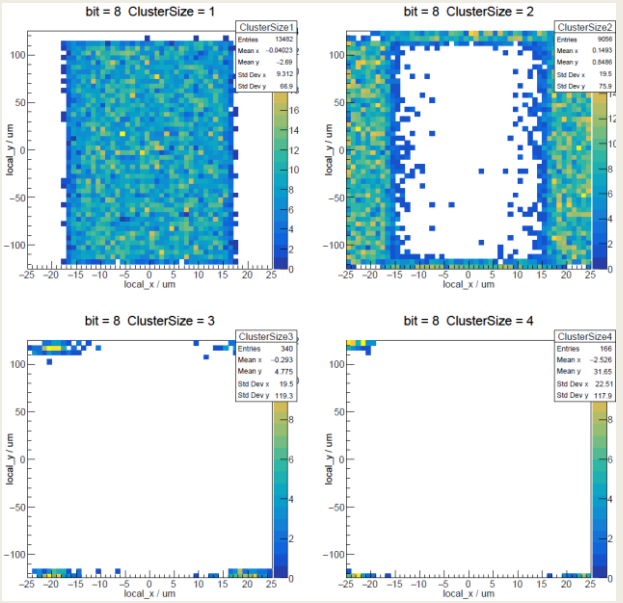
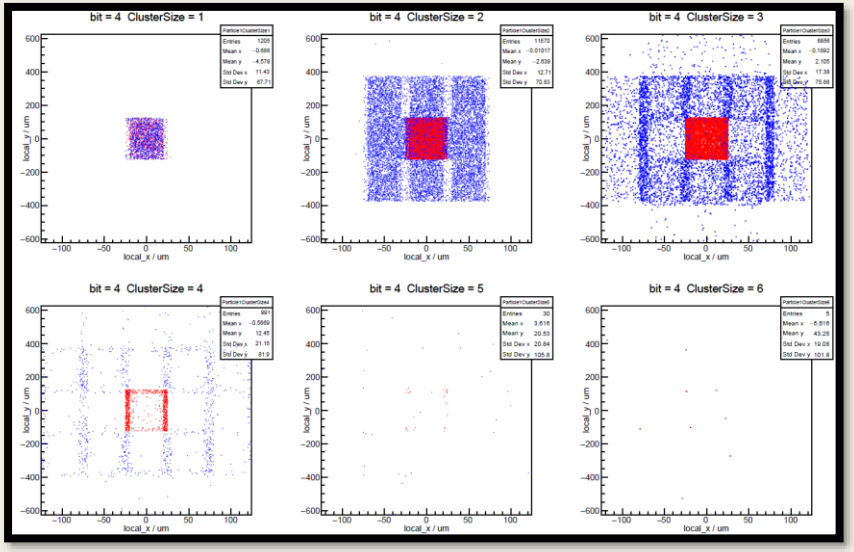
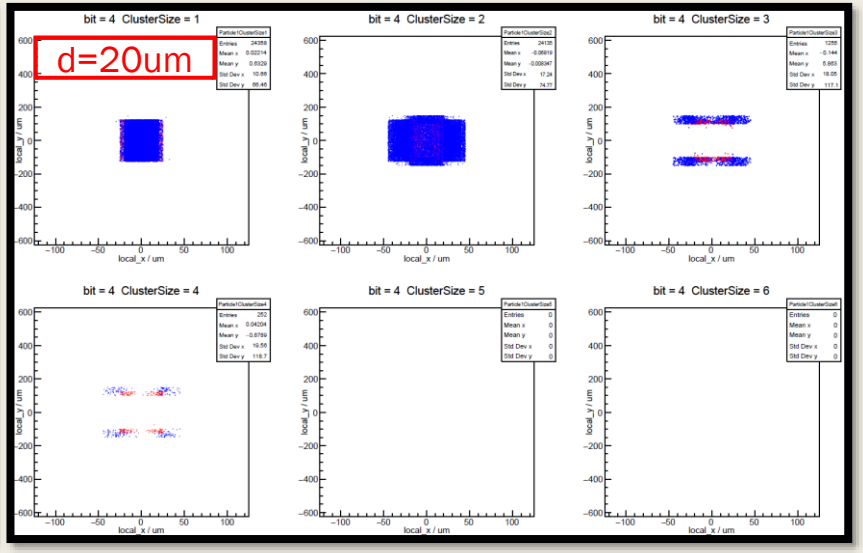
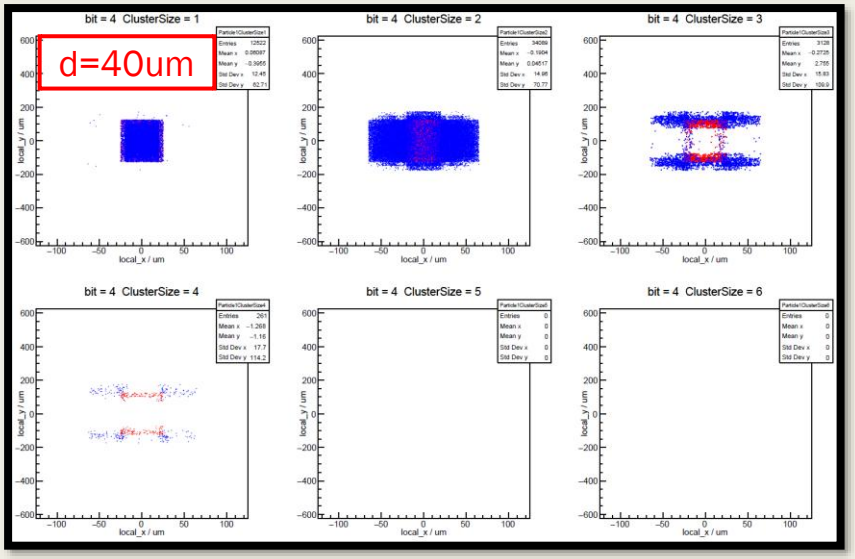
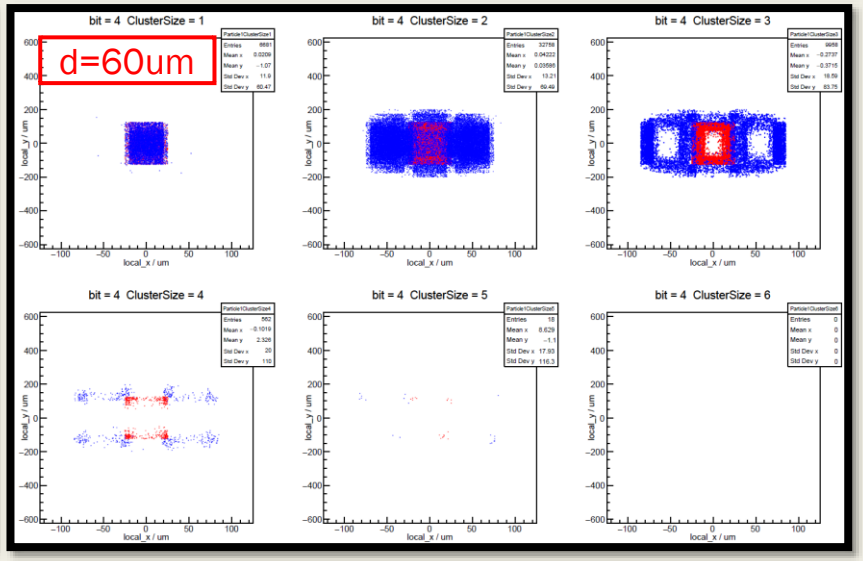


