

SELECTION OF PRIMARY TRACKS.

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CUTS APPLIED TO SELECT TRACKS FROM PRIMARIES:

- Quality/Resolution*:

$$N_{\text{clustersinTPC}} > 50 \quad (1)$$

$$\frac{\chi^2}{N_{\text{clustersinTPC}}} \leq 3.5 \quad (2)$$

$$\sigma_y^2 < 2 \text{ cm}^2 \quad (3)$$

$$\sigma_z^2 < 2 \text{ cm}^2 \quad (4)$$

$$\sigma_{\sin(\phi)}^2 < 0.5 \quad (5)$$

$$\sigma_{\tan(\theta)}^2 < 0.5 \quad (6)$$

$$\sigma_{\frac{1}{PT}}^2 < 2(\text{GeV}/c)^{-2} \quad (7)$$

- Track to vertex: Cutting on DCA normalized by the expected resolution*:

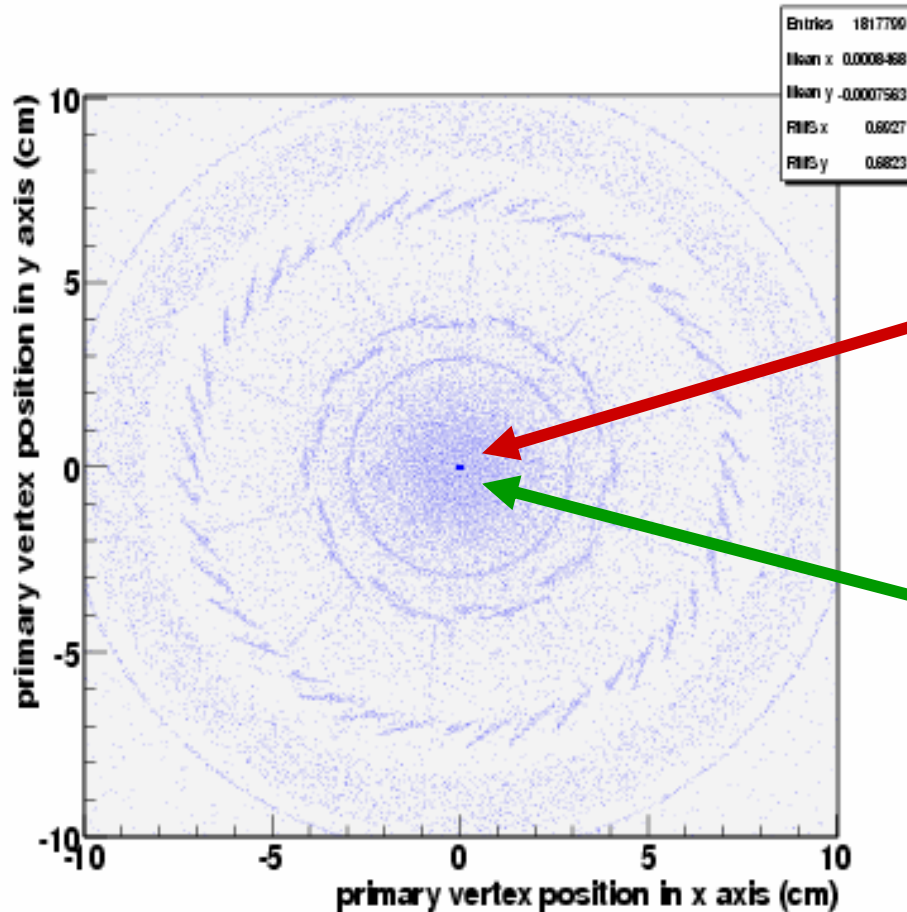
$$N_\sigma < 3 \quad (8)$$

- TPC refit*
- Kink daughters are rejected*

•Cuts Implemented by Jean Fiete in his analysis.

- **RECONSTRUCTED VERTEX IS DEMANDED!!!**

Using MC information, I got the vertex distribution in XY plane:



~ 95.1% of all reconstructed tracks as primaries

NO ITSrefit

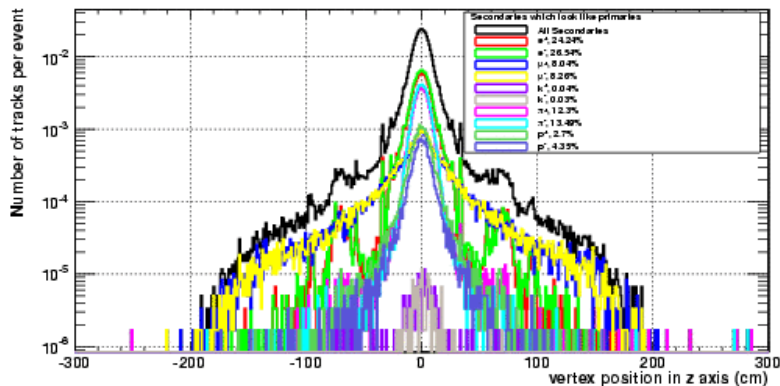
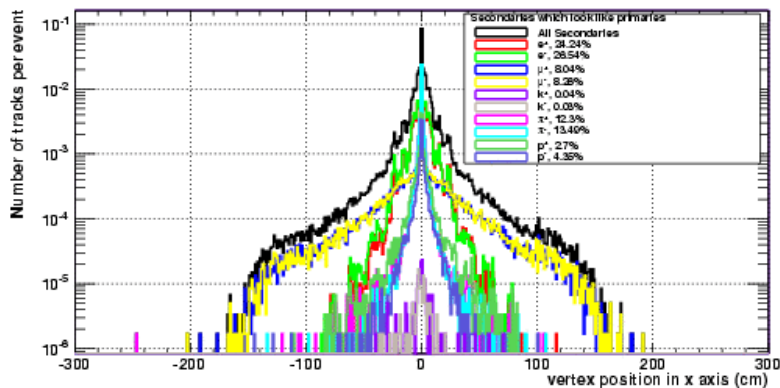
~ 96.38% of all reconstructed tracks as primaries

ITSrefit

SECONDARY TRACKS WHICH LOOK AS PRIMARIES

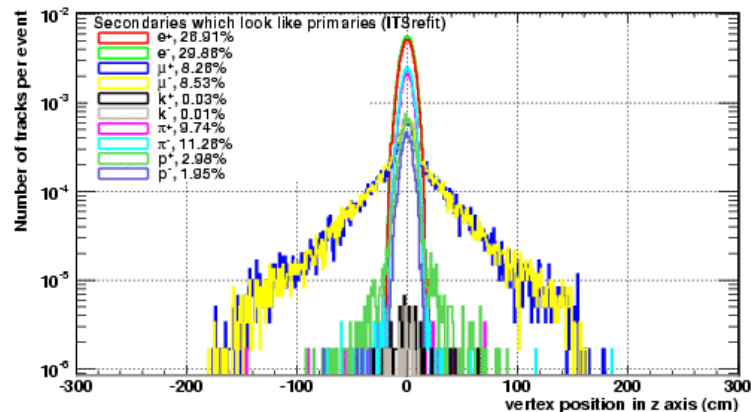
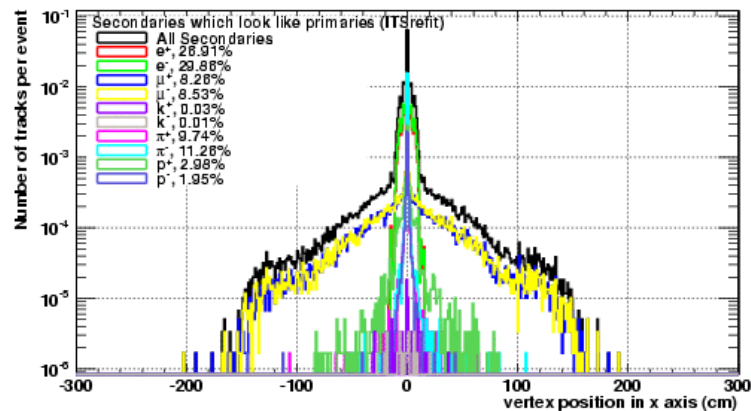
NO ITSrefit

