# Estimation of Number of Hits Including Backgrounds

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https://indico.bnl.gov/event/20218/contributions/79344/attachments/49019/83526/EPIC_Background_Meeting_Shyam8August23.pdf
https://indico.bnl.gov/event/20343/contributions/79985/attachments/49541/84695/Background_Radiation_Shyam_5Sep23.pdf

bgmerged_ep_noradcor.10x100_q2_10_100_run001_n_10000.hepmc

Total Events: 1000     Threshold set to very small at Simulation
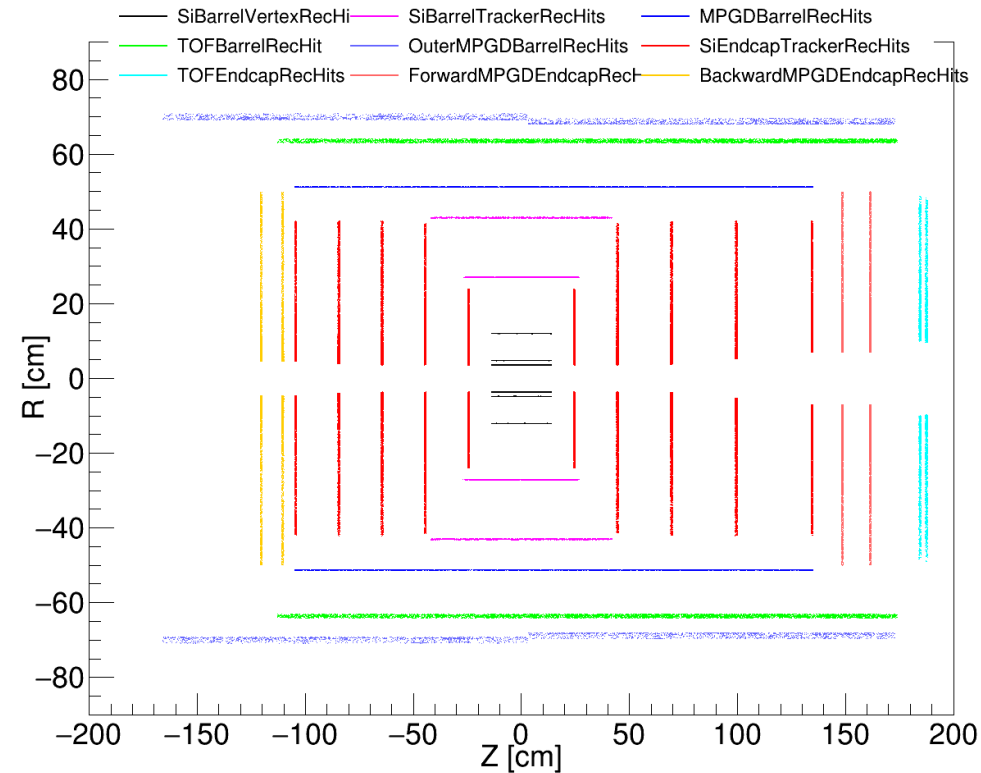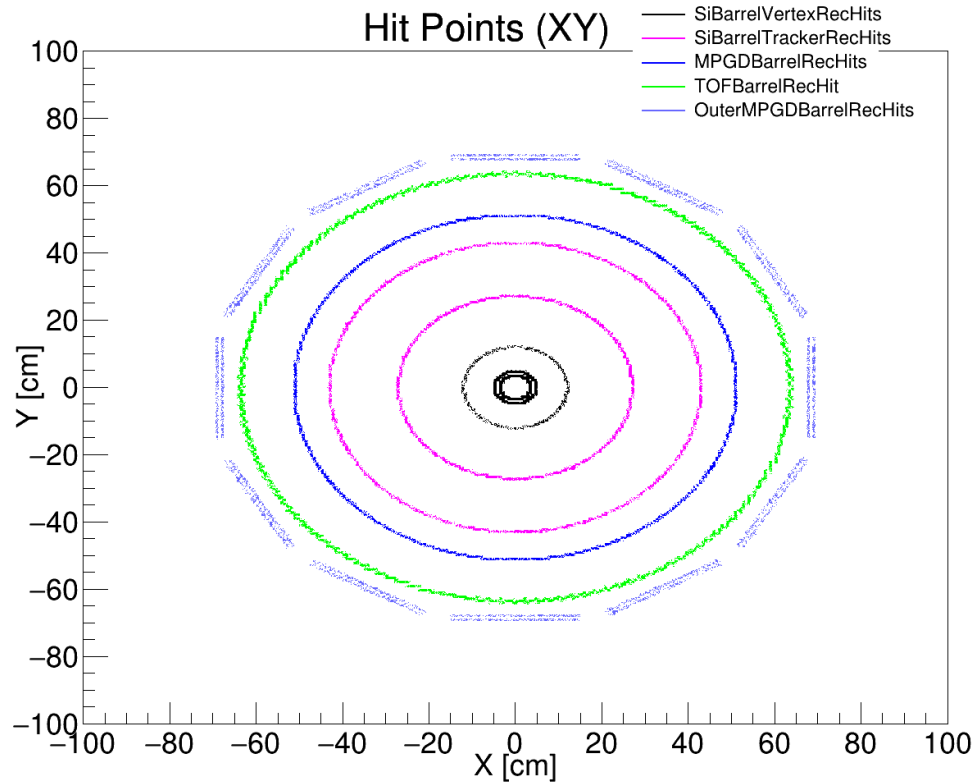