$\eta = 0 \quad \varphi = 0$ 2 particle



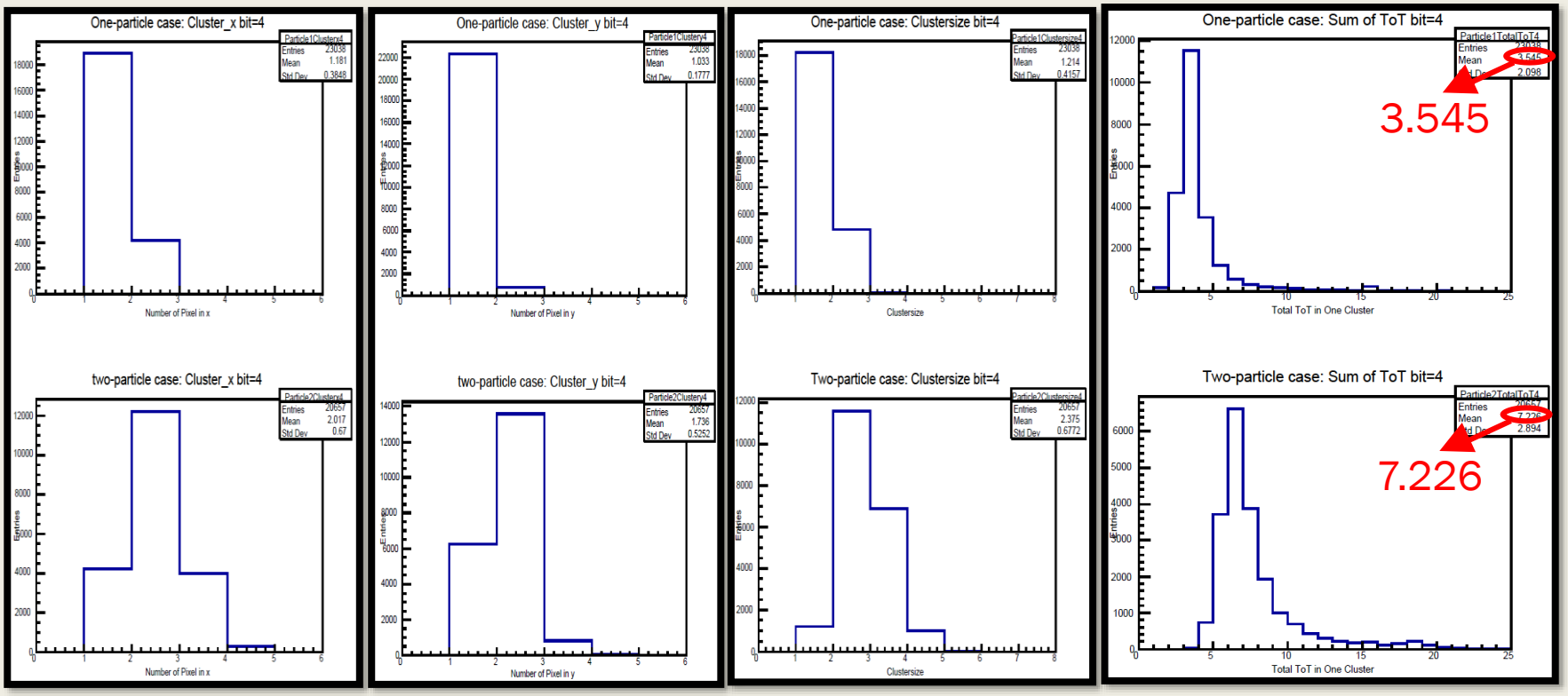






- Red: 1st particle, Blue: 2nd particle

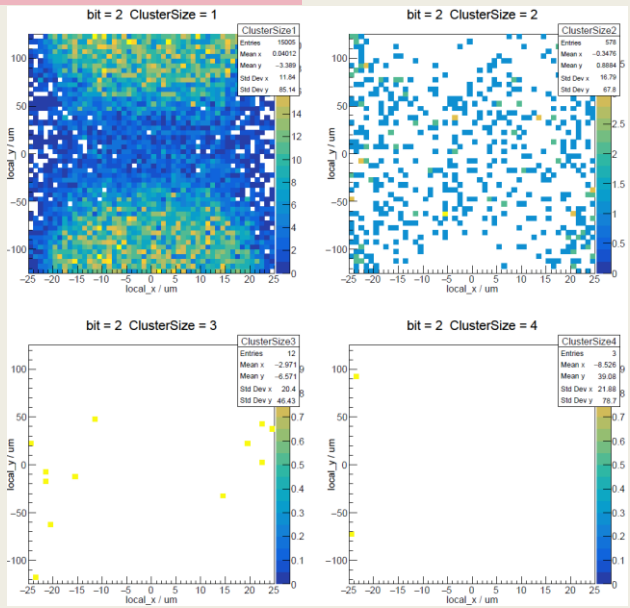
$\eta = 0 \quad \varphi = 0$



- 4 parameters: Cluster_x, Cluster_y, Clustersize, Sum of ToT
- Sum of ToT distribution is peaked twice the value for 2 compared to 1
  - *Larger than twice (especially for small tot bit): energy below threshold for 1 particle may be above threshold for 2 particle when superposed.*

