

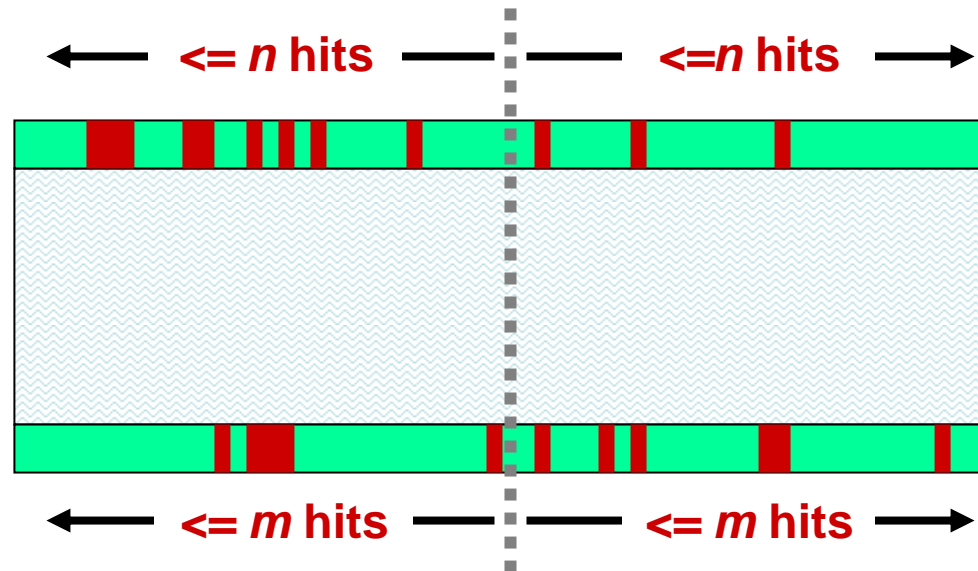
High-Multiplicity Events

Analysis Group

March 28, 2005

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In Each Plane (GTRC)

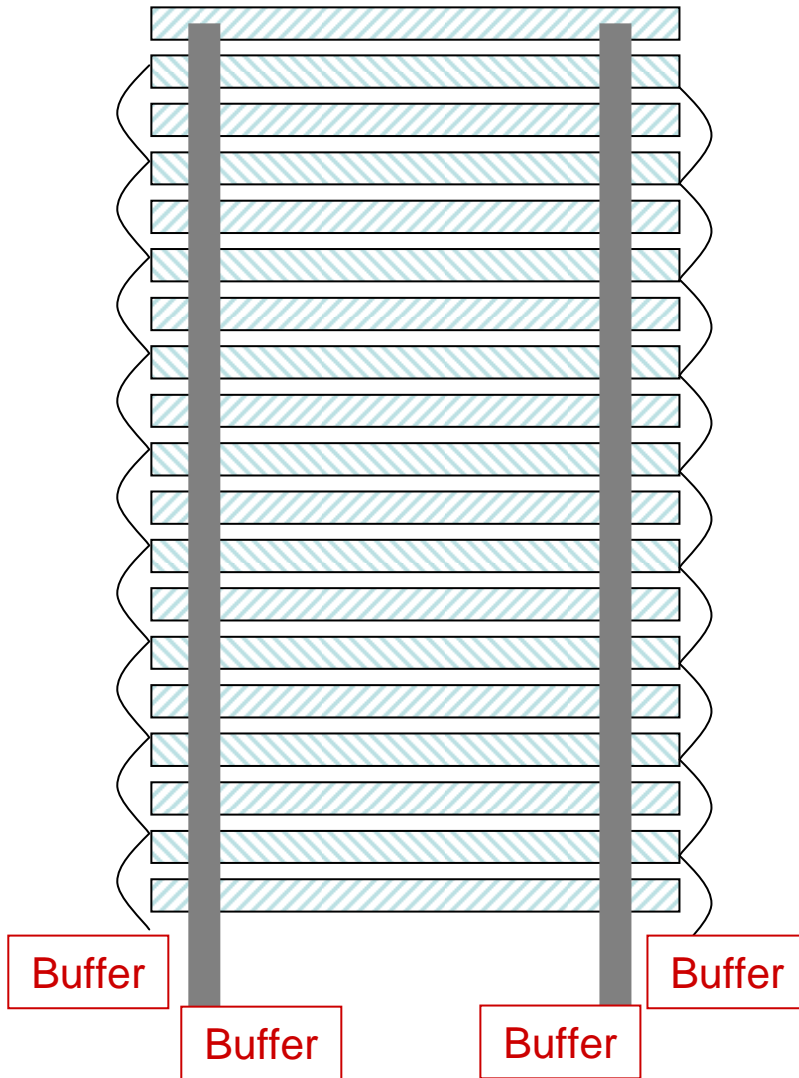


Only the first m or n hits are kept , where $m, n \leq 64$

This is adjustable by plane (maybe even end?)

