Shielding studies

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LUXE simulation and analysis TF

LUXE

Forward detector system with triangular chamber

Beam Pipe 4.2 cm +
Triang chamber
Al window 0.5 mm

Shielding - 3-layer Al-Fe-Al 90 cm thick

MC HICS photon beam,
E e= 16.5 GeV
number_processed_bx: 4722
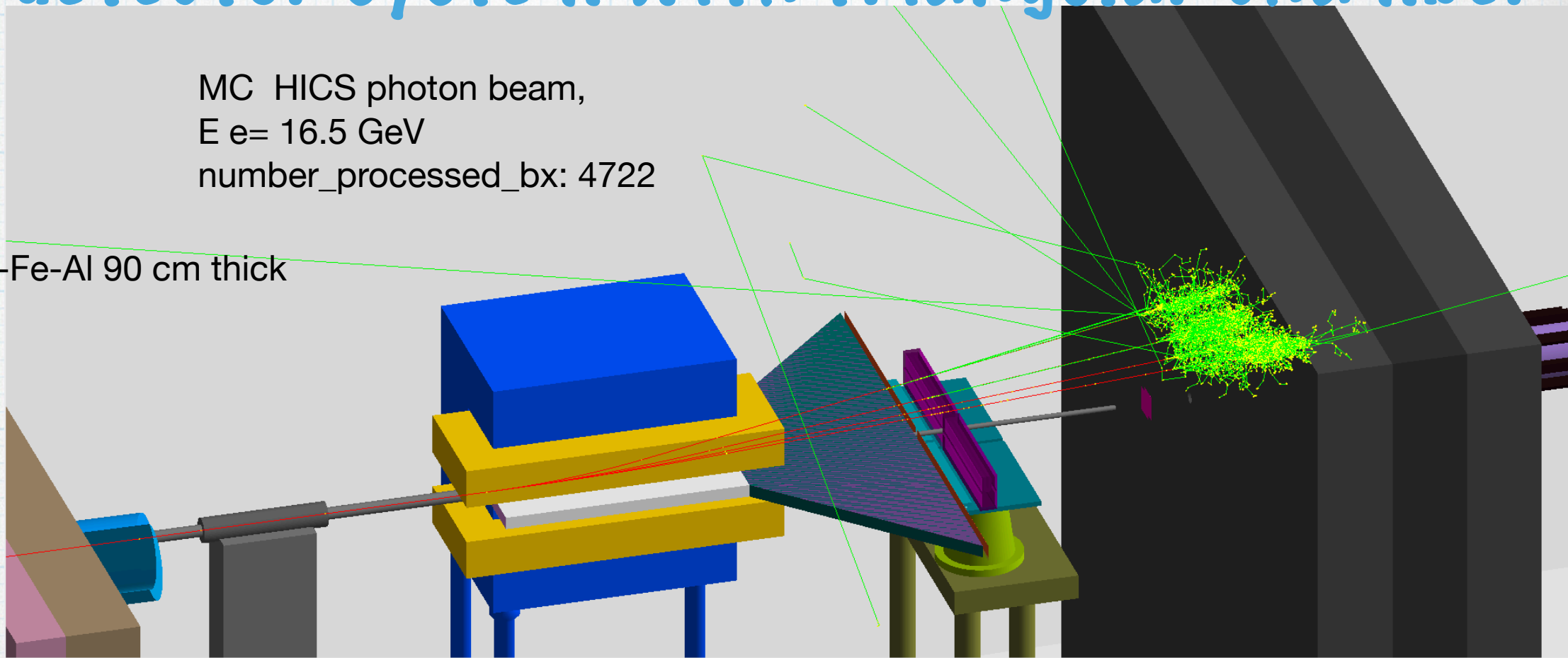
Shielding - Concrete 30 cm vs 80 cm thick
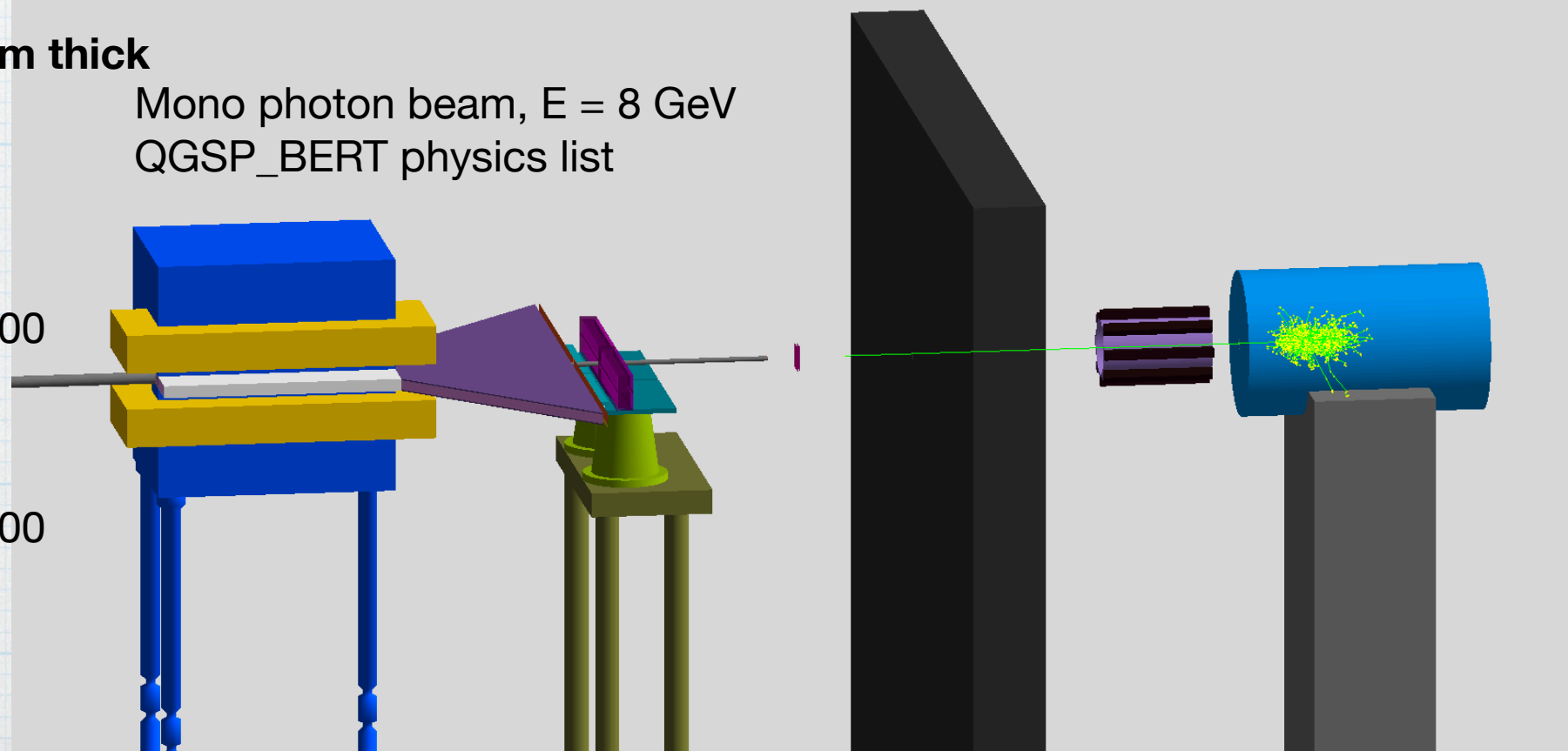
Mono photon beam, E = 8 GeV
QGSP_BERT physics list

30 cm shielding
number_processed_events: 68500000
=> 4% of BX

80 cm shielding
number_processed_events: 18290000
=> 1% of BX
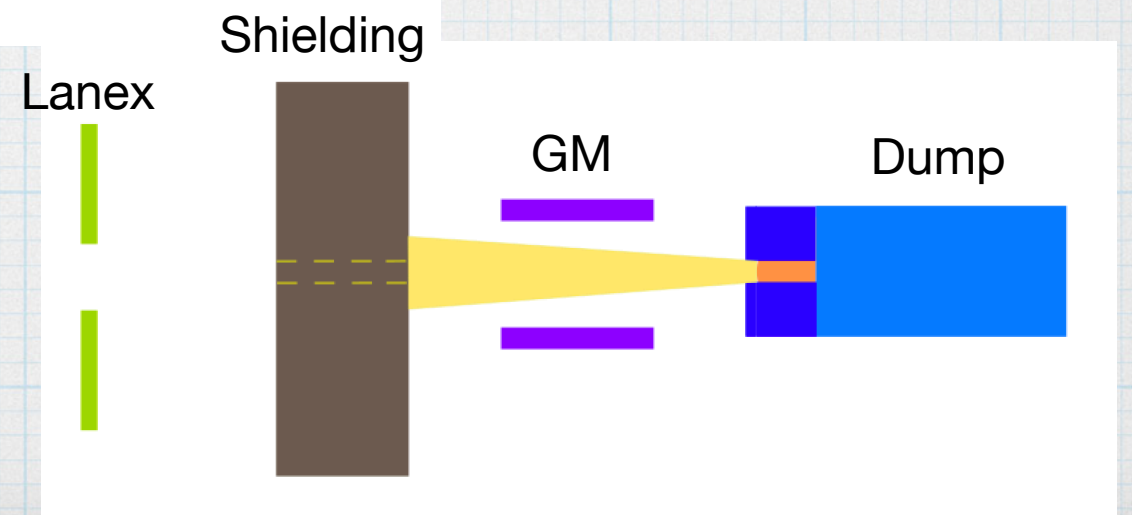
The source of background in FDS

