

Background & MDI

E.P.

for

Manuela, Riccardo, Kirk, Mike, Panta

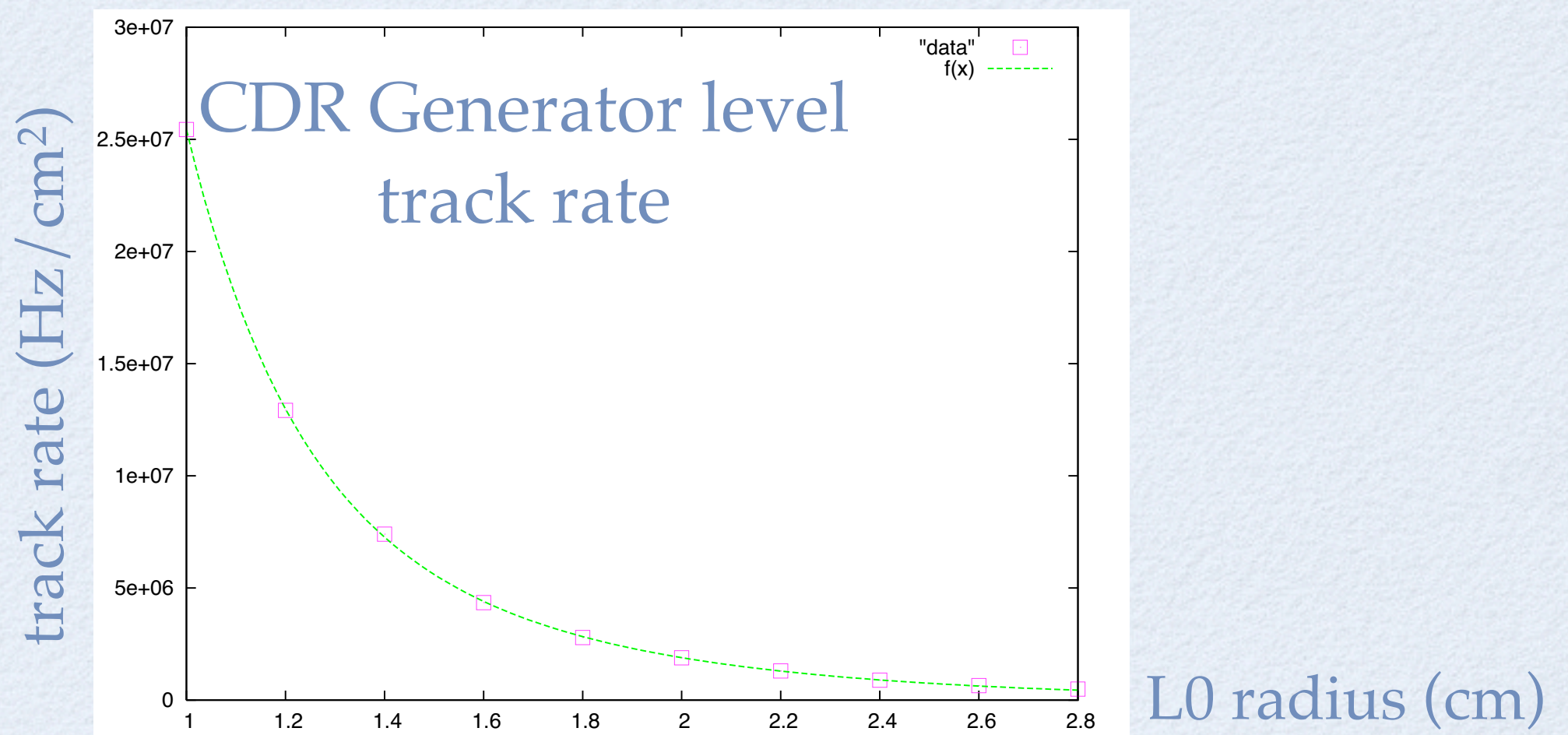
& the Bkg. group

Talk Outline

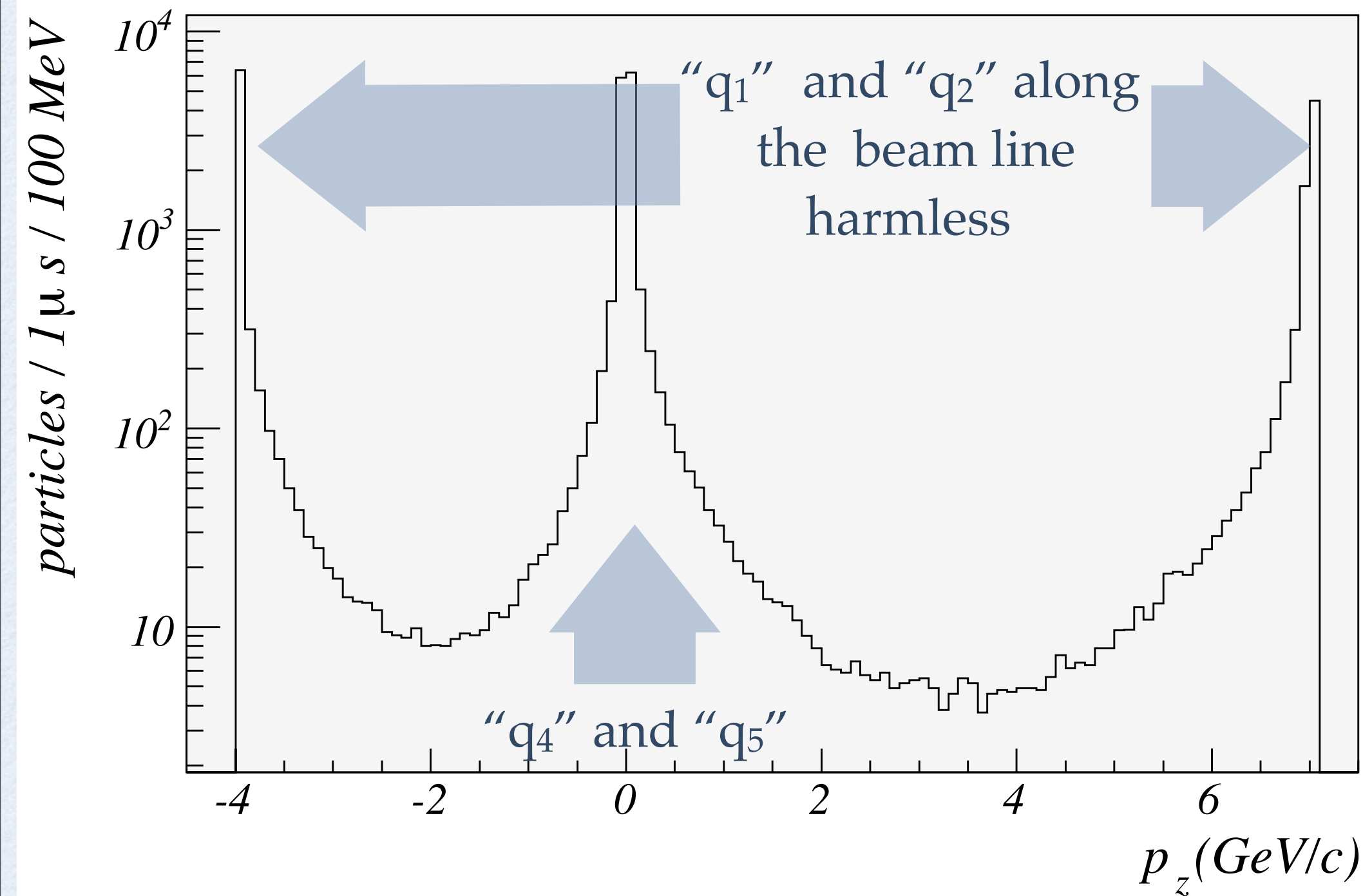
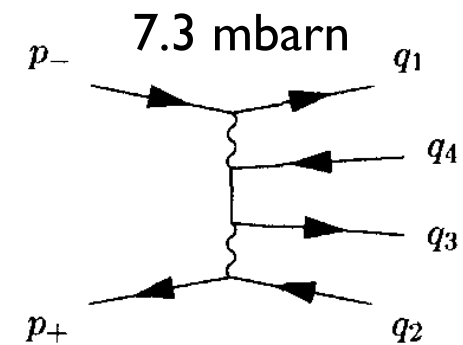
- SVT L0 luminosity background update (Riccardo)
- Solenoid compensation & pairs production remediation (Kirk, Mike, Panta, E.P.)
- Touschek & Beam gas background (Manuela & Panta)
- Future activities

