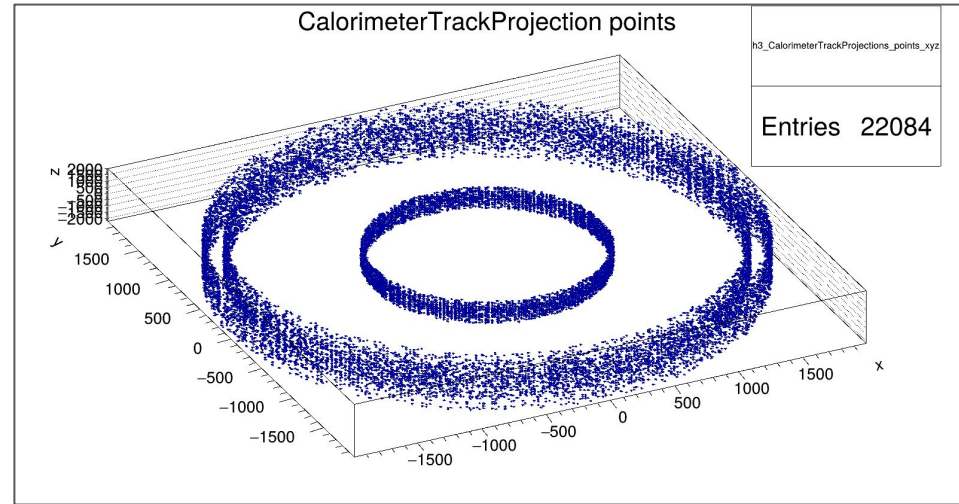
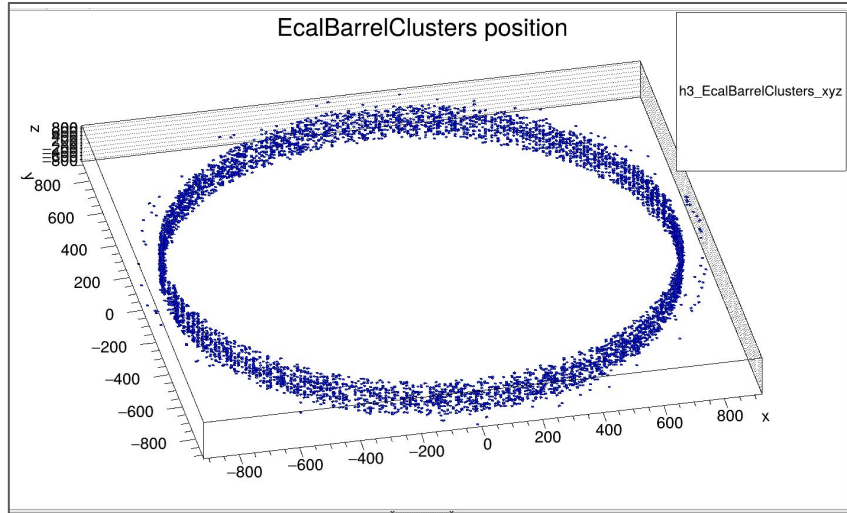


