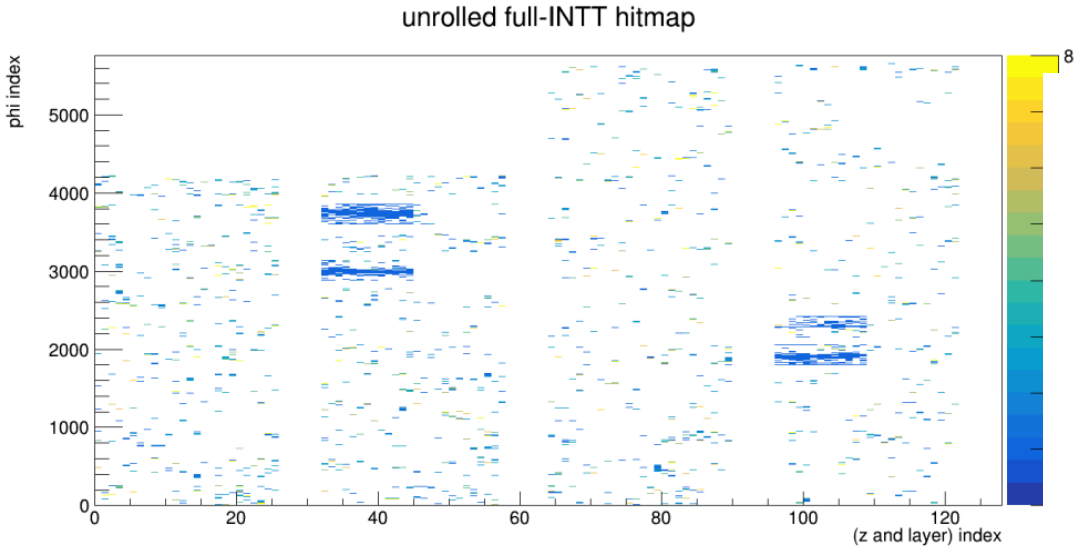
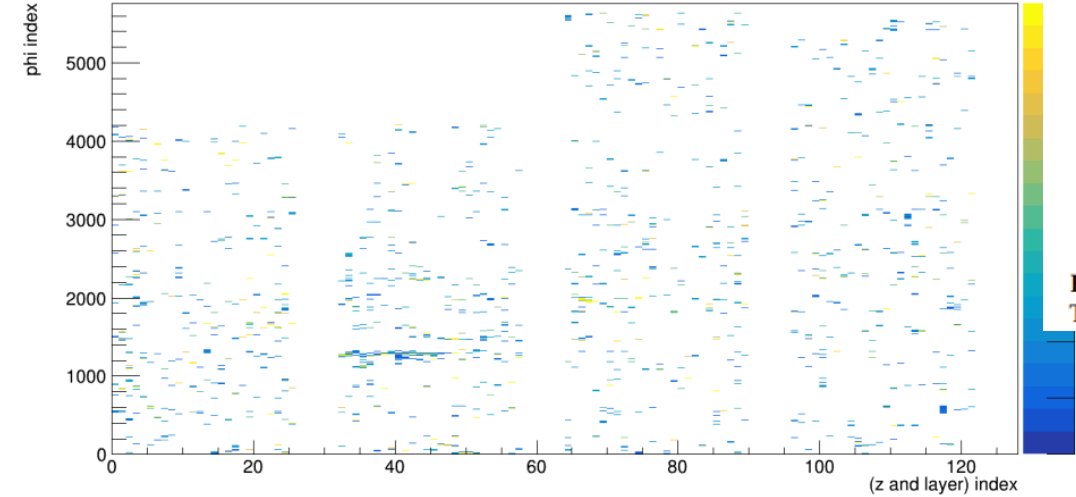


Streaks in TrkrHit distribution in data

- “Streak” = at least 5 consecutive TrkrHits in z direction
- Occurs in roughly 10% of events
- One type: large diffuse ADC=0 line



- Another type: thin line with higher ADC values
- Both types affect reco and analysis, since they create many near-duplicate clusters