$\eta = 1 \quad \varphi = 0$ 1 particle

Bit=2



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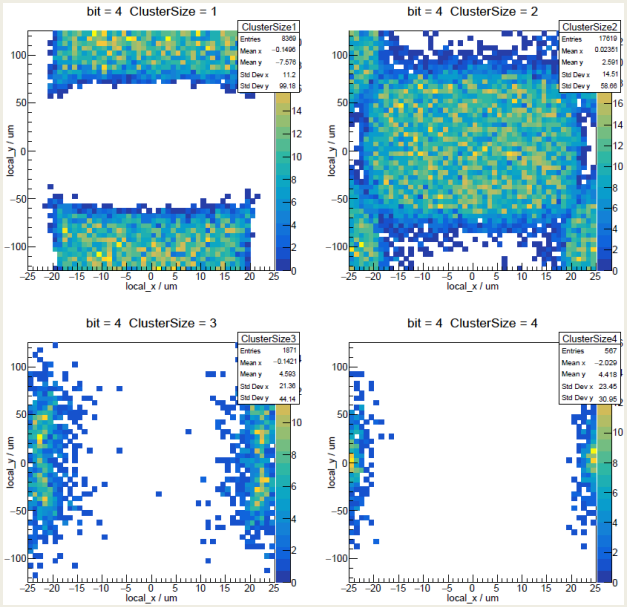

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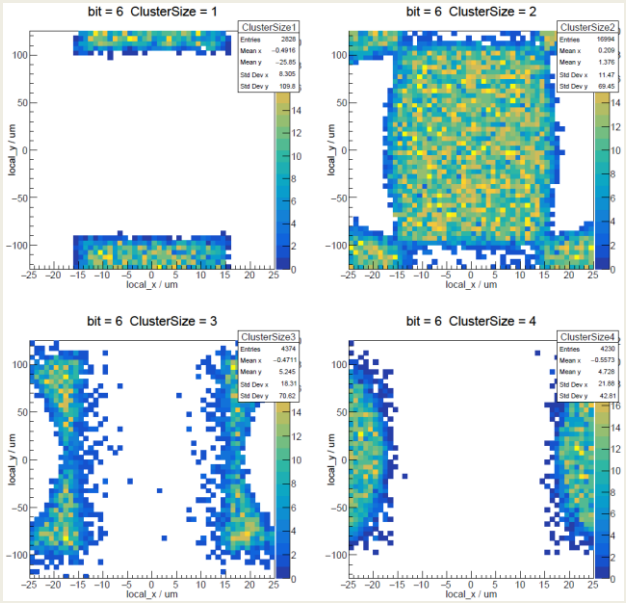

