

Updates to v0B

and several things I don't understand yet about photons

Detector meeting, 27/04/2023



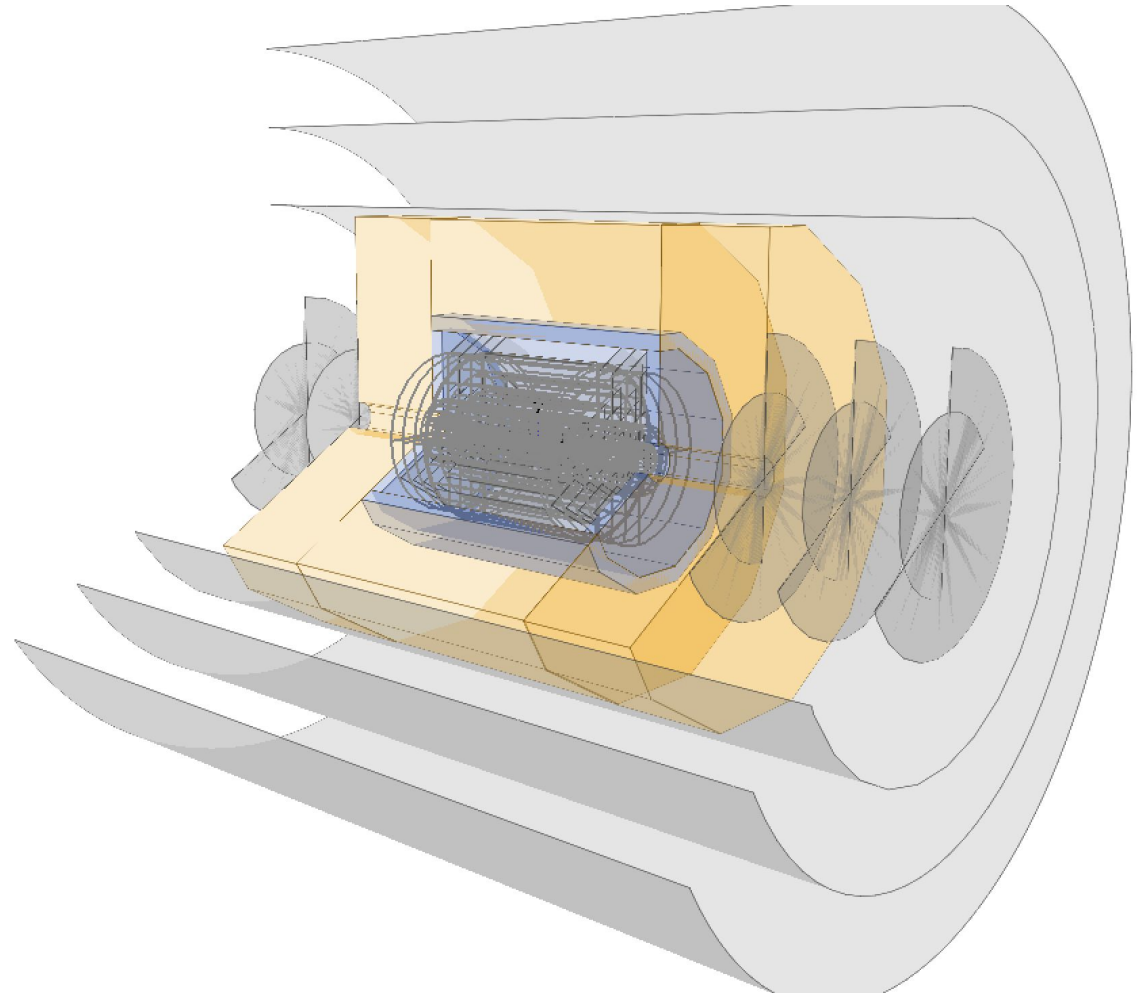
10 TeV detector geometry (MuColl10_v0B)

Started removing the Yoke
(the solenoid field can be
returned by the iron in the
HCal)

Plan is to leave this
relatively idealised and
start to setup muon track
reconstruction with ACTS.