SVT L0 Backgrounds rate

- Poor communication among me and SVT contact person led to a severe overestimate of the Background rate reported at SLAC
- B_z wrongly set to 0 T inside the beam pipe
- The bug was spotted couple of days after the SLAC meeting closeout
- Extensive campaign to regain confidence on the predicted rates



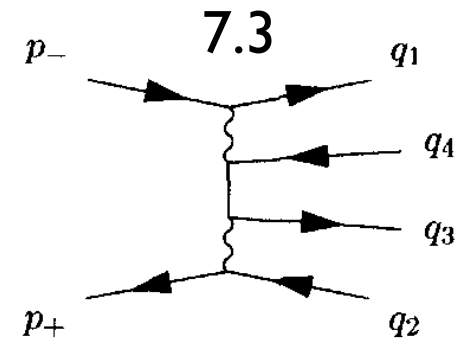
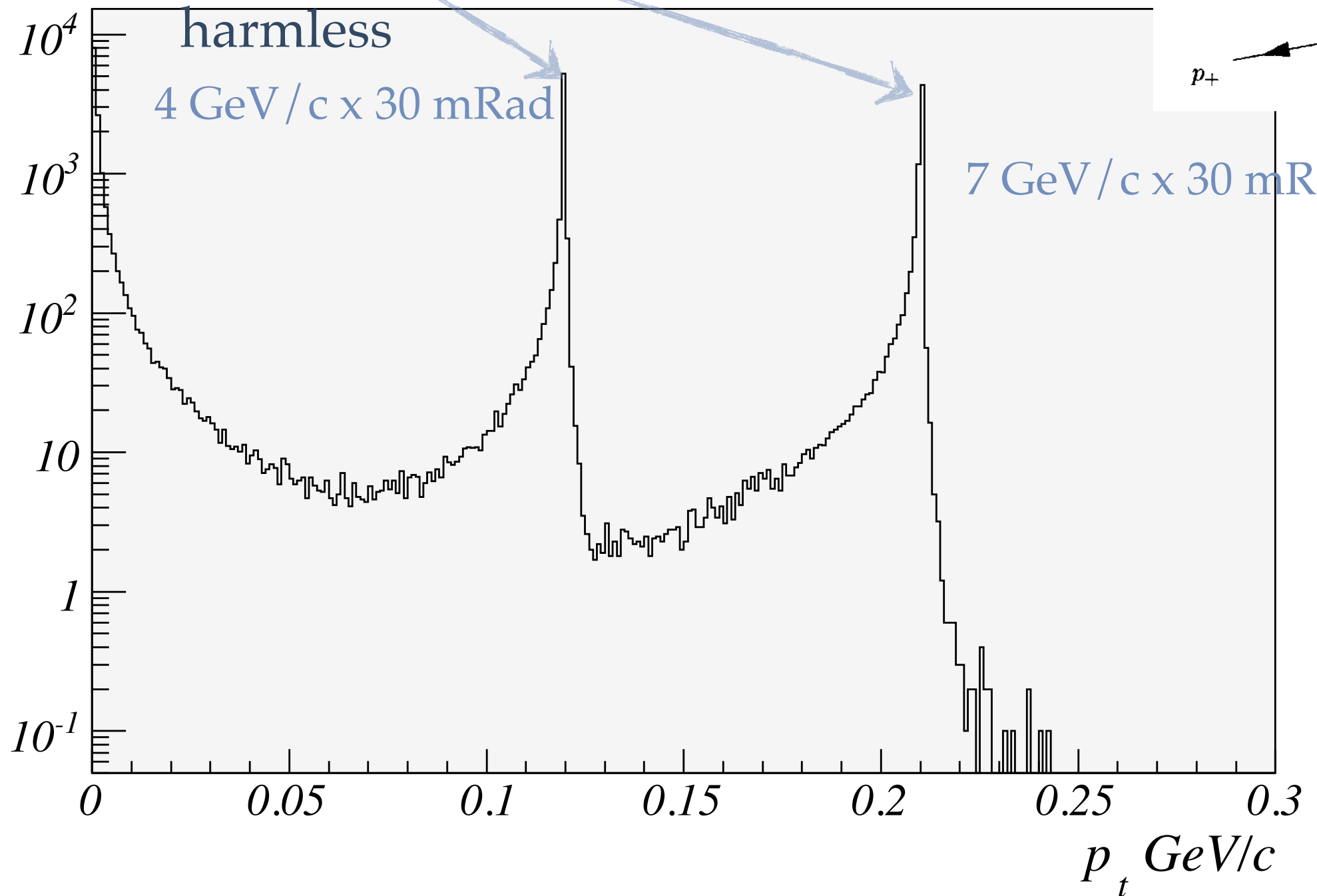
Diag 36 Sanity Check