Number of tracks: 289896



ITSrefit

Number of tracks: 170736

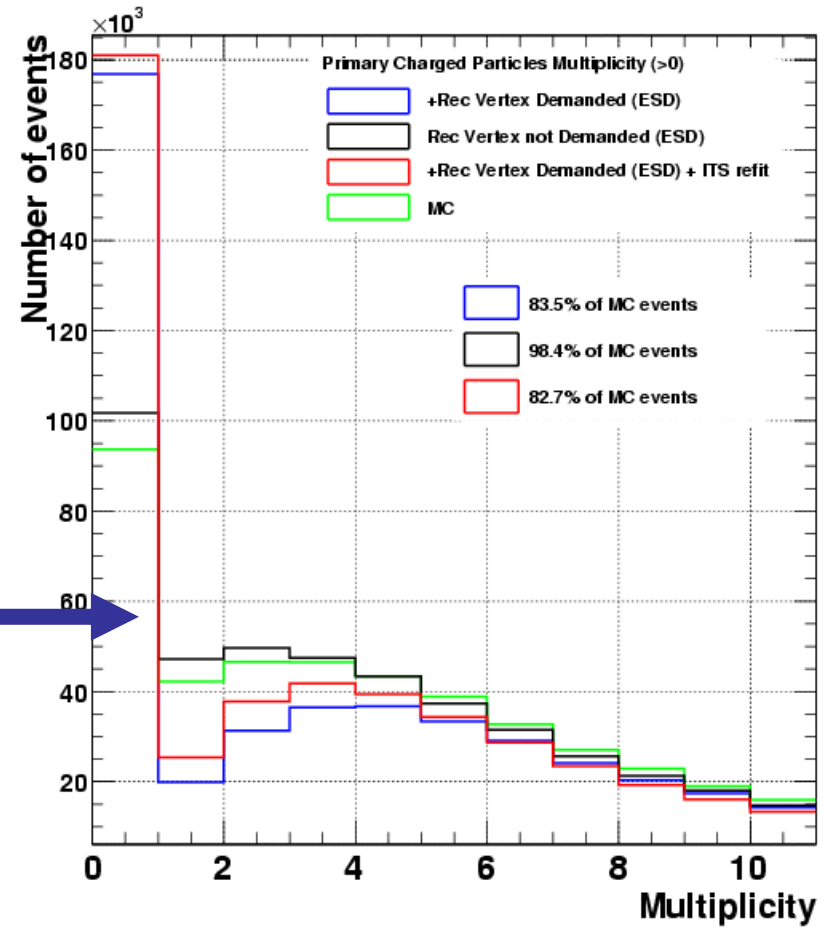
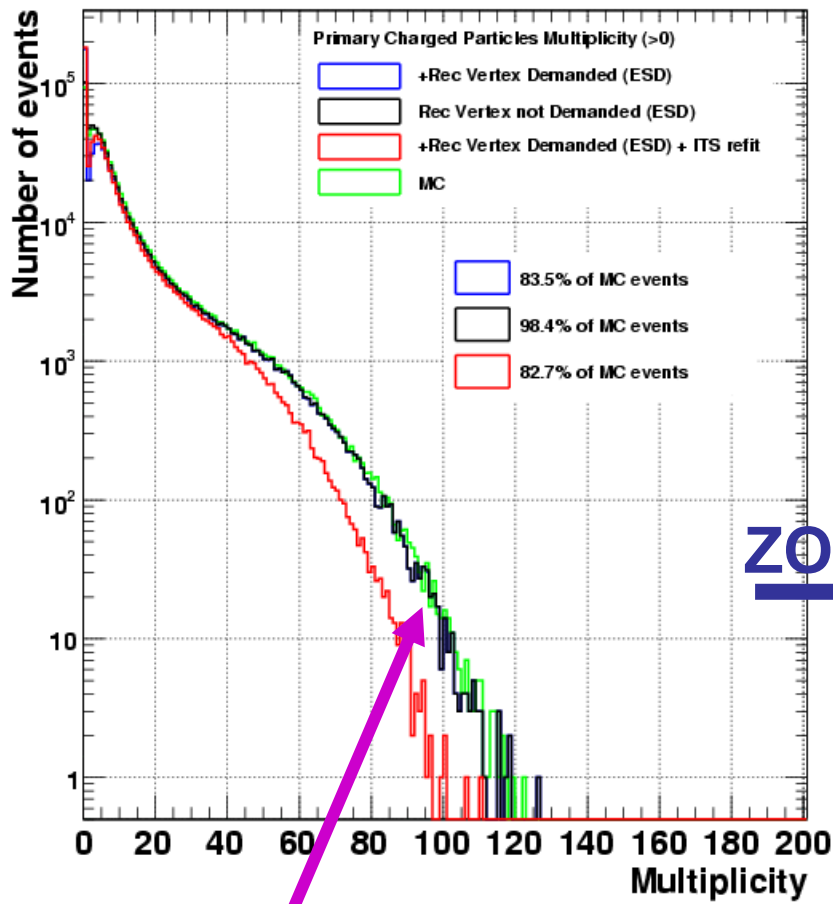


Applying ITSrefit the number of secondaries (selected as primaries) is reduced by 41%

GOOD RECONSTRUCTED PRIMARIES IS REDUCED BY 13.6%

PRIMARY CHARGED PARTICLES MULTIPLICITY (comparison ESD vs MC)

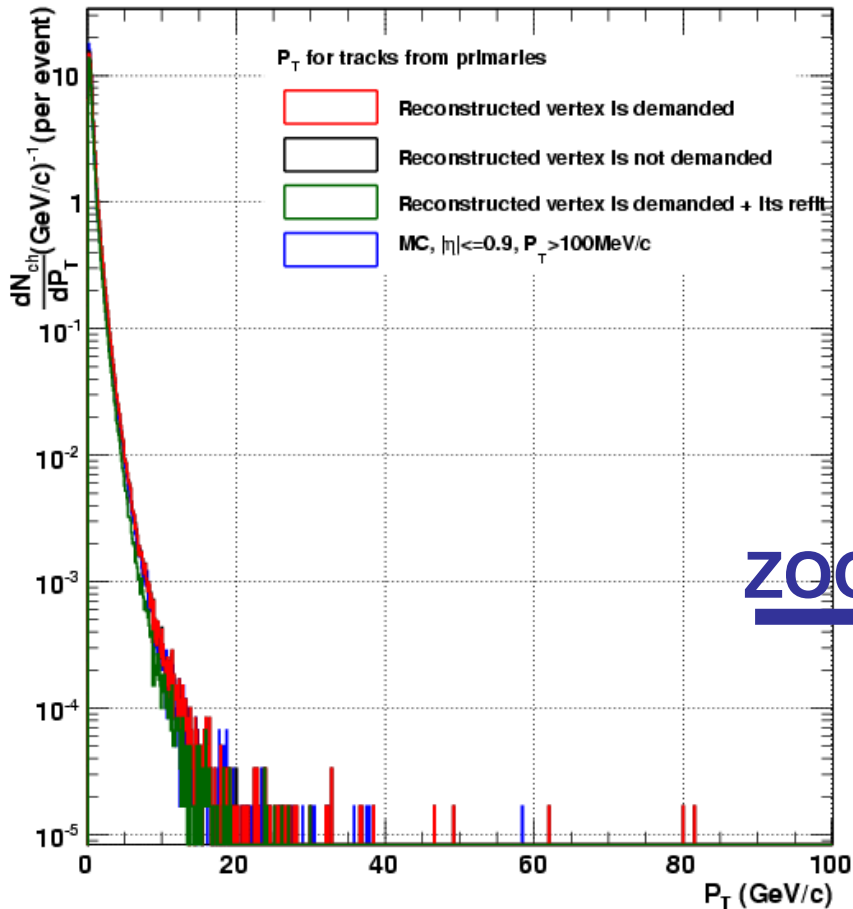
To get MC multiplicity I selected primary charged particles using: $-0.9 \leq \eta \leq 0.9$, $P_T > 100 \text{ MeV}/c$, gluons and quarks rejected, charge $\neq 0$.



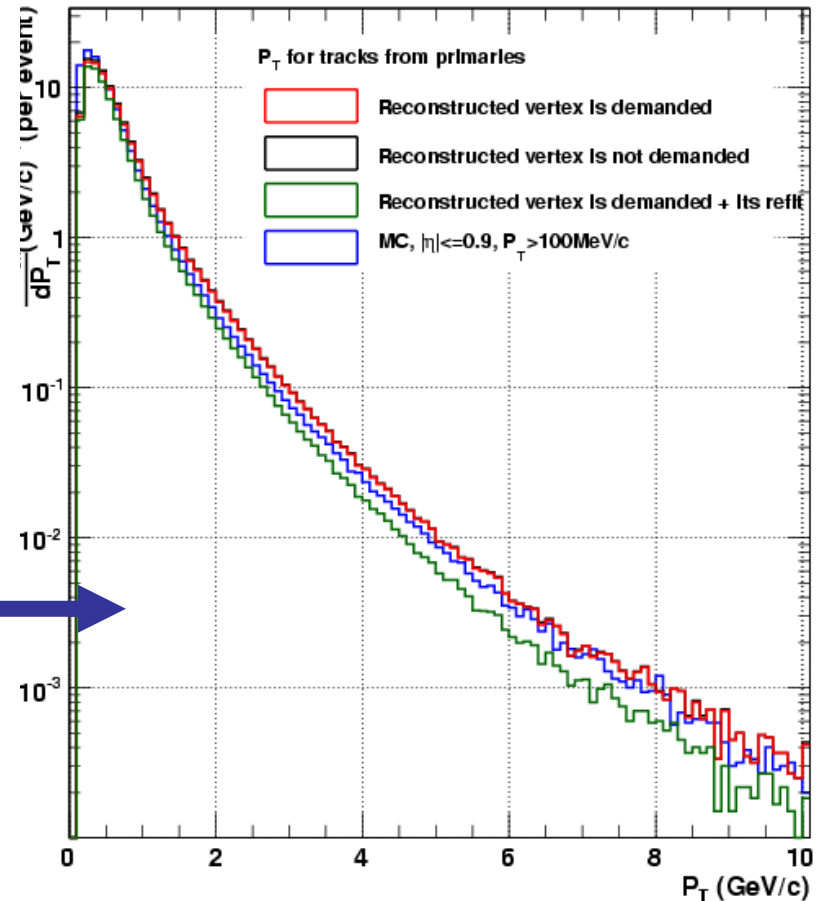
Difference: $\approx 15\%$!!