# Observations for track projections to calorimeters

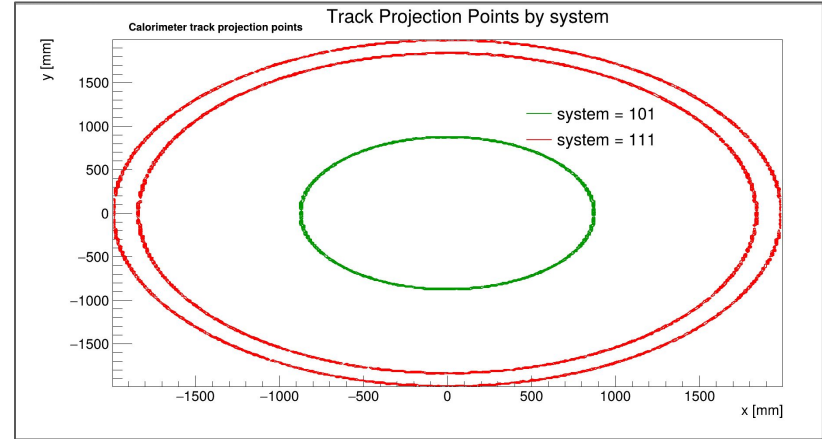
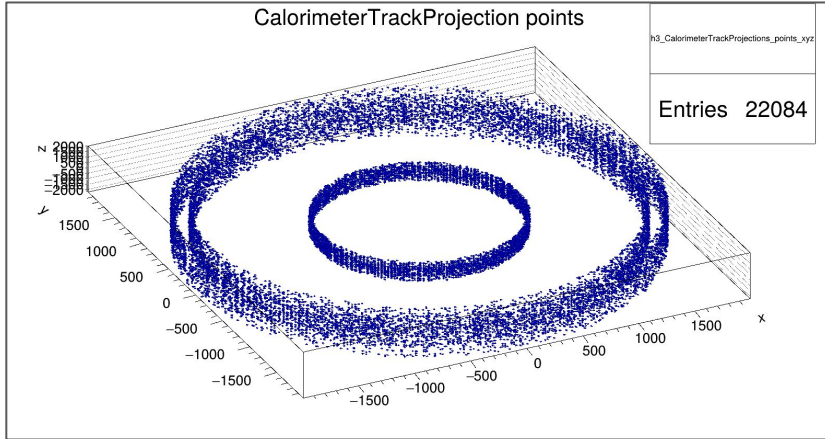
Diego Cristancho

# Ecal clusters and Track projection points for single electrons

[root://dtn-eic.jlab.org/volatile/eic/EPIC/RECO/26.02.0/epic\\_craterlake/SINGLE/e-/5GeV/45to135deg/e-\\_5GeV\\_45to135deg.0000.eicrecon.edm4eic.root](http://dtn-eic.jlab.org/volatile/eic/EPIC/RECO/26.02.0/epic_craterlake/SINGLE/e-/5GeV/45to135deg/e-_5GeV_45to135deg.0000.eicrecon.edm4eic.root)

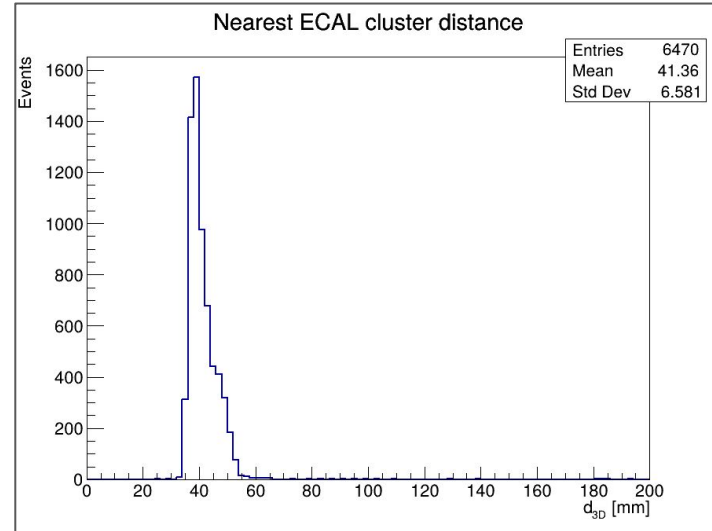
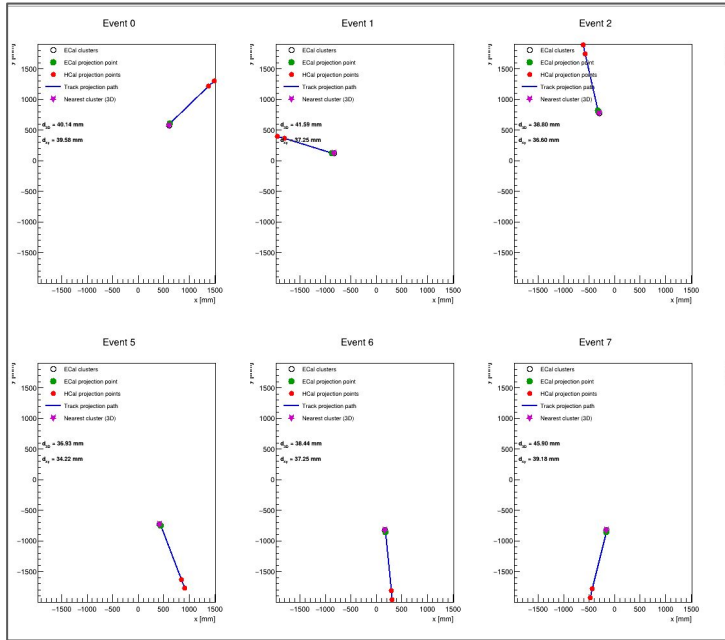