MVTX

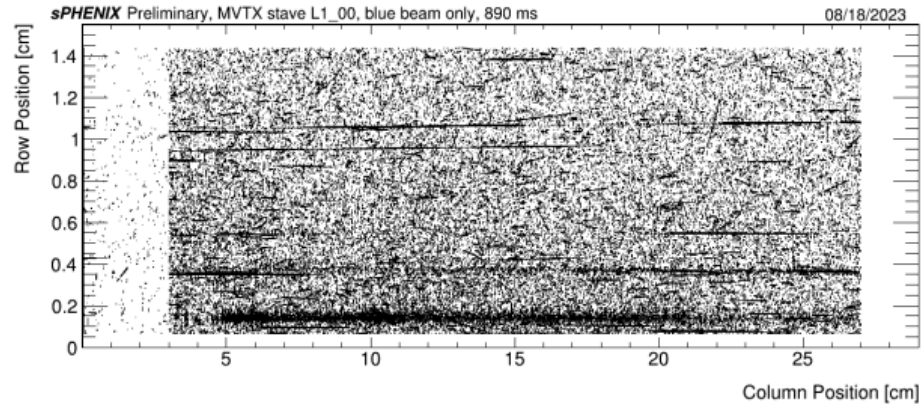
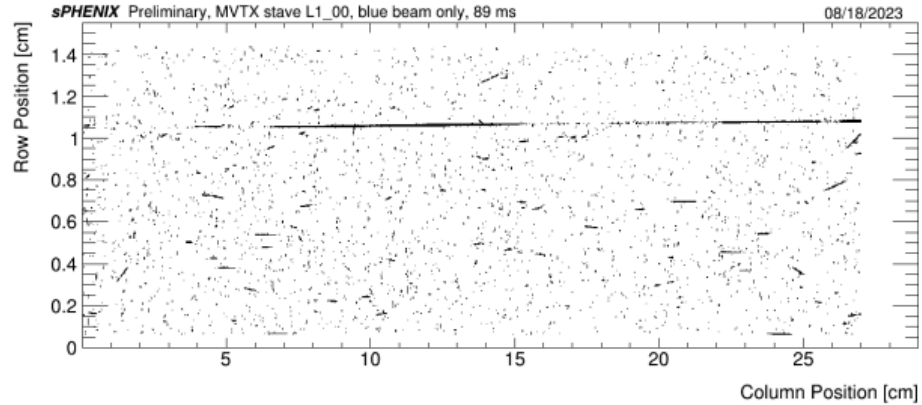
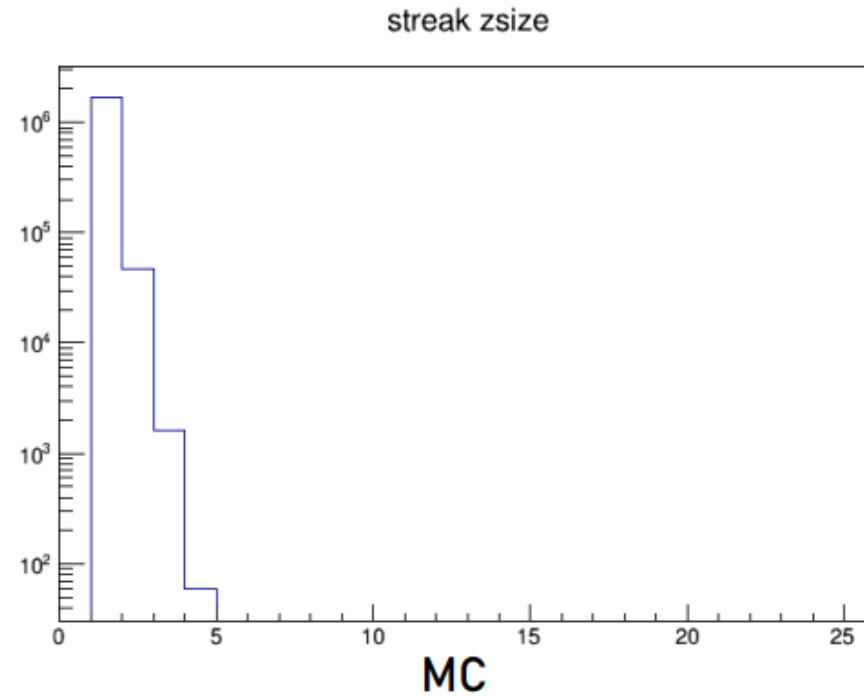
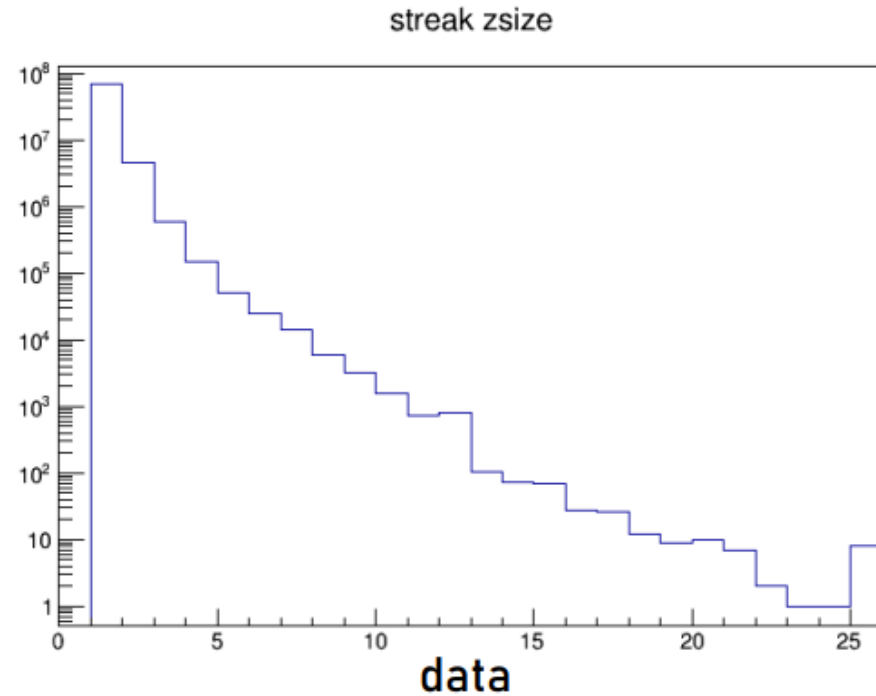


