ITTF Status

STAR Analysis Meeting
Dec 5, 04

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Last 12+ months:
New Reconstruction Chain

- Goals:
  - Integrate the new (ITTF) tracker in the STAR reconstruction chain.
  - Eliminate obsolete/legacy code; e.g. tables .
  - Use StEvent as object model both for processing and persistency.
- Integration/Development Team
  - J. Balewski, **M. Calderon**, L. Didenko, **Y. Fisyak**, **B. Hippolyte**, **J. Lauret**, M. Oldenburg, C. Pruneau, **A. Rose.**
- Duration: ~ 7 months.

BFC Changes and Improvements…

- ITTF Track Reconstruction (ITTF Team)
- Generic Vertex Maker (L. Barnby, J. Balewski, T. Ulrich)
  - Façade/Interface deployed to enable multiple vertex finding algorithms.
  - New Maker based on Minuit
- TPC cluster finder (DAQ Team: J. Landgraf, T. Ljubicic)
  - Fast finder, re-written from scratch in C++.
- Kink finder (C. Mironov, S. Margetis)
  - $K^{\pm}$ reconstruction
  - C++ re-write of FORTRAN code.
- TPC Hit Calibrations (J. Lauret)
  - Coordinate transformation, calibration adjustment)
  - Formerly entangled with old tracker TPT, now a new module “StTpcHitMover” .
- Addition of chain options for increased flexibility (J. Lauret, Y. Fisyak, M. Calderon)
  - Module ordering no longer static, but predicated on components included in the Chain.

Changes and Improvements…

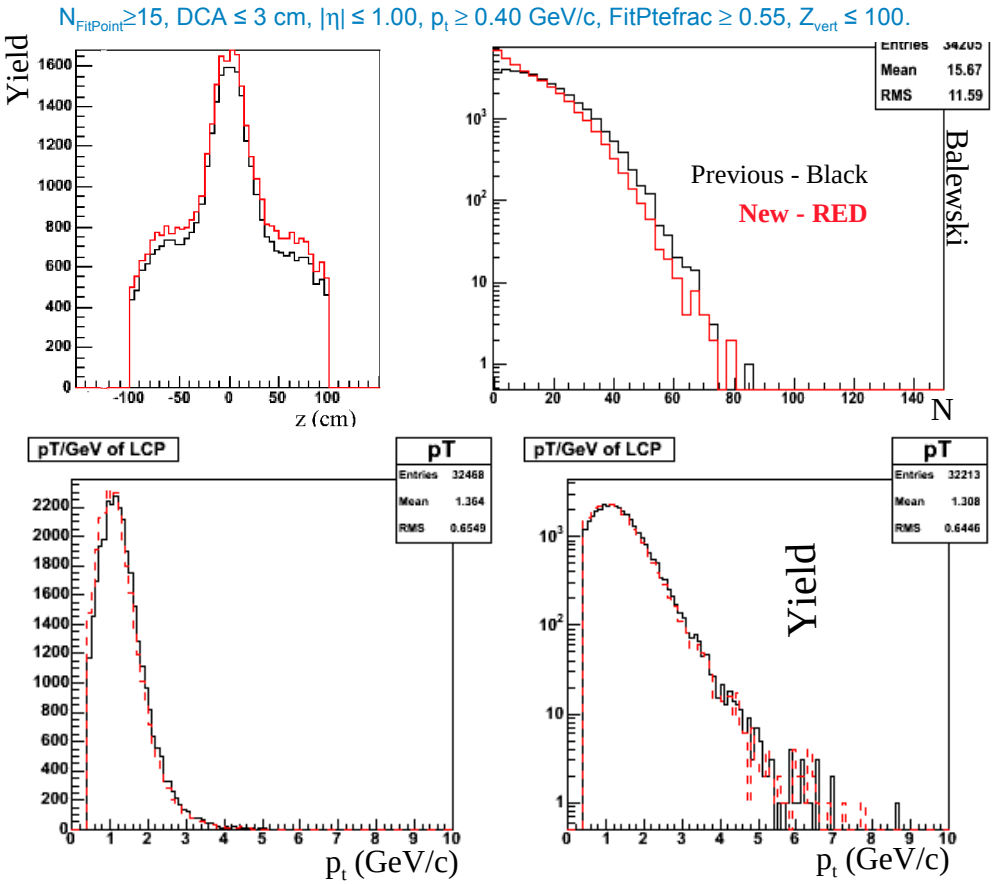
- SVT Code
  - Modified to use StEvent (the persistent data model) or tables.
- FTPC Code
  - Modified to use StEvent.
- Trigger data detectors
  - Formerly in StEventMaker, now part of a compendium maker
- Performance Evaluation Codes (J. Lauret, Y. Fisyak, M. Calderon)
  - Included propagation Geant particle ID in hit/track reconstruction to dominant contributor evaluation (key to dominant, number of hits, avg quality).
  - Generic track-track comparison maker was developed.
- Integration of SSD.
- R&D for a new pixel detector

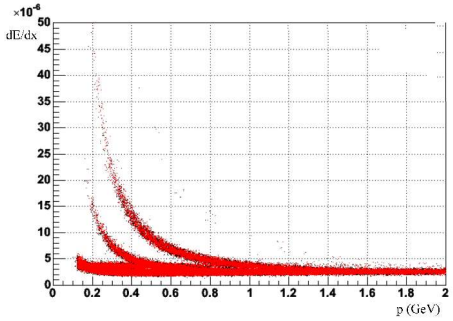
Performance Verification

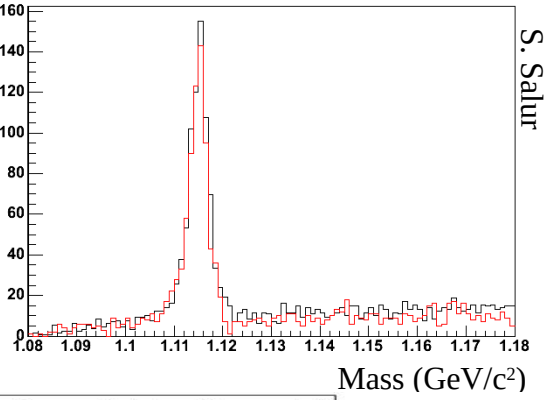
- Goals
  - Verify code integrity - produce sensible numbers
  - Verify physics performance
- Tester team
  - *Representatives from each STAR Physics working group*
  - Event structure - Aya Ishihara
  - Spin - Jan Balewski
  - HBT - Zbigniew Chajecki
  - Heavy Flavor - Alex Suaide
  - EbyE - Paul Sorensen
  - Spectra - Johan E. Gonzalez, Alexander Wetzler
  - High-pT - Marco van Leeuwen
  - Strangeness - Sevil Salur. Camelia Mironov, Ying Guo
- Duration: June 16, 04 to September 22, 04.
- Hard work!
  - Data samples reproduced 14 times.
  - Multiple (minor) bug fixes.

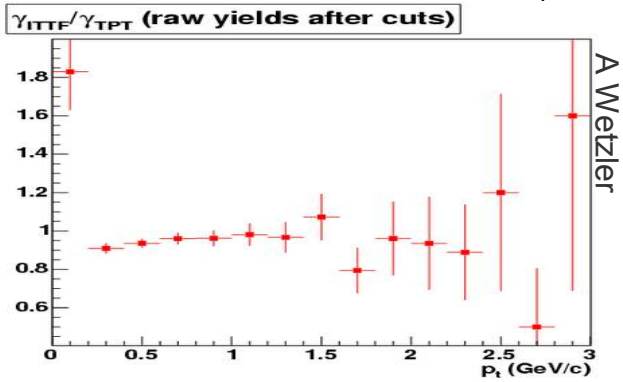
Performance Verification

d + Au @ 200 GeV.