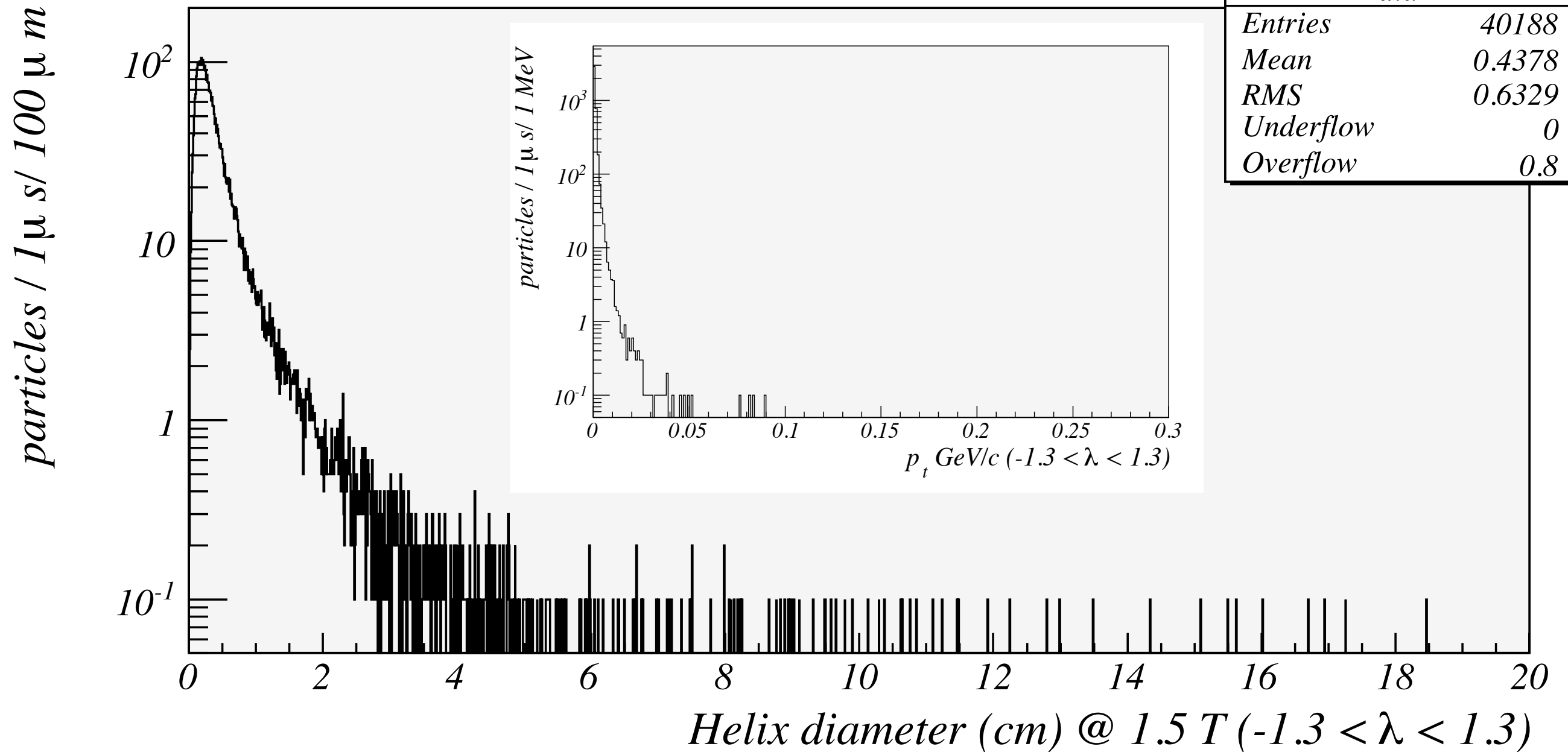
Diag 36 Sanity Check

“q₁” and “q₂” along
the beam line

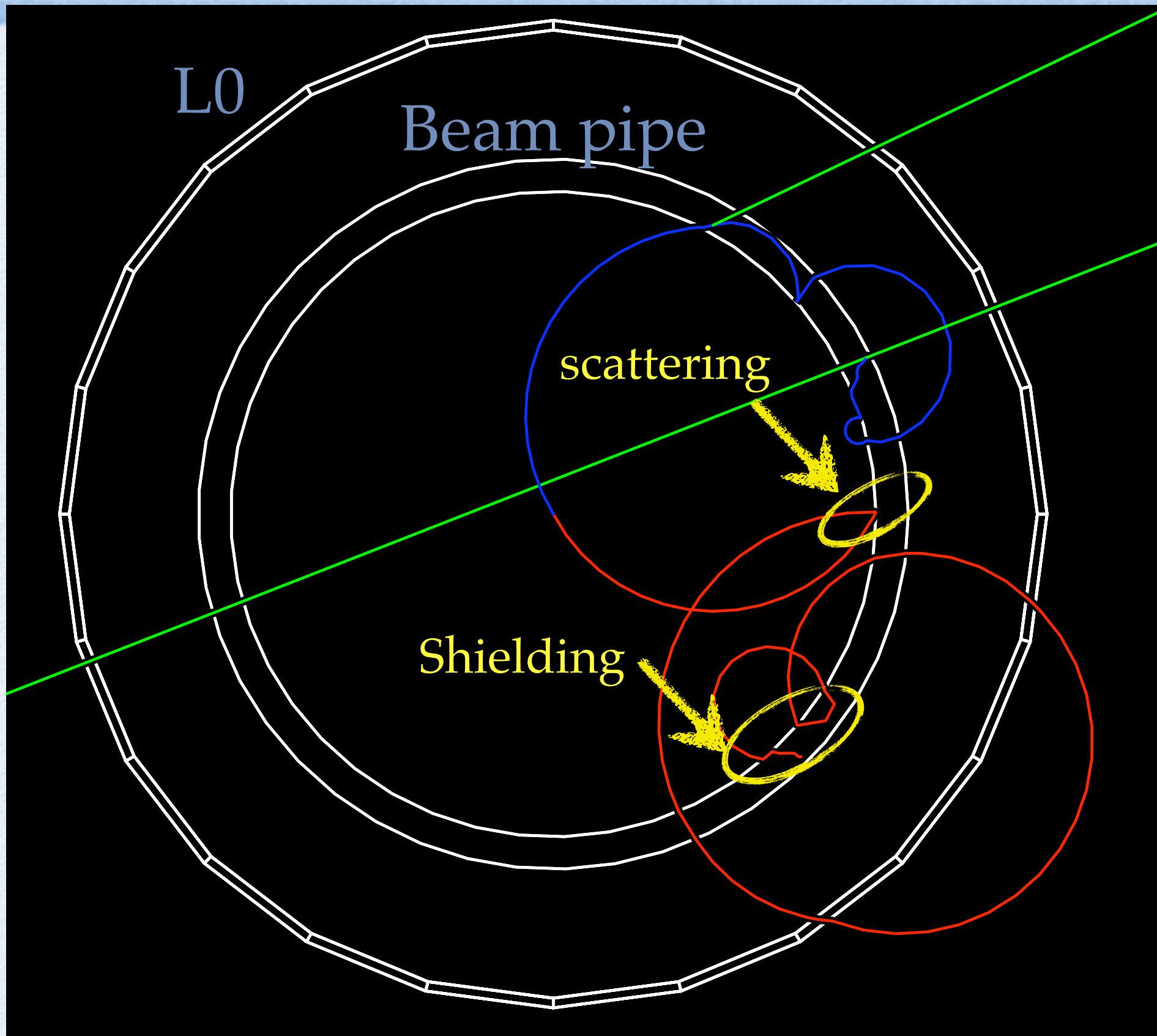
particles / 1 μ s / 1 MeV



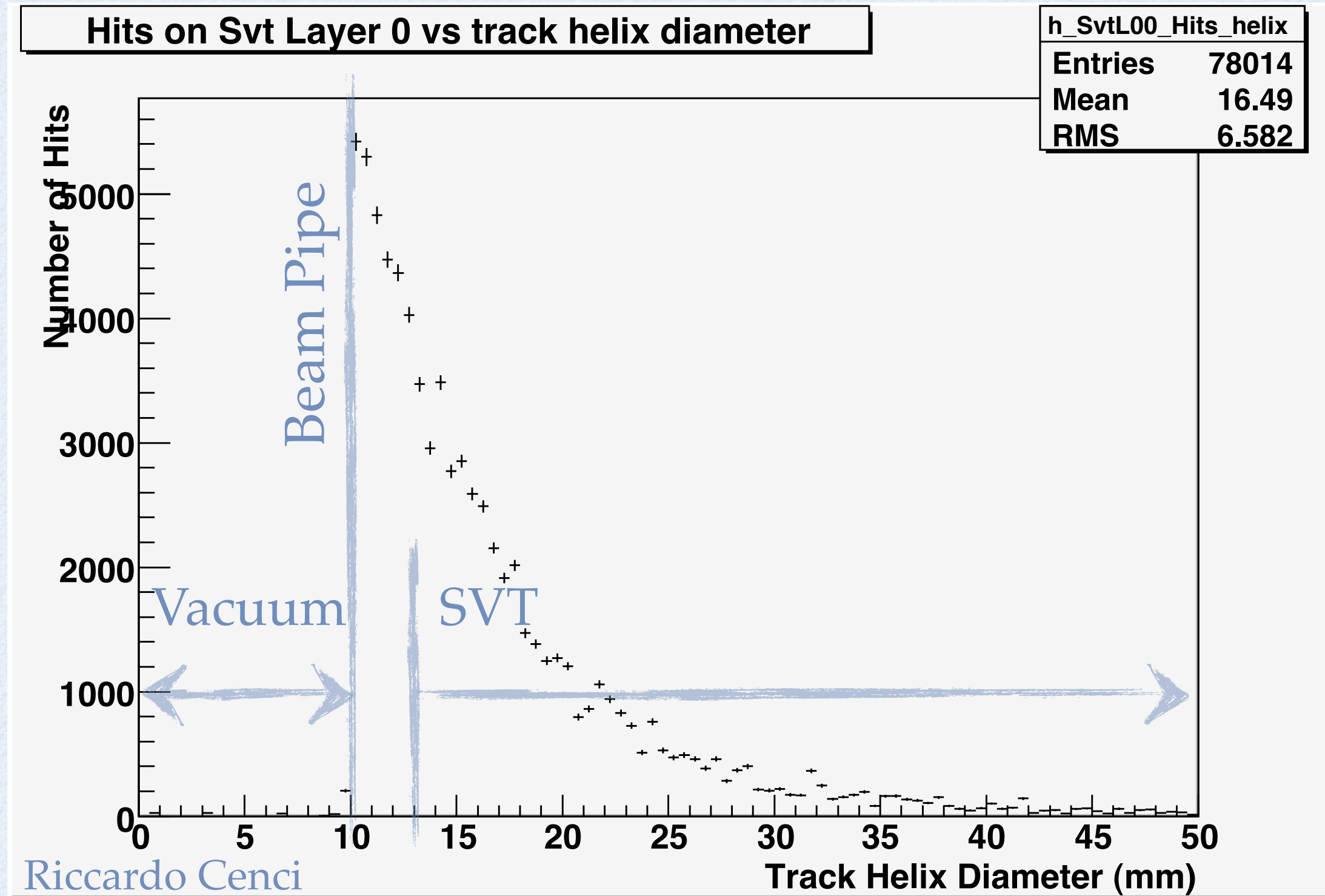
Diag 36: primaries



Why Geant 4 sim. is mandatory



