

Studies of Number of Hits (Generation Level)

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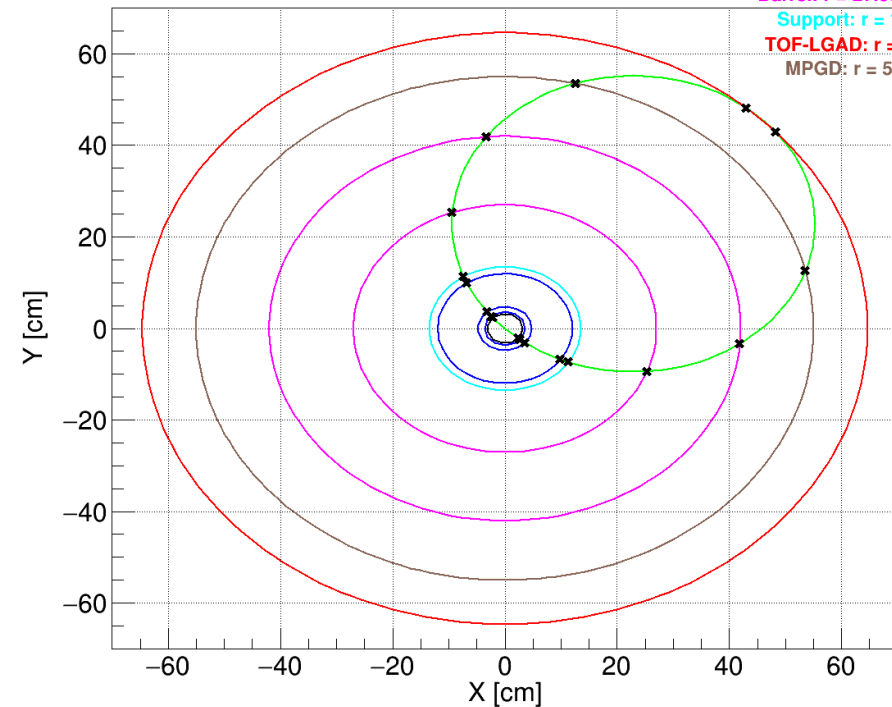
EPIC Configuration

epic_brycecanyon.xml with calorimeters and far forward detectors removed
Curling tracks

```
shyam@shyam:~/eic/epic$ git tag -l
22.10.0
22.10_rc1
22.11.0
shyam@shyam:~/eic/epic$ git checkout 22.10.0
shyam@shyam:~/eic/epic$ git pull origin main
```

Track $p_T = 0.1650$ (GeV/c)

Beam Pipe: $r = 3.18$ cm
Vtx: $r = 3.60, 4.80, 12.00$ cm
Barrel: $r = 27.00, 42.00$ cm
Support: $r = 13.50$ cm
TOF-LGAD: $r = 64.60$ cm
MPGD: $r = 55.00$ cm



<https://github.com/eic/epic/blob/main/compact/definitions.xml>

```
<constant name="Solenoid_rmin" value="1420.0*mm"/>
```

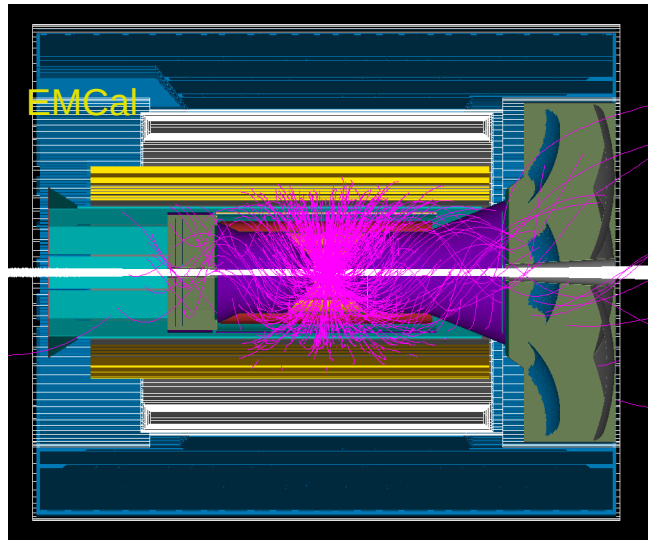
$$p_{Tmin} = 0.3 * 1.7 * 1.42 / 2 = 0.3621 \text{ GeV/c}$$