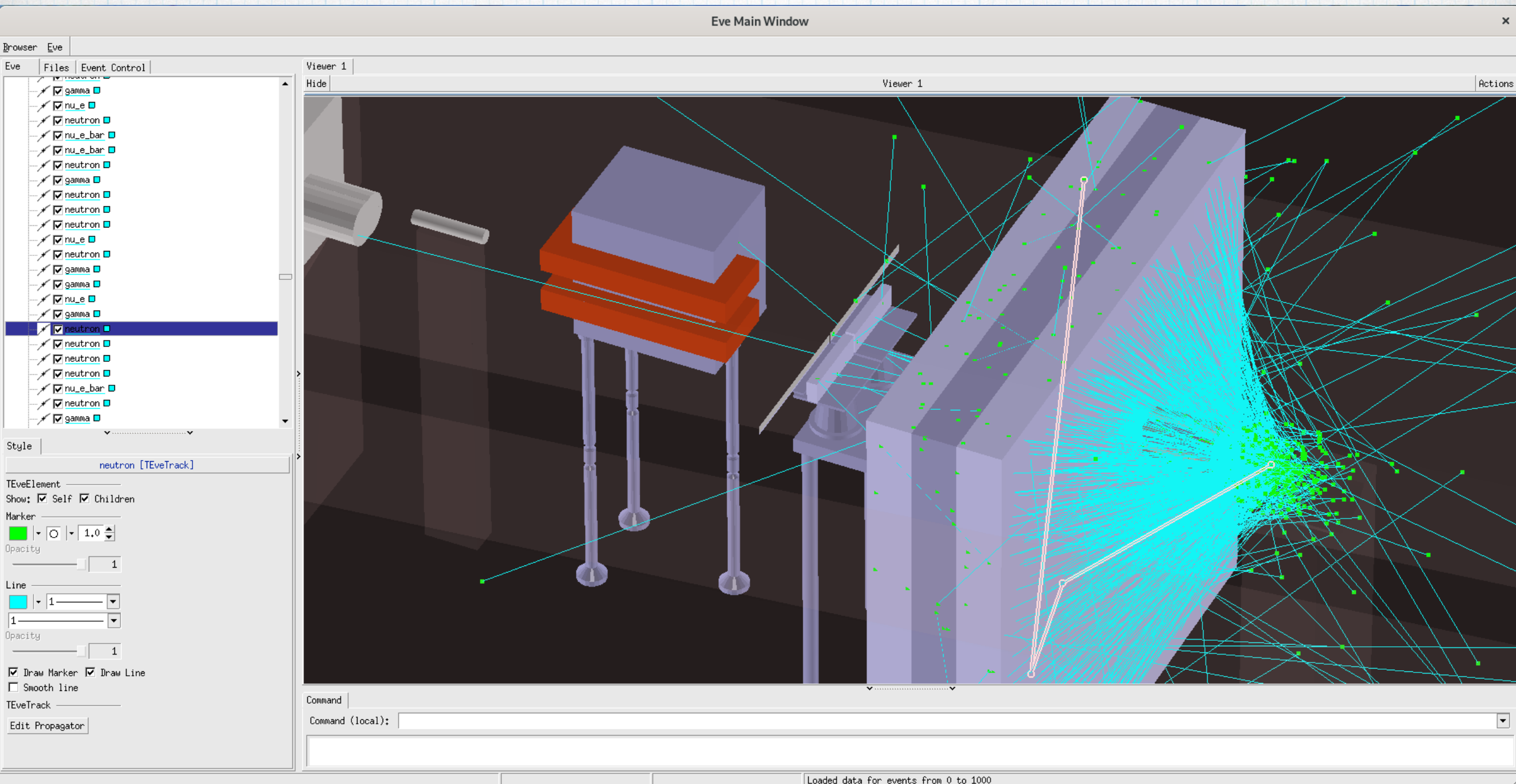* Background in the photon spectrometer depends on combine influence of the shielding and the design of the beam dump

