Ecal performance

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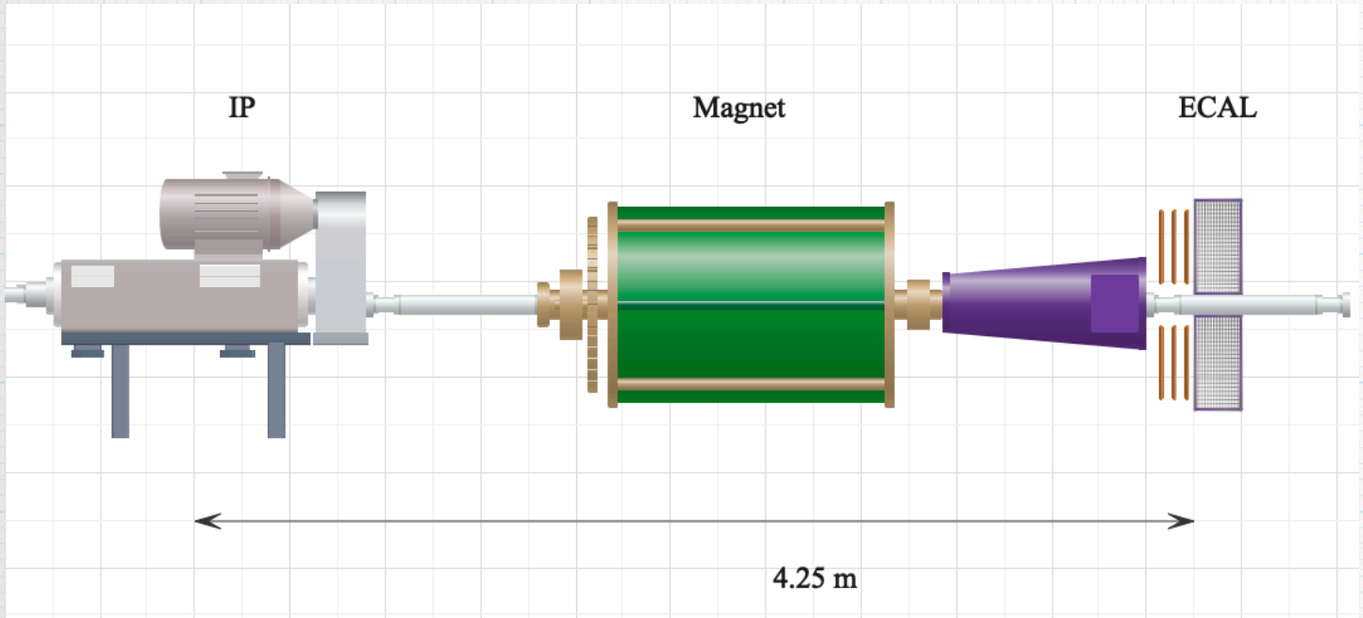
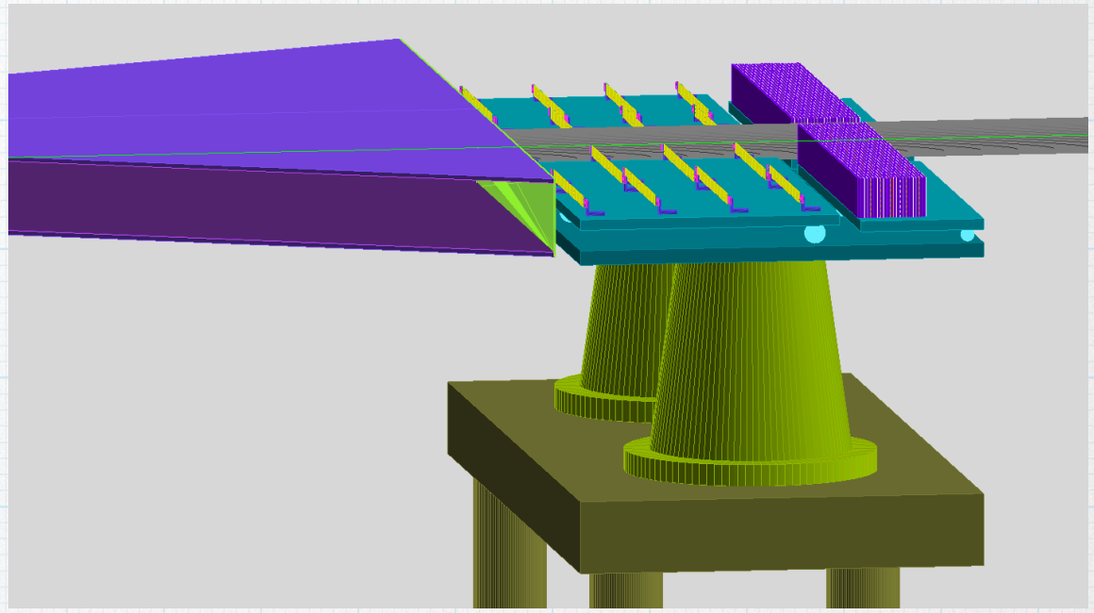
27/08/20
LUXE FCAL meeting

