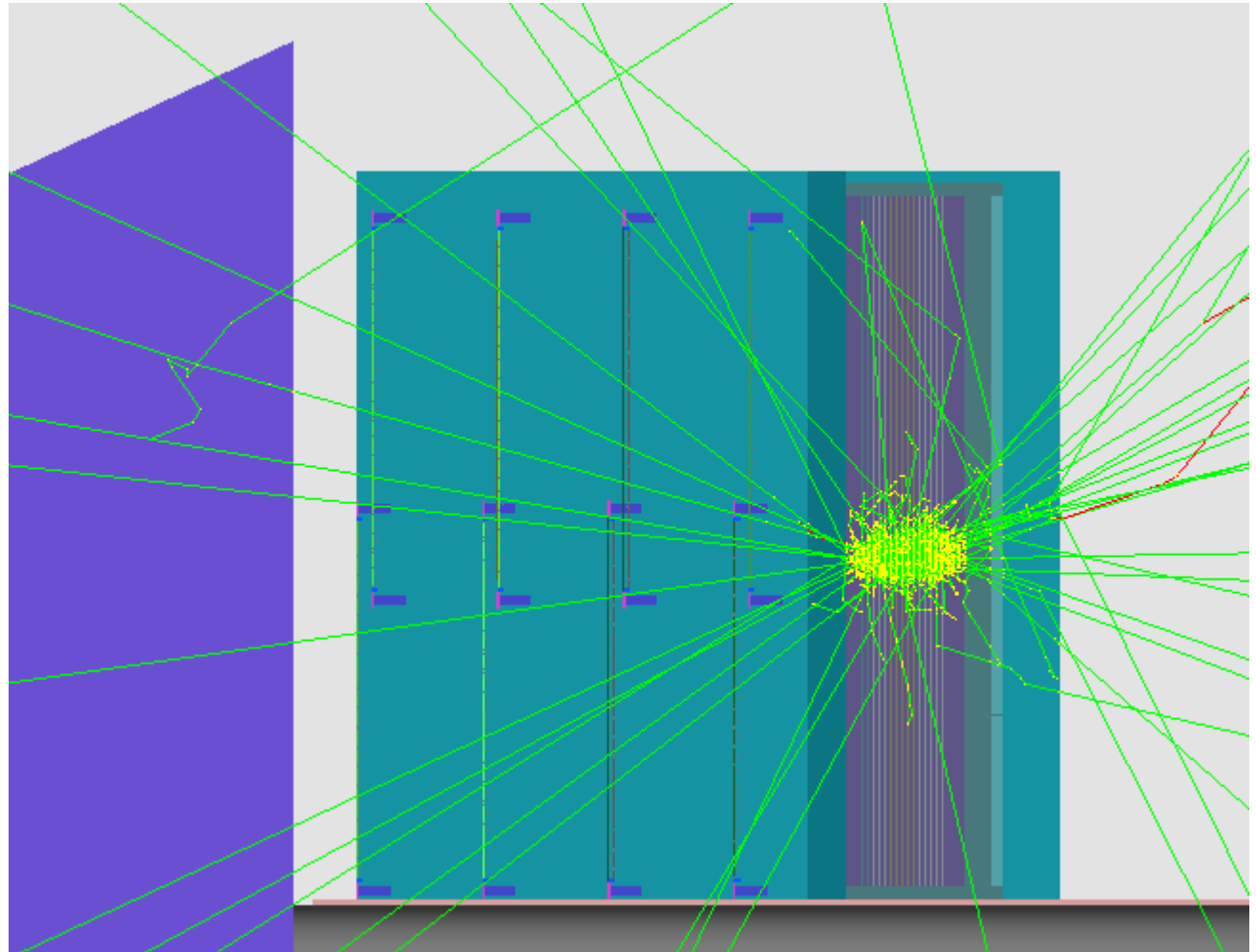


GEANT4 Simulation of Neutrons in LUXE ECal

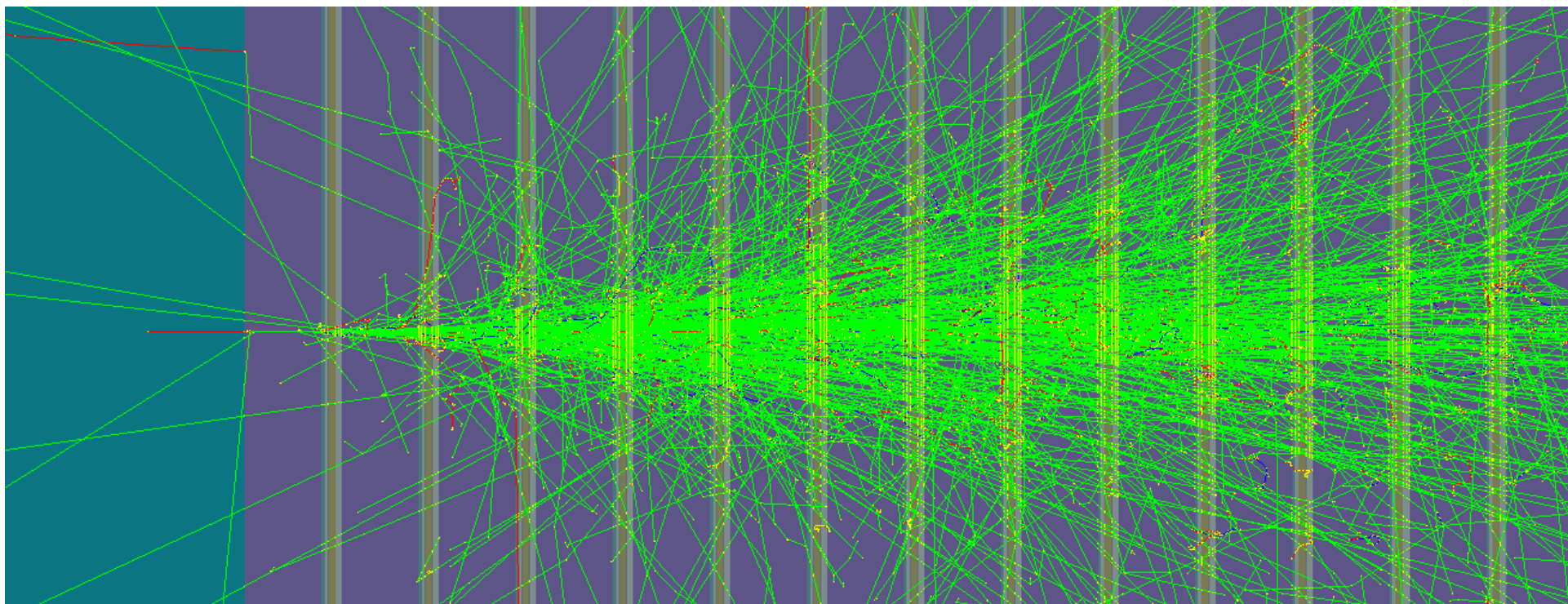
Oleksandr Borysov

LUXE Technical Meeting