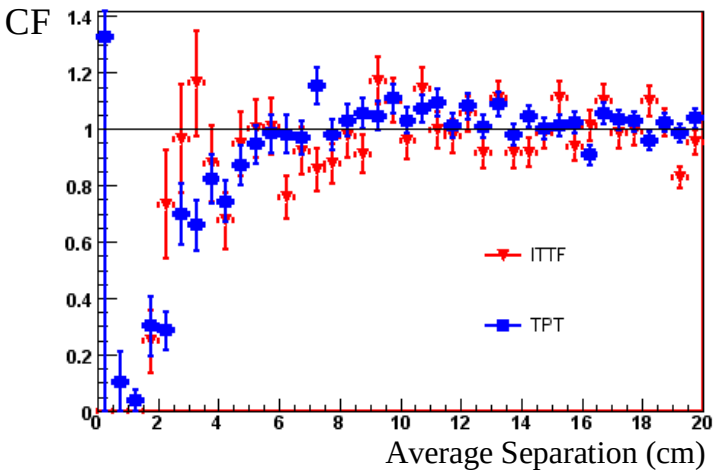






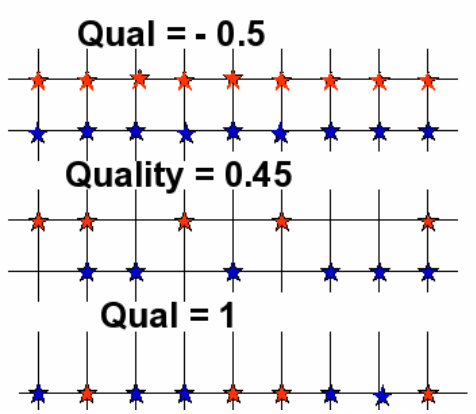
Performance Review - HBT Analysis - Track Merging/Splitting

d +Au data

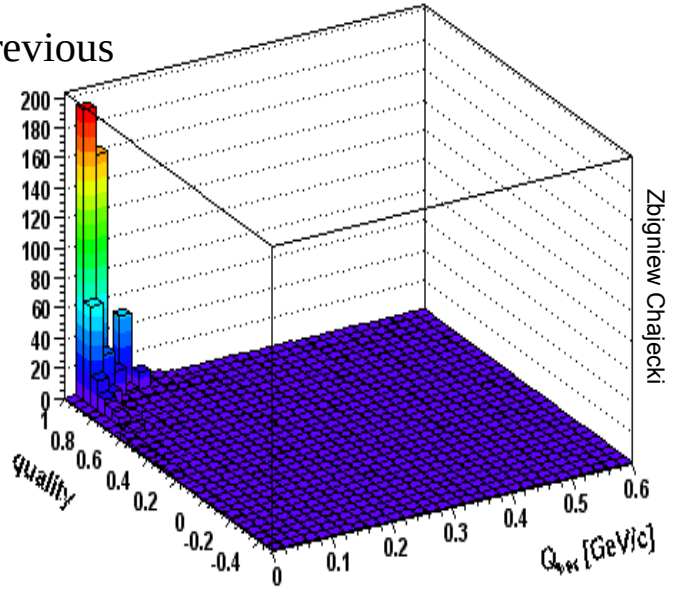


Merging?

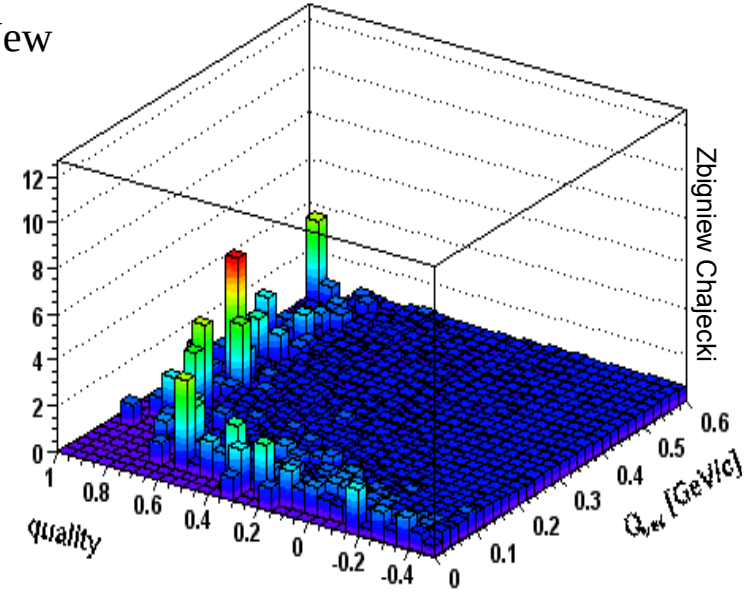
Splitting?



Previous



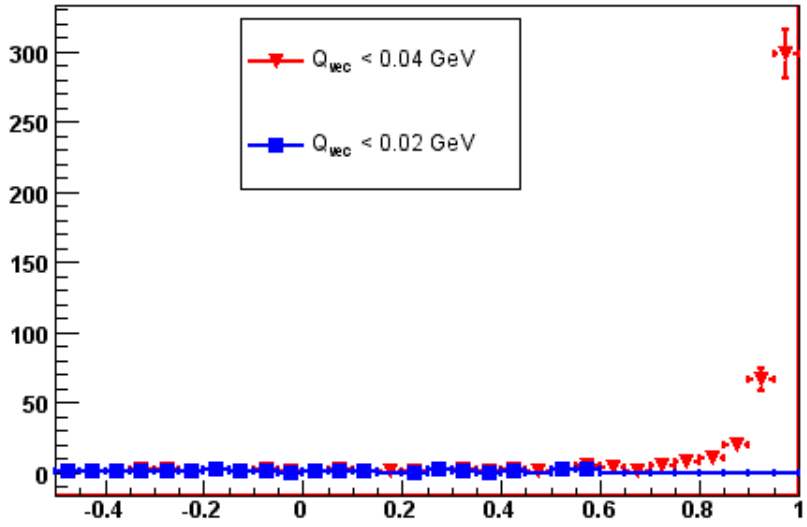
New

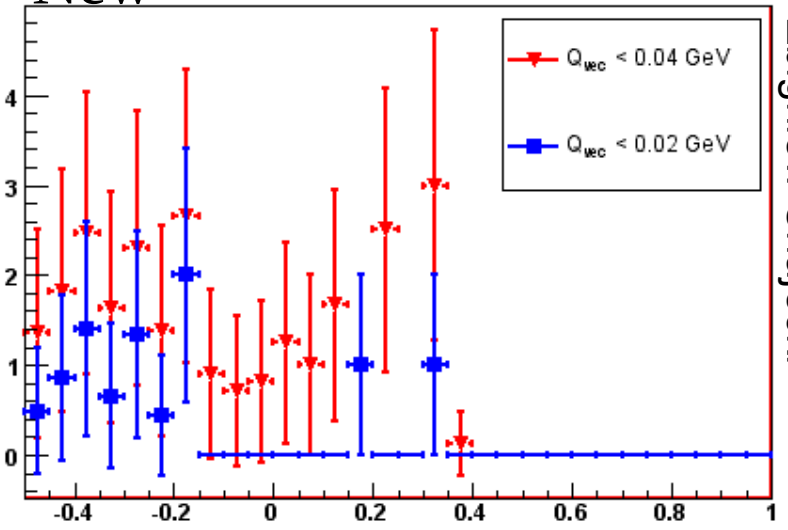


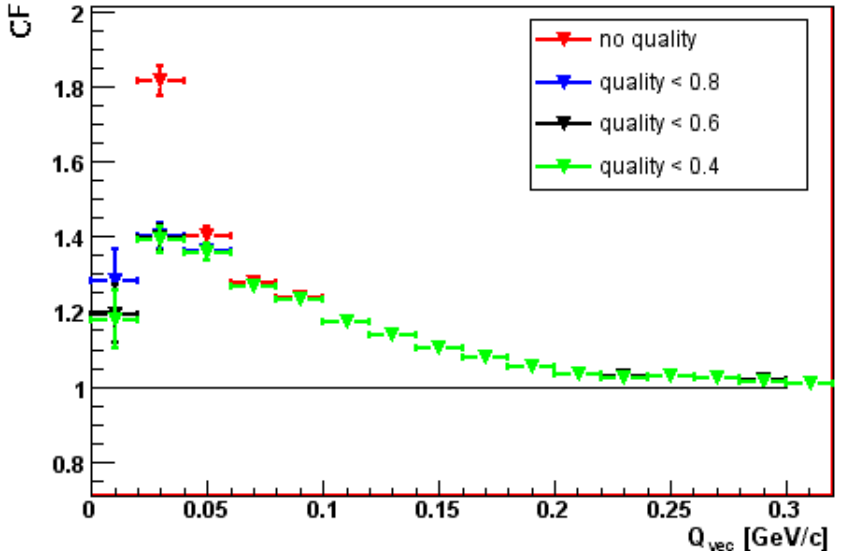
Previous

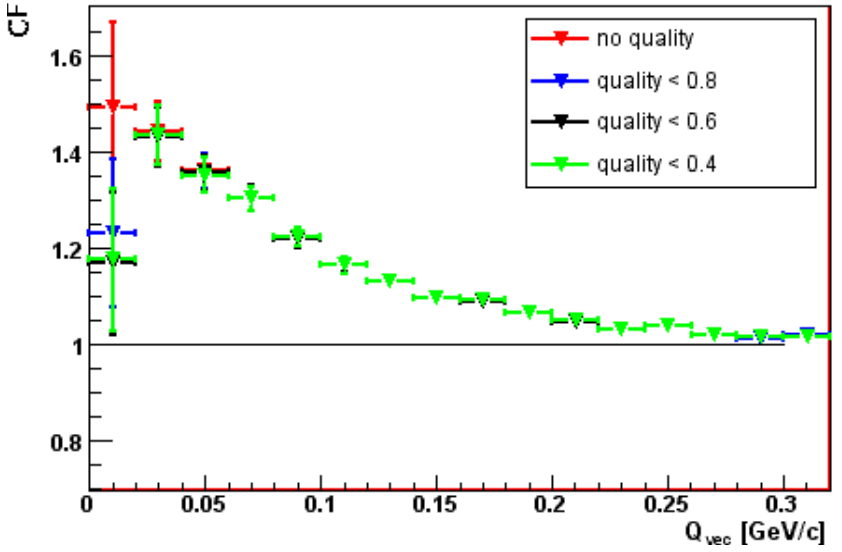
New

BETTER!!!









