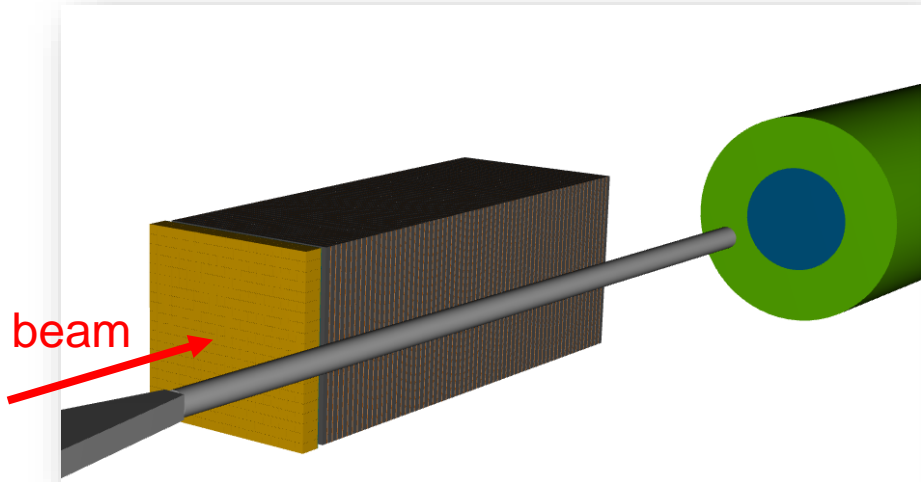




ZDC ML Developement

20241106

Beam Setting



Command line :
#under dyparton
#under eic-shell
> ddsim --steeringFile steering_gamma_atZDC.py --compactFile
\$DETECTOR_PATH/\$DETECTOR_CONFIG.xml --outputFile
gammaAtZDC_1GeVto20GeV/outfile_steering_gamma_atZDC_
1GeVto20GeV_1000evt_run\${runN}.root

Steering.py

```
import math

from DDSim.DD4hepSimulation import DD4hepSimulation
from g4units import cm, mm, GeV, MeV, degree, radian
SIM = DD4hepSimulation()

energyMin = "1*GeV"
energyMax = "20*GeV"
particle = "gamma"

ionCrossingAngle = -0.025 * radian
ZDC_r_pos = 3550 * cm
ZDC_x_pos = ZDC_r_pos * math.sin(-0.025)
ZDC_y_pos = 0 * cm
ZDC_z_pos = ZDC_r_pos * math.cos(-0.025)

SIM.numberOfEvents = 1000

SIM.enableGun = True
SIM.gun.position = (ZDC_x_pos, ZDC_y_pos, ZDC_z_pos)
SIM.gun.particle = particle
SIM.gun.momentumMin = eval(energyMin)
SIM.gun.momentumMax = eval(energyMax)
#SIM.gun.direction = (math.sin(-0.025), 0, math.cos(-0.025))
SIM.gun.thetaMin = ionCrossingAngle
SIM.gun.thetaMax = ionCrossingAngle
SIM.gun.phiMin = 0*degree
SIM.gun.phiMax = 0*degree
SIM.gun.distribution = "uniform"
SIM.gun.multiplicity = 1
```

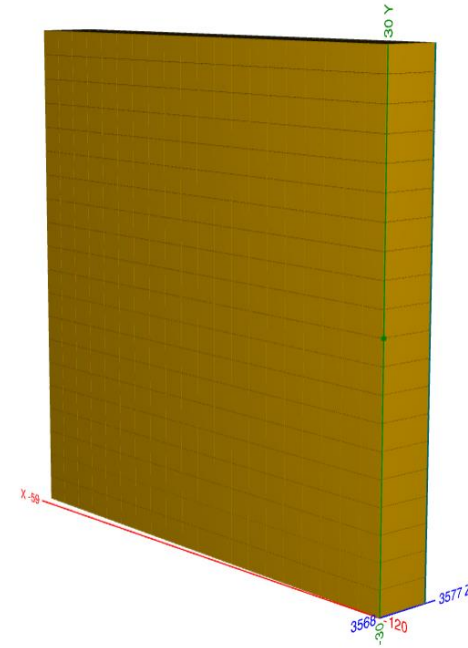
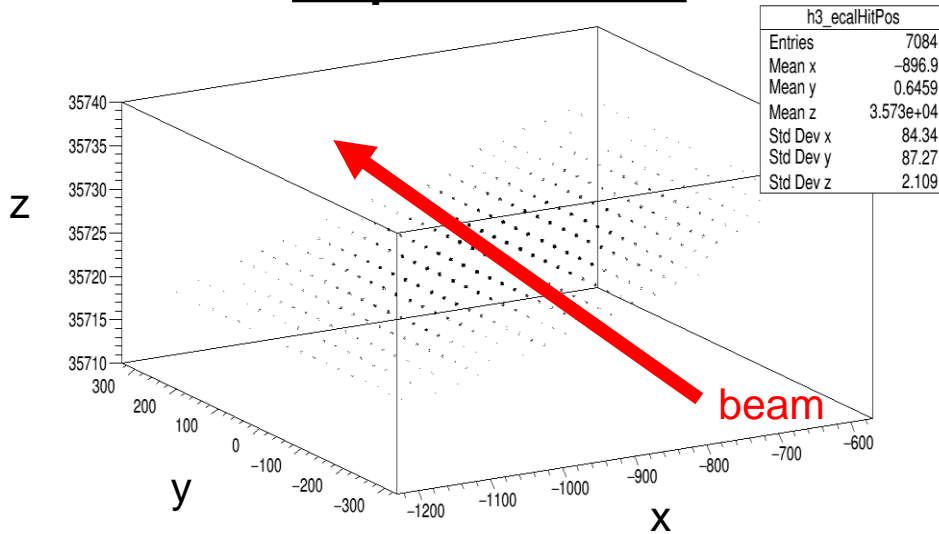
beam type
and energy