Figure 50: Hit map from Stave L1 00 taken during a fill with only the blue beam and no collisions. Top - data recorded over 89 ms. Bottom - data recorded over 890 ms.

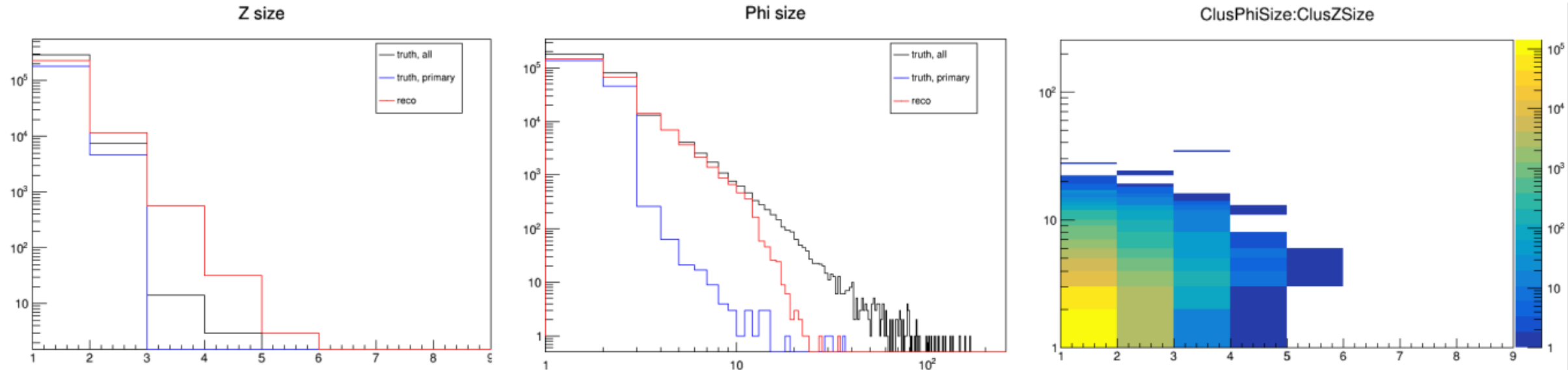
<https://indico.bnl.gov/event/20205/attachments/49212/84264/Commissioning Status August 2023 1.0RC.pdf>