(Currently handled in MC, with $n = 64$)

On Each Cable (GTCC)



There are 8 cables on each tower. Each cable reads out one-half of one face of every other tray.

No more than **128** hits can be stored in each cable buffer.

The hits are read into the buffer **from the bottom up**.

In a high-multiplicity event, info from the top (i.e. interesting) planes may be lost.

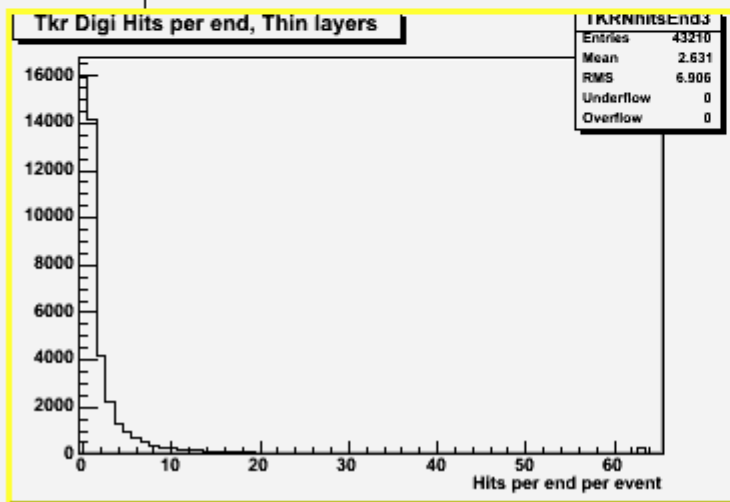
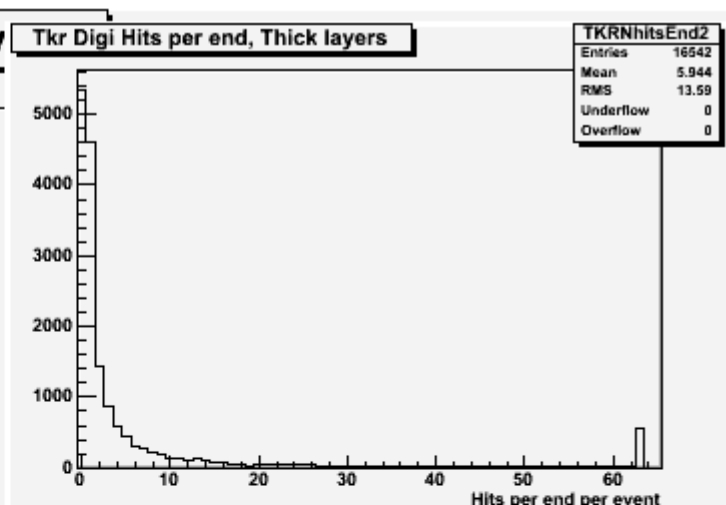
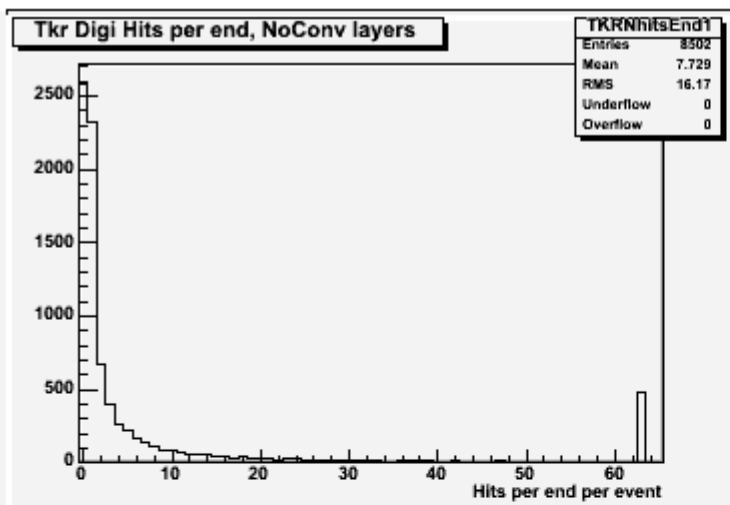
(Not in MC)

The event sample

- Flight instrument
- 515-GeV simulated gammas
- 1000 events generated; 284 triggered