Bruno sim: $B_z = 1.5$ T

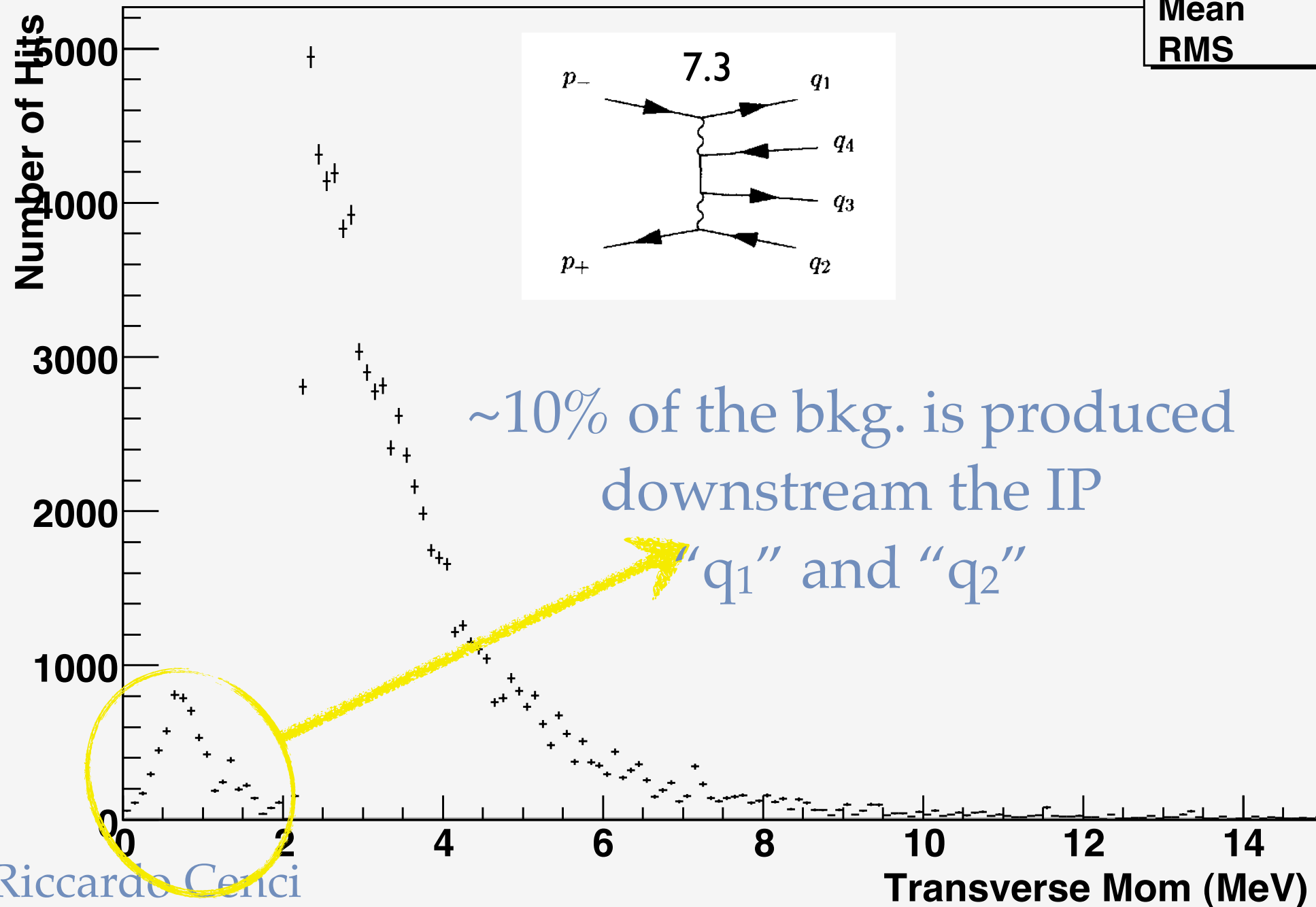


- Tracks from *primary* vertex that produces bkg

Beam line contributions

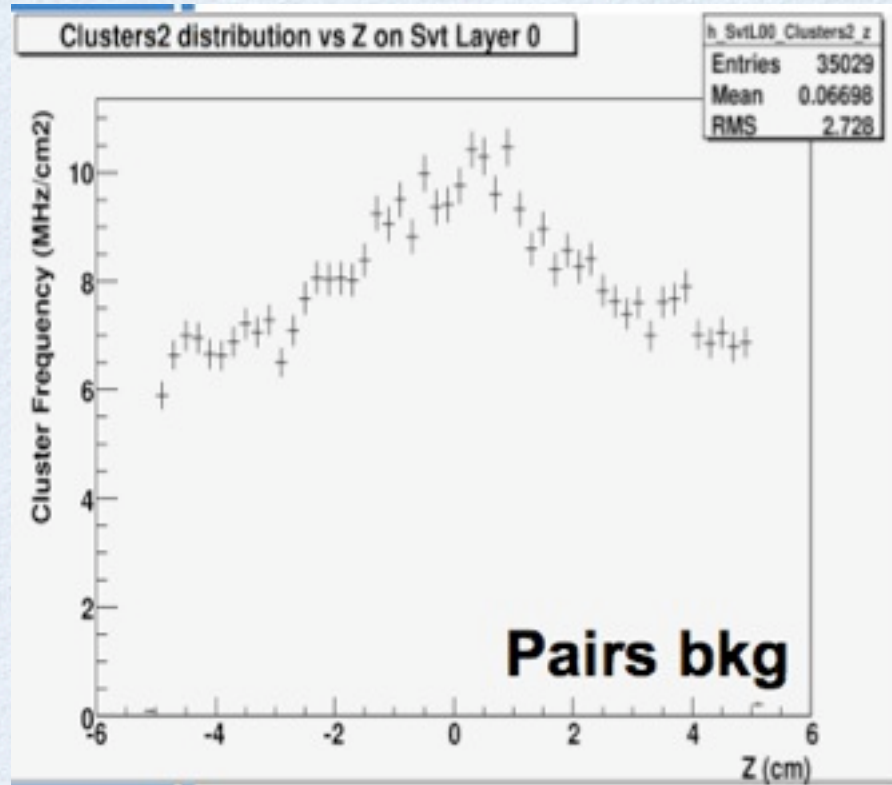
Hits on Svt Layer 0 vs track transverse momentum