LUXE

Post IP detector setup





SiW ECAL, 550 cm×5.5×9 cm3

Al window, 2mm

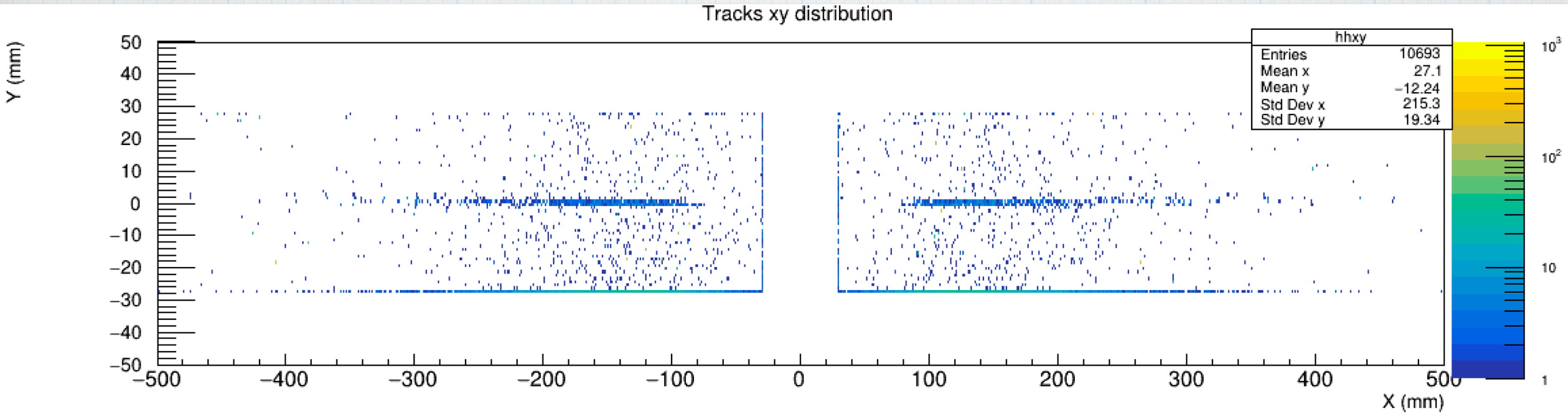
Inputs

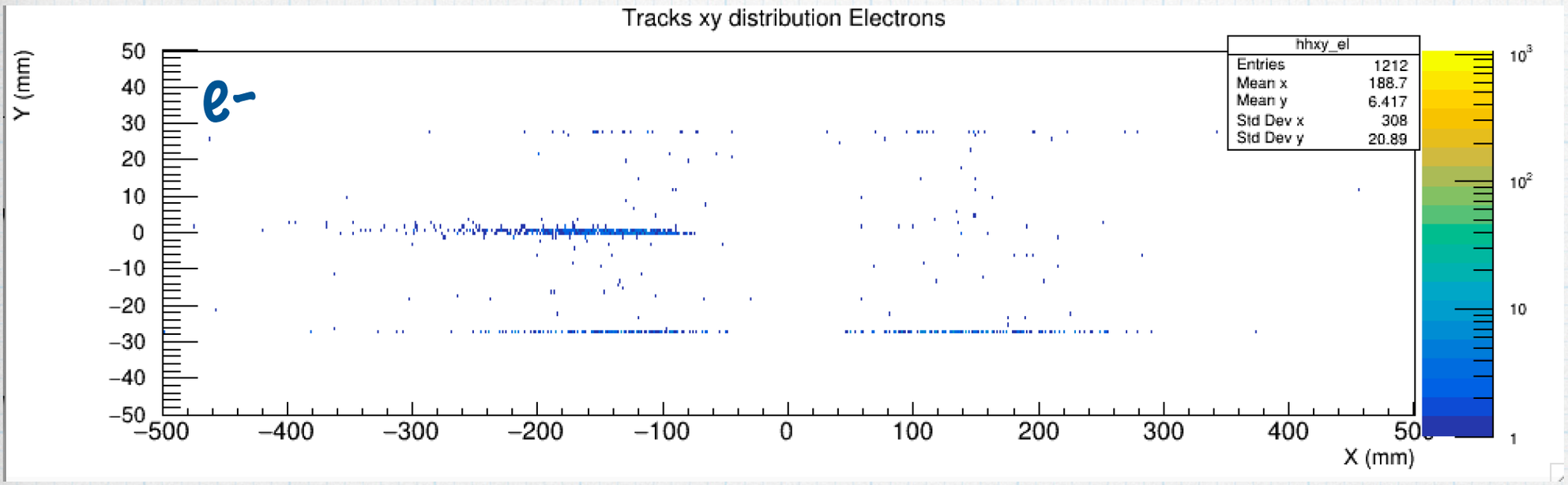
- MC for BPPP to model $\gamma + n\omega$ process (A. Hartin)
- Ee = 17.5 GeV
- laser intensity 0.85 J; ξ ~2.3
- 20 BX, 6×10^{9}electrons/bunch

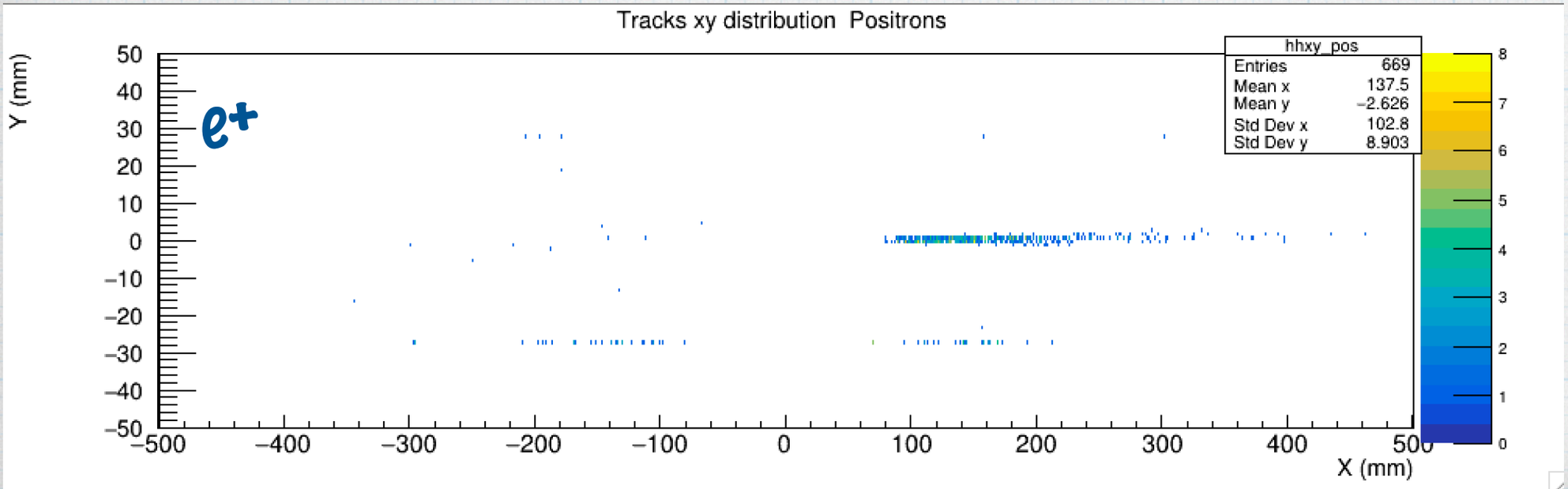
J	ξ
0.01	0.26
0.1	0.82
0.2	1.16
0.35	1.54
0.6	2.02
1.0	2.6

- the estimated rates of electrons, positrons and photons in the various detector regions for γ-laser setup (from LOI) and Ee =17.5 GeV (1.5×10^{9}electrons/bunch)

Location	particle type	rate for $\xi = 6.5$	rate for $\xi = 1.2$
e^- detector behind converter	e^-, $E_e < 13$ GeV	2×10^7	
e^+ detector behind converter	e^+	9×10^4	
photons after converter	γ	1.3×10^8	
$e^\pm$ detector behind IP	e^-/e^+	350	1×10^{-2}
Photon detector	γ	1.3×10^8	
Photon detector	e^+ and e^-	160	