# Ecal track projection divided by system



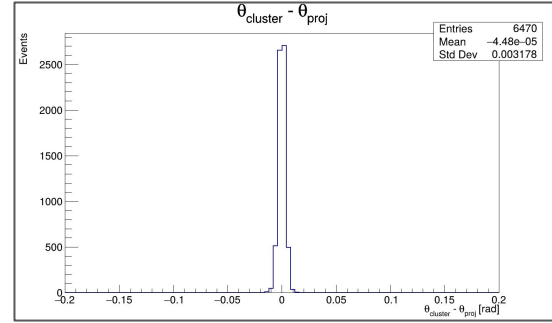
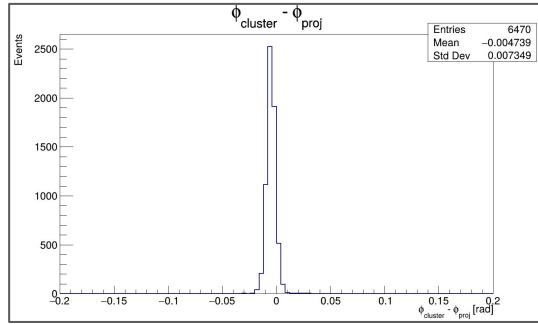
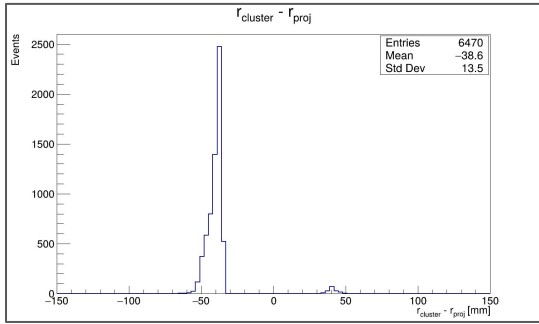
We see the two rings where system 101 would be the Ecal and 111 the Hcal.

# Event tracks and cluster position and Cluster Distance



What is the Single reconstructed point of the Ecal?  
 -weighted center?  
 -position estimate at the calorimeter face?

# Finding the cluster - projection distance

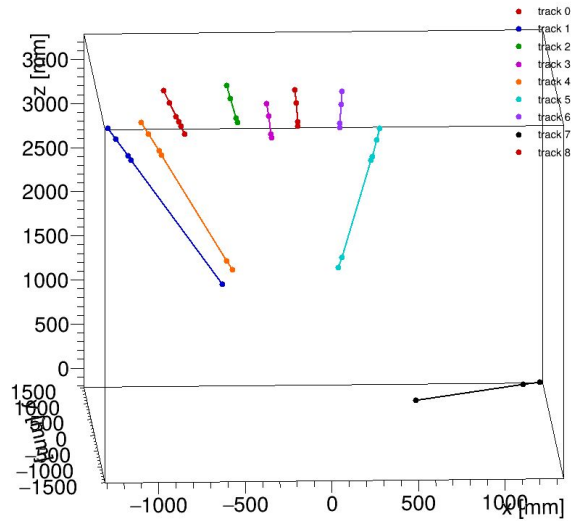


- Good agreement is observed in the angular variables  $\phi$  and  $\theta$ .
- The  $r$  cluster- $r$  proj distribution is significantly shifted from zero.

