

New Background Production (**g20**)

- Uniform (spatial) electrons and gamma background from a plane which is in front of the GEM tracker (see plot on slide n. 4)
- Assume isotropic angular direction (+/- 4 deg around the normal direction)
- Assume Nelyubin MC Background Energy distribution and rate:
 - Gamma 0 – 10 MeV ($R_g = 1.12 \text{ E-7 /cm}^2/\text{e}$)
 - Electron 0 – 100 MeV ($R_e = 3.38 \text{ E-10 /cm}^2/\text{e}$)

Setup (same as prod g17)

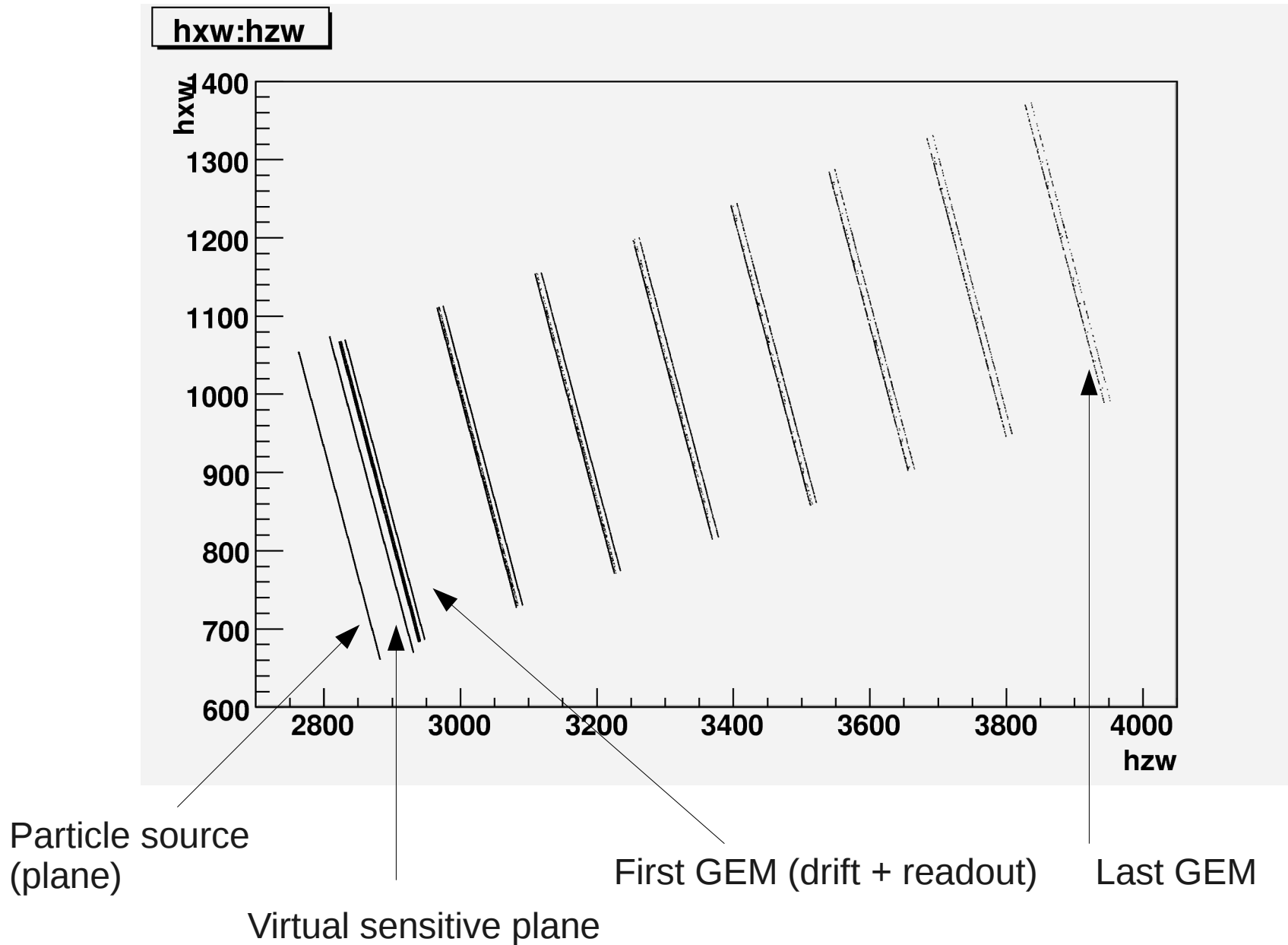
- 8 Identical GEM chambers ($A = 40 \times 50 \text{ cm}^2$)
- SBS at 16.9 degree
- Magnet off
- Beam Current = 75 μA ($I = 46.9 \text{ E}13 \text{ e}$)
- Coincidence Time: $dT = 500 \text{ ns}$
- Proton signal from production g17
- Estimated Background Normalization:
 - Electron: **$N_e = R_e \cdot I \cdot dT \cdot A = 160 \text{ e/chamber/event}$**
 - Gamma: **$N_g = R_g \cdot I \cdot dT \cdot A = 52000 \text{ gamma/chamber/event}$**