## MinimalKineticEnergy to store particles created in the tracking region
**SIM.part.minimalKineticEnergy = 1.0e-9*GeV**
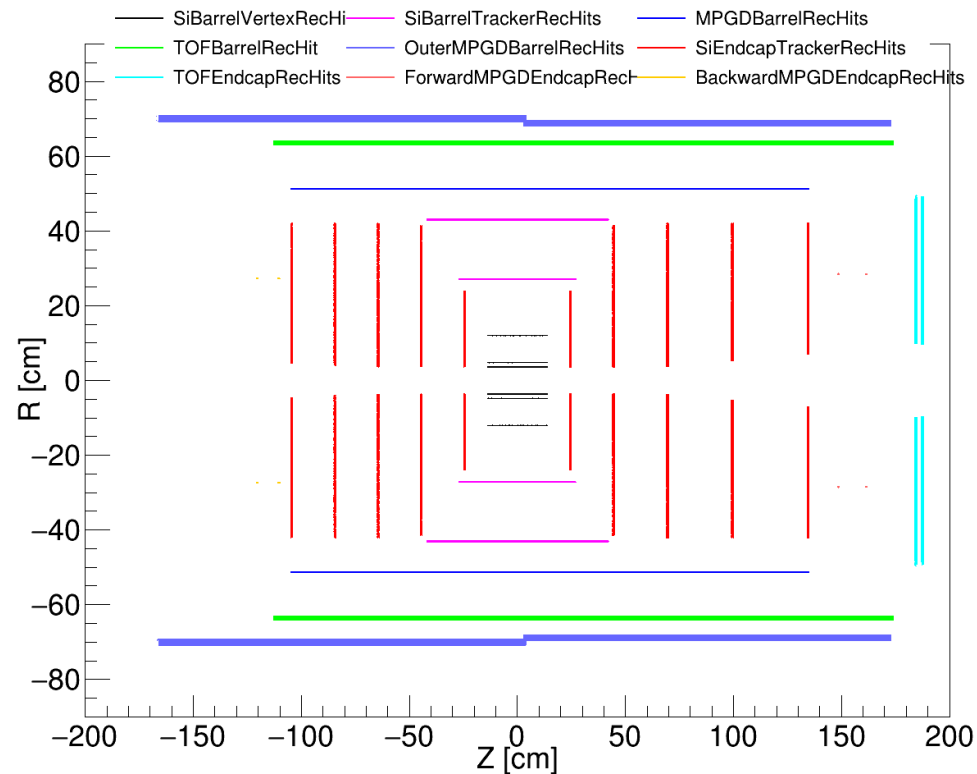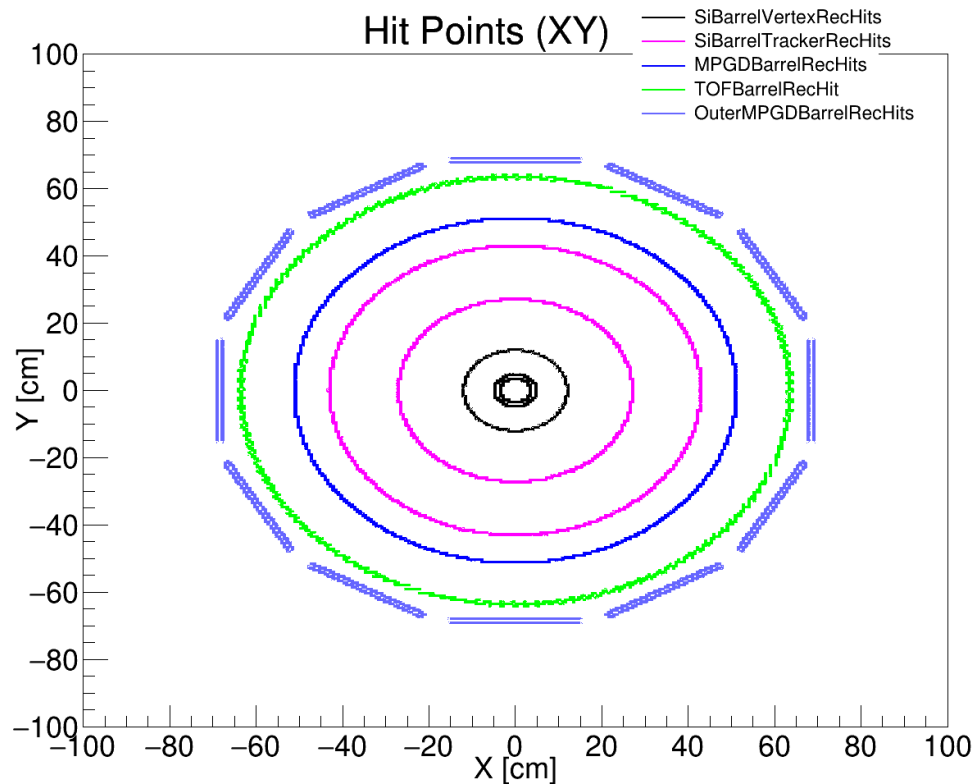## Keep all created particles
**SIM.part.keepAllParticles = True**