- Need to add magnetic field, see [discussion](#)

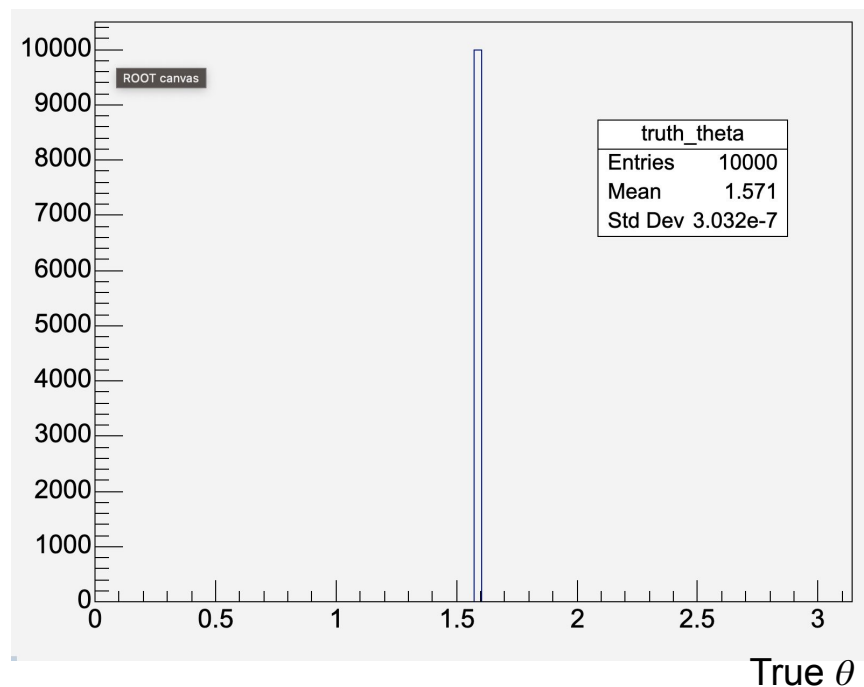
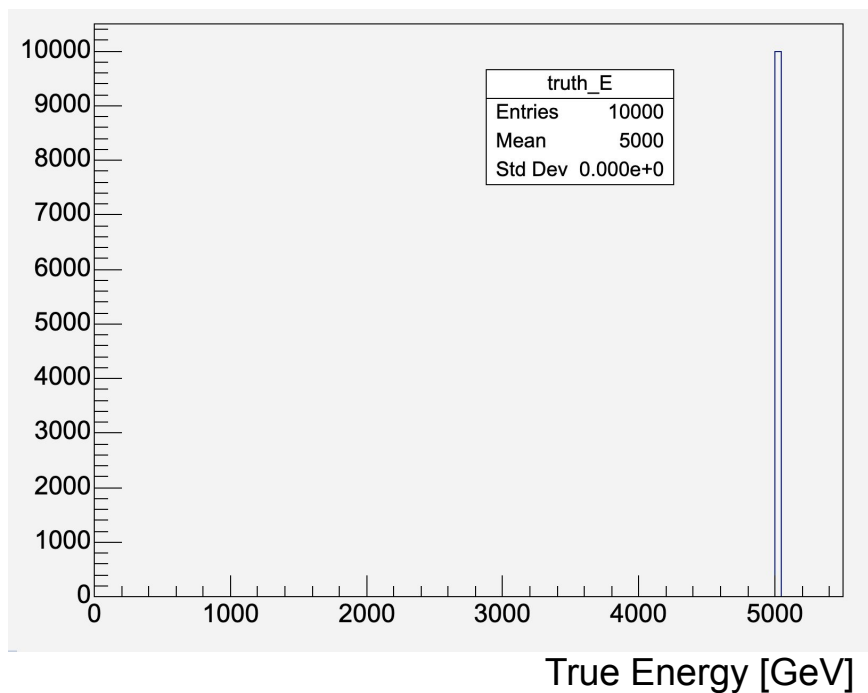
Endcaps have a problem
with the parameterisation
of the radial coordinate,
they are meant to close the
cylinder...



