Data/MC comparison for Test Beam 2024

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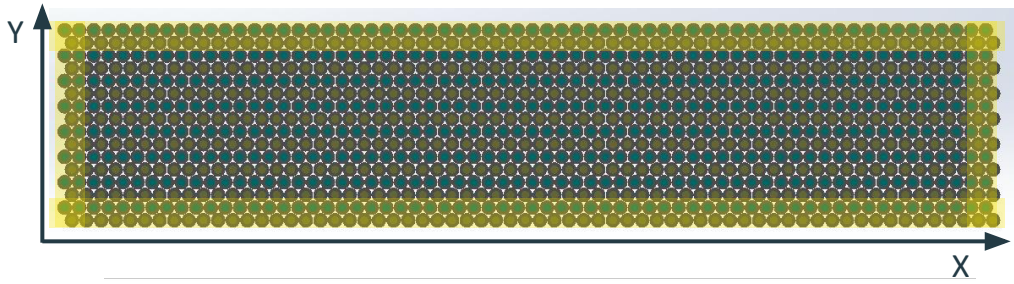
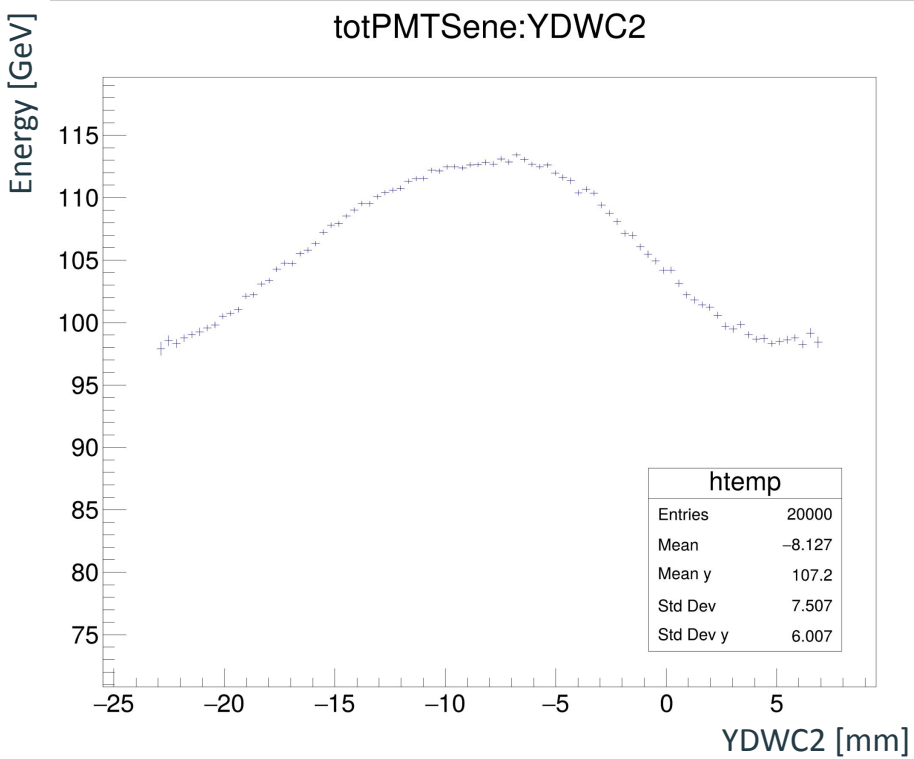
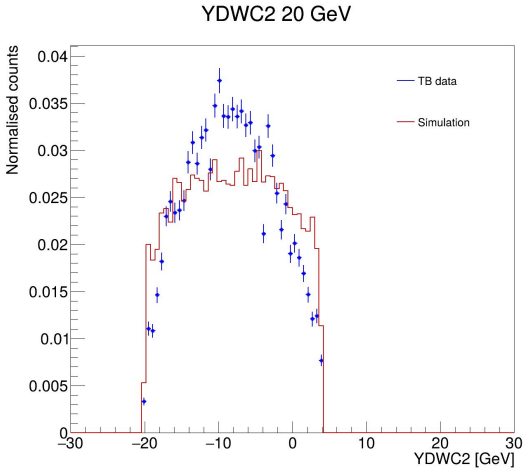
HiDRa meeting - 29/04/2025

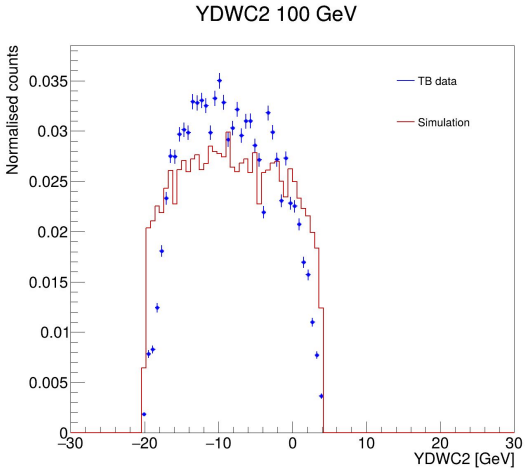
In order to reproduce dependence of total energy in impact point position, introduced new function in simulation to reduce number of photoelectrons in perimeter of each tower

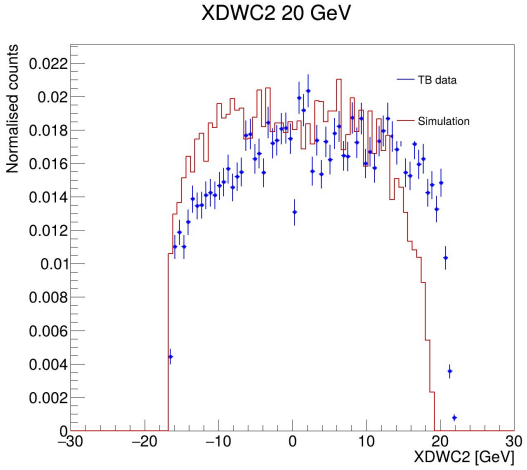


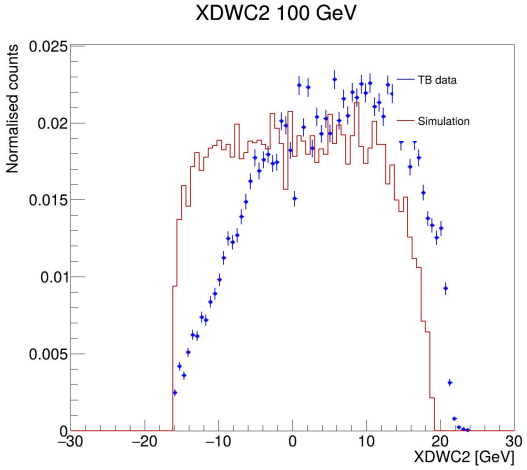
-> associate a 70% probability to each optical photon to be read out, if it belongs to the first and last two rows/columns
(100% probability to all others inside the tower)