Pt DISTRIBUTION FOR PRIMARY CHARGED PARTICLES (comparison ESD vs MC)

To get MC multiplicity I selected primary charged particles using: $-0.9 \leq \eta \leq 0.9$, $P_T > 100 \text{ MeV}/c$, gluons and quarks rejected, charge $\neq 0$.

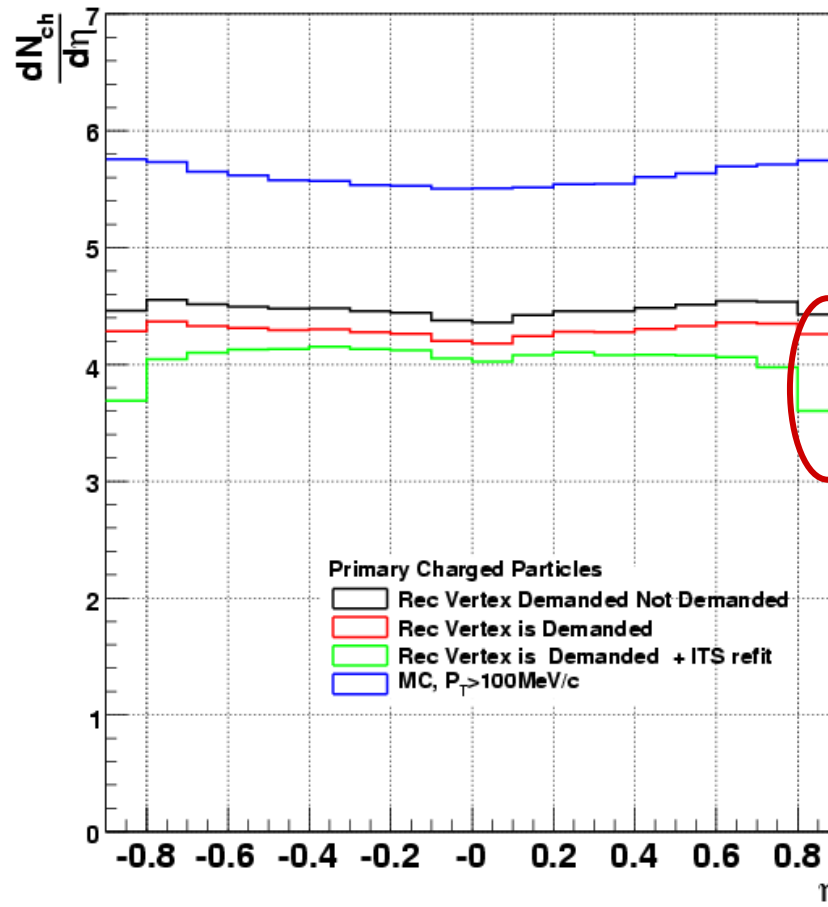


ZOOM



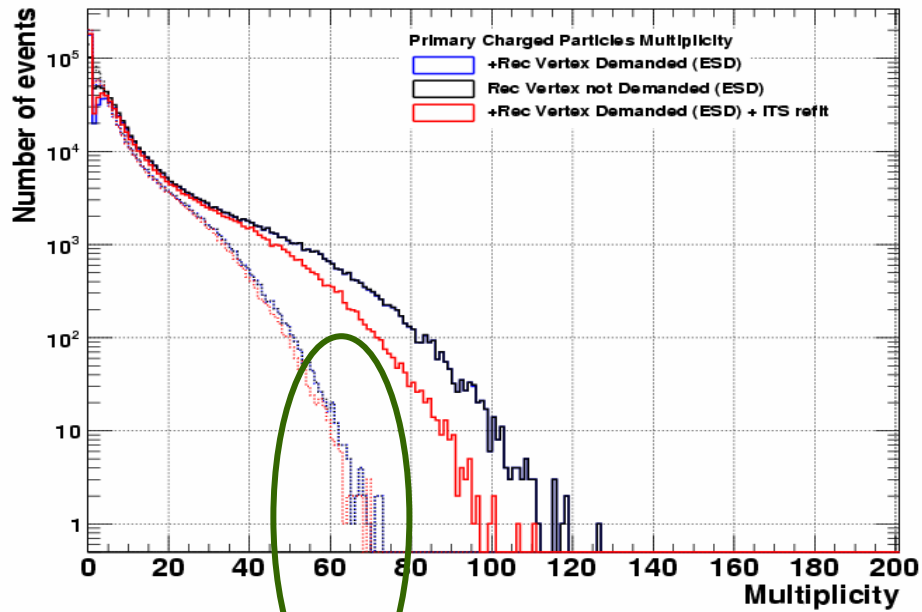
ETA DISTRIBUTION FOR PRIMARY CHARGED PARTICLES (comparison ESD vs MC)

To get MC multiplicity I selected primary charged particles using: $-0.9 \leq \eta \leq 0.9$, $P_T > 100 \text{ MeV}/c$, gluons and quarks rejected, charge $\neq 0$.



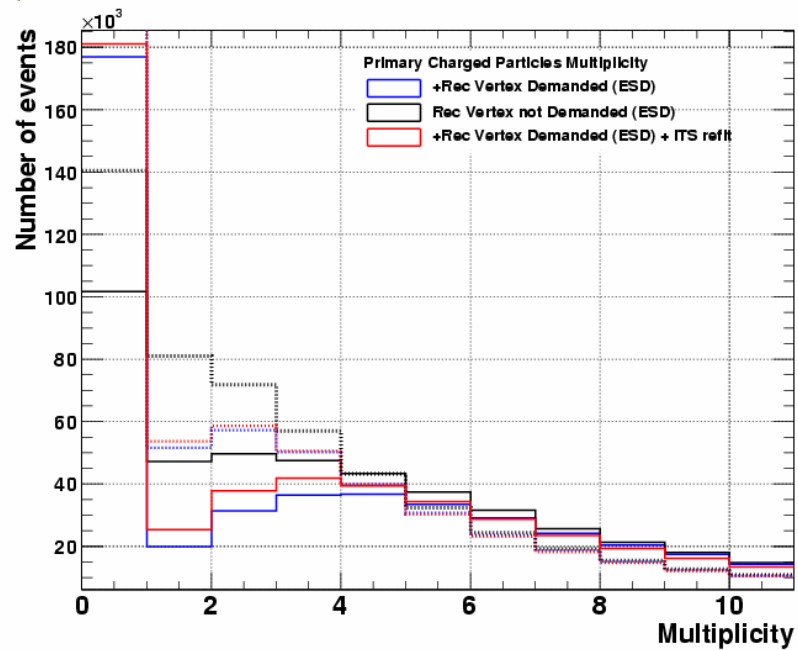
$|\eta| > 0.6$,
Difference: \sim
15%

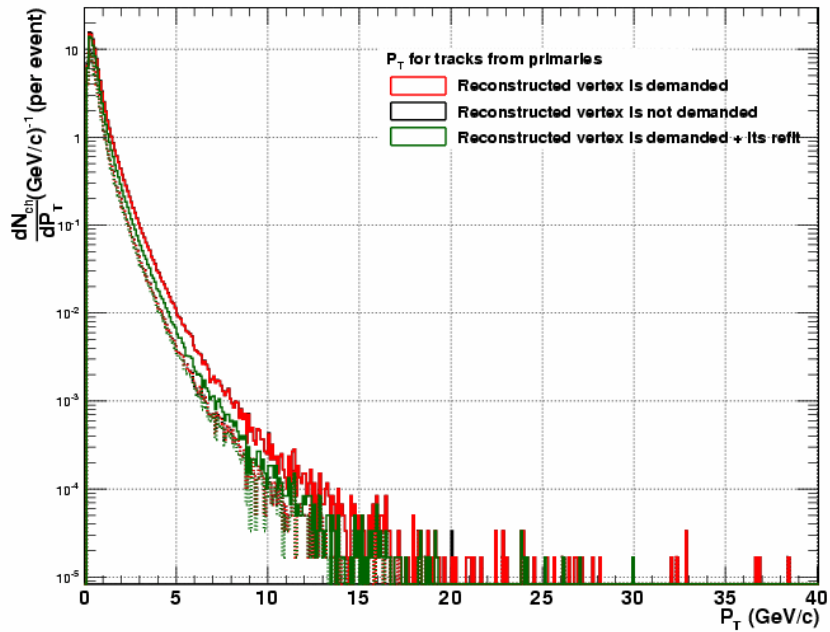
**HOW DO MULTIPLICITY
AND PT DISTRIBUTIONS
LOOK IF WE APPLY A CUT
IN ETA, ($|\eta| \leq 0.6$)?**