Barrel EMCal

$$P_{Tmin} = 0.3 * 1.7 * 0.78 / 2 = 0.199 \text{ GeV/c}$$

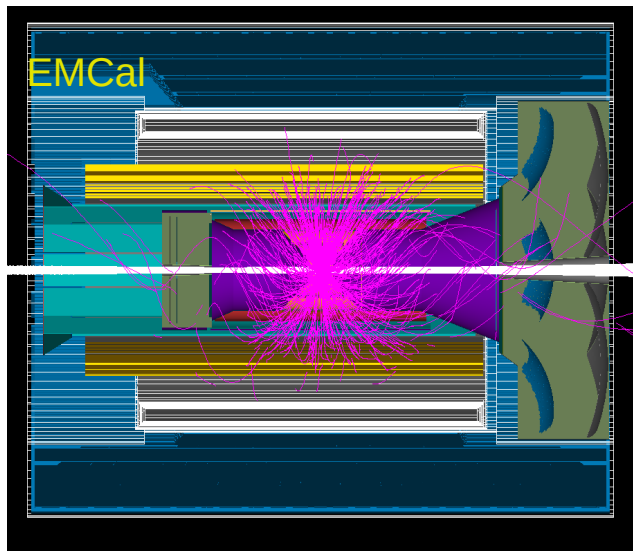
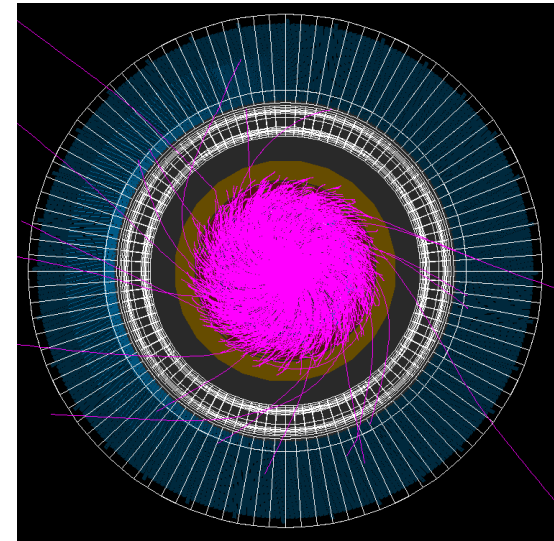
```
field_map="fieldmaps/MARCO_v.6.4.1.1.3_1.7T_Magnetic_Field_Map_2022_11_14_rad_coords_cm_T.txt"
url="https://github.com/eic/epic-data/raw/64b7ca6306b138b7f000e696c82bd8f72db1da56MARCO_v.6.4.1.1.3_1.7T_Magnetic_Field_Map_2022_11_14_rad_coords_cm_T.txt"
```

Pion+ Event Display



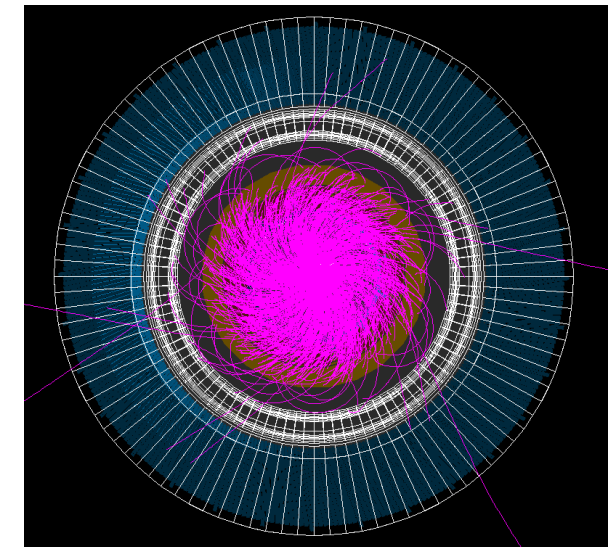
1000 pi+ with
mom = **0.2-0.4** GeV/c
 η [-1.0,1.0]

