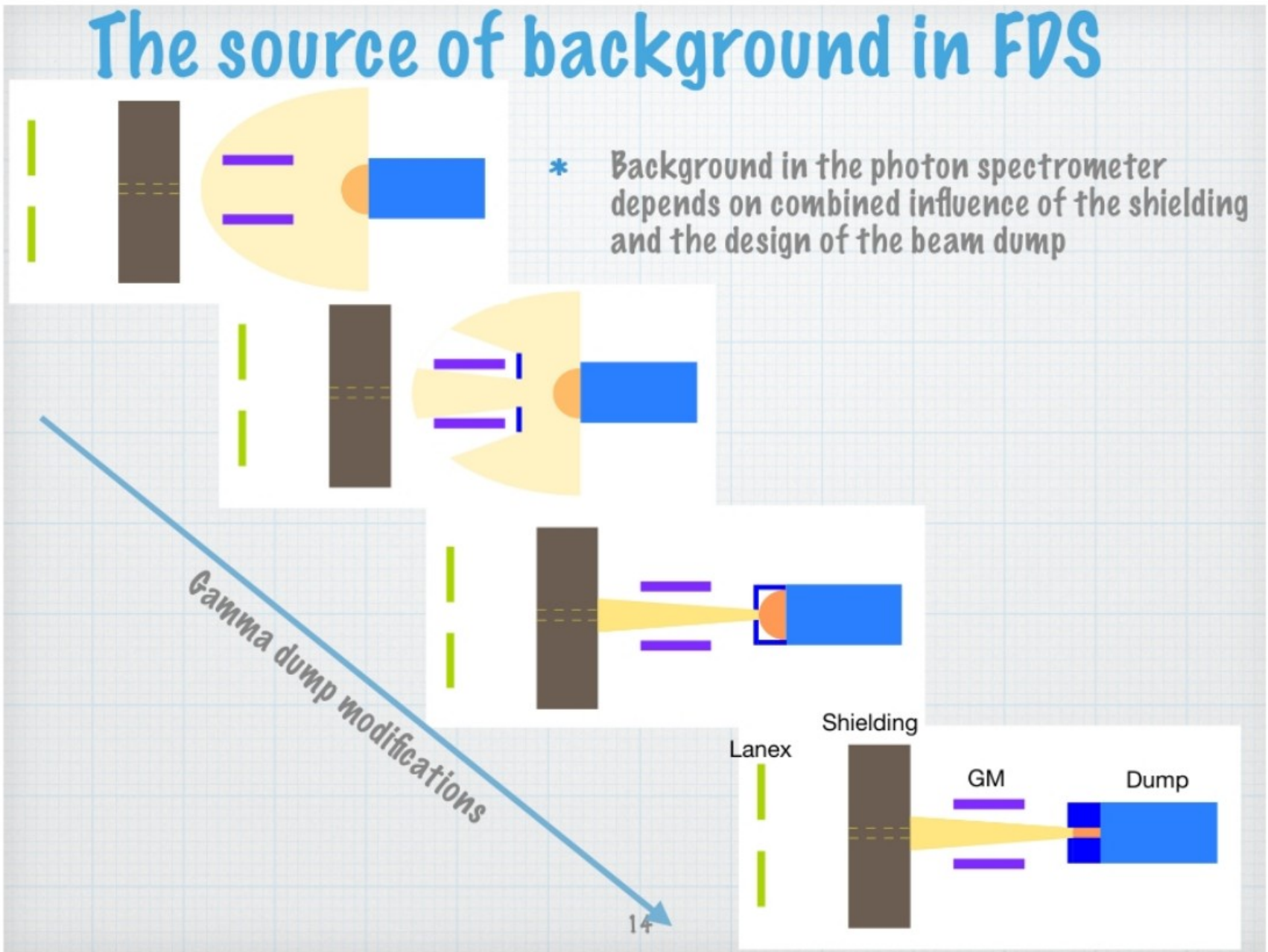


Update of LUXE GEANT4 Simulation

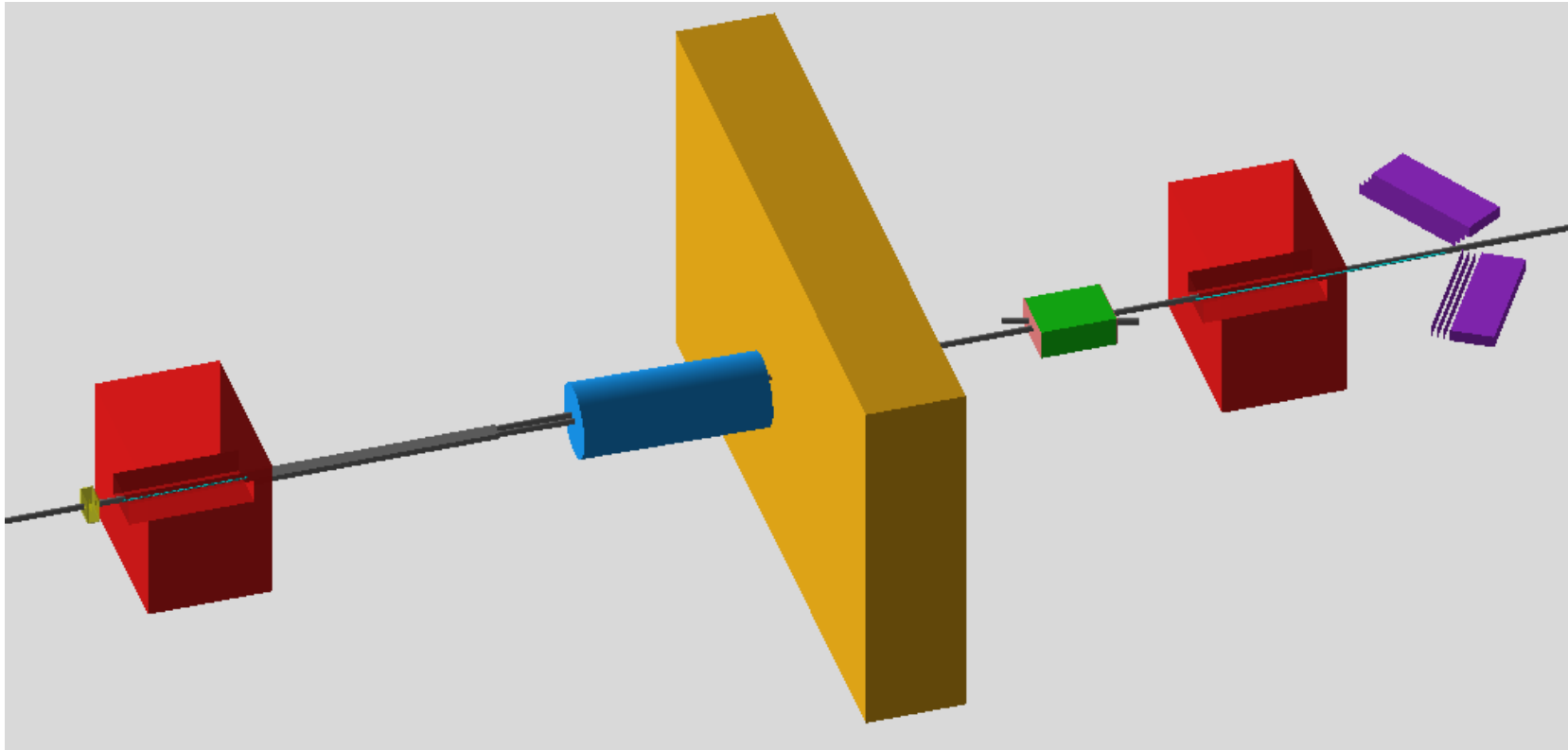
Oleksandr Borysov

Beam dump modifications to reduce back scattering

