Strip Clustering in Svx Offline Package

Svx Meeting
May 30, 2008

Kenichi Nakano
RIKEN

Introduction

- Main topic: studies of charge sharing and clustering in stripixel layers
  - Sasha has implemented the simple charge sharing between strips
  - Manabu is working on the x-u charge sharing
  - I have just made a simple strip clustering (x & u separately)

- Simulation Condition
  - HIJING Au+Au events –> PISA –> SvxSimreco
  - Sasha's charge sharing algorithm turned on
  - 50%-50% charge sharing between x & u (no energy asymmetry)
  - x-strips clustering & u-strips clustering –> *detail in next page*
  - x-u crossing (also called “cluster”) finding –> *detail in next page*
  - no noise added

Clustering Method

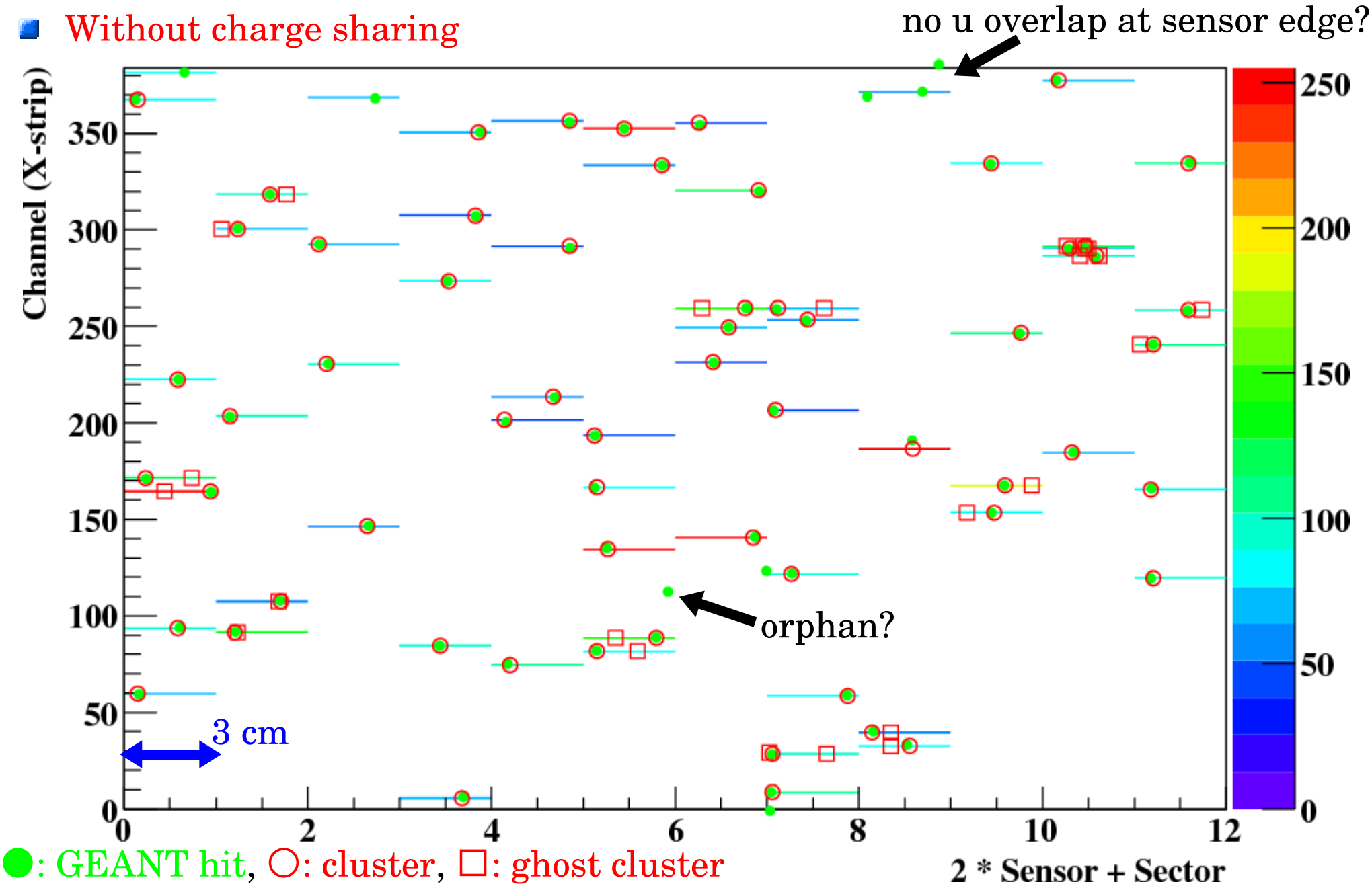
- Strip clustering (x & u separately)
  - just gather continuous fired strips
  - N of strips in a cluster **not** limited (like < 3) to see how it is in reality
  - no minimum energy cut applied, no noise added