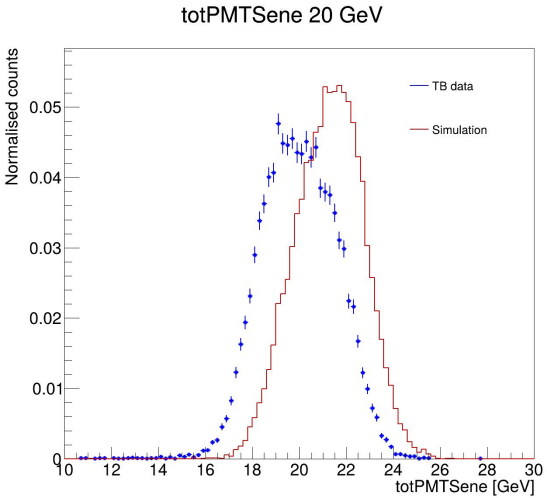


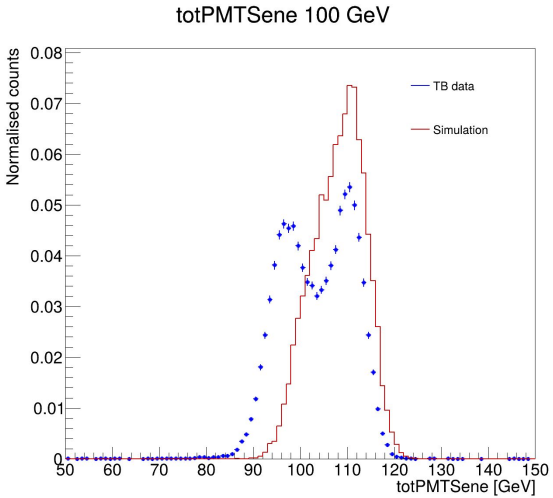






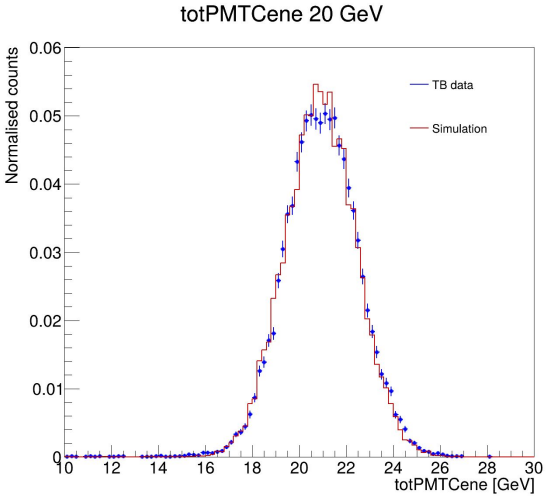
Coordinates in mm (sorry :))

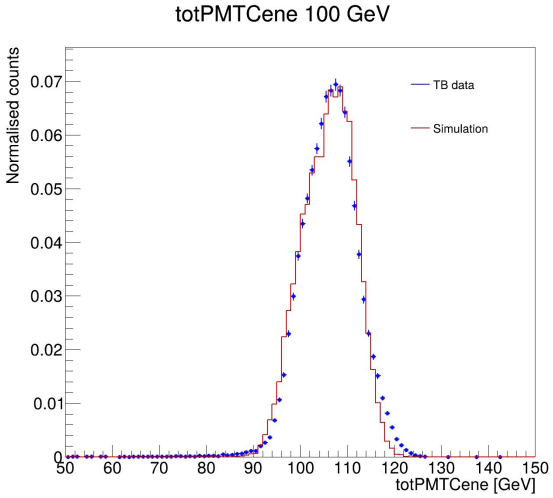




Phe/GeV (S) = 225;
Phe/GeV (C) = 39.3;