Zbigniew Chajecki

Status Statement- End of August

ITTF Tracker	Completed!☺
Integration in Reconstruction Chain	Completed! ☺
Performance Comparison/Validation	Completed! ☺

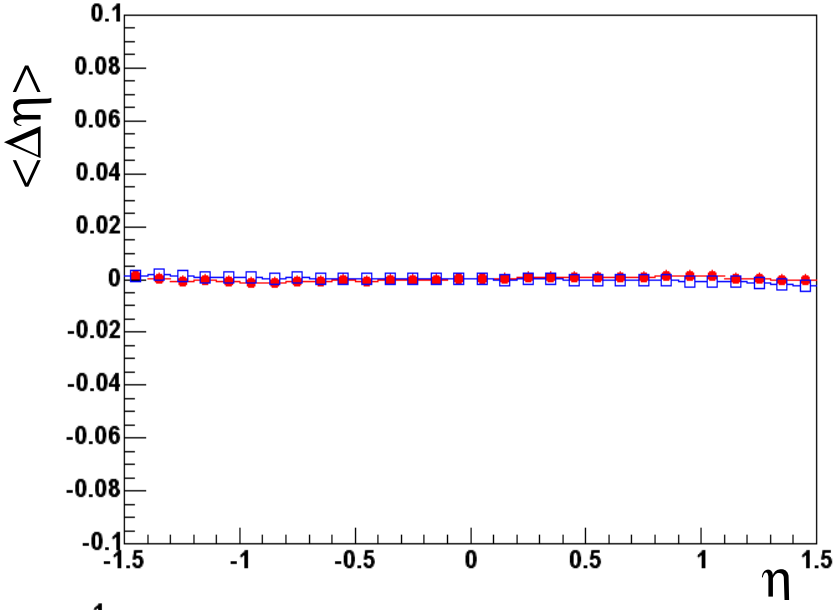
Ready?

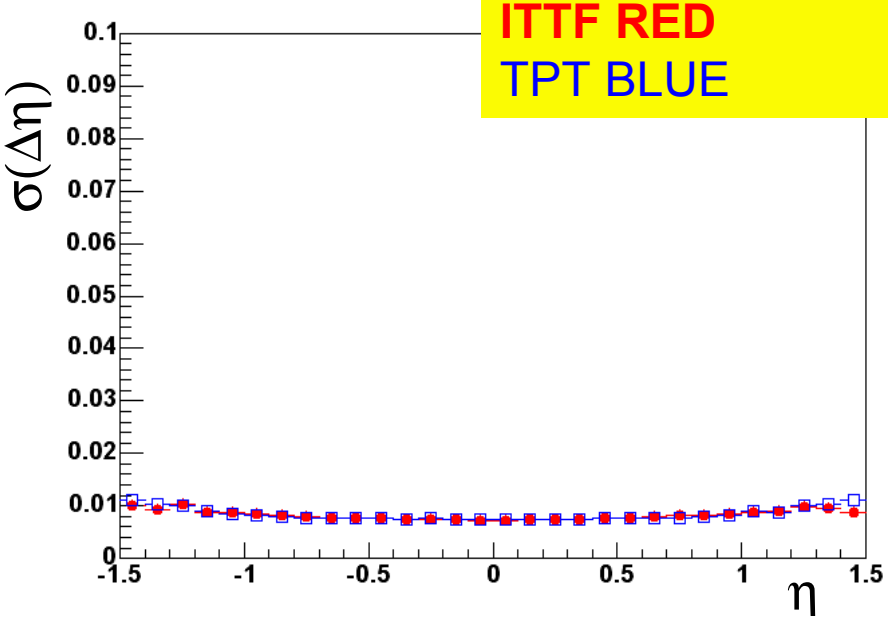
Maybe not…

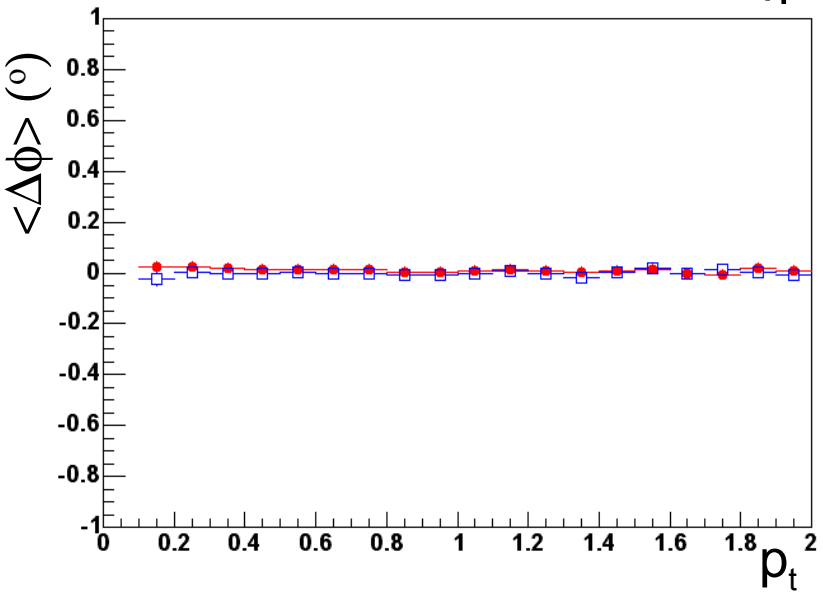
- Message from Marco van Leeuwen - Sept 24.
- “When looking at the express-stream production, I saw that there are still some primary tracks with helix origin at 'weird' values (r > 10m).”
- Another Message from Marco beginning of October.
  - “Correlation global vs primary tracks is anomalous”