Not pushed to github yet

Photons

Apologies for the plots coming out of the TBrowser



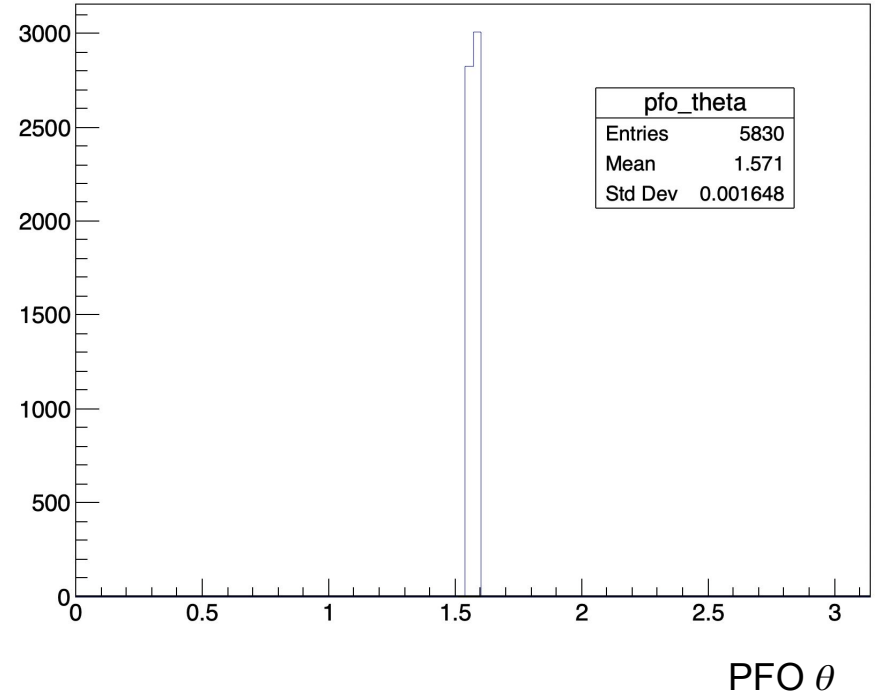
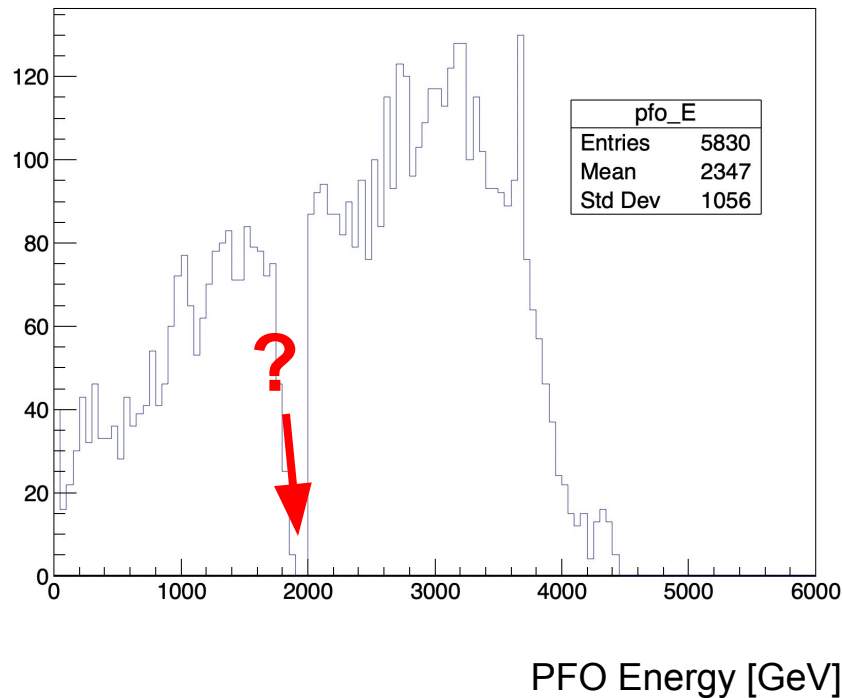
Goal: test hermeticity and energy resolution of calorimeter in v0B

Shot monochromatic particle gun sample at 90 degrees wrt to beam axis, no BIB

- Showing here plots for 5 TeV (but did the exercise for 500 GeV too)