February 24, 2021

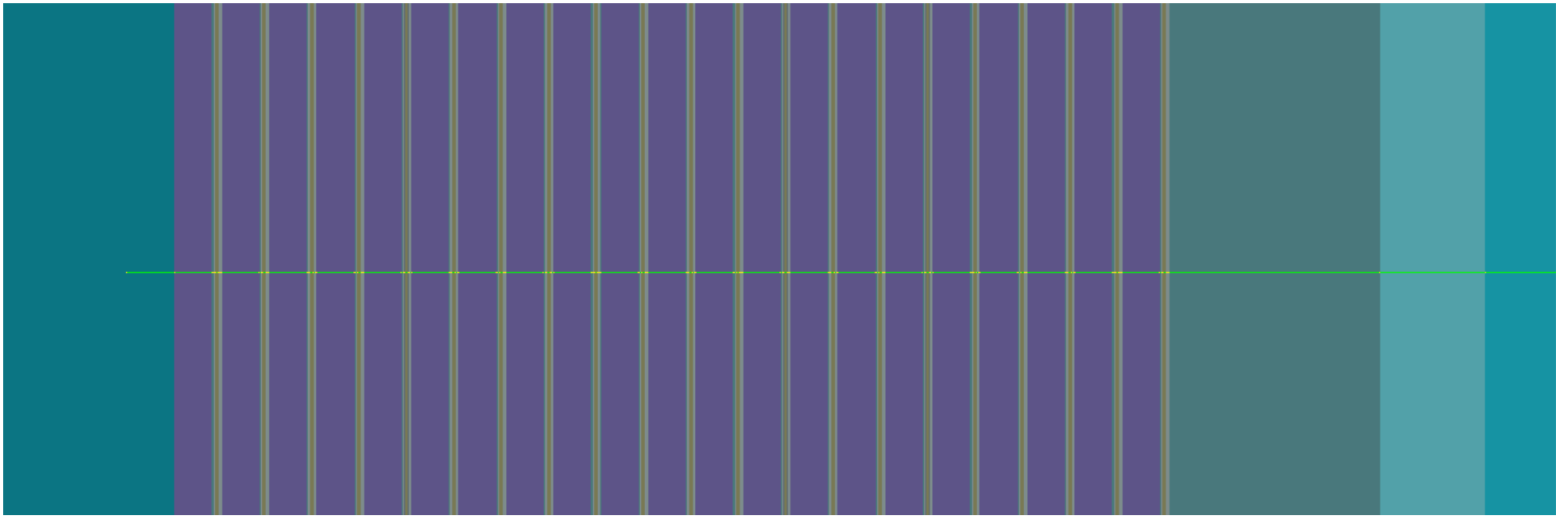
Single electron in ECal



Single electron in ECal

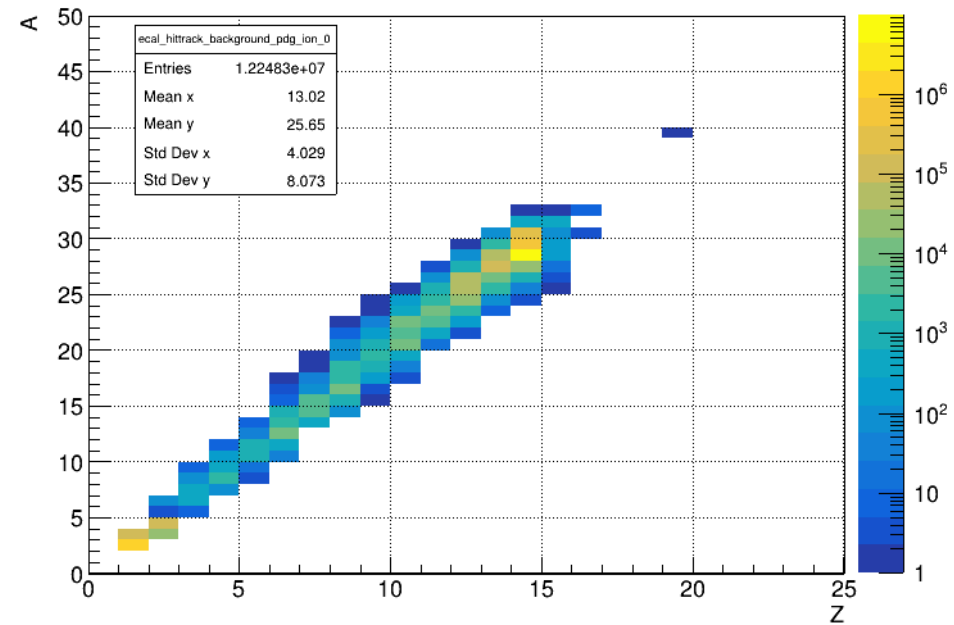