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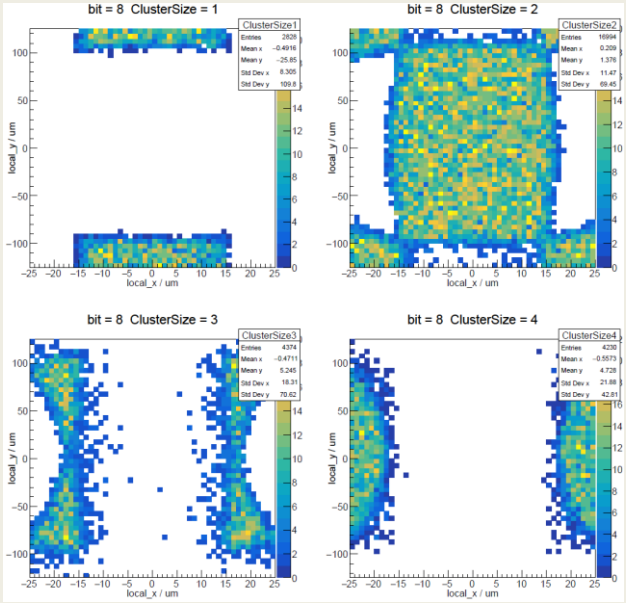
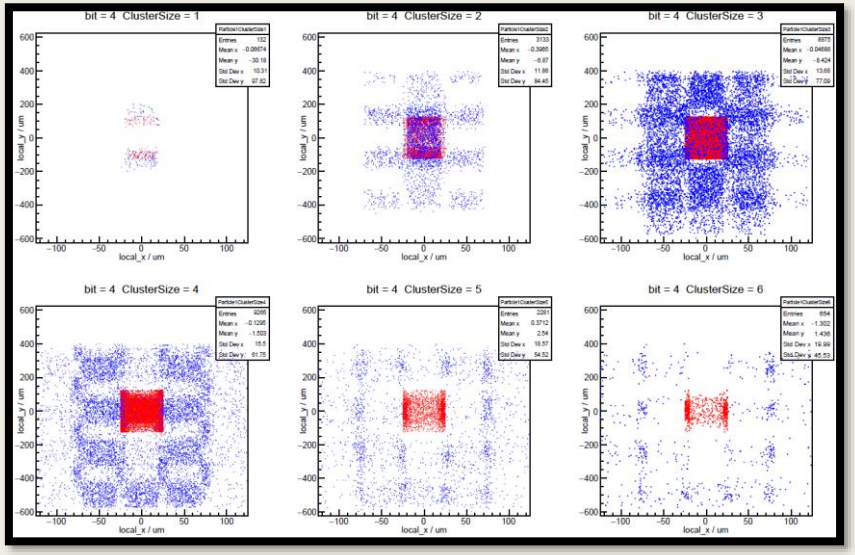
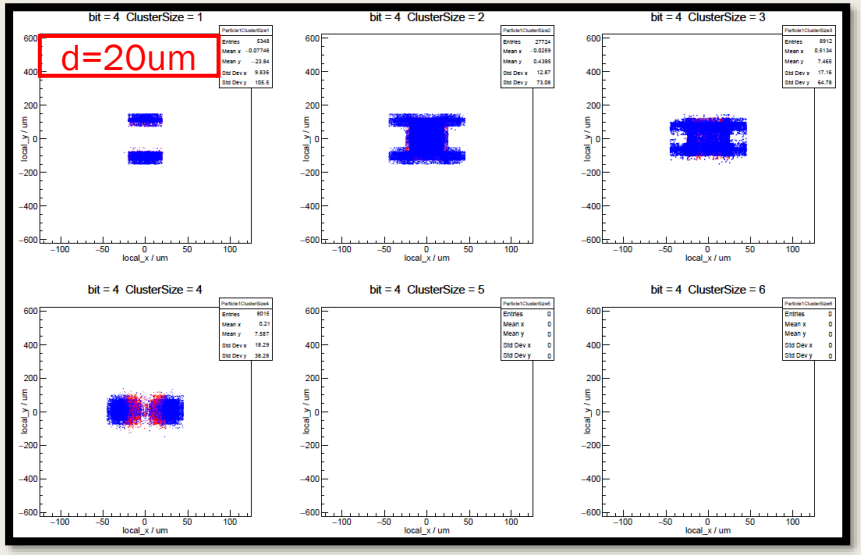
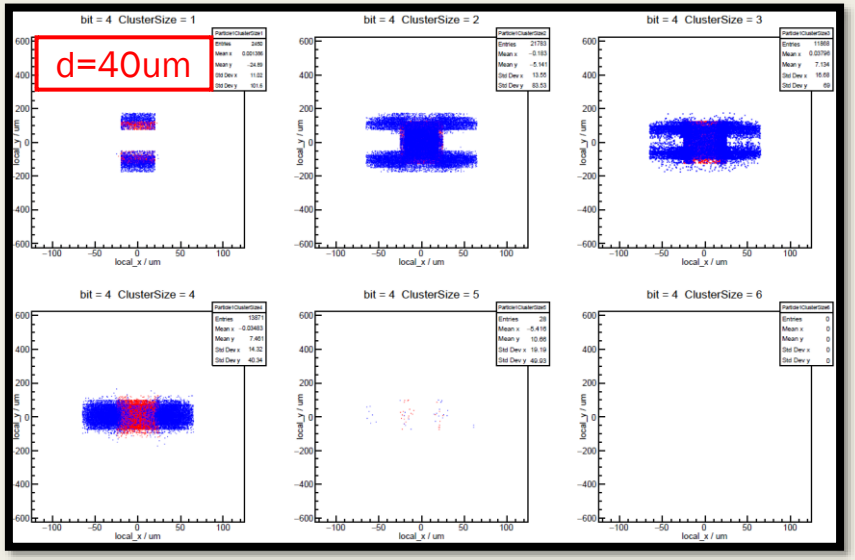
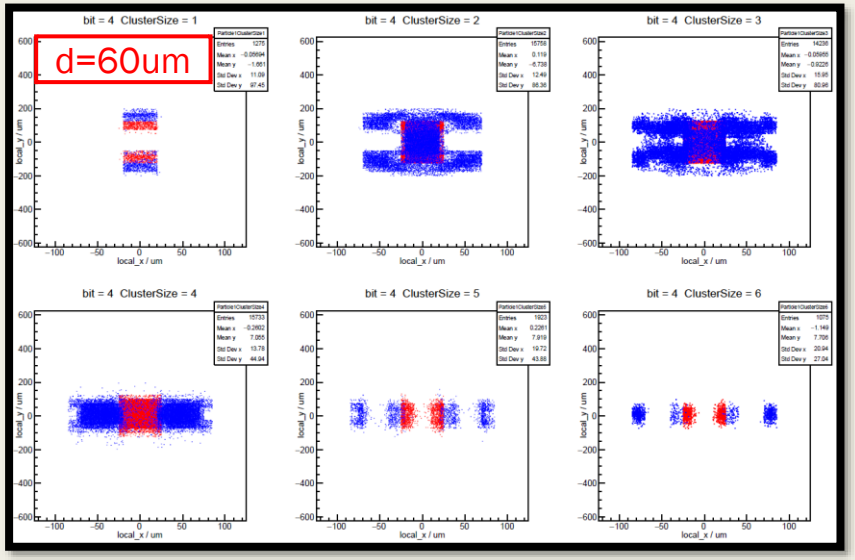


