HBT Analysis

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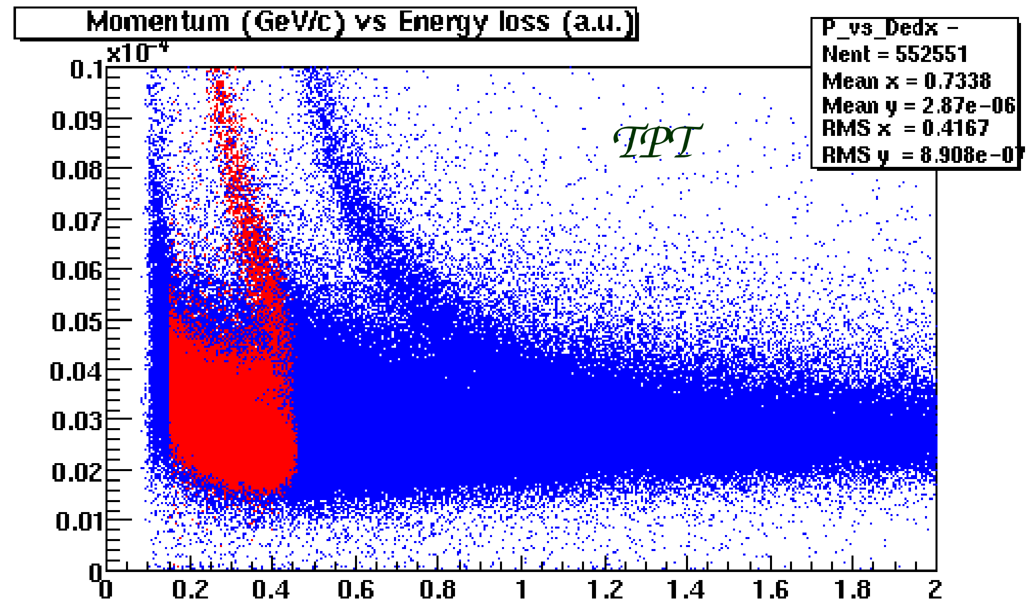
- Event and Track Selection
- Pairs:
  - Track Splitting
    - how we calculate it: Quality Factor
    - what we see
  - Track Merging
- 1D Correlation Function

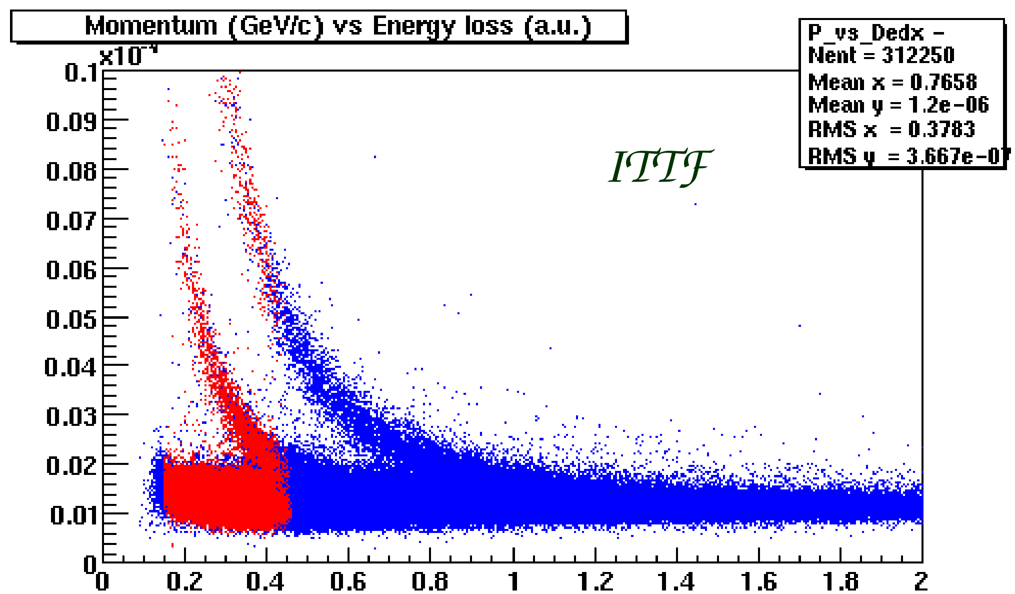
Event and Particle Selection

Results for 20k events from TPT and ITTF central MuDsts, from exactly same events with same cuts:

- no multiplicity cuts
- V_z = (-25,25)cm

- NHits > 20
- y = (-0.5,0.5)
- DCA < 3cm
- charge = -1 (h^-)
- pt = (0.15,0.40)

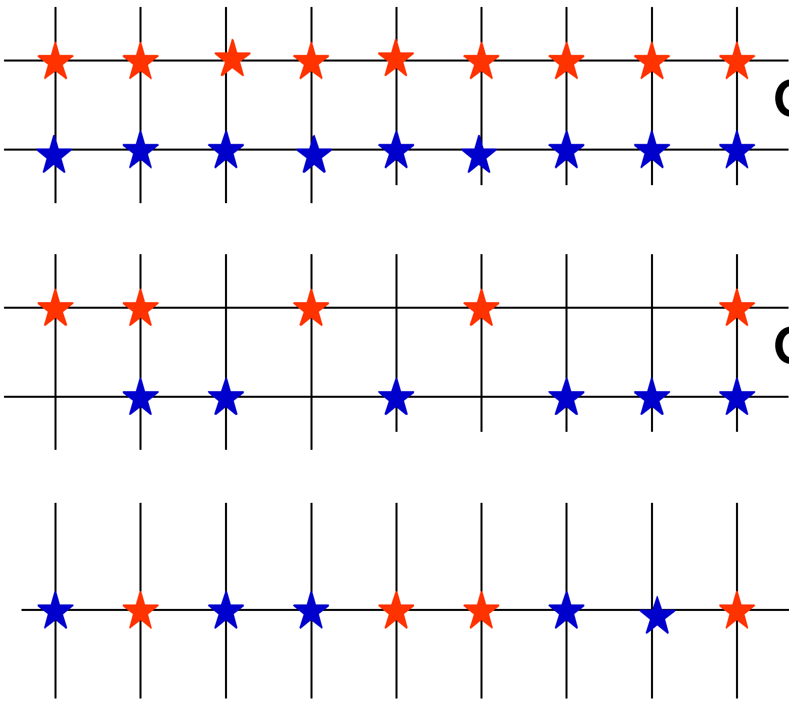




A measurement of split-tracks: Quality

Quality calculated using the topology map:

$$Quality = \frac{\sum PADS\ \ with\ \ 1\ \ hit\ -\ \sum PADS\ \ with\ \ 2\ \ hits}{Total\ \ number\ \ of\ \ hits}$$