Single neutron in ECal

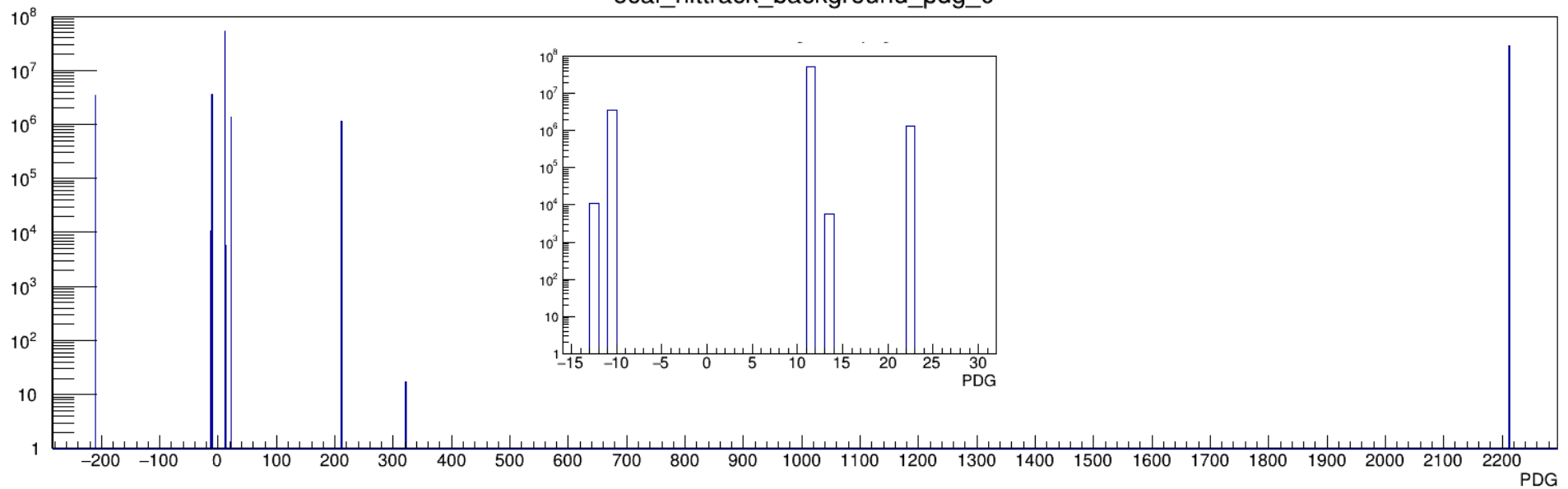


Particles contributed in energy deposition in ECal silicon sensors

9.95e7 neutrons of 1 GeV