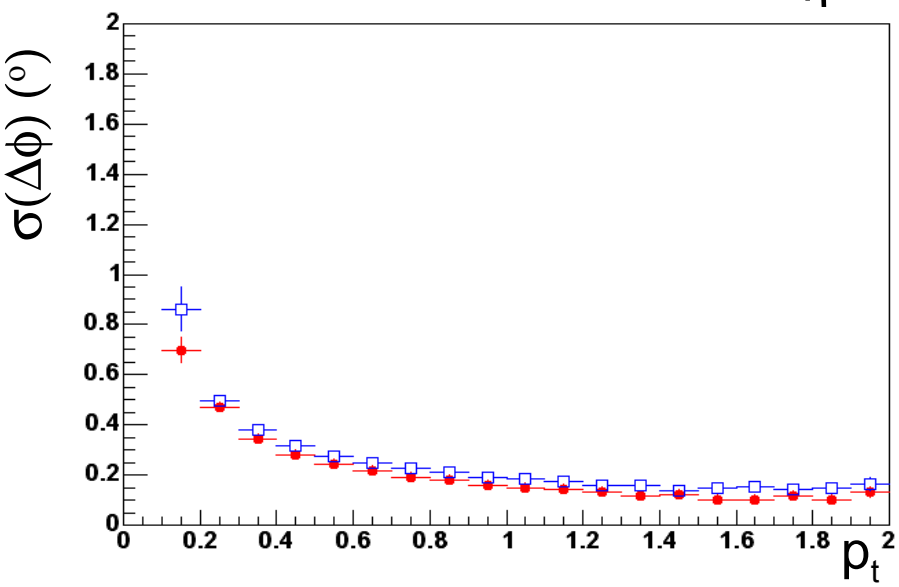
Reconstruction Bias & Resolution

Primary π^+
ITTF RED
TPT BLUE



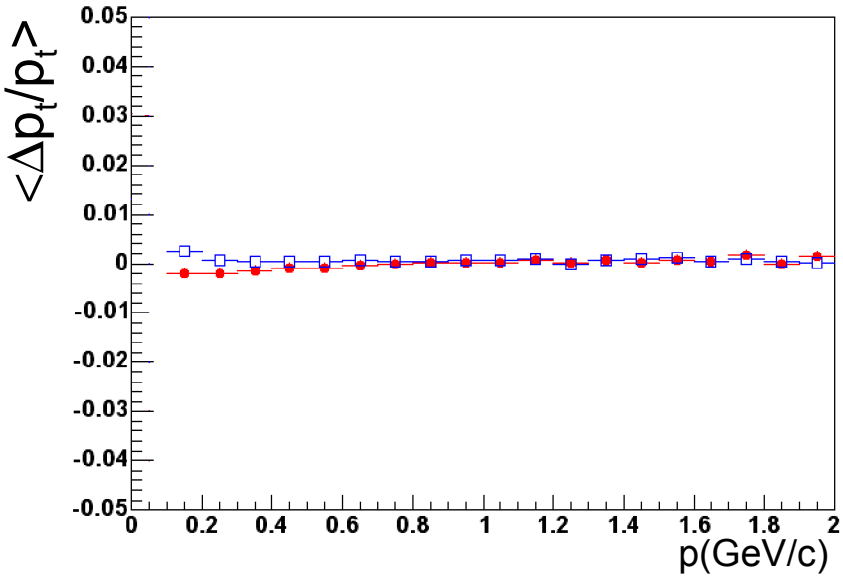


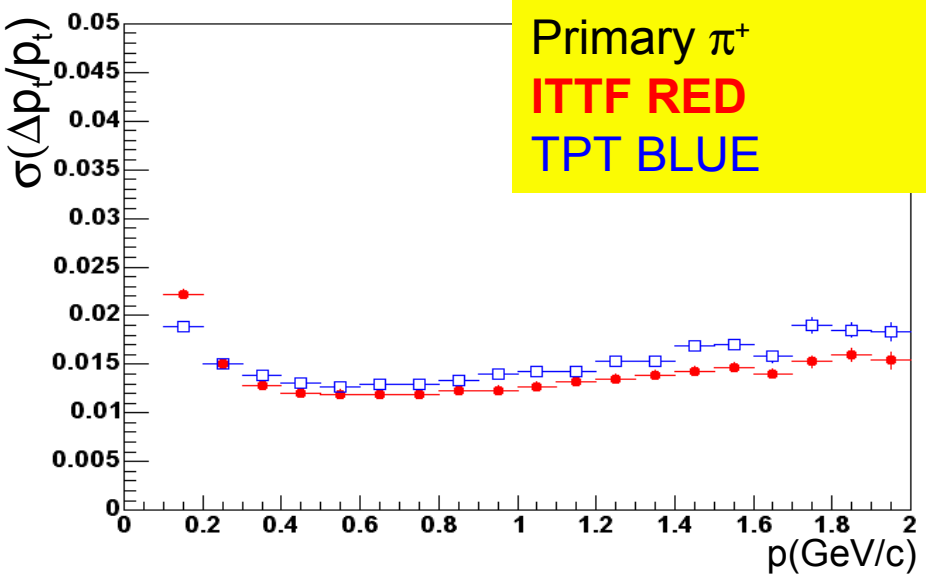




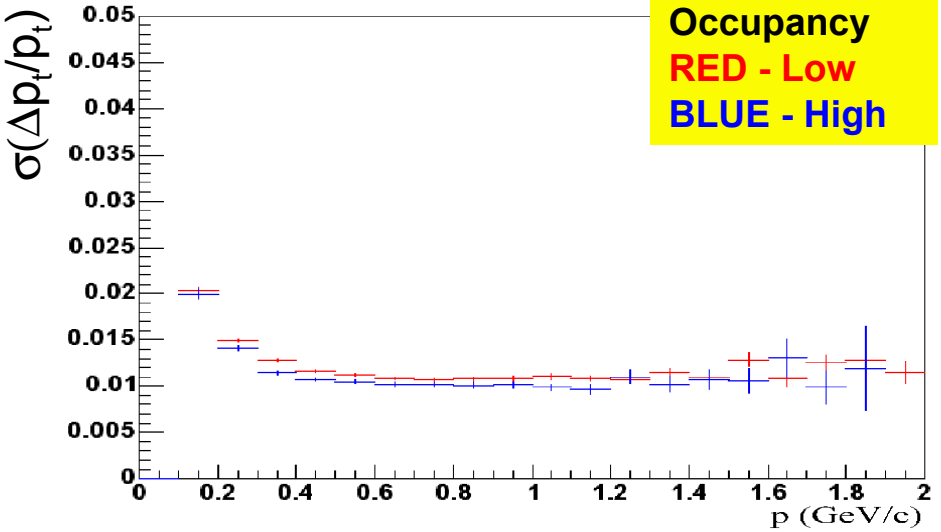
Review - Aug 03.

Reconstruction Bias & Resolution



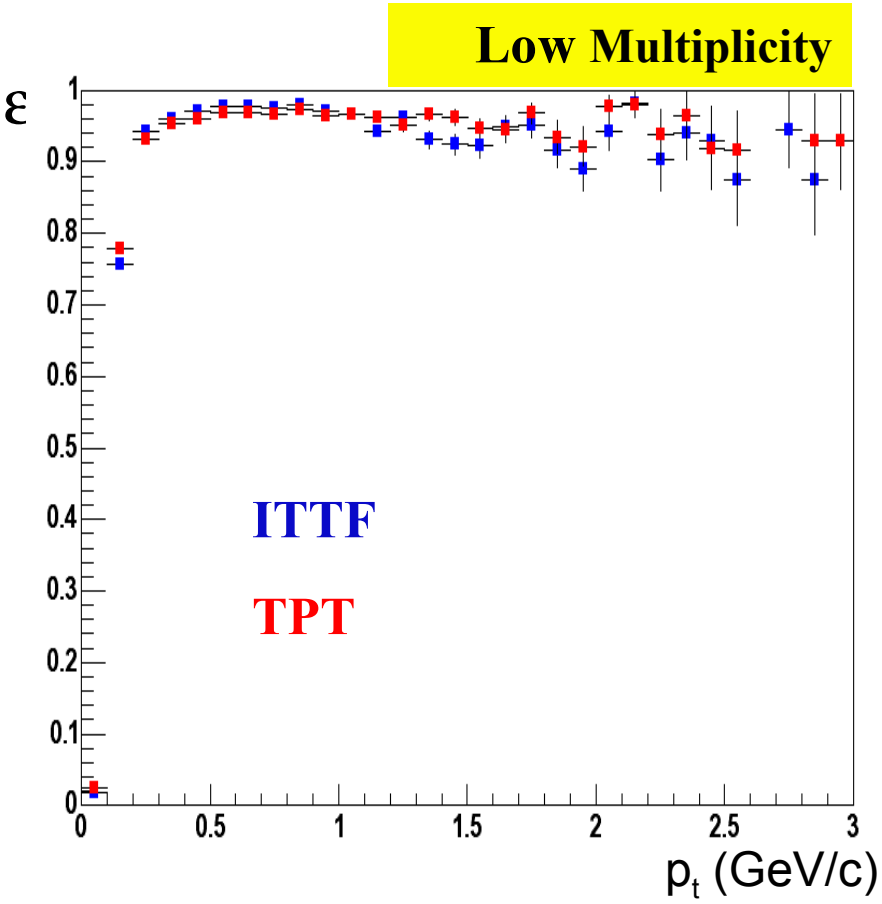


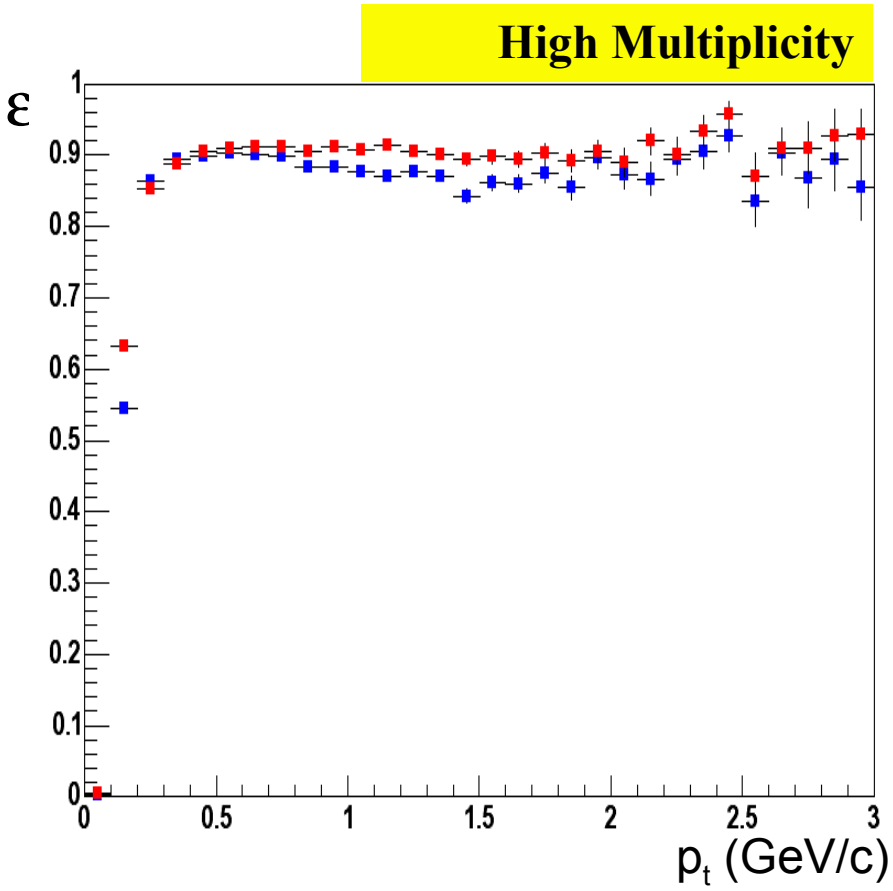
Primary π^+
ITTF RED
TPT BLUE



Occupancy
RED - Low
BLUE - High

Efficiencies vs p_t





Cuts : **N MC Hit > 10; $-1<\eta<1$; DCA<3 cm**

Closer Look at Code+Output

- Found many problems/bugs.
  - Some primary tracks not going through beam pipe.
  - Some tracks with negative chi2, others with negative track lengths, still others with points outside the fiducial volume of the detector.
  - Apparent mis-alignment of the SVT.
  - …