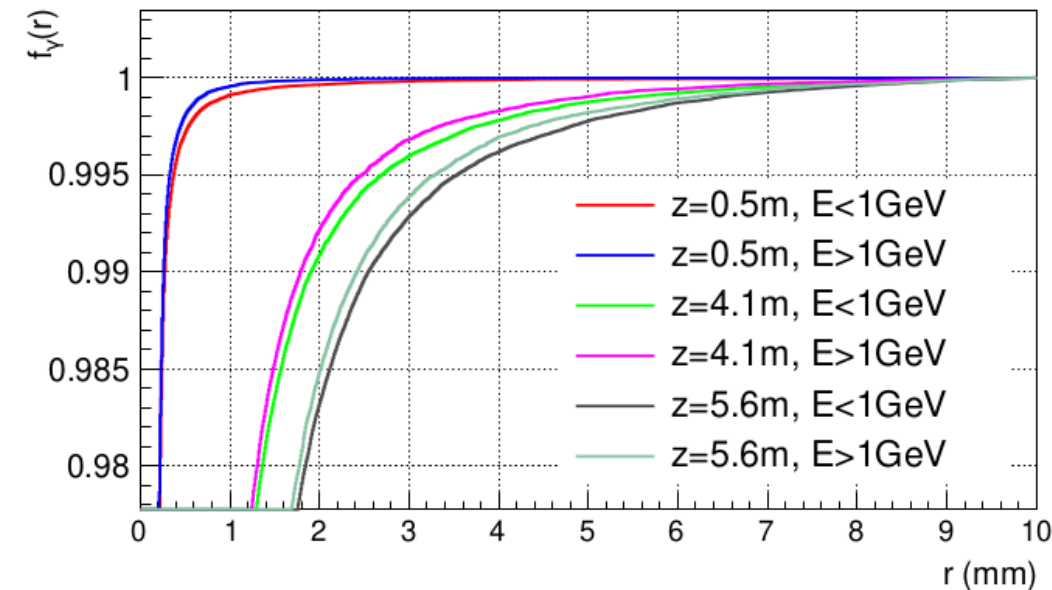
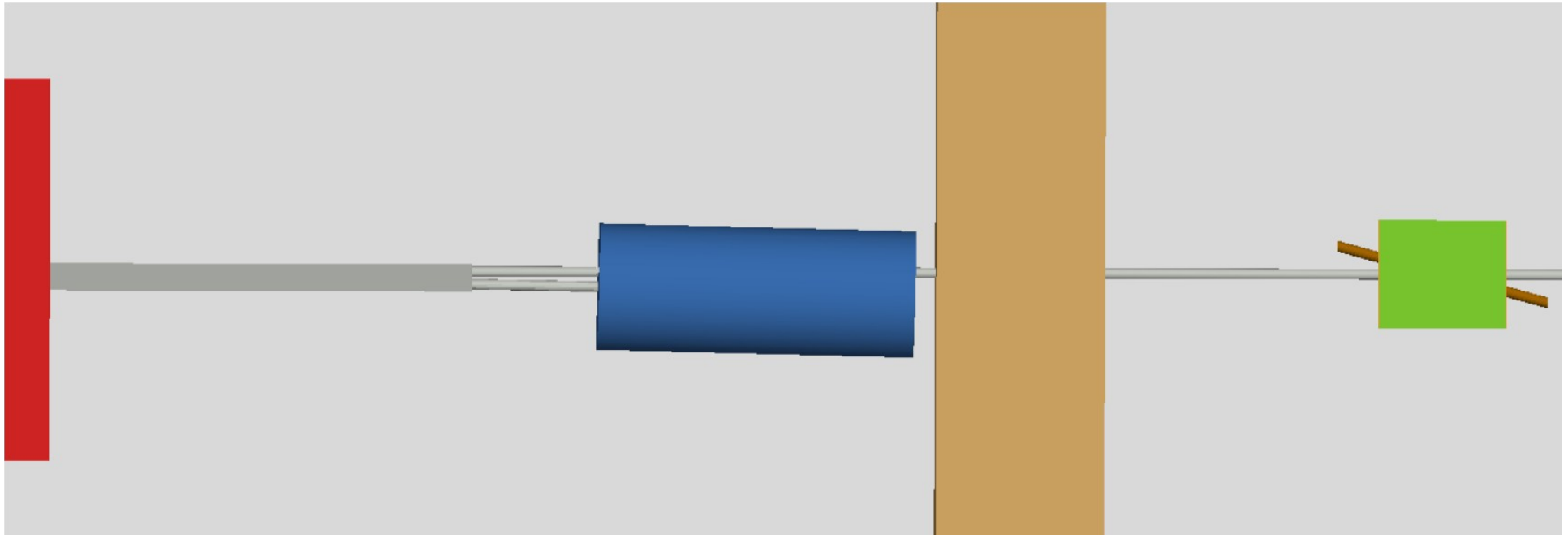


Reducing upstream background in gamma-laser
mode

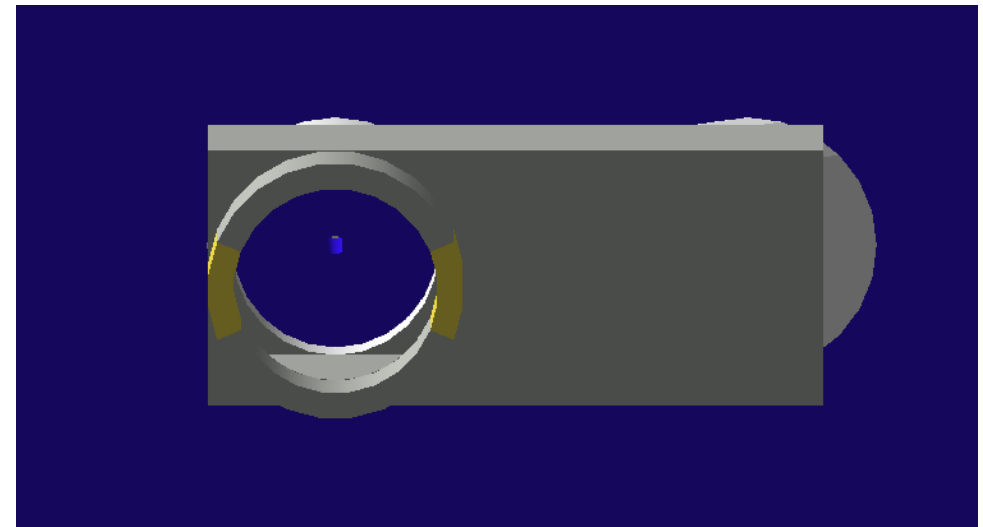
Gamma-laser setup, summer 2019 (before Lol)