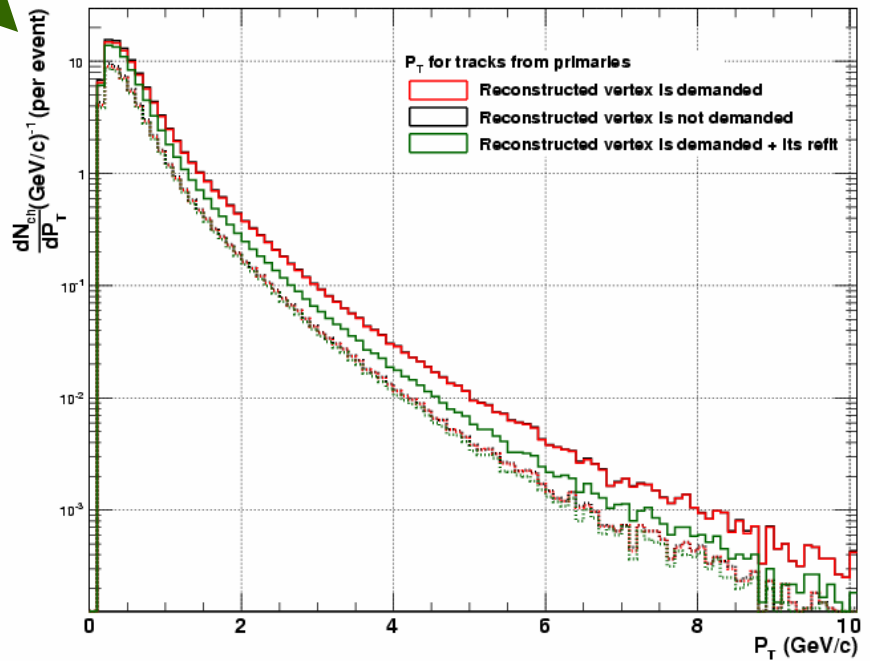
CUT IN ETA, $|\eta| \leq 0.6$

ZOOM



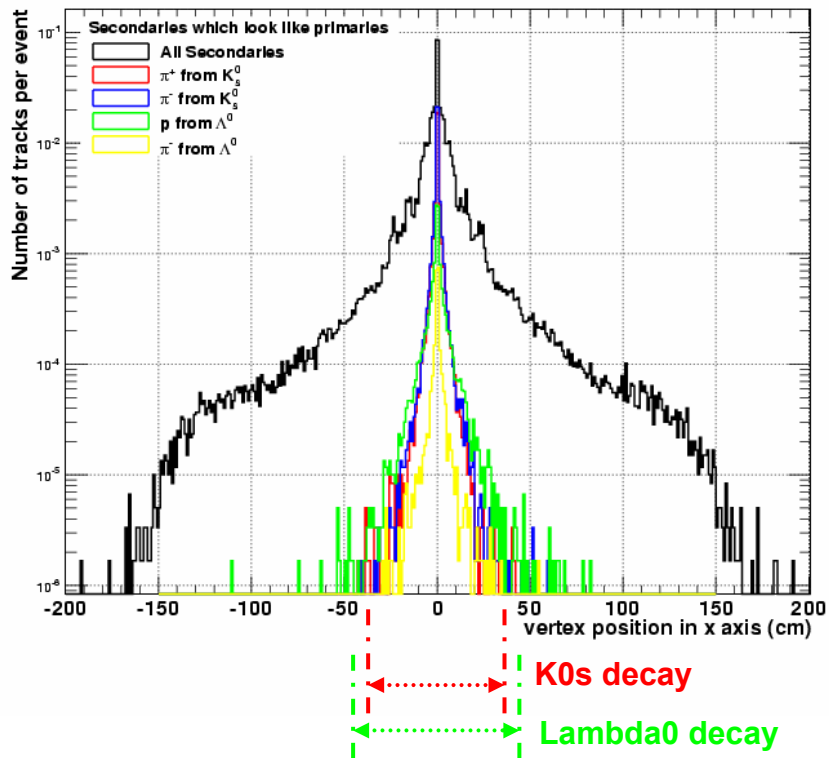


ZOOM

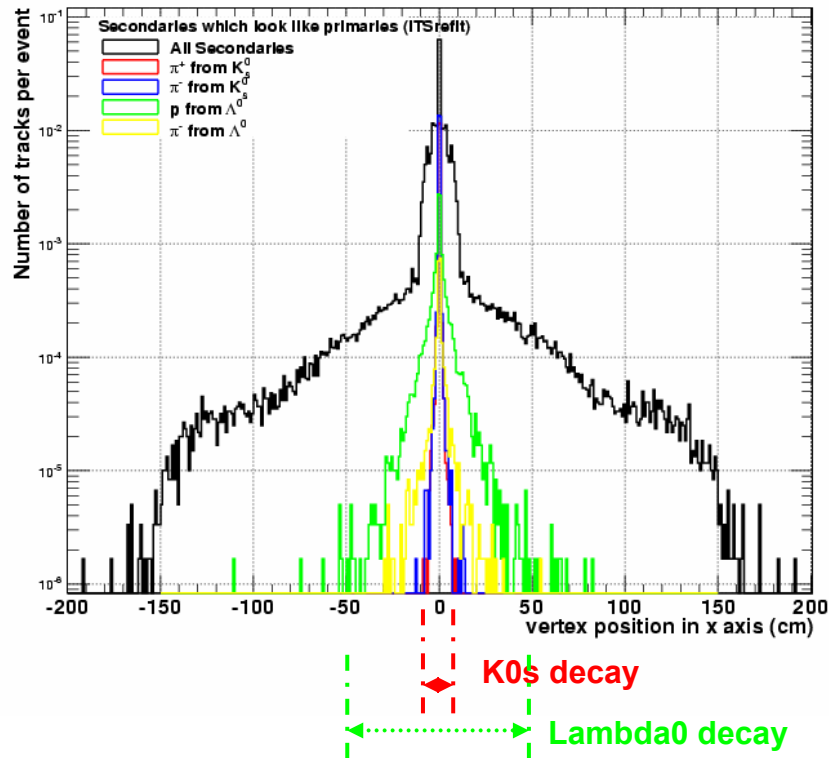


SECONDARIES SELECTED AS PRIMARIES WHICH COME FROM Lambda0 and K0s decays. (vertex distribution)

NO ITSrefit



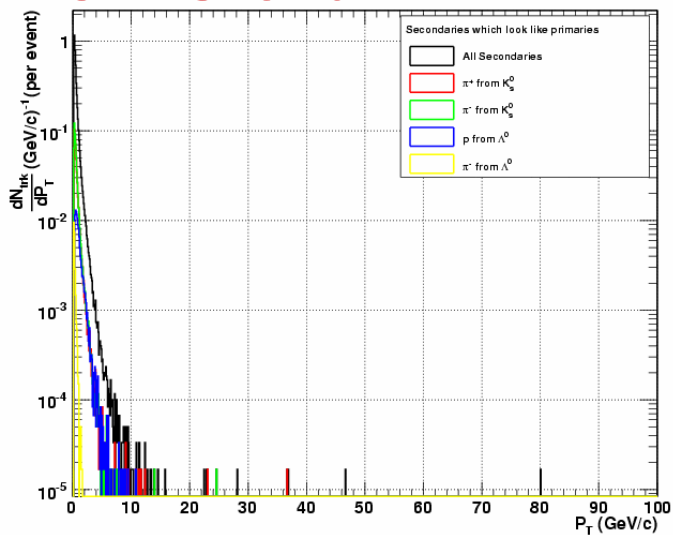
ITSrefit



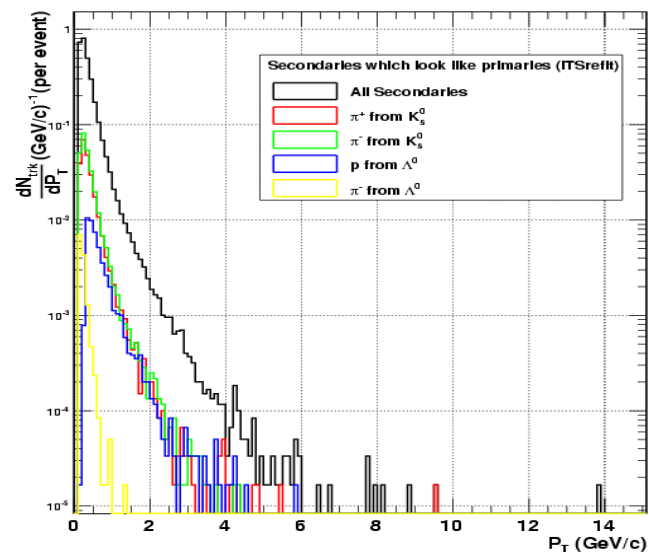
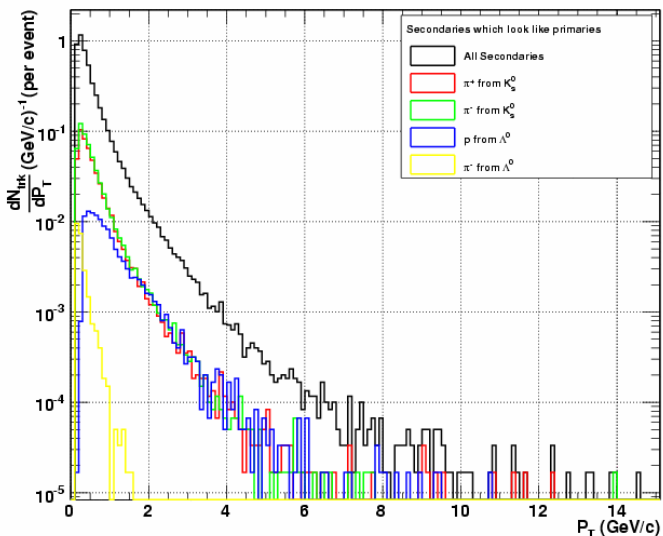
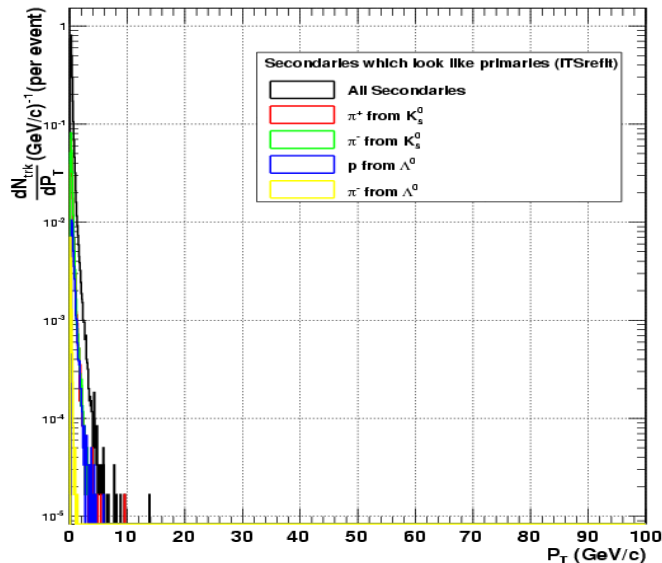
ITSrefit is more effective in reducing tracks from K0s than from Lambda0 decay