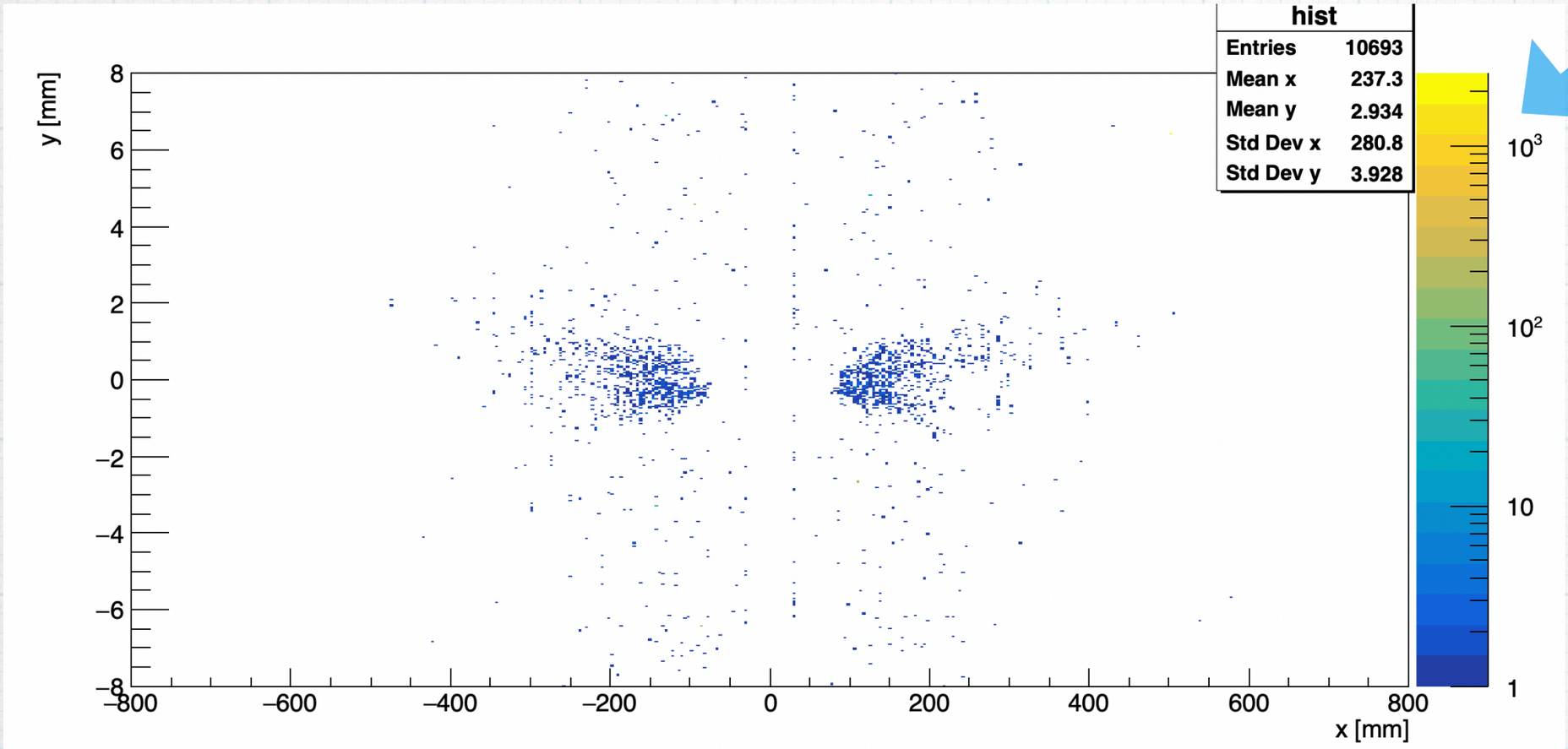




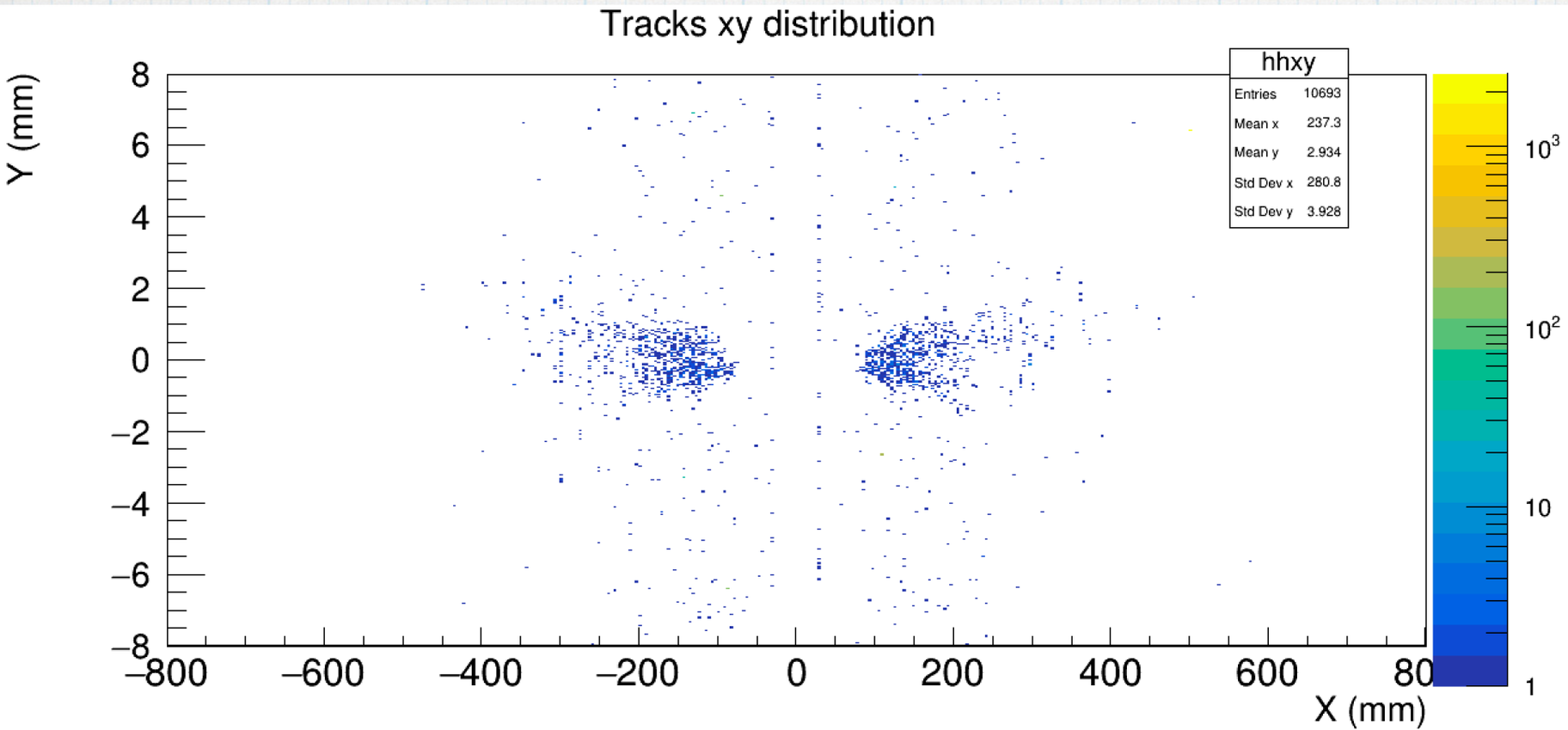


Tracks crossing calorimeters volumes

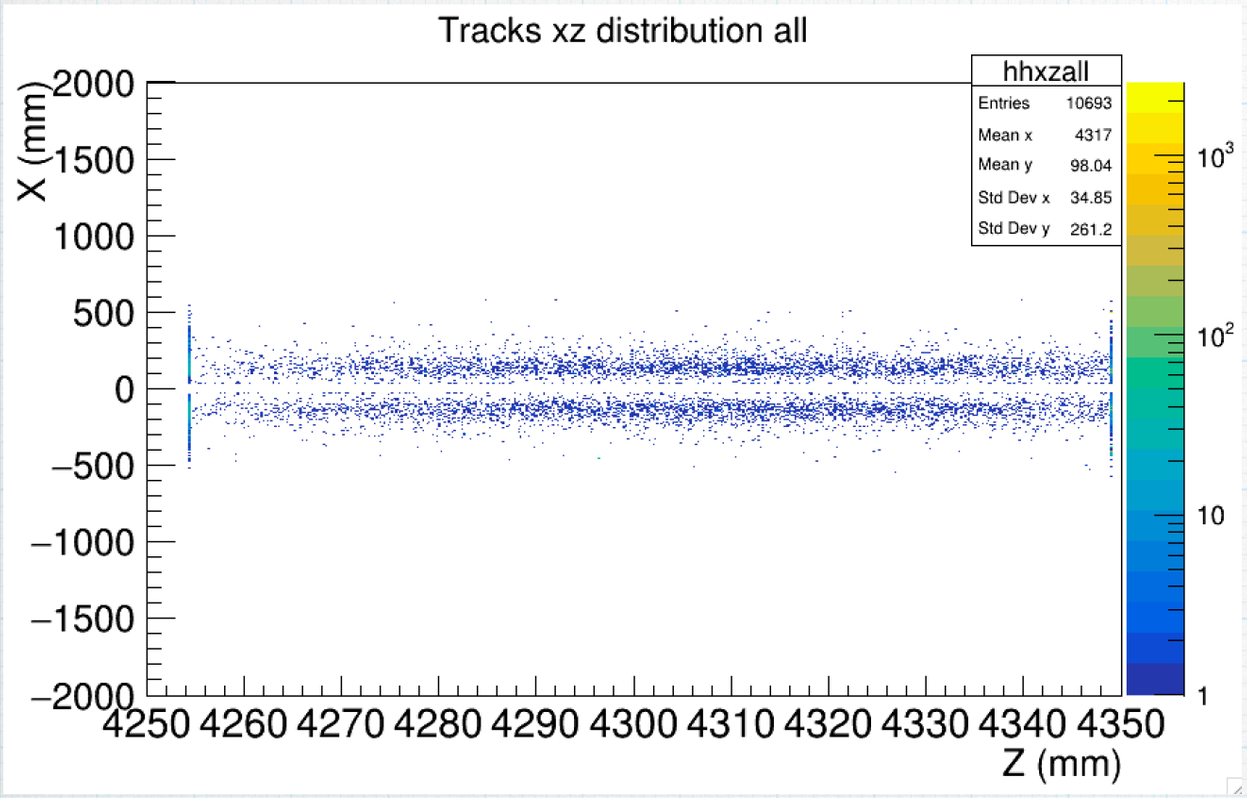
