L2CFT Issues for the L1CFT

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Introduction

L1 Specifications:

- 6 Concentrator boards
- Variable number of tracks per board up to 48 tracks
- Headers and Trailers same as to GL2
- In Headers:

  Number of tracks per concentrator

  Number of track per bin

  Tracks sorted into bins, but not within bins
- Track properties specified by:

  FE_Number

  Offset (with Sign)

  H fiber number

<u>Question: Can L2CFT handle these specifications?</u>

Simulation of L2CFT

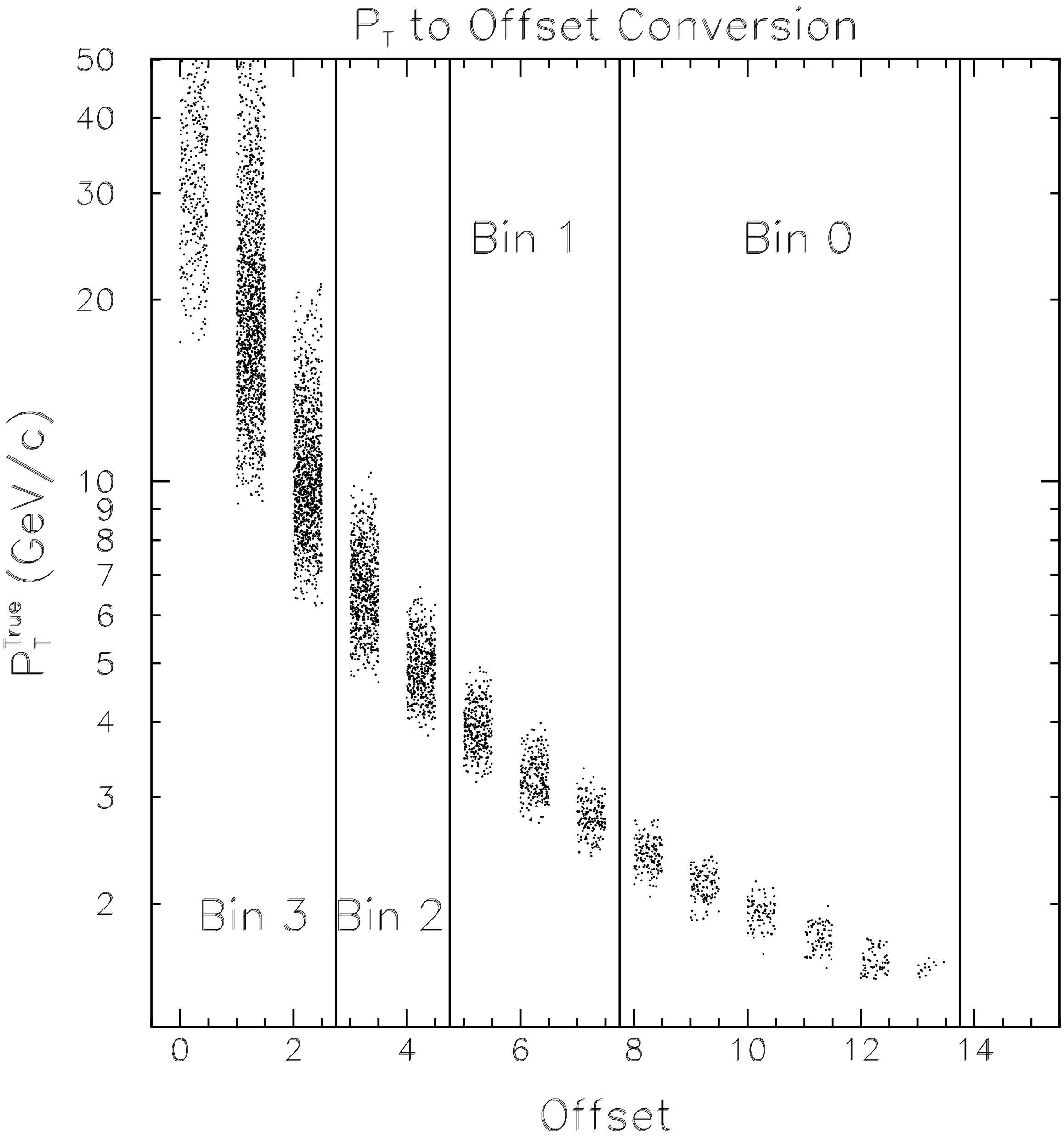
To answer this question we simulate the L2 algorithm and measure the processing time per event.

Begin with a toy simulation of L1CFT.

