

# Charge Sharing and Clustering in Pixel Layer

Svx Software Meeting

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# Topics

1. Implementations of hit and hit-list classes  
(STL vector  $\rightarrow$  TClonesArray)
2. Charge sharing and clustering in pixel layer

# 1. Implementations of Hit and Hit-List Classes

## ▶ Story

- ▶ the original hit-list classes (`SvxGhitList` etc.) need a too-long time in sorting hits due to `TClonesArray::Sort` badness
- ▶ I adopted STL vector instead of `TClonesArray`, but it needs a larger file size and a longer time in being written out
- ▶ conventional array has the defect same as STL vector, because `TClonesArray` itself has a special I/O scheme

## ▶ Final configuration

- ▶ the hit-list classes have a `TClonesArray` object to hold hits
- ▶ when sorting, hits are copied into a temporal STL-vector object
- ▶ in addition, the hit-relator classes (`SvxGhitRawhitList` etc.) have been reverted

## ▶ To be committed to PHENIX CVS in one week

## 2. Charge Sharing and Clustering in Pixel Layer

### ▶ Charge sharing (Manabu's work)

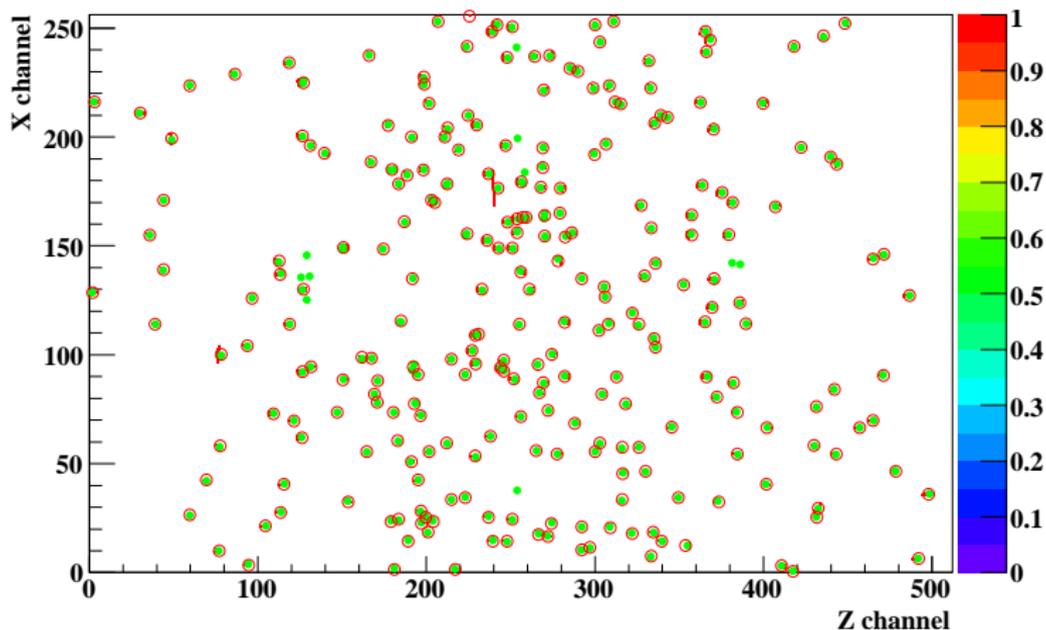
- ▷ for each GEANT hit, charges are shared by the fraction of a path length in each pixel toward the total path length
- ▷ the effect of charge diffusion not yet considered
- ▷ (note) ADC = 0 or 1, no noise

### ▶ Clustering

- ▷ just gather fired pixels neighboring in  $x$  or  $z$  directions (8 pixels around a initial fired pixel are candidates)
- ▷ cluster position is just the mean value of pixel positions
- ▷ no clustering across sections
  - ▷▷ one pixel sensor consists of 7 sections (0 to 6)
  - ▷▷ sensors 0, 2, 4, 6 are under readout chips and consist of 30 or 31 pixels in  $z$  with  $425 \mu\text{m}$
  - ▷▷ sensors 1, 3, 5 are between readout chips and consist of 2 pixels in  $z$  with  $625 \mu\text{m}$

## 2. Charge Sharing and Clustering in Pixel Layer

### ▶ Event display (Layer 0, Ladder 0)



21.8 cm width, 1.28 cm height / ●: GEANT hit, ○: cluster

▶ no cluster for some GEANT hits at sensor edge ... to be investigated

## 2. Charge Sharing and Clustering in Pixel Layer

- ▶ Position resolution (**Layer 0**)
  - ▷ right plots,  $x_{Cluster} - x_{Ghit}$
  - ▷ consistent with  $width/\sqrt{12}$
- ▶  $N$  of raw hits per GEANT hit (**Layer 0**)
  - ▷ mostly 2 or 3