Beam Dump with Hole for Photons



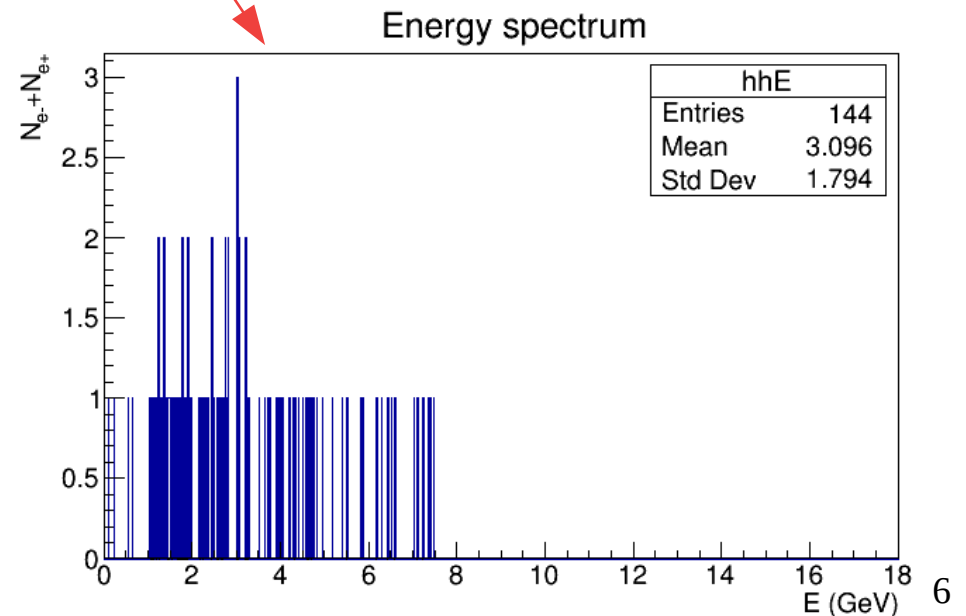
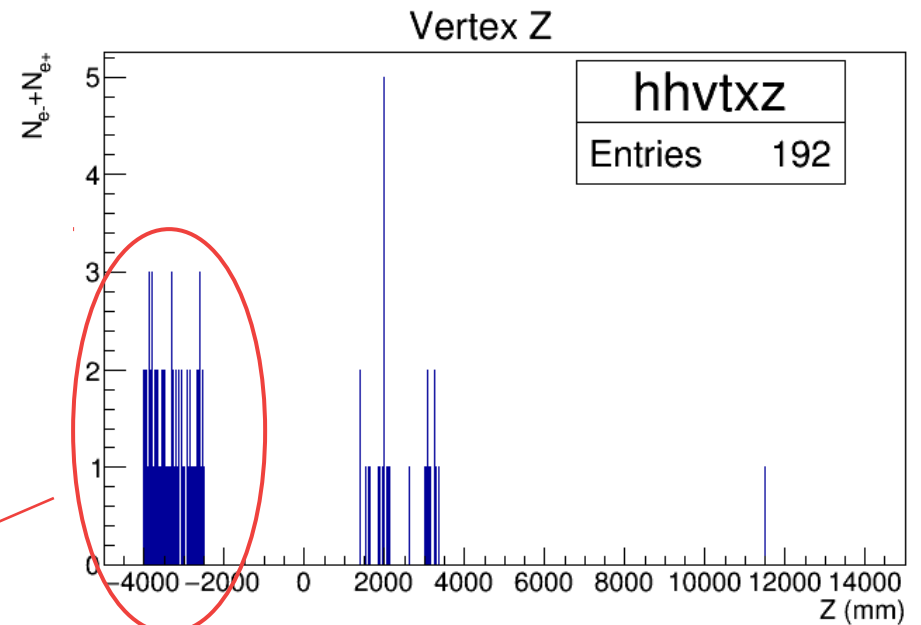
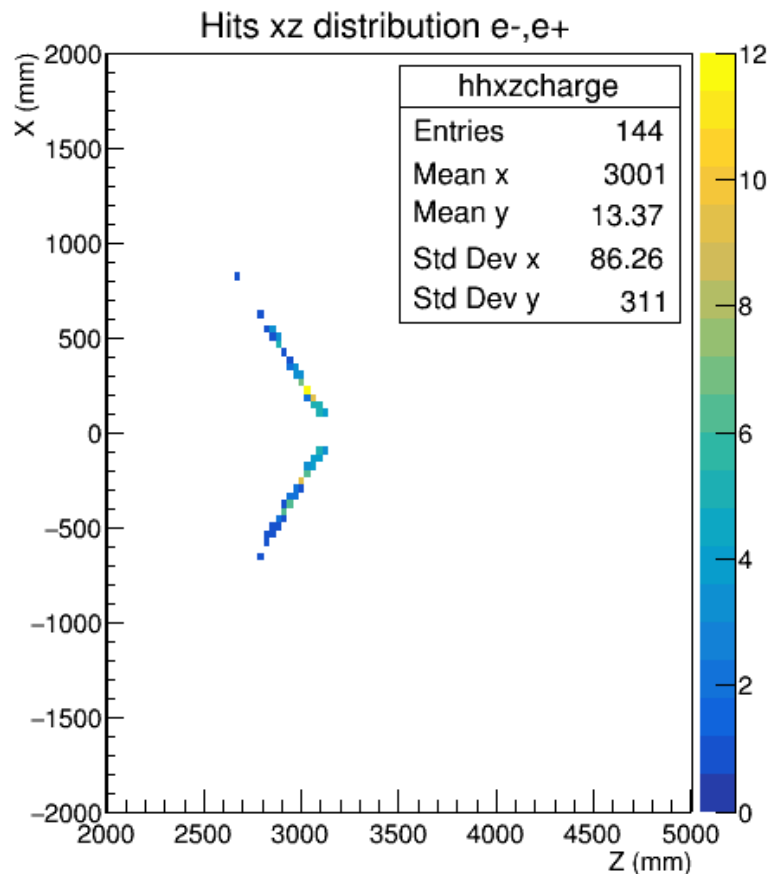
Fraction of photons inside the circle as a function of its radius for different distances from the target



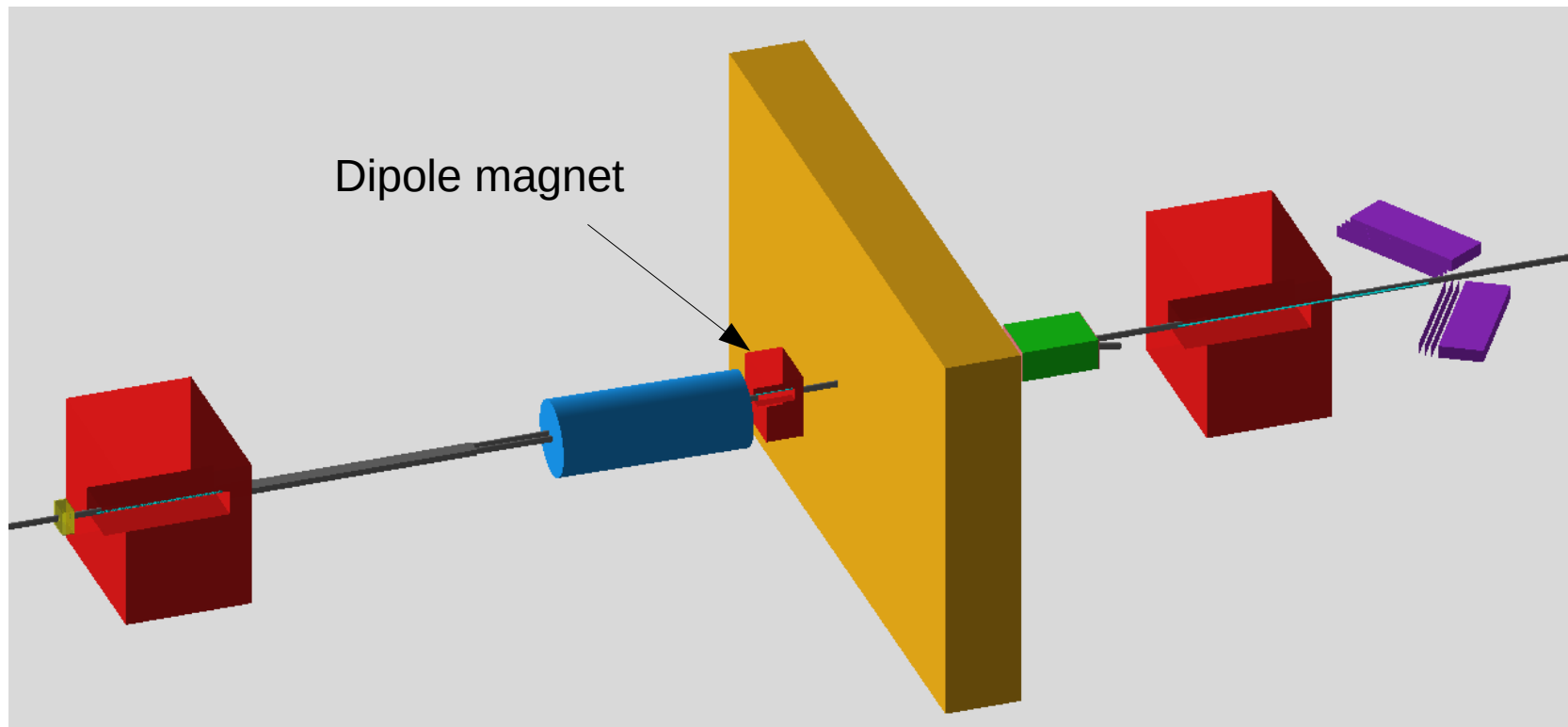
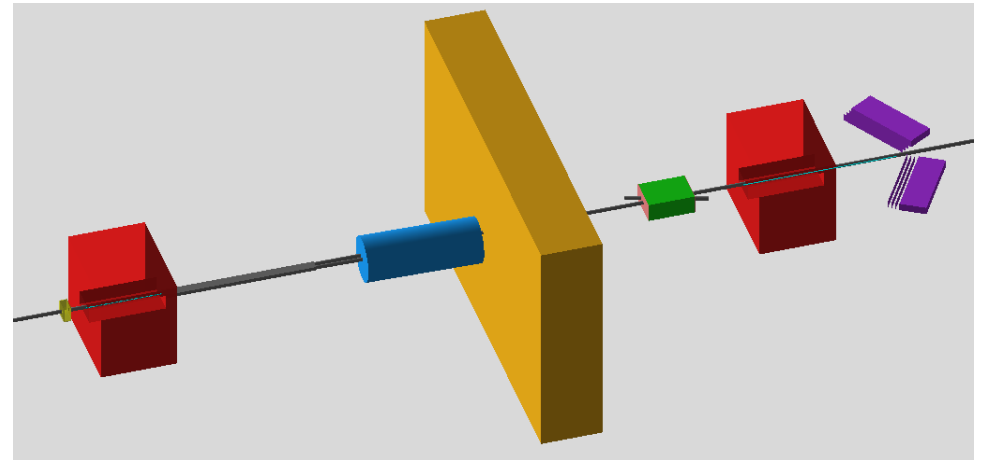
Front view of the beam dump through the beam pipe