- X & u clustering
  - cluster position = where the center of x-strips crosses the center of u-strips
  - no energy asymmetry cut applied ... it can reduce ghosts

- Performance plots in later slides
  - comparision between the original method (no charge sharing) and this method (charge sharing + clustering)
  - in conclusion...
    - this method works fine (at least not worse than the original in terms of hit-position reconstruction)
    - even in the original, there are some parameters/algorithms to be tuned

Hit Positions in Layer 3 Ladder 0

- Without charge sharing

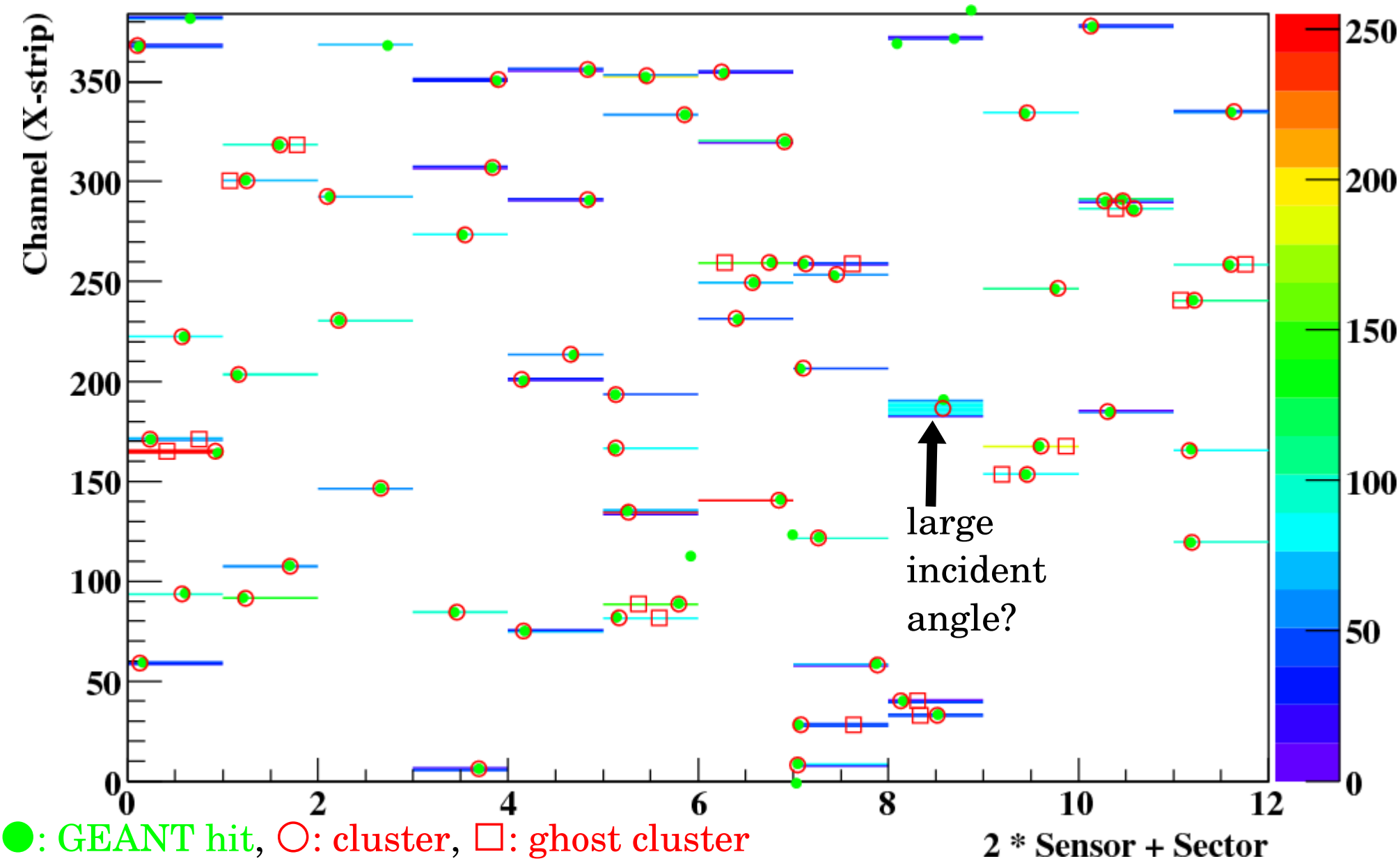


●: GEANT hit, ○: cluster, □: ghost cluster

—— : X raw hit (U not shown)