Gamma dump modifications
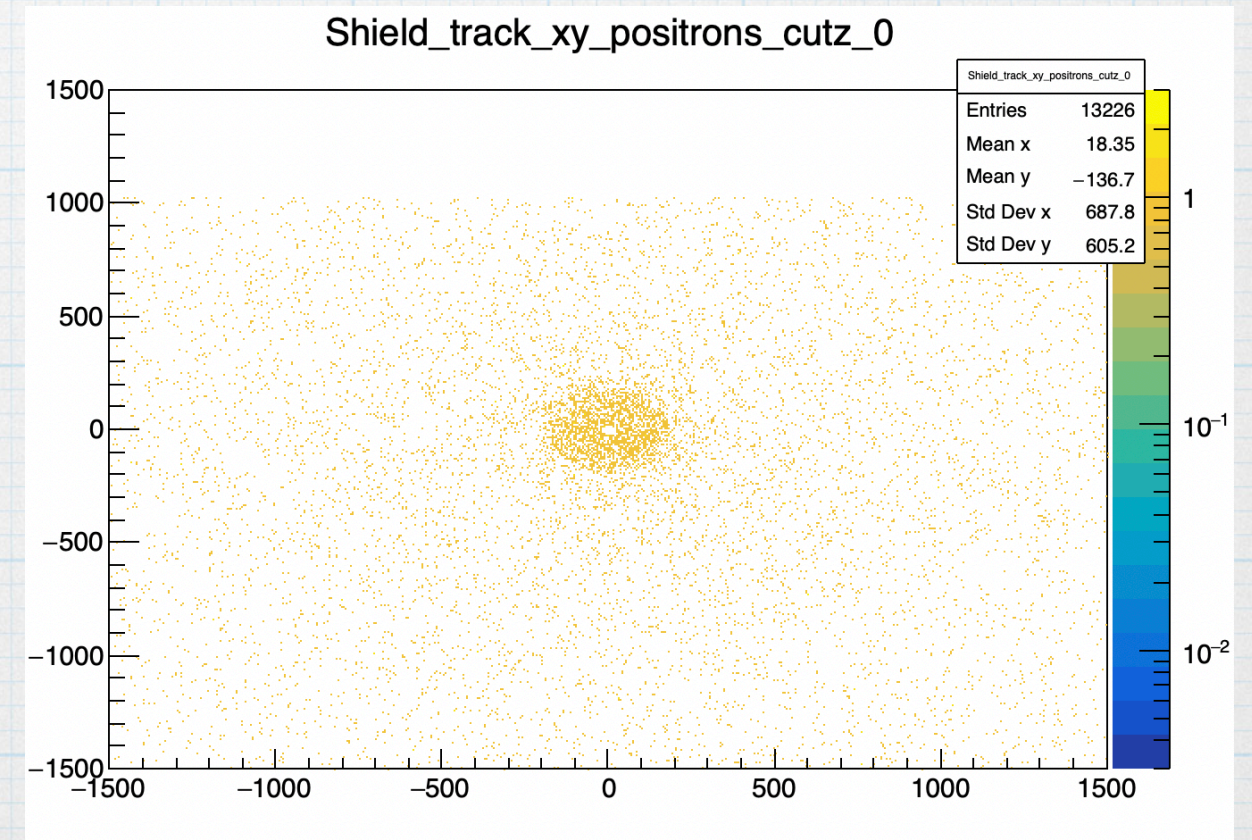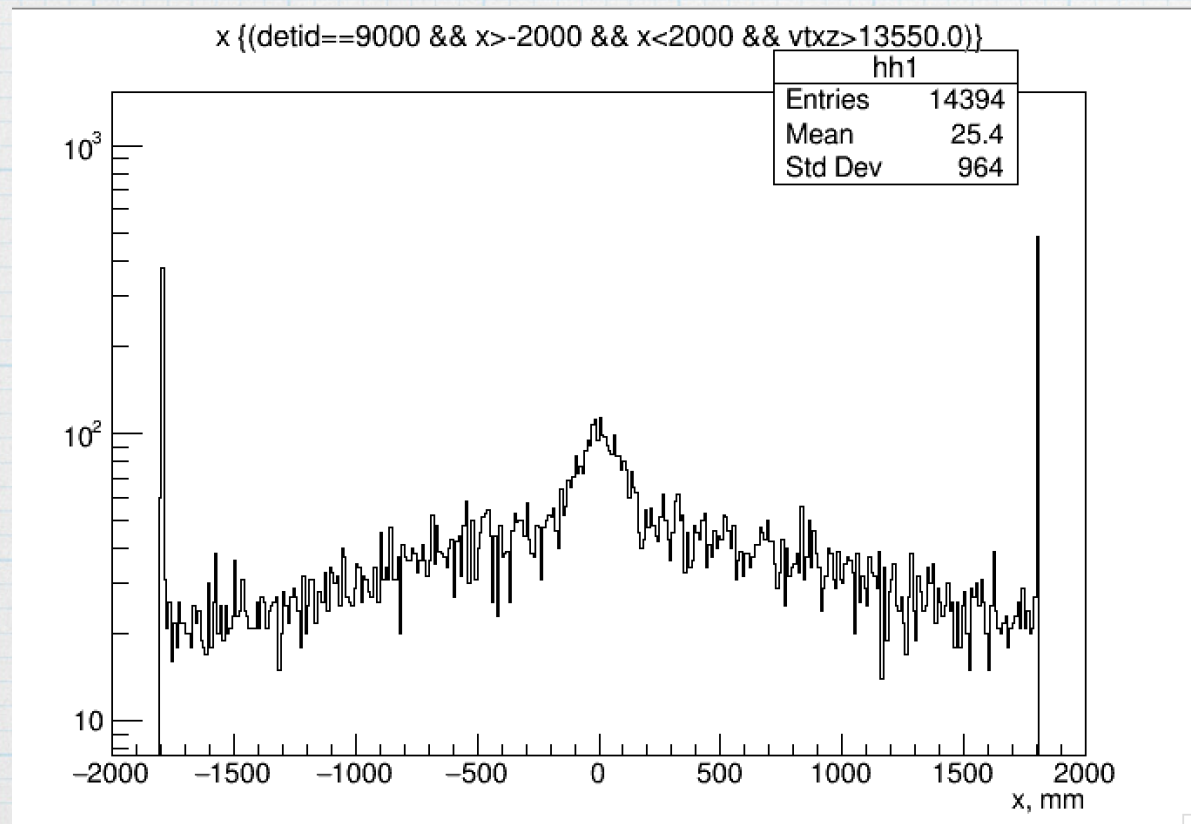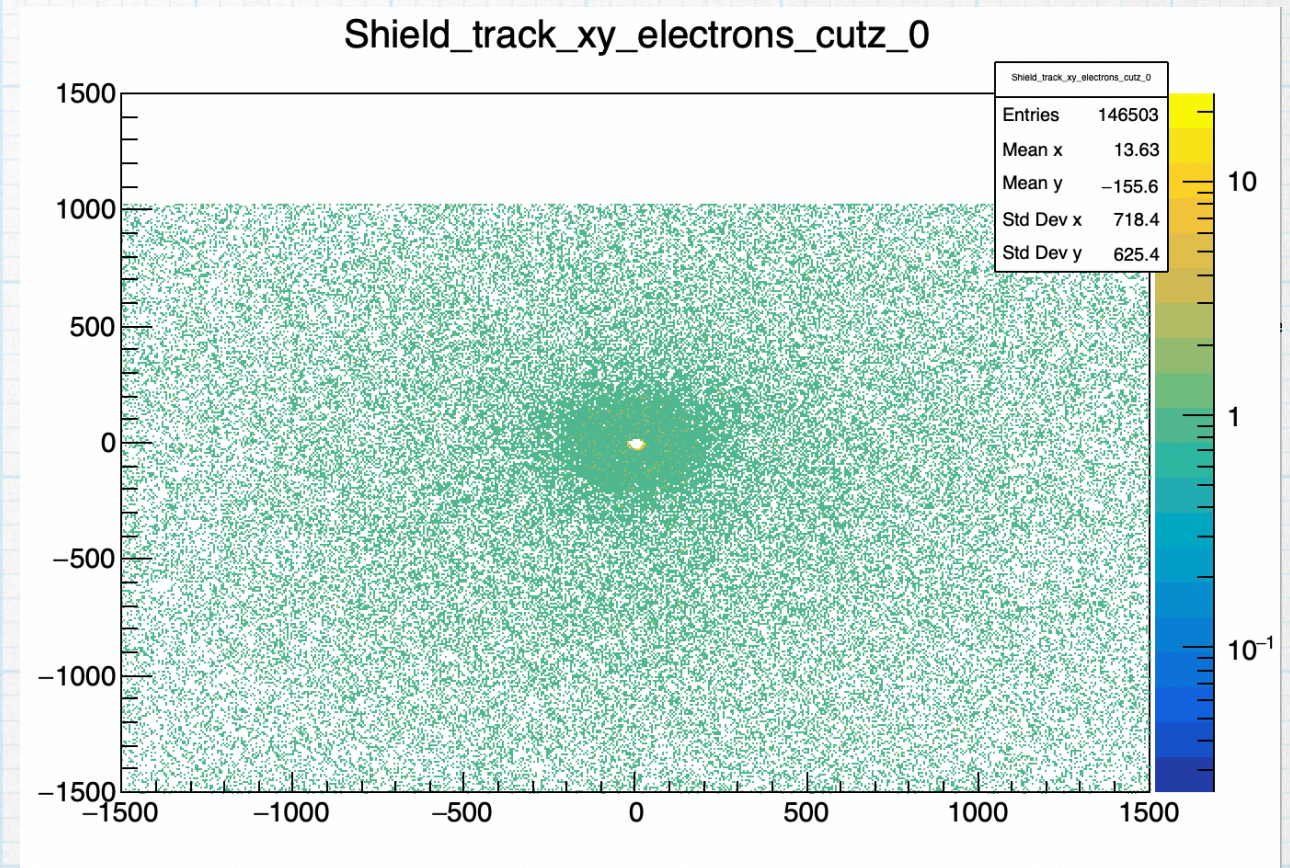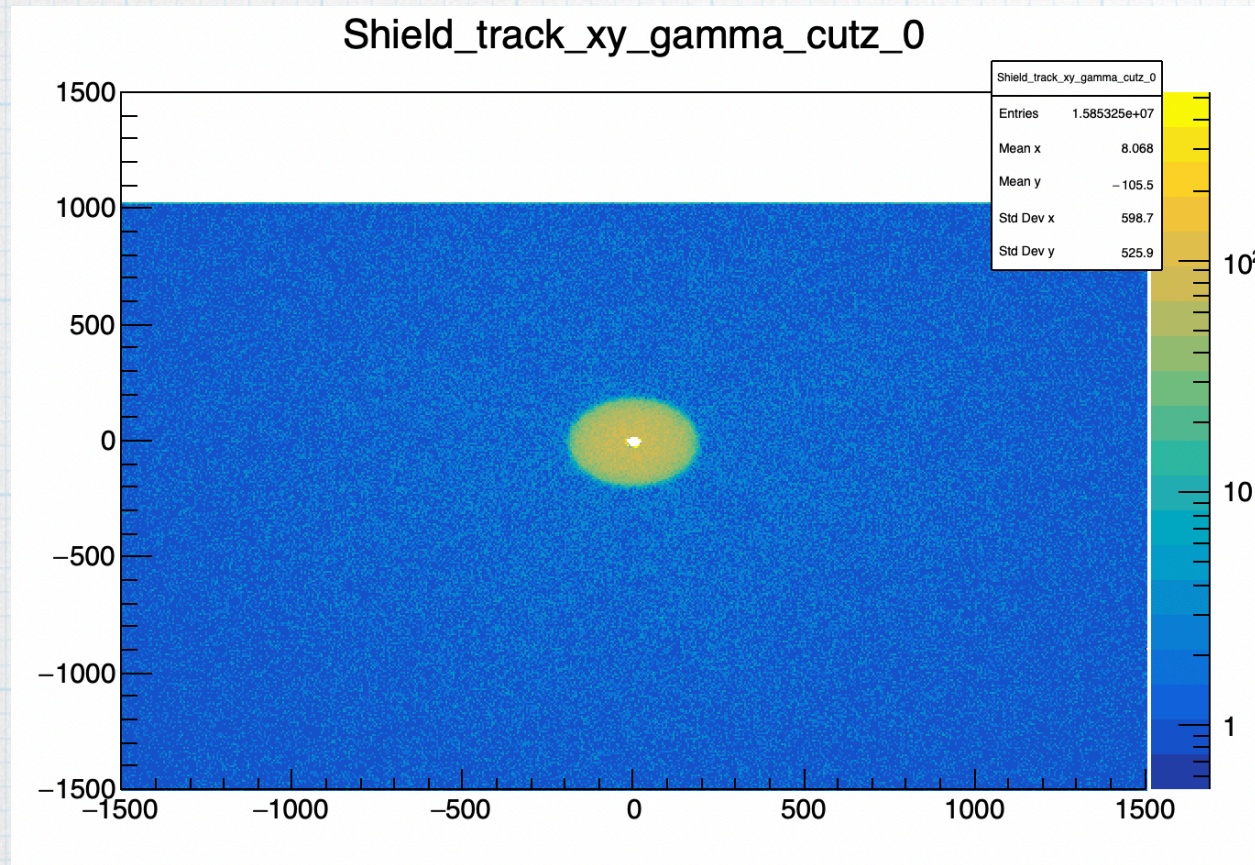
Lanex