Hits with origin in collimator

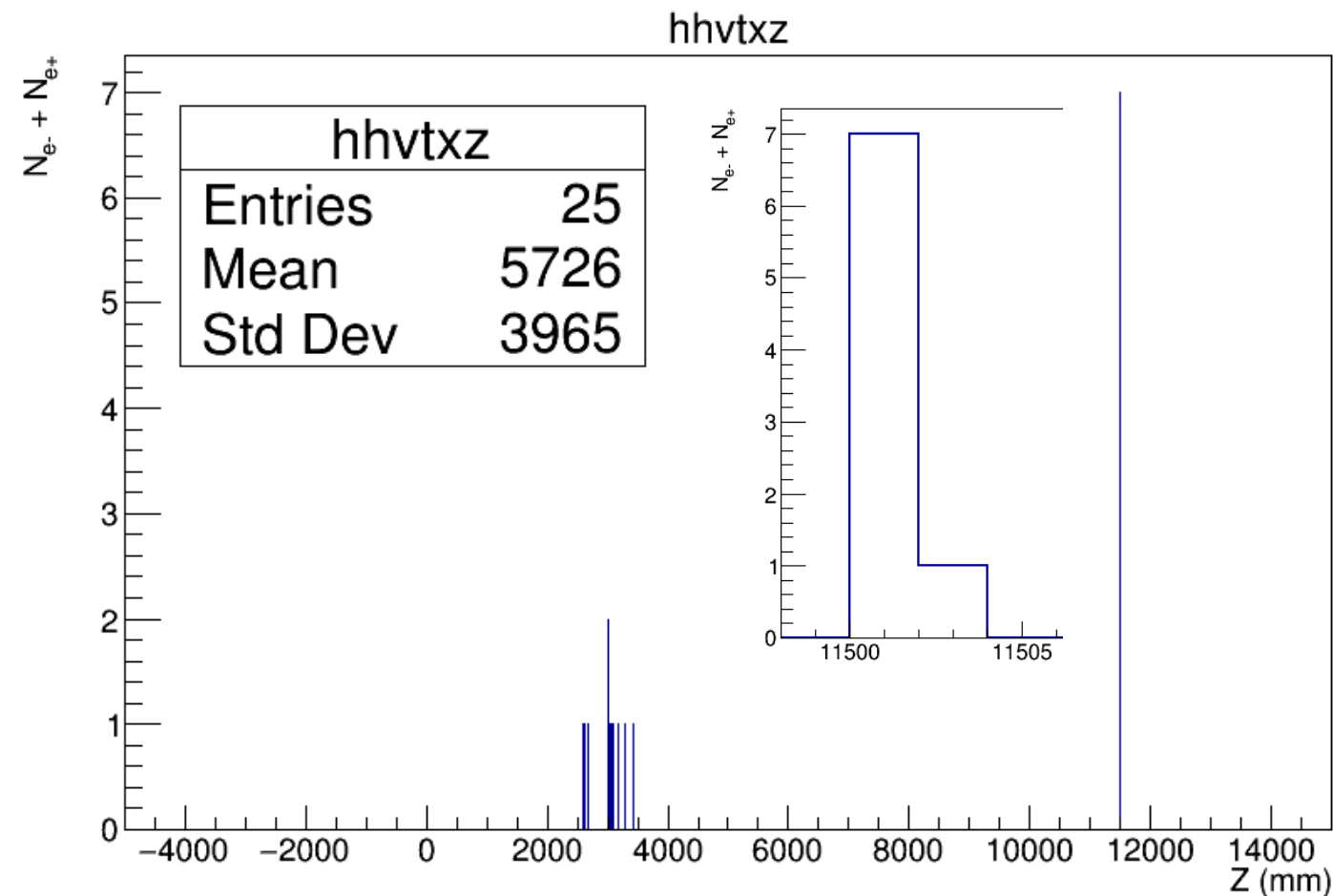
10.72 M electrons of
17.5 GeV
with 35 μm tungsten target
were simulated



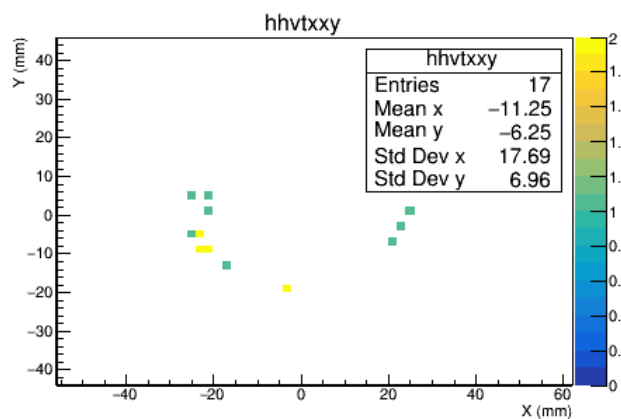
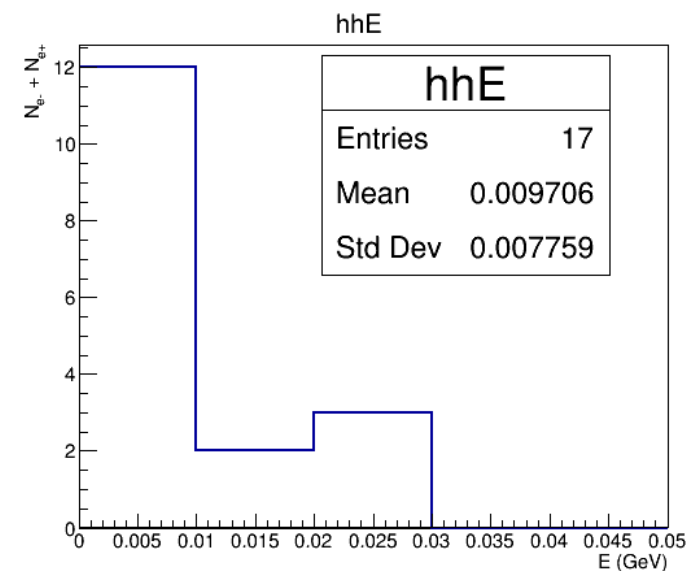
Cleaning beam after the dump