SECONDARIES SELECTED AS PRIMARIES WHICH COME FROM Lambda0 and K0s decays. (PT distribution)

NO ITSrefit



ITSrefit



Z
O
O
M

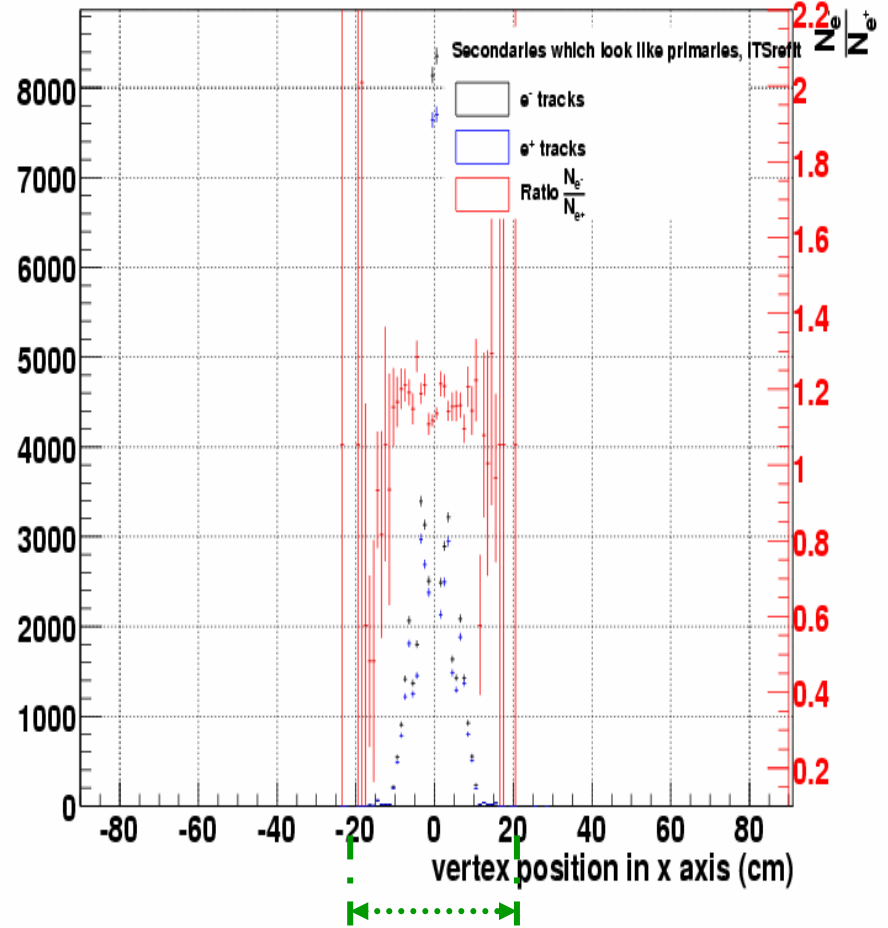
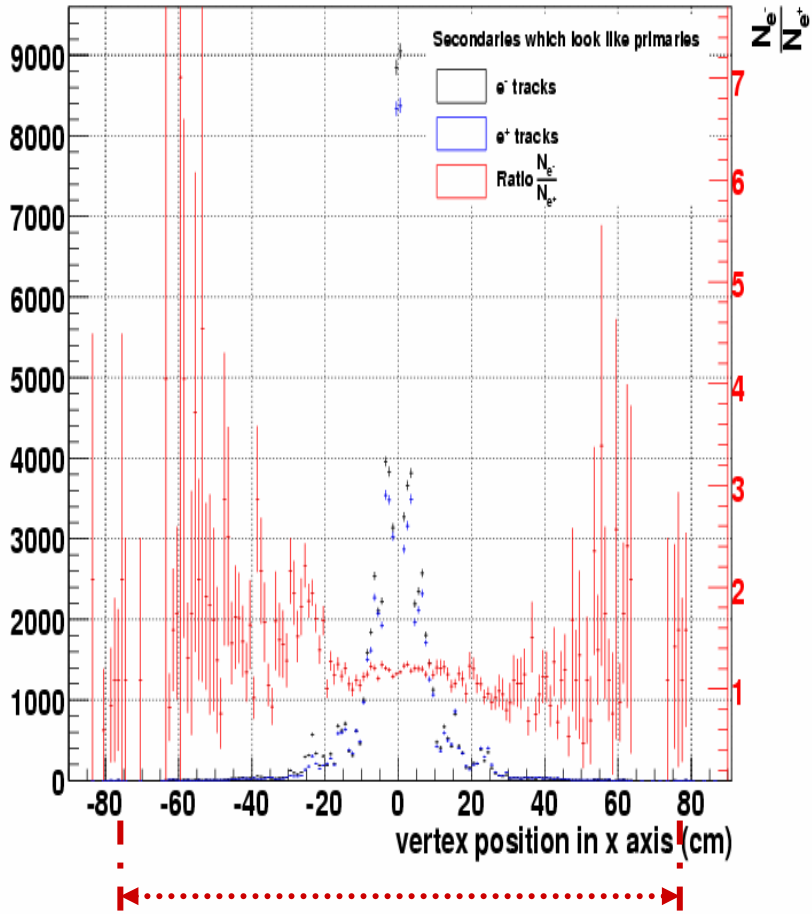
Z
O
O
M

SECONDARY ELECTRONS SELECTED AS PRIMARIES (vertex distribution)