$\eta = 1 \quad \varphi = 0$ 2 particle



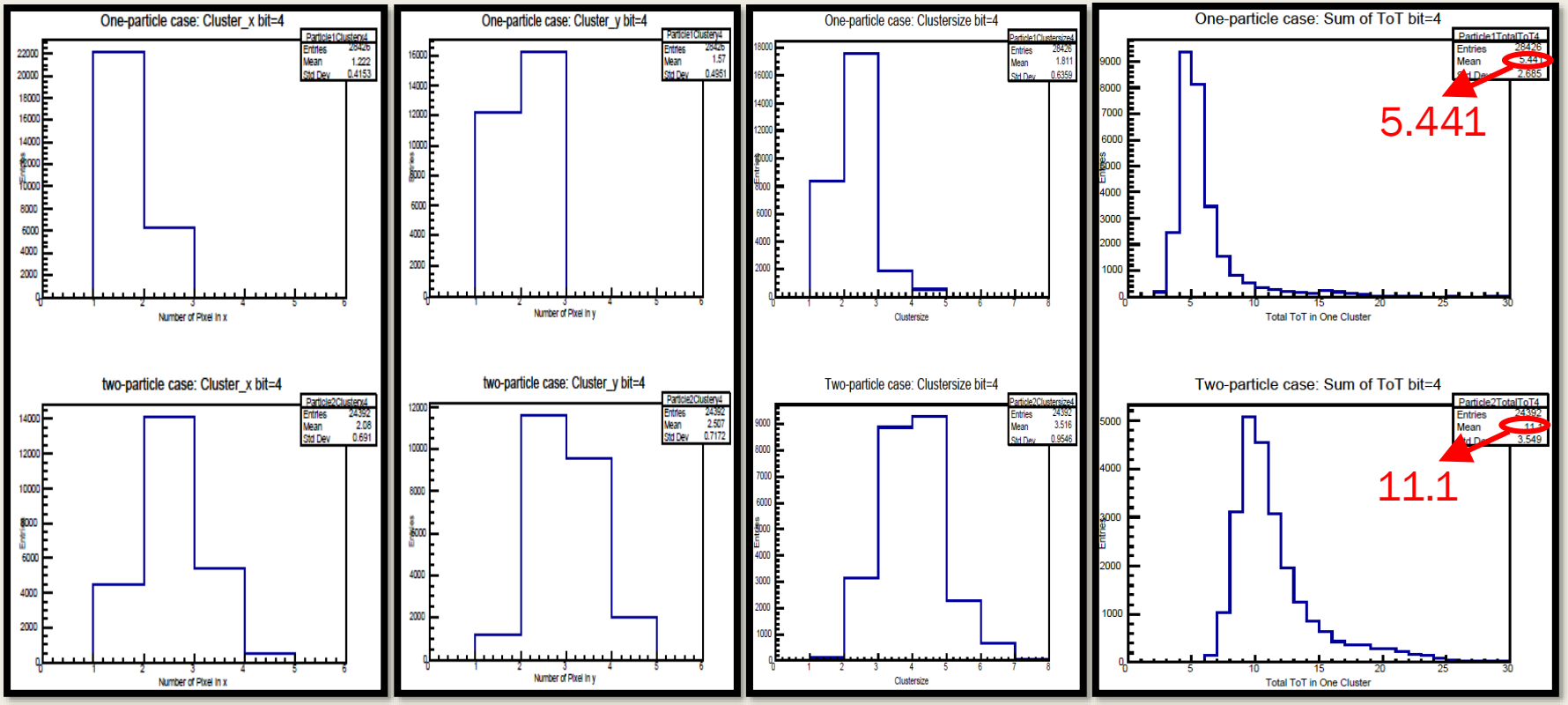






- Red: 1st particle, Blue: 2nd particle

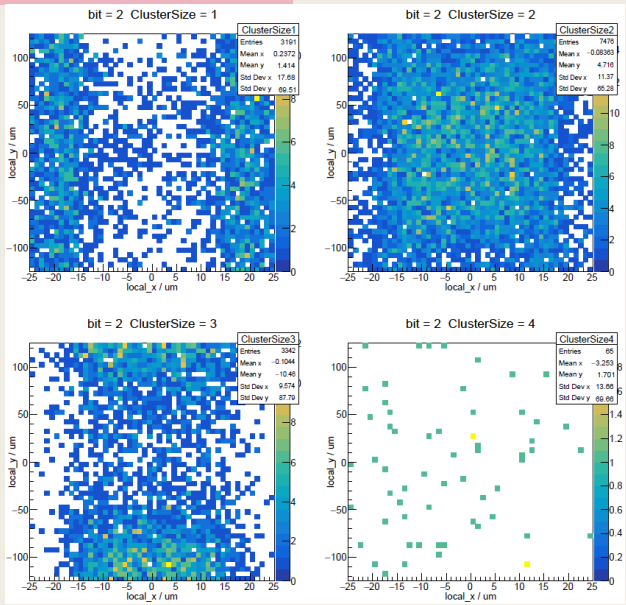
$\eta = 1 \quad \varphi = 0$

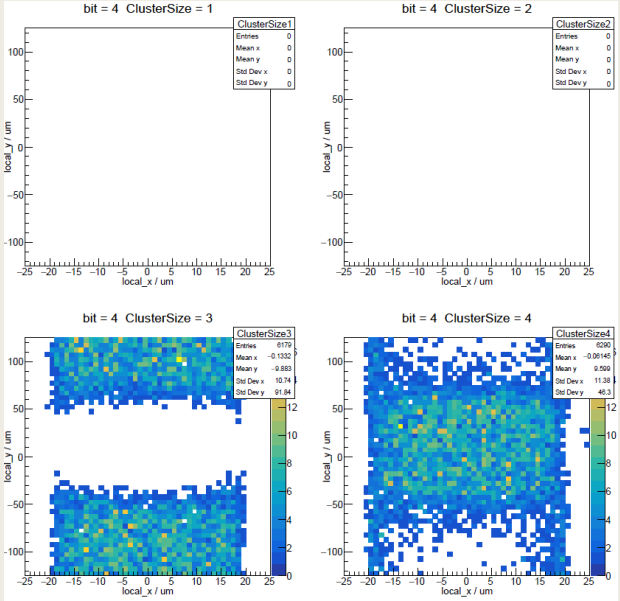


- 4 parameters: Cluster_x, Cluster_y, Clustersize, Sum of ToT

$\eta = 2 \quad \varphi = 0$ 1 particle

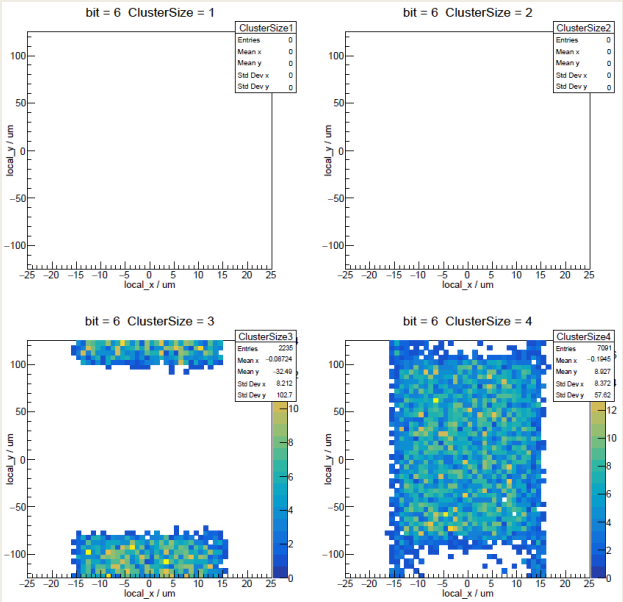