Kept Primary only



1000 pi+ with
mom = **0.2-0.6** GeV/c
 η [-1.0,1.0]

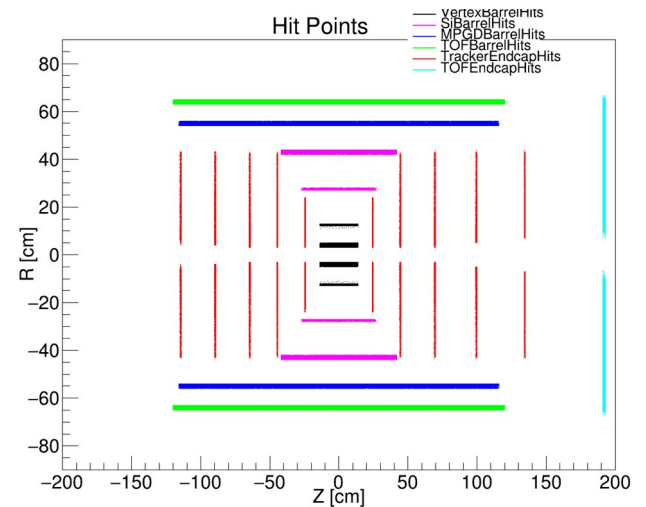
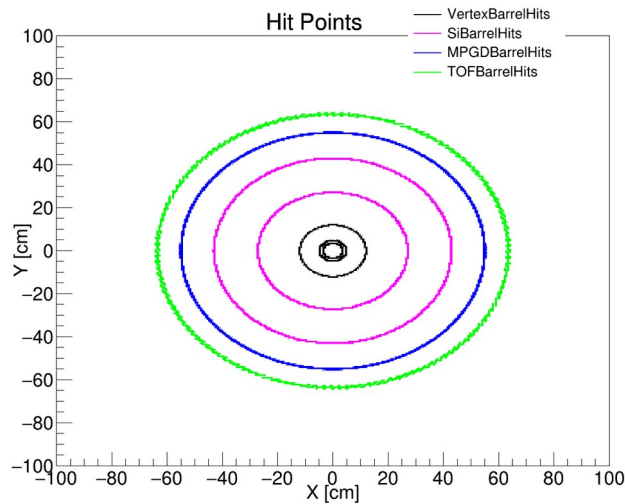
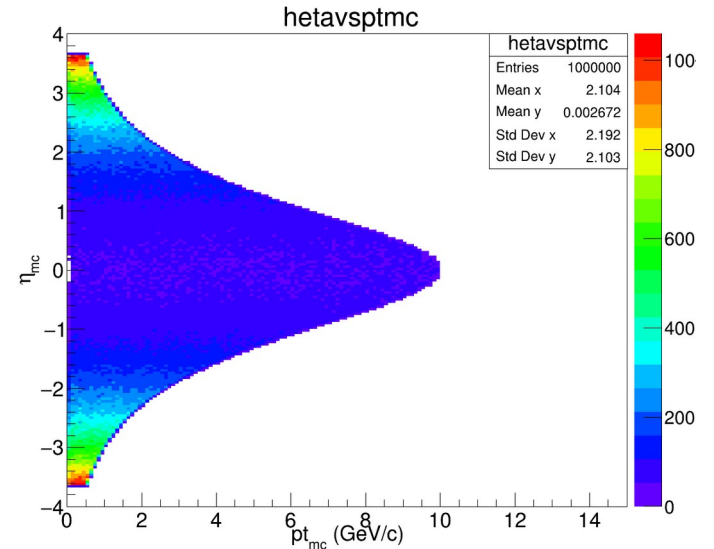
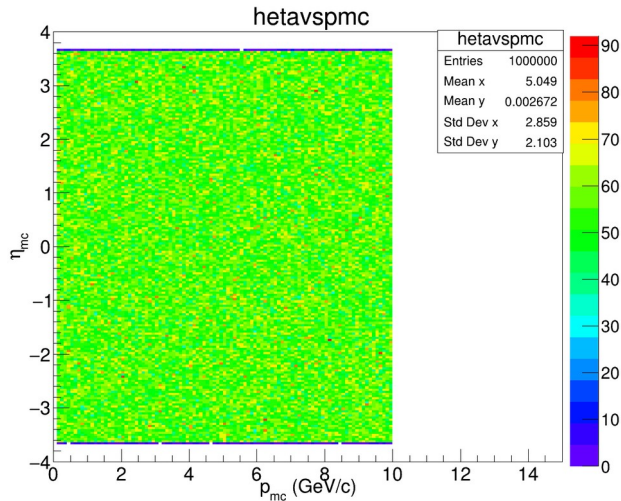
Kept Primary only