Streak length

- “streak zsize” = number of consecutive TrkrHits in z
- Long streaks present in data, but not in MC



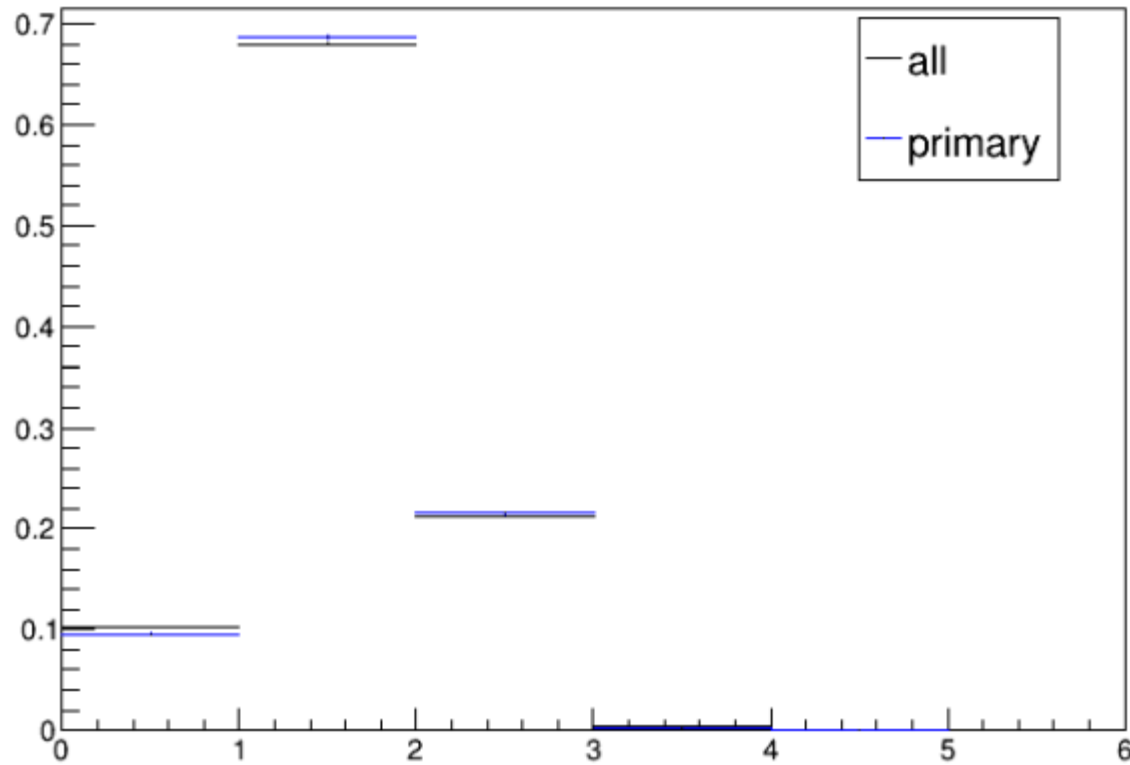
How do reco clusters compare to truth?



