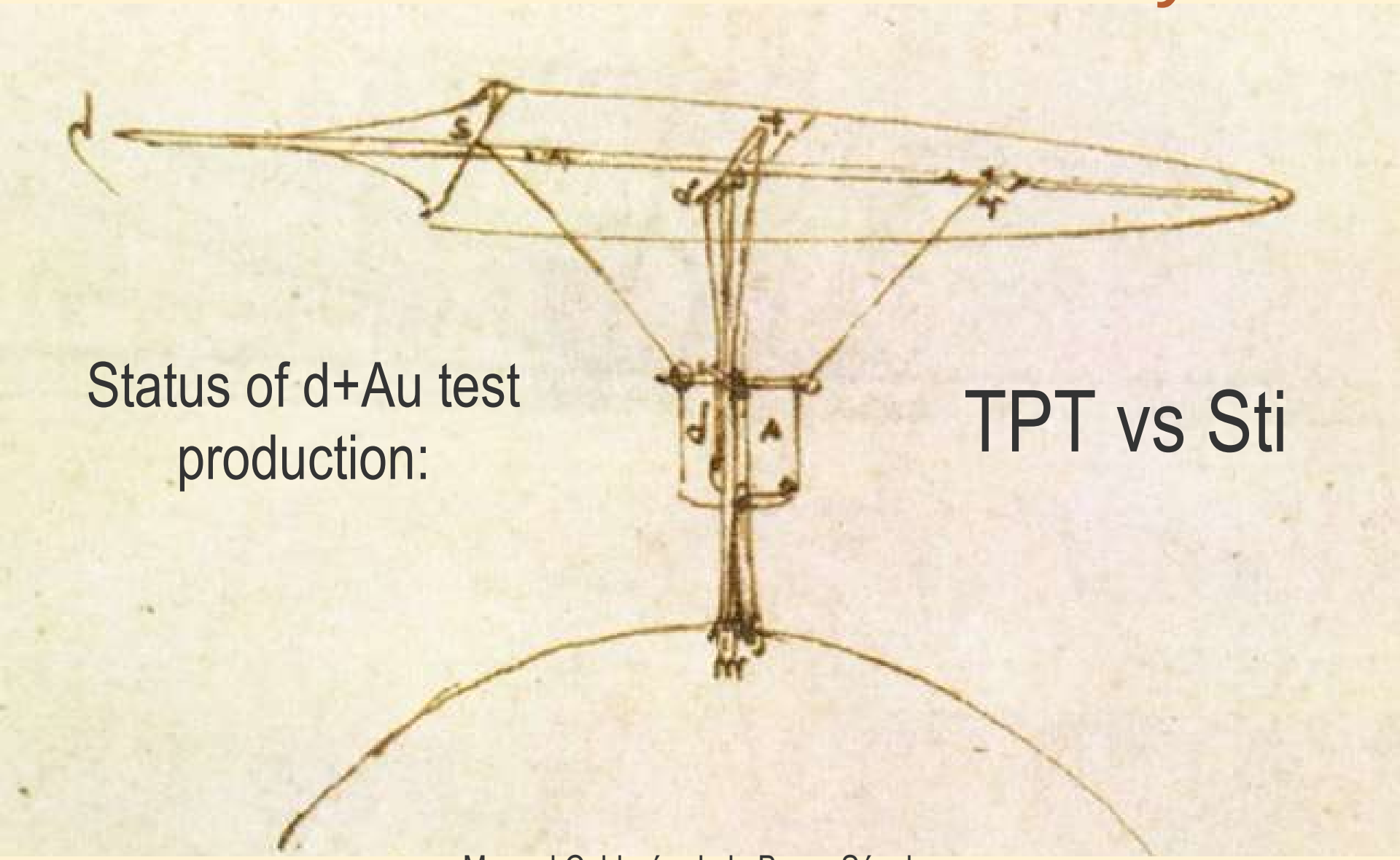
ITTF Evaluation Summary



Status of d+Au test production:

TPT vs Sti

Manuel Calderón de la Barca Sánchez,
reporting live for Zbigniew Chajecki

ITTF Evaluation

- We will use the integrated tracker for Au+Au Run IV
- Should strive to work out any hiccups (or heart attacks!) before we run production.
- Controlled sample:
  - d+Au Data production with old and new code
  - Concerted effort from Testers from various PWG's.

