Event Selection in Pass 3 DST

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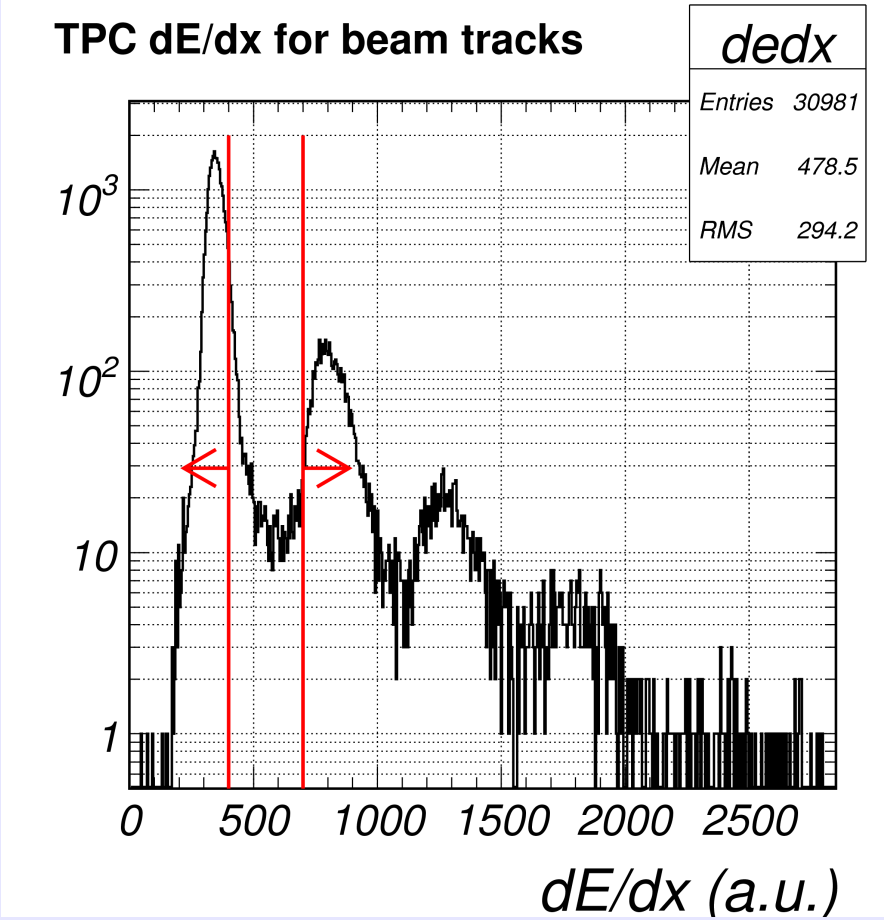
MIPP Software Meeting