NO ITSrefit

ITSrefit

ITSrefit reduces: e- in 33.7% and e+ in 34.6%

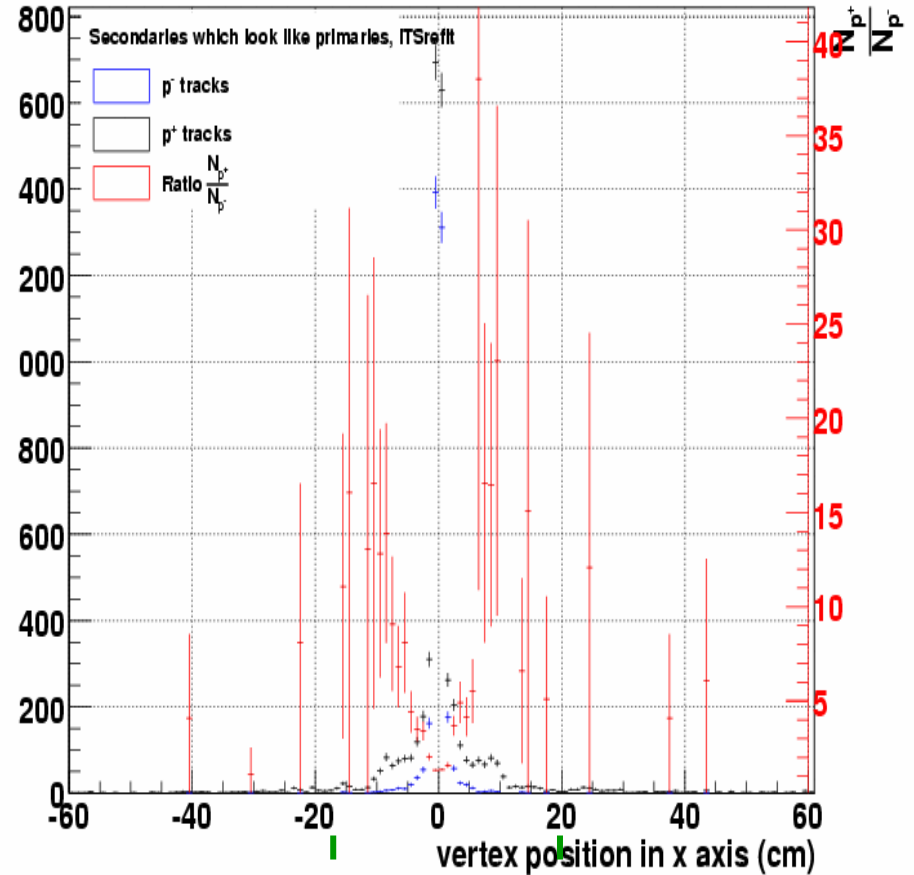
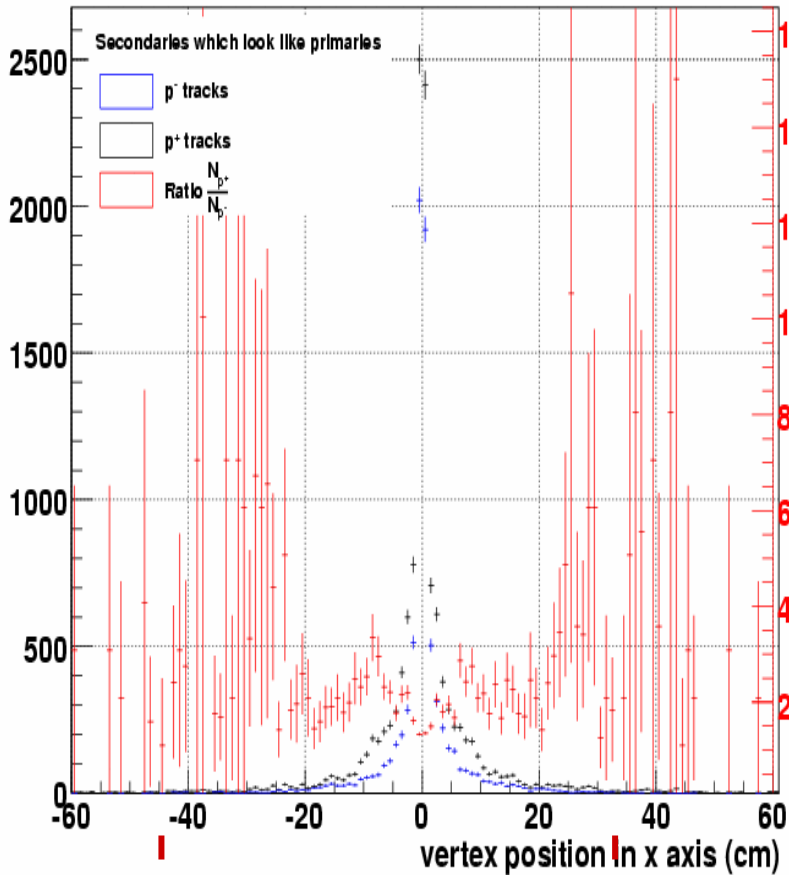


SECONDARY PROTONS SELECTED AS PRIMARIES (vertex distribution)

NO ITSrefit

ITSrefit

ITSrefit reduces: p- in 73.6% and p+ in 24.6%



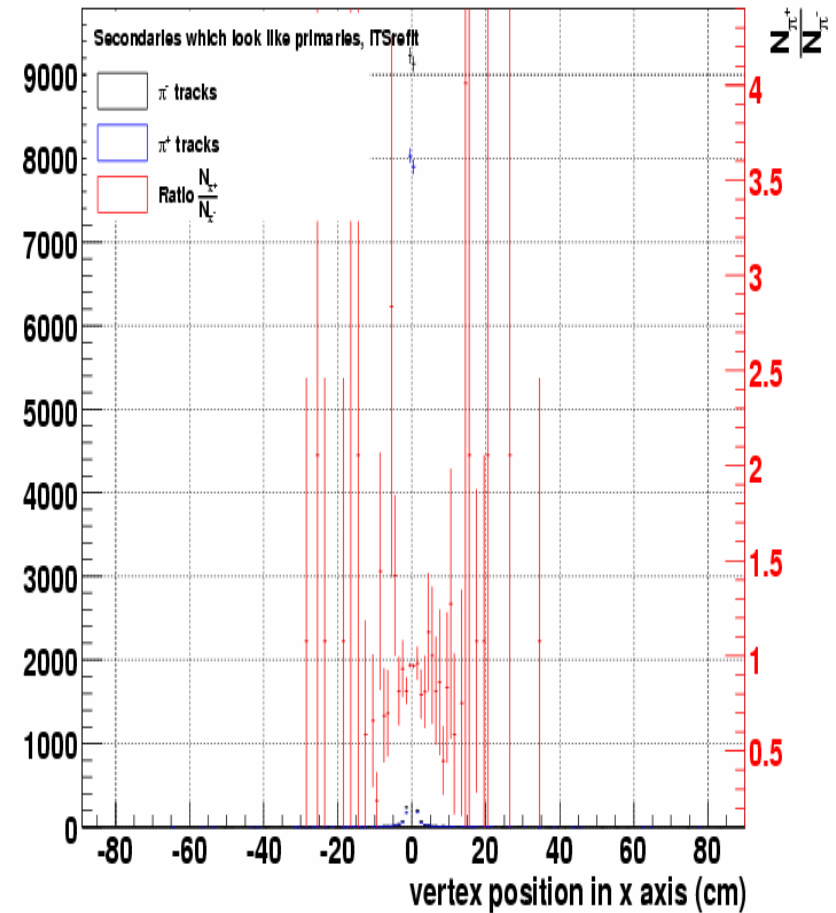
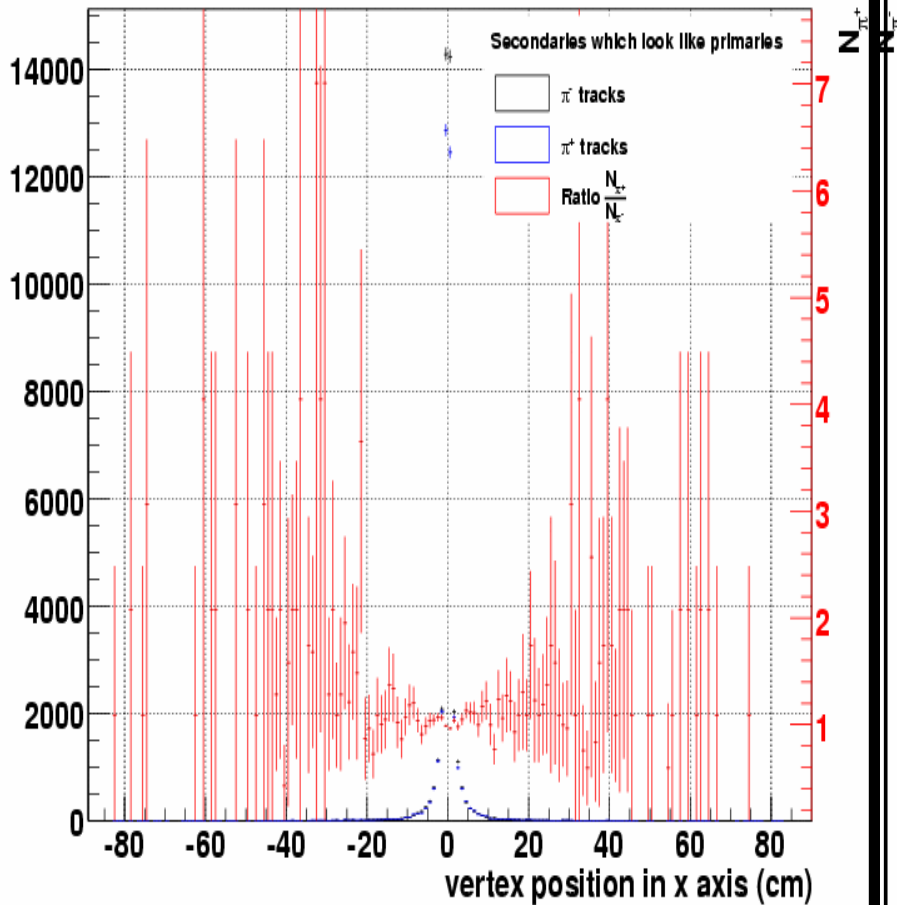
Antiprotons are reduced

SECONDARY PIONS SELECTED AS PRIMARIES (vertex distribution)