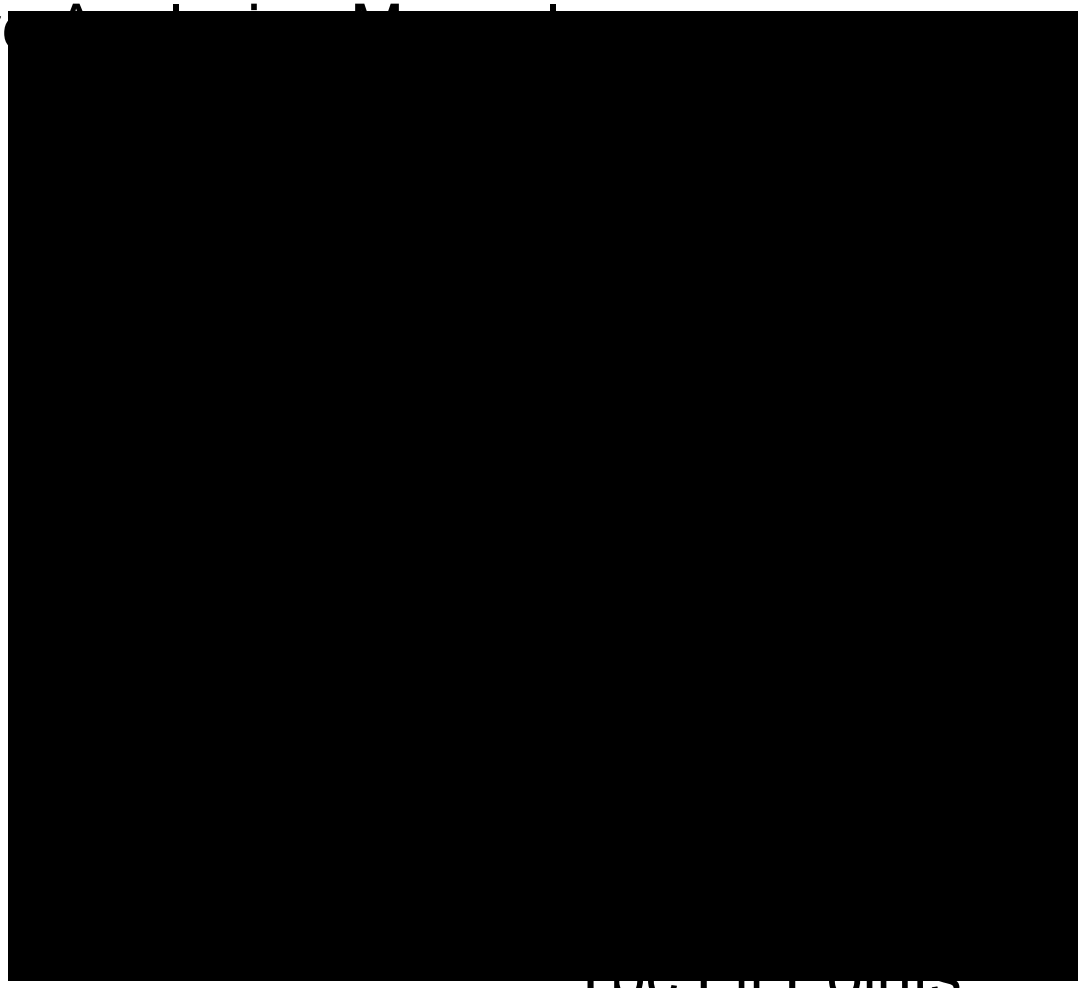
Status as of Dec 4, 04

- Special thanks to:
  - Victor, Yuri, Jerome, Marco, Manuel, Duncan, Helen, Marcelo, …
- Many bug fixes…
- Code review

Some “good” news!