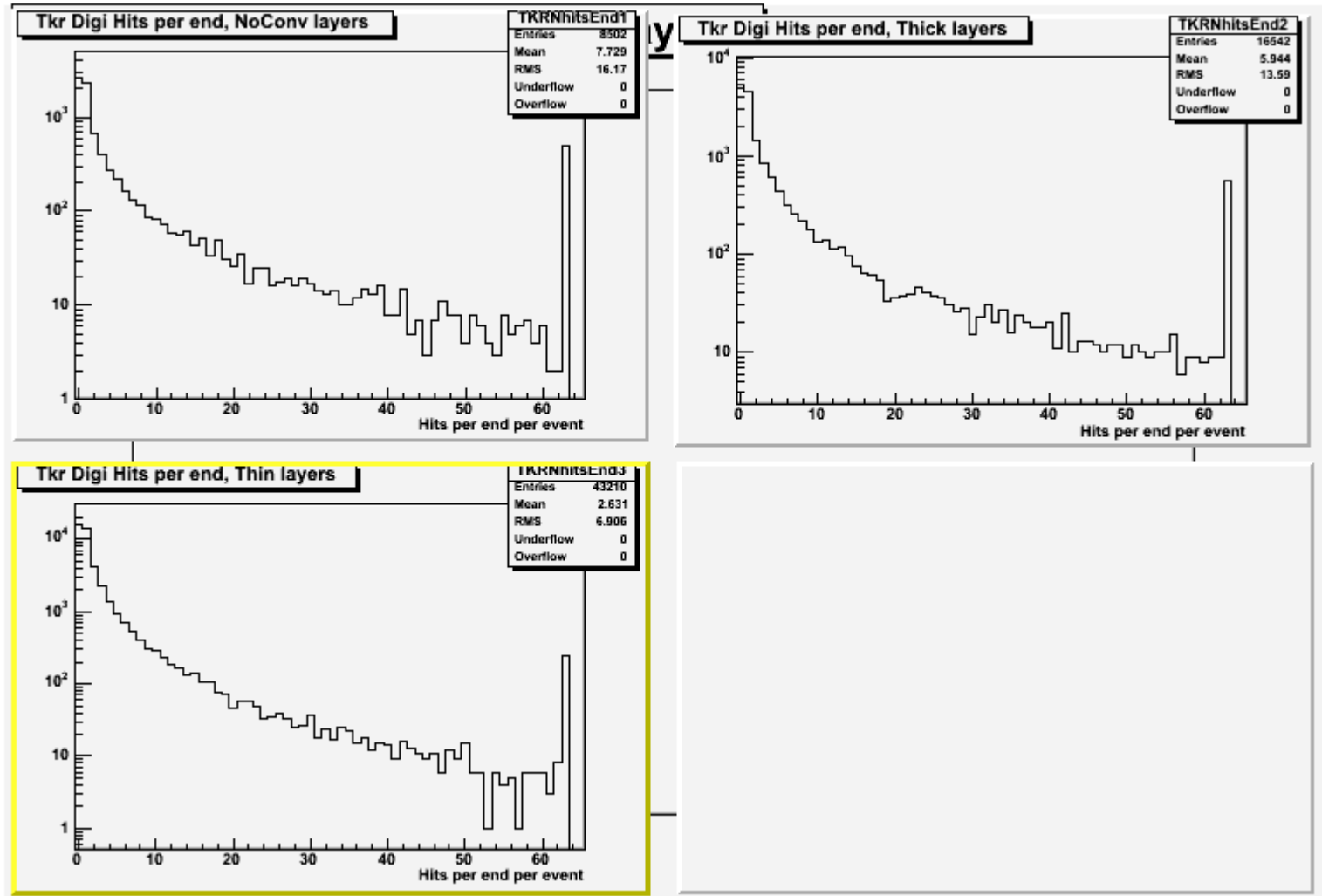
- Pictures from the old event display
 - For now, slightly better than new one, since it sometimes works, with a bit of coaxing