NO ITSrefit

ITSrefit

ITSrefit reduces: pi- in 50.1% and pi+ in 53.3%

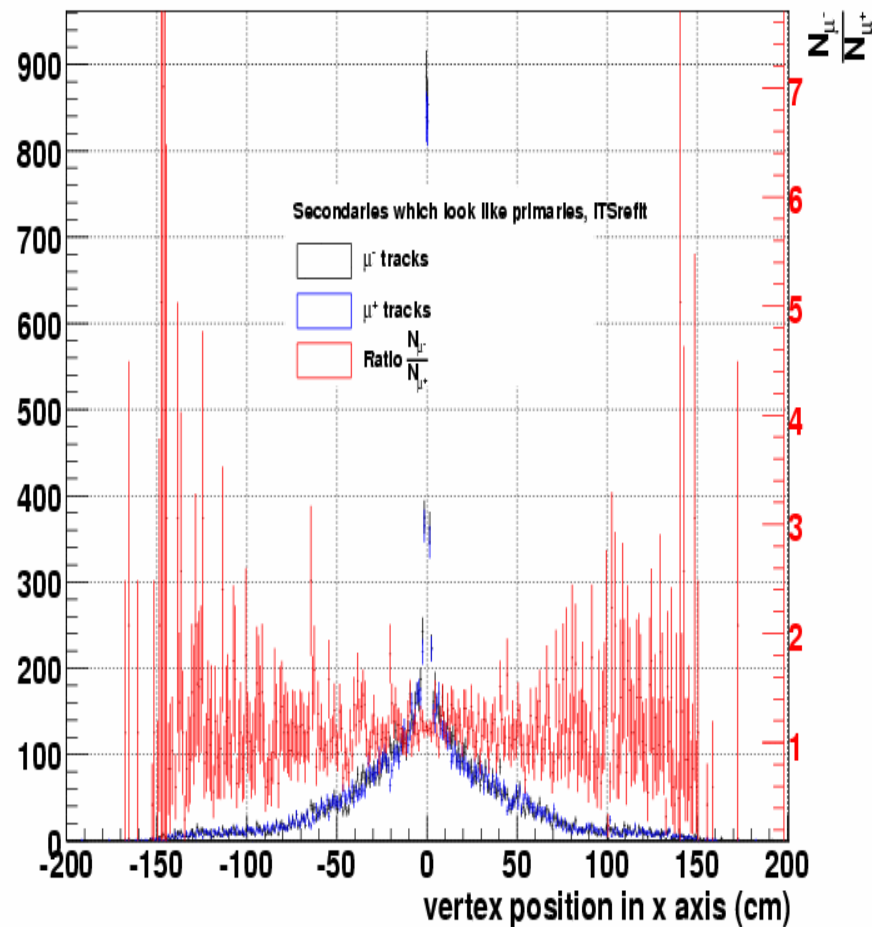
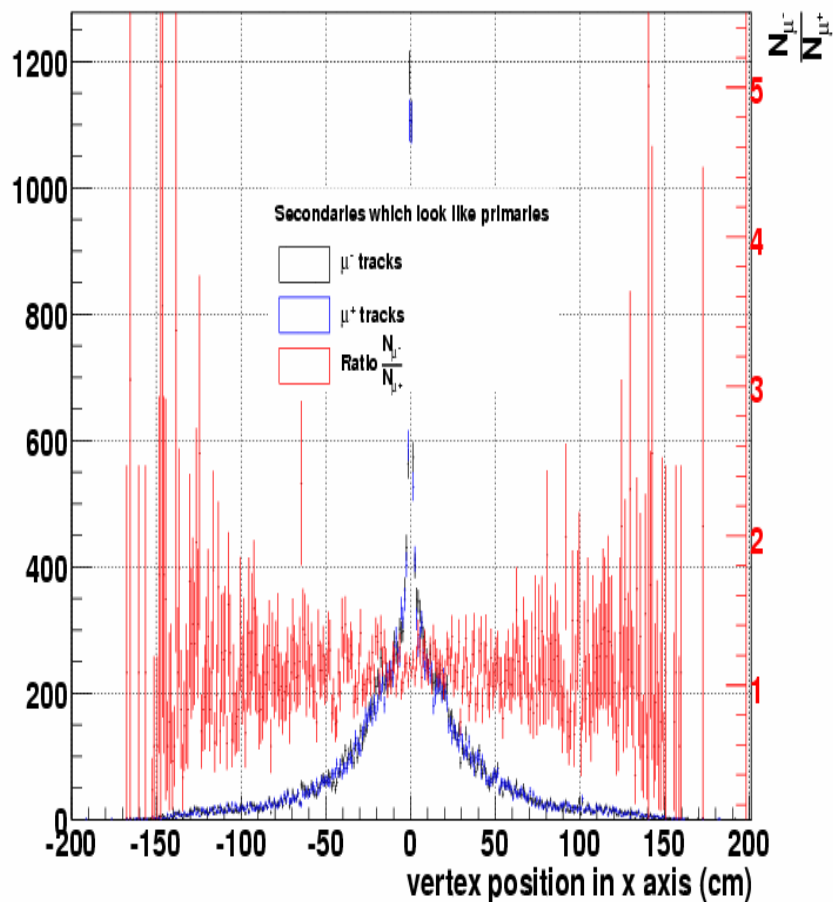


SECONDARY MUONS SELECTED AS PRIMARIES (vertex distribution)

NO ITSrefit

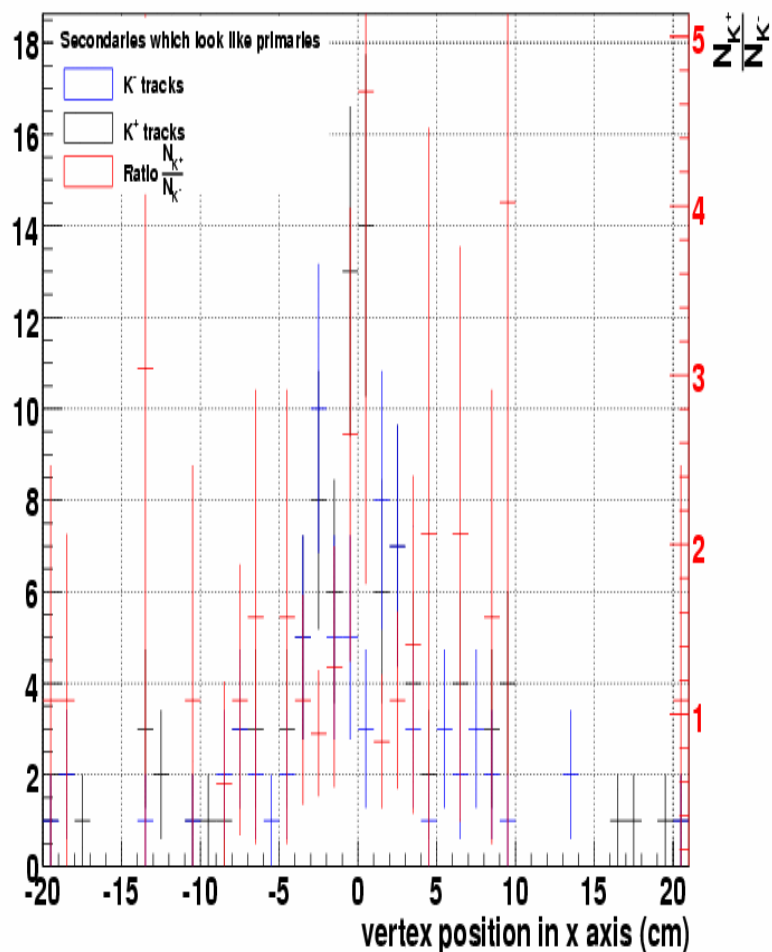
ITSrefit

ITSrefit reduces: mu- in 39.1% and mu+ in 39.4%

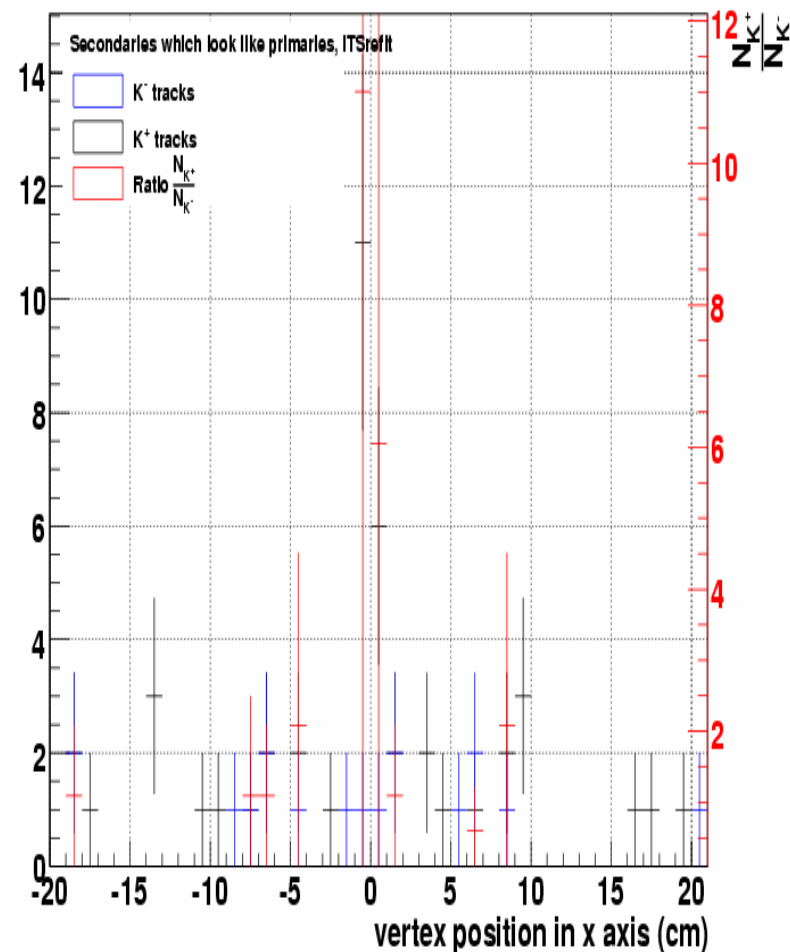


SECONDARY KAONS SELECTED AS PRIMARIES (vertex distribution)