- Simulate tracks with P_T randomly distributed by an exponential, and flat in ϕ_0
- Determine which FE board, A and H layers the track passes through.
- Assume a perfect detector $\rightarrow$ track output FE, Offset and H
- Put tracks onto their correct Concentrator

  Ignore bin sorting to be conservative

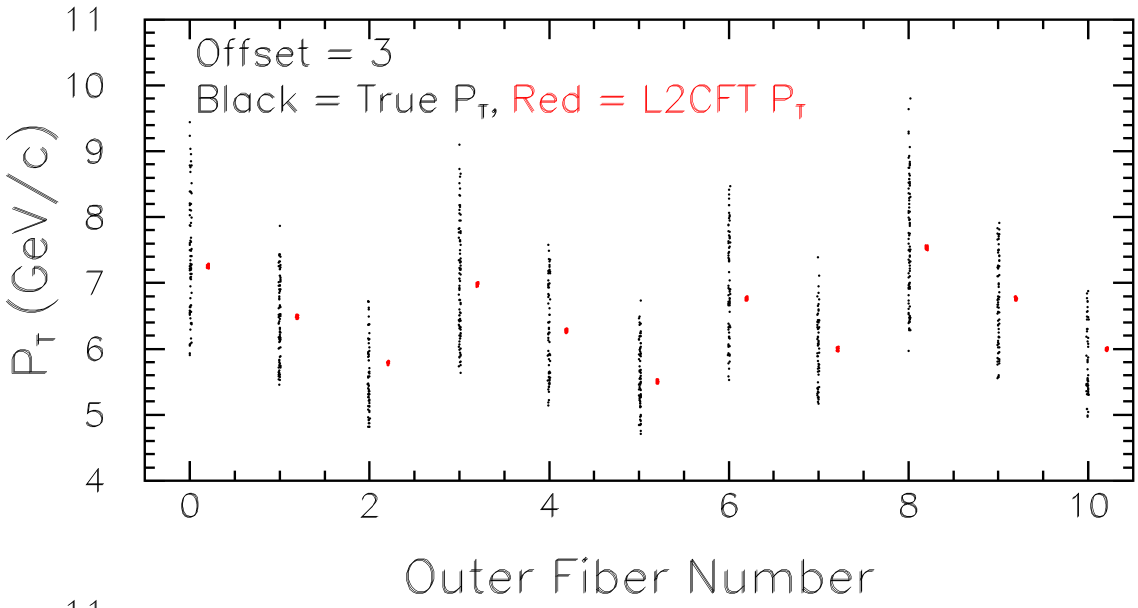
L1CFT Simulation

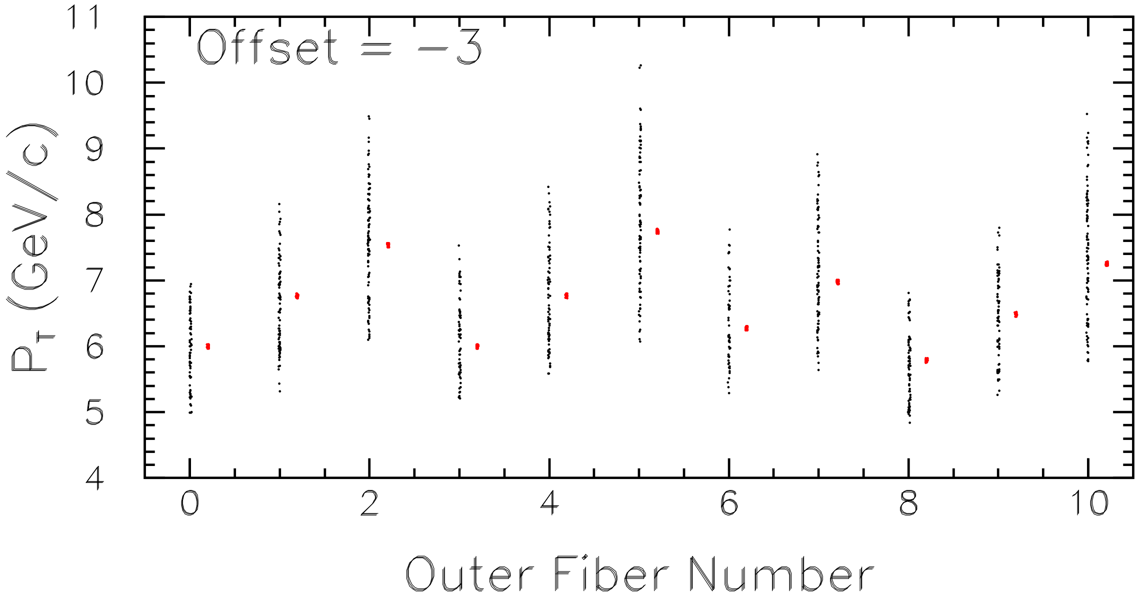


L1CFT Simulation Cont...