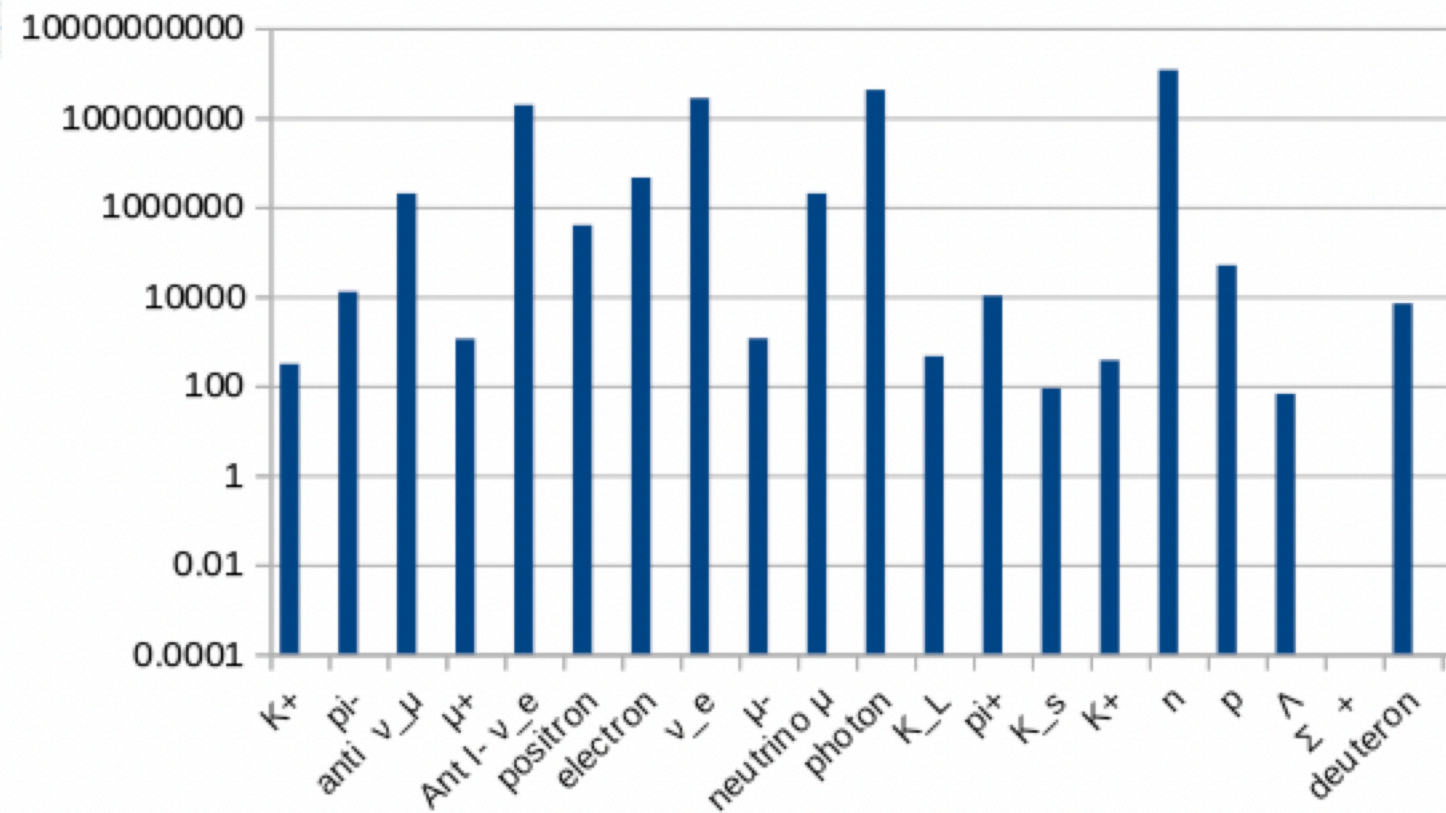Shielding

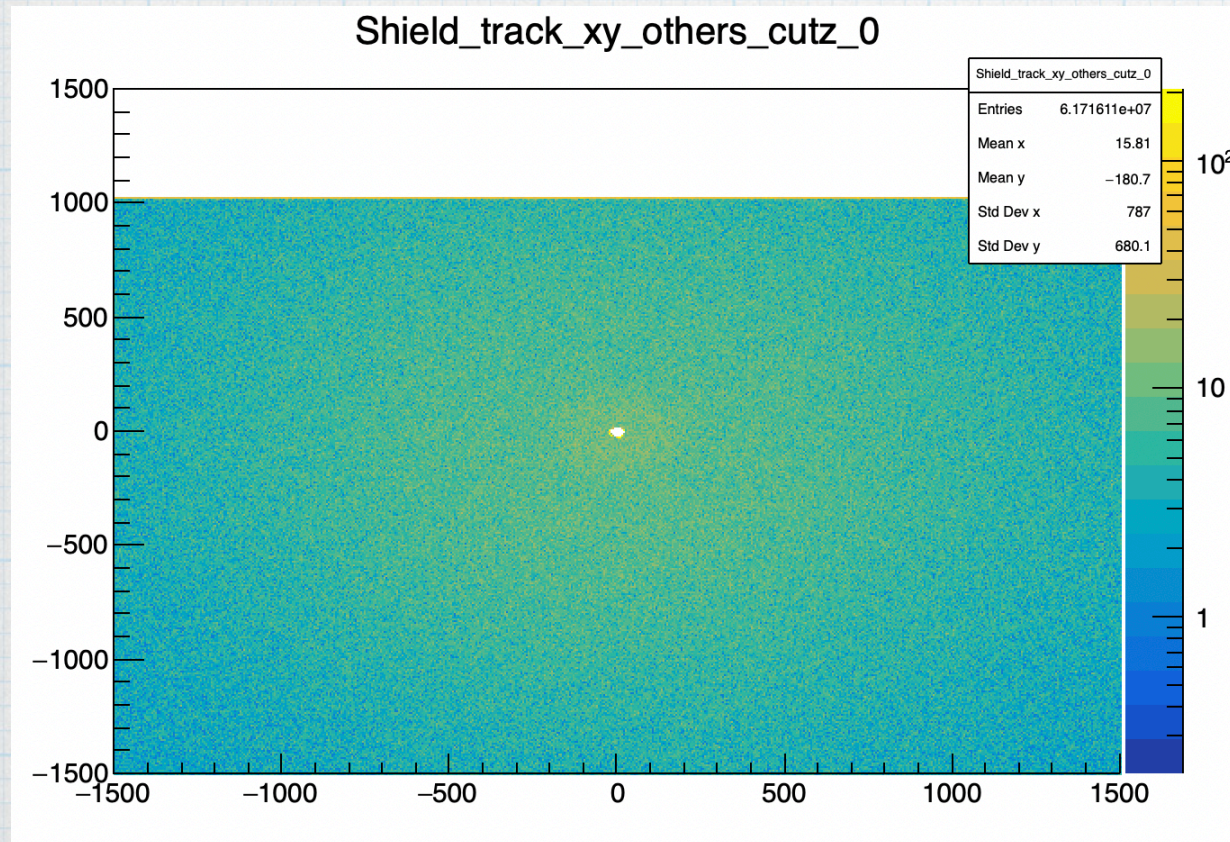GM

Dump

3

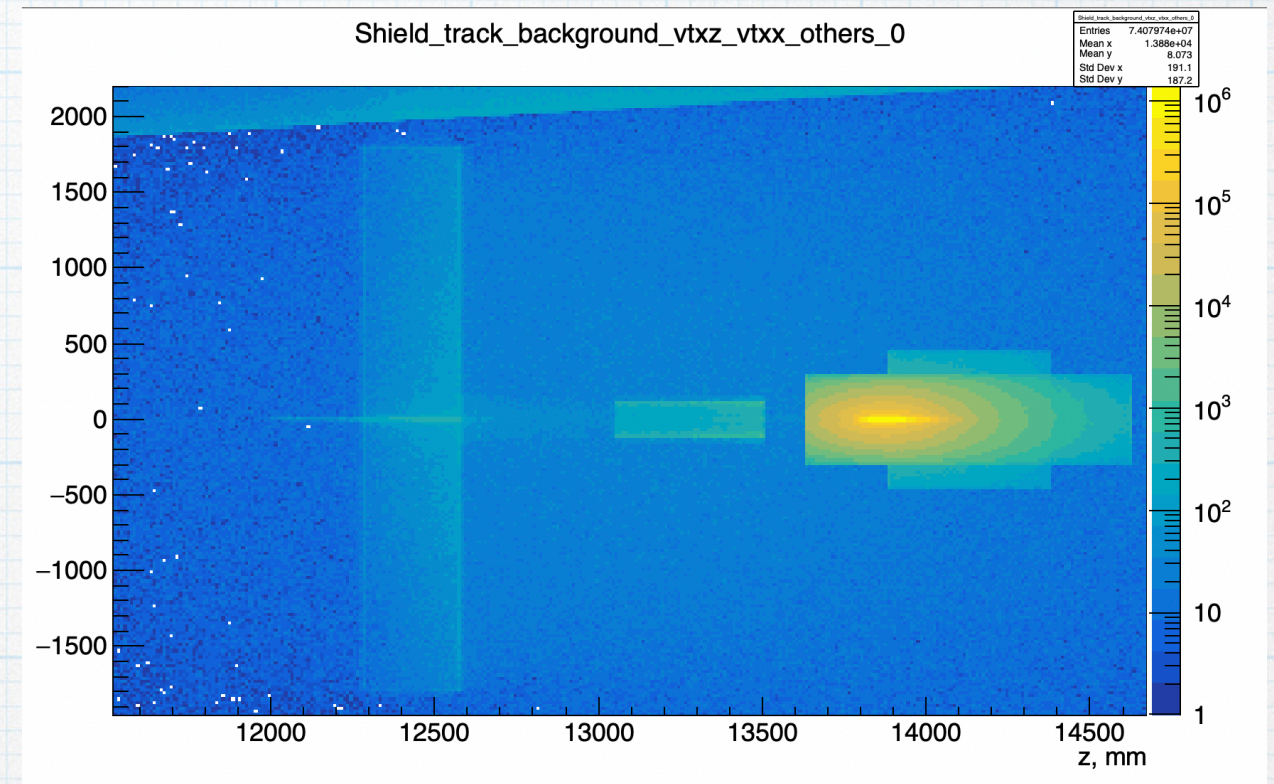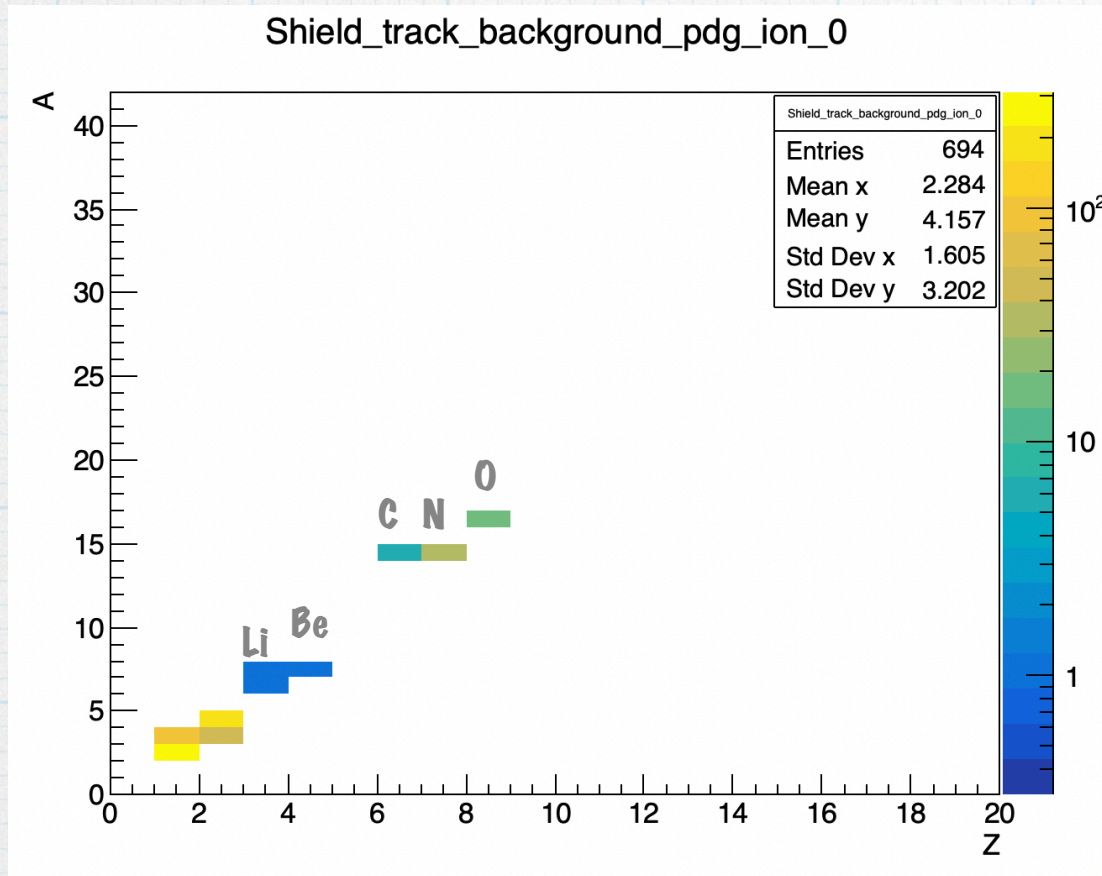# Event display