Bit=2

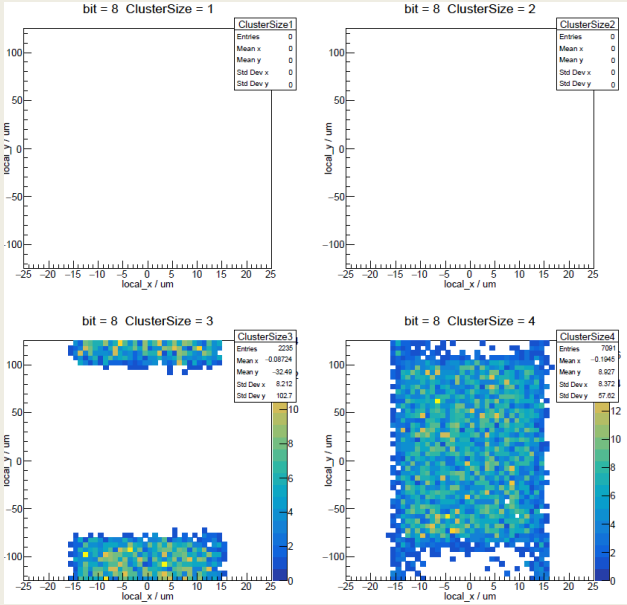




Bit=4

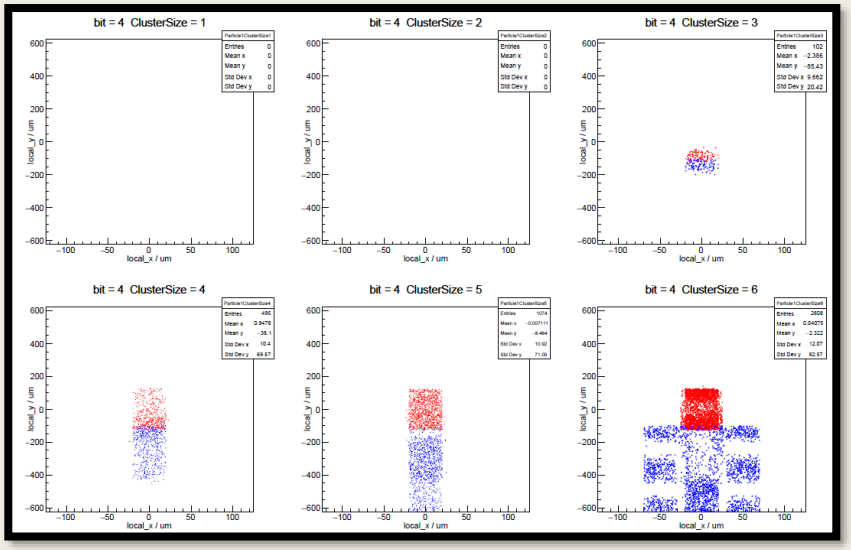
Bit=6

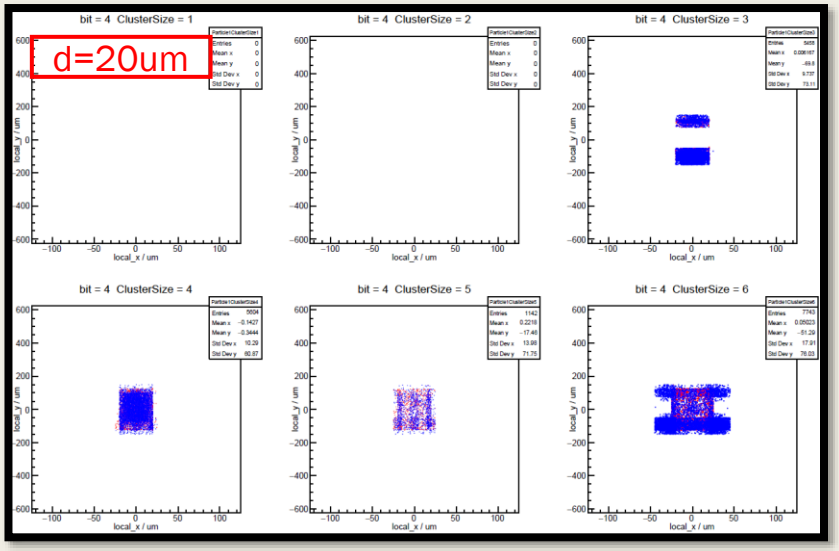


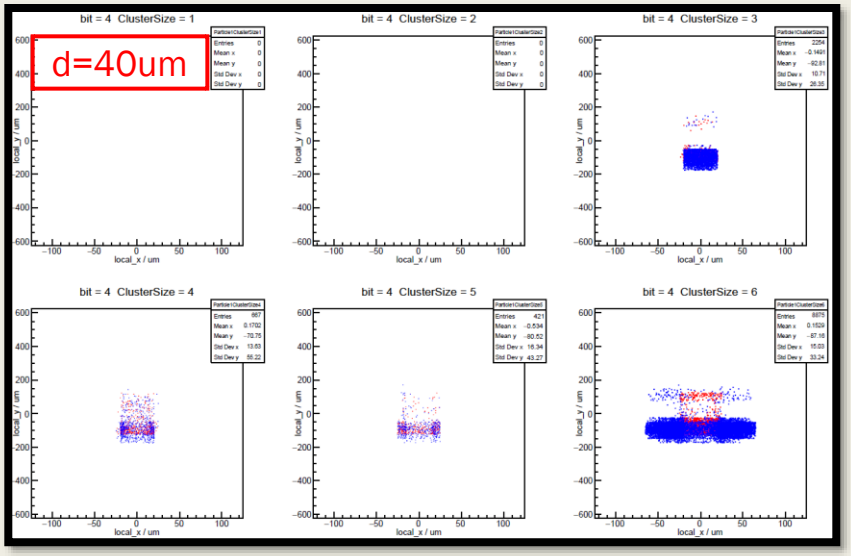


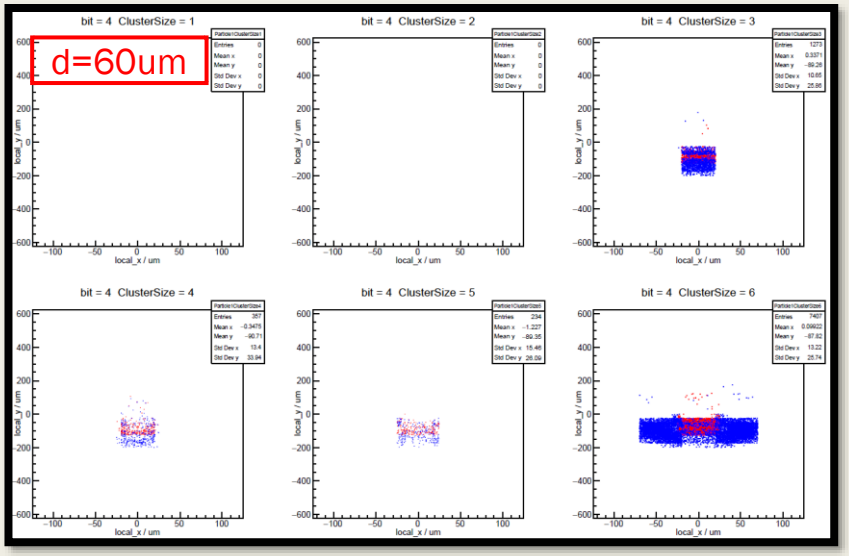
Bit=8

$\eta = 2 \quad \varphi = 0$ 2 particle



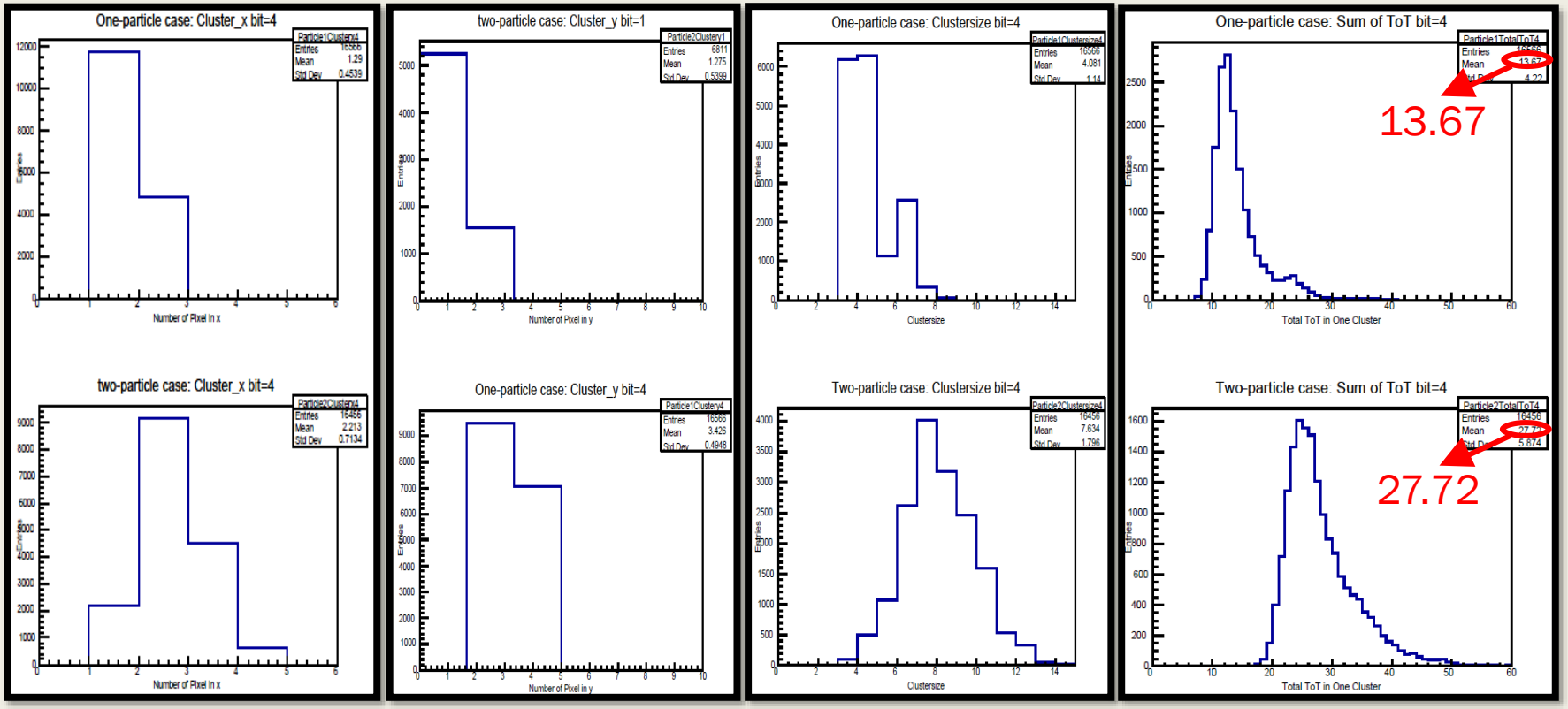




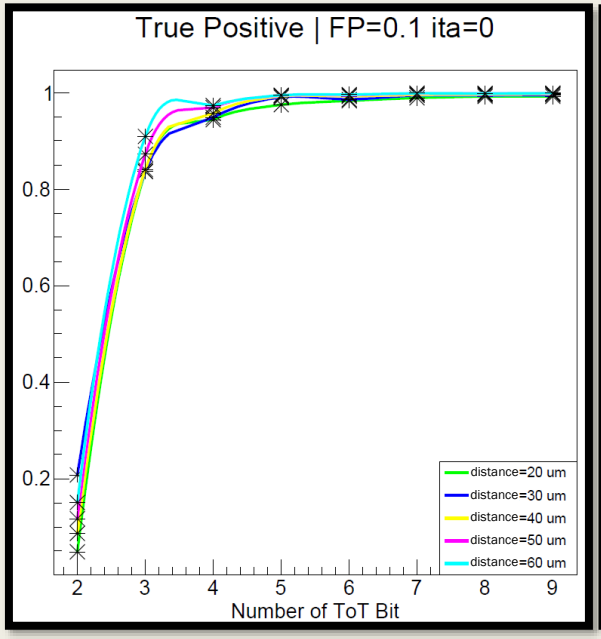