PFO

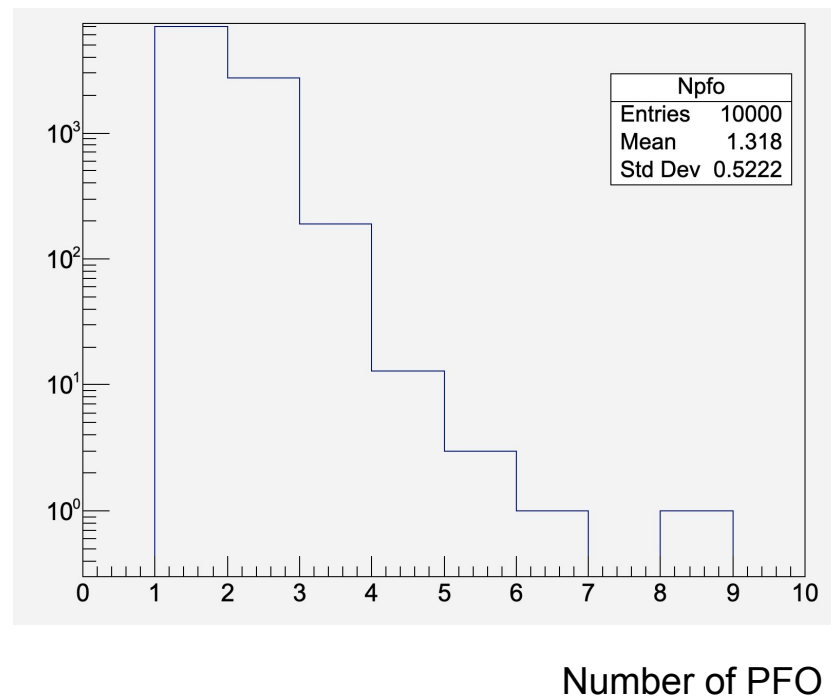
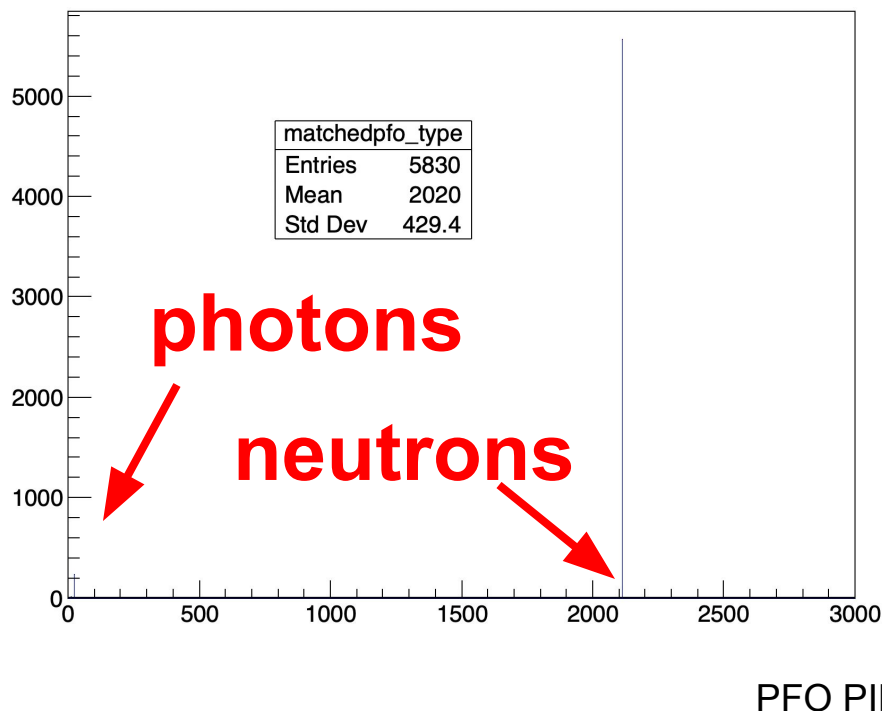
Apologies for the plots coming out of the TBrowser



Applied delta R matching and looked at reco PFO (particle flow object) quantities

Photons?