Occupancy plot from Mykyta's script

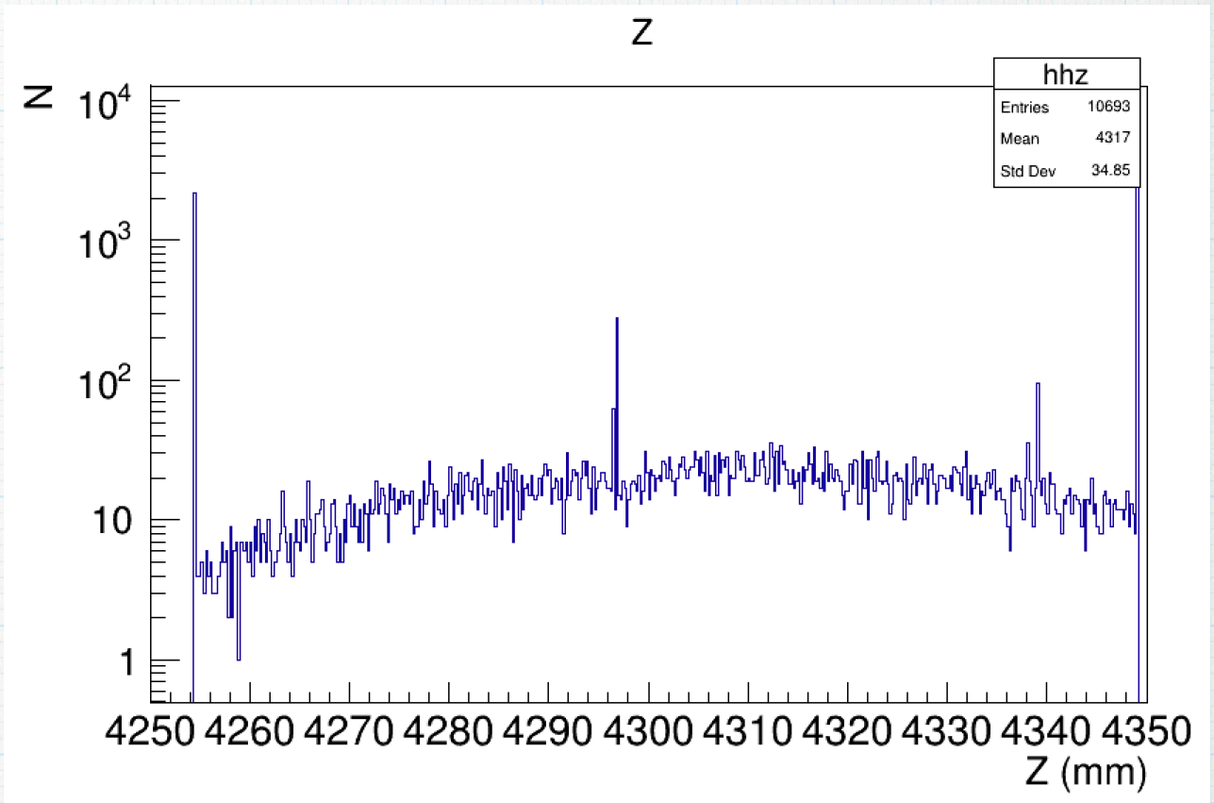


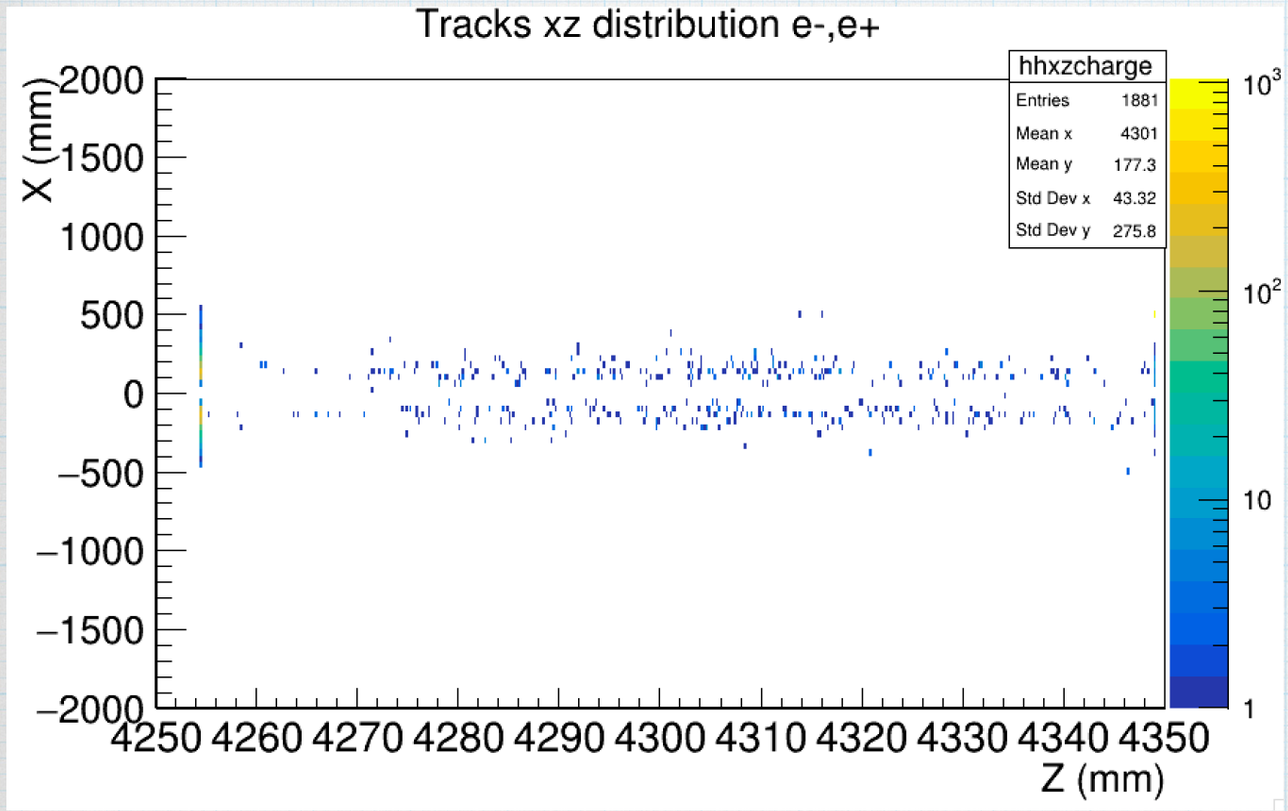
Tracks crossing calorimeters volumes, zoomed