Hit Positions in Layer 3 Ladder 0

- With charge sharing & clustering



●: GEANT hit, ○: cluster, □: ghost cluster

—— : X raw hit (U not shown)

Number of Hits in Stripixel Ladders

Without charge sharing

N of GEANT hits
- stripixel ladder = 3967
- layer 3 ladder 0 = 69

N of raw hits
- stripixel ladders = 6973
- layer 3 ladder 0 = 125

N of clusters
- stripixel ladder = 5710
- layer 3 ladder 0 = 85
- all ghost = 2256
- ghost on layer 3 ladder 0 = 24

With charge sharing & clustering

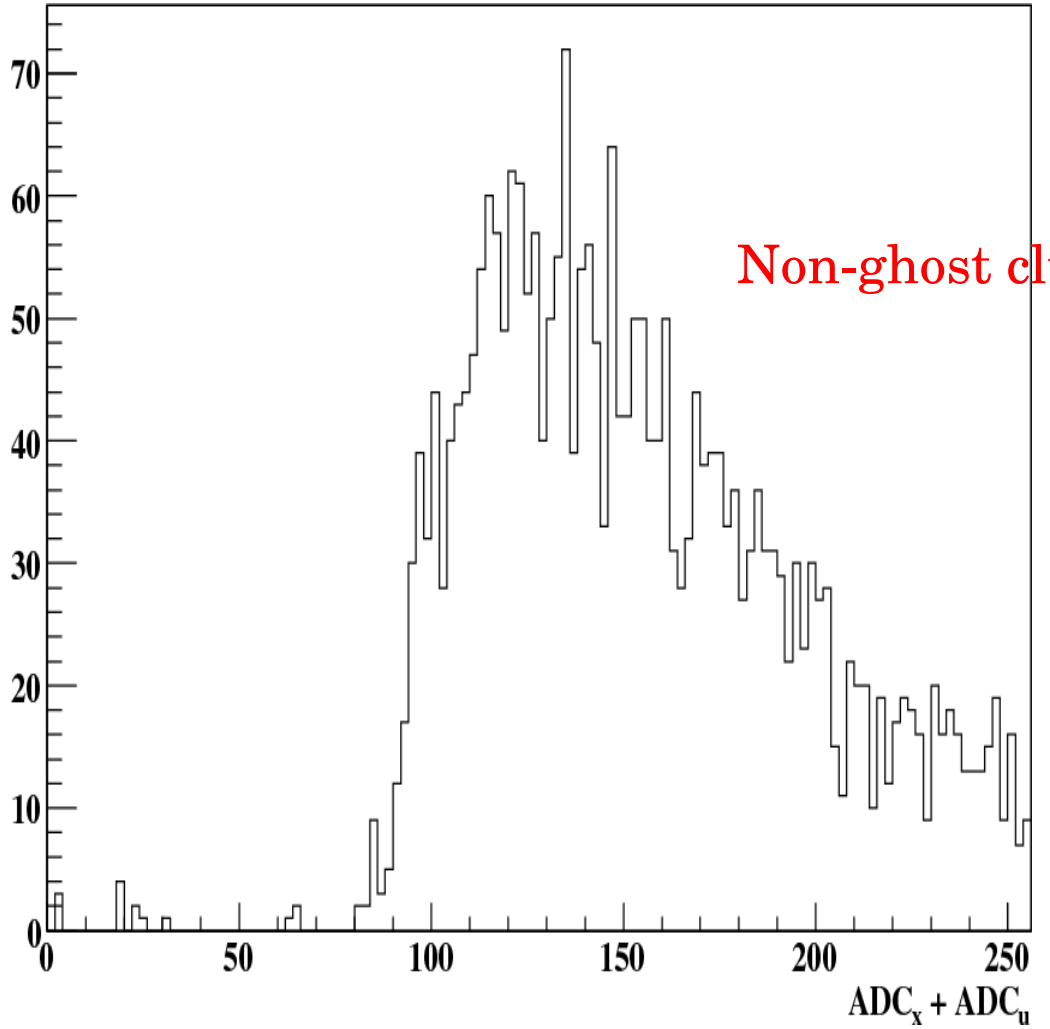
N of GEANT hits
- stripixel ladder = 3967
- layer 3 ladder 0 = 69