Apologies for the plots coming out of the TBrowser

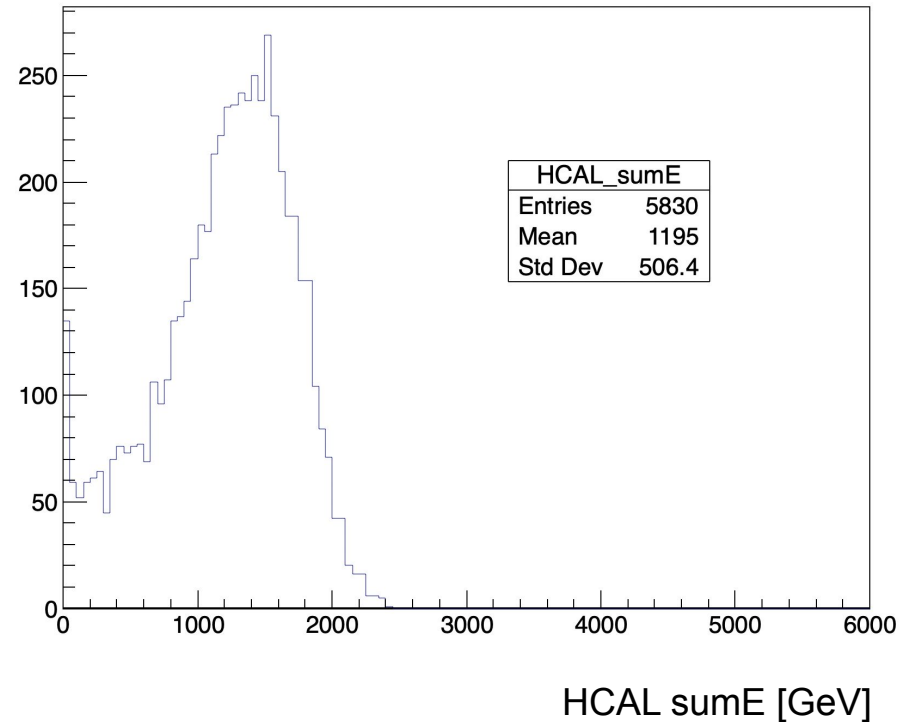
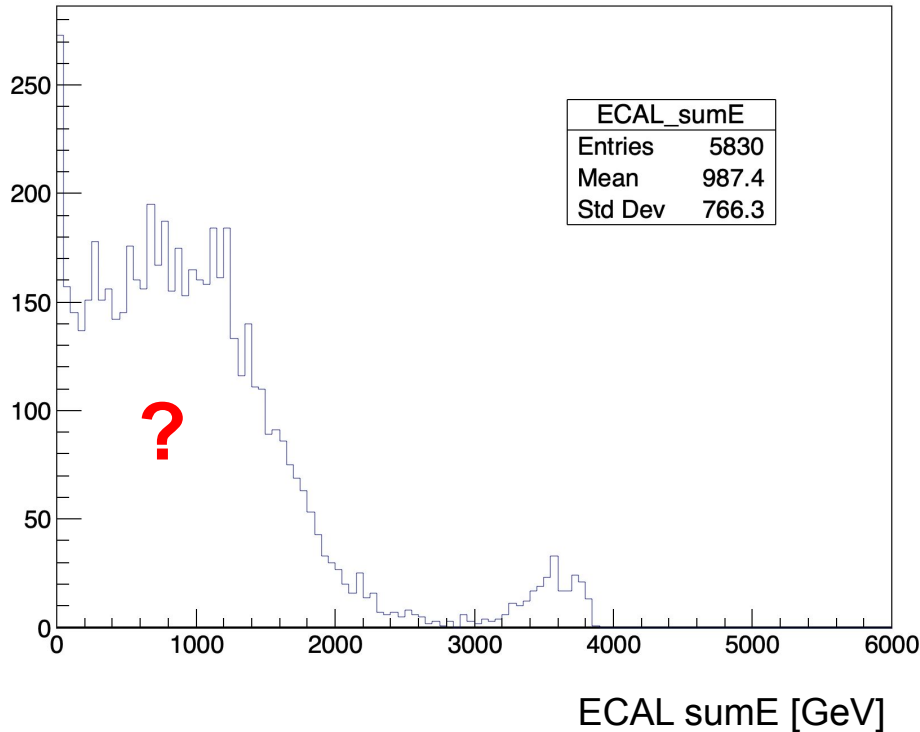