First, GTRC Readout

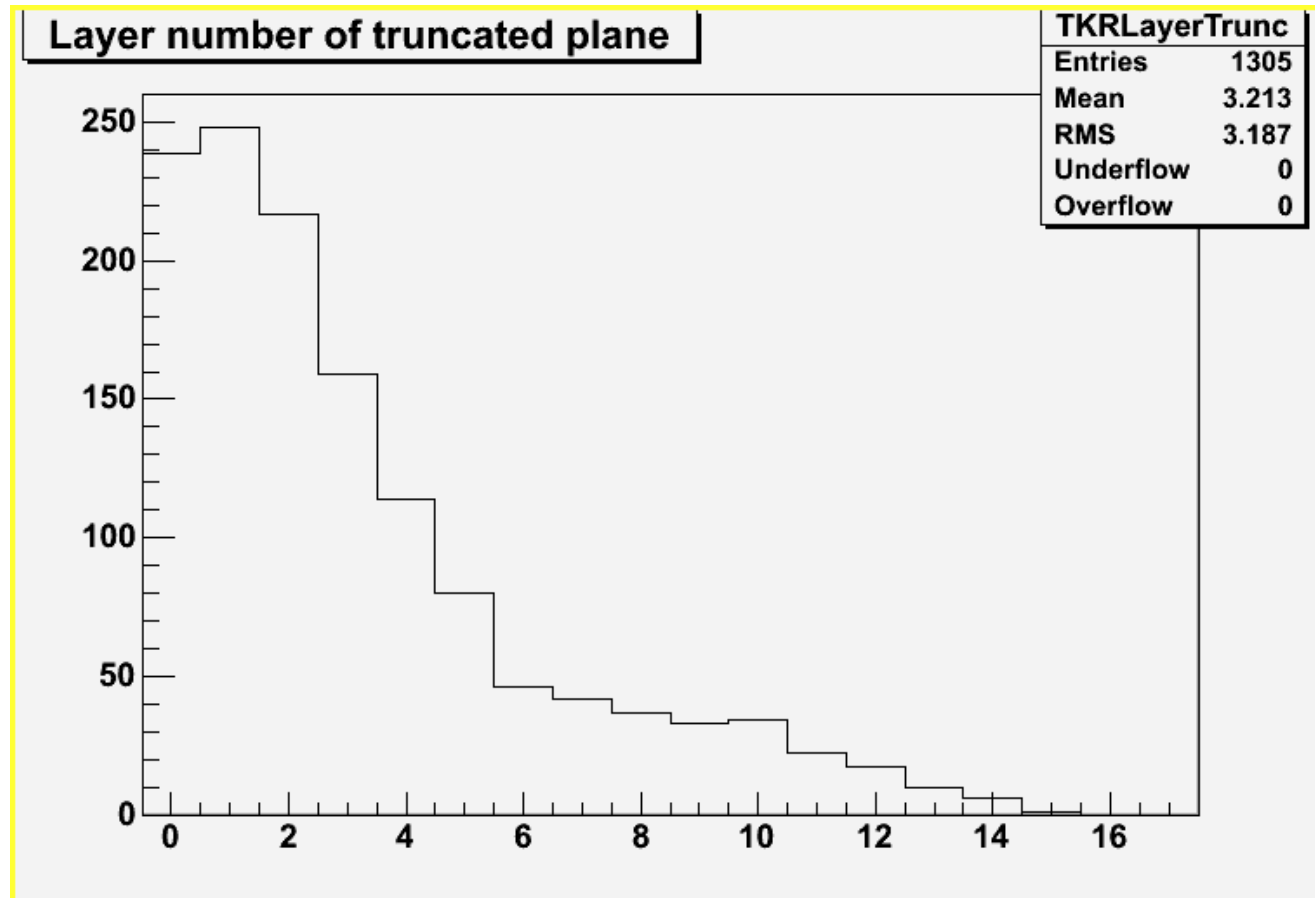


Truncation occurs at
63 strips, each end,
Already in simulation

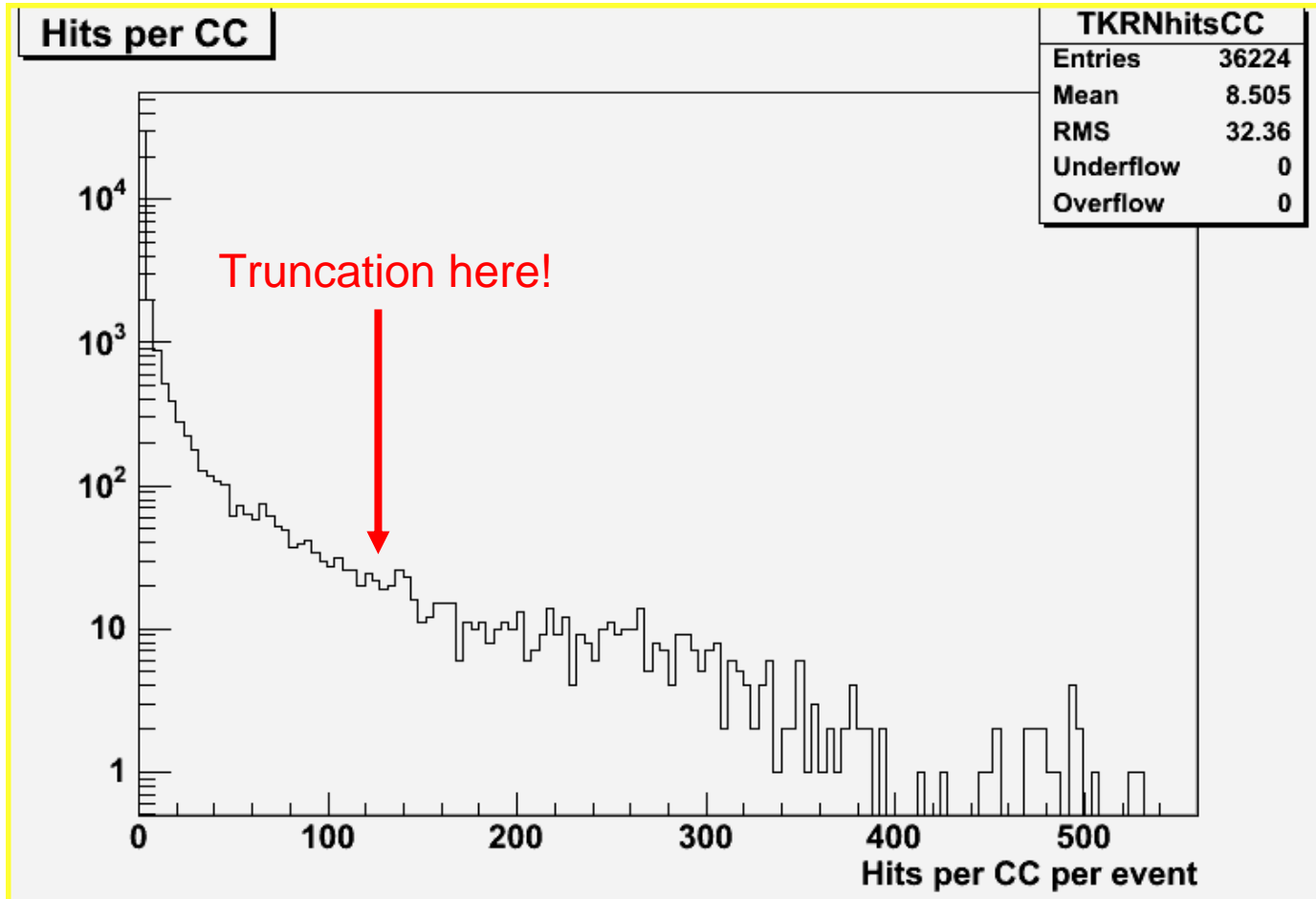