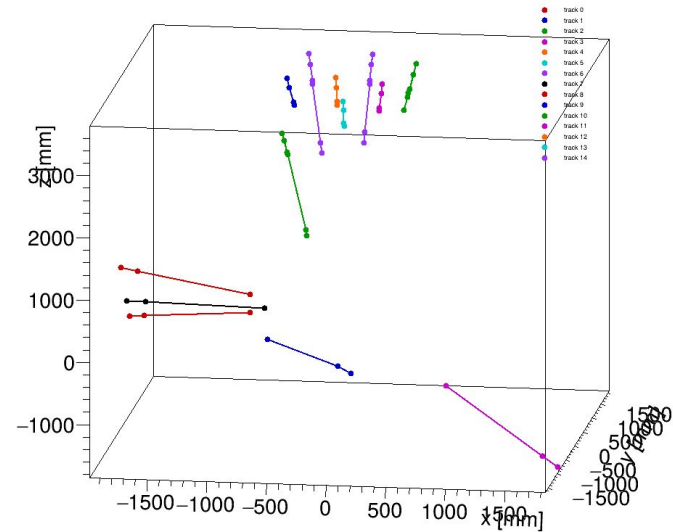
# Moving to DIS events

root://dtn-eic.ilab.org/volatile/eic/EPIC/RECO/26.02.0/epic\_craterlake/DIS/NC/18x275/minQ2=100/pythia8NCDIS\_18x275\_minQ2=100\_beamEffects\_xAngle=-0.025\_hiDiv\_1.0000.eicrecon.edm4eic.root

Event 6 track projection points

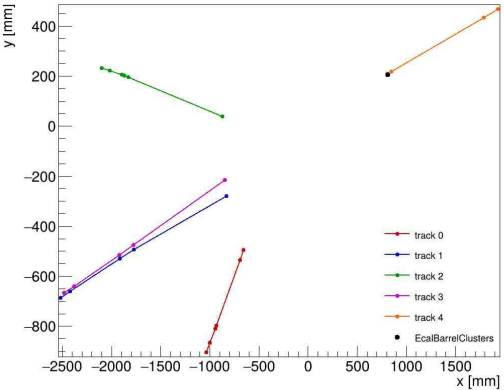


Event 2 track projection points

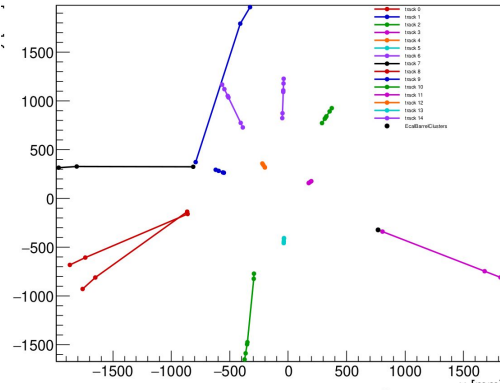


# Events Track projectio in y and x with the Ecal cluster.

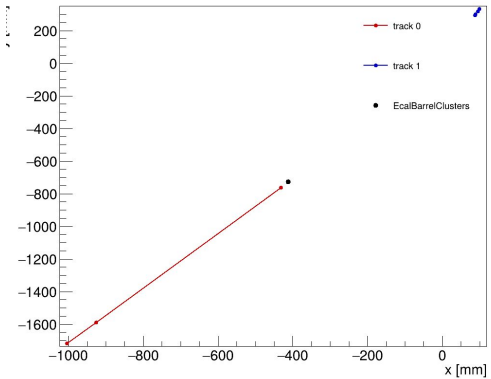
Event 1 track projection points and ECal clusters



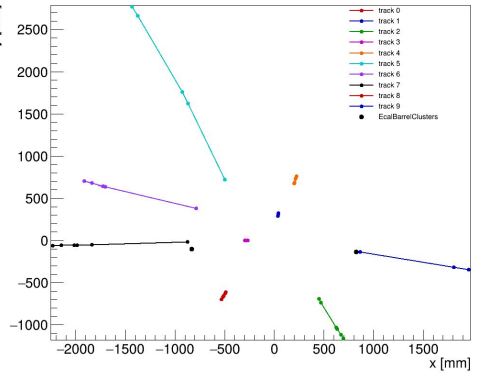
Event 2 track projection points and ECal clusters



