Brief updates

Status of truth in pile-up events

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Contents of McEventCollection

- Raw truth container of events
  - Physics Event : GenParticles
  - In-time pile-up event 1 : GenParticles
  - In-time pile-up event 2 : GenParticles
  - BC +/-1 pile-up event 1 : GenParticles
  - .... far out-of-time events : GenParticles
  - Cavern radiation event : GenParticles

- We were dumping all of the above
- Explains why the # truth tracks was huge
Event selection helpers

- TruthHelper/PileUpType.h (c.f. Ketevi)
- Only in athena v14, but I ported to v13
- Tried selecting in-time only (physics+pileup)
  - BC-2 <5% of digits occupancy
  - BC-1 <10% of digits occupancy
- Even then, IPAT<->truth matching is bad
- Experts: this doesn't take into account copies of the same particle before/after brems.
Moreover...

- If we dump ALL stable truth particles:

I would expect good efficiency of matching IPAT (or FTK) to truth, since we dump EVERYTHING (all pileup events +/- 5 BC, AND all barcode changes).

But: more than half of IPAT (FTK) tracks do not have a match in truth!

Not sure what to do about this, since all my previous attempts were aimed at selecting a smaller subset of truth to improve truth->IPAT matching.
Emails from ID & pileup experts

- TrackTruthParticle container:
  - “the only reliable way to connect back to truth for the inner detector tracking”
- Keeps track of which pile-up events deposit energy in each pixel/strip
- Takes care of tracking barcode changes for interacting particles
- Had a lot of updates in Athena v14
- Looking at it now...
Plan for the next week

- Set up v14, port FTK wrapper [almost done]
- I think v14 can reconstruct v13-digitized evts
- Compare IPAT and MC truth tracks
  - Stay within athena (no need to run ftksim)
  - Understand matching problems
  - Explore TrackTruthParticle framework
Datasets

- Whuu digitization never ran successfully
  - Hanged on staging of HITS files from tape
- I managed to get a few undeleted HITS files
  - Can run $10^{33} / 10^{34}$ digi locally
- Whbb HITS files seem to be deleted
  - But we have some hi-lumi digi events