h_SvtL00_Hits_pTransv	
Entries	85031
Mean	3.56
RMS	1.805

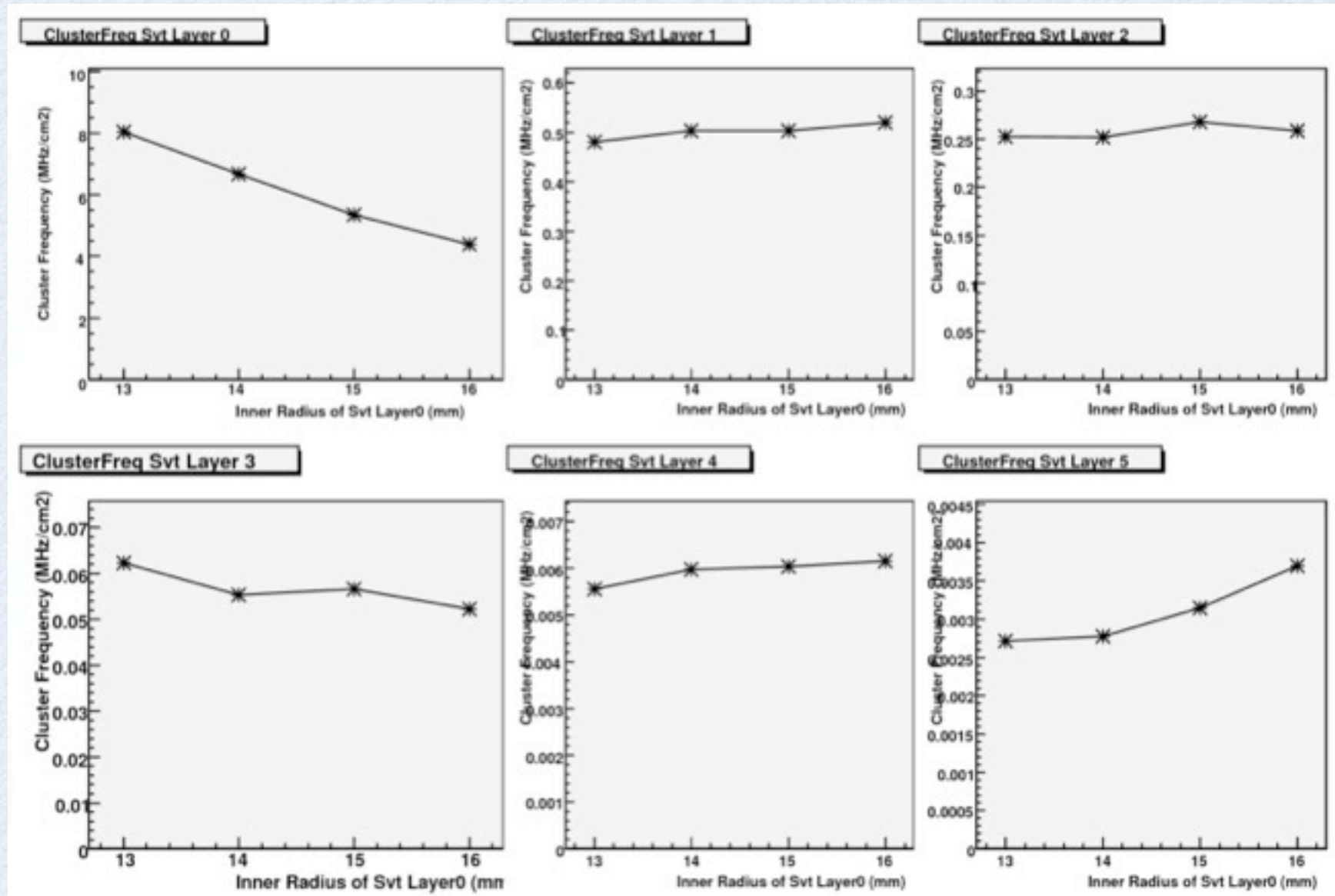


- All pairs tracks that produces background in L0

Track rate on L0 (Riccardo)