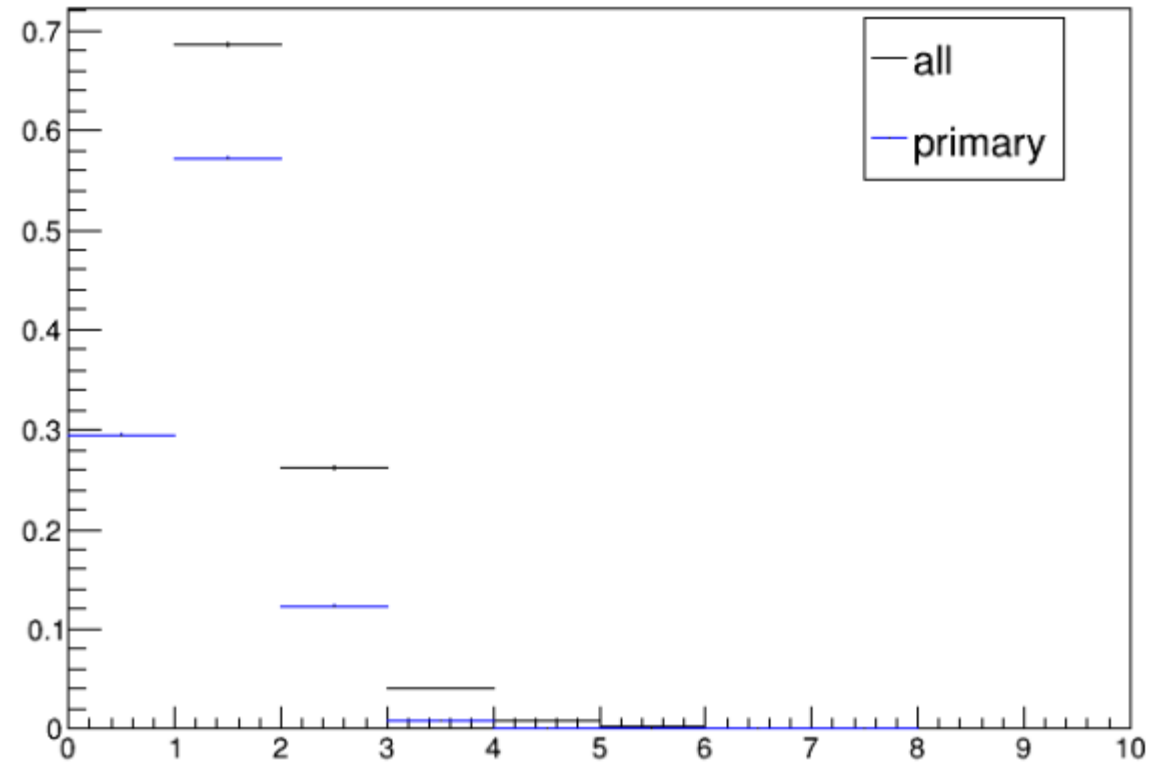
- But this isn't quite what we want from a benchmark; just because size distributions overlap (or don't) doesn't mean clusters are (or aren't) actually properly reconstructed

Standard Clusterizer (w/ Z clustering)

Number of reco clusters for truth cluster



Number of G4Particles for reco cluster



- 10% of truth clusters are missed, 22% of truth clusters are split in reco
- 0% of reco clusters (in MC) are fake/noise, 30% of reco clusters are secondaries, 30% of reco clusters merge multiple truth particles

Test of benchmark: Standard vs. XOR adjacency

- Currently, definition of “adjacent” is: (row difference ≤ 1 and col difference ≤ 1)
- Allows for merging of nominally-separated clusters if one of their TrkrHits is diagonal to another cluster’s TrkrHit
- To see how big this effect is, we can define adjacent as: ((row difference ≤ 1 and col difference $= 0$) xor (row difference $= 0$ and col difference ≤ 1))

Blue	Blue	White	White
Blue	Blue	White	White
White	White	Blue	Blue
White	White	Blue	Blue
White	White	White	White

Blue	Blue	White	White
Blue	Blue	White	White
White	White	Blue	Blue
White	White	Blue	Blue
White	White	White	White