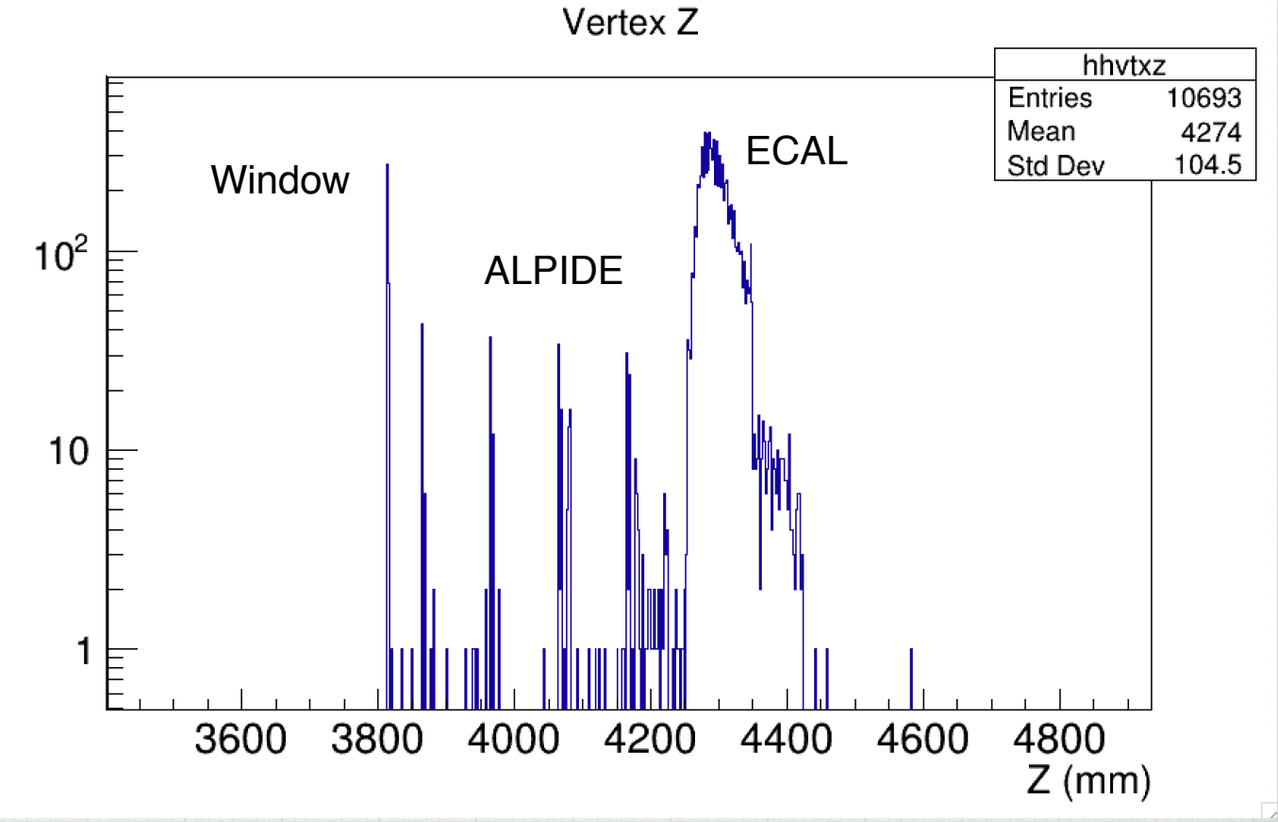


Z distributions

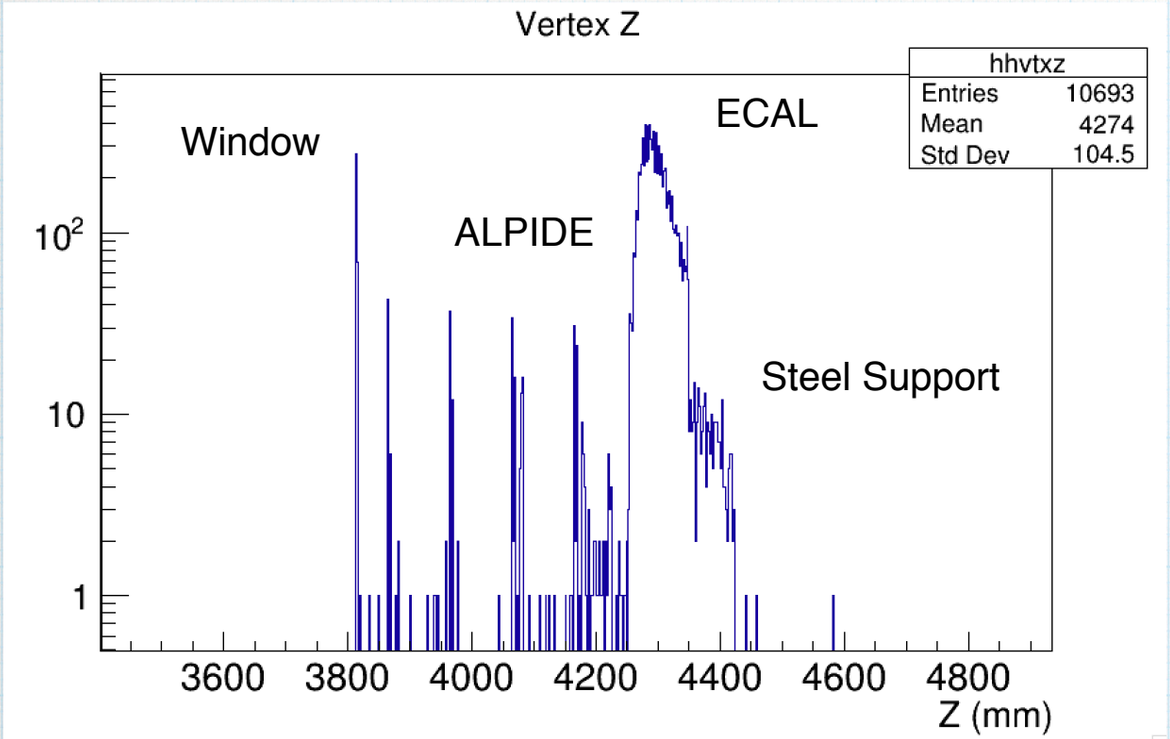


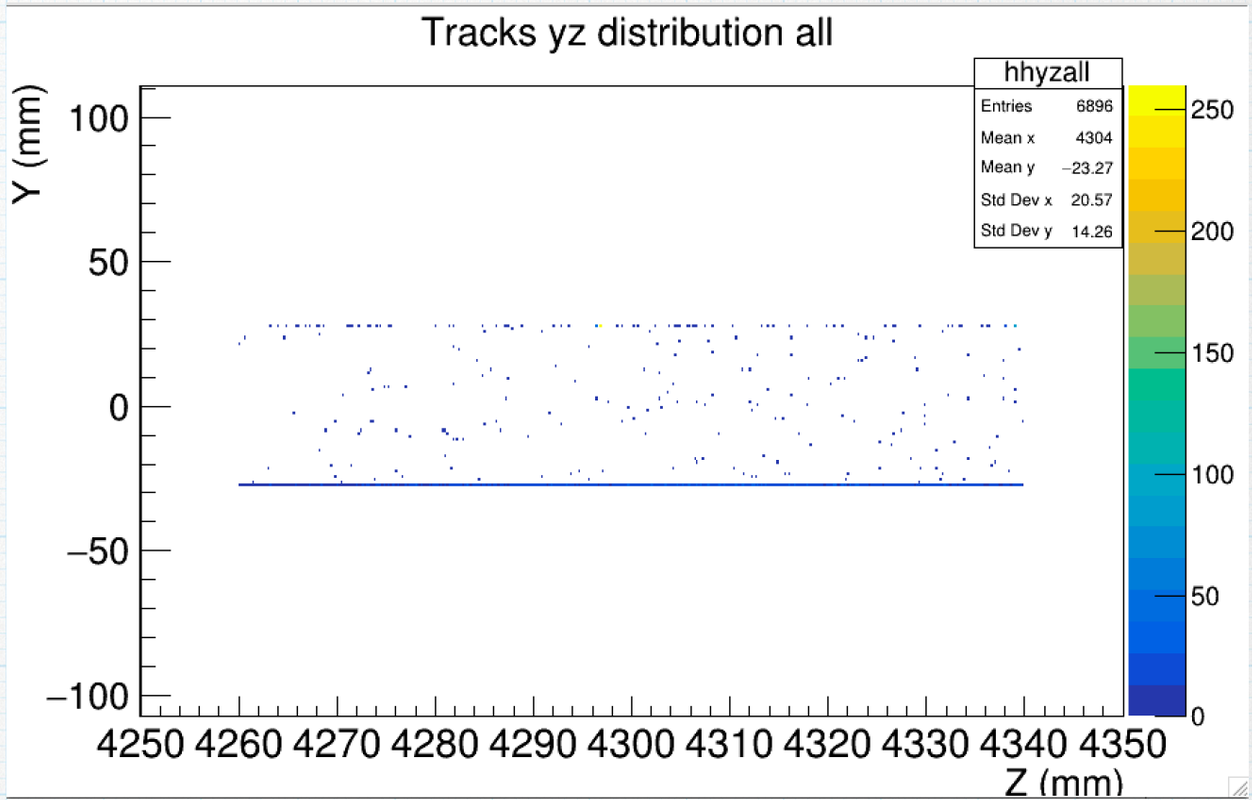