Comparison to previous productions

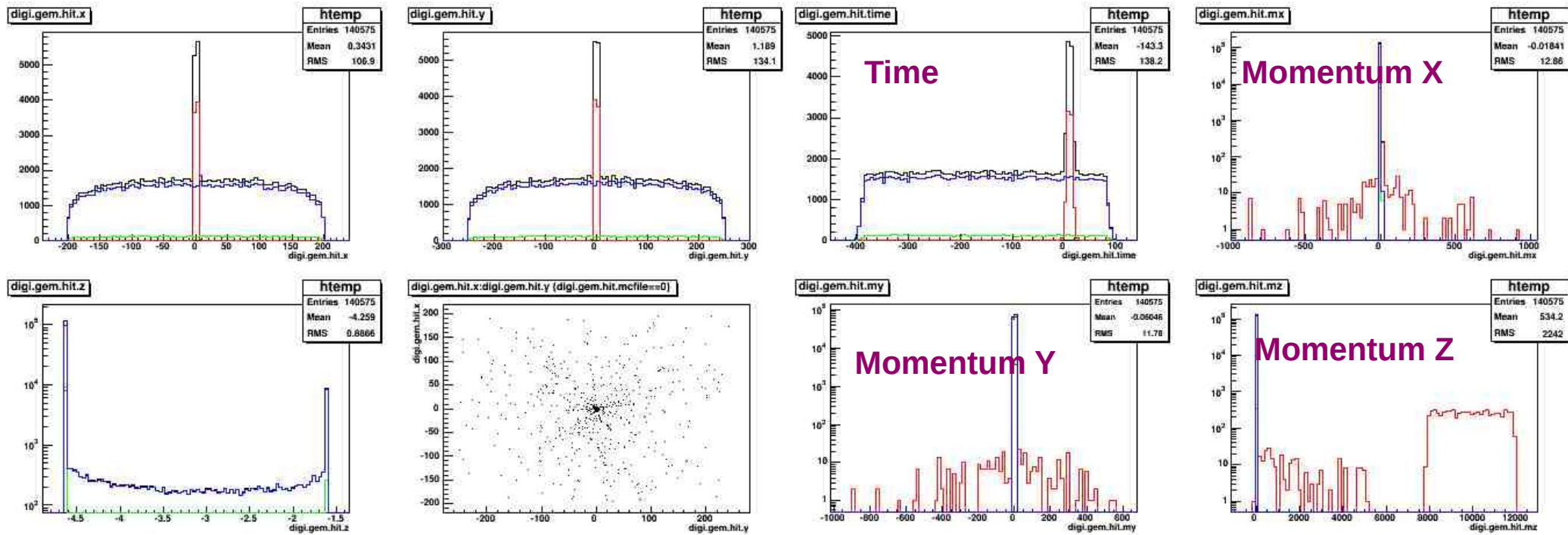
- Background were simulated starting from target (instead of a plane near the tracker entrance)
- Background rate based on Lubomir data (scaled to 16.9 deg):
 - Normalizations: $N_e = 500$, $N_g = 2000$
- Background Energy distributions flat:
 - Electrons: 1 – 500 MeV
 - Gamma: 1 keV – 100 MeV

→ Number of hits/proton ~ 1/3 of the previous production and gamma dominate (see last two slides) – Situation apparently better than before.