Simulation Details

With and without Barrel Calorimeters

Simulation of 1M pi- with η [-3.5,3.5] and mom [0.1,10.] GeV/c



Nhits vs η

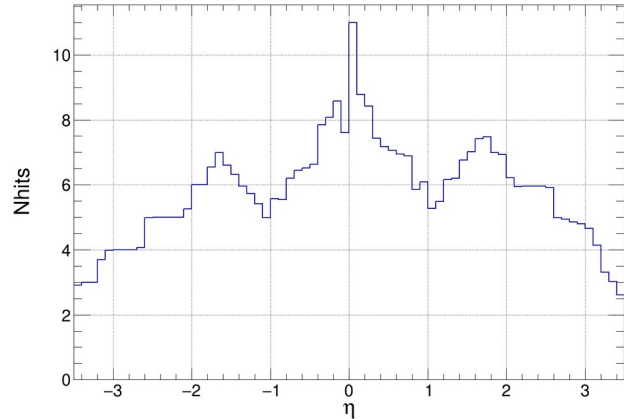
Positive eta DiskZ: [25,45,70,100,135]

Negative eta DiskZ: [-25,-45,-65,-90,-115]

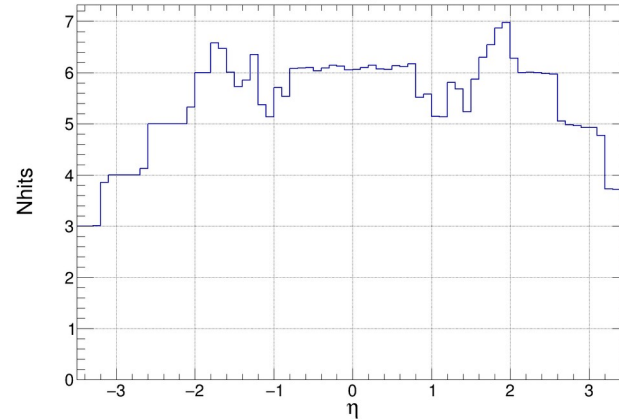
Without Calorimeters

MPGD missing hits in few cases because of energy cut

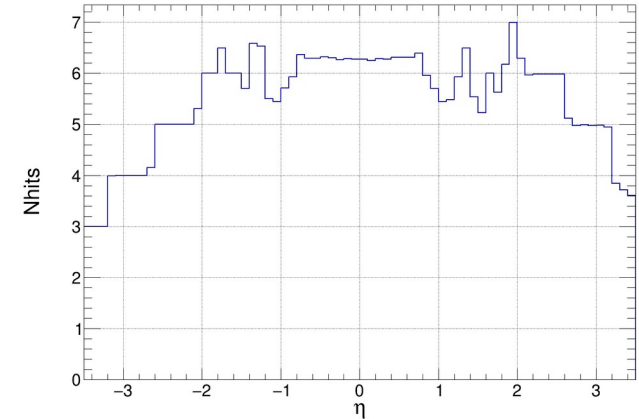
0.2 < p (GeV/c) < 0.4