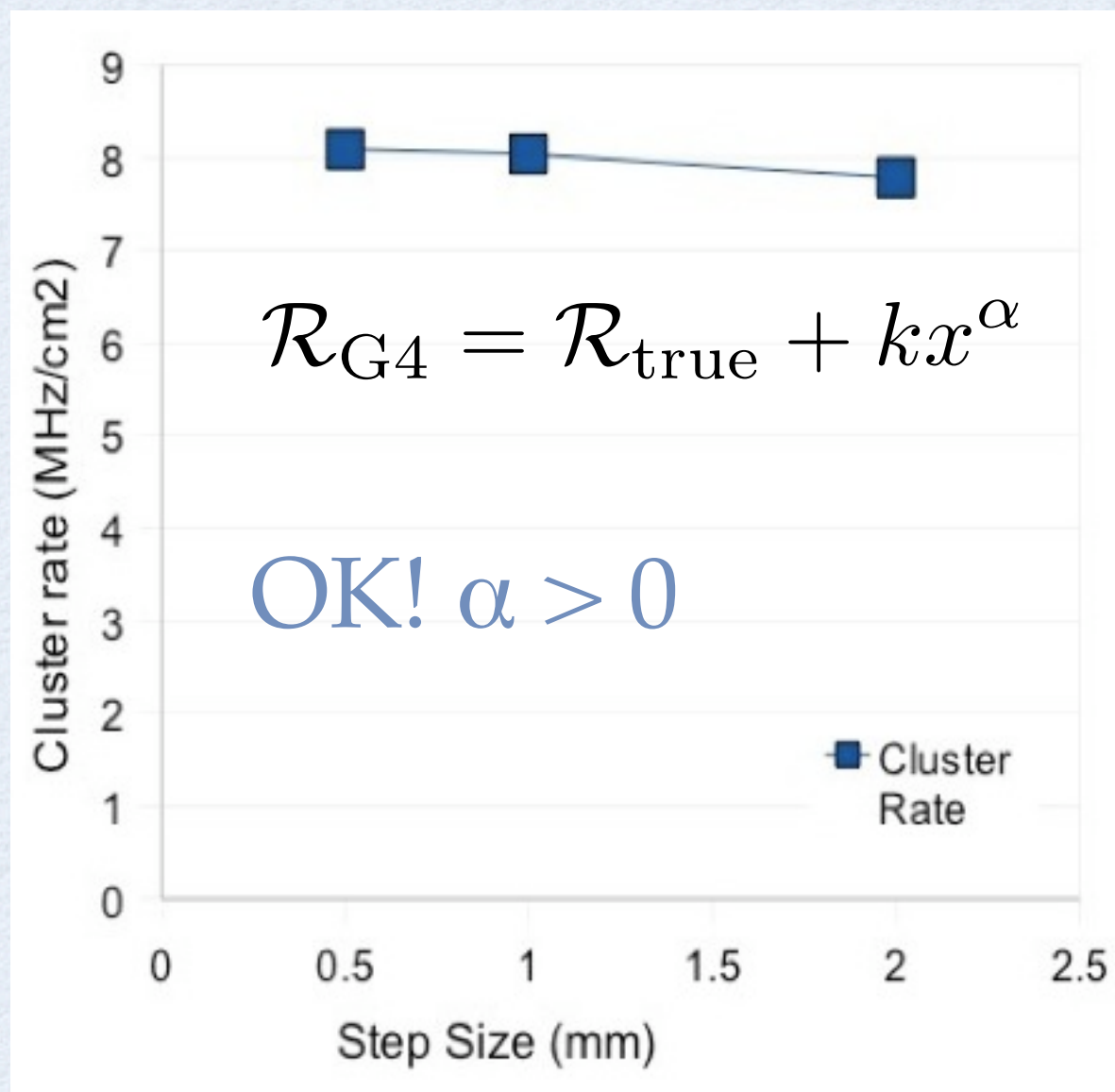


Track rate on L0 @ 1.3 cm: 8.8 MHz/cm²

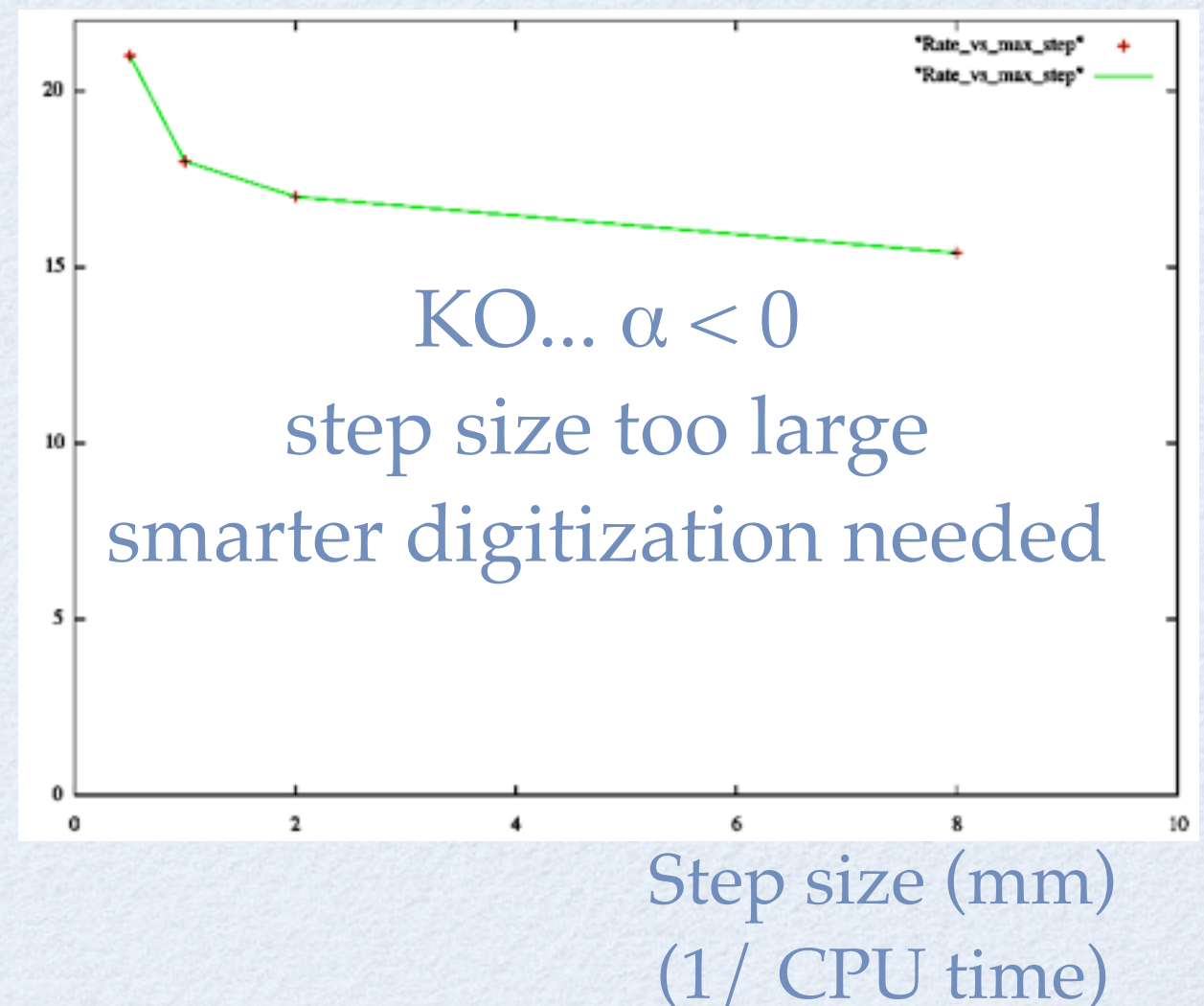


Geant4 Sanity Check

- The Unphysical parameter G4 MaxStep varied in the .5 mm to 2 mm range



Hit Rate (MHz/cm²)



SVT L0 conclusion

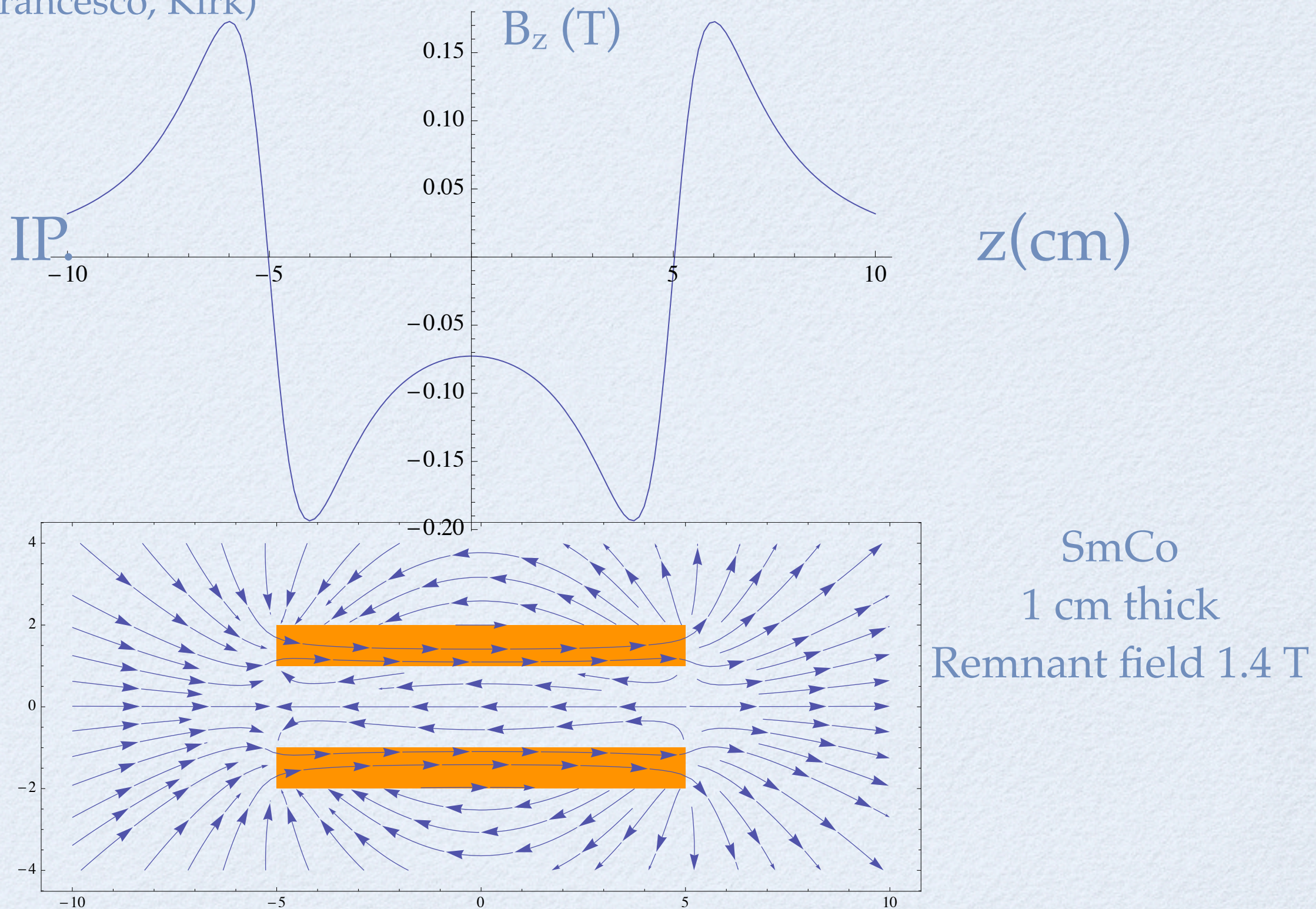
- Sound prediction of the track rate from pair production:
8.0 MHz/cm² (L0 @ 1.3 mm)
4.0 MHz/cm² (L0 @ 1.6 mm)
- Work in progress on the hit rate:
dependent on the L0 design and the Si sensitive thickness.
- Hit Rate >> 20 MHz/cm² for a 300 μm sensitive L0 @ 1.3 mm