1000 photons of 8 GeV energy

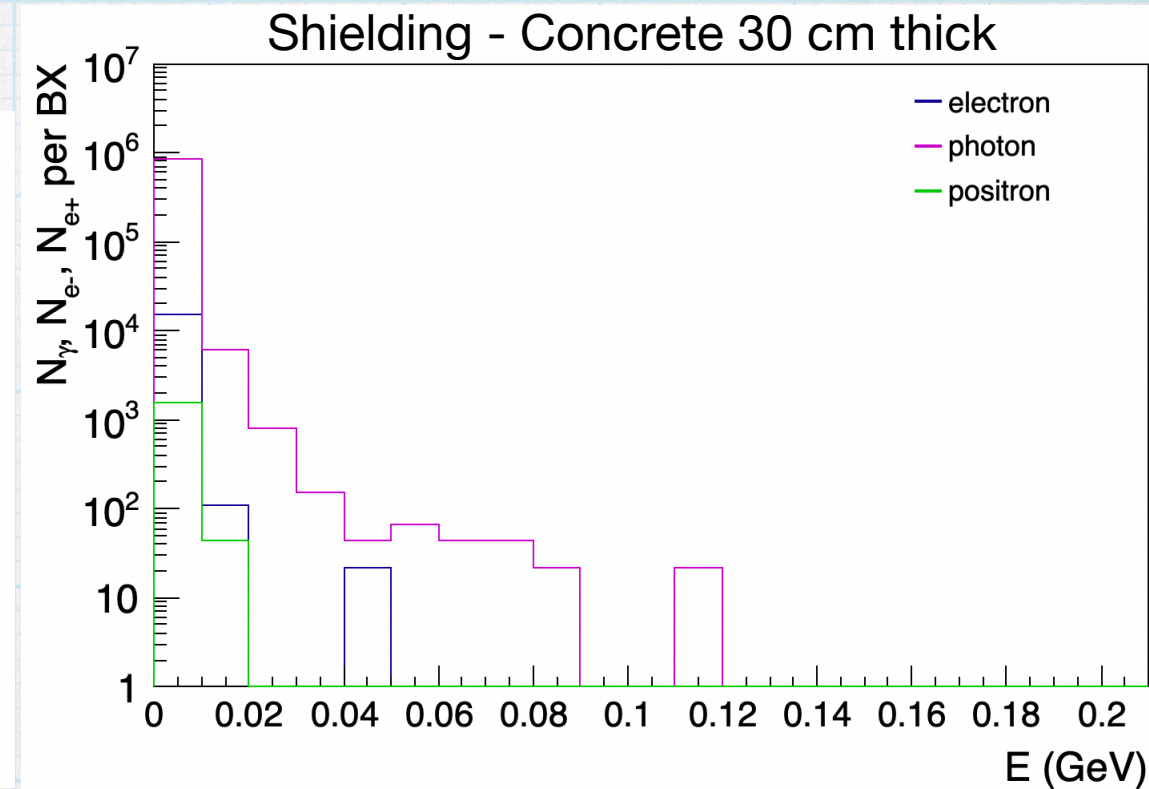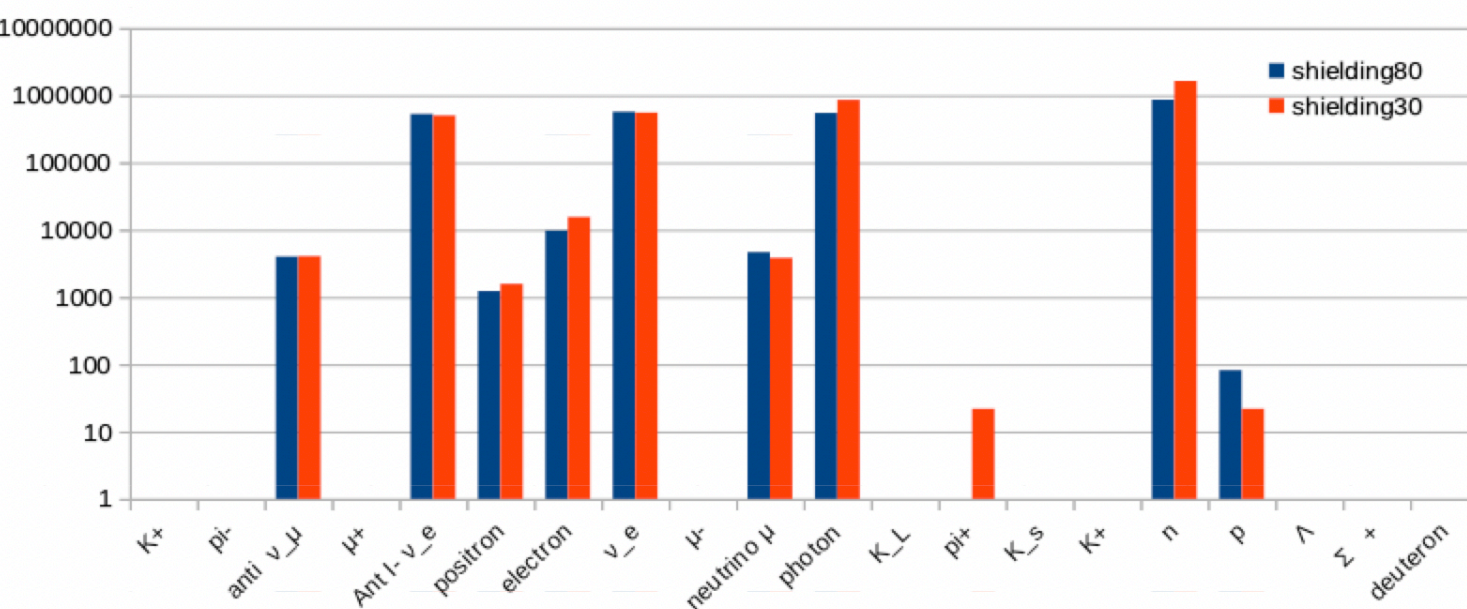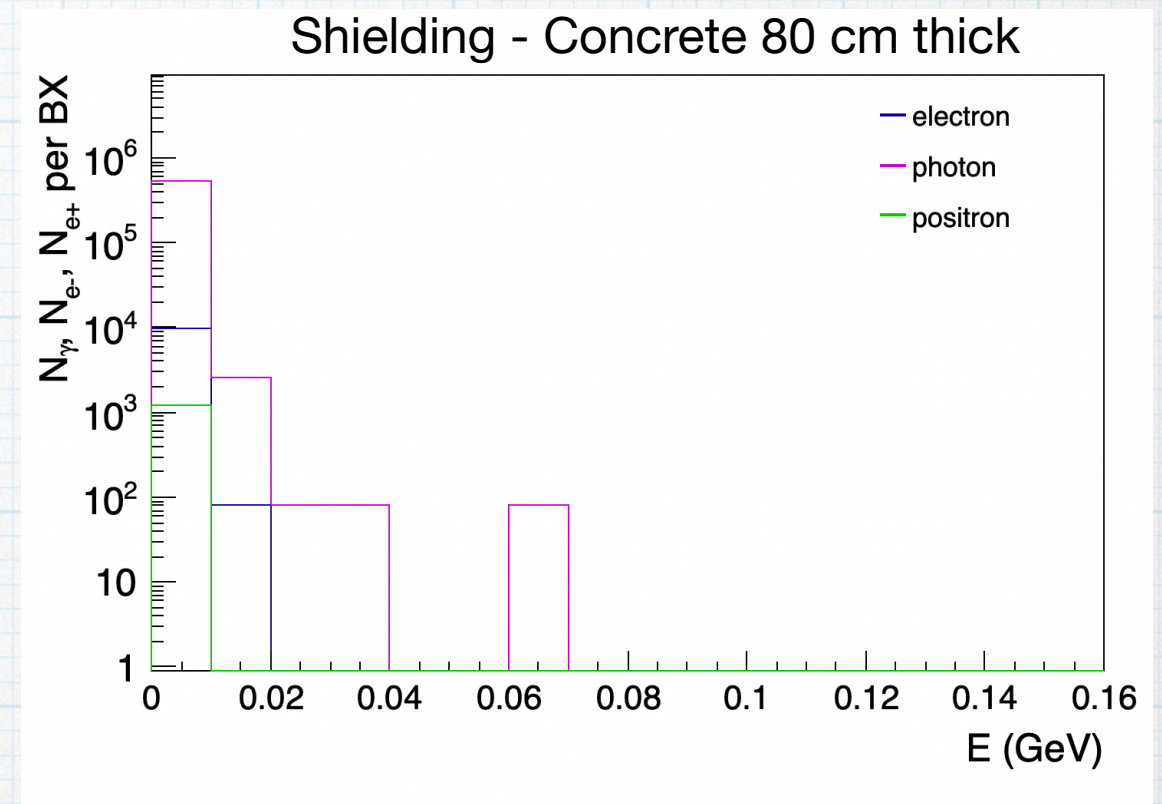# Tracks xy, rear surface