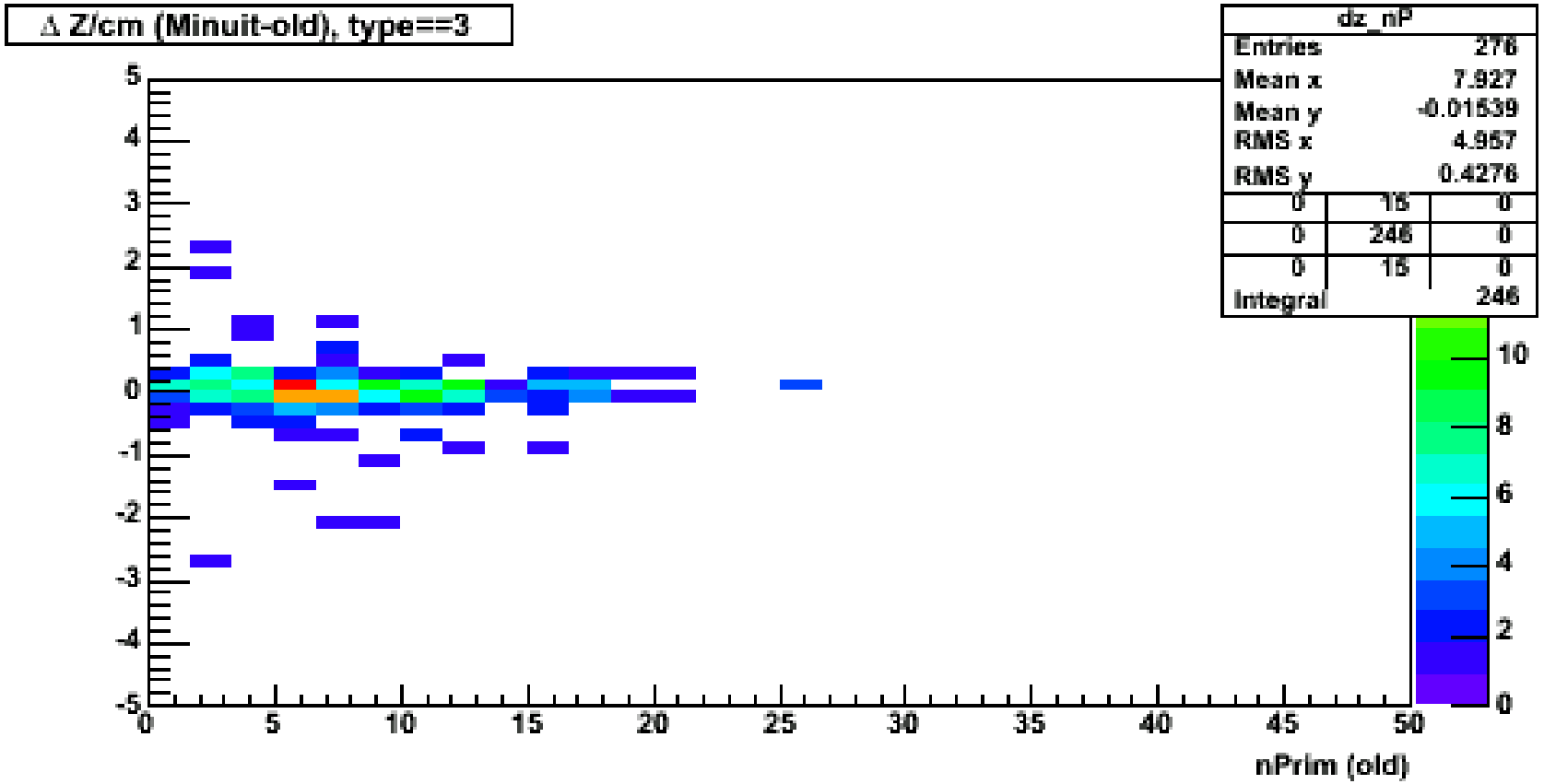
Tester Feedback

- Spin - Jan Balewski, vertex finding
- HBT - Zbigniew Chajecki, splitting merging
- E-by-E - Paul Sorensen, comparisons with FlowMaker
- Spectra - Johan Gonzalez, dE/dx
- High-pT - Marco van Leeuwen, rdo problem (fixed!), vertex
- Strangeness -
  - Camelia Mironov, kinks and global track quality
  - Sevil Salur, Lambda
- SVT, Pixel - Ying Guo, Kai Schweda: track extrapolation
- Event Structure - Aya Ishihara, two-particle η-difference
- Heavy Flavor - Alex Suaide, MCBS: electron, track-by-track