Handles on Backgrounds

- Beam pipe radius and thickness
- L0 sensitive thickness
- Magnetic field

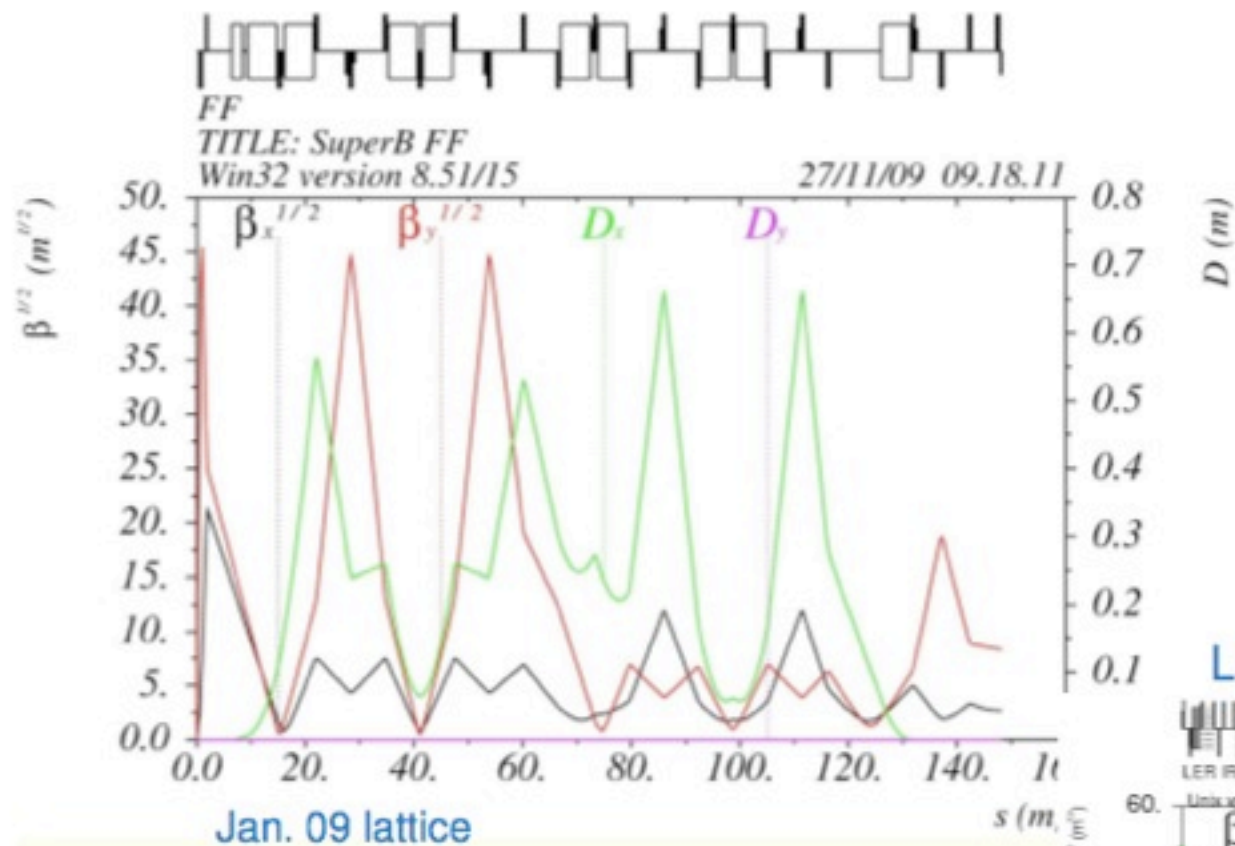
IP Magnetic field increase

- Place couple of permanent magnets near the IP to increase B_z (Suggested by Panta & Francesco, Kirk)