Event-by-event track by track TPT vs Sti

Comparativ

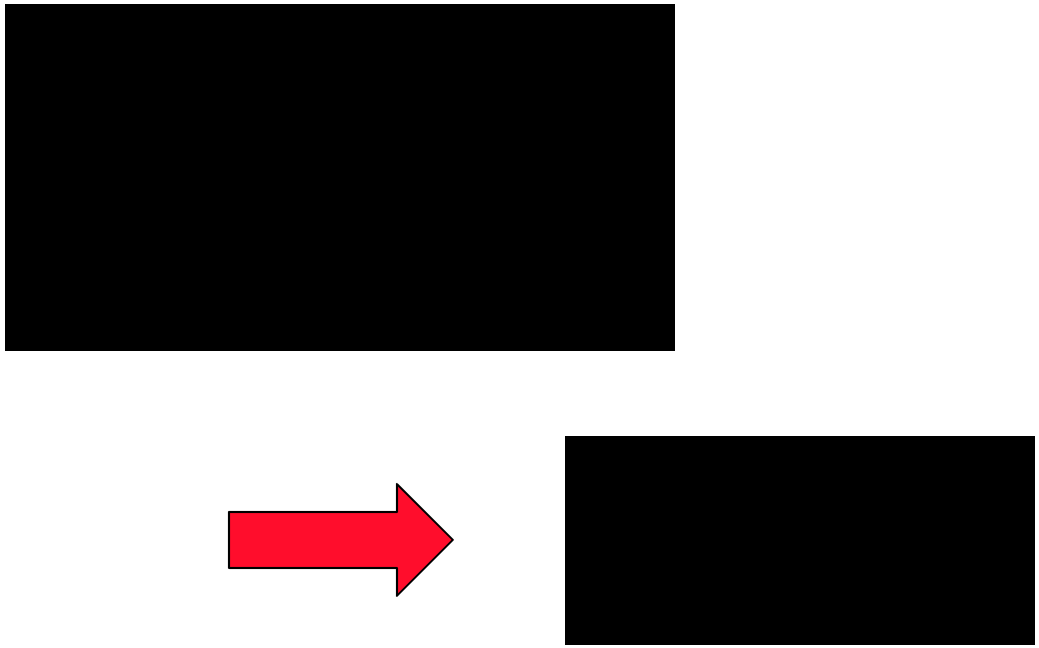


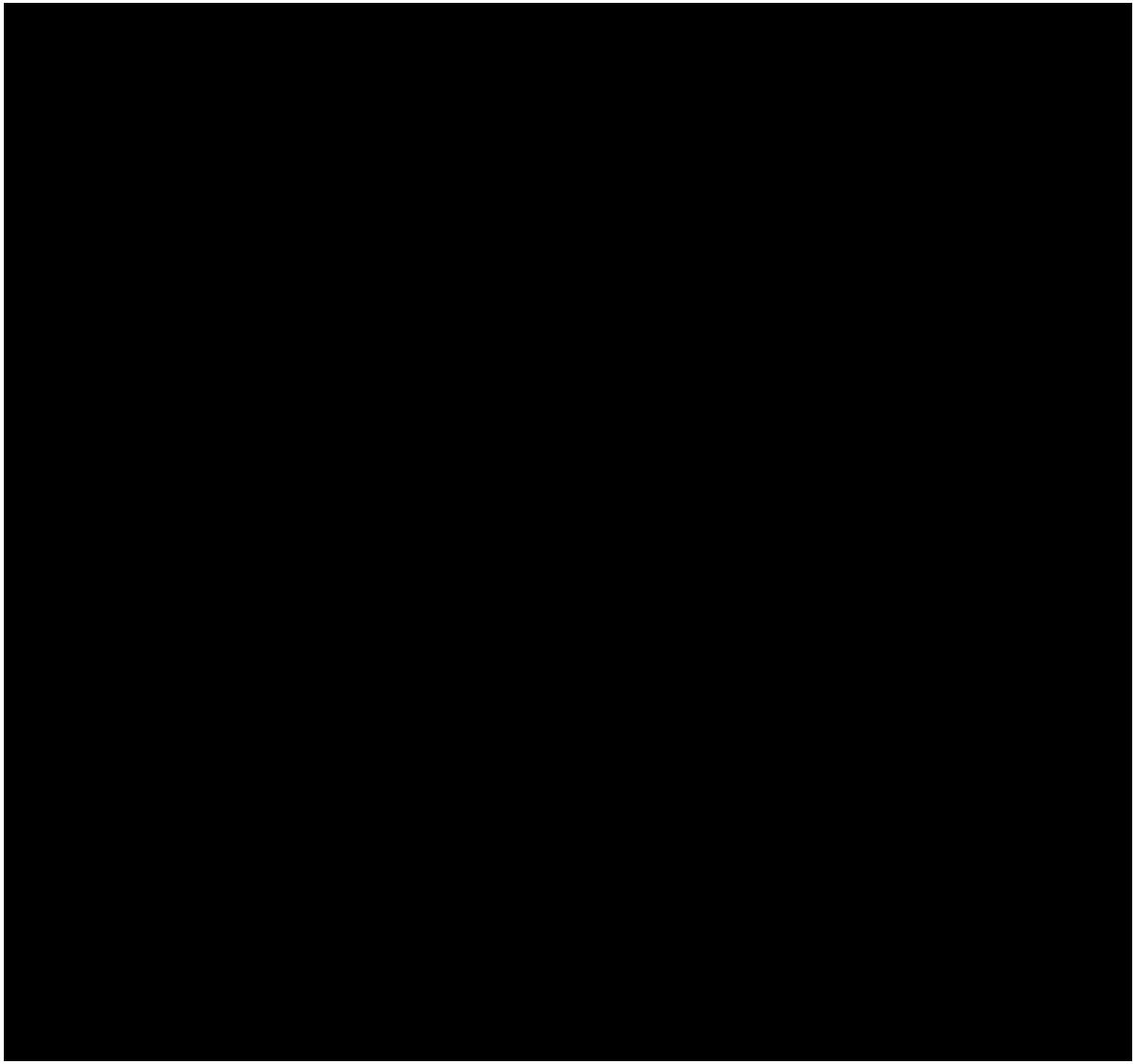
Mo

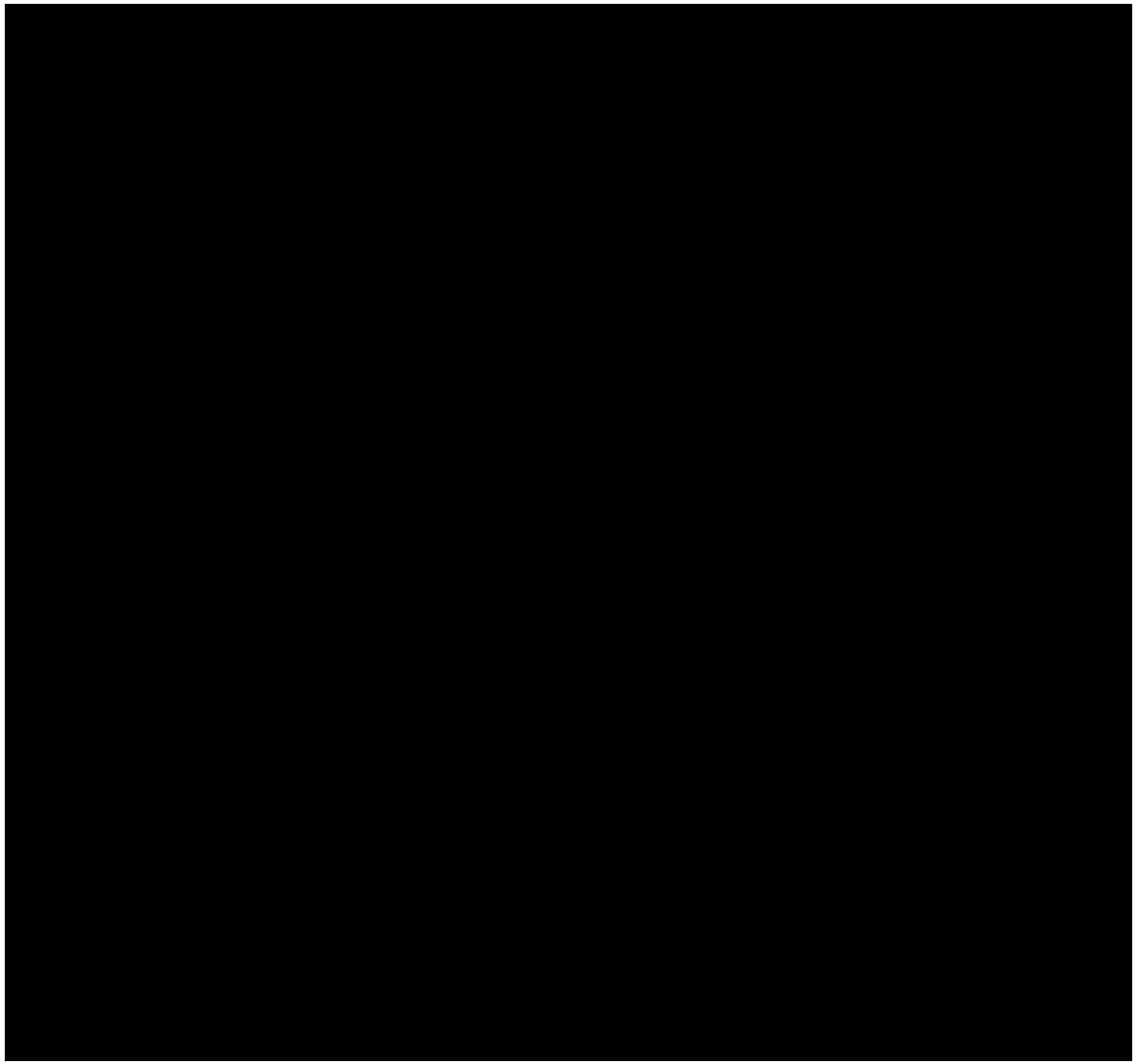
Fit Points	Mean	RMS
15-25	0.004	0.05
25-35	-0.0007	0.04
35-45	-0.001	0.03

Relative Tracking Efficiency

By doing a comparison track-by-track, one can measure the relative efficiency of each tracker. In the absence of ghost tracks, to first order the track populations seen by each tracker are obtained from the same (unknown) track population