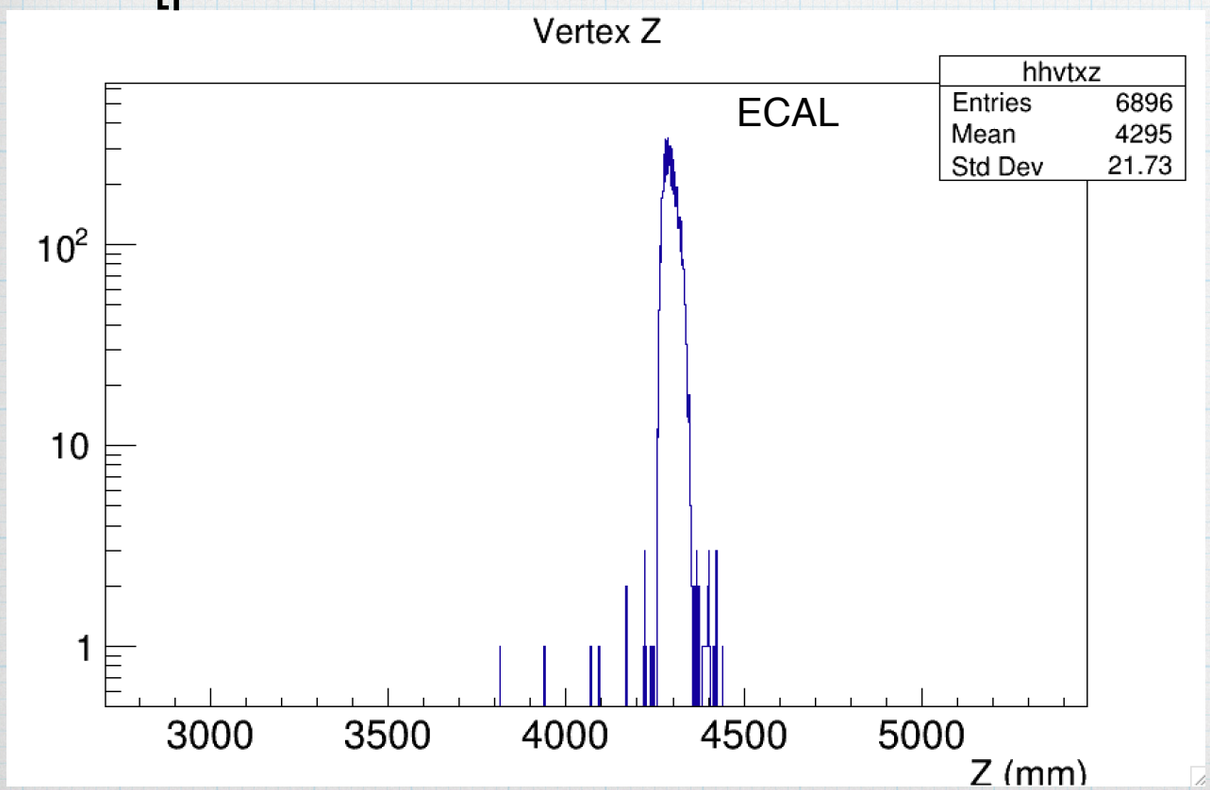


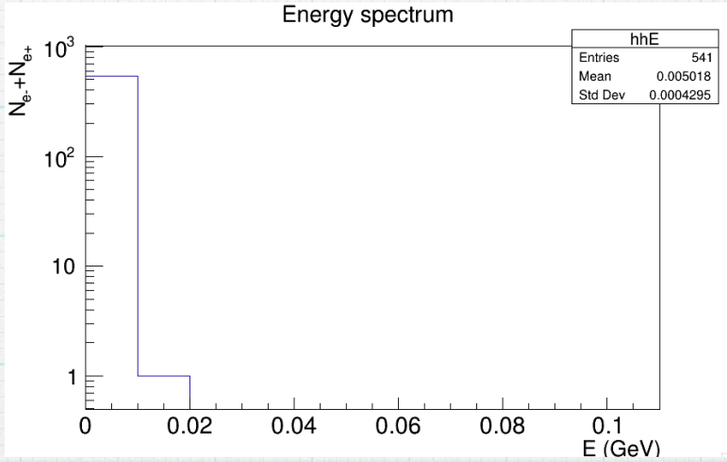
Vertex distribution of particles hitting calorimeter:

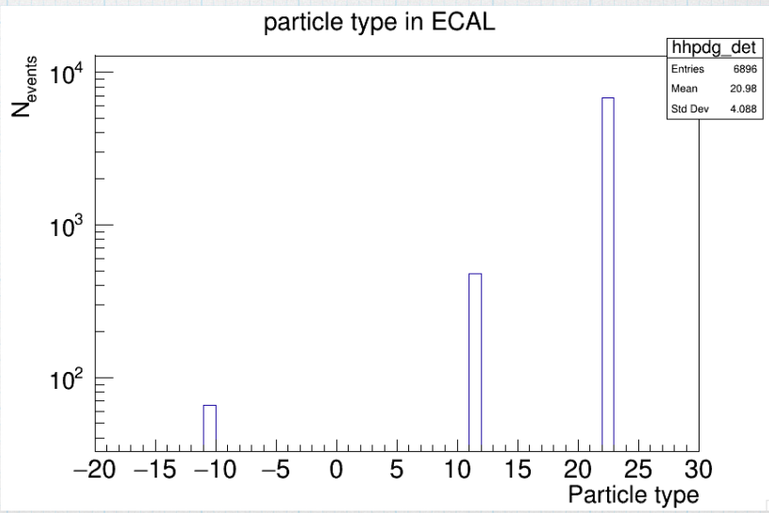




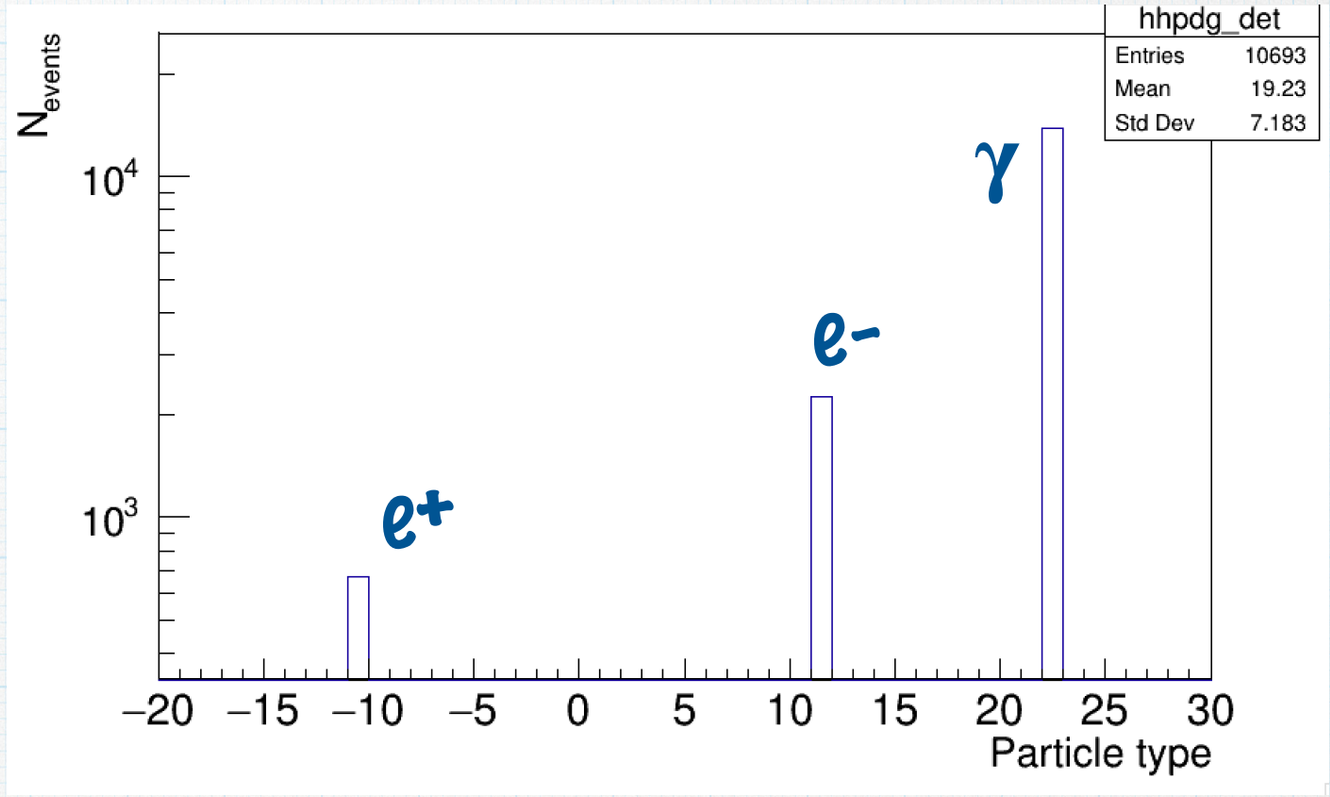
Excluding particles coming from the front and back [planes of the calorimeter :