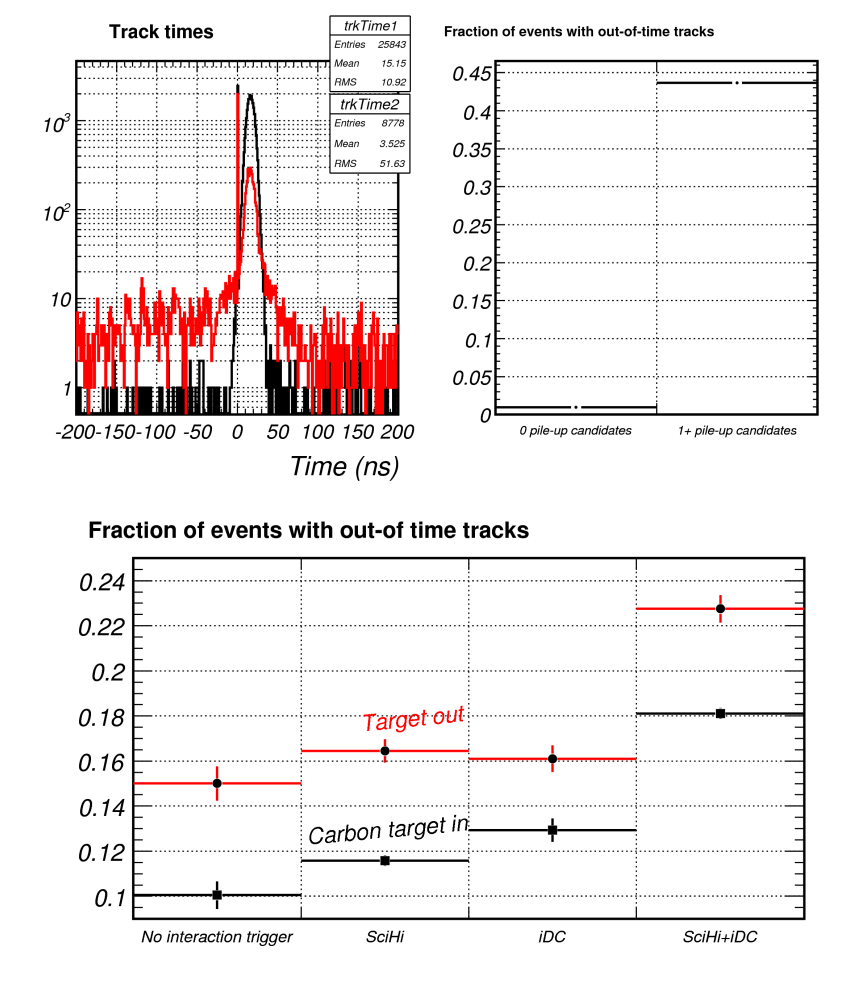
March 22, 2007

Pile-up in 120 GeV/c Data



- 120 GeV data set is clean, but pile up is still there
  - Not wanted for analysis
- Plotting TPC dE/dx for beam tracks gives familiar plot on the left
- Define:
  - 1-track dE/dx<400
  - 2+ track dEdx>700