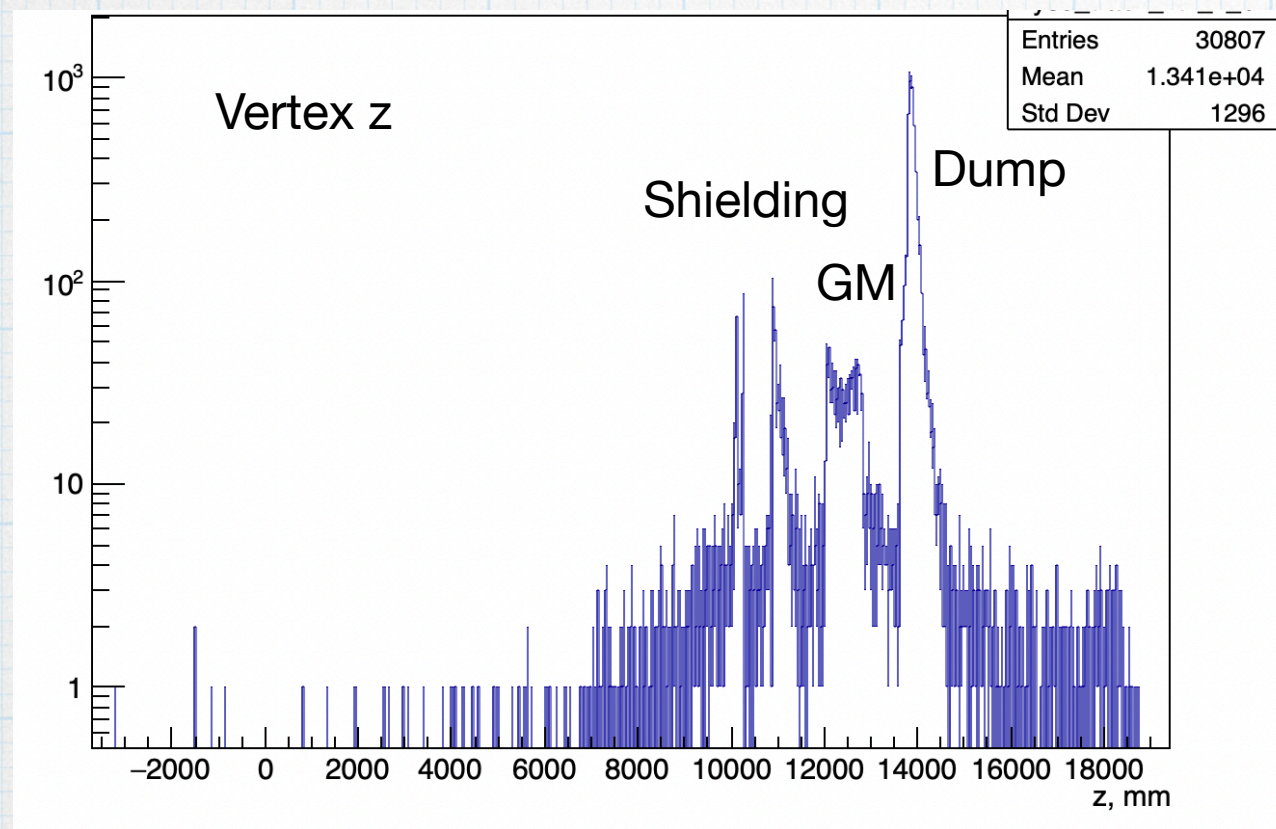Shielding - Concrete 80 cm thick , 8 GeV

Ions & other particles in Shielding

Shielding - Concrete 30 cm thick

Dump induced background in photon spectrometer

Dump induced background in photon spectrometer

y:x {detid==3000 || detid==3001}

hh	
Entries	8330