beam angle

beam position

Draw Hits and Save Tree

Hit position in 3D



- save ecal info to myTree

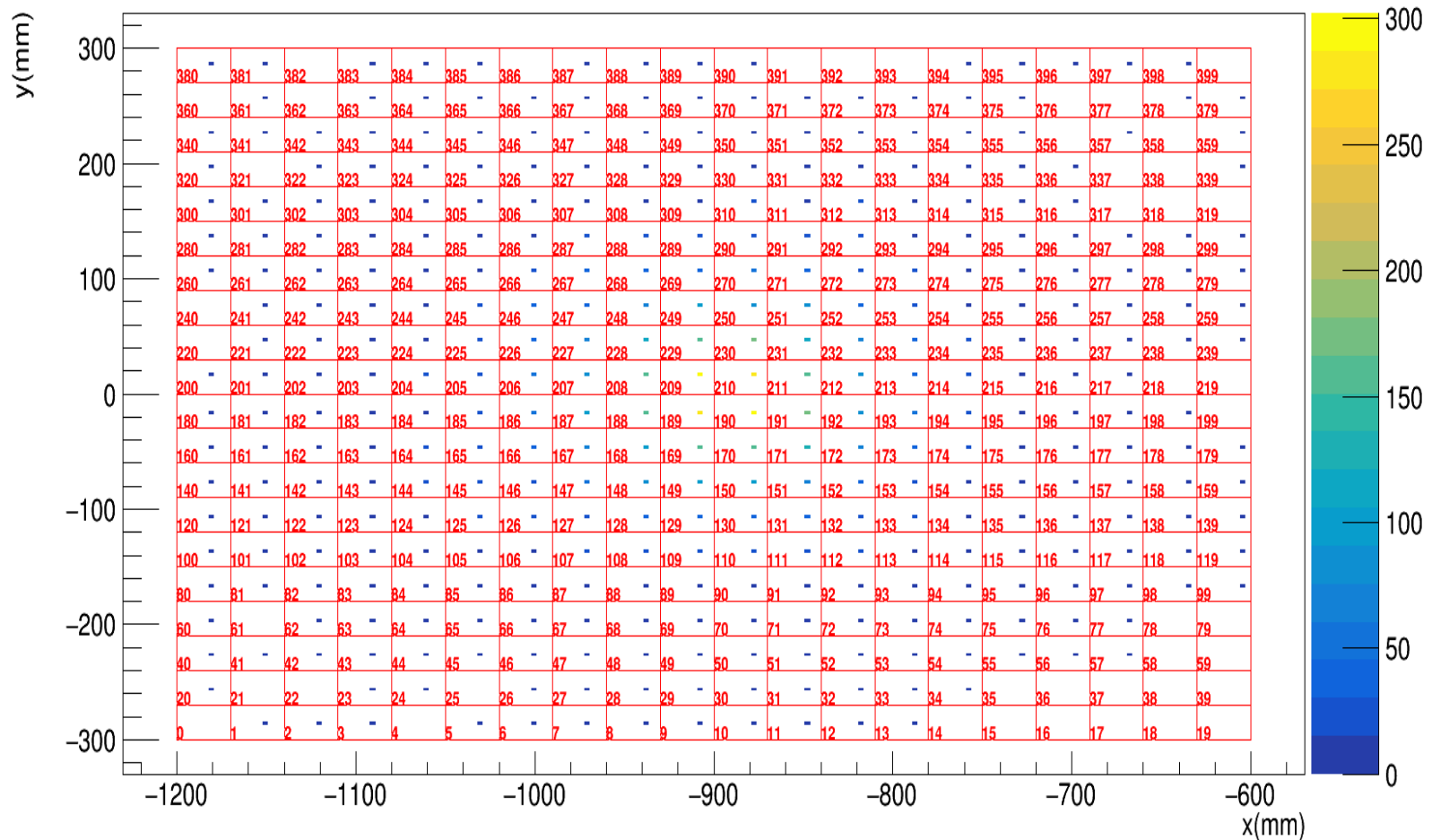
```
ecal_cellID.push_back(ecalID)
ecal_energy.push_back(EcalHits_energy)
ecal_posX.push_back(EcalHits_posX)
ecal_posY.push_back(EcalHits_posY)
ecal_posZ.push_back(EcalHits_posZ)
```

- save MC particle info to myTree

```
mcPar_PDG .push_back(MCpar_PDG)
mcPar_mass .push_back(MCpar_mass)
mcPar_momX .push_back(MCpar_momX)
mcPar_momY .push_back(MCpar_momY)
mcPar_momZ .push_back(MCpar_momZ)
mcPar_energy.push_back(MCpar_energy)
```

10, 000 events has been saved and passed to 馨毅

Project to XY



cellID is self defined.

Next

- Wait for 馨毅's feedback and generate more sample
- Setup eic-shell environment under grid server (錫泓?)