NO ITSrefit

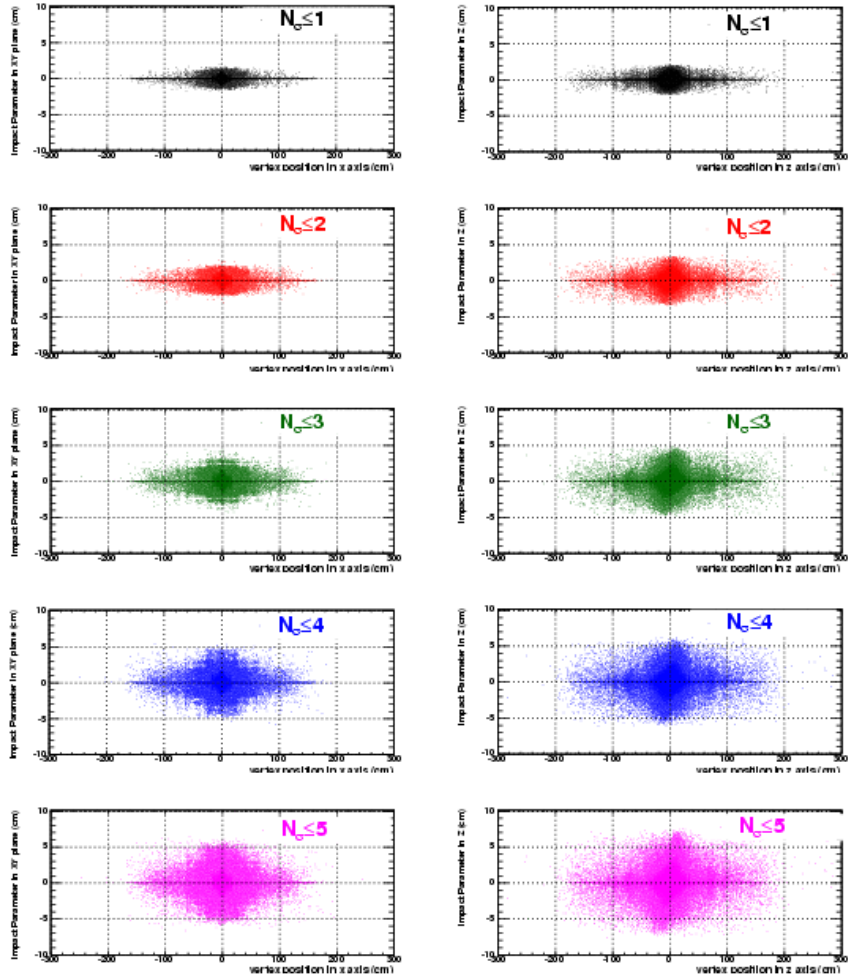


ITSrefit

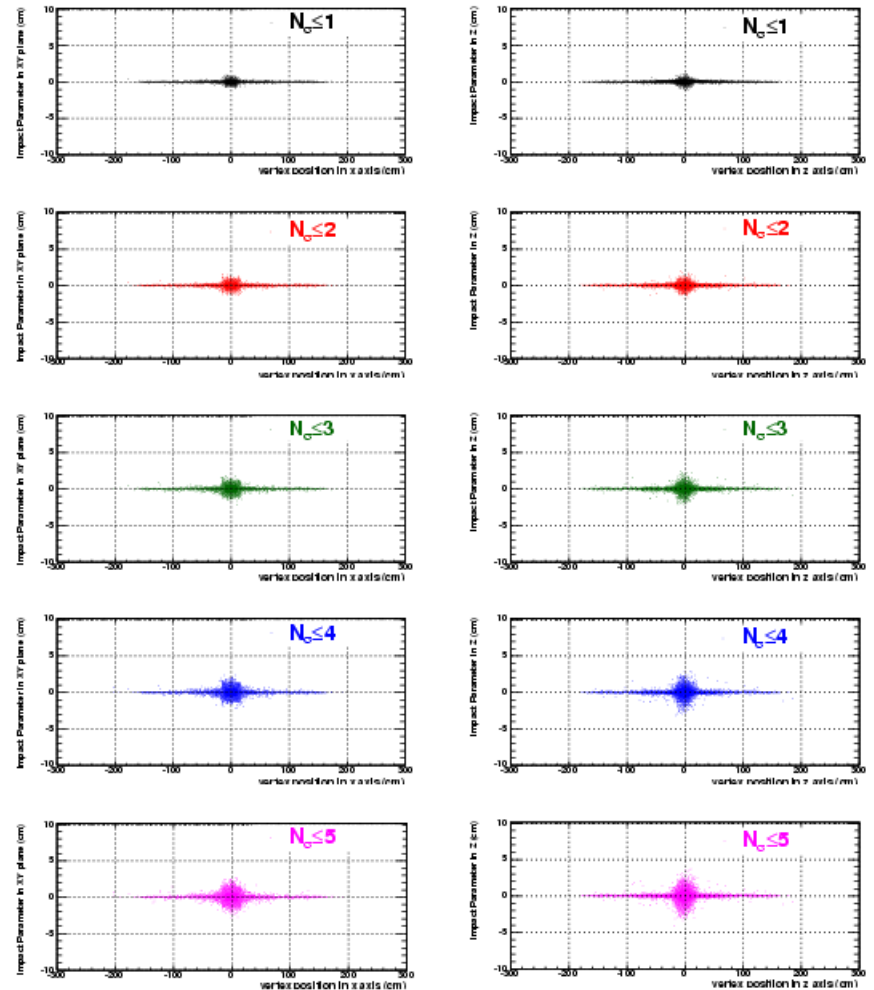


DCA (from ESD) vs. Vertex production (from MC) for secondary tracks which look as primaries, different cuts in N_{σ} .

NO ITSrefit



ITSrefit

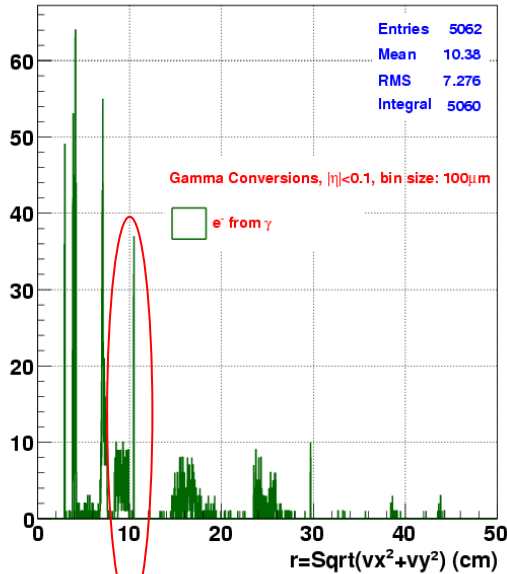


Number of conversions (in central region) vs $r = \sqrt{v_x^2 + v_y^2}$,

v_x : vertex position in X axis, v_y : vertex position in Y axis.

NO ITSrefit

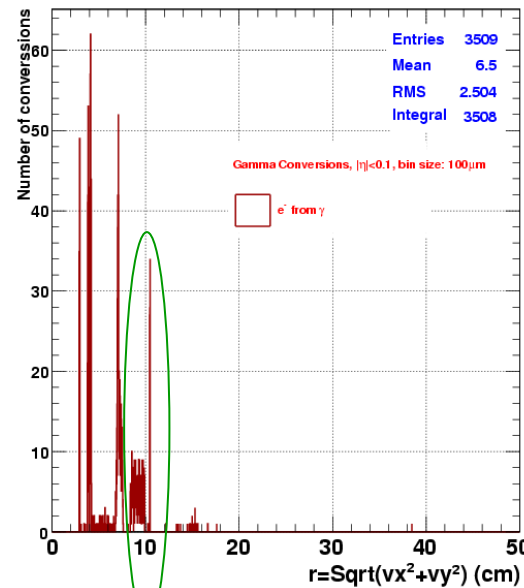
Secondary electrons selected as primaries



?

ITSrefit

Secondary electrons selected as primaries



?

CONVERSIONS

5060

3508

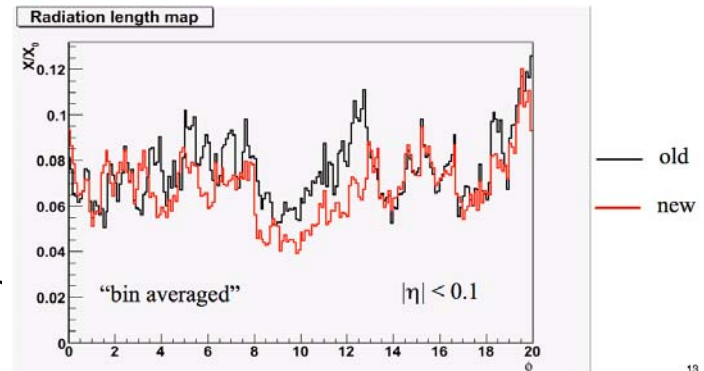


Compatible??



Radiation Length in central region (Andreas)

- ❑ New geometry: 613150 nodes / 395 volumes ! (most detailed at LHC?)
Careful with code efficiency!
- ❑ Check consistency of Detector publication



Antonio Ortiz Velasquez, Febr 2008