Z distribution of charged vertexes with cleaning magnet



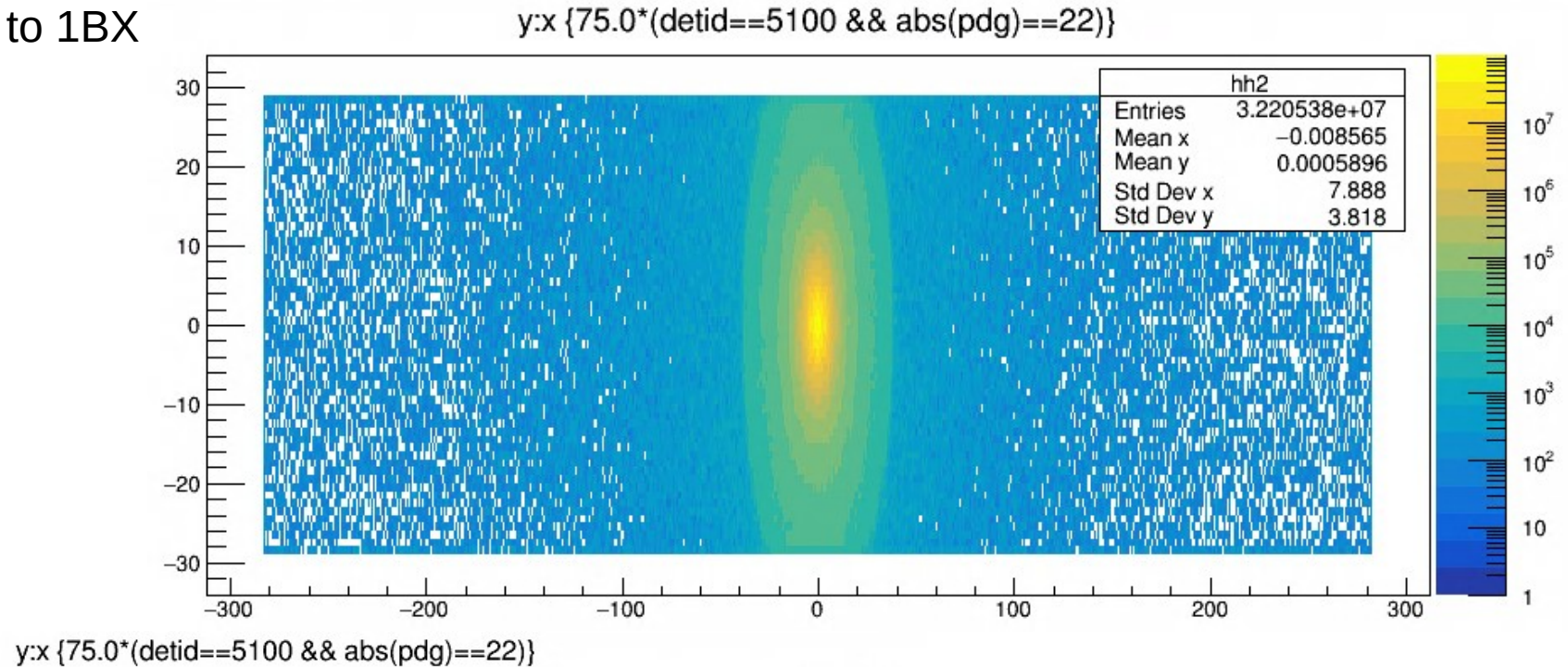
13.54 M e^-



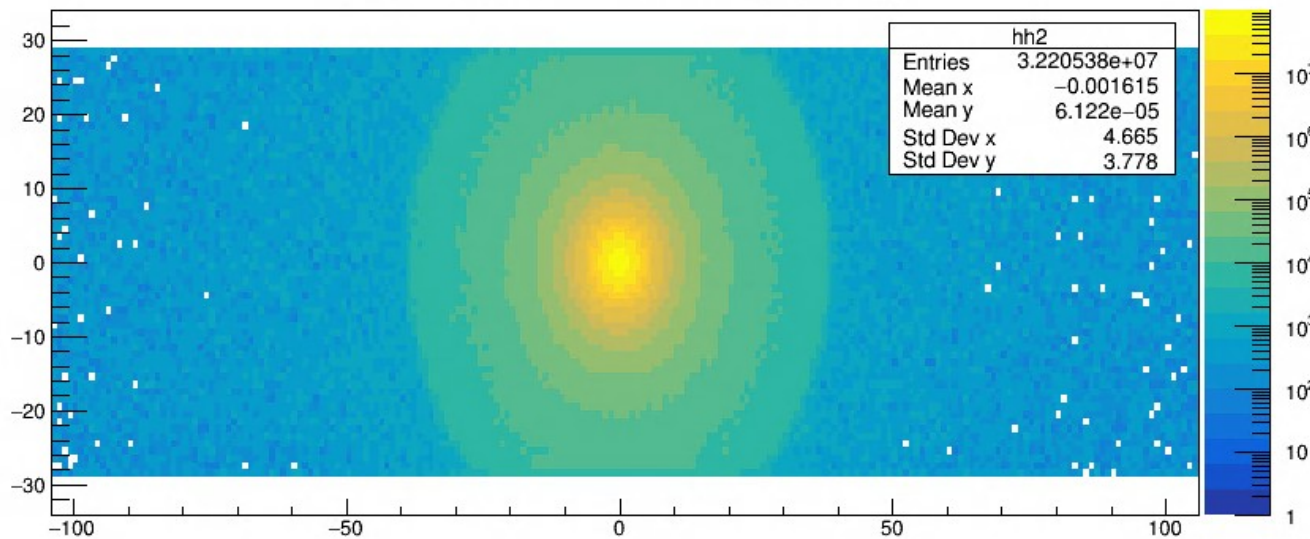
Photons in magnet-VC interface

Gamma laser background simulation with 600um target (October 2021).