- P_T is not a function of offset!!!
- Sorting by offset is NOT is the same as sorting by P_T
- For a given offset, there is more P_T information contained in the H fiber number

P_T Information from H Fiber





L2CFT Simulation

Use L1Toy simulation to test L2CFT timing

Simulate:

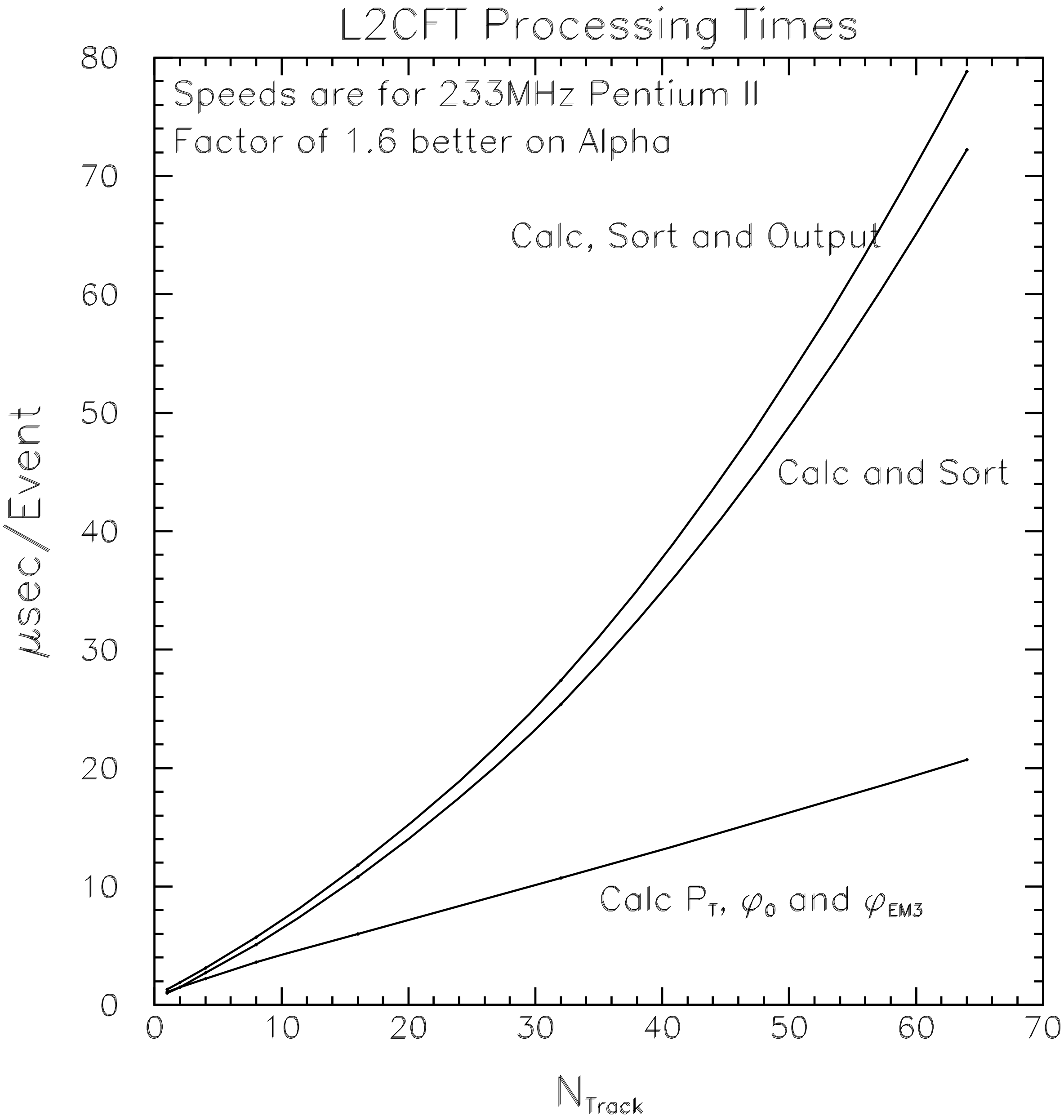
- Each concentrator board is read into a memory location as an array of integers (as on Alpha board)
- Unpack the number of tracks from each concentrator board
- Use the 32-bit track information word in a look up table. Get:

  $\mathrm{P_T}$

  ϕ_0

  ϕ_{EM3}
- Fill L2 objects with these results
- Sort by $\mathrm{P_T}$ using Insertion Sort
- Write L2 objects to output buffers in correct order with header and trailer information