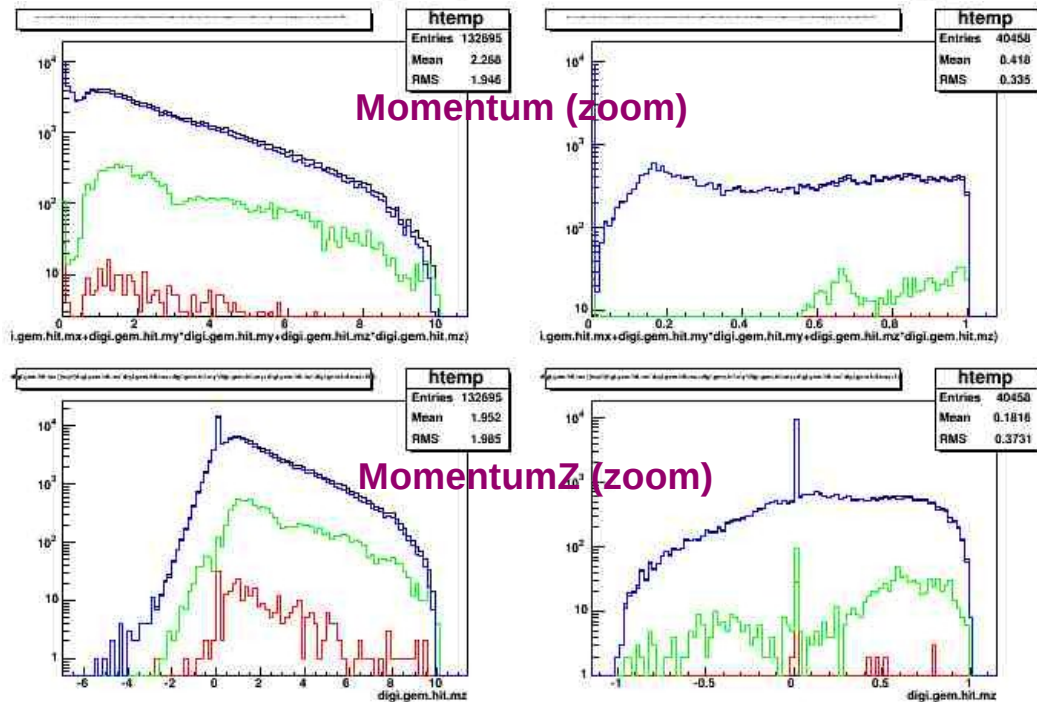
Geometry (seen by hit distribution)



Distributions (10% background)