# Reco Hits (Without Background)

ep_noradcor.18x275_q2_0_1_run001_0_739.eicrecon.tree.edm4eic.root

740 files

Total Events: 567108 from Simulation Campaign
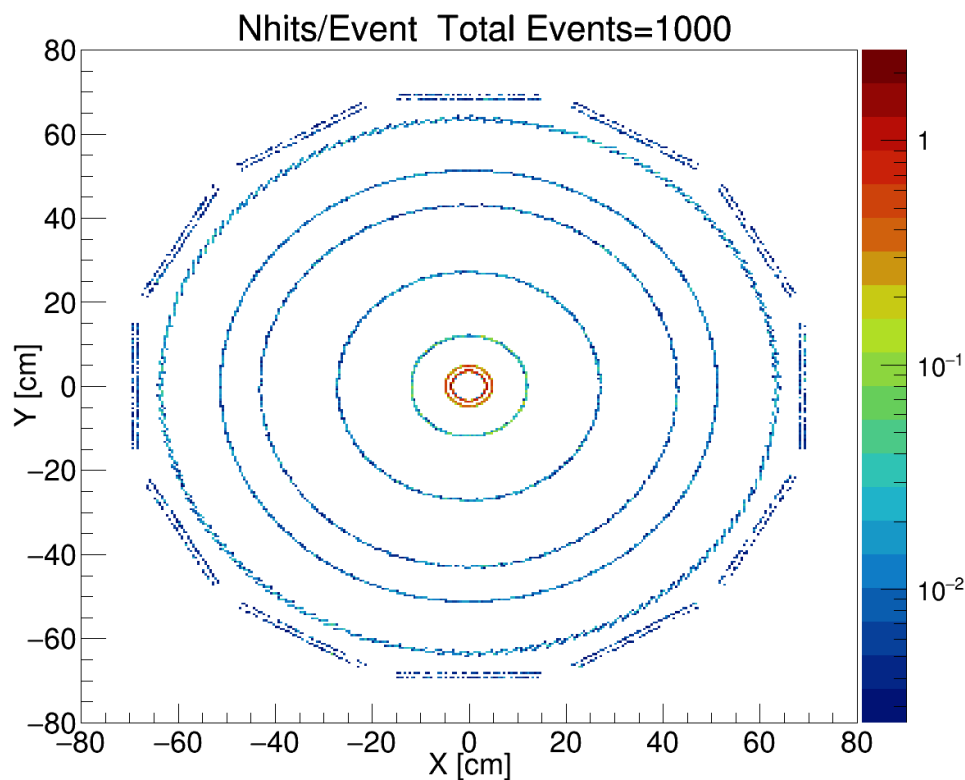