Current Status

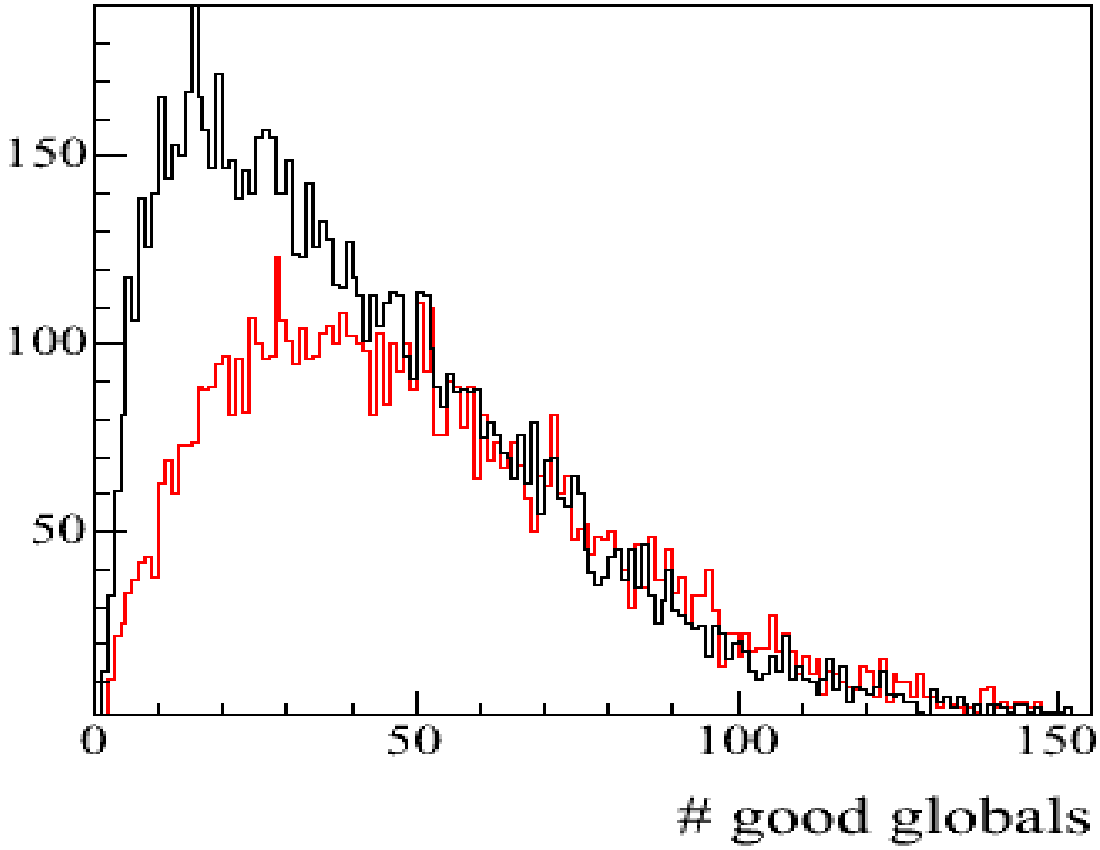
- Nicely summarized in Zbigniew's page:
  - http://www.star.bnl.gov/~chajecki/index.php?sec=709
- Identified and fixed various problems already
  - problem with dead rdo masking was fixed in ITTF
    - Marco confirmed this problem has gone!
  - ZDC information was lost and now is back in both chains
  - CTB matching for vertex is on in new reproduction
  - modifications to ITTF code to flag tracks with low fit points
    - Camelia confirmed they don't make it into analysis
- Lots of people have contributed to find - and fix - problems

Z vertex difference



- Jan: Look at events where both vertex finders found a valid vertex and compare
- The vertex is mainly the same, differences at low Nch

Vertex efficiency



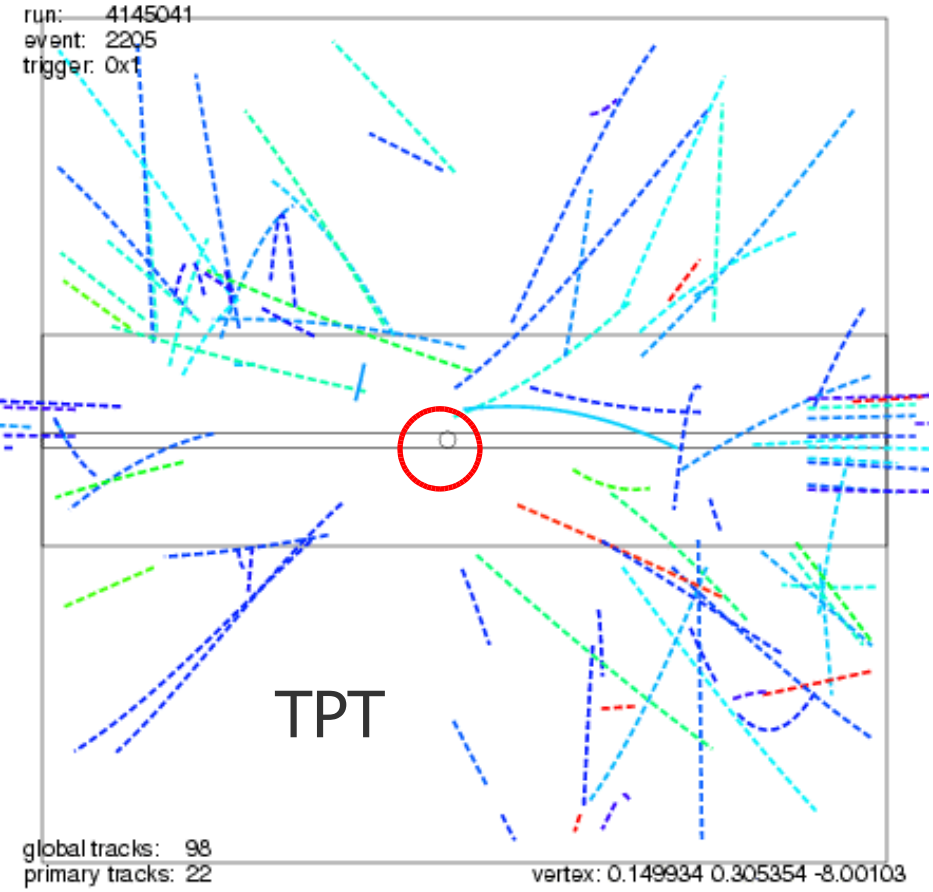
- Marco: Less events are found, with CTB matching turned on, at low multiplicity than before
  - Minuit vertex finder vs. ppLMV
  - Showstopper! If not understood…