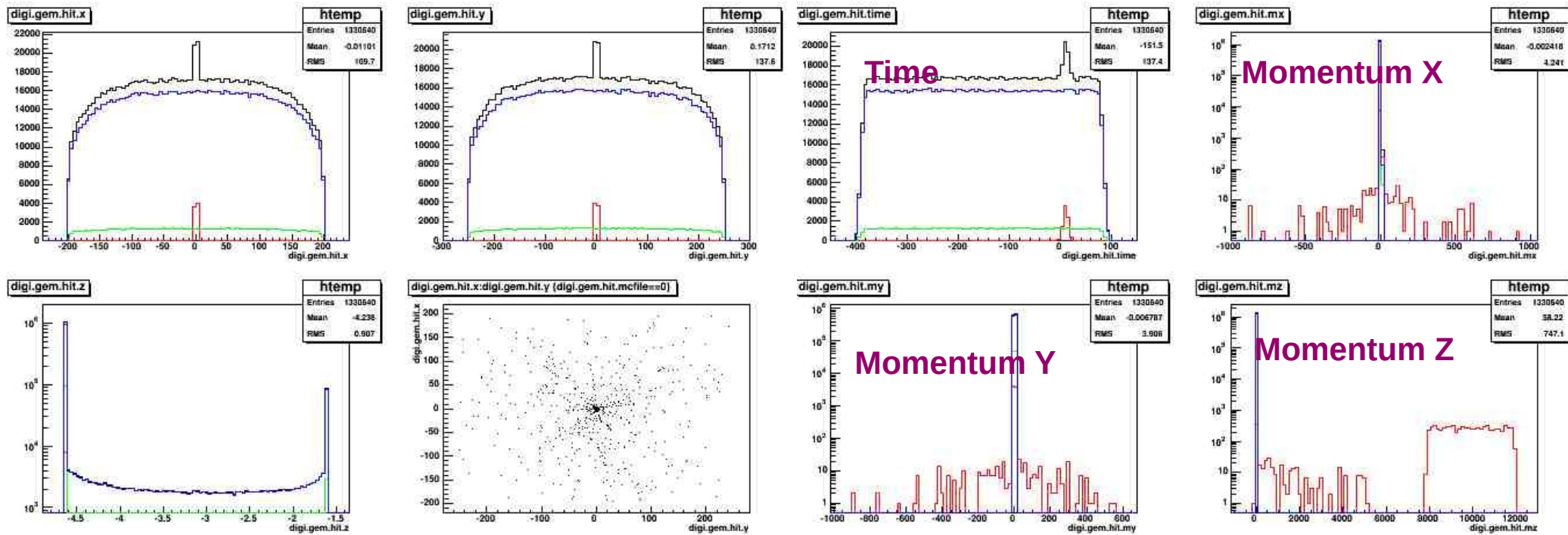


Hit Position (x,y,z,x vs y)



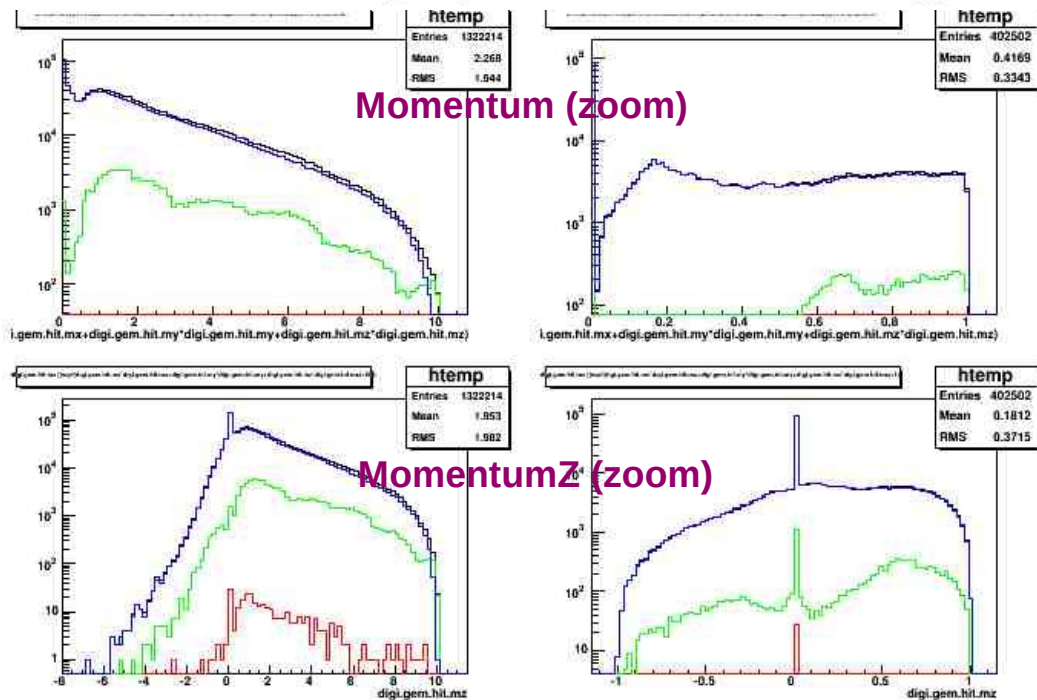
Black = all
Red = Proton signal
Green = Electron Background
Blue = Gamma Background

Distributions (100% background)