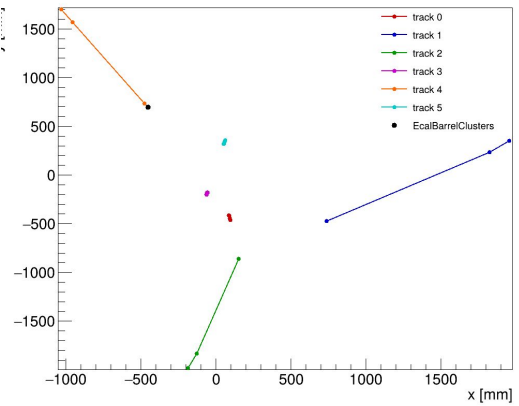
Event 3 track projection points and ECal clusters



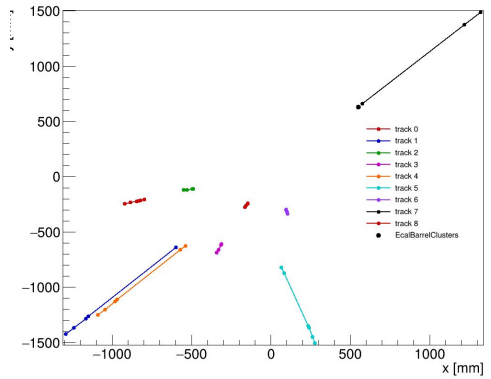
Event 4 track projection points and ECal clusters



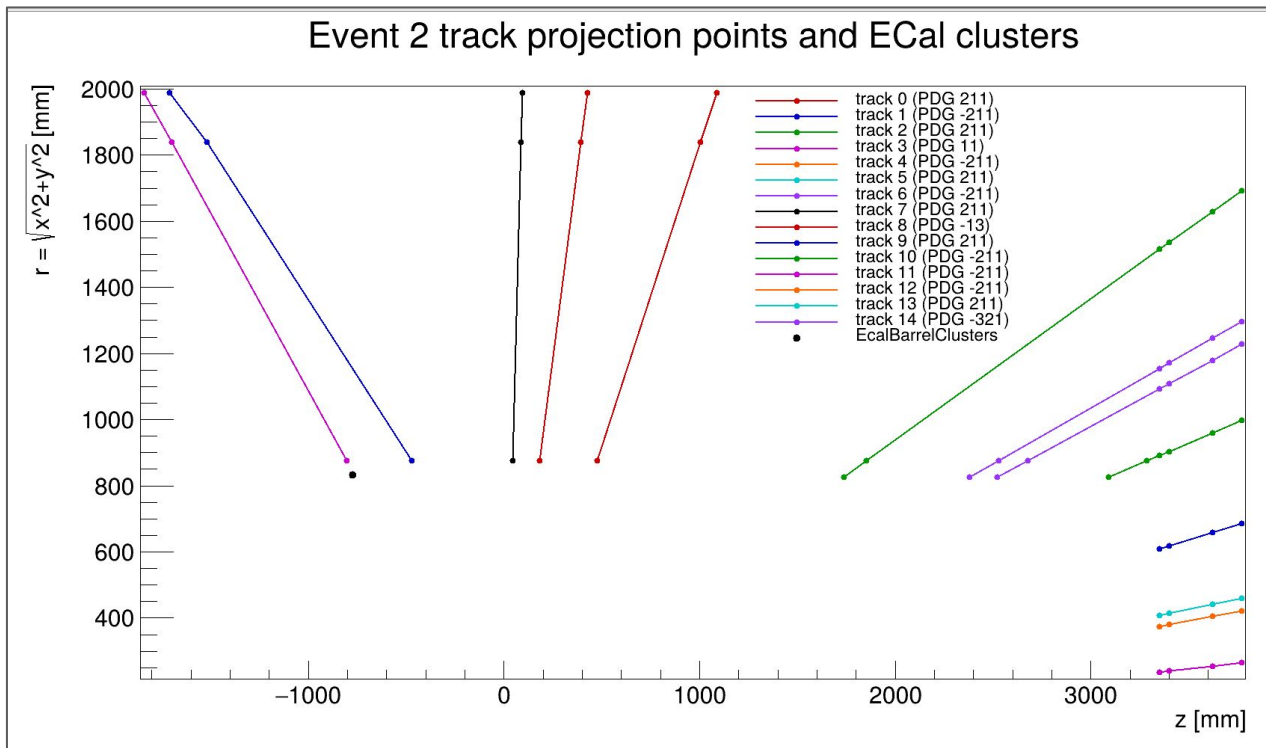
Event 5 track projection points and ECal clusters