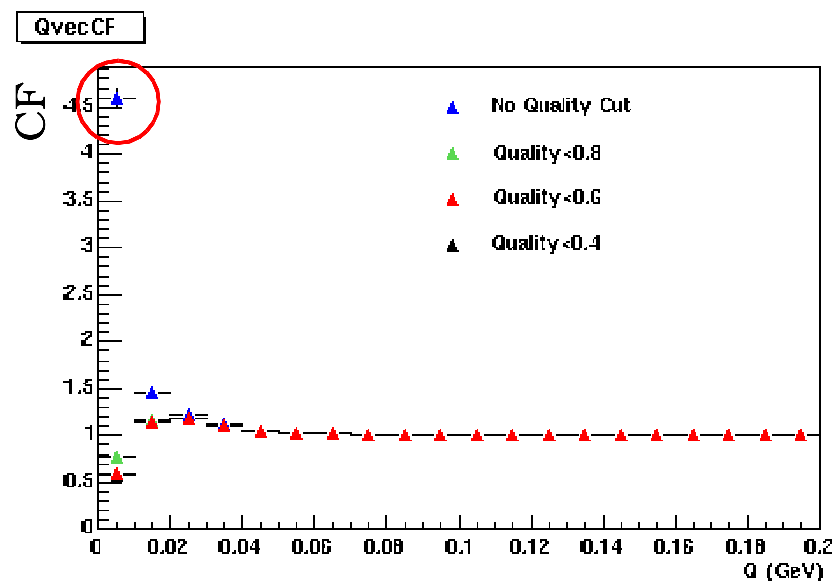


Qual = - 0.5

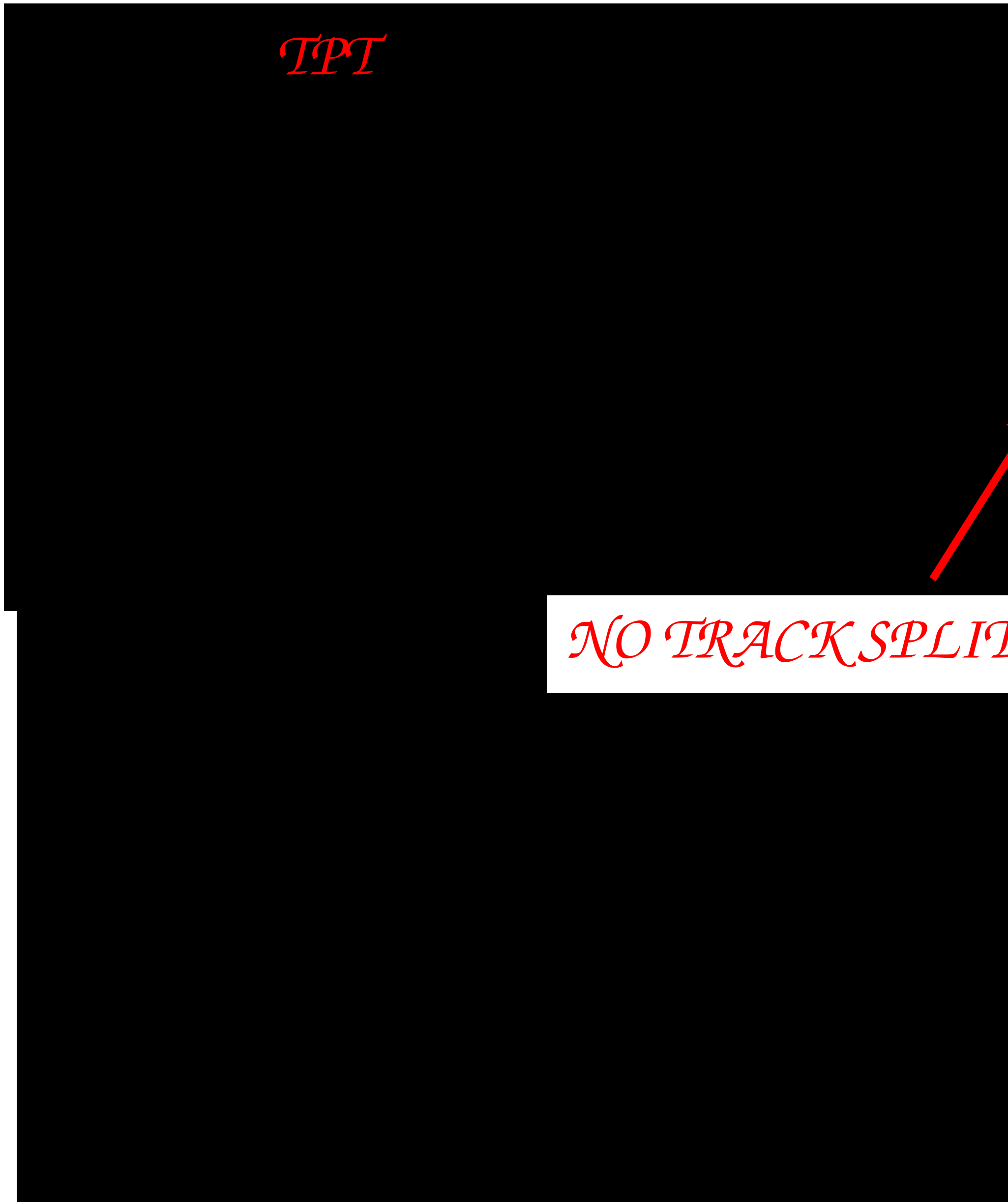
Qual = 0.45

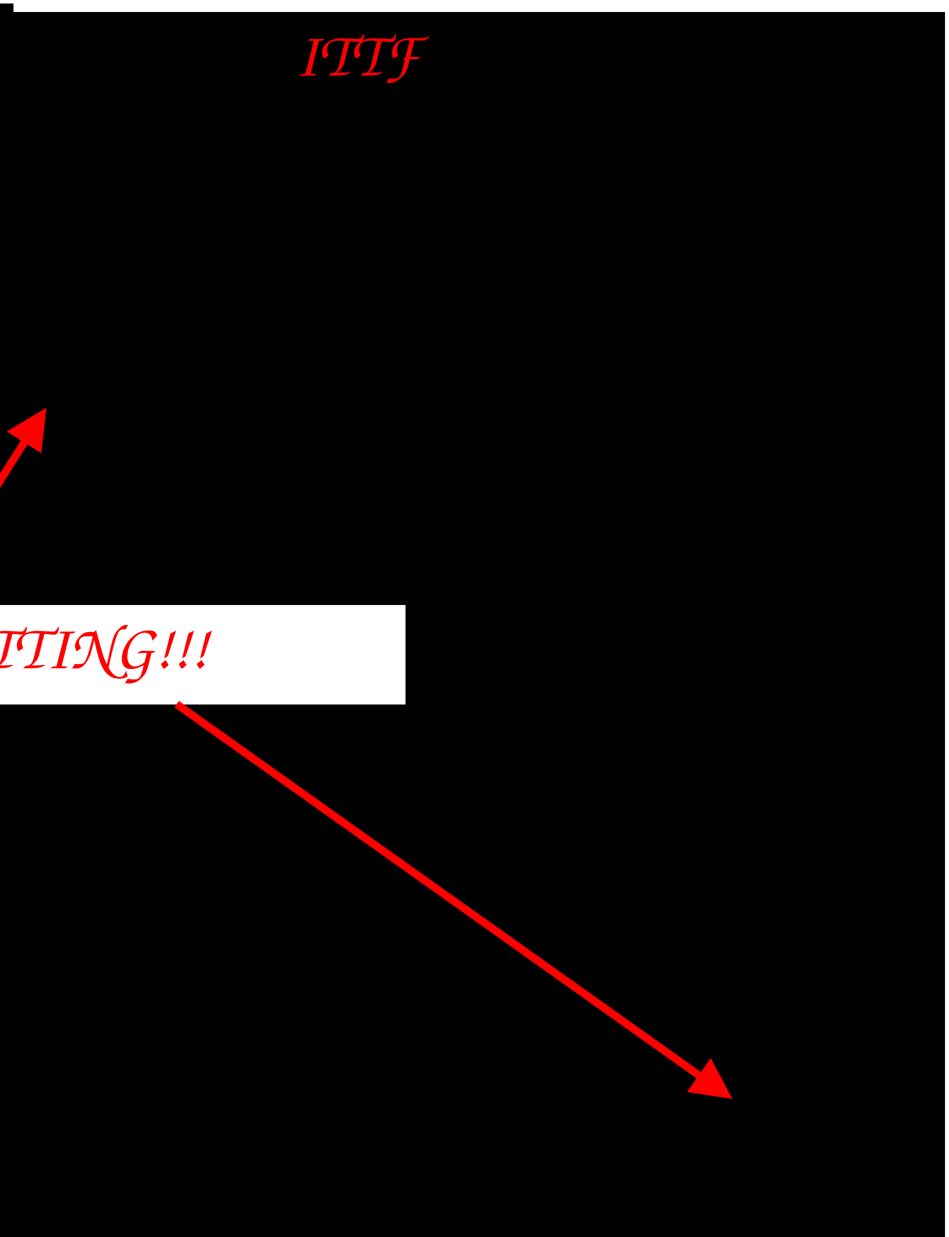
Qual = 1