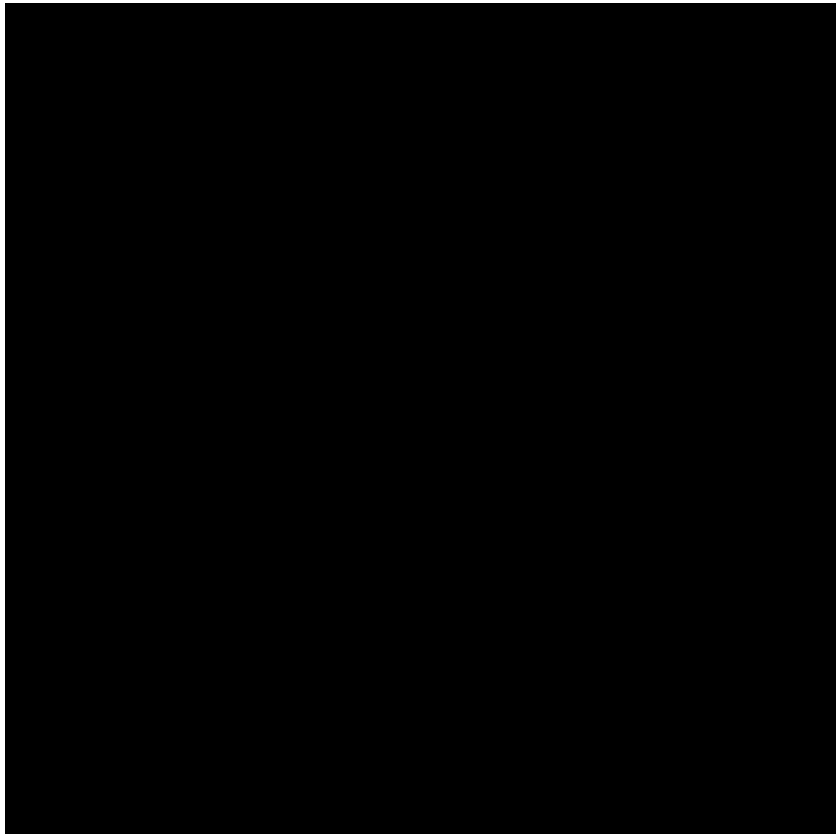




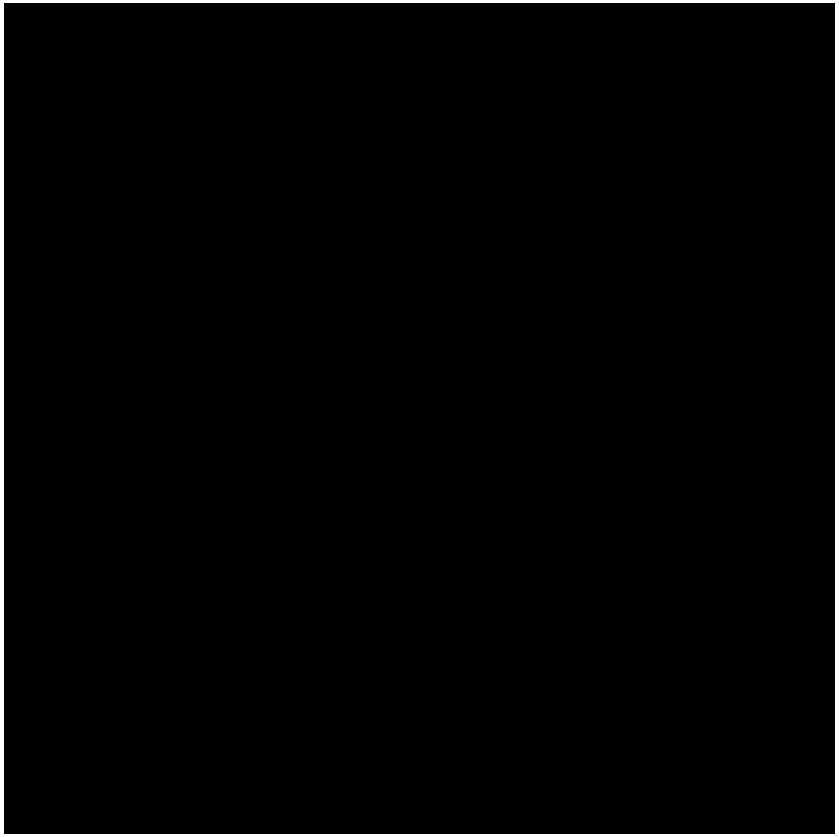


From Marco’s Web Page - Addition Dec 3.