Issue with Forward/Backward MPGD hits

No Threshold at Simulation level
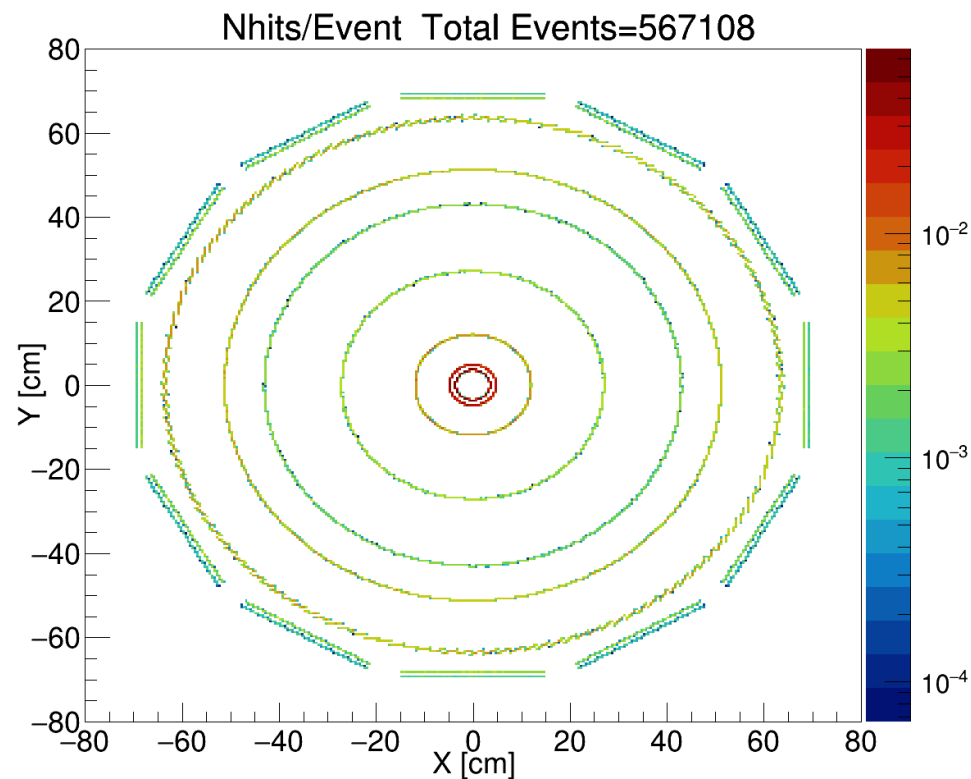