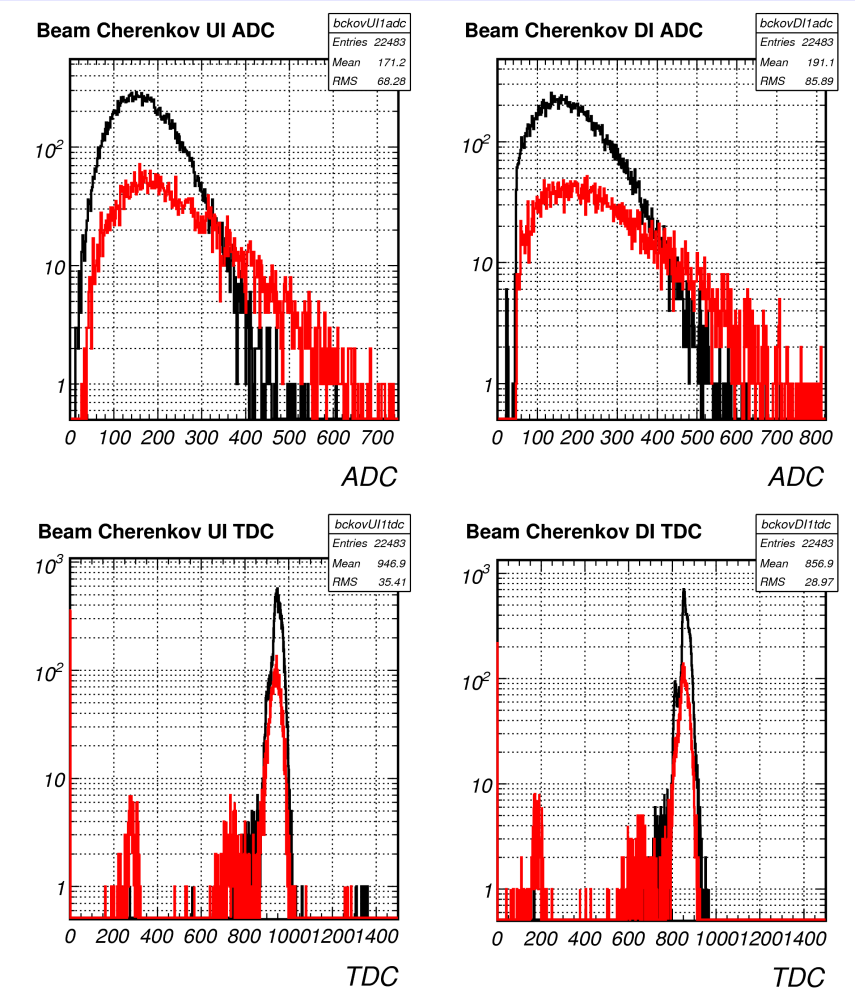
Out of time tracks



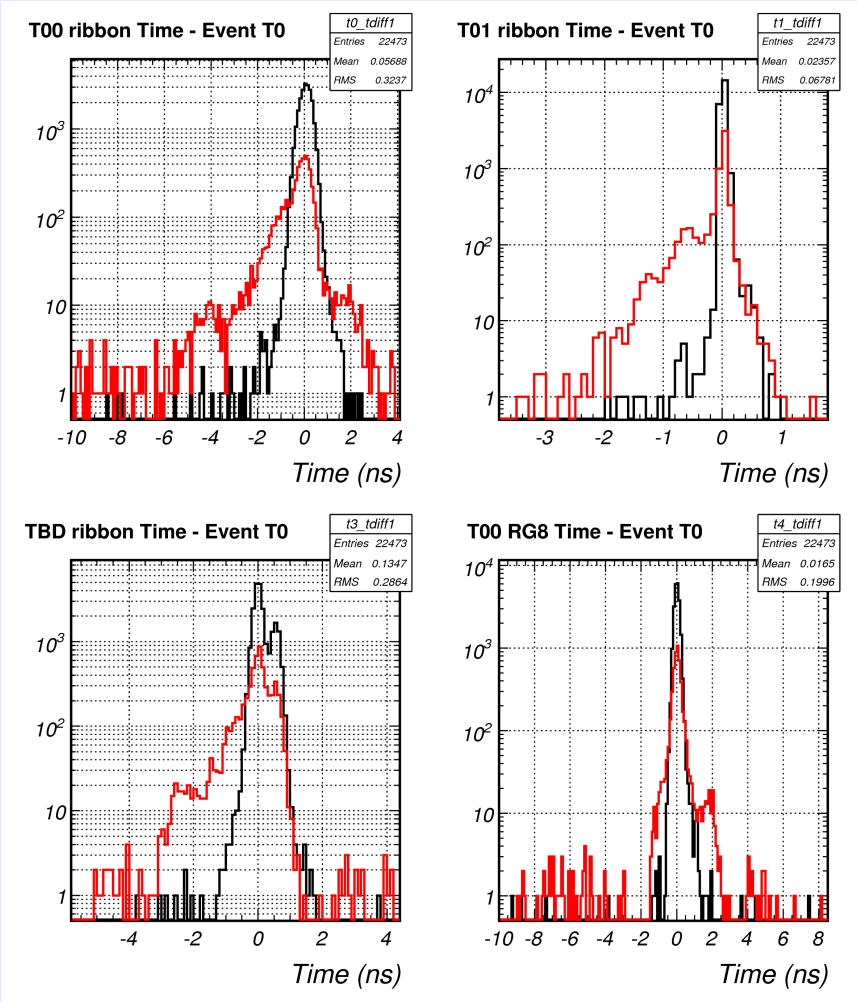
- The strongest variable (as expected) is whether or not there are out of time tracks in the event
  - Info on multiple beam tracks is not available (yet) in the DST
- The "1-track" sample contains very few out of time tracks!