N of raw hits
- stripixel ladders = 14023
- layer 3 ladder 0 = 195

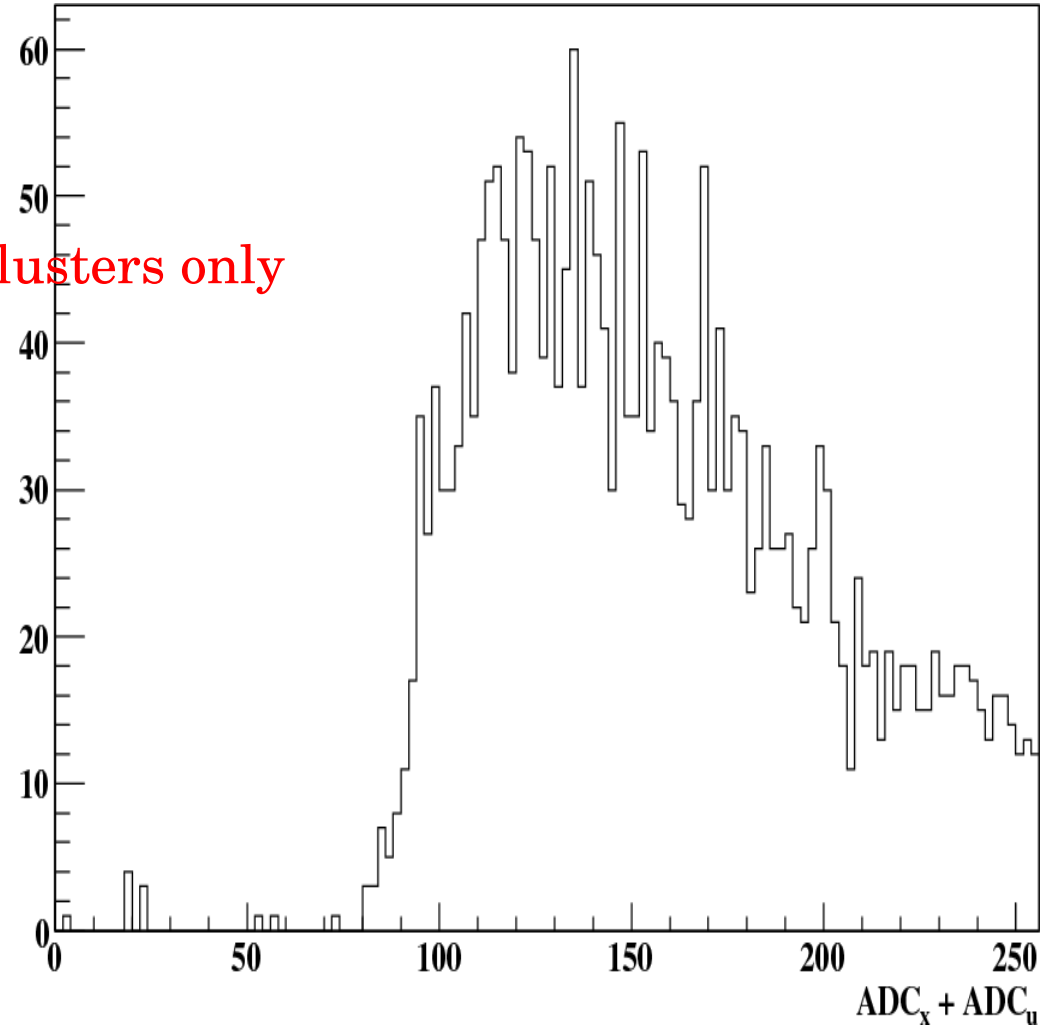
N of clusters
- stripixel ladder = 4974
- layer 3 ladder 0 = 77
- all ghost = 1583
- ghost on layer 3 ladder 0 = 16