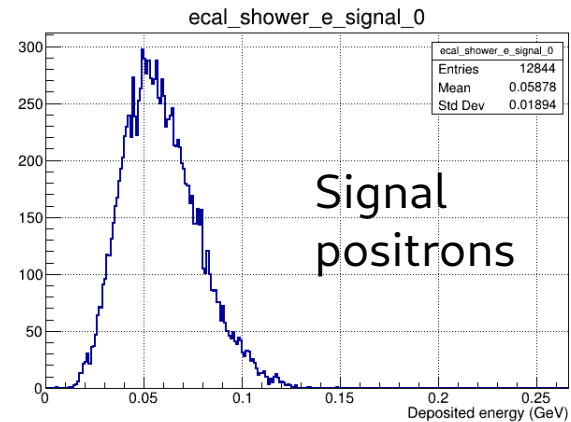
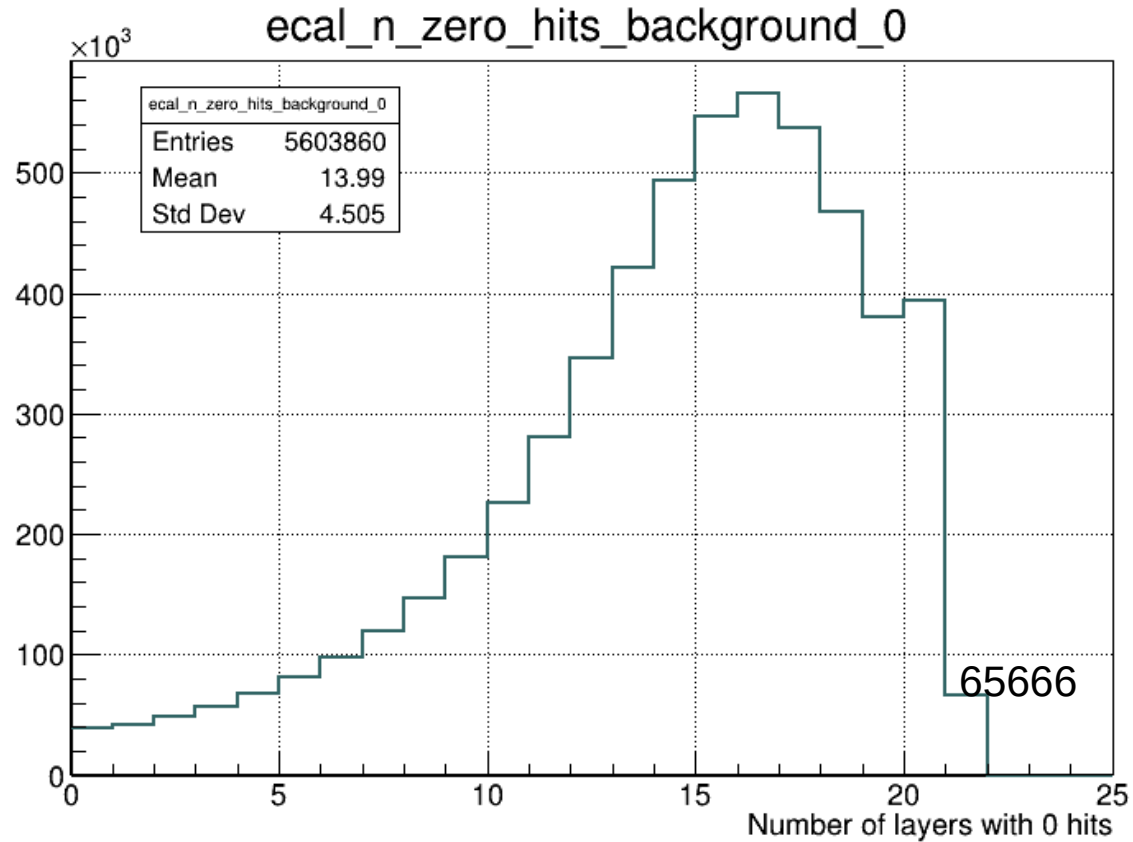
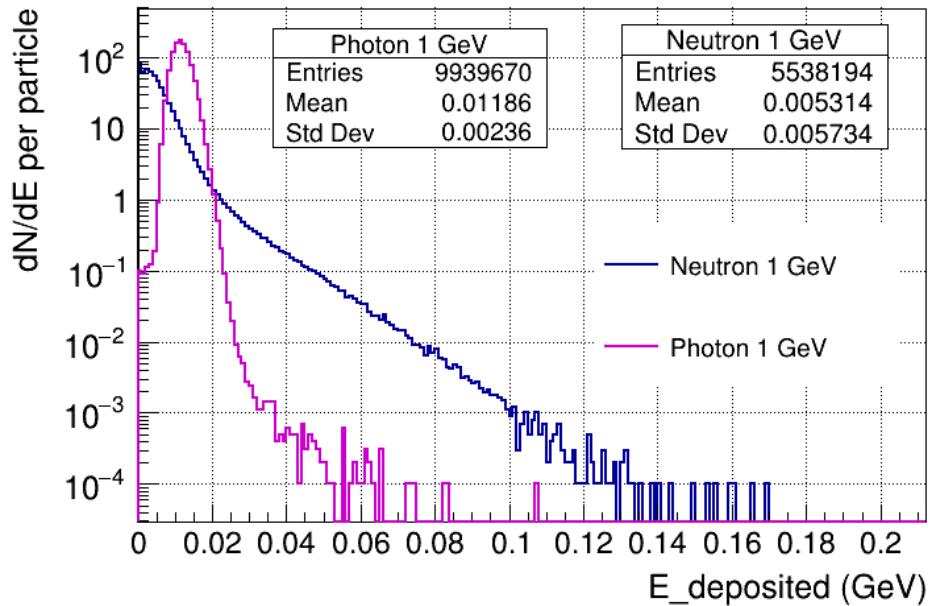
ecal_hittrack_background_pdg_0