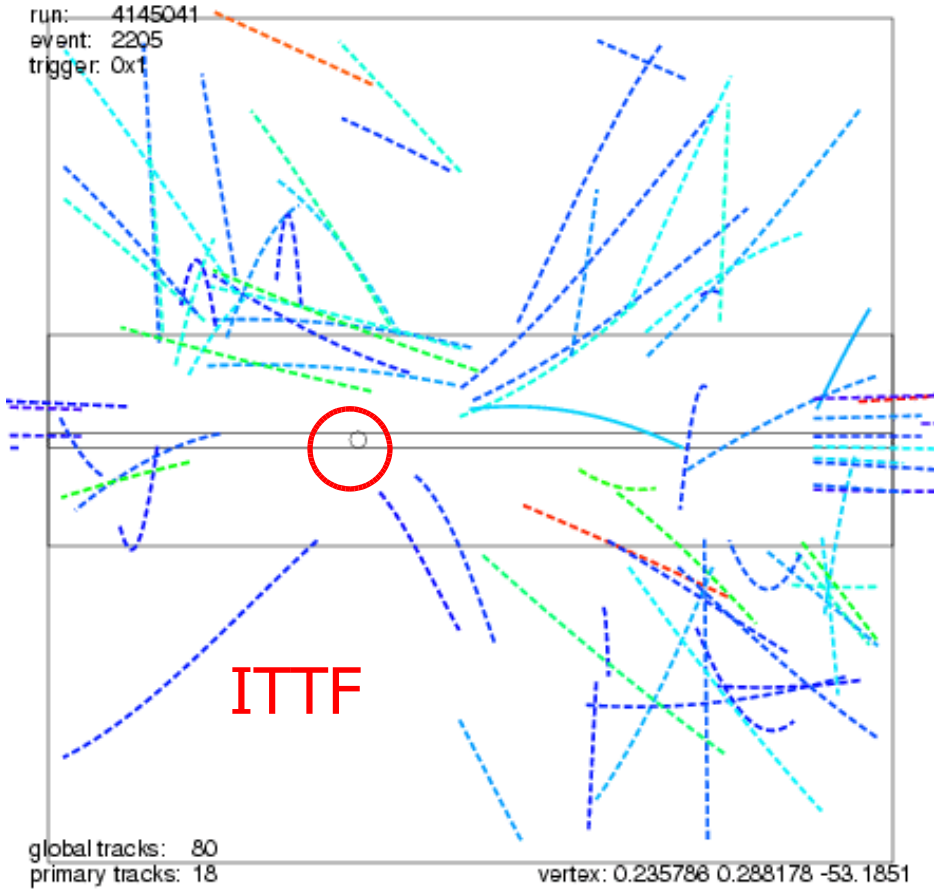
Understanding Vertex Finders

- Run ppLMV on ITTF tracks
  - Compare both vertex finders on same input
    - change 1 variable, not 2!
- Question: Is the difference due to:
  - Difference in algorithm?
  - Difference in CTB matching, i.e. treatment of pileup?
- Consolidate CTB matching code in both cases
  - Remove potential sources of difference

Study pileup effect

- ★ Jan finds a whole list of events where vertex finders find a different vertex… how do they look like?
- ★ Mike M.: Check every event on that list by eye:



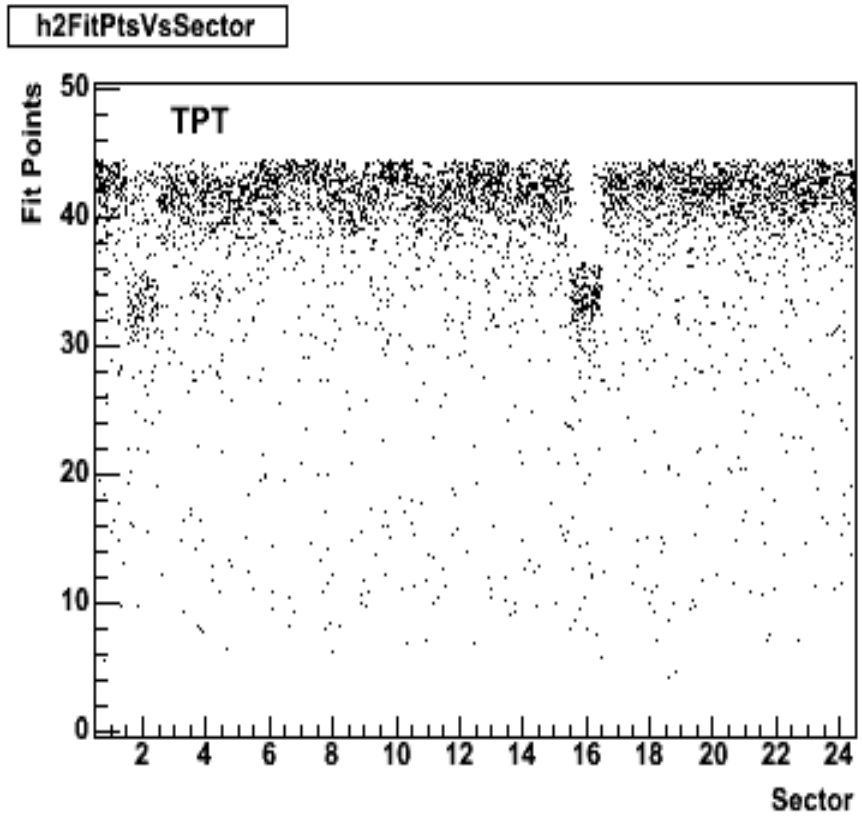


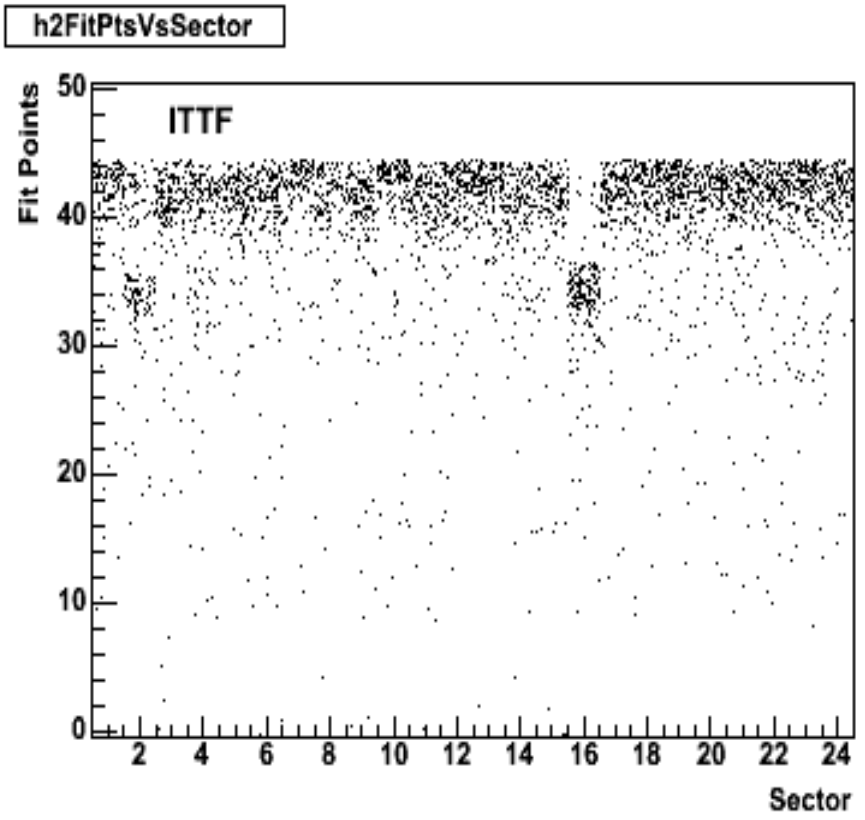
Pileup Effect II

- Mike:
  - Not a clear vertex in most of these events
  - A lot of tracks are NOT matched to CTB
  - New vertex finder ONLY uses tracks matched
  - ppLMV seems to find a vertex not pointed to by CTB matched tracks
  - New vertex finder problem found: high-pt short tracks pull the vertex; no shield in the algorithm against this
    - Needs to be corrected
- Deficit found by Marco could be from very small number of available CTB matched tracks in new vertex finder
  - Very few tracks, MINUIT can't converge to a minimum

Tracking over dead RDO's

- Marco:
  - difference in Number of Fit Points vs Phi between trackers.
  - Corrected in reproduction of pass, problem was gone!