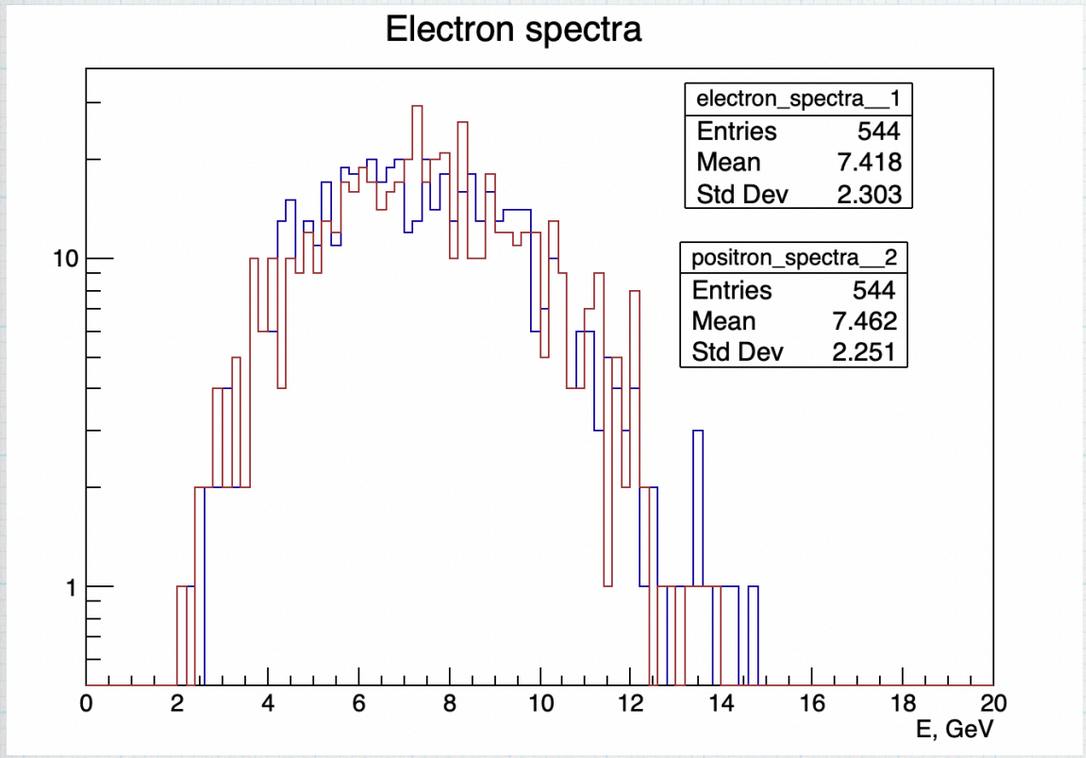




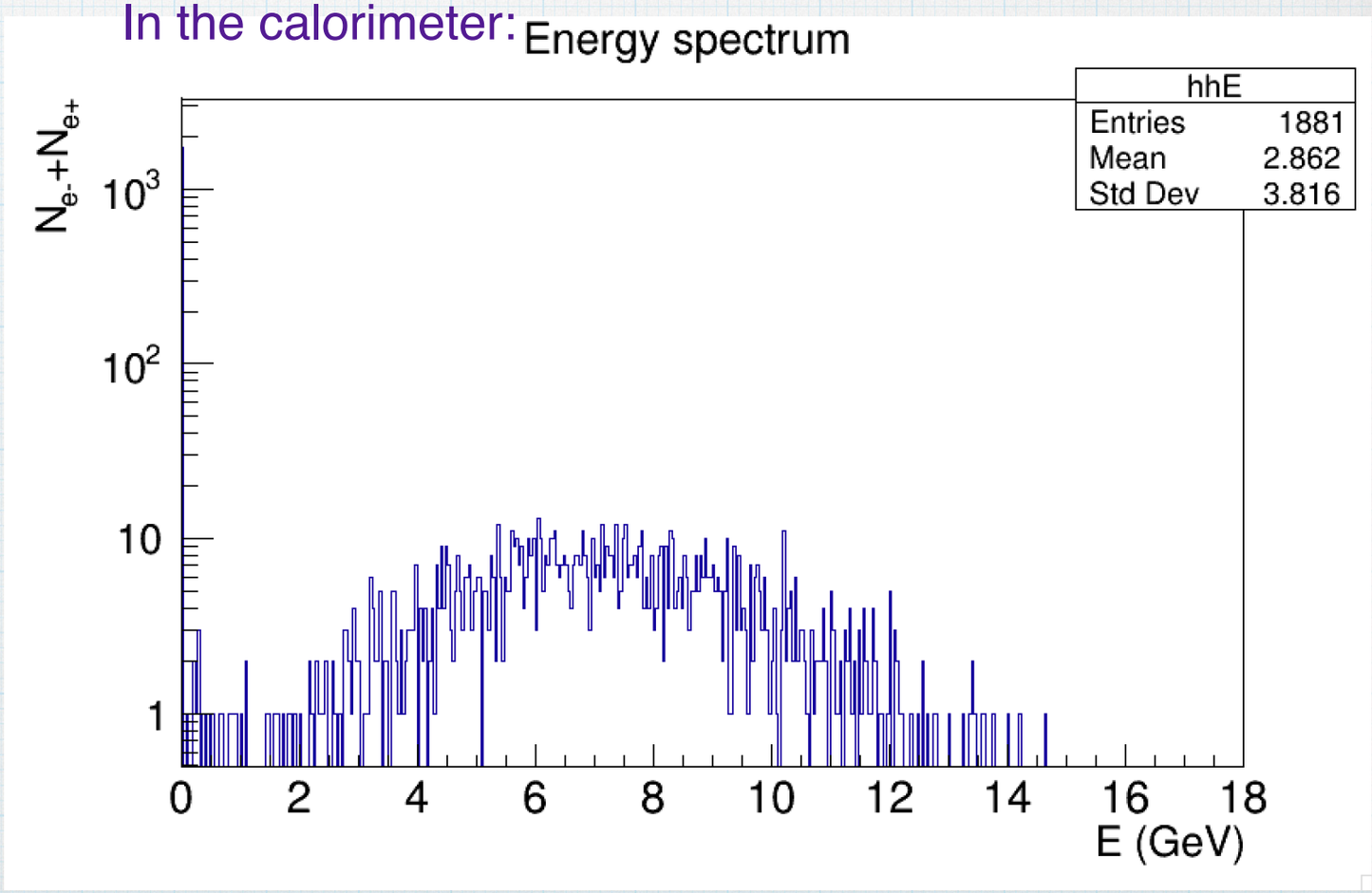
Energy spectra



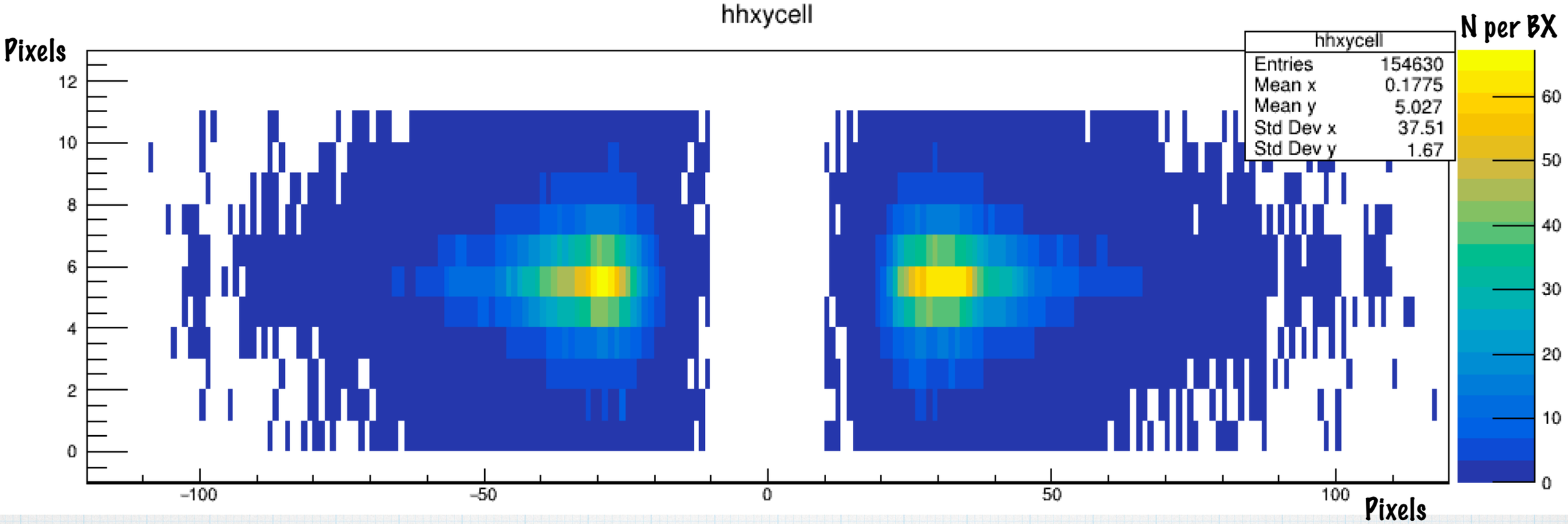
Initial spectra:

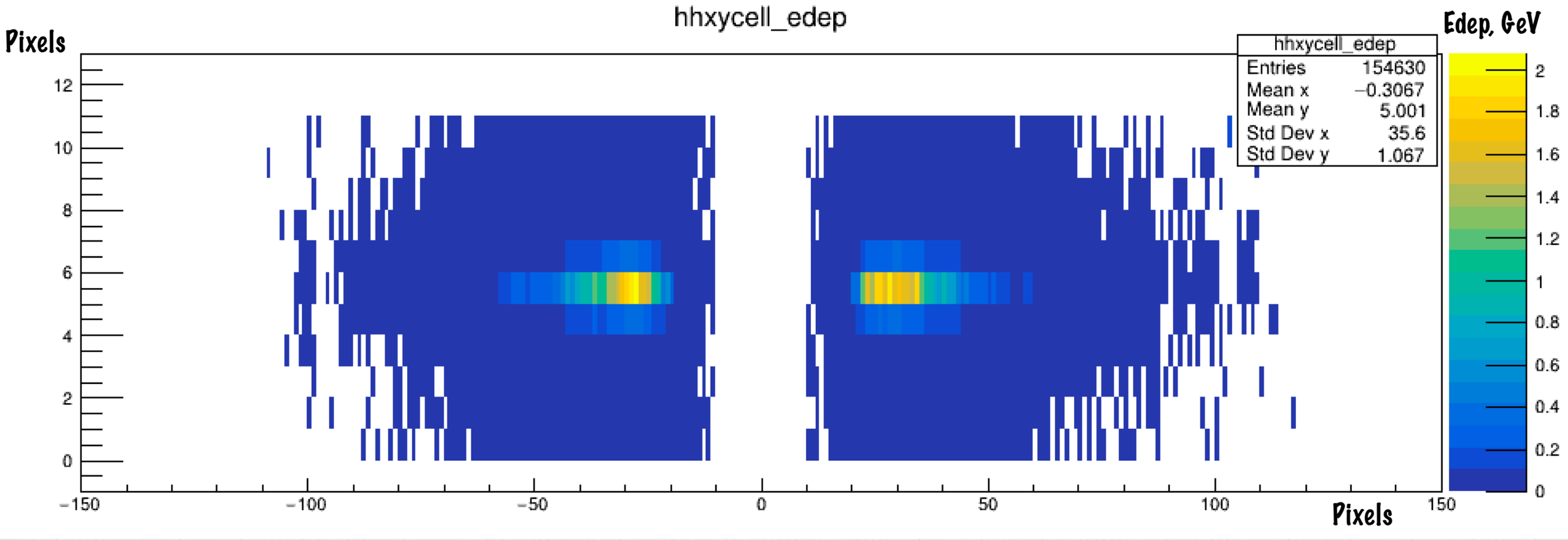


In the calorimeter:



Hits: deposition in towers





The pad size (pixel) on the silicon sensors is 5x5 mm^2

Summary

- First glimpse at the signal data in ECAL
- Track distributions are consistent with Mykyta's results
- XZ distributions show a lot of particles crossing the volume of calorimeter, the origin of some of them is the steel support under the ECAL, should be checked
- The energy deposition per tower is around 2 GeV