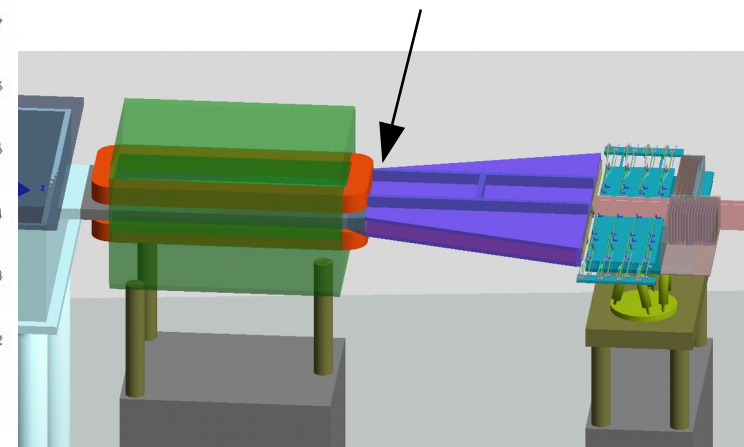
20M e-, scaled to 1BX



y:x {75.0*(detid==5100 && abs(pdg)==22)}

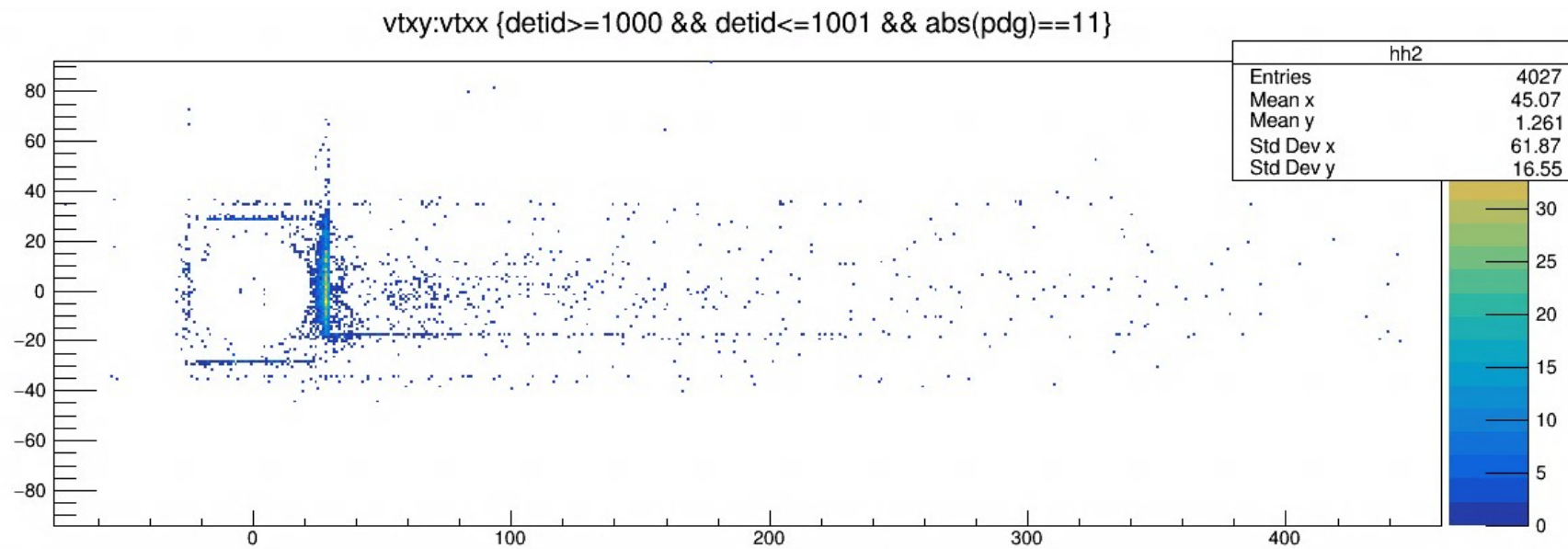
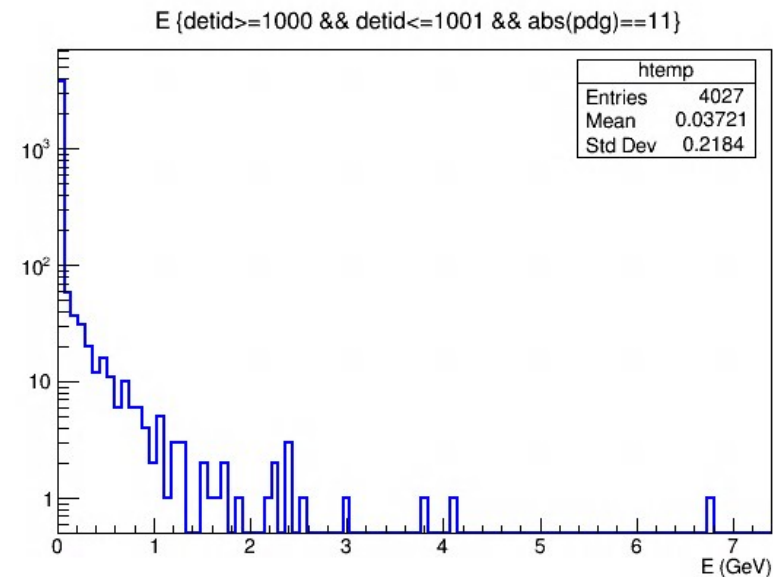
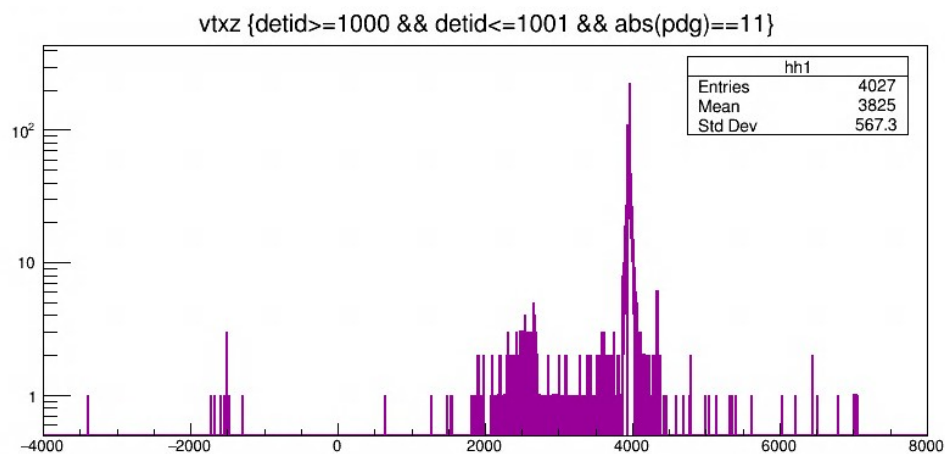