Mean x	−0.5552
Mean y	−0.4037
Std Dev x	207.3
Std Dev y	13.82

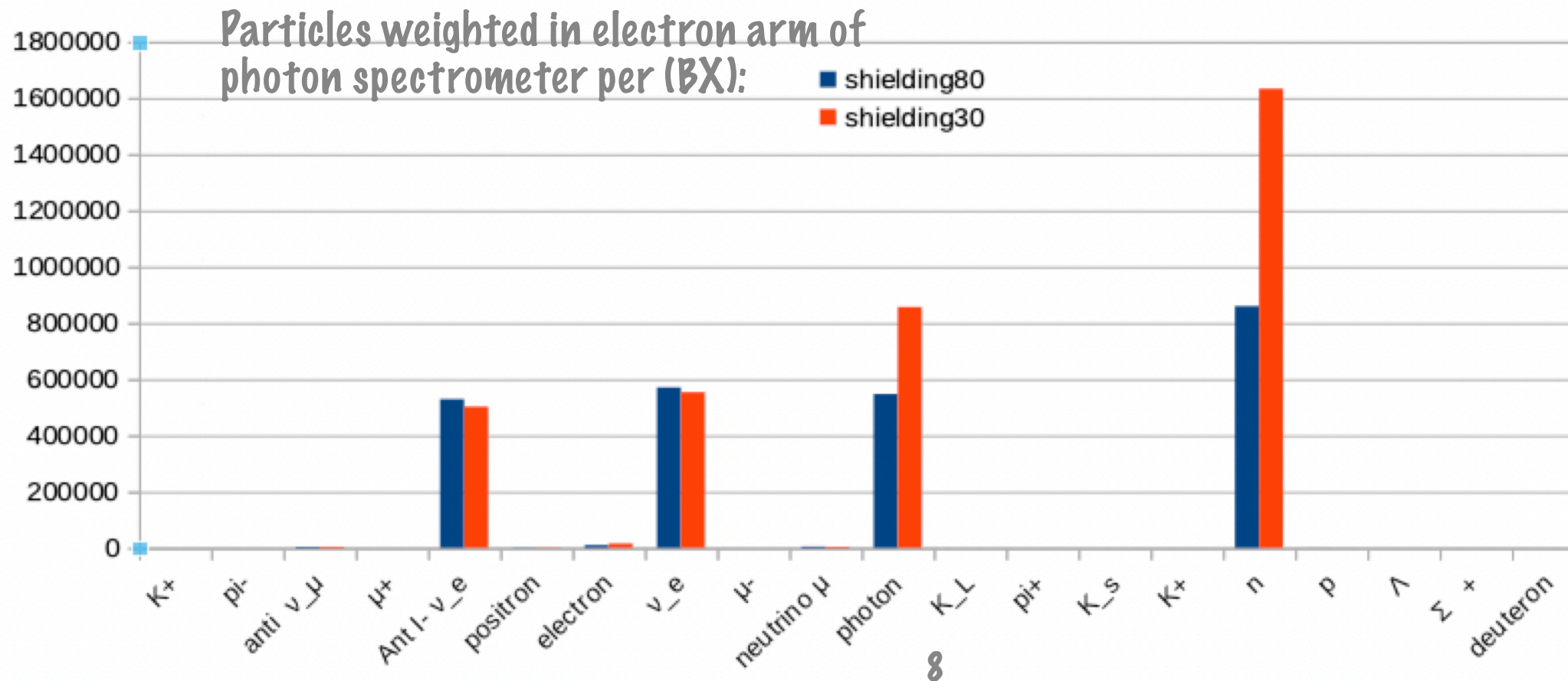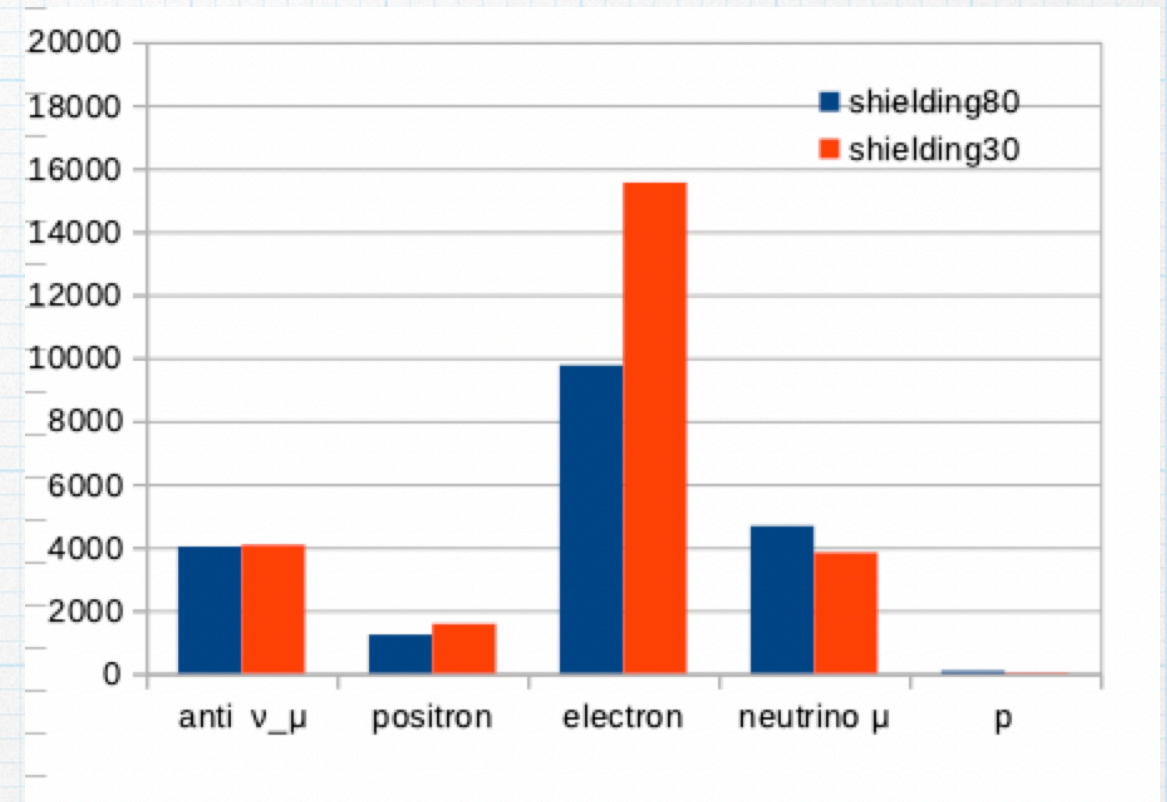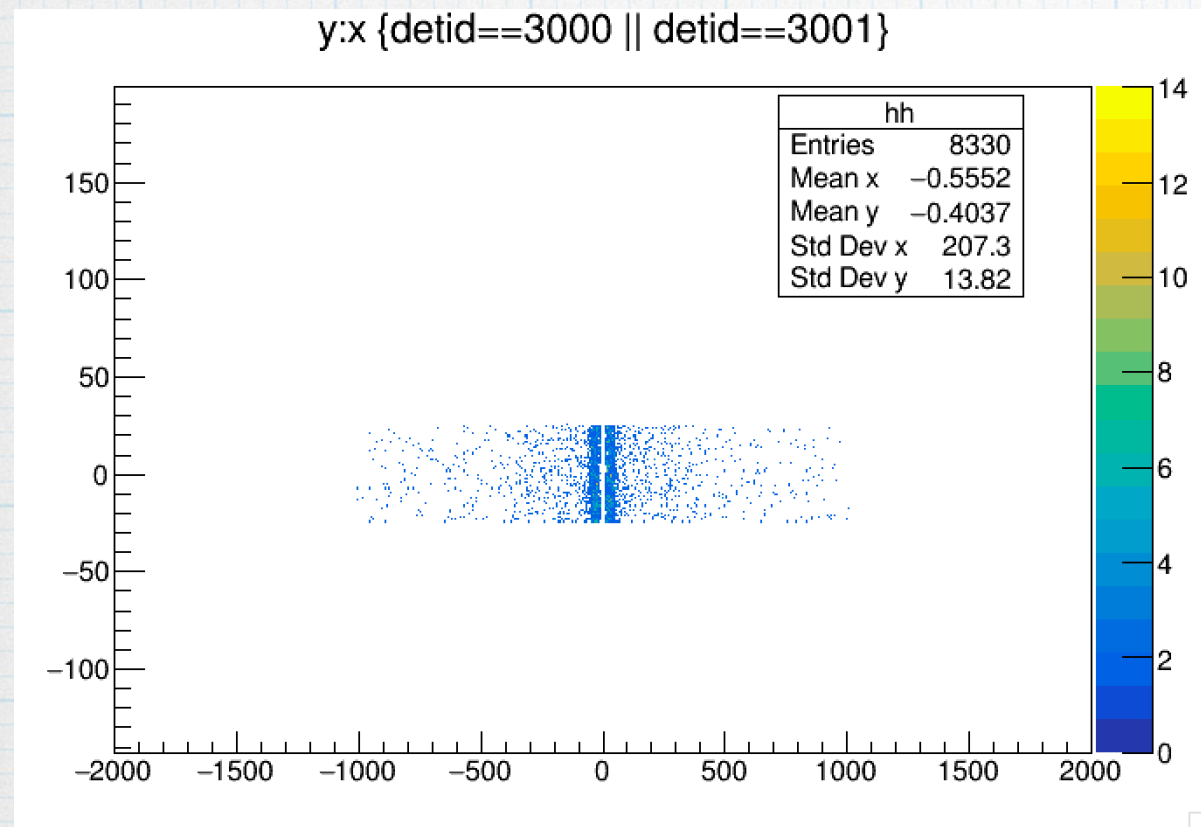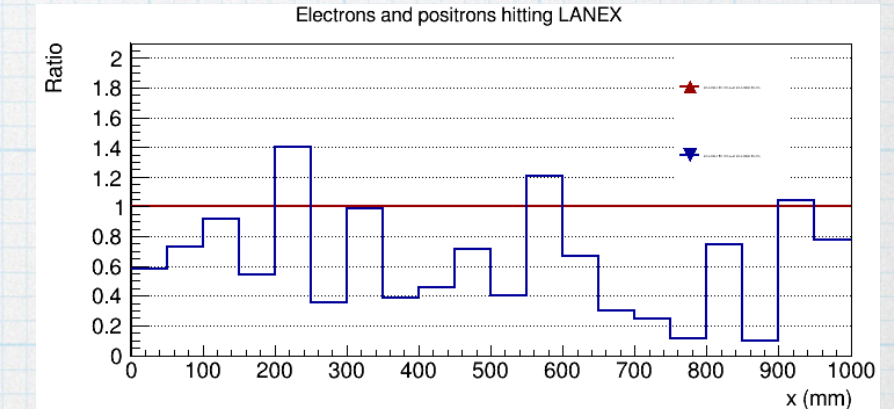Particles weighted in electron arm of photon spectrometer per (BX):