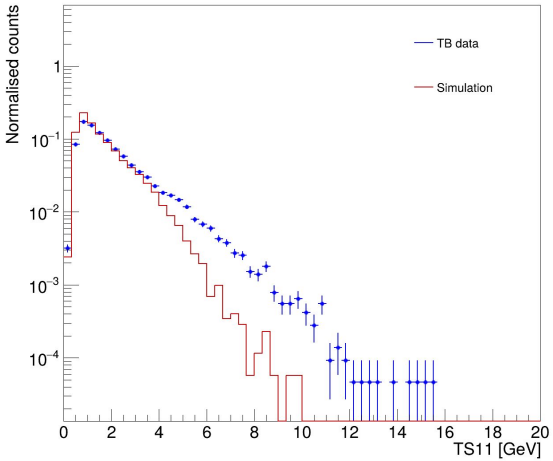
Total energy, S channel



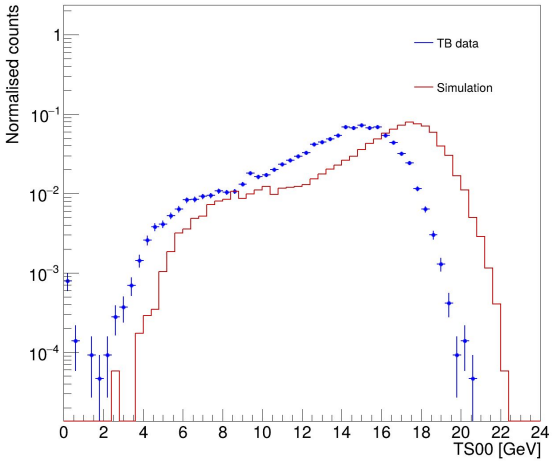


Total energy, C channel

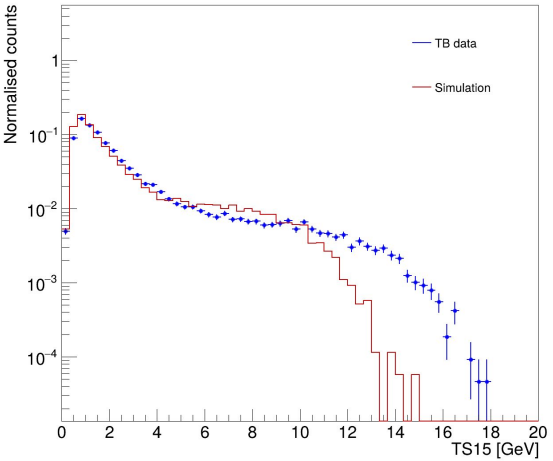
TS11 20 GeV



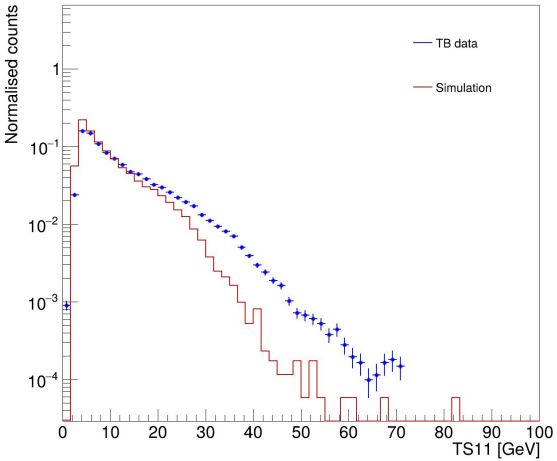
TS00 20 GeV



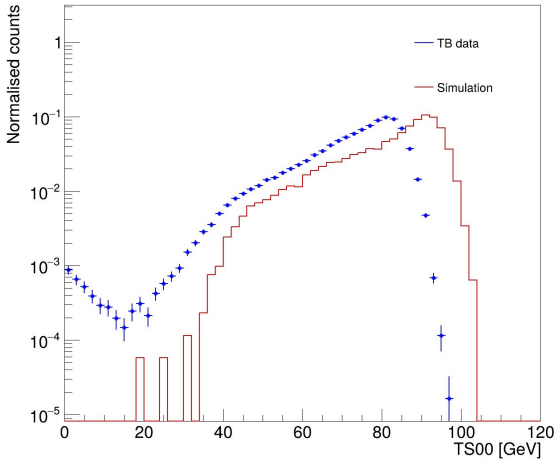
TS15 20 GeV



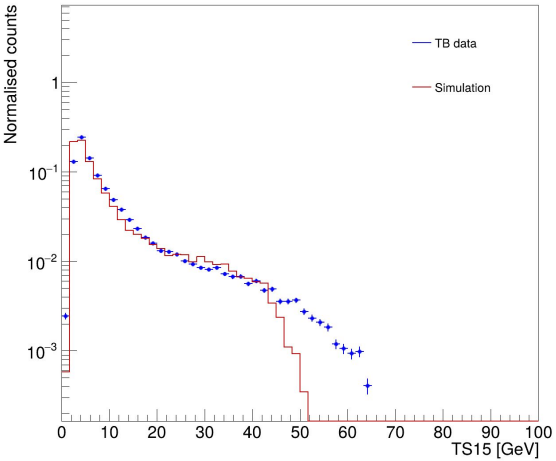
TS11 100 GeV



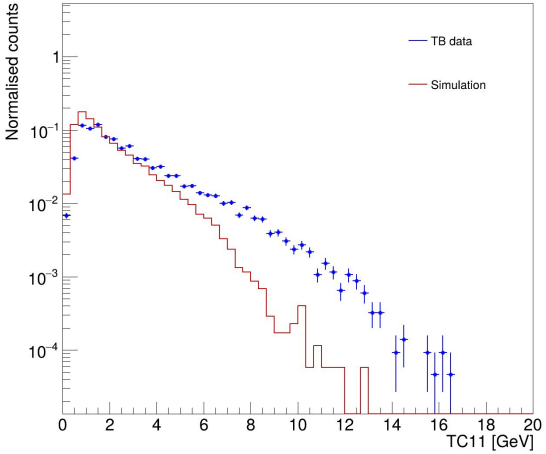
TS00 100 GeV



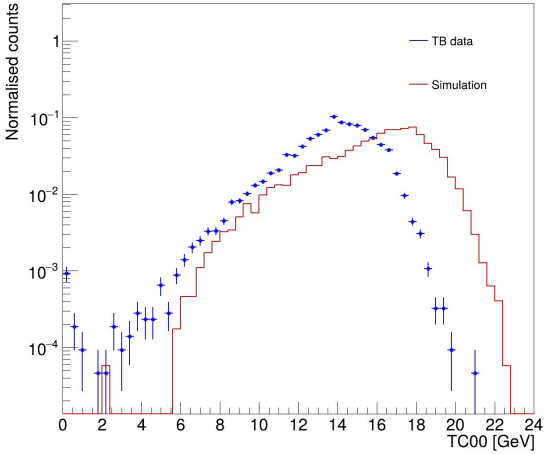
TS15 100 GeV



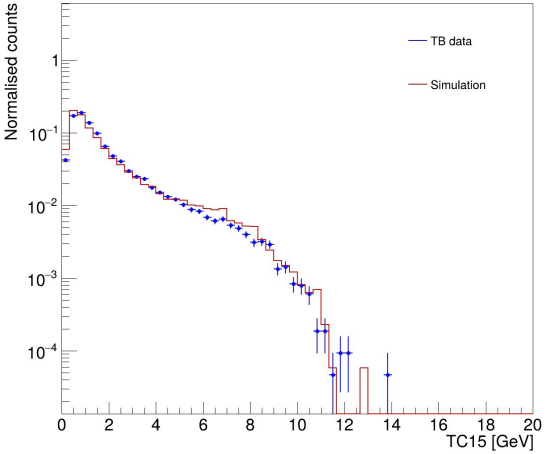
TC11 20 GeV



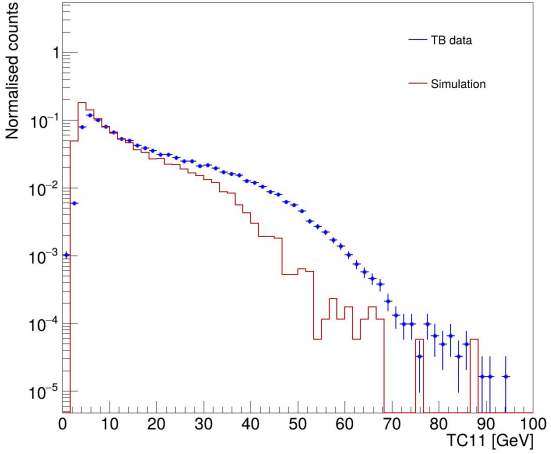
TC00 20 GeV



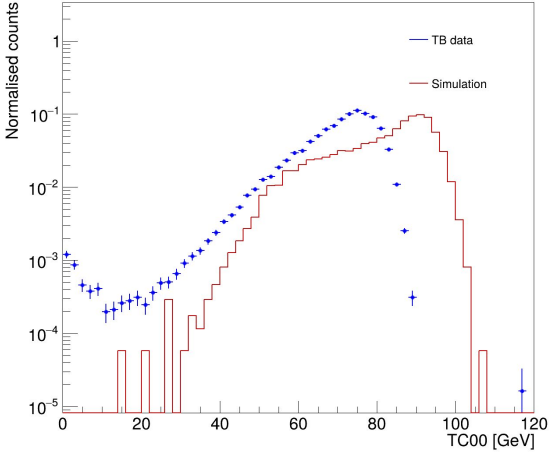
TC15 20 GeV



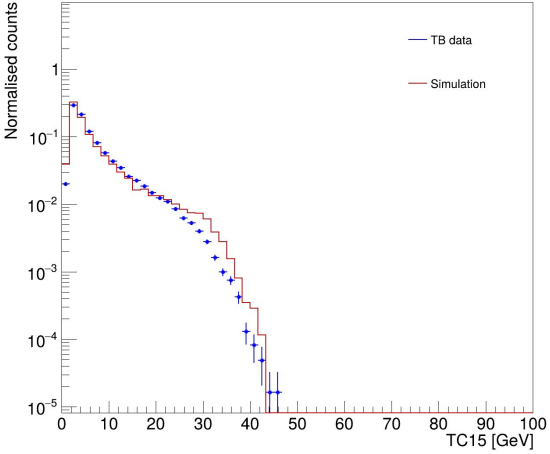
TC11 100 GeV

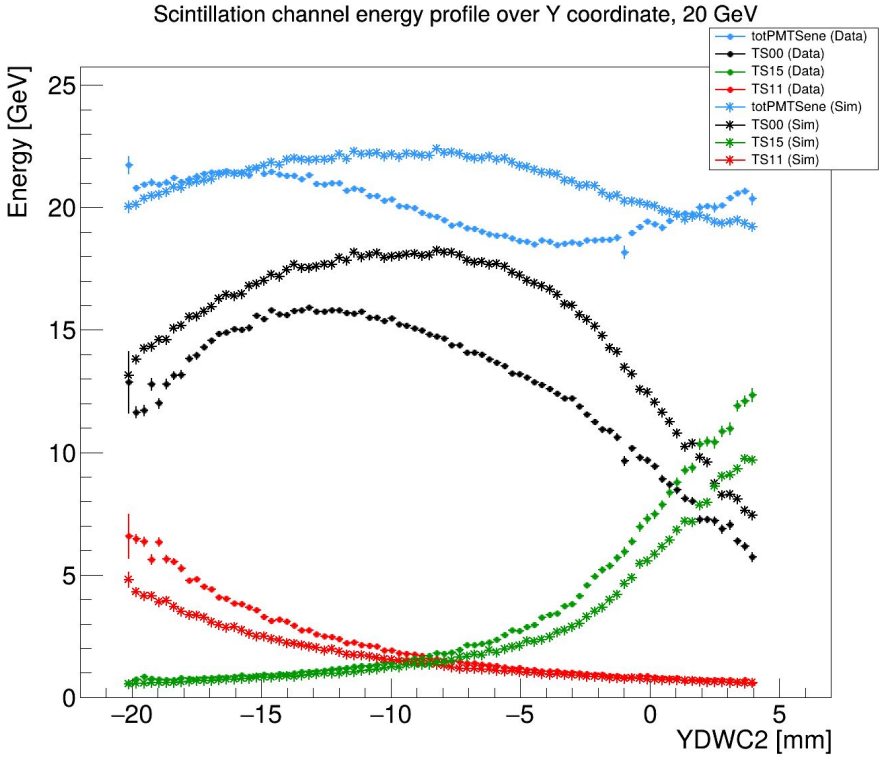


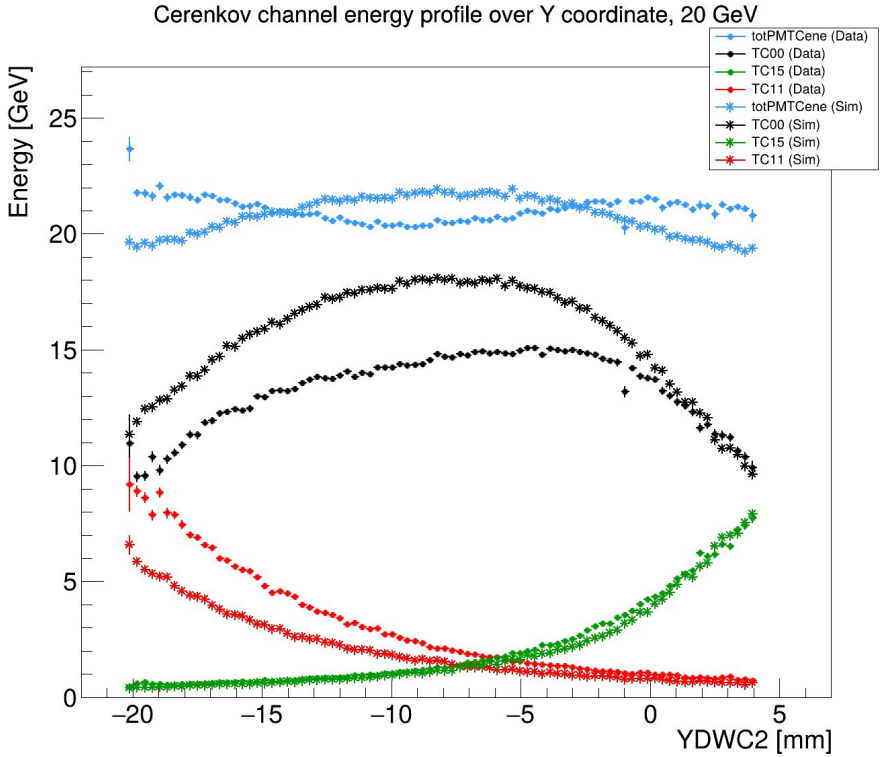
TC00 100 GeV



TC15 100 GeV

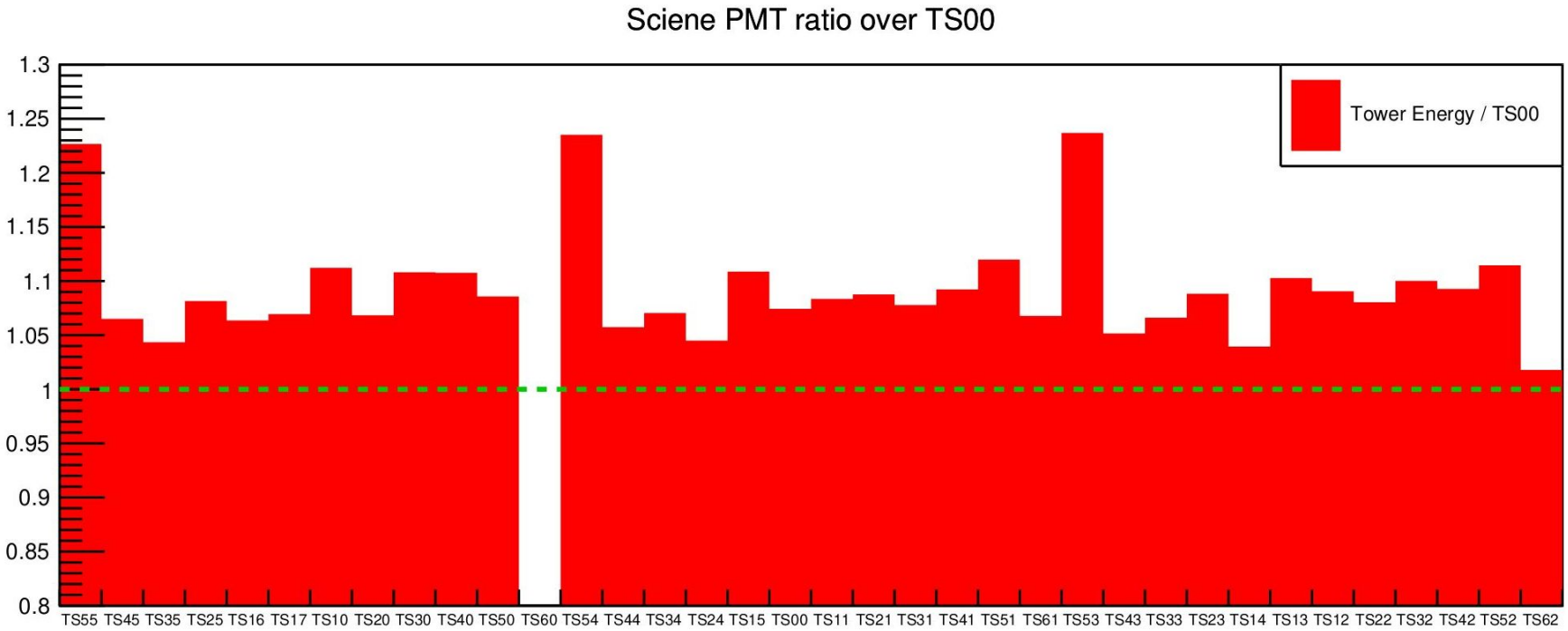



Scintillation channel energy profile over Y coordinate, 20 GeV