ADC Sums of X & U Strips in Each Cluster

Without charge sharing



With charge sharing + clustering



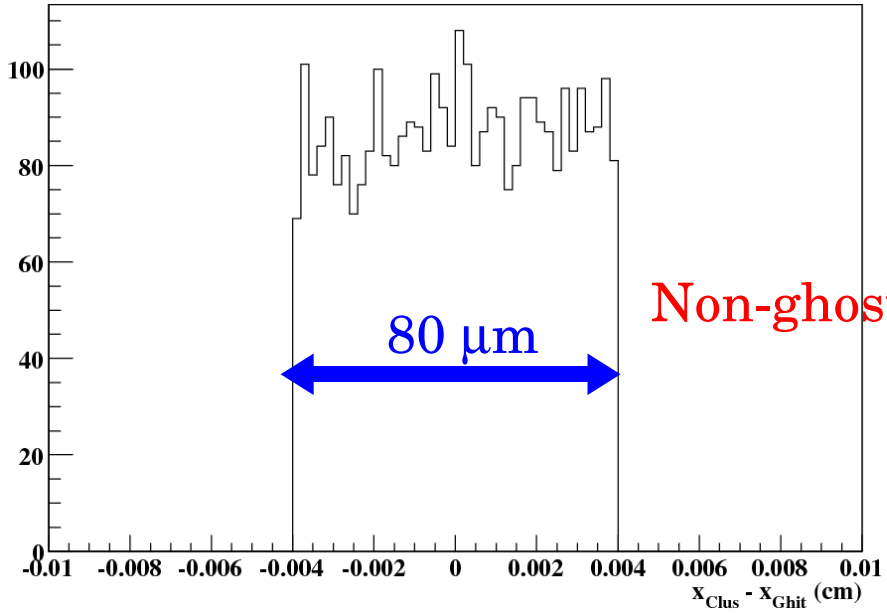
Non-ghost clusters only

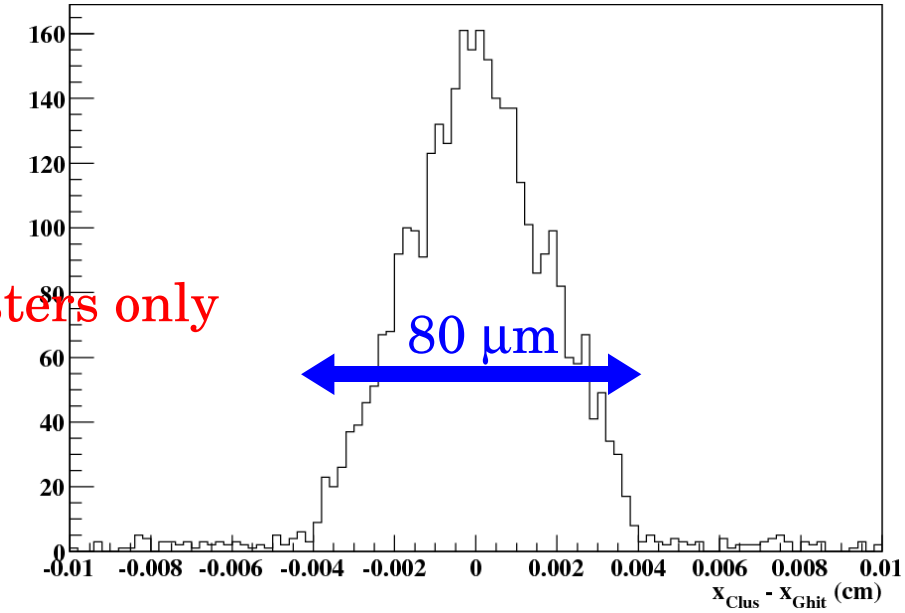
Hit Position Difference between GEANT hit & Cluster