0.4 < p (GeV/c) < 0.6

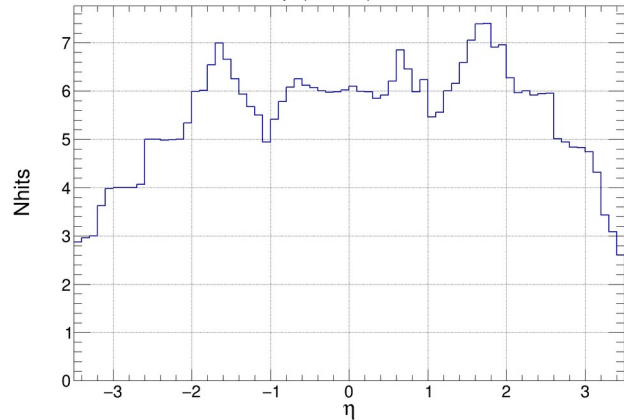


4.0 < p (GeV/c) < 5.0

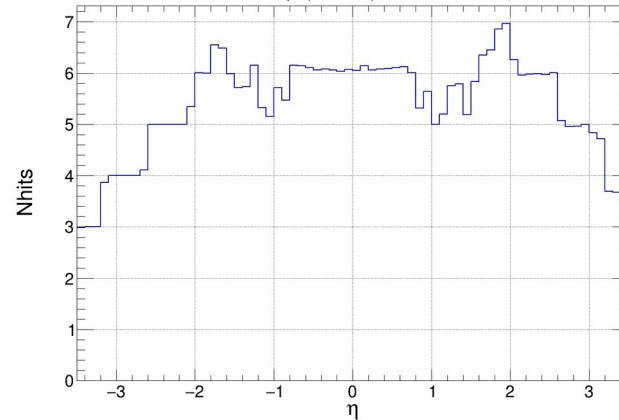


With Calorimeters

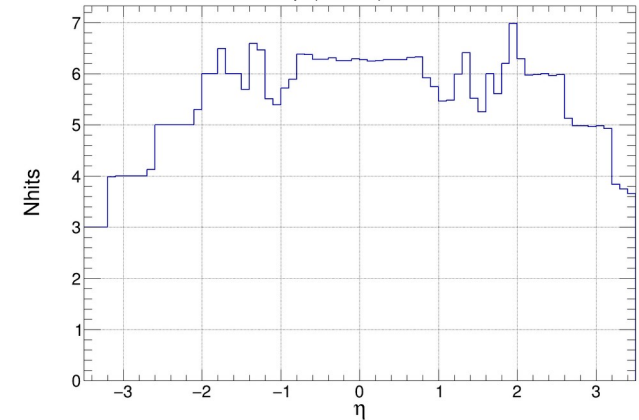
0.2 < p (GeV/c) < 0.4



0.4 < p (GeV/c) < 0.6



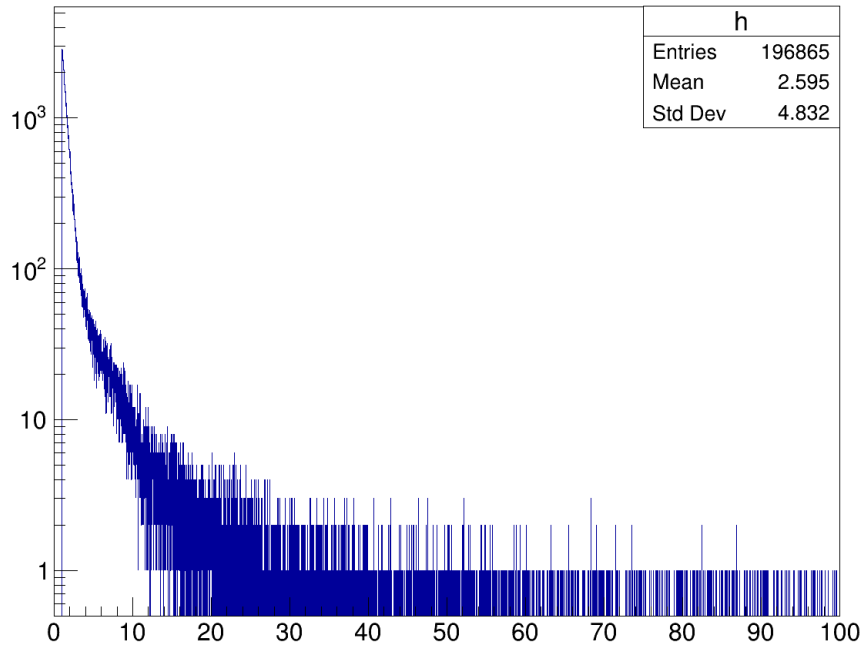
4.0 < p (GeV/c) < 5.0



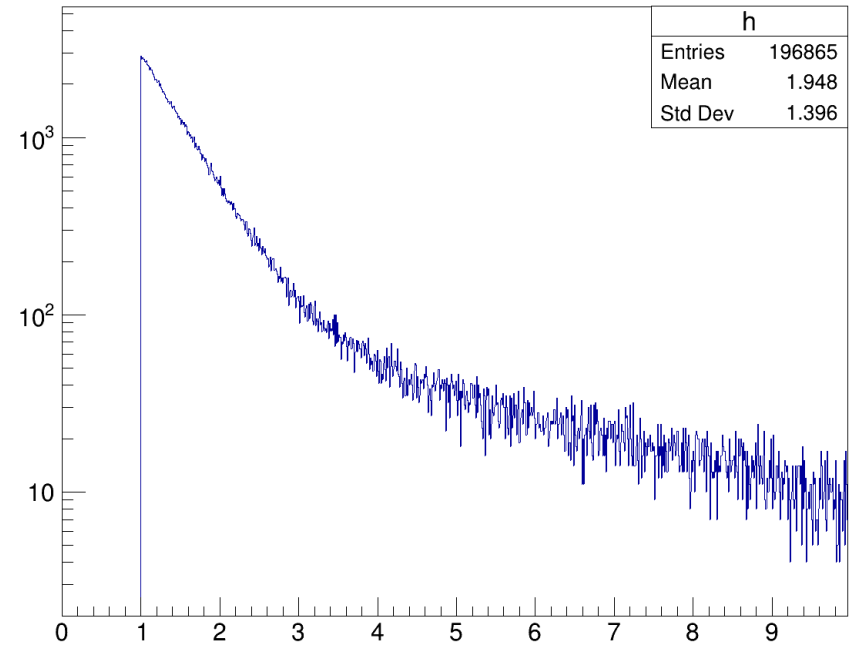
MPGD Energy Deposition

Missing MPGD hits in few cases because of energy cut

MPGDBarrelHits.EDep*1.0e+6 {MPGDBarrelHits.quality==0}



MPGDBarrelHits.EDep*1.0e+6 {MPGDBarrelHits.quality==0}



Summary

- Checked Event display at the level of generation using GEANT4
- Very low momentum range (0.2-0.4 GV/c) tracks are absorbed in Barrel Calorimeter
- Curling tracks situation will be there momentum below < 0.2 GeV/c
- Once we have trajectory information then will study number of hits and Chi2 at the reco level

Thank You !!