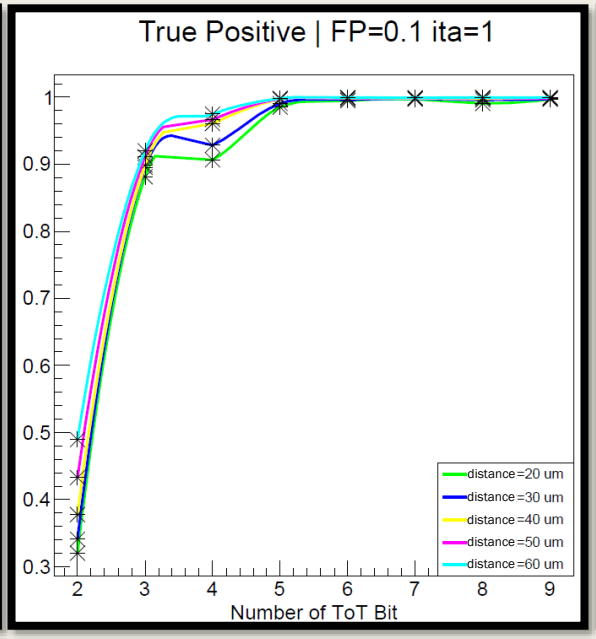
- Red: 1st particle, Blue: 2nd particle

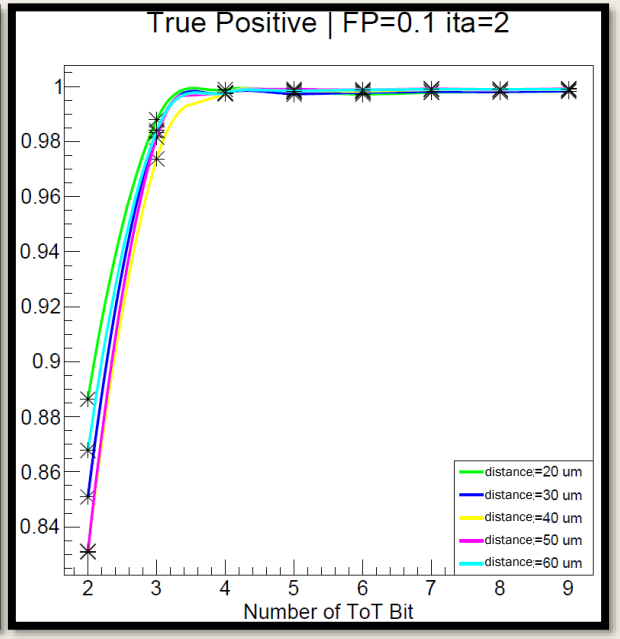
$\eta = 2 \quad \varphi = 0$



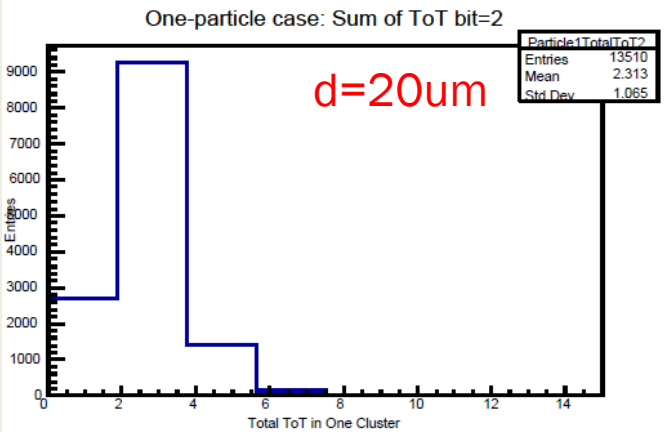
- 4 parameters: Cluster_x, Cluster_y, Clustersize, Sum of ToT

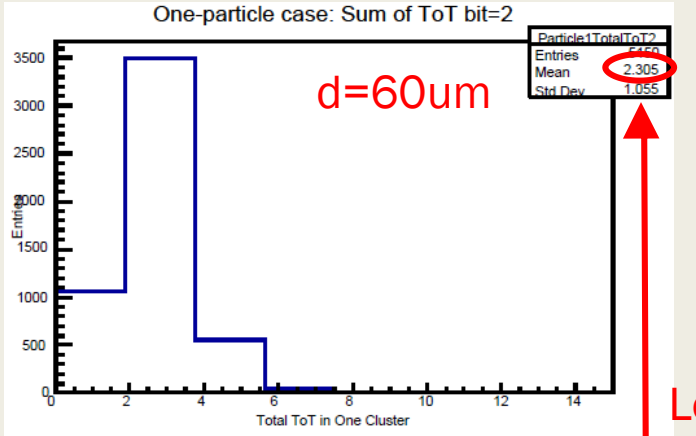


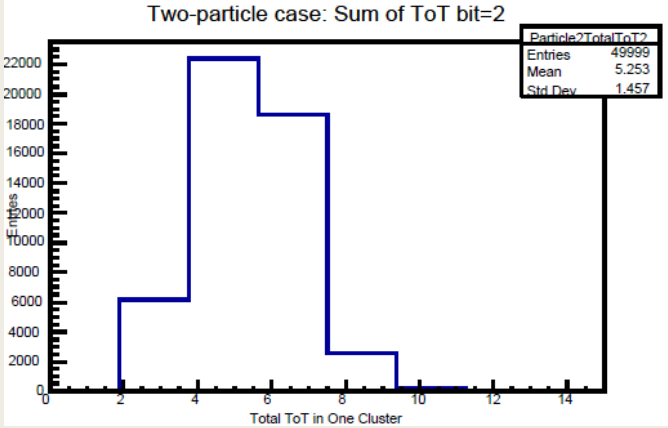