Z location of the plane

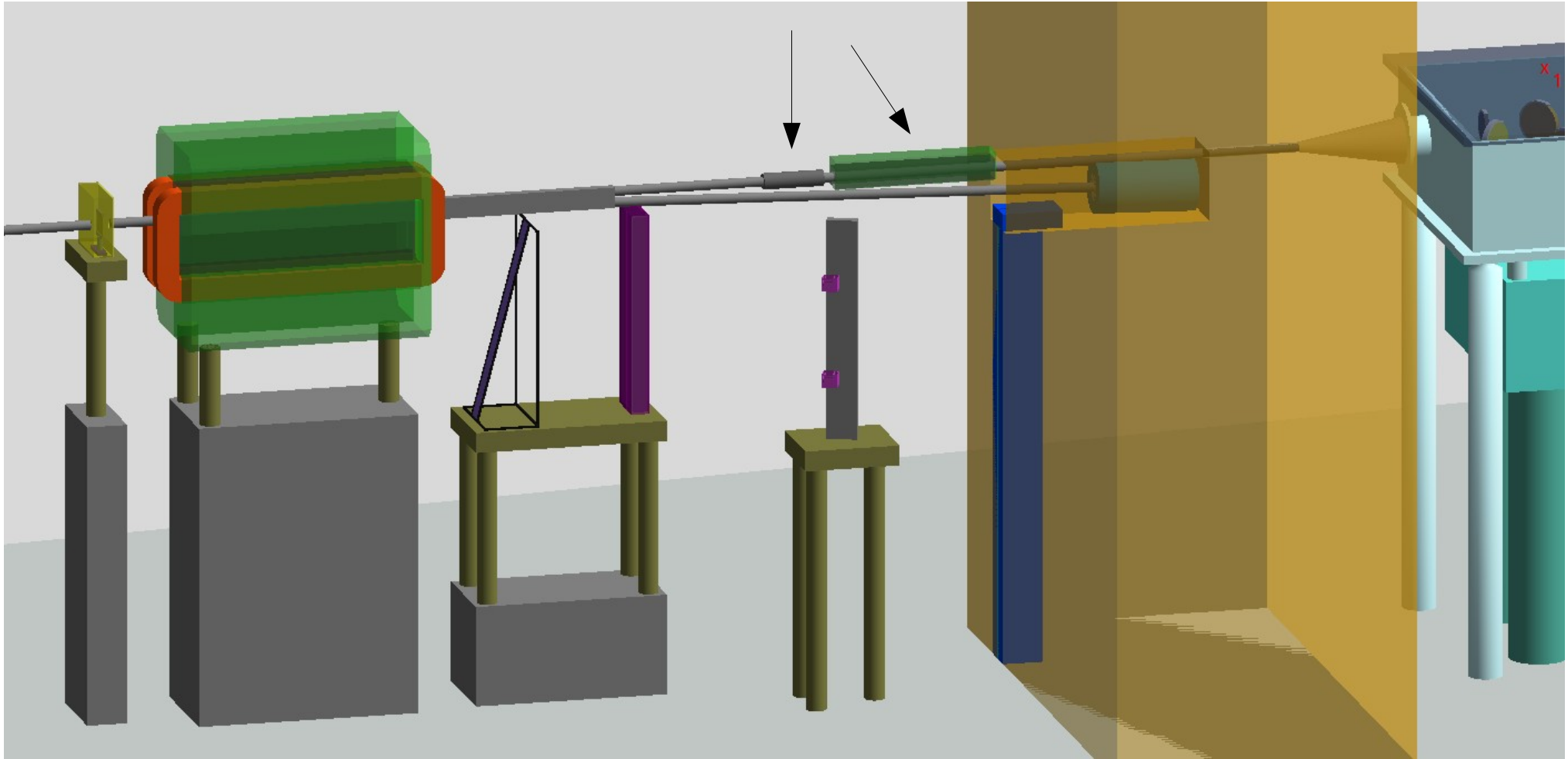


Electrons in first layers of tracker

20M e-

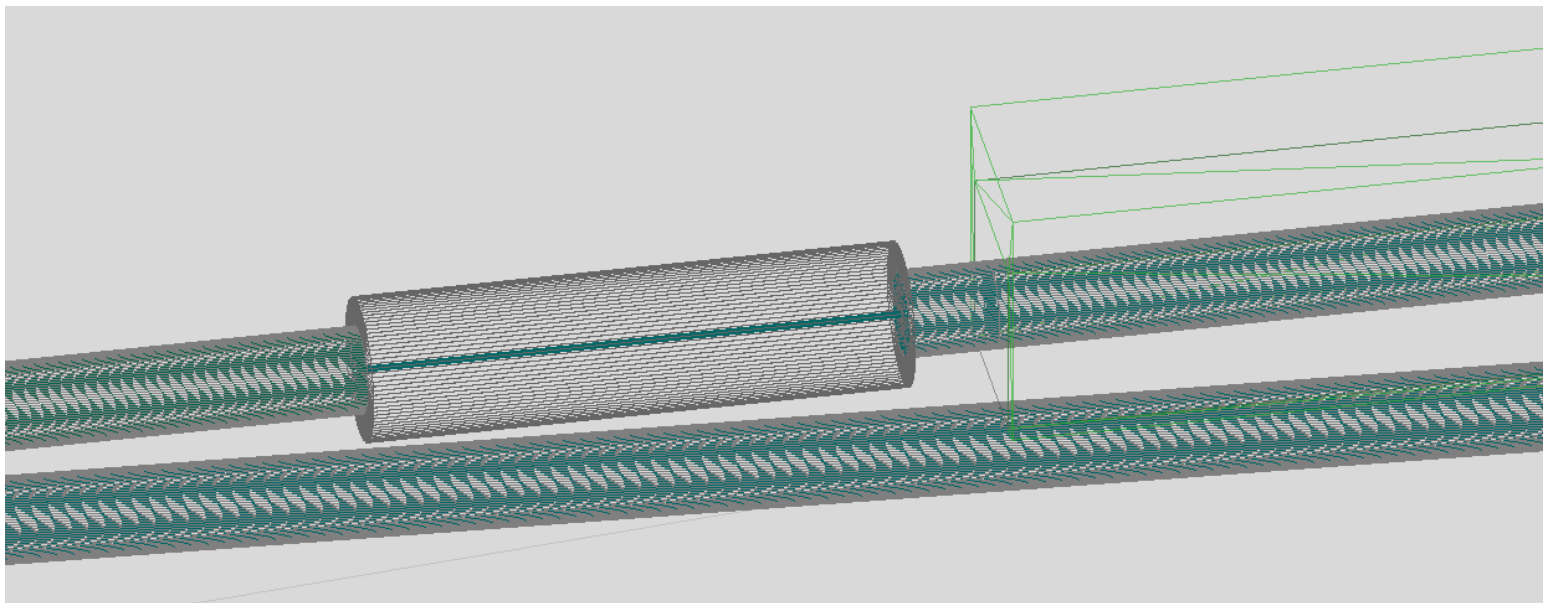
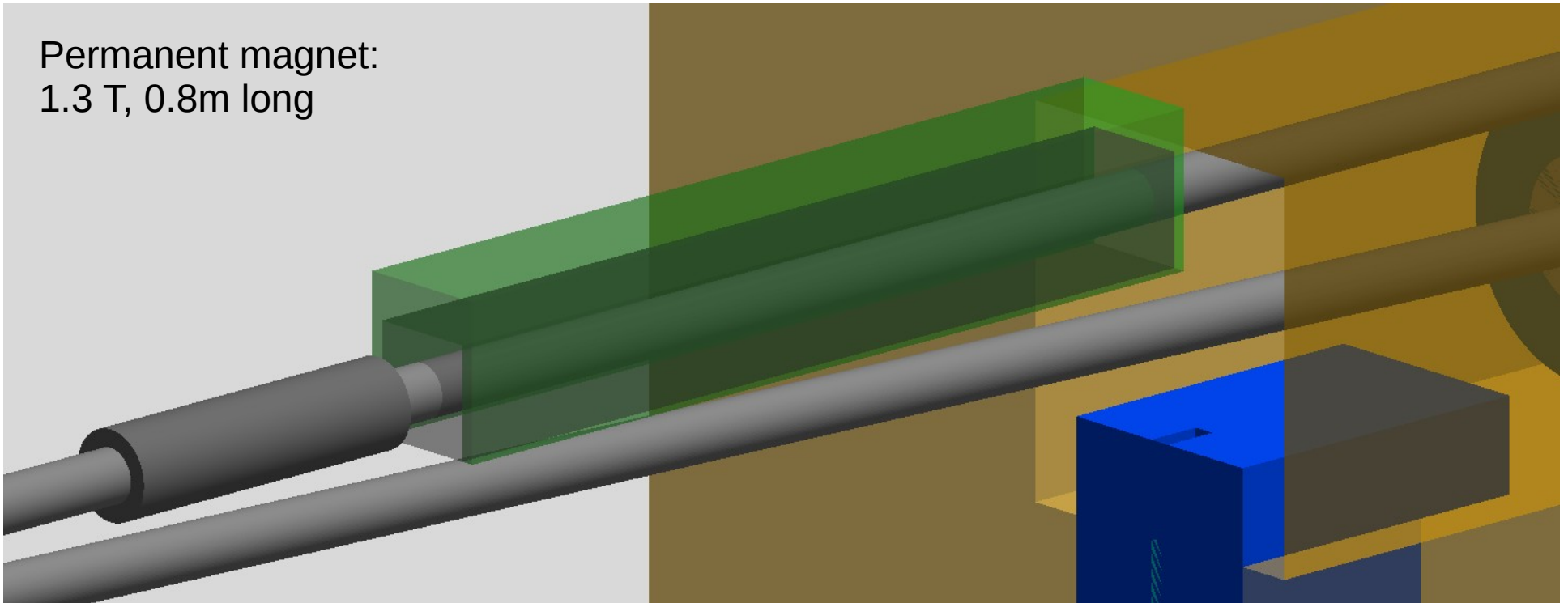