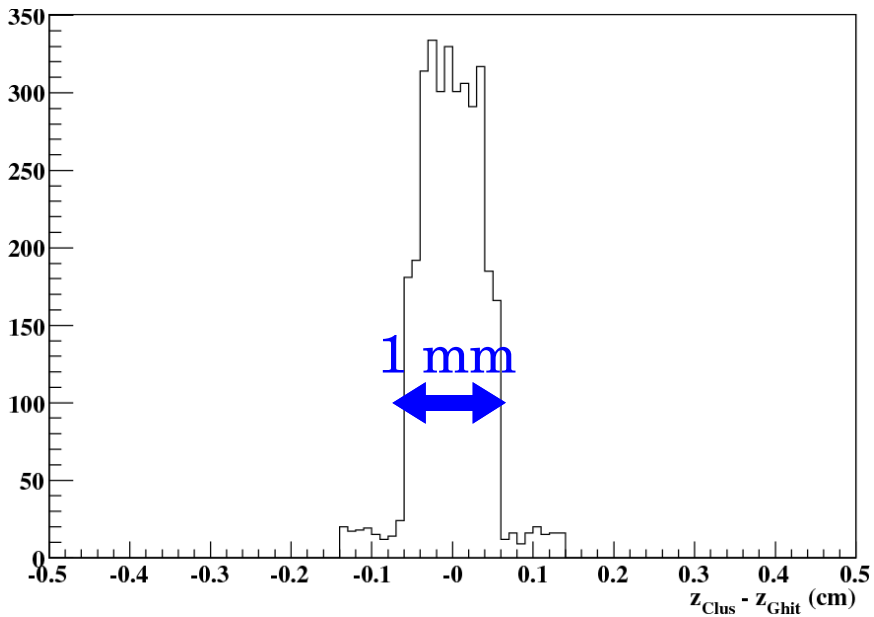
Without charge sharing

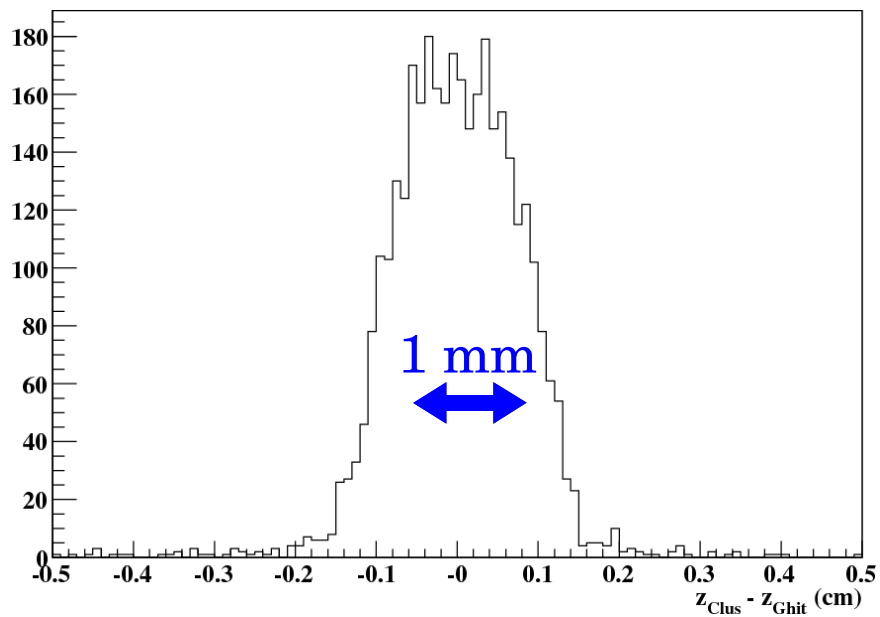
With charge sharing + clustering