Same, log scale



Layer Number of Truncated Plane

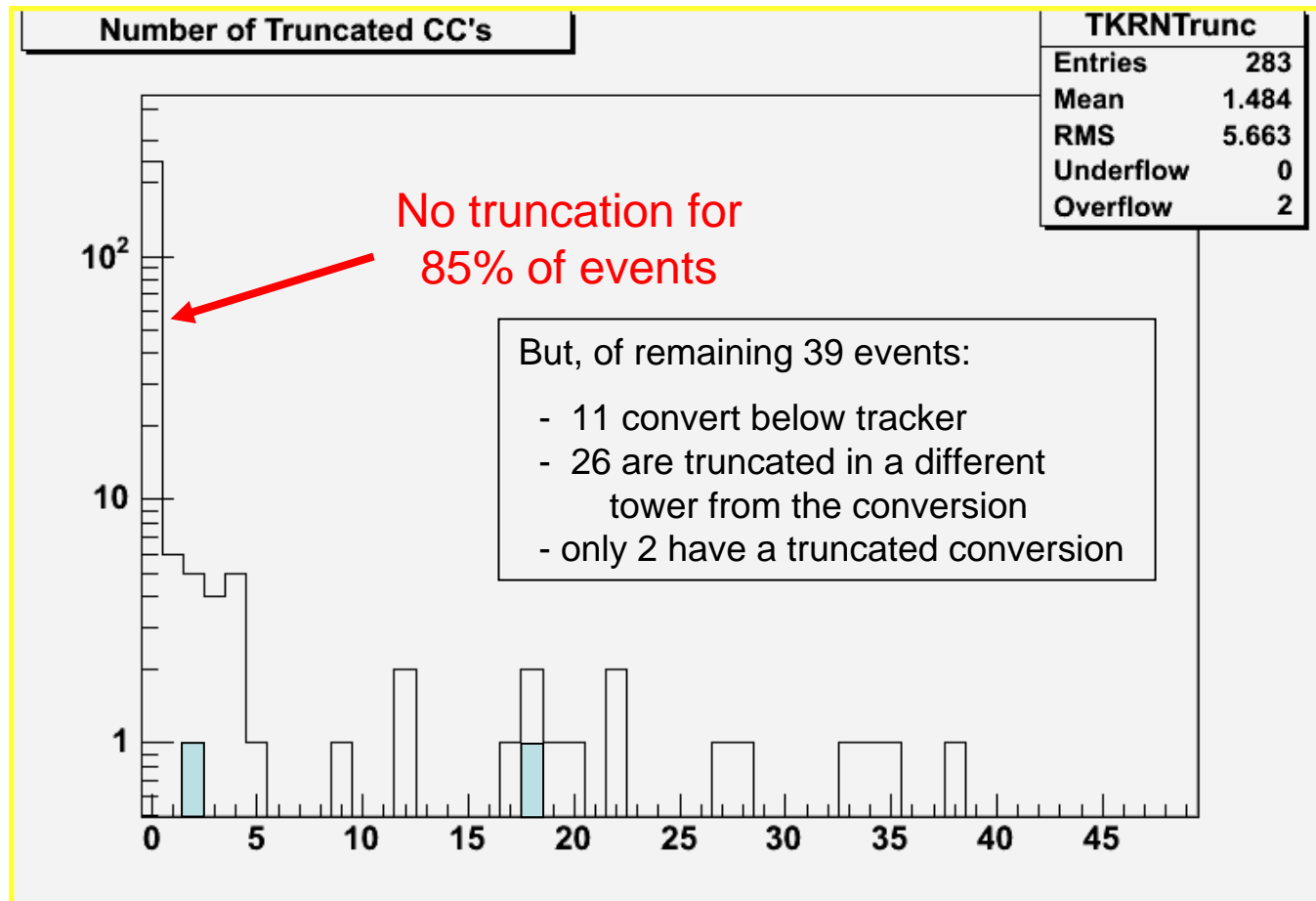


Next, the Cable Controllers