Low-Q pairs correlations dominated by splitting



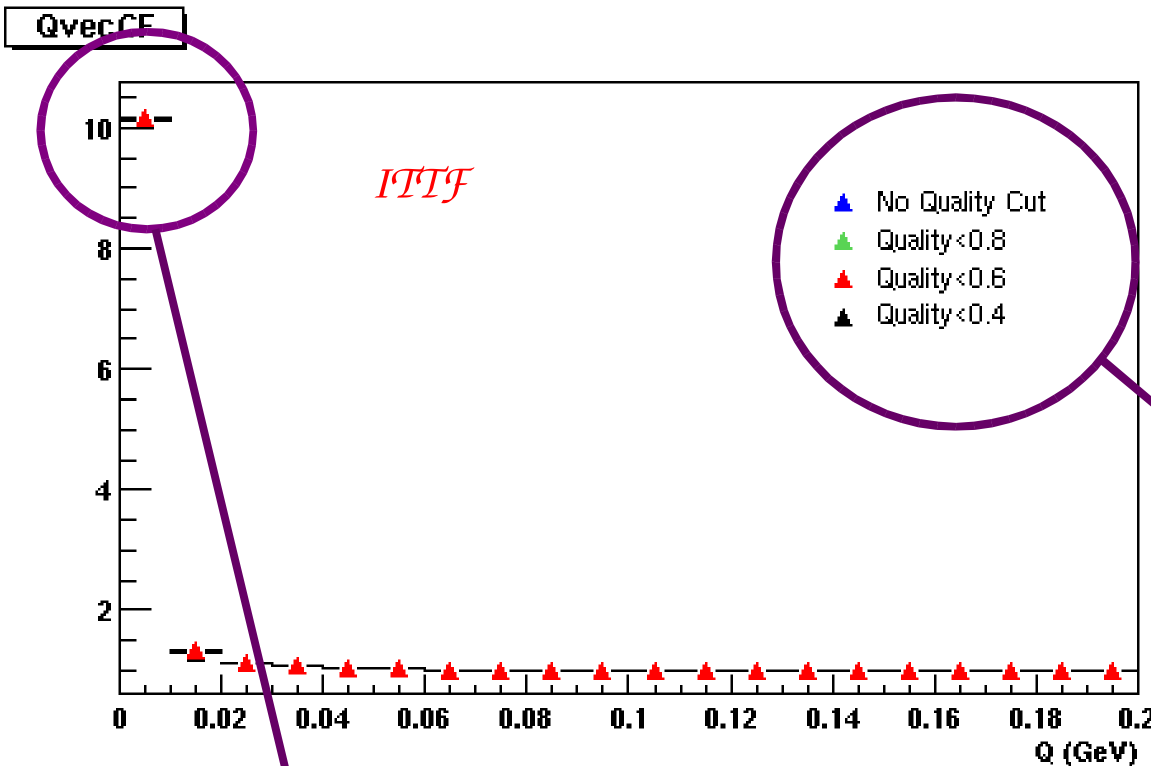
TPT vs. ITTF split-tracks





NO TRACK SPLITTING!!!

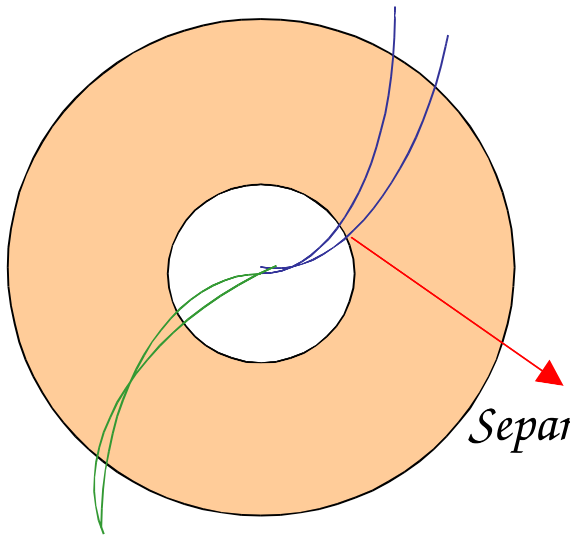
No Track Splitting???



Applying an anti-splitting cut does not change things!!!

Correlation Function still dominated by something that looks just like splitting!?!?