Energy deposition

Fraction of neutrons producing hits
in ECal

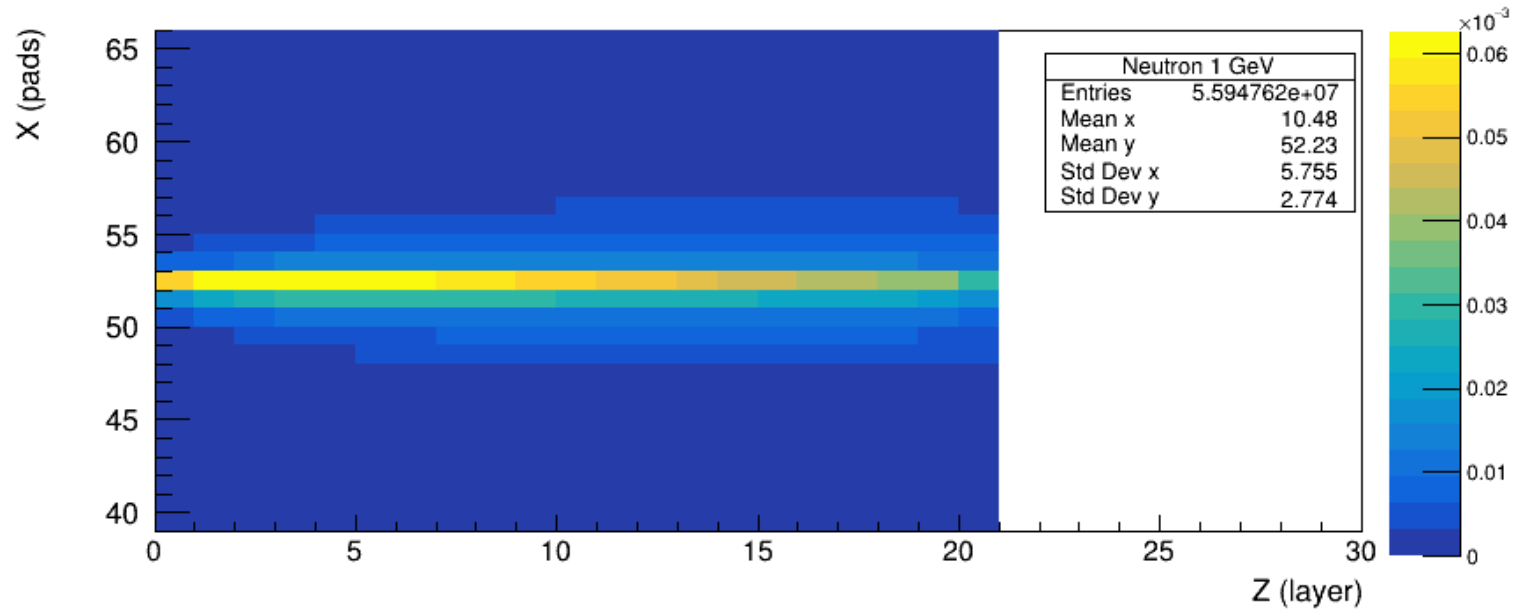
$$(5603860 - 65666) / 9.95e6 = 0.5566$$



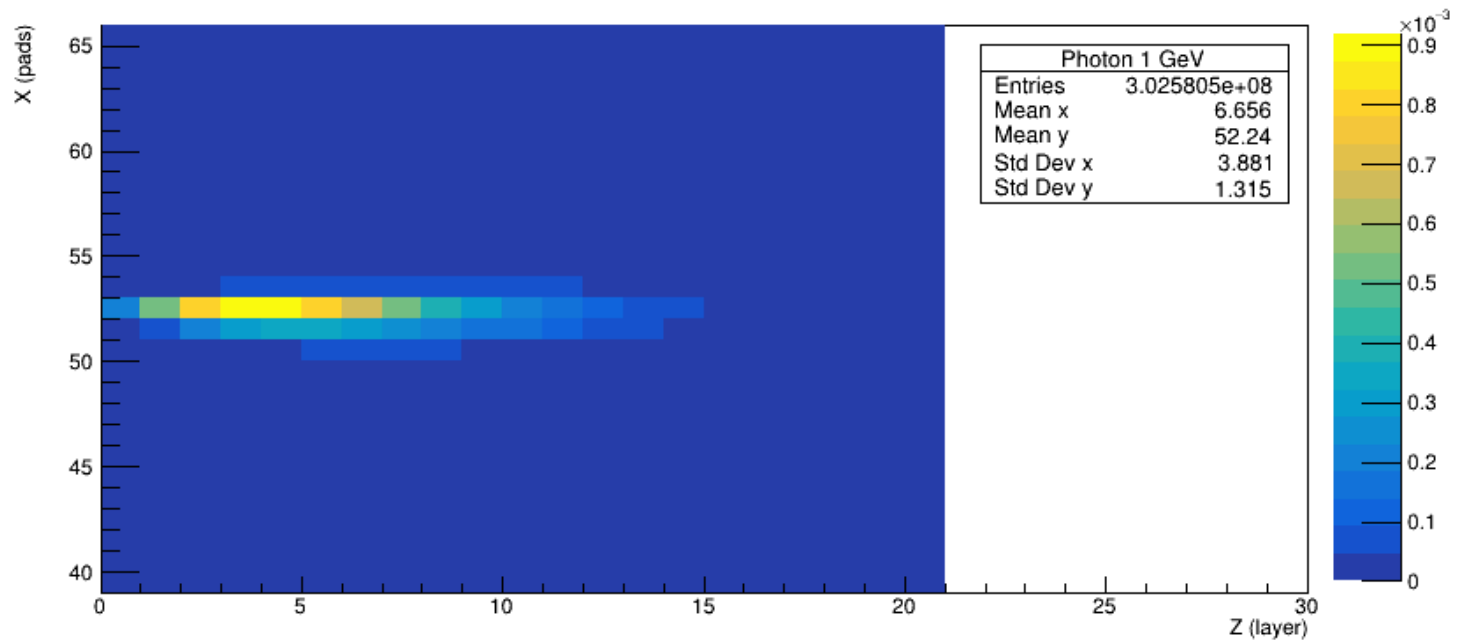
Neutron and photon shower in ECal

Average deposited energy per incident particle

n 1 GeV;



γ 1 GeV;