Non-ghost clusters only



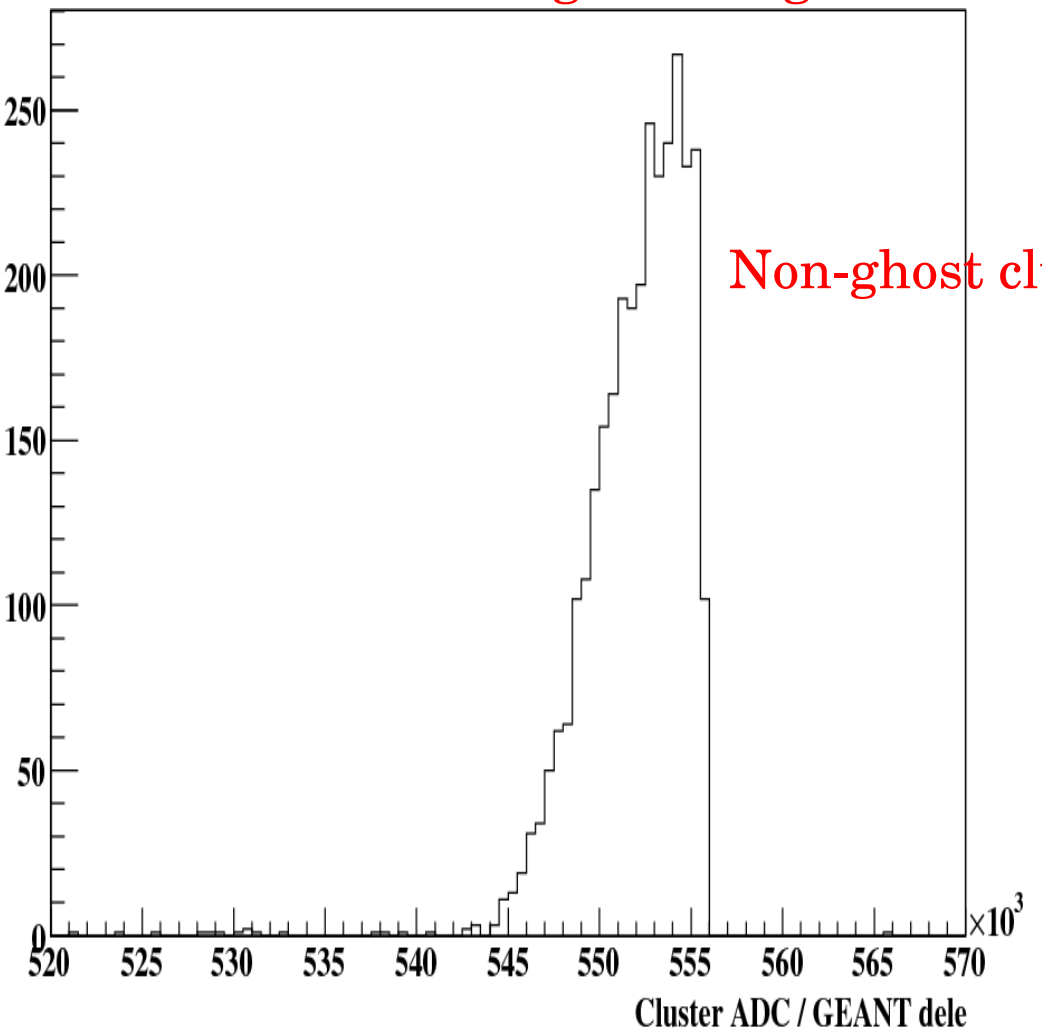




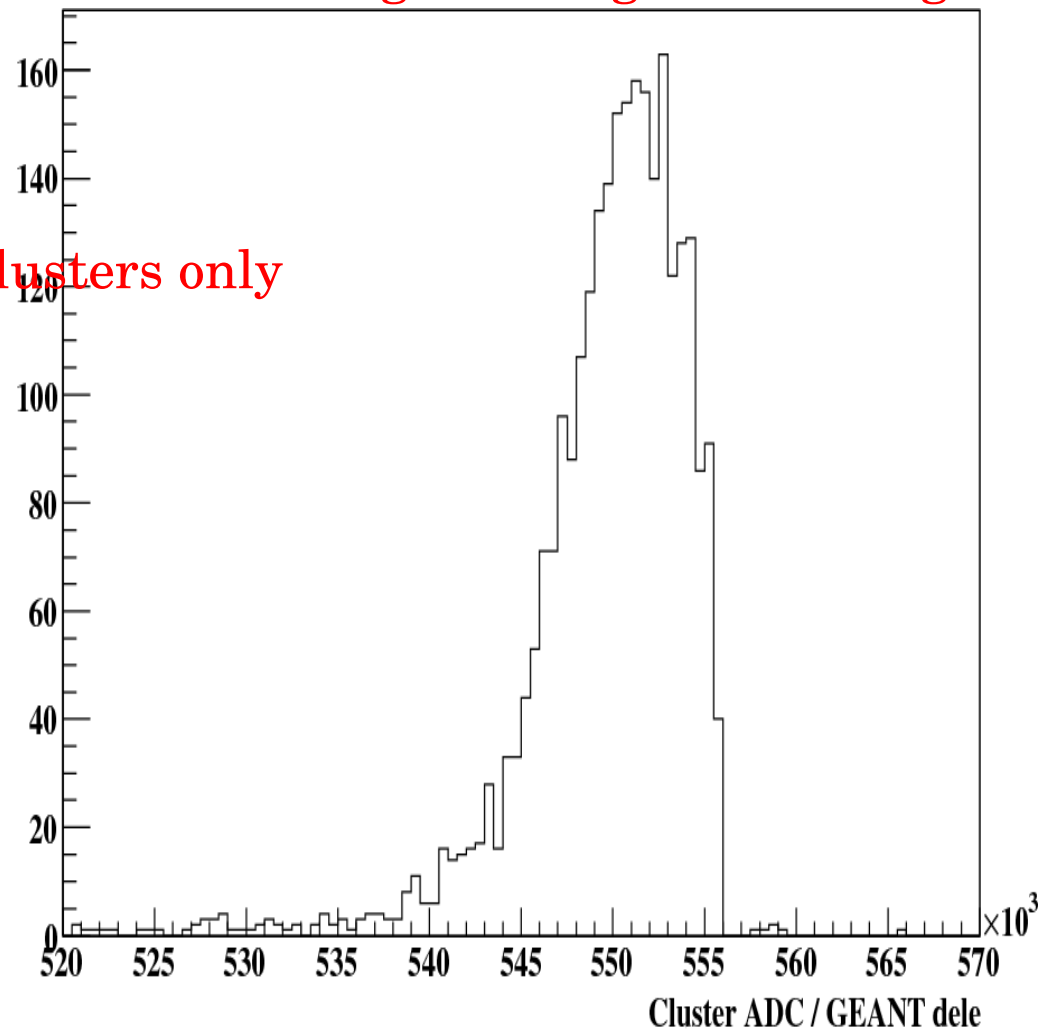


Cluster ADC / GEANT Energy Deposit ("dele")