Event 6 track projection points and ECal clusters



# r vs z for event 2 with PDG



-Only the electron creates a cluster.

-It seems like the projection points come in pairs.

-More projection points towards the forward region.

```
Projection 0
track.index      = 0
track.collectionID = 530999115
points_begin     = 0
points_end       = 3
n points         = 3
point 0: system=101, surface=2, x=-860.333, y=-159.540, z=476.575, r=875.000
point 1: system=111, surface=1, x=-1735.684, y=-606.205, z=1003.266, r=1838.500
point 2: system=111, surface=2, x=-1868.014, y=-681.656, z=1085.980, r=1988.500
```

```
Projection 1
track.index      = 1
track.collectionID = 530999115
points_begin     = 3
points_end       = 6
n points         = 3
point 3: system=101, surface=2, x=-791.794, y=372.408, z=-472.872, r=875.000
point 4: system=111, surface=1, x=-410.247, y=1792.144, z=-1519.044, r=1838.500
point 5: system=111, surface=2, x=-326.401, y=1961.529, z=-1709.422, r=1988.500
```

```
Projection 2
track.index      = 2
track.collectionID = 530999115
points_begin     = 6
points_end       = 12
n points         = 6
point 6: system=101, surface=1, x=-292.942, y=-771.239, z=1737.820, r=825.000
point 7: system=101, surface=2, x=-294.737, y=-823.866, z=1851.475, r=875.000
point 8: system=102, surface=1, x=-348.907, y=-1474.217, z=3350.000, r=1514.943
point 9: system=102, surface=2, x=-351.743, y=-1495.312, z=3400.000, r=1536.125
point 10: system=116, surface=1, x=-364.206, y=-1588.100, z=3620.000, r=1629.327
point 11: system=116, surface=2, x=-373.034, y=-1651.258, z=3770.000, r=1692.870
```

```
Projection 3
track.index      = 3
track.collectionID = 530999115
points_begin     = 12
points_end       = 15
n points         = 3
point 12: system=101, surface=2, x=806.269, y=-339.934, z=-802.707, r=875.000
point 13: system=111, surface=1, x=1680.236, y=-746.251, z=-1699.321, r=1838.500
point 14: system=111, surface=2, x=1816.219, y=-809.619, z=-1838.939, r=1988.500
```

-System 101 is the ECAL.

-A 50mm difference when system 101 appears twice.

-System 101 appears twice near the EDGE?