Most photons are actually identified as neutrons by Pandora

Also, in 30% of the cases, more than 1 PFO is reconstructed

Total energy in calorimeters

Apologies for the plots coming out of the TBrowser

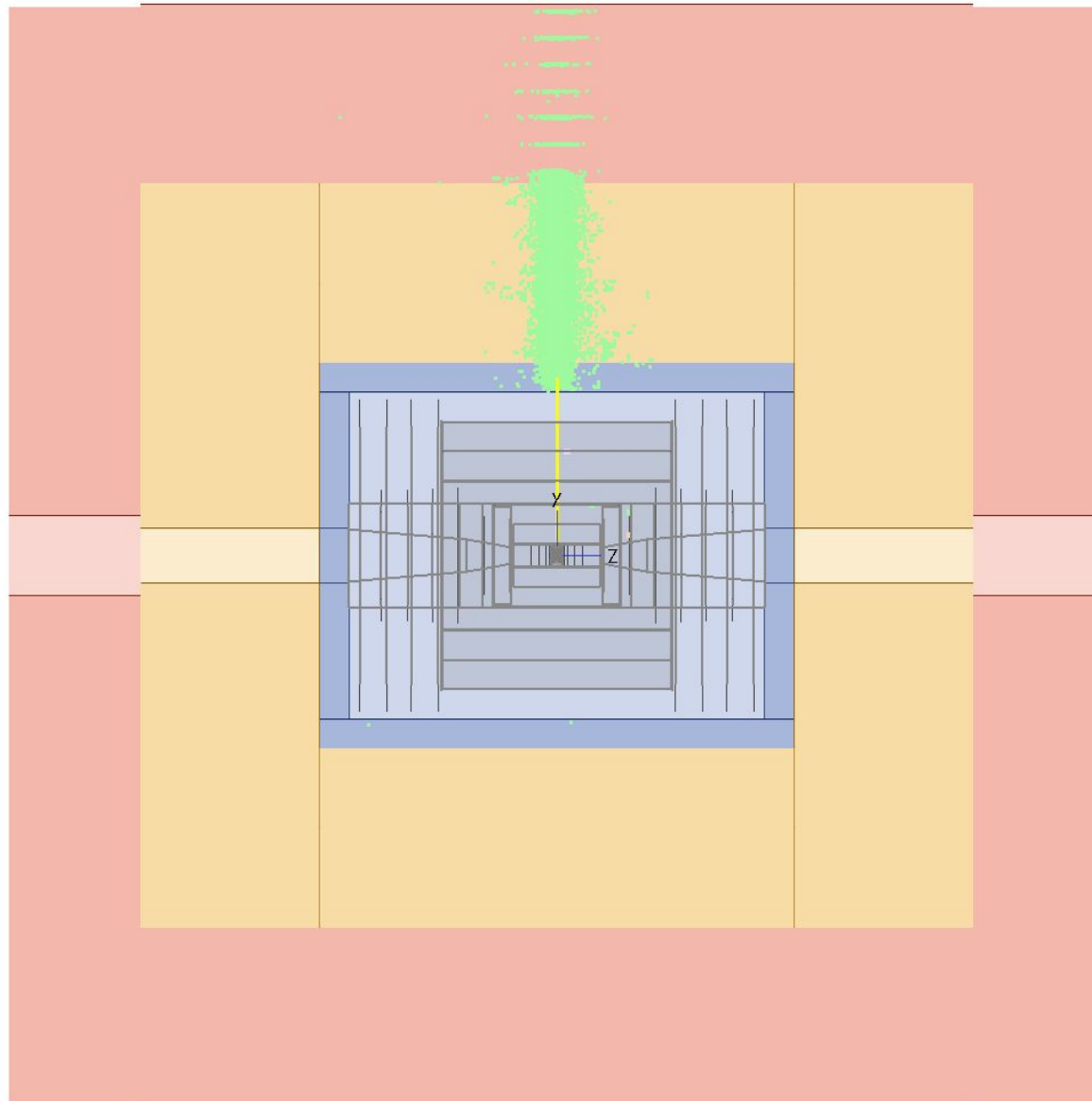


Decided to forget about Pandora for now and look at energy in cells.

90% of the photons leave little energy in the ECAL?