Beam Cherenkov signals

- Additional signals are desirable to make sure that there is no in-time pileup
- It is ok to require Bckov
  - UI ADC<450
  - DI ADC<550
- Similar situation on outer PMT's



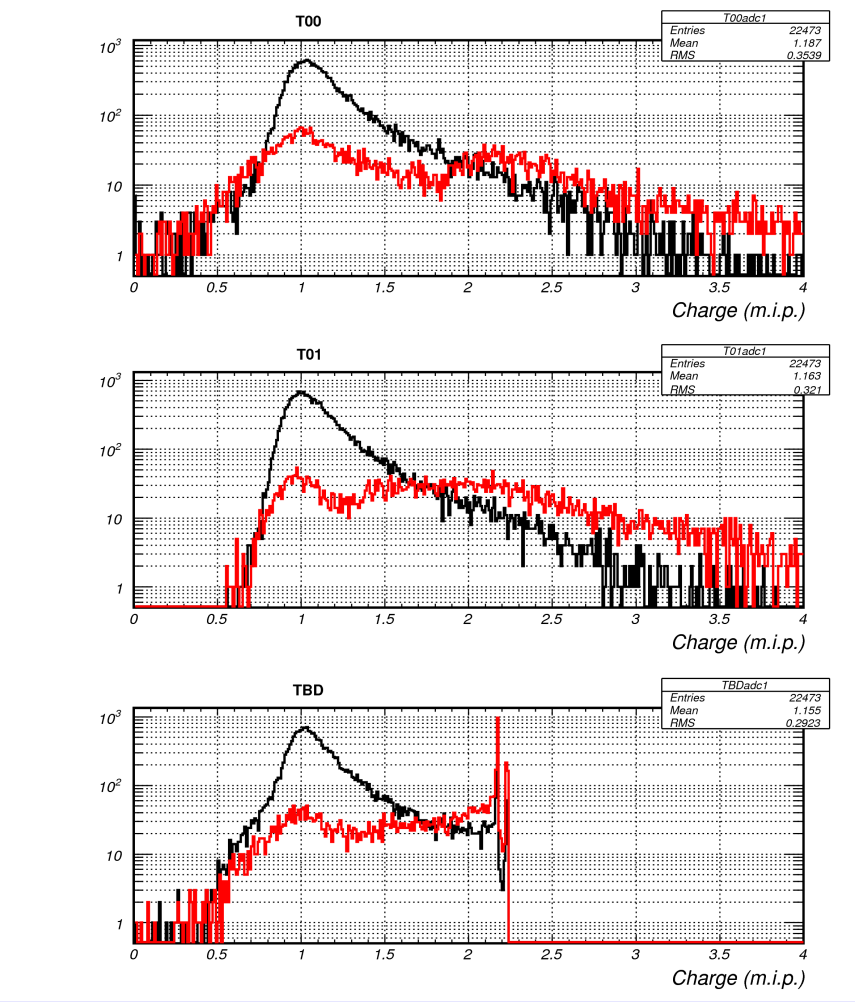
T0 Times



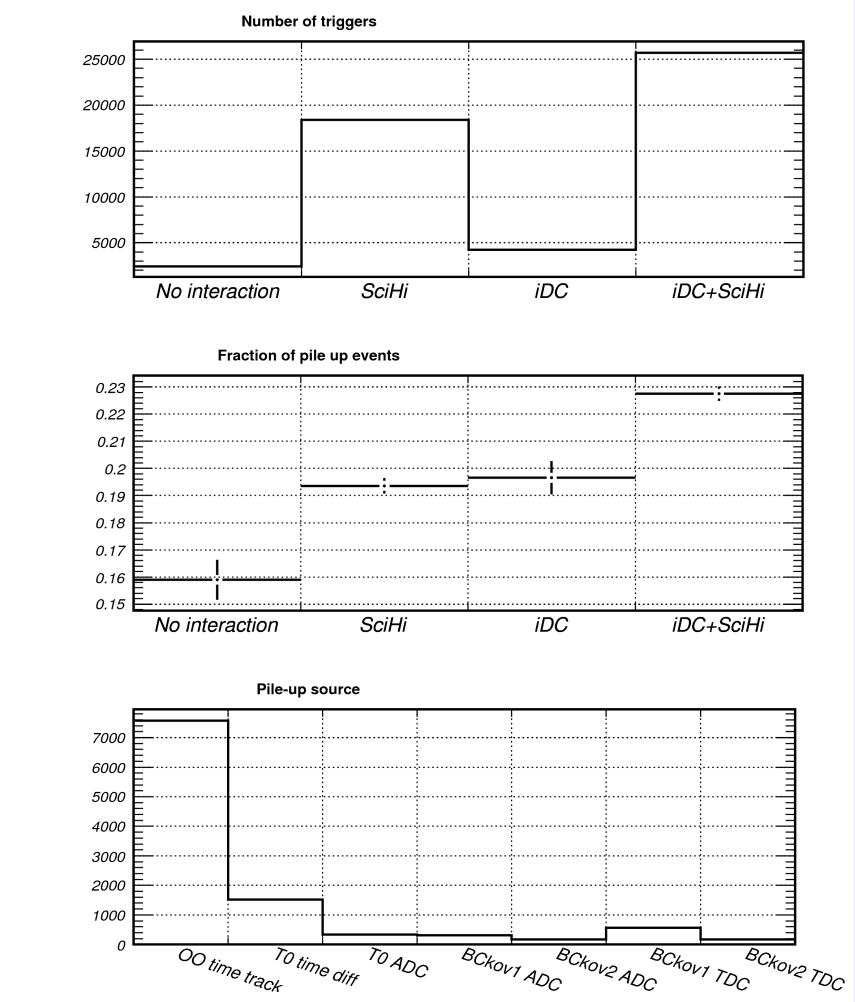
- In 120 GeV one has the luxury of 5 independent measurements of track time
  - In secondary beam data T00 is probably useless
- Again, distributions are very different for 1-track and multi-track events

T0 ADC's

- Because of Landau tail, total charge on T0 counters is not a very strong discriminant
- TBD sees a lot more light, ADC quickly overflows
- Cutting above 3.5 seems reasonable (a bit conservative)