# Inside Tracking.cc

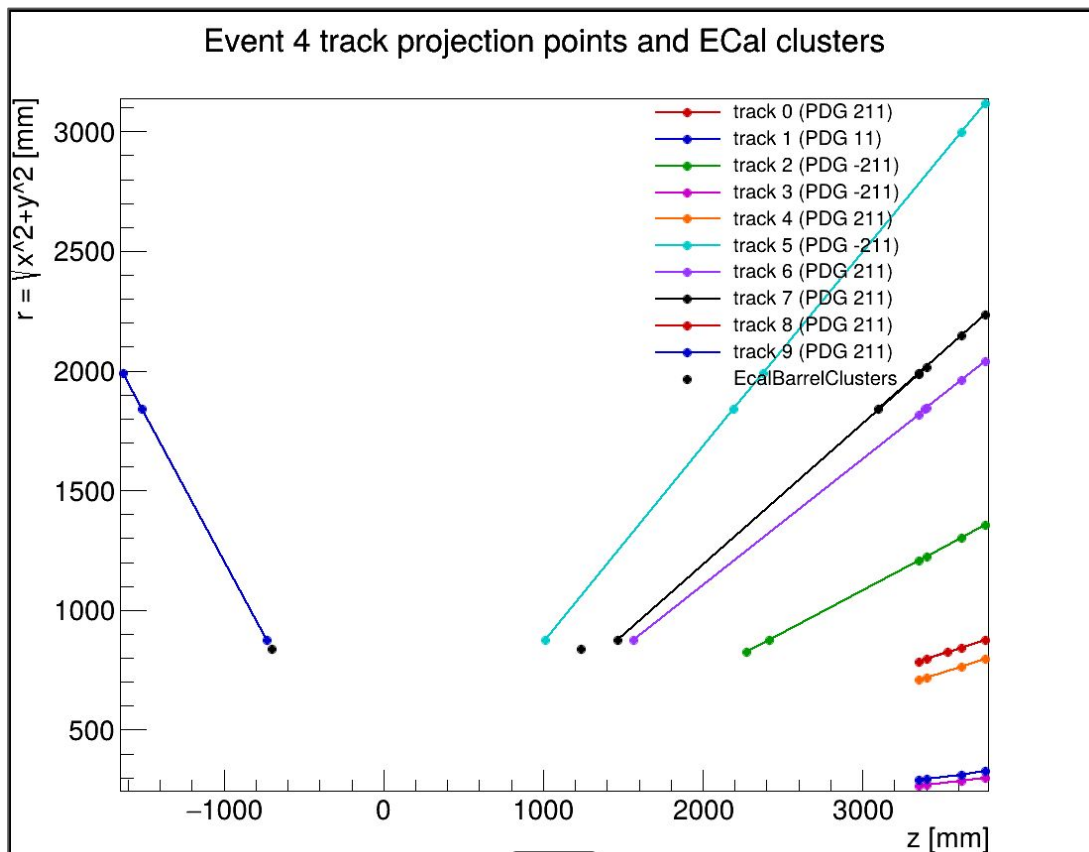
```
250 app->Add(new JOmniFactoryGeneratorT<TrackPropagation_factory>(  
251     "CalorimeterTrackPropagator",  
252     {"CentralCKFTracks", "CentralCKFActsTrackStates", "CentralCKFActsTracks"},  
253     {"CalorimeterTrackProjections"},  
254     {.target_surfaces{  
255         // Ecal  
256         eicrecon::DiscSurfaceConfig{.id = "EcalEndcapN_ID",  
257             .zmin = "- EcalEndcapN_zmin",  
258             .rmin = 0.,  
259             .rmax = "1.1*EcalEndcapN_rmax"},  
260         eicrecon::DiscSurfaceConfig{.id = "EcalEndcapN_ID",  
261             .zmin = "- EcalEndcapN_zmin - 50*mm",  
262             .rmin = 0.,  
263             .rmax = "1.1*EcalEndcapN_rmax"},  
264         eicrecon::CylinderSurfaceConfig{  
265             .id = "EcalBarrel_ID",  
266             .rmin = "EcalBarrel_rmin",  
267             .zmin = "- 1.1*max(EcalBarrelBackward_zmax,EcalBarrelForward_zmax)",  
268             .zmax = "1.1*max(EcalBarrelBackward_zmax,EcalBarrelForward_zmax)"},  
269         eicrecon::CylinderSurfaceConfig{  
270             .id = "EcalBarrel_ID",  
271             .rmin = "EcalBarrel_rmin + 50*mm",  
272             .zmin = "- 1.1*max(EcalBarrelBackward_zmax,EcalBarrelForward_zmax)",  
273             .zmax = "1.1*max(EcalBarrelBackward_zmax,EcalBarrelForward_zmax)"},
```

-The track projection point is at  
“EcalBarrel\_rmin +50mm”

-The Projection at  
“EcalBarrel\_rmin” is missing at  
the center of the Barrel

Thanks for your attention

# r vs z for event 4 with PDG



-Two clusters.

-It seems like the projection points come in pairs.

-More projection points towards the forward region.