totPMTSene (Data)
TS00 (Data)
TS15 (Data)
TS11 (Data)
totPMTSene (Sim)
TS00 (Sim)
TS15 (Sim)
TS11 (Sim)
Energy [GeV]
YDWC2 [mm]


Cerenkov channel energy profile over Y coordinate, 20 GeV
totPMTCene (Data)
TC00 (Data)
TC15 (Data)
TC11 (Data)
totPMTCene (Sim)
TC00 (Sim)
TC15 (Sim)
TC11 (Sim)
Energy [GeV]
YDWC2 [mm]

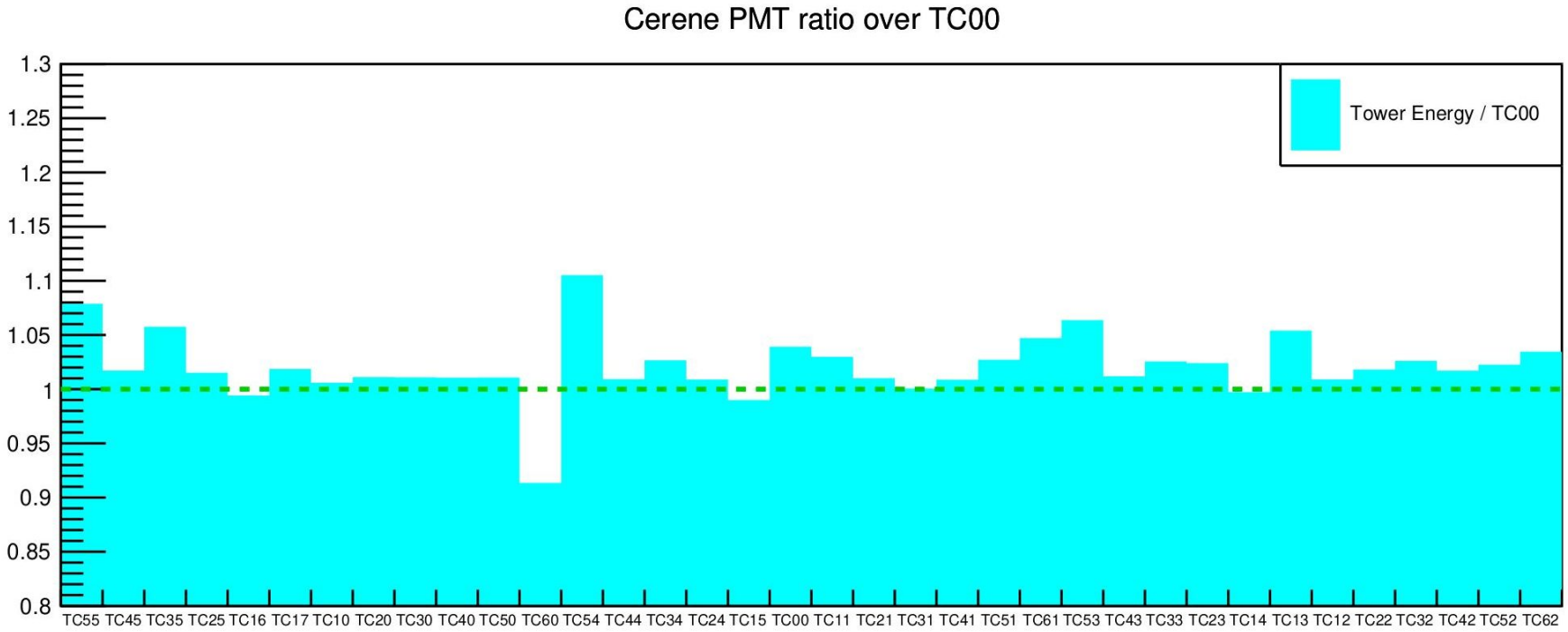
Electron equalisation runs

Following plots show comparisons of variables seen in equalisation runs and the ones in run 0766 used for electron energy linearity and resolution extraction
Showing tower where we are shooting at in equalisation run over T00 in run 0766



Electron equalisation runs

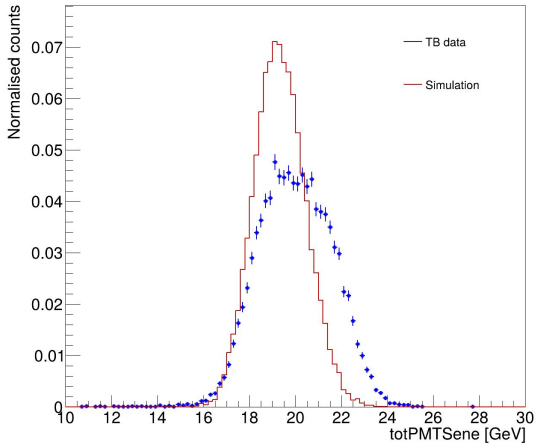
Following plots show comparisons of variables seen in equalisation runs and the ones in run 0766 used for electron energy linearity and resolution extraction
Showing tower where we are shooting at in equalisation run over T00 in run 0766