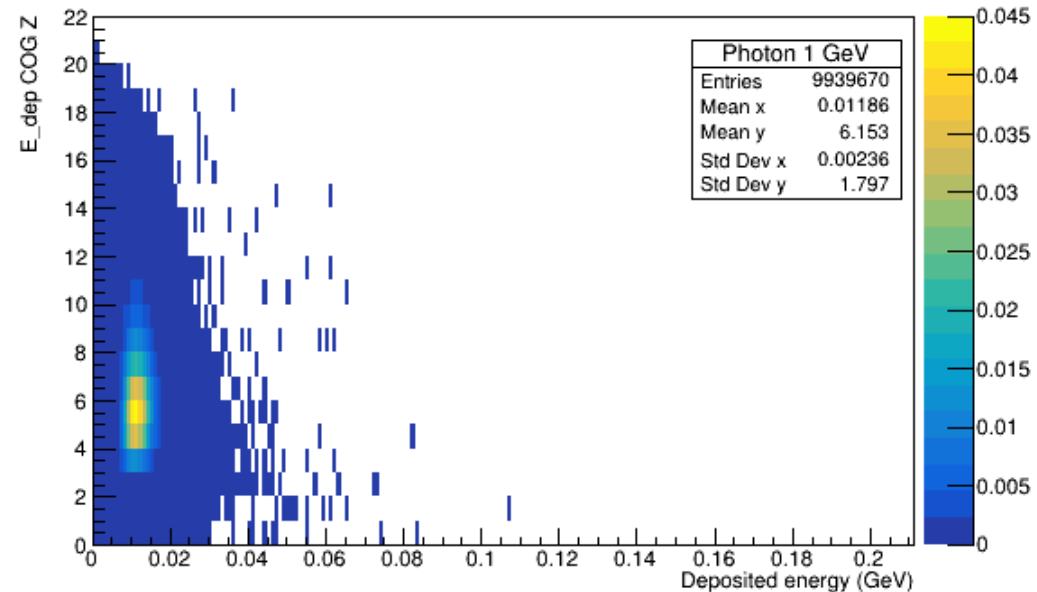
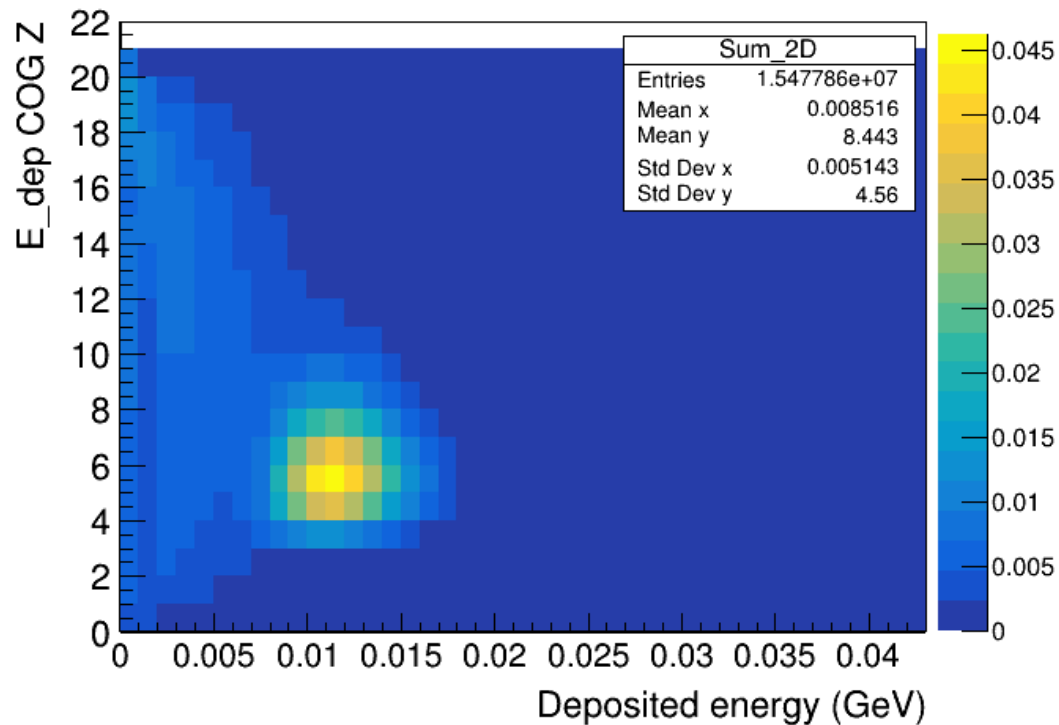
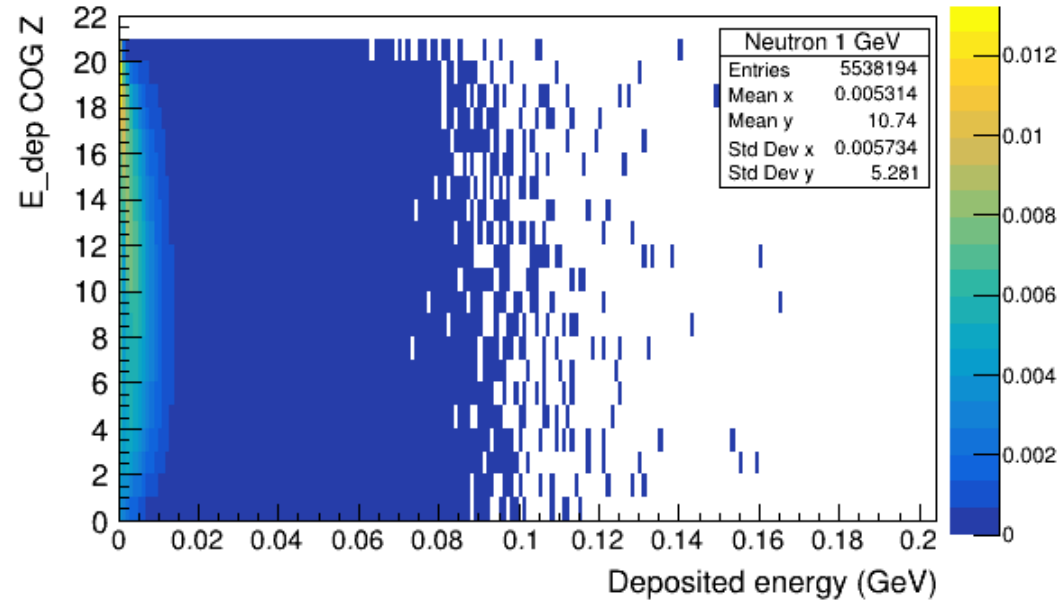


Neutron and photon energy deposition

n 1 GeV;
 γ 1 GeV;

- Center of gravity of the shower longitudinal direction
- COG weighted with deposited energy in the layer