Merging I: TPT



Two tracks reconstructed as one

→artificial low-Q pair suppression

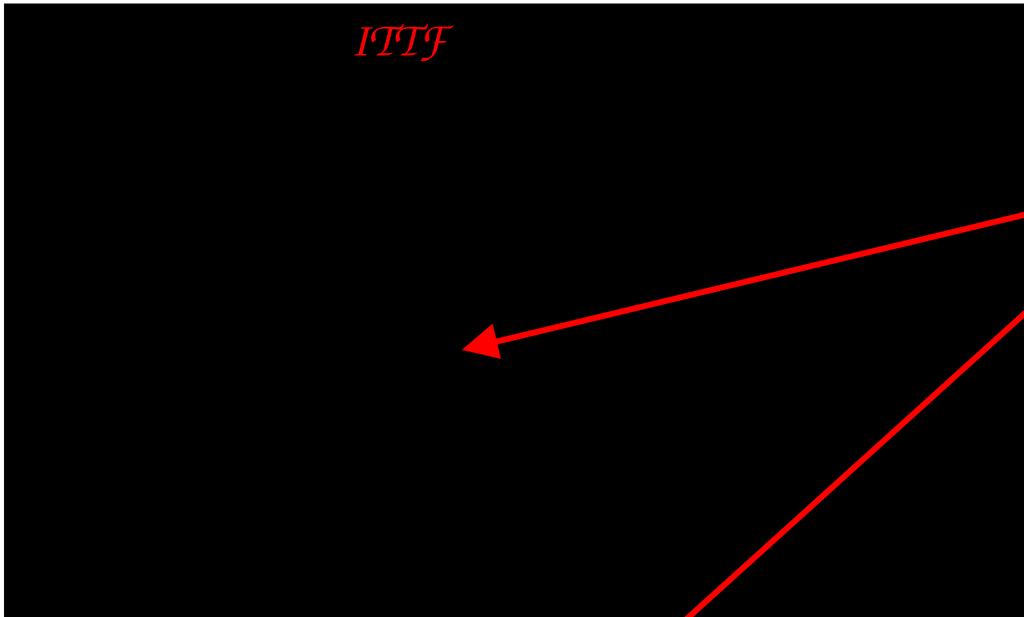
Separation at the entrance of the TPC for every pair

TPT

[redacted]

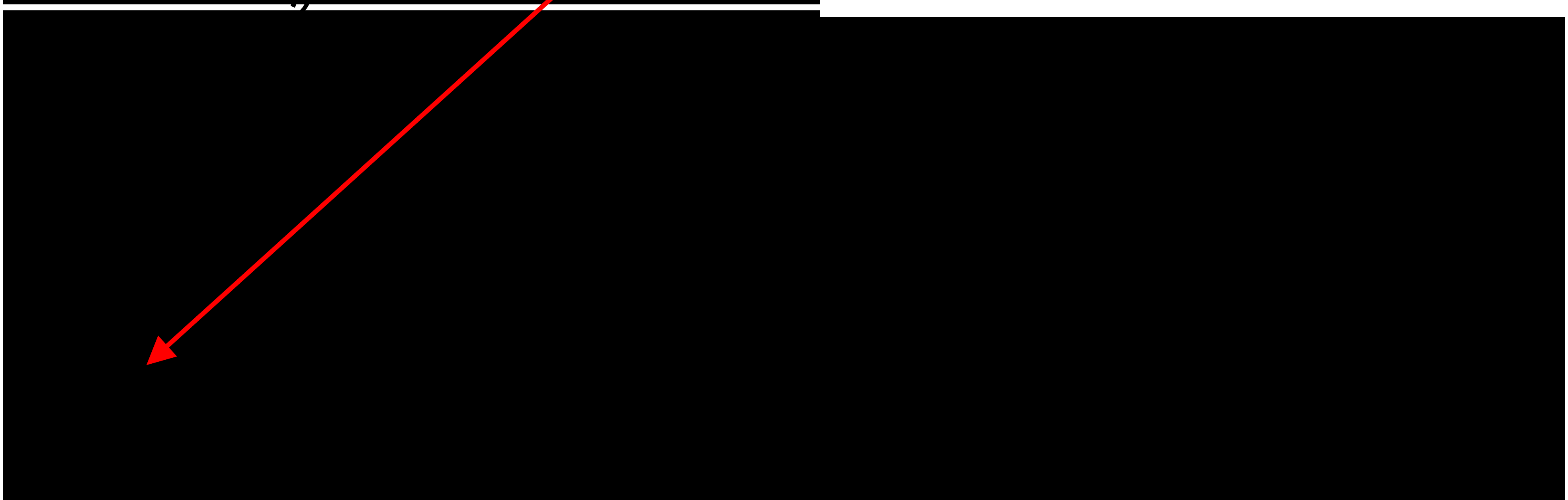
(cm)