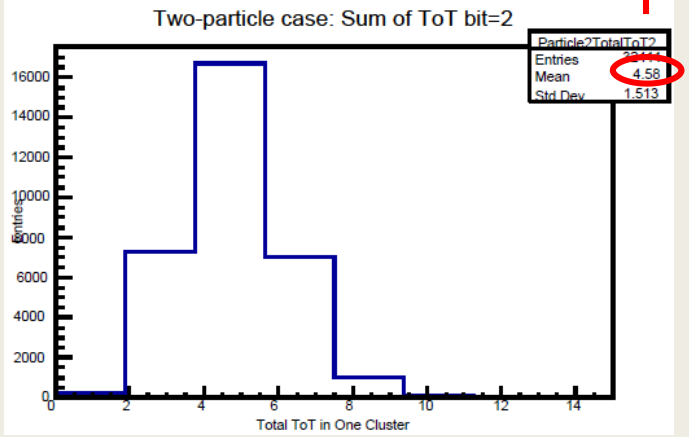


- False Position=0.9
- ToT>4, True Position is near 1
- Ita=2, TP is not decreasing with distance increasing when tot bit is small









Less than twice

- Larger distance:
  - *Overlap pixels of the 2 particles are less*
  - *More pixels are below threshold*
  - *Especially in small tot bits*

- Fix ita=2
- Start regression of position

Thanks!