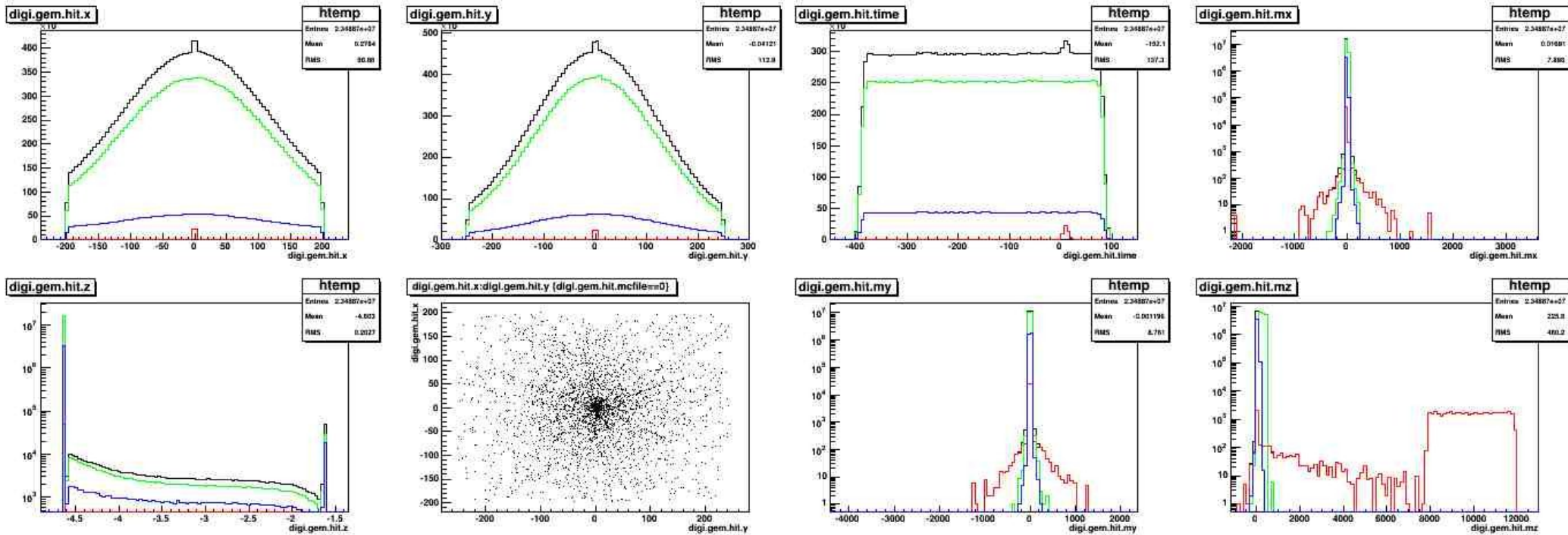


Hit Position (x,y,z,x vs y)

Black = all
Red = Proton signal
Green = Electron Background
Blue = Gamma Background