Simulation Times



Timing Distribution

Using this information we get a timing distribution

- Mean N_{Track} per collision = 0.33

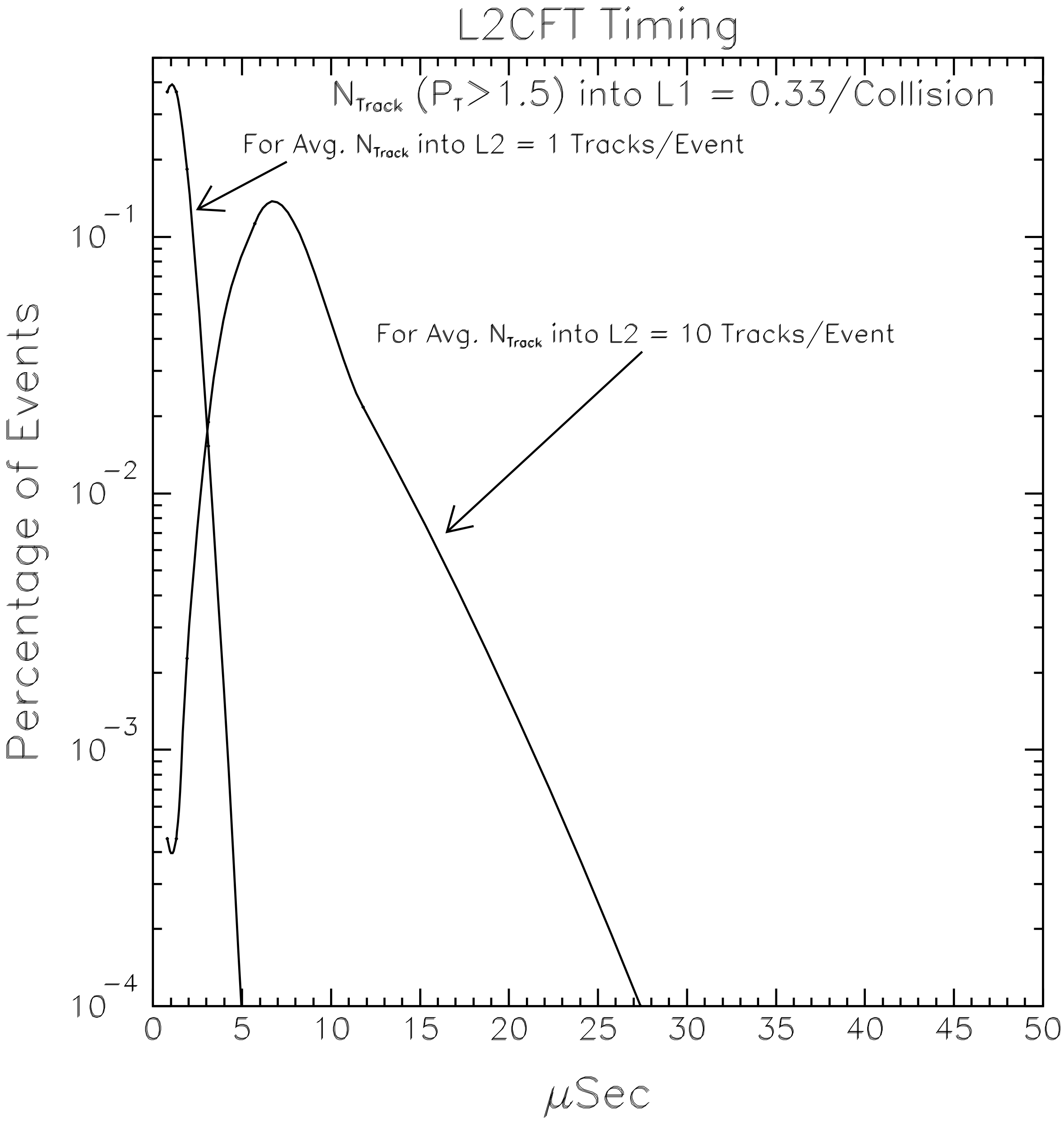
  $P_T > 1.5$ for $|\eta| < 1.0$

- At the moment guess the change for going into L2 and taking into account varying luminosities and fake rates

  Assume 1 track/event

  Assume 10 tracks/event

Processing Times



Conclusions

- L2CFT Algorithms simulated
- Preliminary timing studies look ok
- It's not clear we need to indicate the number of tracks per bin for timing reasons
- Probably can accommodate the additional P_T processing time associated with Kin's threshold bins.