With SVT



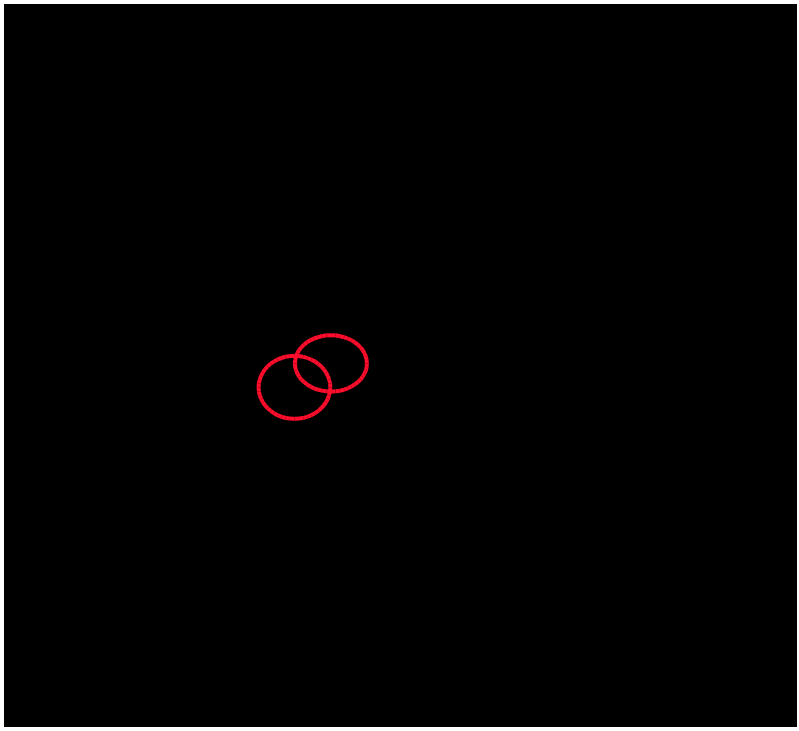
Without SVT



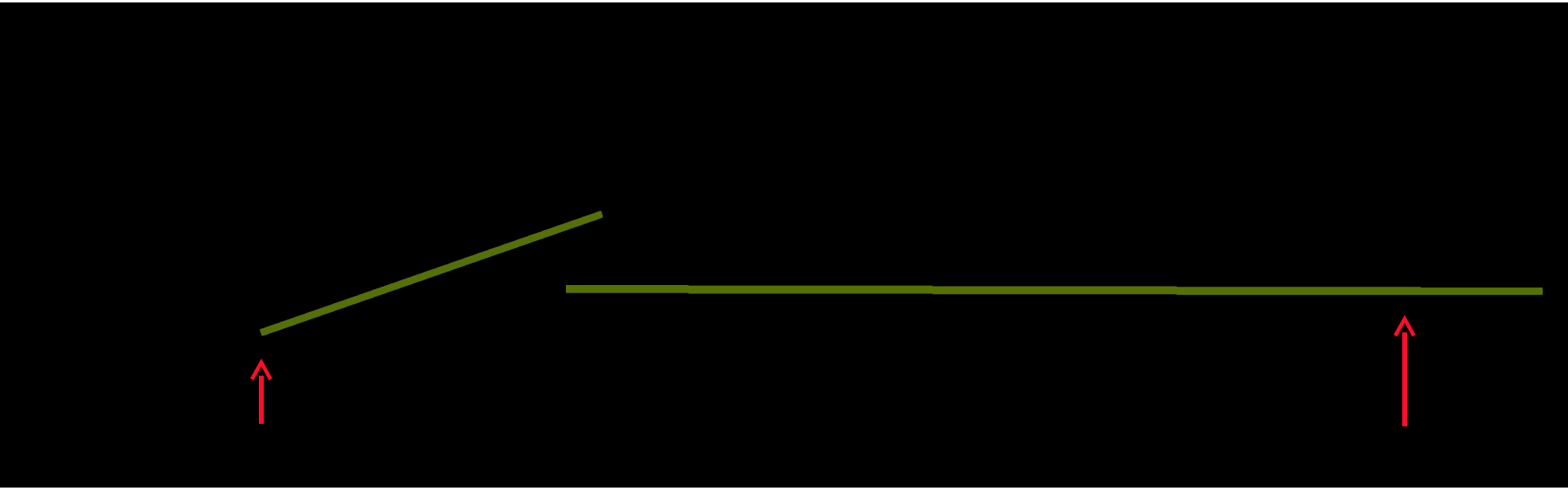
Vertex Position in the transverse plane

Without SVT

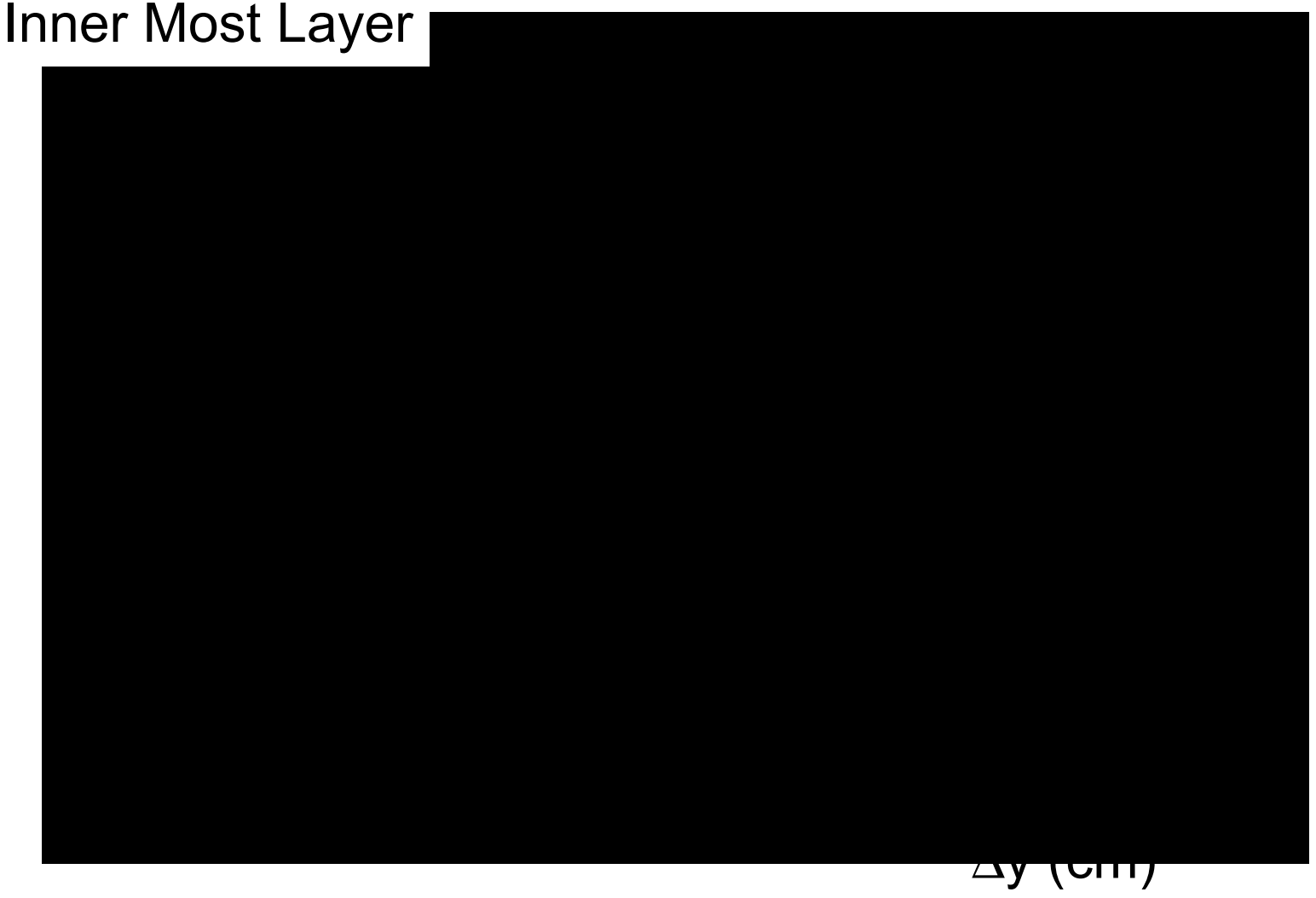
With SVT



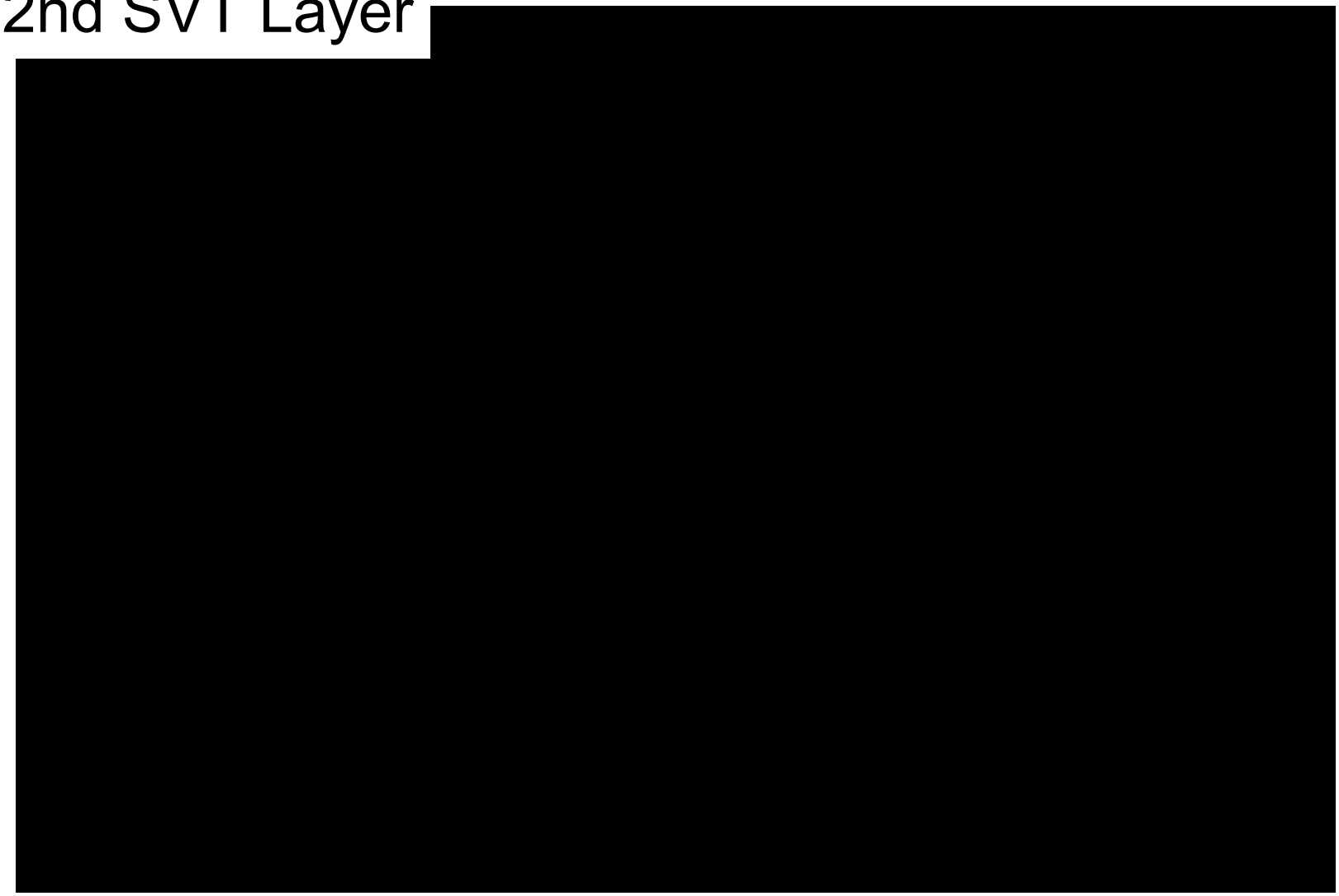
“y” Residuals (pad row direction)



SVT “y” (drift direction) Residuals



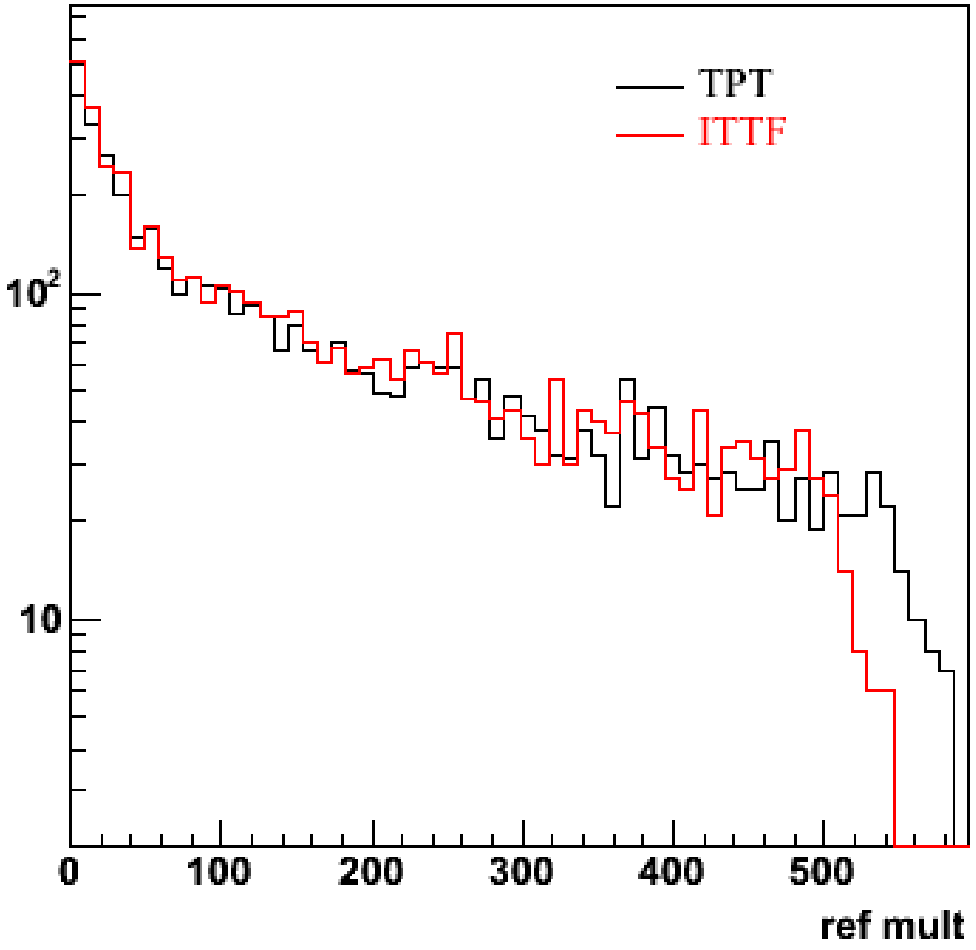
2nd SVT Layer



Primaries |eta|<1

From D

From Marco



What's next

- Code review + some further bug fixes in progress (Victor+Yuri)
  - Completed soon.
- Further performance checks (Marco, Helen, Duncan)
- Is the SVT geometry OK, or Sti problem only?
- Some tuning - insure tracking parameters are optimal
- Large scale test and review (again?)