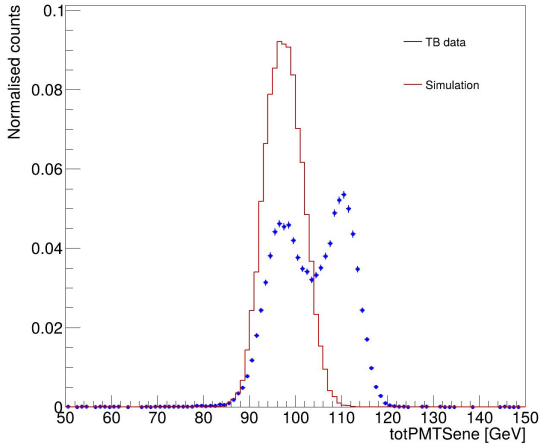
A few tests to try describing TB data

- Increase to 3 the number of rows of fibers with dishomogeneity
- Reduce to 75% the energy observed ONLY in TS00, TC00
- Increase phe/GeV ratio (make other towers more important in energy contribution)
  Phe/GeV (S) = 185
  Phe/GeV (C) = 30.3

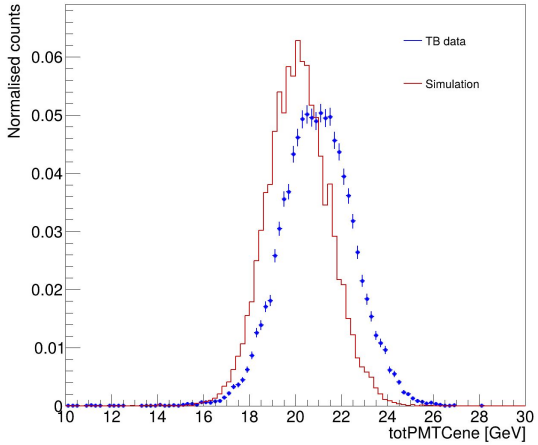
totPMTSene 20 GeV



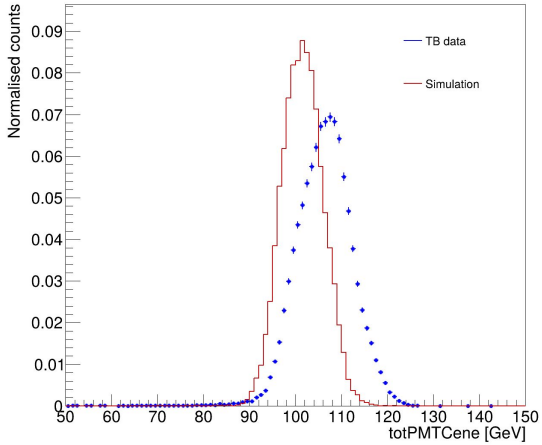
totPMTSene 100 GeV

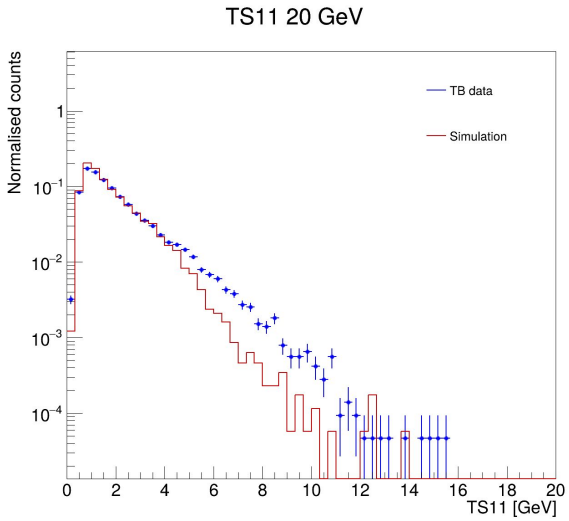


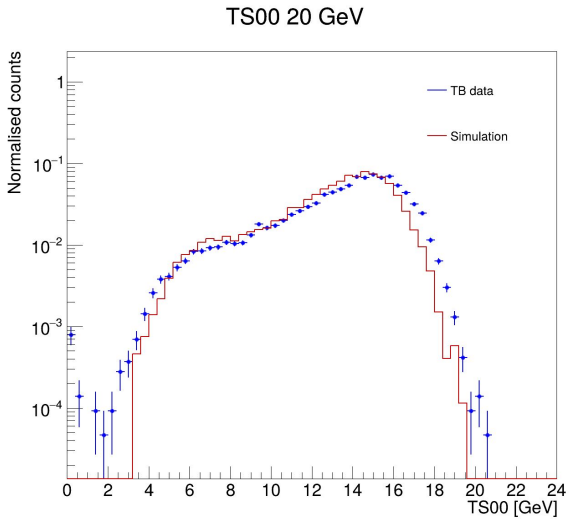
totPMTCene 20 GeV

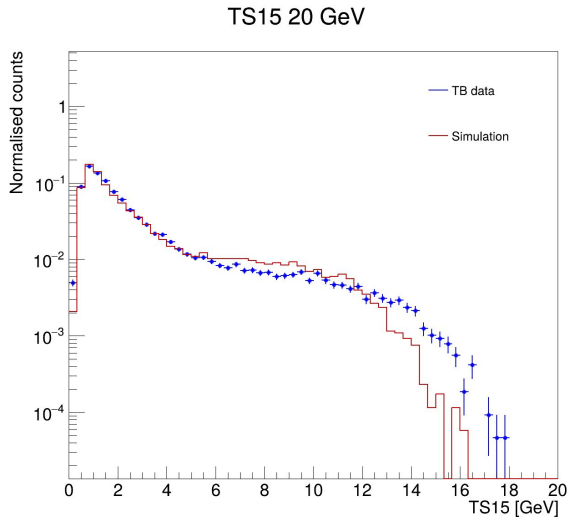


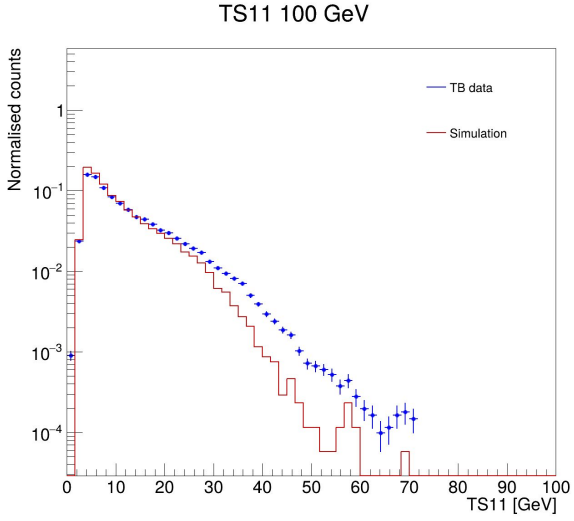
totPMTCene 100 GeV

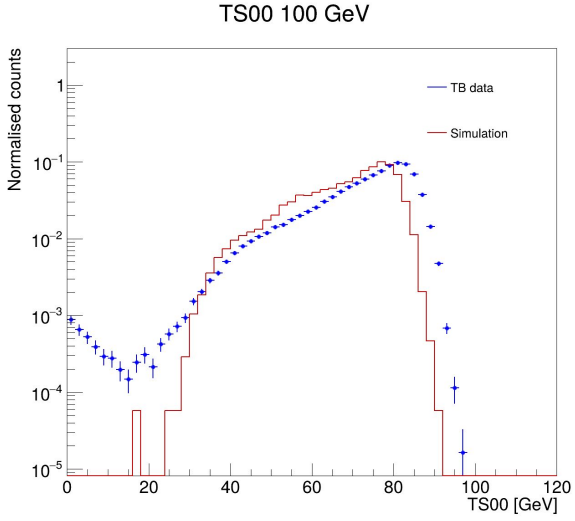


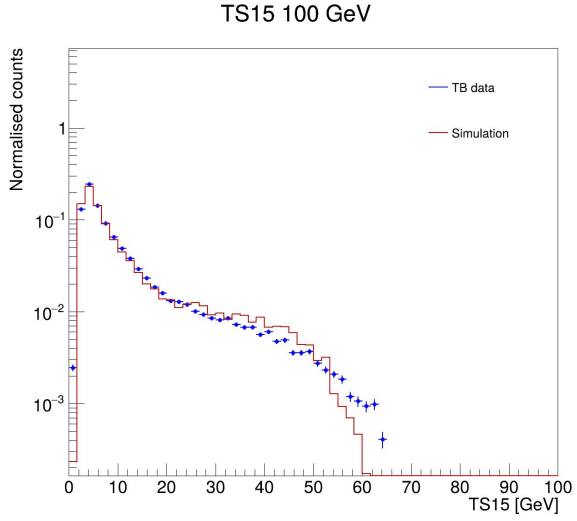

TS11 20 GeV
Normalised counts
TB data
Simulation
TS11 [GeV]