shielding80
shielding30

Dump induced background in photon spectrometer
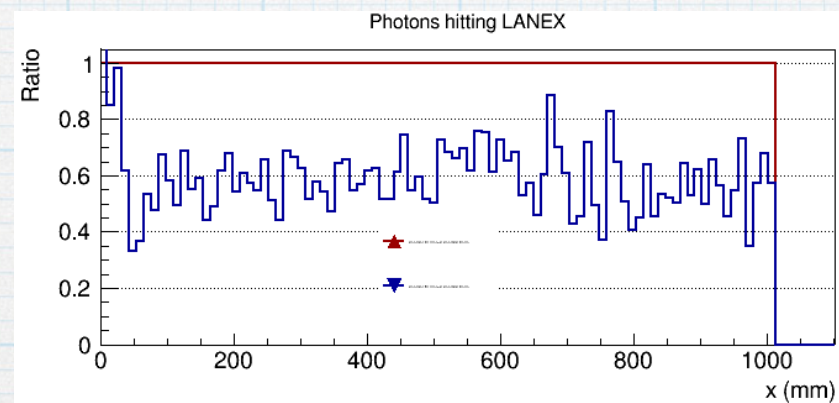
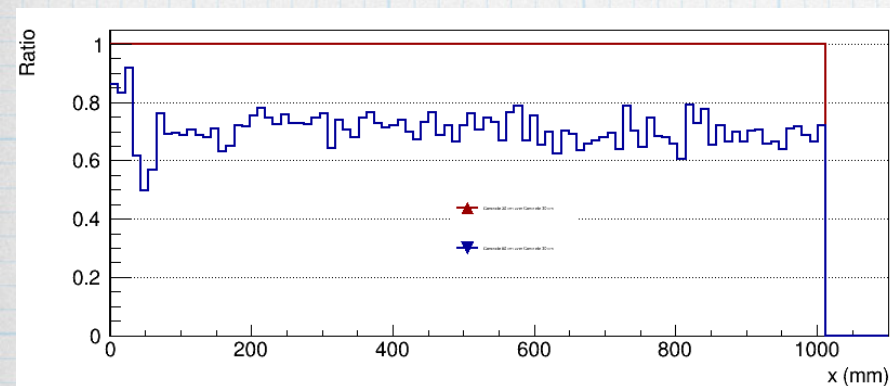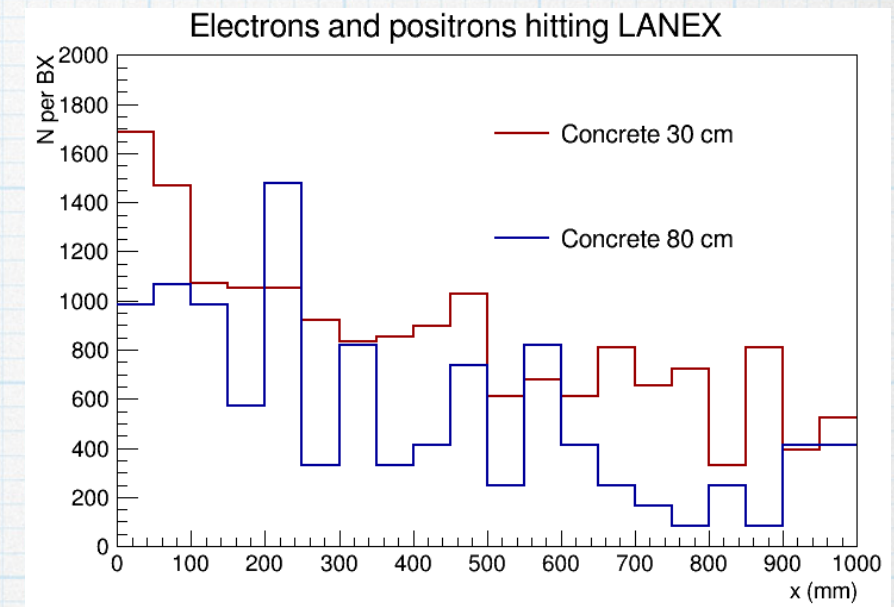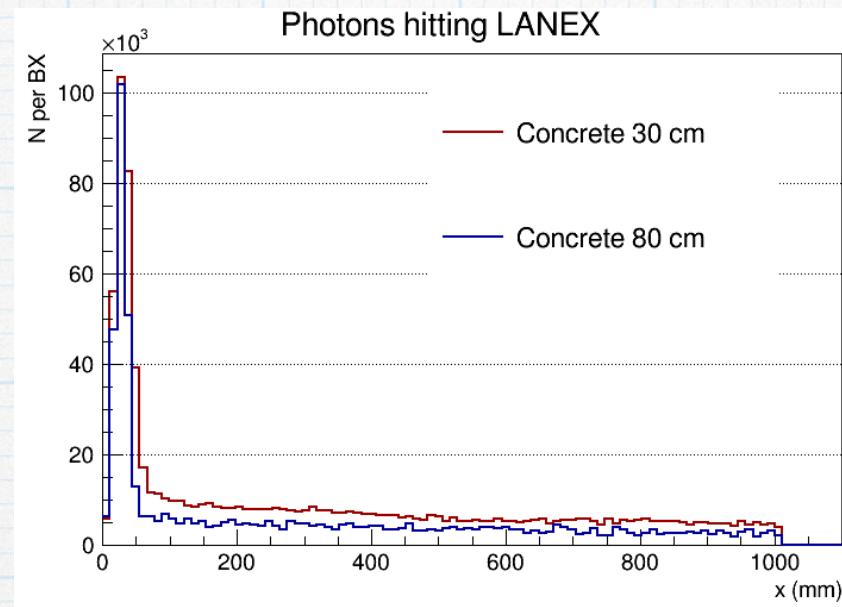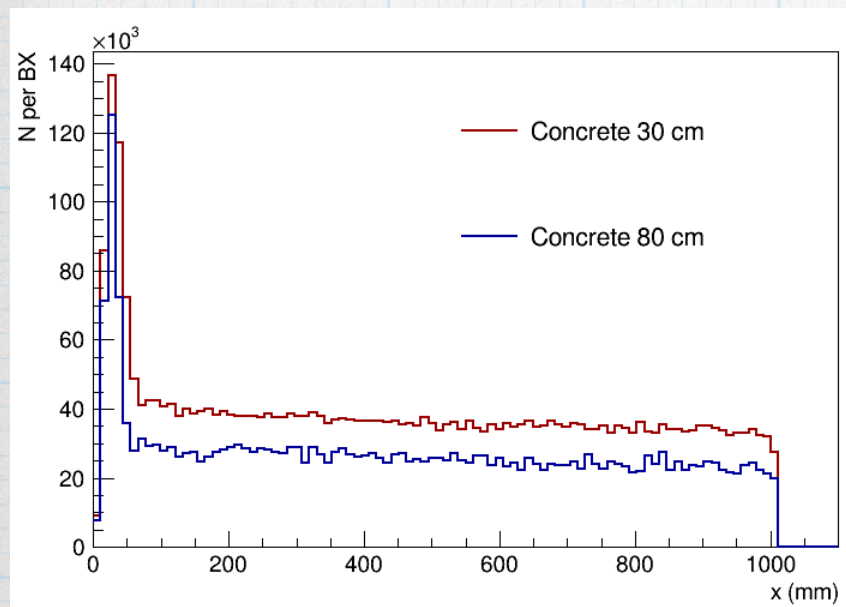| Material	X0, cm	Thickness	d in X0
Concrete	10.7	30	2.80
Concrete	10.7	80	7.48
			7.48/2.80 =2.6

Material	X0, cm	Thickness	d in X0
Al	8.9	60	6.74
Fe	1.76	30	17.05
			17.05+6.74=23.8

Energy dependence

Particles weighted in shielding per (BX):
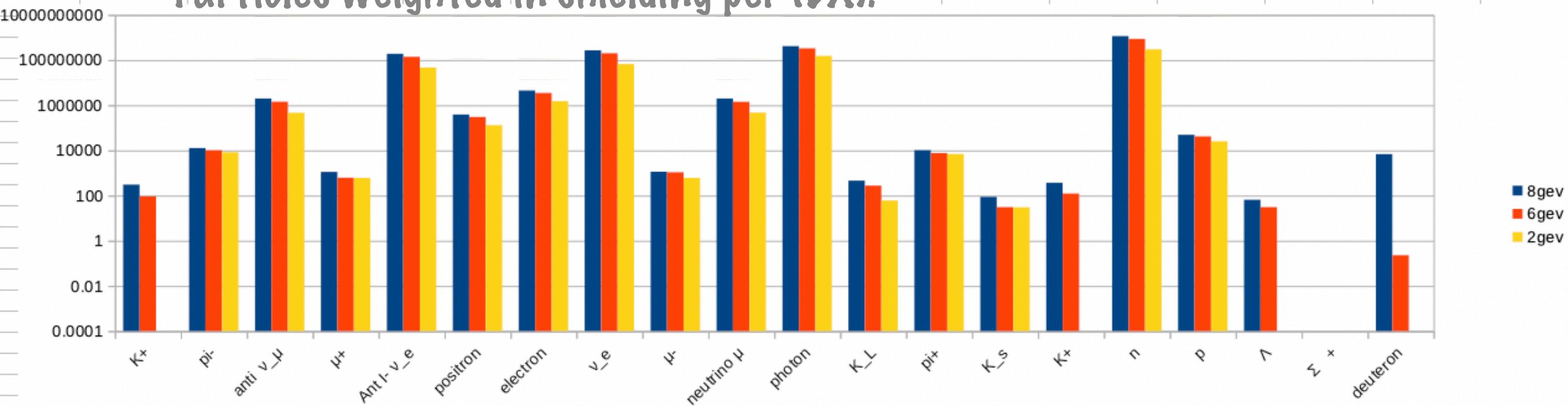
Particles weighted in electron arm of photon spectrometer per (BX):

Outlook

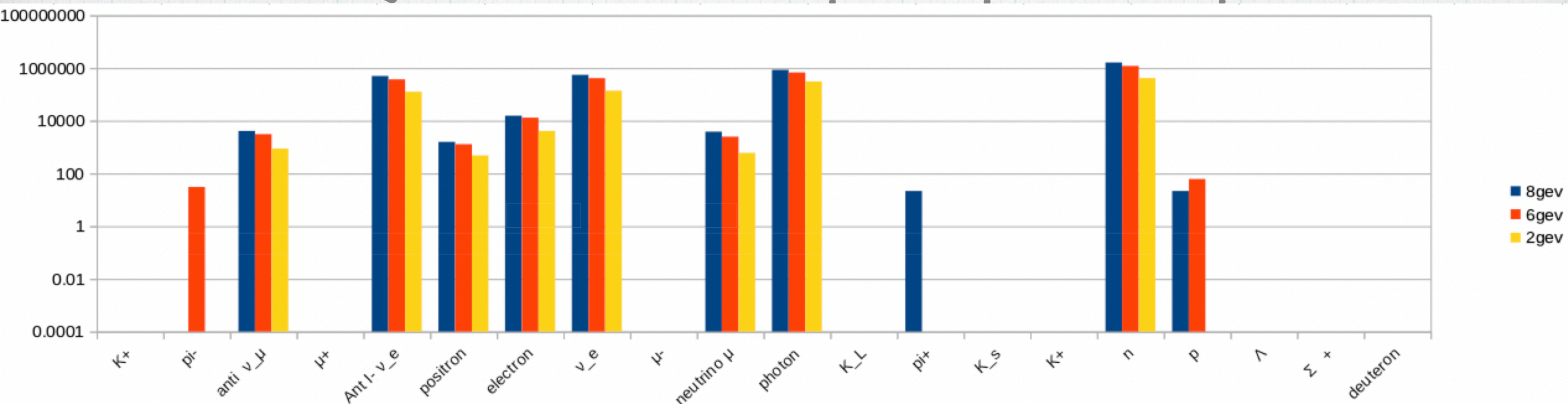* Studied the dump induced background in the shielding and in the forward spectrometer

* Two thicknesses of the shieldingand 3 different mono energies were compared

* To make final conclusions on the shielding we need to run background simulation with the original shielding as the results are not obvious

* To compare Signal and background

Back up