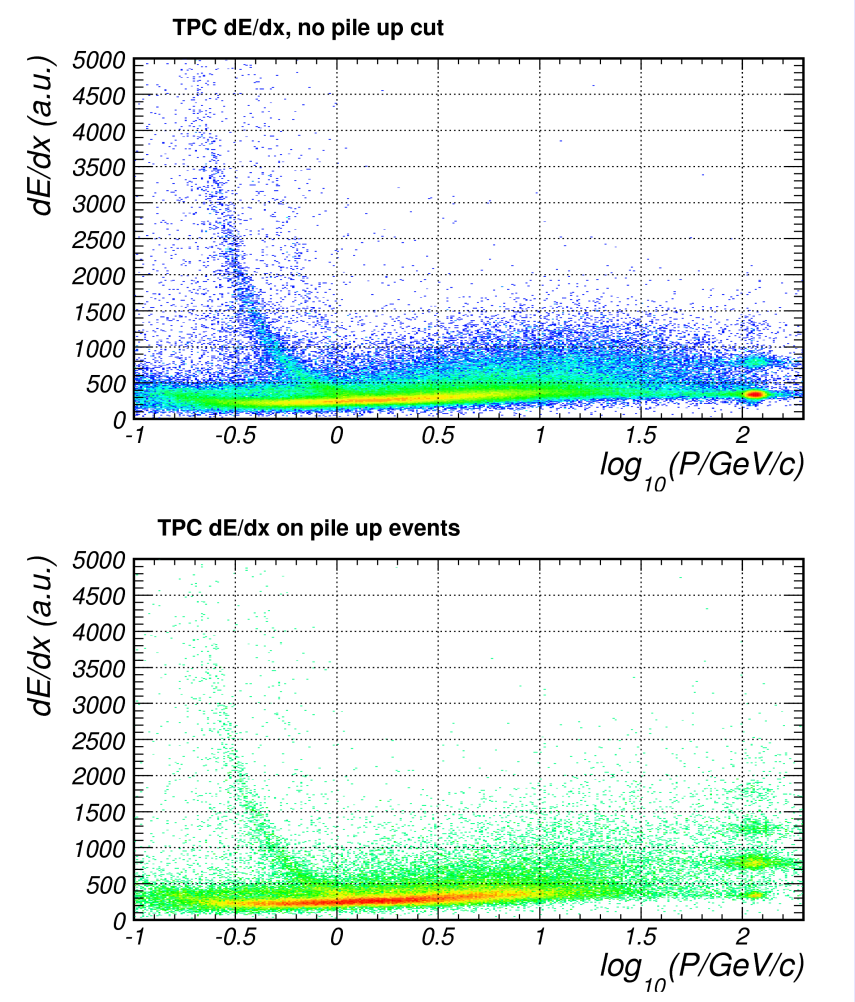
Putting it all together



- In run 15860, most events come when iDC and SciHi fire
  - Also has the largest fraction of pileup events
- Out of time tracks remove ~70% of pileup, so using all available variables is good