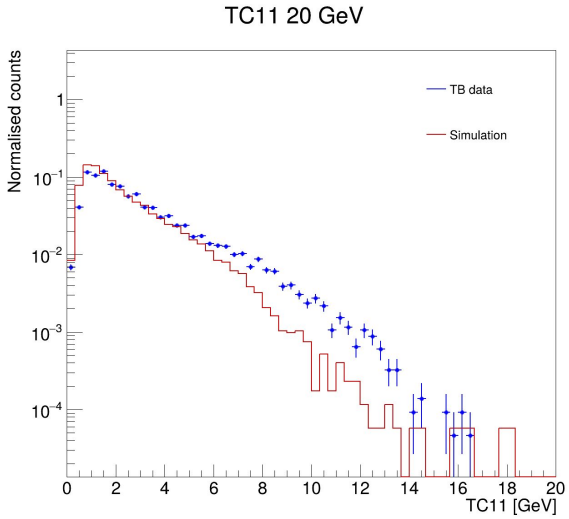

TS00 20 GeV
Normalised counts
TB data
Simulation
TS00 [GeV]

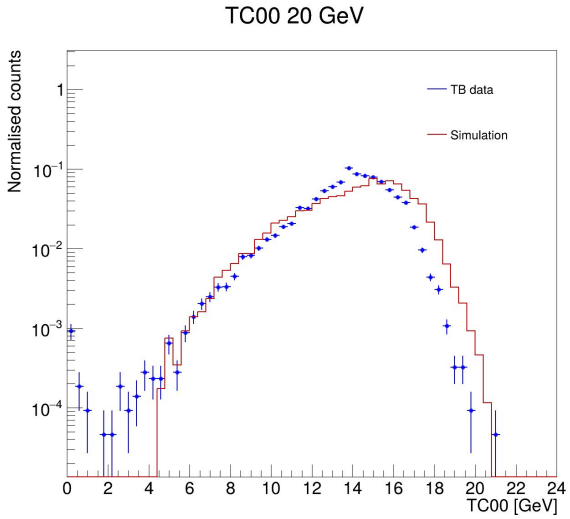

TS15 20 GeV
Normalised counts
TB data
Simulation
TS15 [GeV]

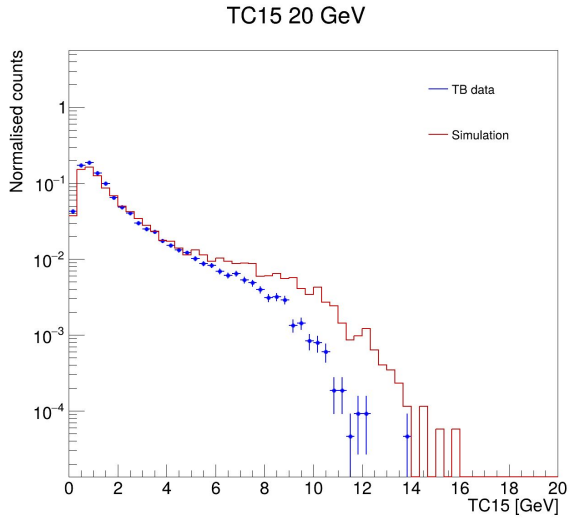

TS11 100 GeV
Normalised counts
TB data
Simulation
TS11 [GeV]

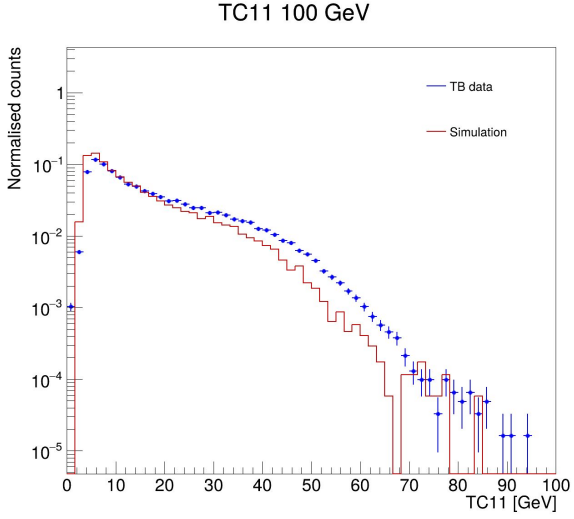

TS00 100 GeV
Normalised counts
TB data
Simulation
TS00 [GeV]

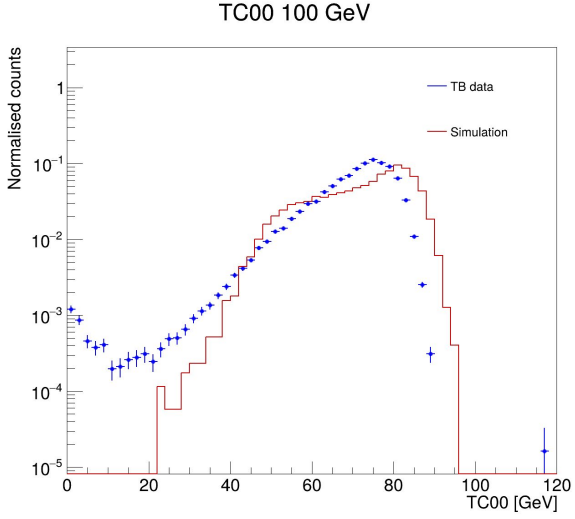

TS15 100 GeV
Normalised counts
TB data
Simulation
TS15 [GeV]

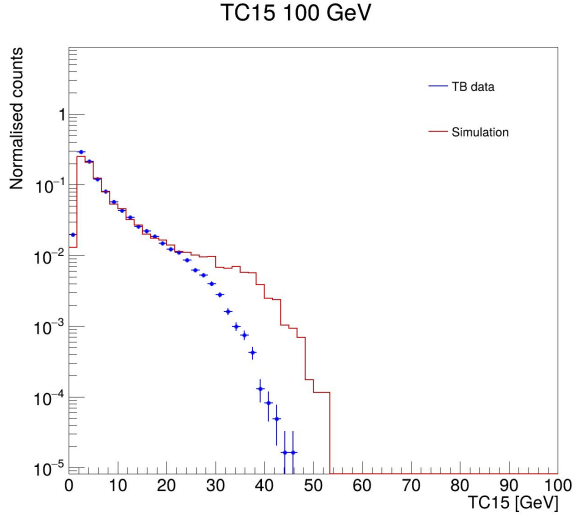

TC11 20 GeV
Normalised counts
TB data
Simulation
TC11 [GeV]