Collimator and magnet

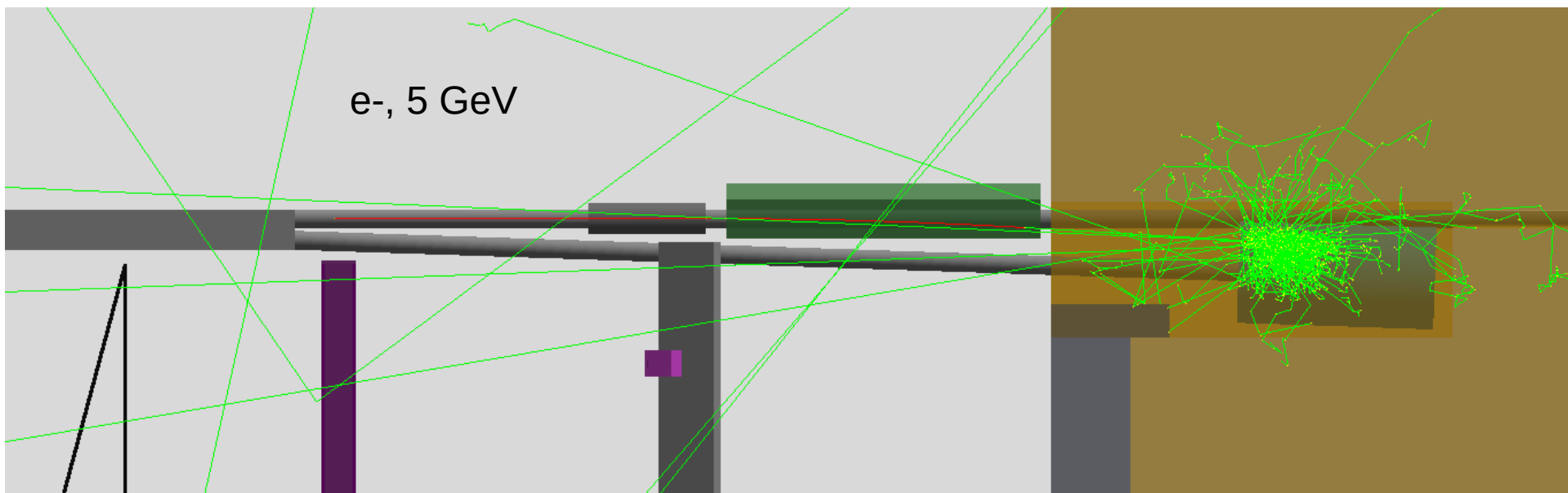
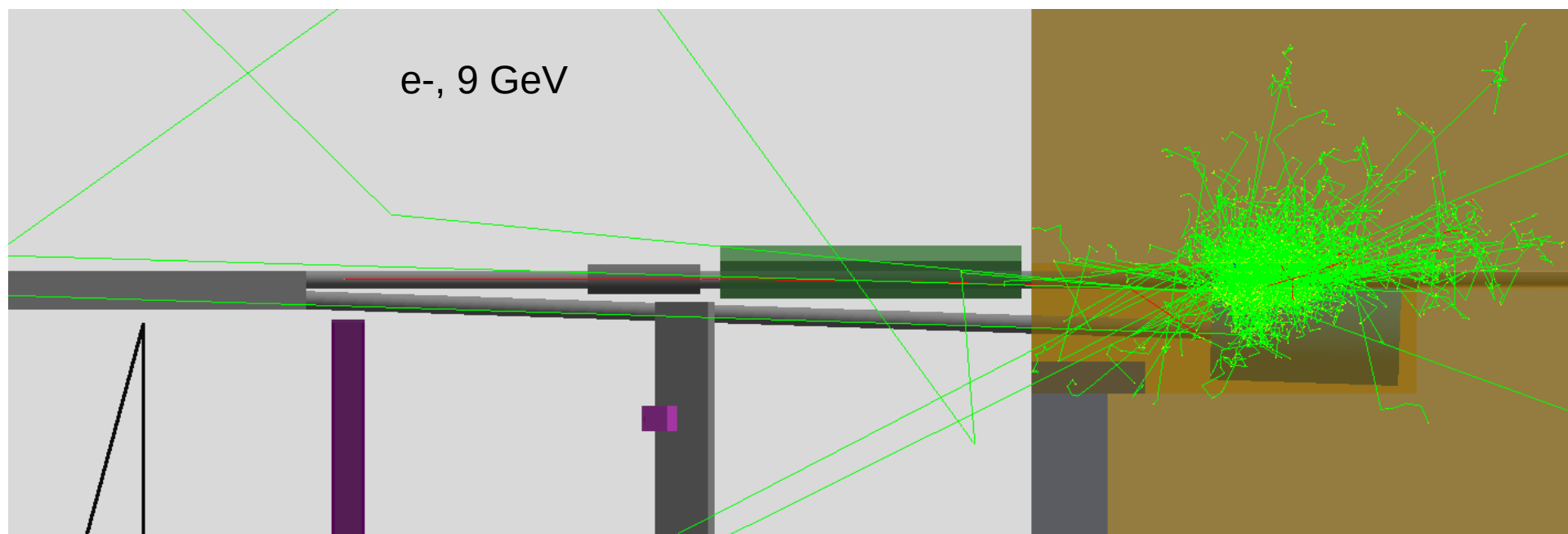


Collimator and magnet

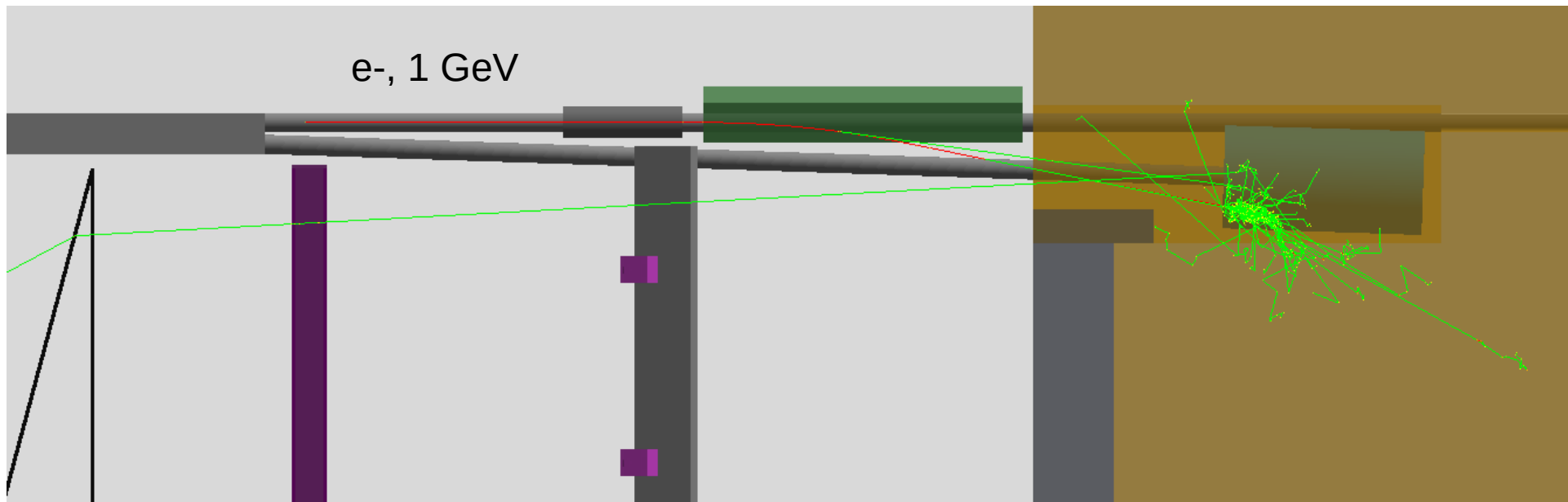
Permanent magnet:
1.3 T, 0.8m long



Electrons in permanent magnet



Electrons in permanent magnet



Summary

- It was observed with simple LUXE model of 2019 that bremsstrahlung photon collimator followed by a dipole magnet provide cleaner environment for collision and signal.
- There is space in present setup for similar installation: small collimator and permanent magnet.
- Test version is Implemented in separate git branch.