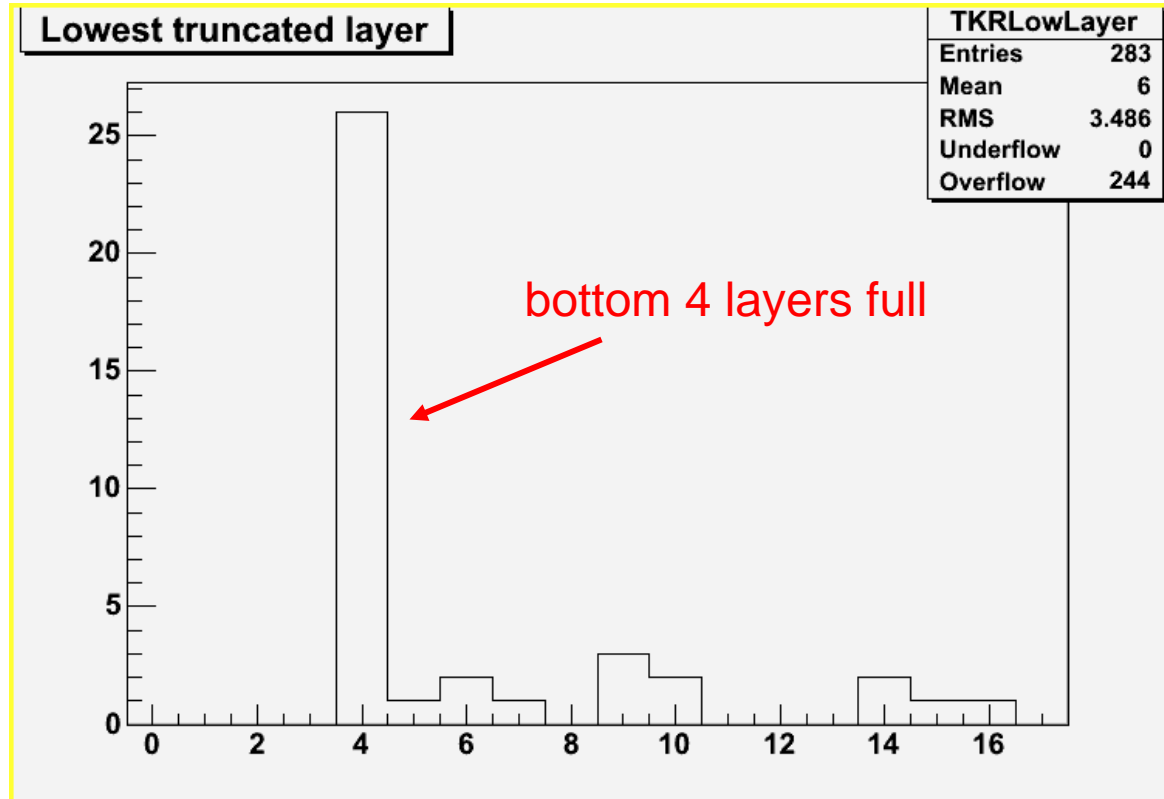


Hits in each CC; no truncation yet in simulation

Number of Truncated CC's per Event



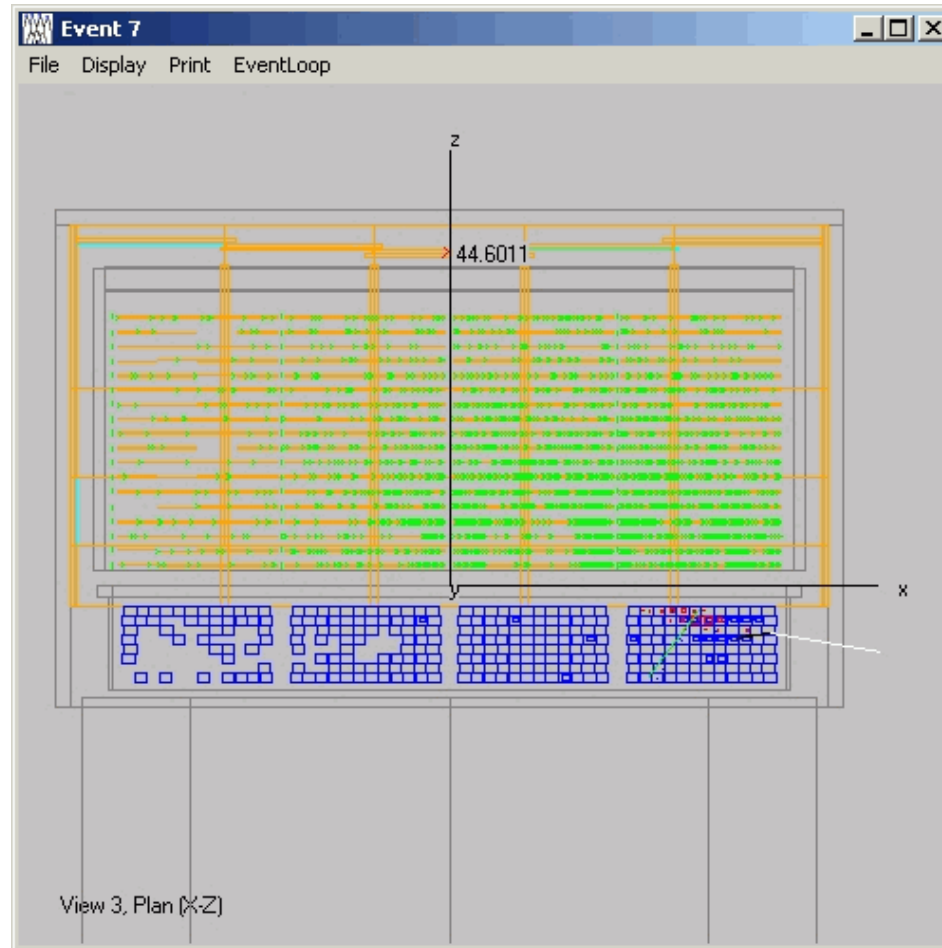