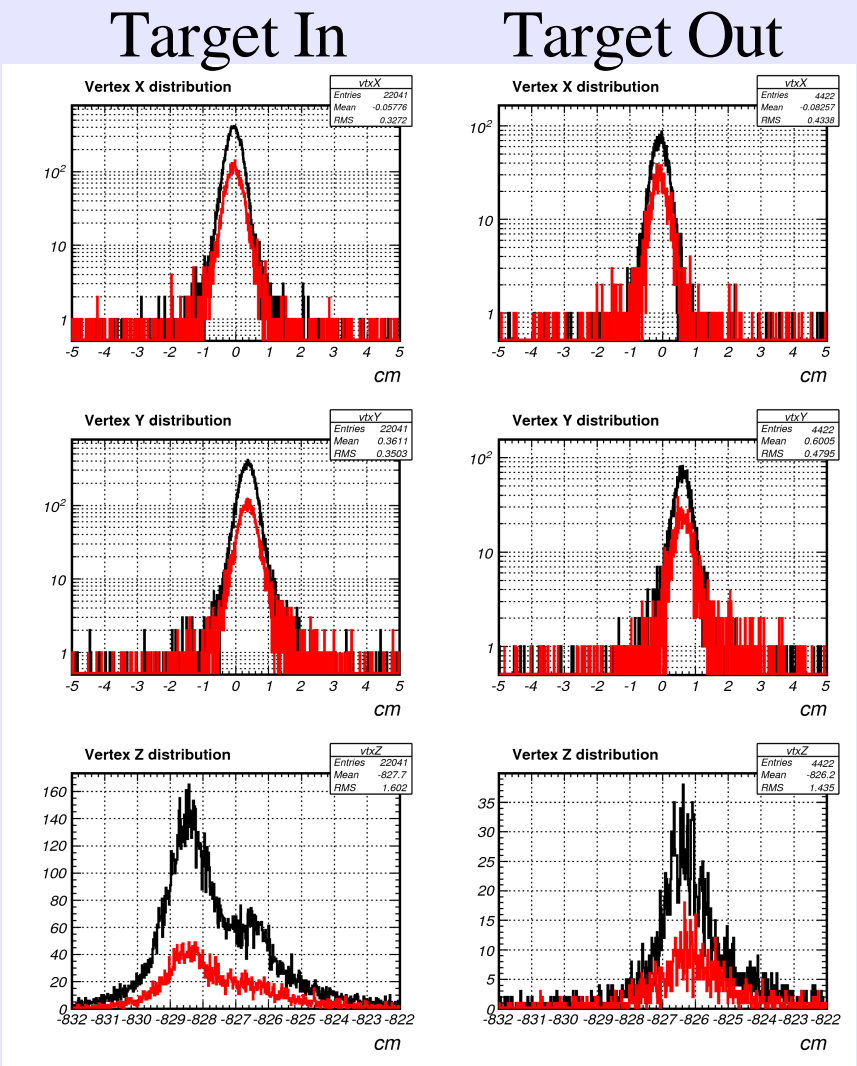
Changes to TPC dE/dx

- Clearly, the cuts did what they intended, although not completely
- However, TPC integration time is much larger than chamber TDC window
  - May account for part of double/triple dE/dx peak