Merging II: ITTF



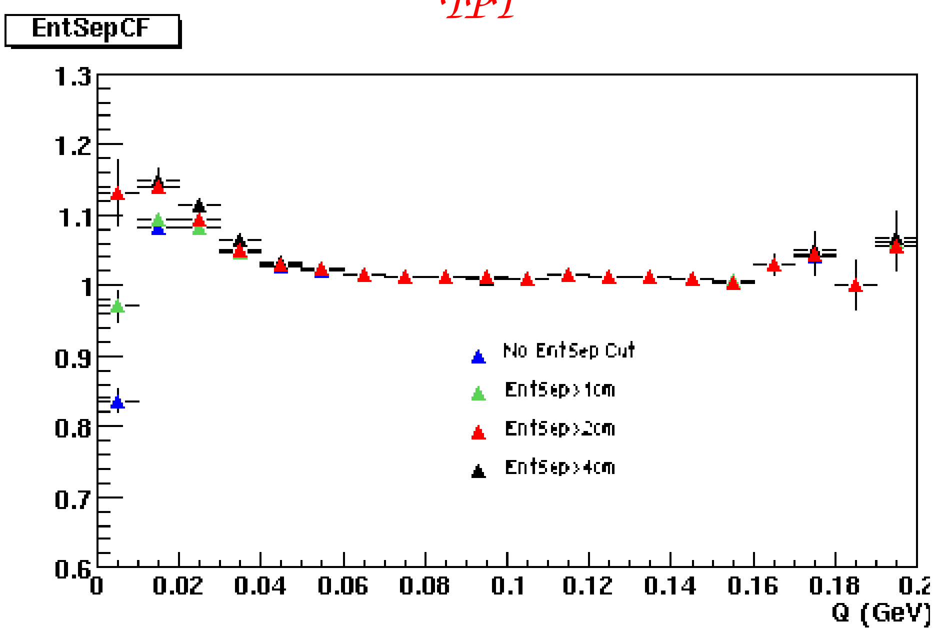
Lot of pairs with Q < 10MeV/c and entrance separation < 0.5cm

INDICATION OF SPLITTING

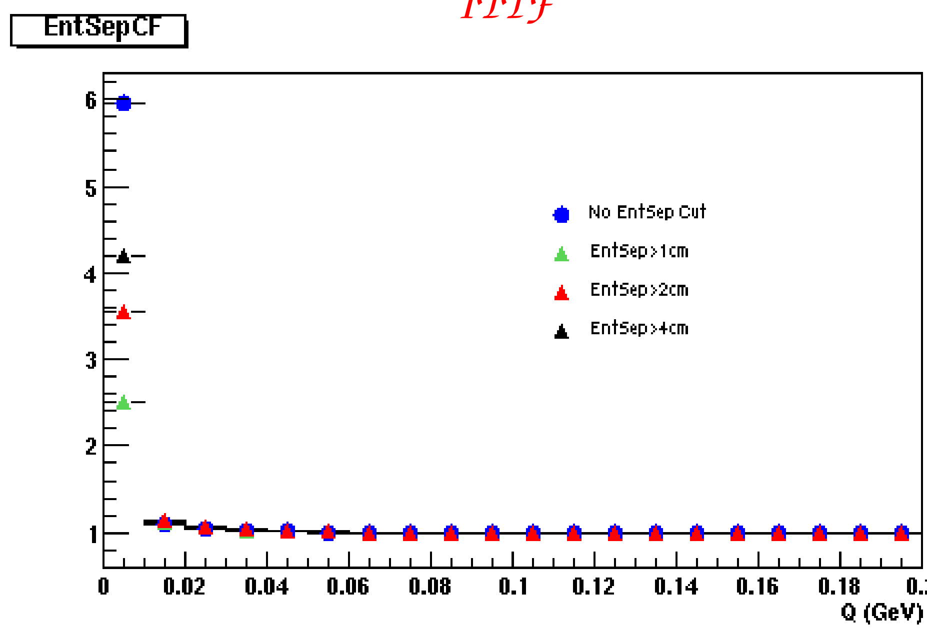


1D Correlation Functions

TPT



ITTF



One Dimensional Correlation Functions for different anti-merging (entrance separation) cuts

Conclusions

- Correlation Functions dominated by splitting but:
  - we can not measure it
  - we can not get rid of it
  - we can not measure track merging
- Is the hit sharing on?
  - Probably (and hopefully) yes and it must be turned off

Entrance Separation CF

TPT

ITTF

[redacted]