Lowest Truncation Layer



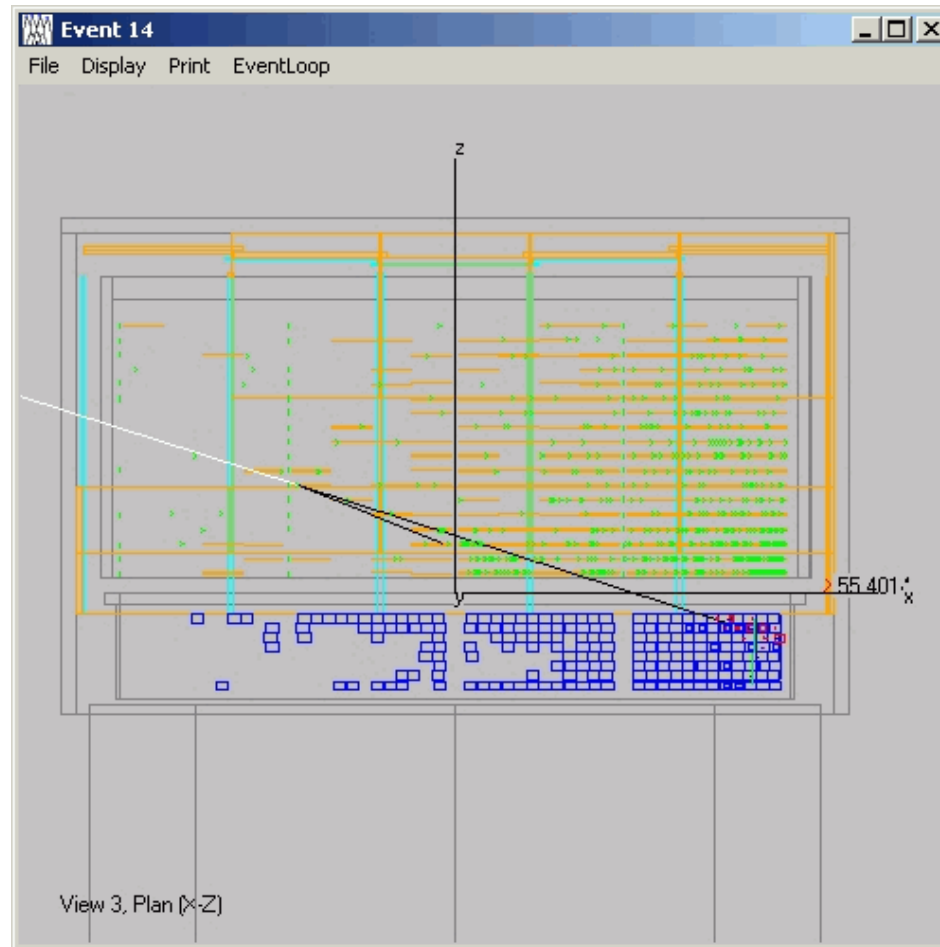
For each truncated event, the layer number of the lowest layer in which CC truncation occurs.