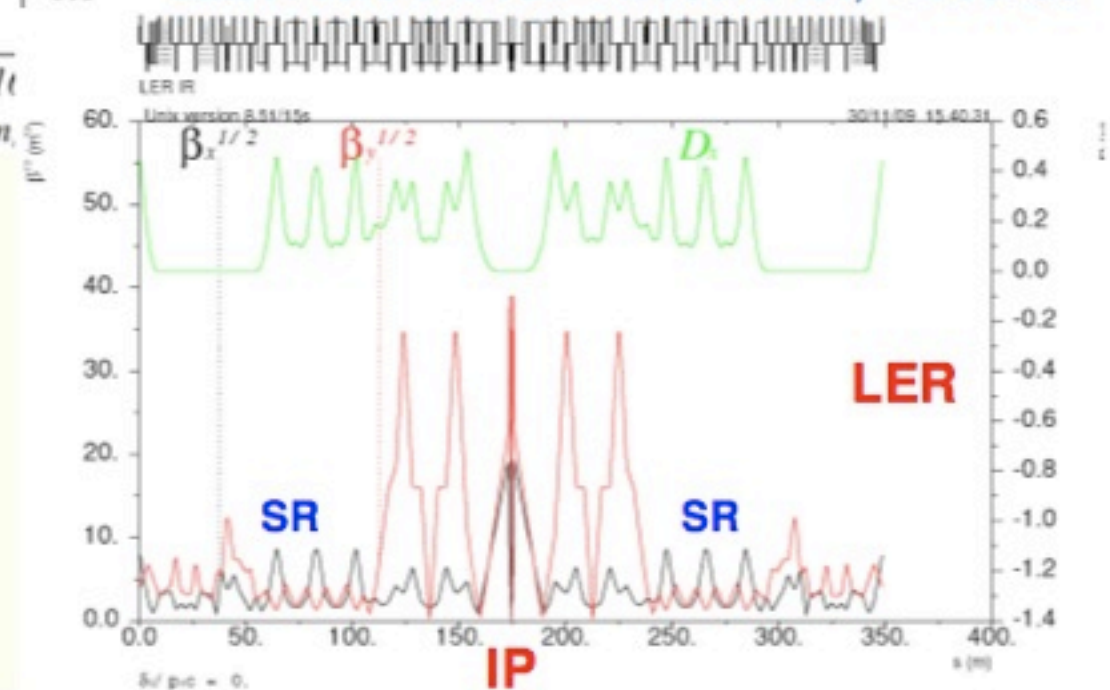


Beam gas & Touschek LER

Final Focus used for collimation studies



Latest version: Yuri Nosochokov, 1 Dec. 09



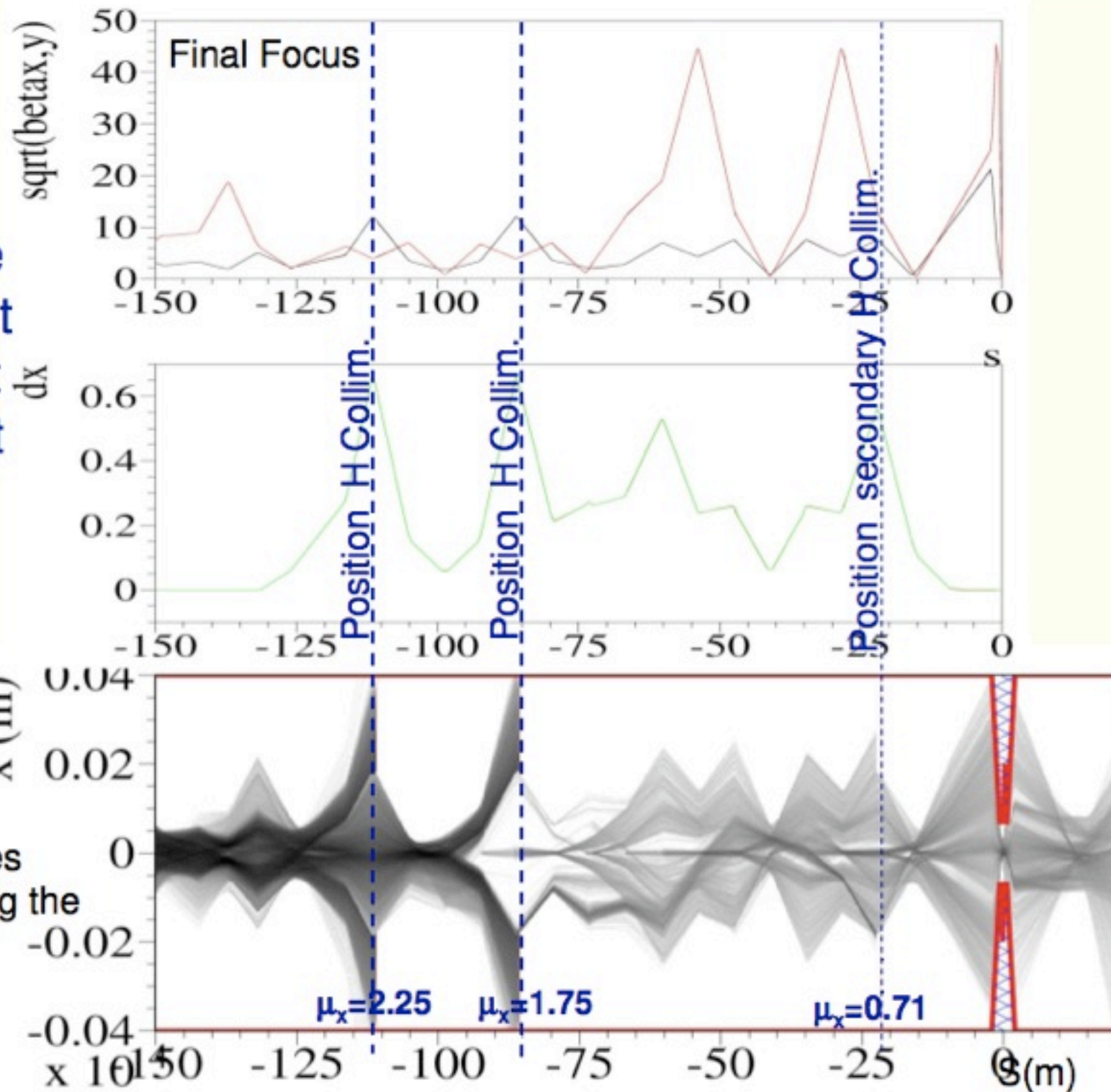
Manuela & Panta

Collimators for Touschek

collimators at $n \cdot \pi/2$ upstream the IP to intercept particles that would be lost at IP

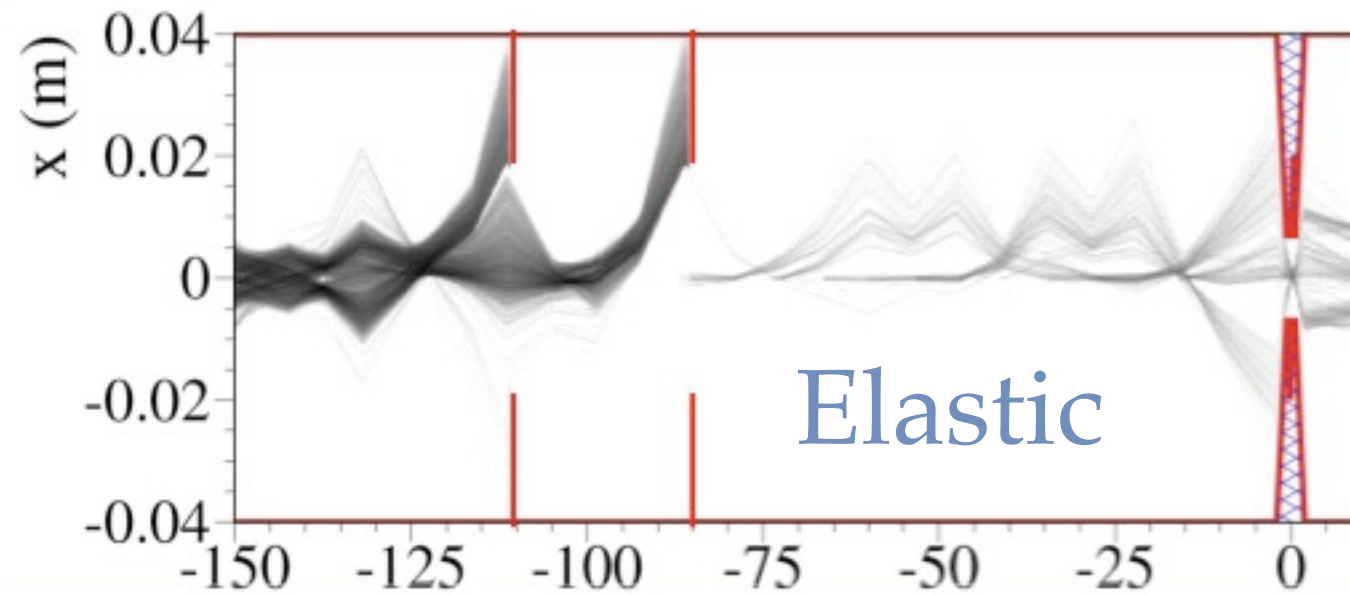
Text

Trajectories of Touschek particles scattered all along the ring and tracked through the FF

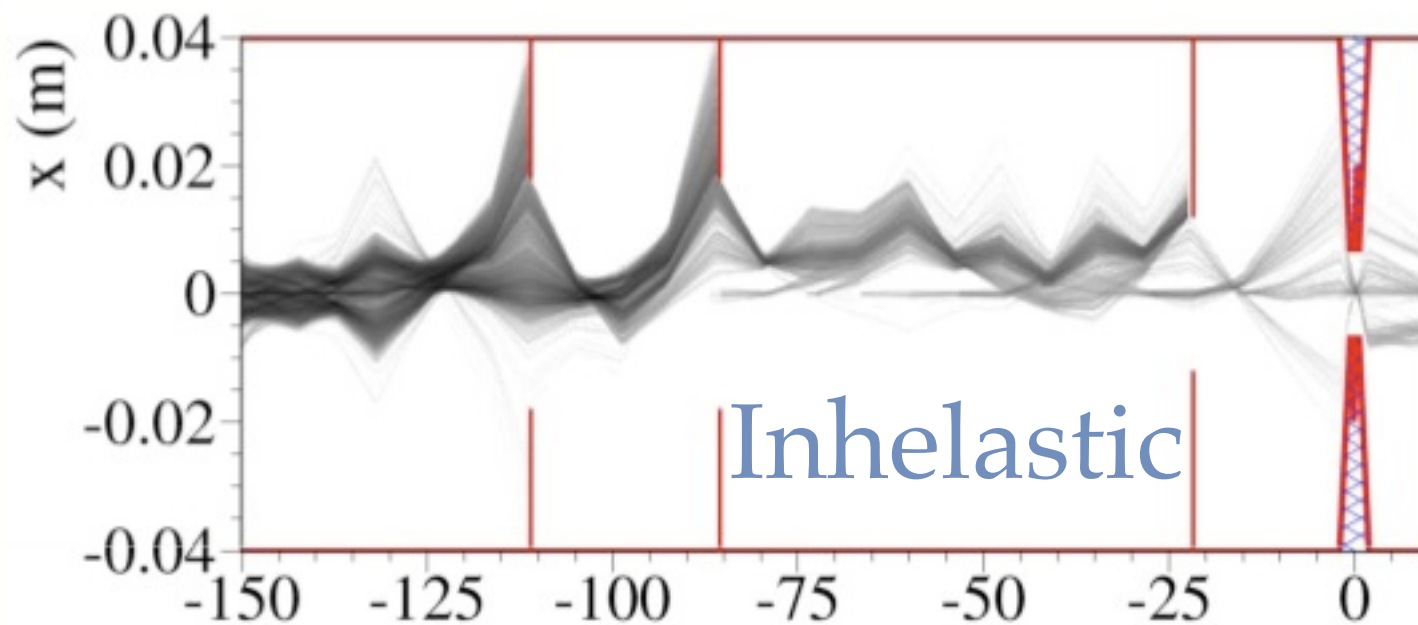


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Beam gas



Trajectories of scattered particles in the FF, with the **two primary Hor. collimators** inserted



Trajectories of scattered particles in the FF, with the **2 primary collimators + secondary one** inserted

- Vertical jaws position and aperture optimization in the ToDo list

Background production

- Radiative Bhabha:
100kevt
- 2 IR options: with/without W Shield
- Several set of Geant4 “unphysical”
parameters
- production to be started in early Jan 2010

Conclusions SVT L0

- Lot of work to re-gain confidence in the Pairs Production background rates.
- Track rate prediction are sound
- More work needed to predict occupancies for the various SVT L0 options

Conclusions Tousheck + Beam Gas

- Manuela and Pantaleo begun to analyze the last lattice and final focus
- Final focus off-energy dynamic aperture still to be optimized

Full background Injection

- Goals for the February Fast Sim production
 - Radiative Bhabha bkg frame superimposed
 - Pairs productions occupancies on L0