$$Z = \sum_{\text{Layers}} w_i Z_i \quad w_i = \frac{E_i}{E_{\text{tot}}}$$

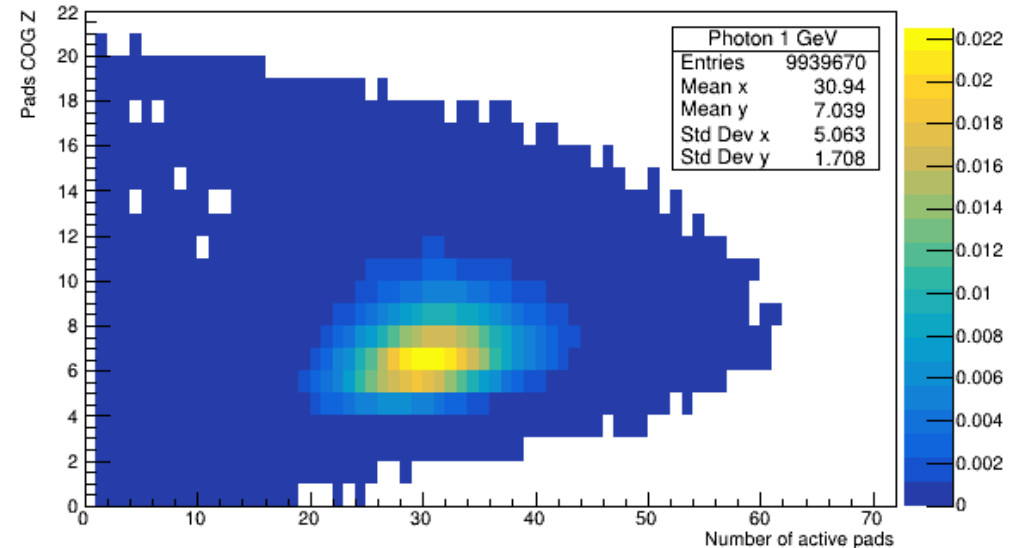
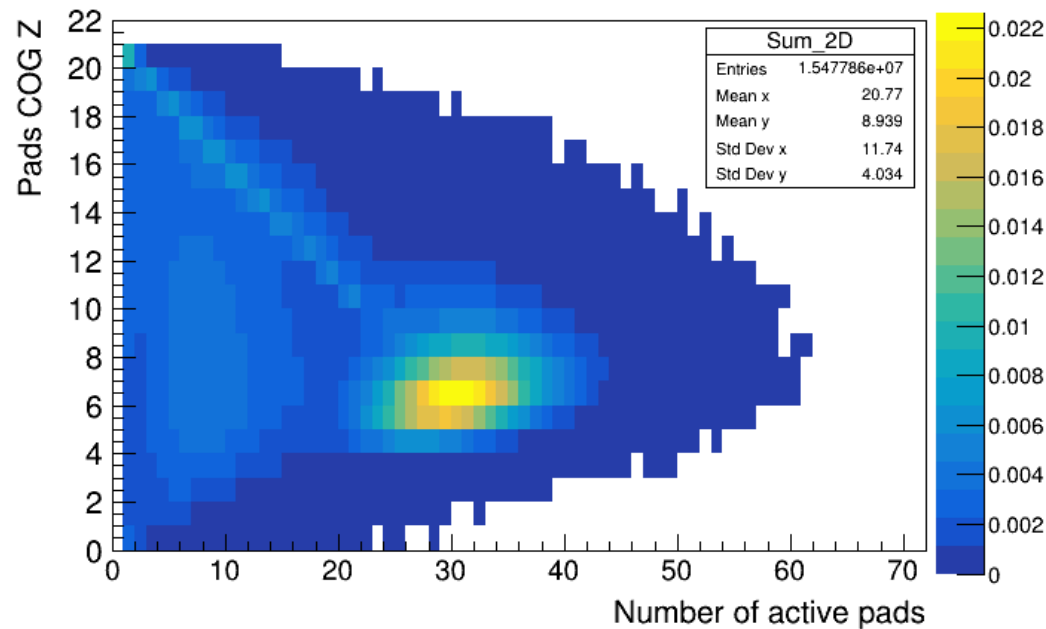
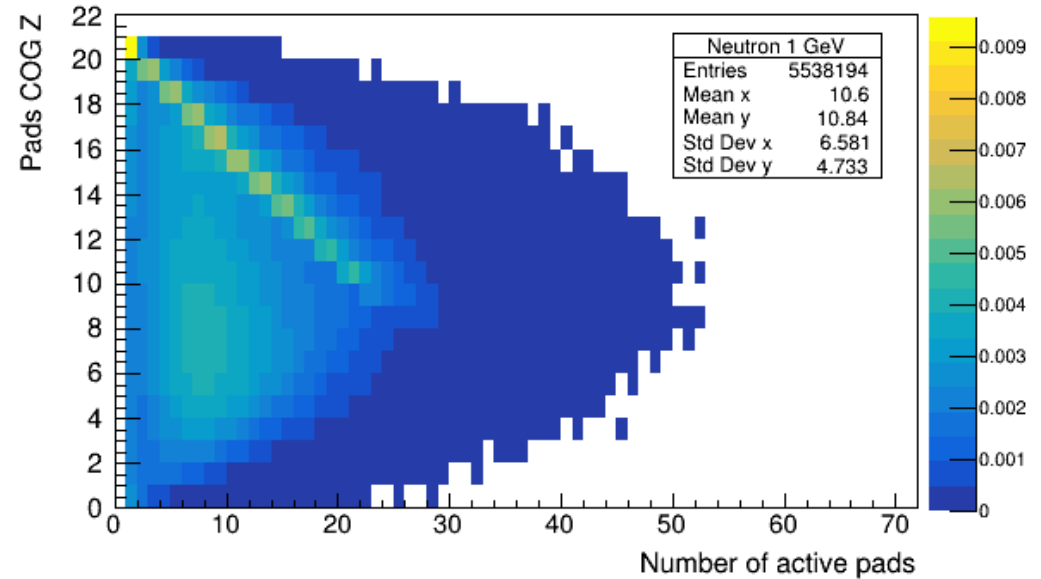


Neutron and photon energy deposition

n 1 GeV;
γ 1 GeV;

- Center of gravity of the shower longitudinal direction
- COG weighted with number of active pads in the layer

$$Z = \sum_{\text{Layers}} w_i Z_i \quad w_i = \frac{N_i}{N_{\text{tot}}}$$



Time of energy deposition