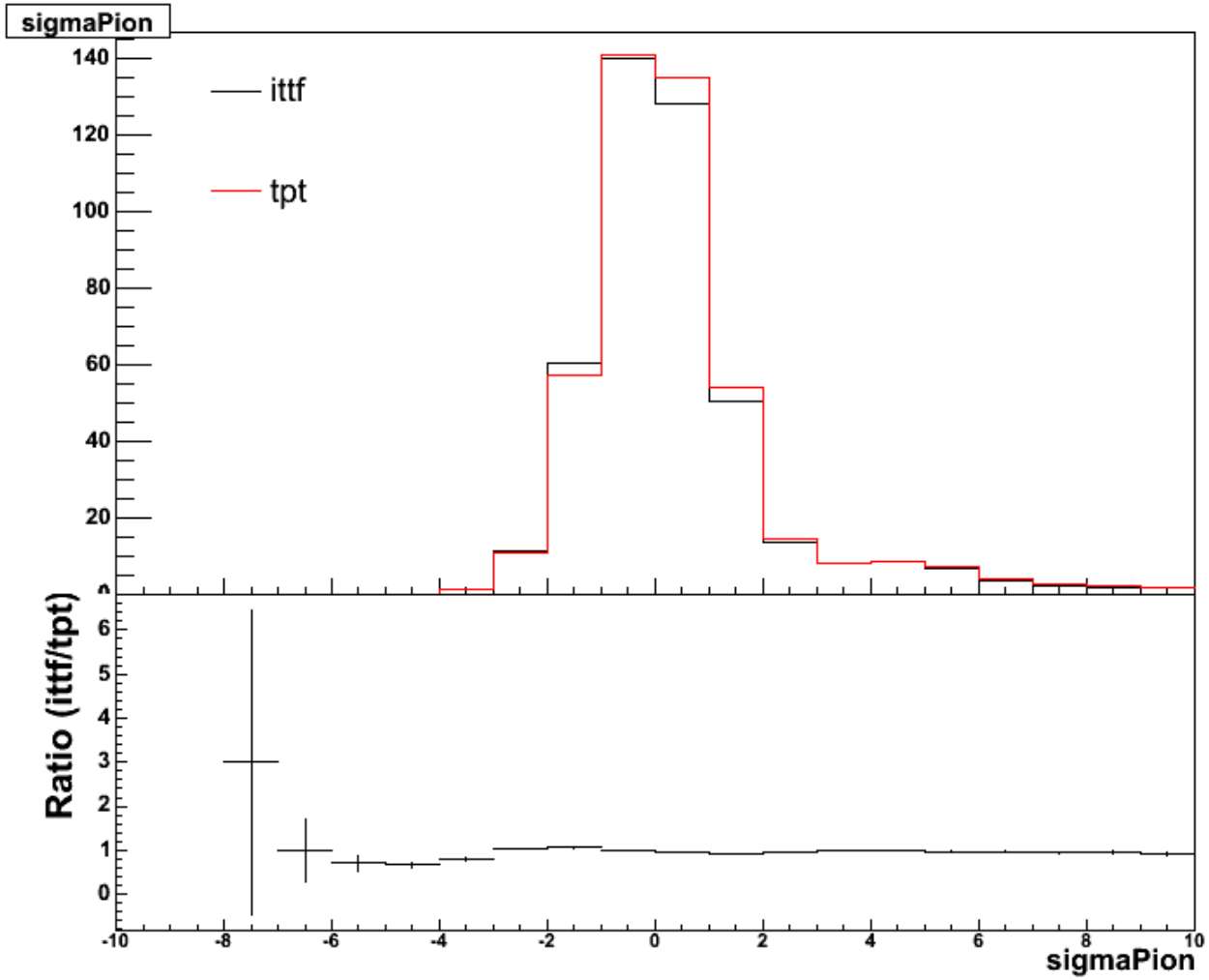




Tracking Results

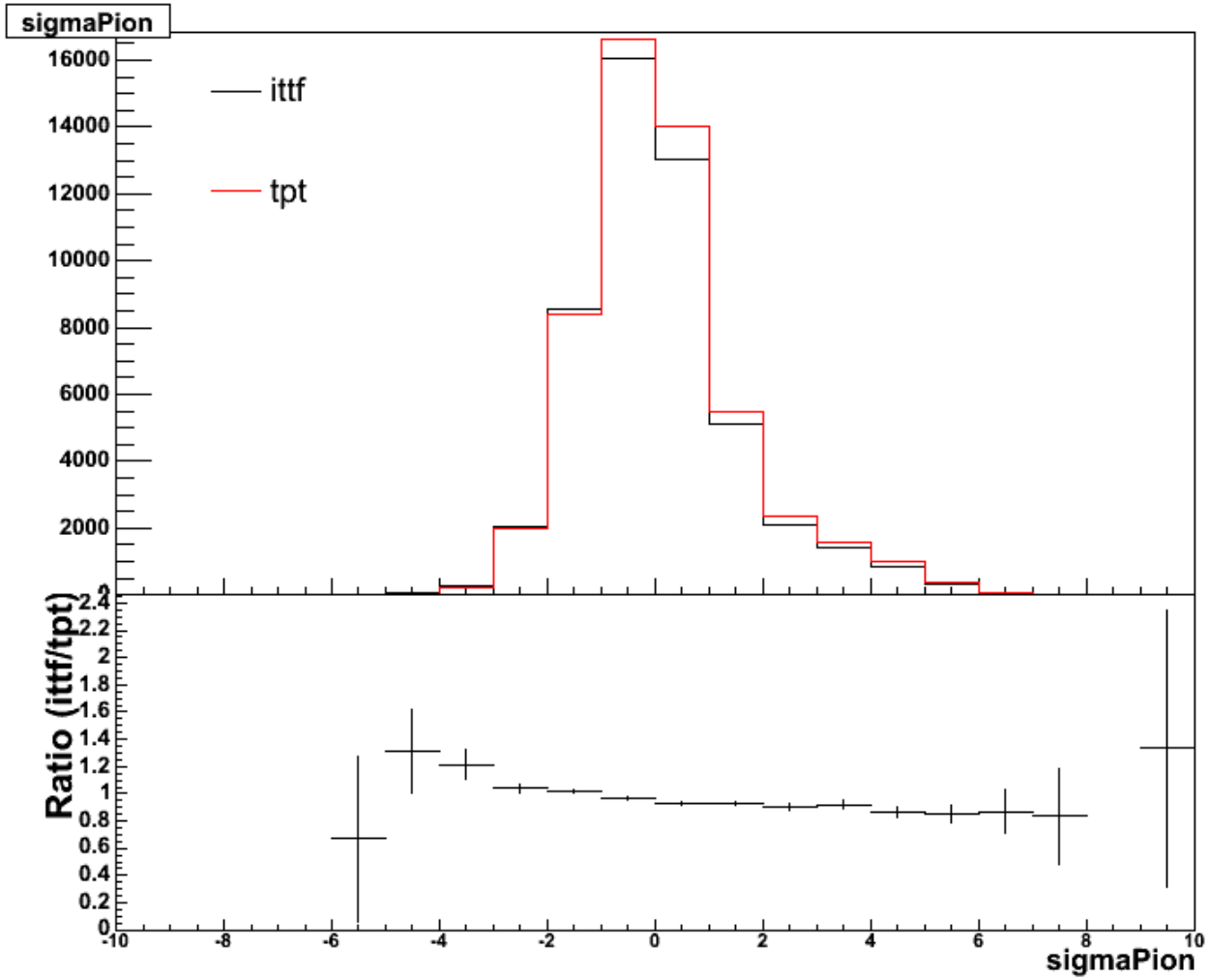
- Paul: *Everything looks mostly consistent between ittf and tpt*
  - Differences in FTPC (same tracker in both chains, possible vertex finder issue)
- Johan: Look at dE/dx -nSigma- distributions for both trackers
  - Momentum integrated, then for various momentum slices
  - No glaring discrepancies are found:

Pion dE/dx, 0<p<1



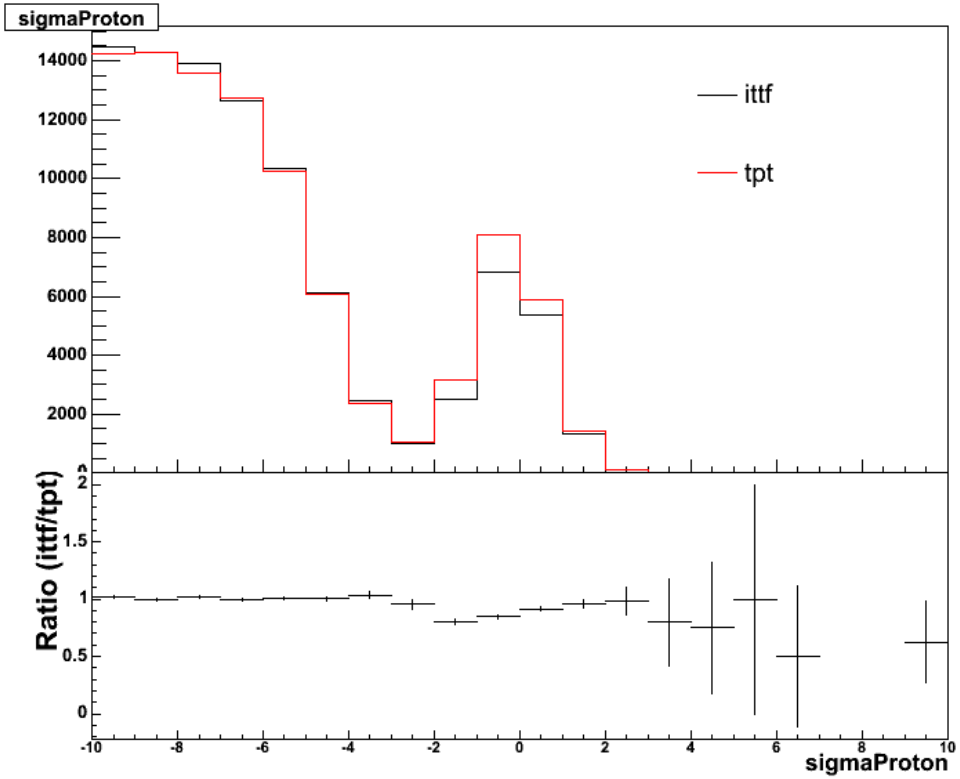
★ Ratio is flat near sigmaPion~0

Pion dE/dx, 1<p<2

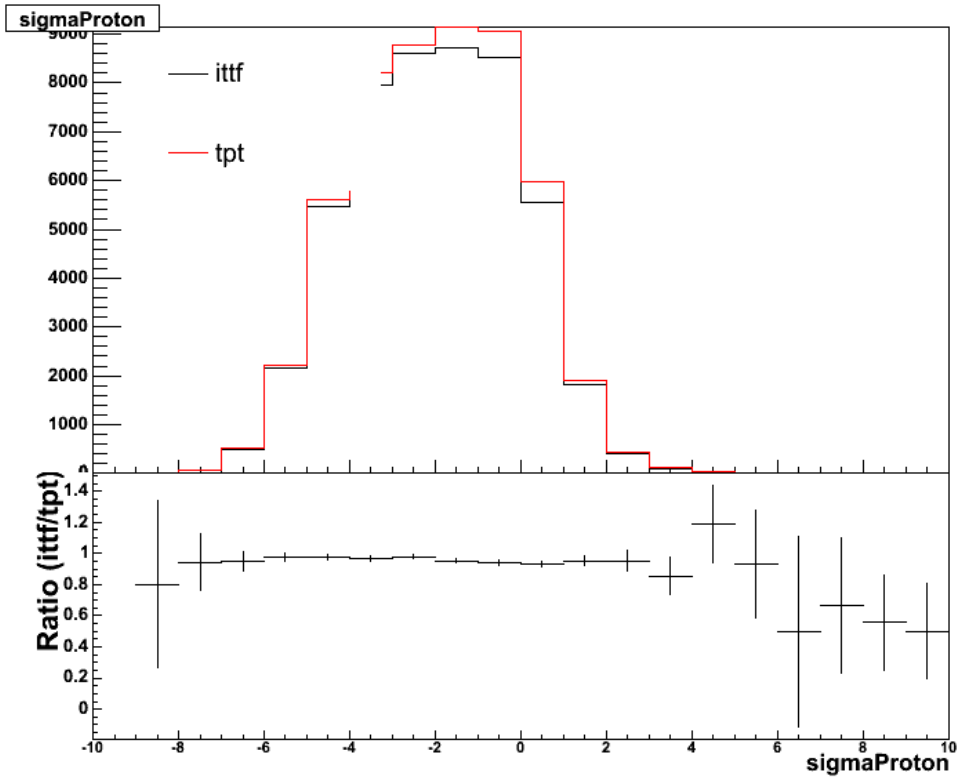


★ Ratio near sigmaPion~0 has a slight tilt

Proton dE/dx



0<p<1



1<p<2

★ Mostly Ok, slight tilt at low momentum

Track-by-Track Comparison

- Question: Is the difference in dE/dx due to a momentum bias in the tracker?
- Need to compare both trackers track-by-track
- “StTrackMateMaker”
  - For a given reco track, find its “mate” in the same event when seen by the other tracker.

P_tpt - P_sti

Alternative tracking efficiency

- A comparison of both trackers on a track-by-track basis can be used to obtain the tracking efficiency
  - We can obtain the absolute efficiency of both trackers without using Monte Carlo embedding.
- In the absence of ghost tracks, to first order:

$$N_{sti} = \varepsilon_{sti} \cdot N$$

$$N_{tpt} = \varepsilon_{tpt} \cdot N$$

$$N_{sti \cap tpt} = \varepsilon_{tpt} \cdot \varepsilon_{sti} \cdot N$$

- We always had first two equations, now we have the 3d!