Distribution (100% Background) OLD PROD. g17



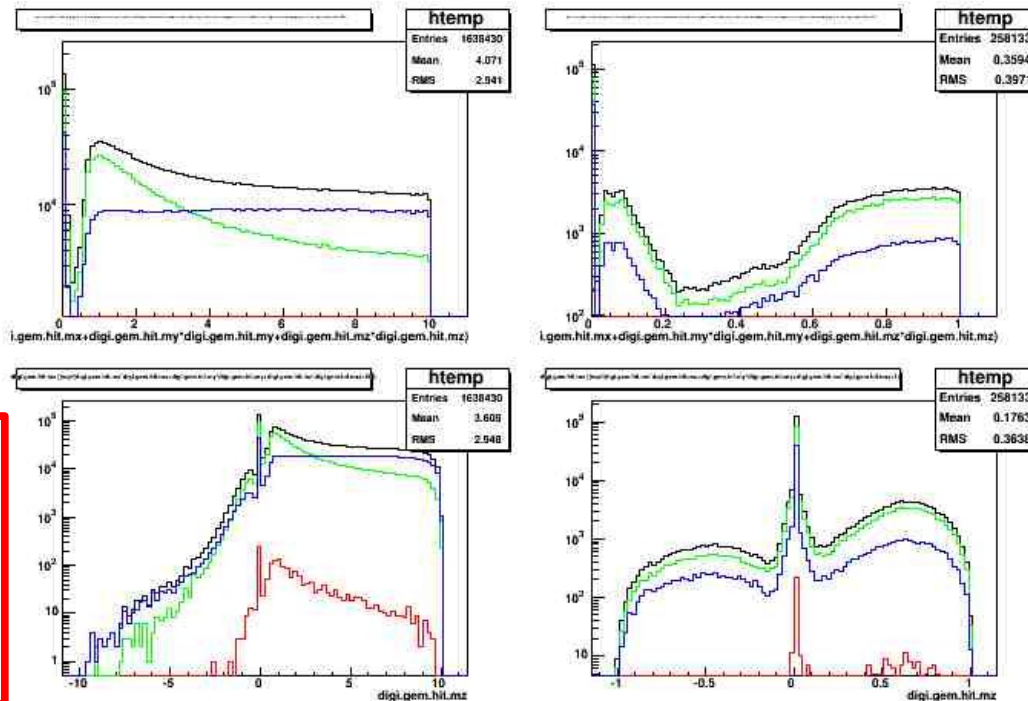
Black = all

Red = Proton signal

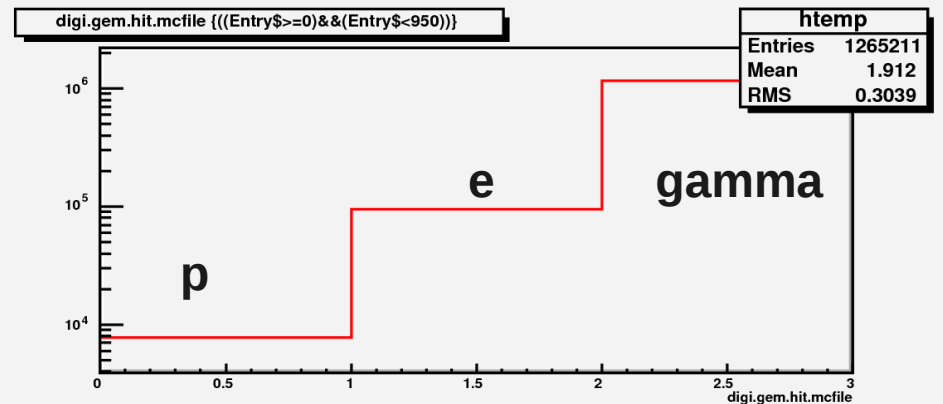
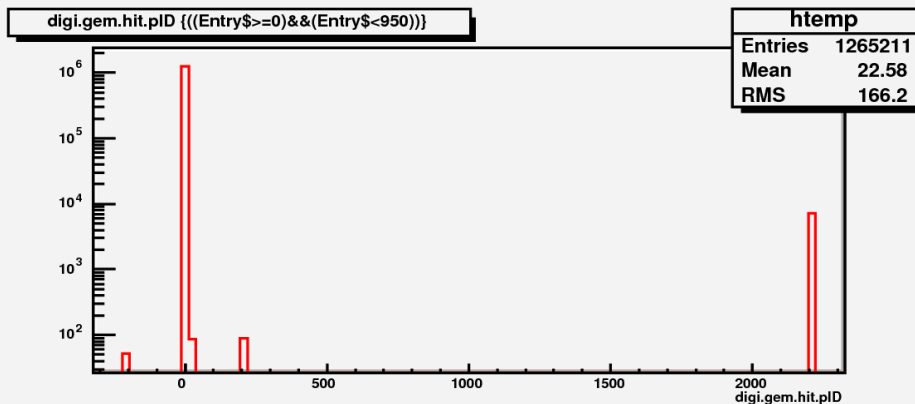
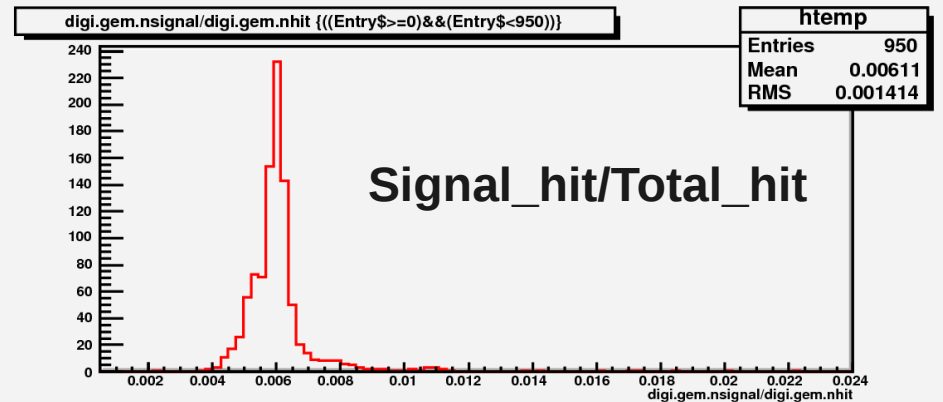
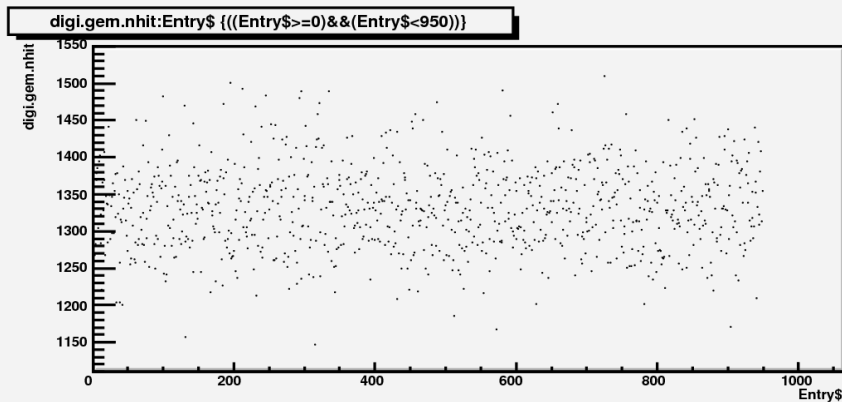
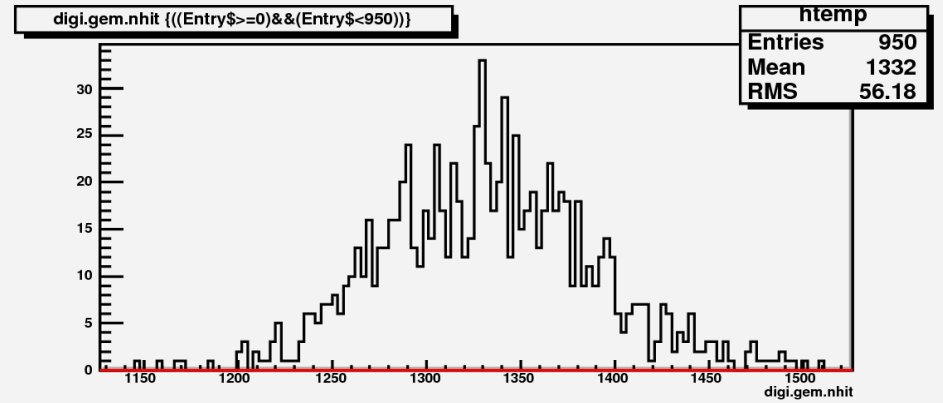