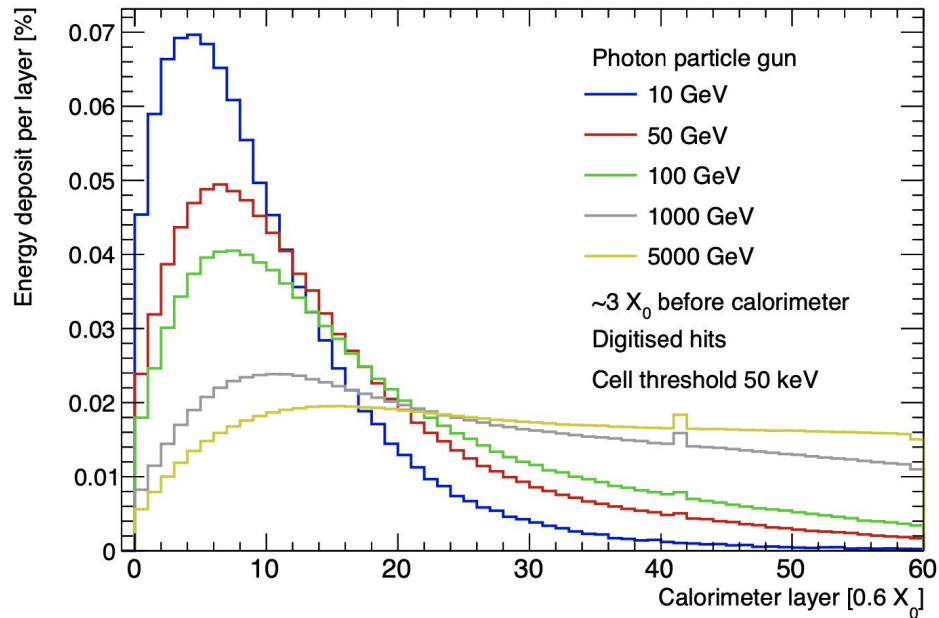
- Ruling out 1 shot in a calo crack by generating new samples (in progress)

Visual inspection...

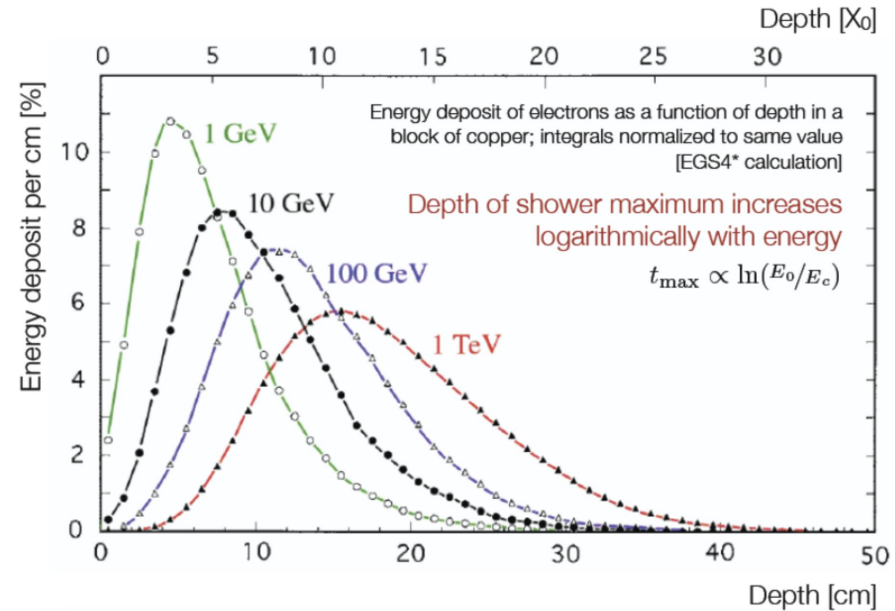


Looking at shower evolution

MuColl_10TeV



Reference



Shower maxima seem to be roughly consistent, but the tails are not.

- Checked with v1 and also vanilla CLIC geometry finding consistent (ly wrong?) results

Summary

Continuing to update v0B detector layout

- Expect to be done with Muon Spectrometer this week
- Adding Magnetic field will require a bit more time

First look at photon reconstruction without BIB

- ECAL/HCAL not understood (but consistent in various samples)
 - ECAL likely still too thin
- ECAL and HCAL scale calibration is a bit off
- Pandora's reconstruction not necessarily optimal
 - Investigate a bit the effect of the various handles
 - Alternatively, I will try to think of a simpler clustering

Next:

- evaluate efficiencies and resolutions
- move to BIB samples

Thank you!

10 TeV detector geometry (MuColl10_v0B)

Geometry currently in
github, for reference