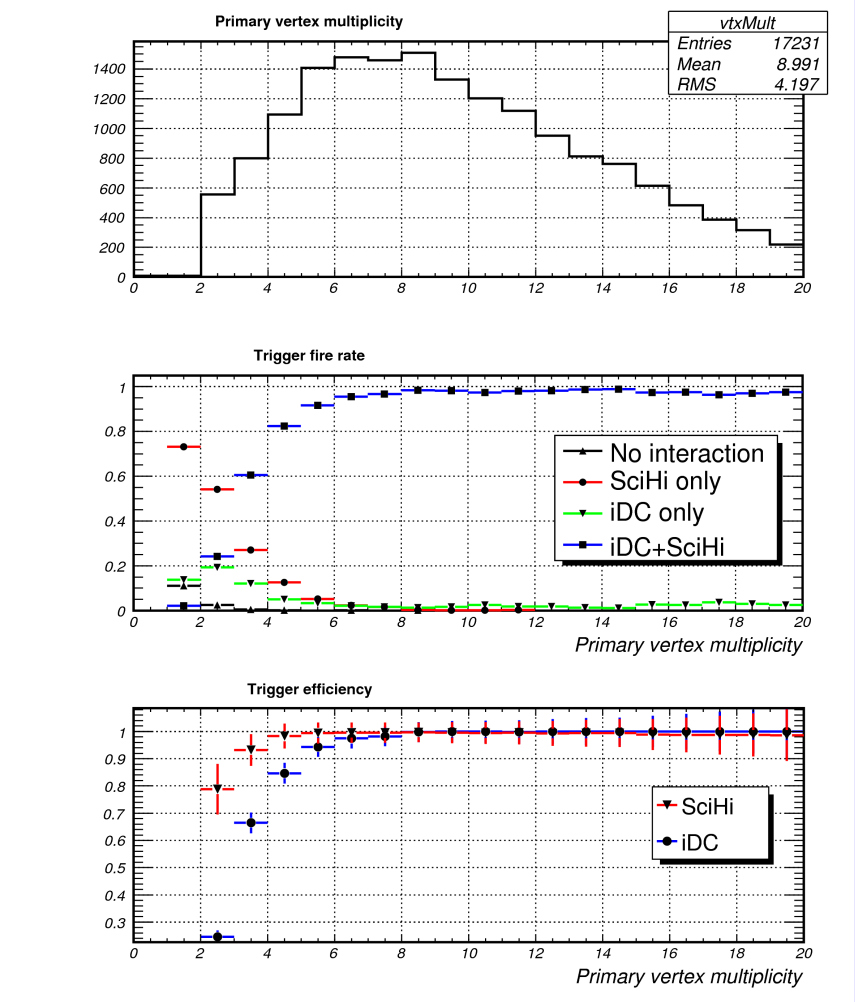
Vertex reconstruction

- In terms of vertex reconstruction, pile up may have a slightly worse resolution in z, but the effect is small



Interaction Trigger

- Measuring trigger efficiency with 50k triggers is impossible
  - I get 33 target-like interactions from min-bias trigger
- Instead measure SciHi efficiency when iDC fired and vice versa



Summary

- Removing all pile-up is costly
  - >20 % of 120 GeV data, will be worse for secondary beam
- A simple set of cuts on BCkov and T0 signals does a pretty good job, more sophisticated approach possible, but is probably not necessary
- Interaction trigger efficiency as measured by beating one trigger against the other is possible
  - Need all statistics to do it from min-bias data