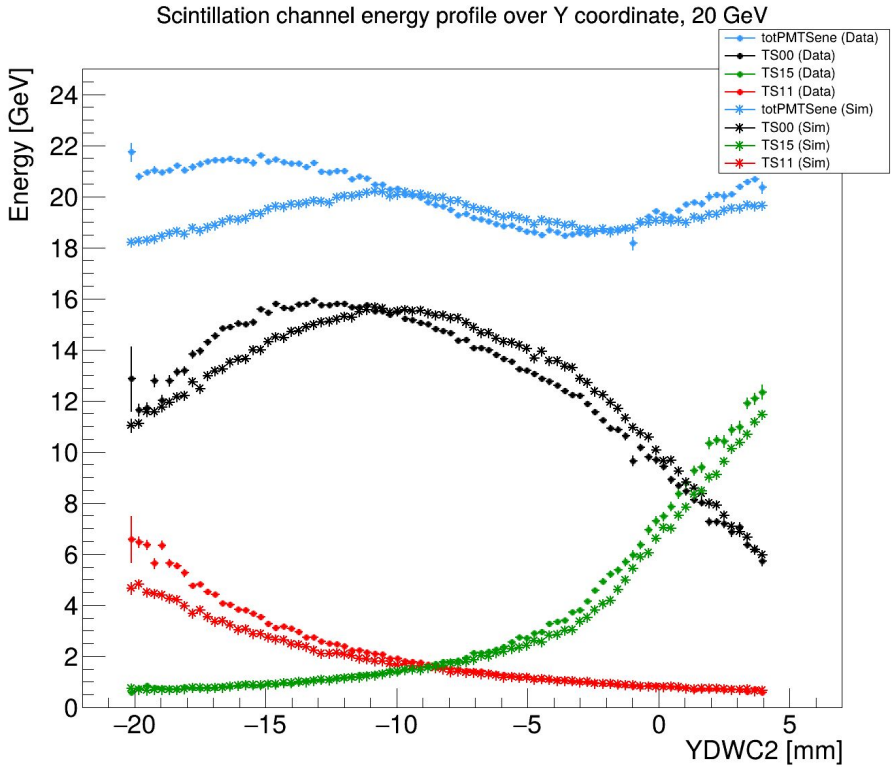

TC00 20 GeV
Normalised counts
TB data
Simulation
TC00 [GeV]

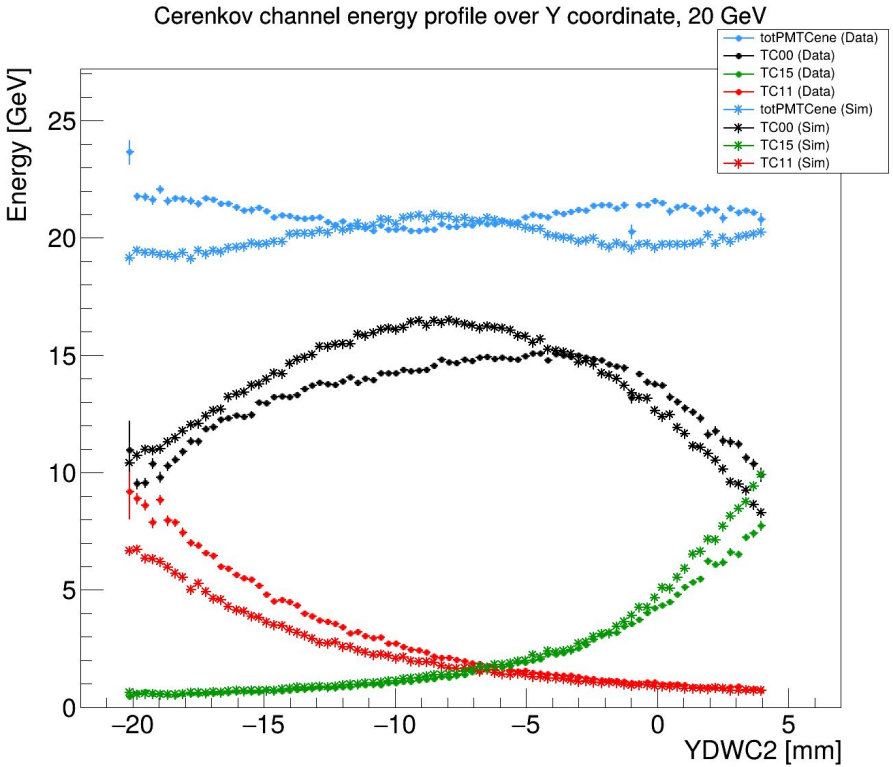

TC15 20 GeV
Normalised counts
TB data
Simulation
TC15 [GeV]

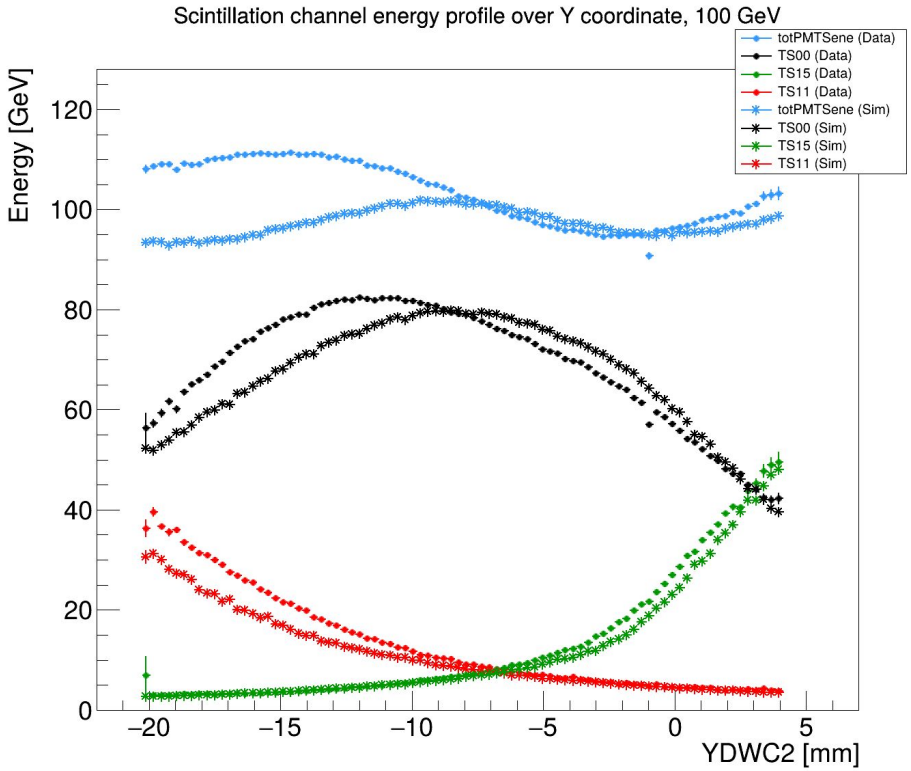

TC11 100 GeV
Normalised counts
TB data
Simulation
TC11 [GeV]

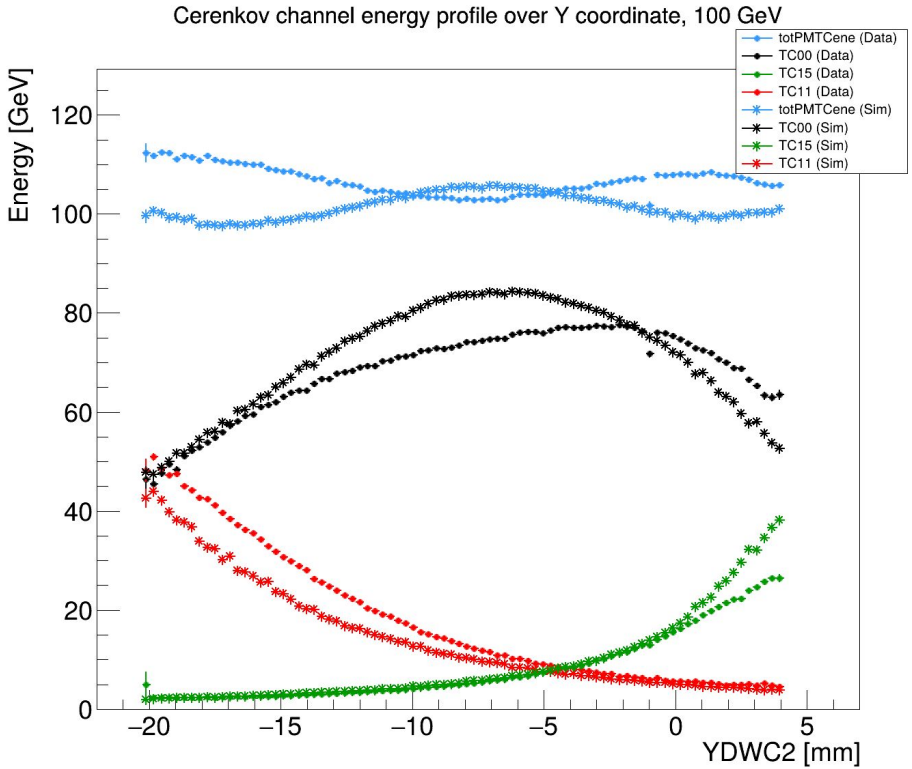

TC00 100 GeV
Normalised counts
TB data
Simulation
TC00 [GeV]