(Spike should be in layer 3, but sample was generated with a max of 63 at each end, instead of 64)

A saturated event



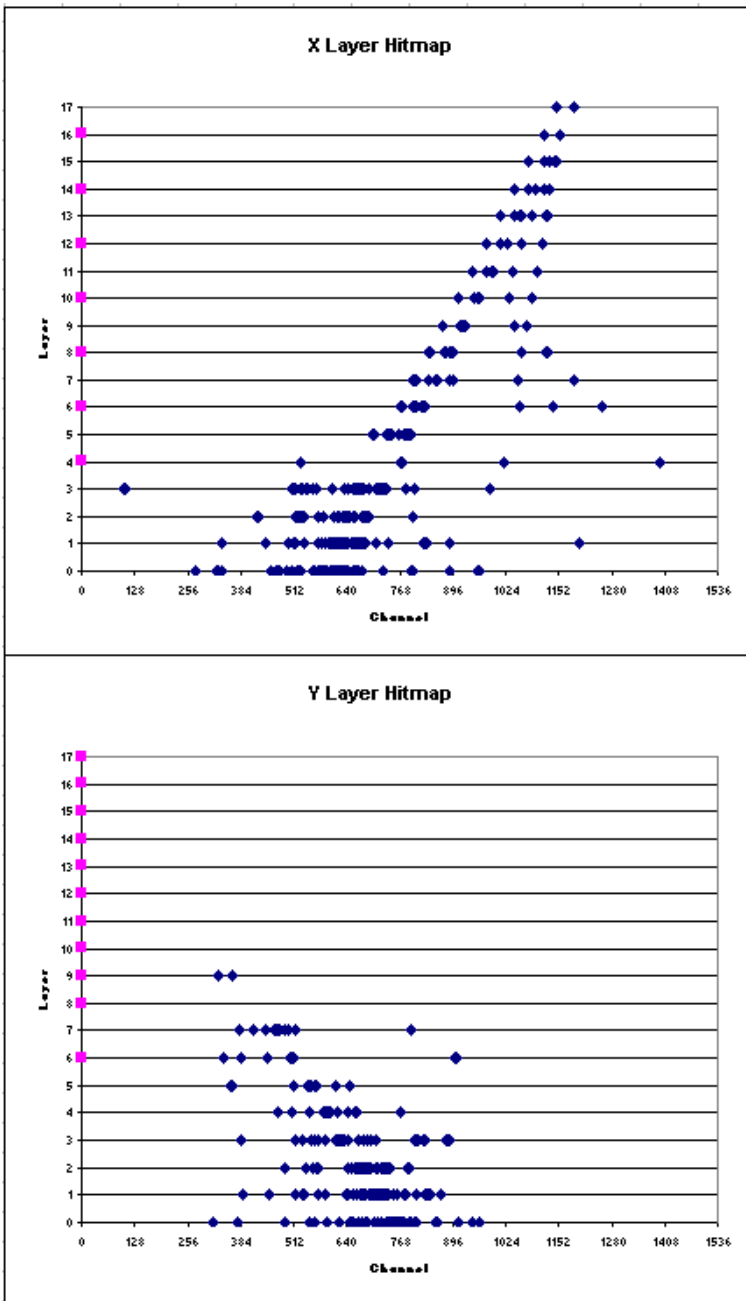
Another



An Air Shower (real data from TkrFMA)

In x view, hits at top and bottom of shower are mostly on different cables.

In y view, they are on the same cables, and the top hits are lost.



Pink squares mark truncated planes.

Conclusions

- There is some truncation in each GTRC.
 - Not a big problem by itself, since any plane that truncates is not likely to be useful in reconstruction anyway.
- About 15% of the events have at least 1 truncated GTCC.
 - But in most cases, conversion is in a different plane than truncation.
- We will know when truncation occurs.
- Contouring of plane truncation (limiting maximum # of strips in the lower layers) may be useful.
- This effect should probably be included in the simulation.