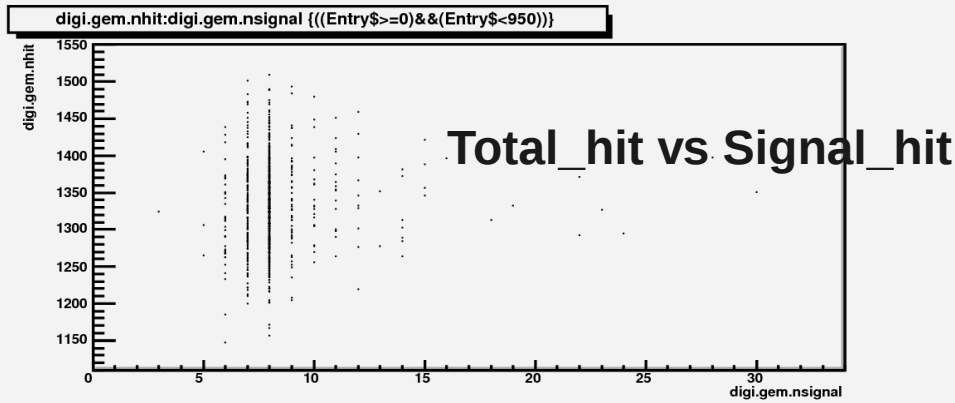
Green = Electron Background

Blue = Gamma Background

Note: the spatial profile is more “peaked” due to the fact that particles comes from target
While in prod g20 background originates uniformly from a plane in front of the GEM tracker



#Hits/Event (100% Background)



#Hits/Event (100% Background) OLD PROD. g17