TC15 100 GeV
Normalised counts
TB data
Simulation
TC15 [GeV]


Scintillation channel energy profile over Y coordinate, 20 GeV
totPMTSene (Data)
TS00 (Data)
TS15 (Data)
TS11 (Data)
totPMTSene (Sim)
TS00 (Sim)
TS15 (Sim)
TS11 (Sim)
Energy [GeV]
YDWC2 [mm]

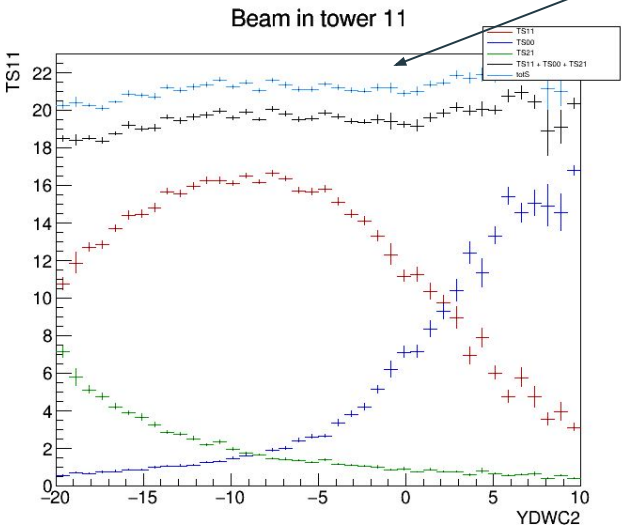

Cerenkov channel energy profile over Y coordinate, 20 GeV
totPMTCene (Data)
TC00 (Data)
TC15 (Data)
TC11 (Data)
totPMTCene (Sim)
TC00 (Sim)
TC15 (Sim)
TC11 (Sim)
Energy [GeV]
YDWC2 [mm]

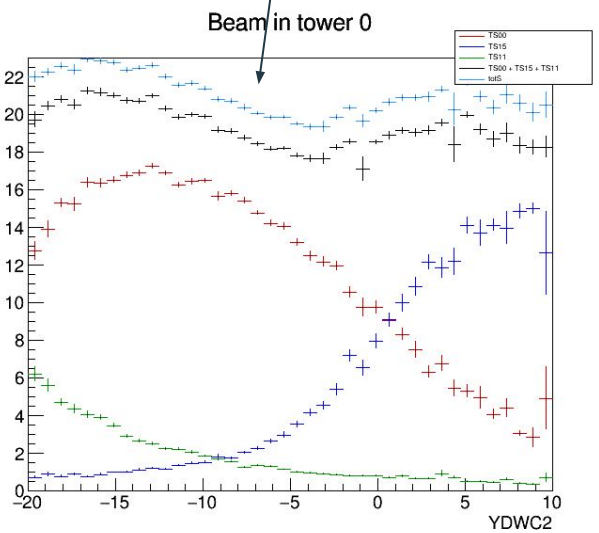

Scintillation channel energy profile over Y coordinate, 100 GeV
totPMTSene (Data)
TS00 (Data)
TS15 (Data)
TS11 (Data)
totPMTSene (Sim)
TS00 (Sim)
TS15 (Sim)
TS11 (Sim)
Energy [GeV]
YDWC2 [mm]

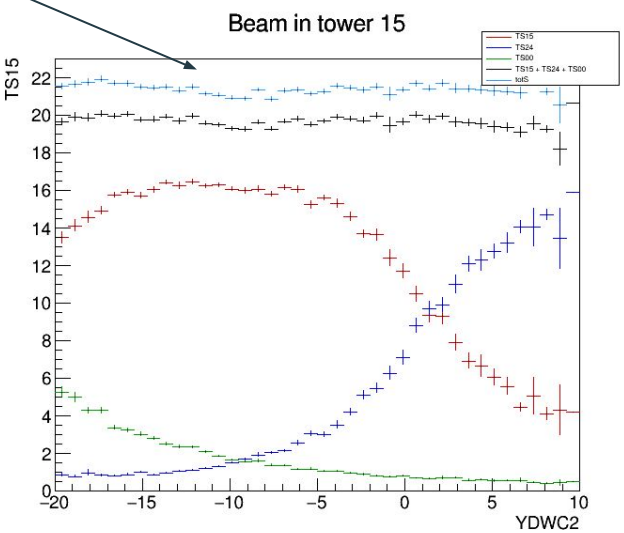

Cerenkov channel energy profile over Y coordinate, 100 GeV
totPMTCene (Data)
TC00 (Data)
TC15 (Data)
TC11 (Data)
totPMTCene (Sim)
TC00 (Sim)
TC15 (Sim)
TC11 (Sim)
Energy [GeV]
YDWC2 [mm]

S channel, T11, T00, T15

Have we shot in the worst tower possible?



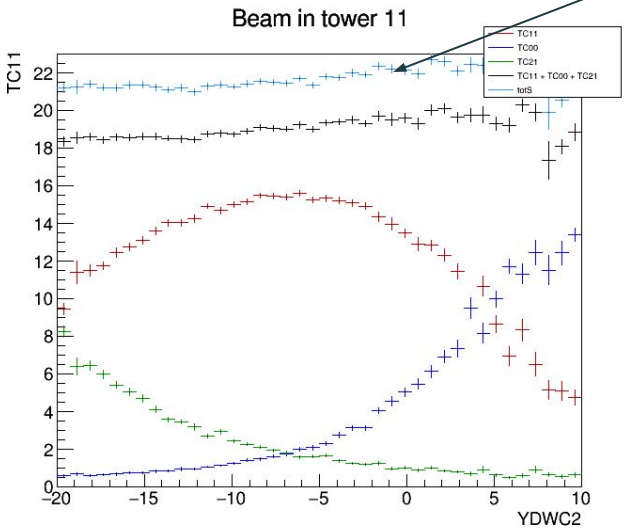


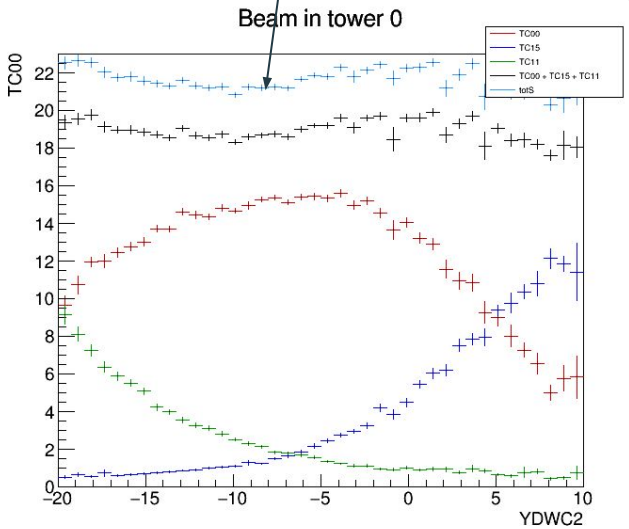


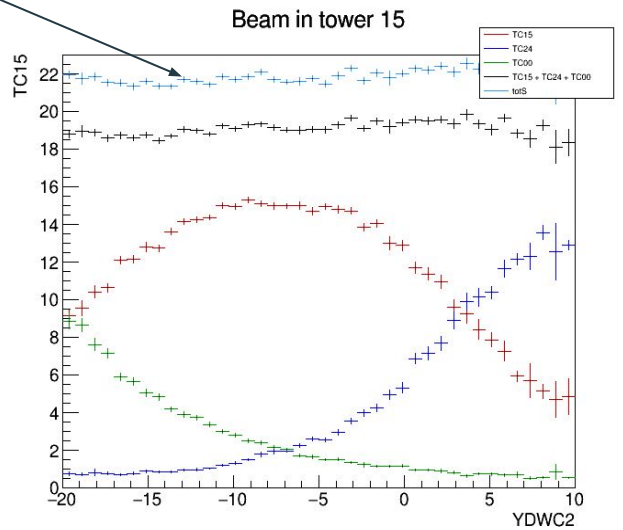
Y [mm]

C channel, T11, T00, T15

Have we shot in the worst tower possible?







Y [mm]

Backup