Without charge sharing

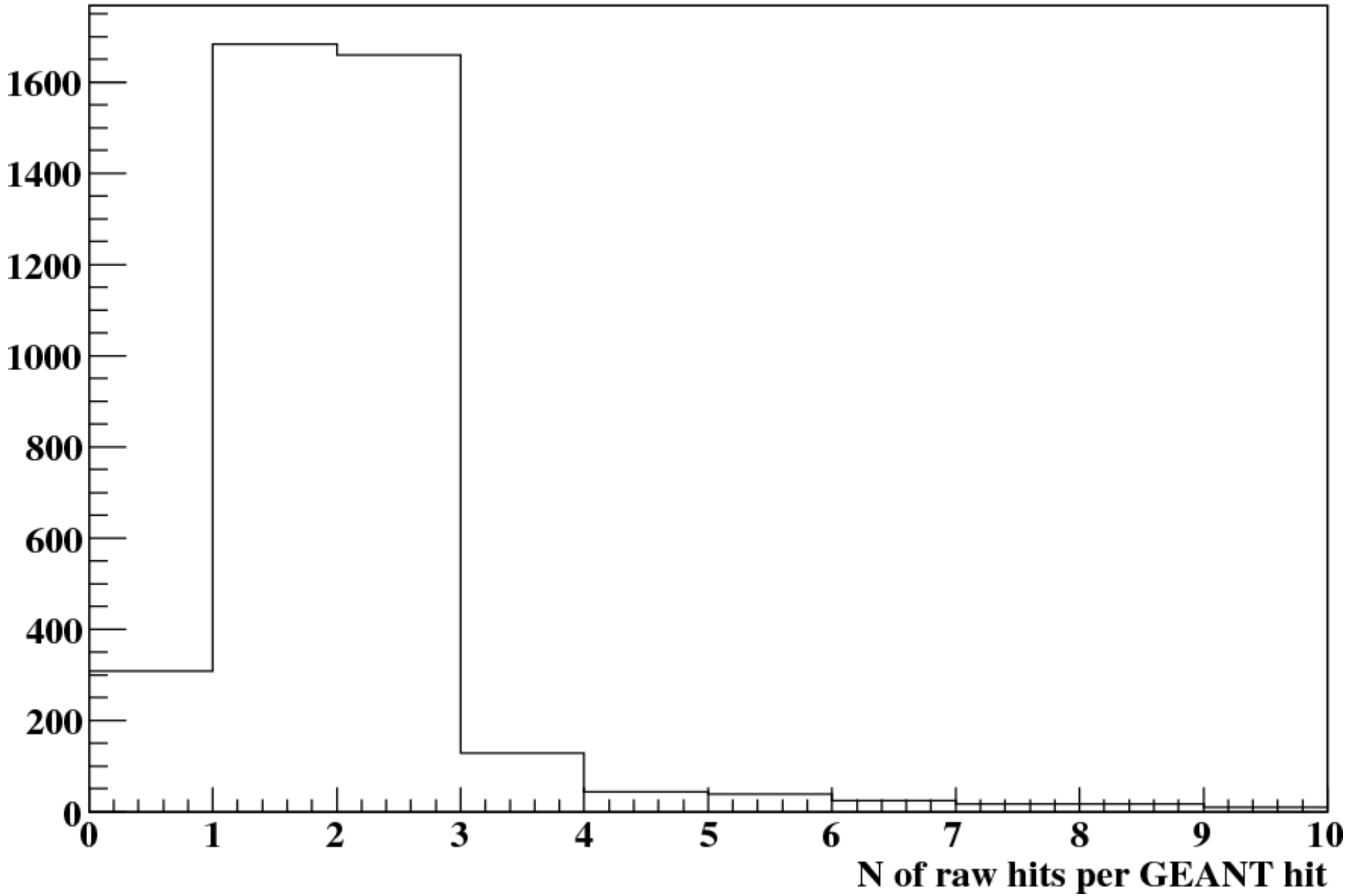


With charge sharing + clustering



Non-ghost clusters only

Backup Slides...

Number of Raw Hits per GEANT Hit

With charge sharing + clustering, of course