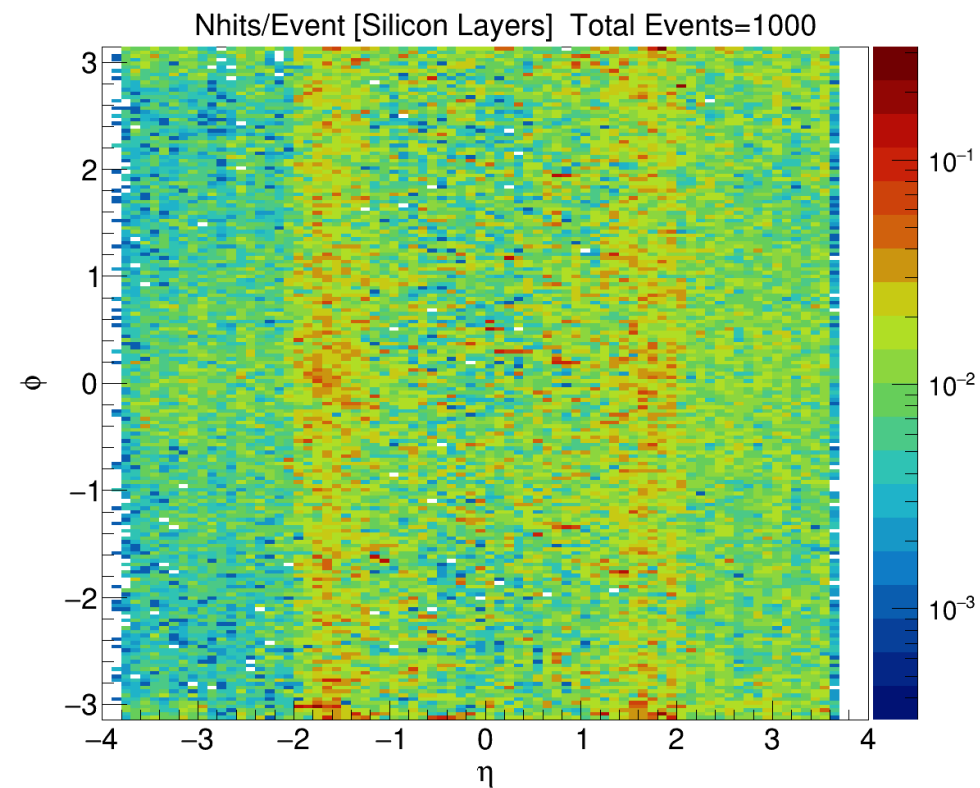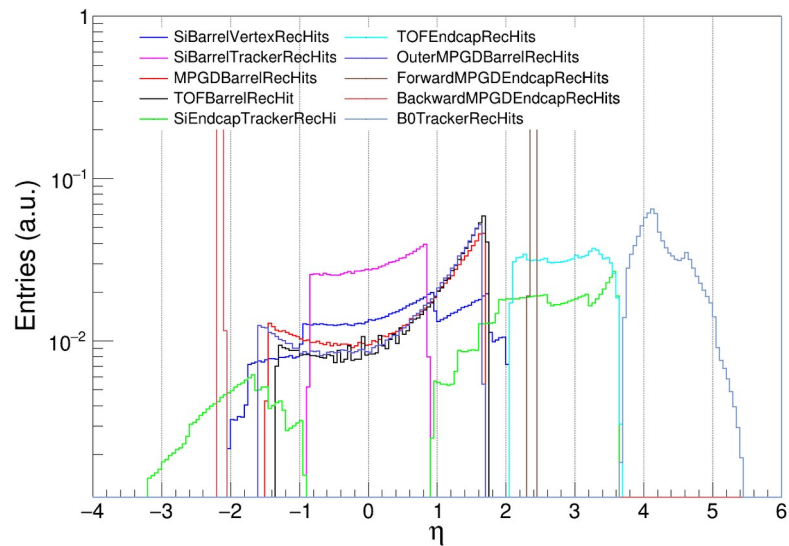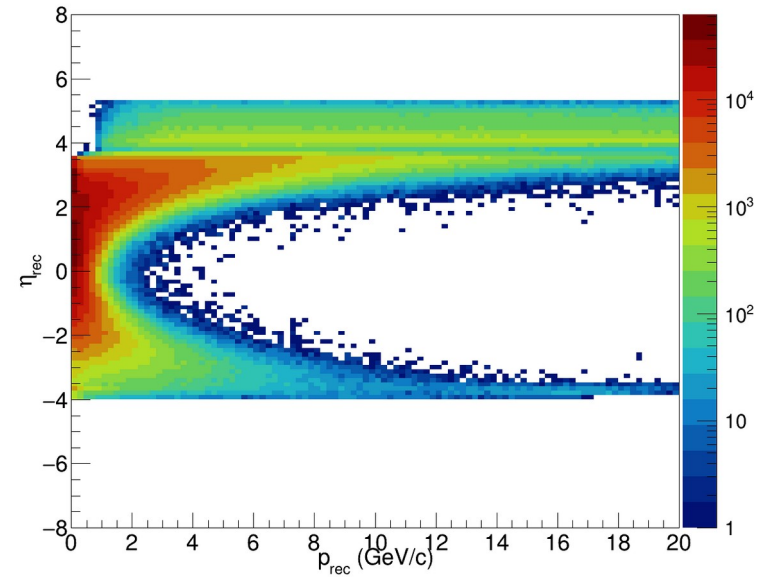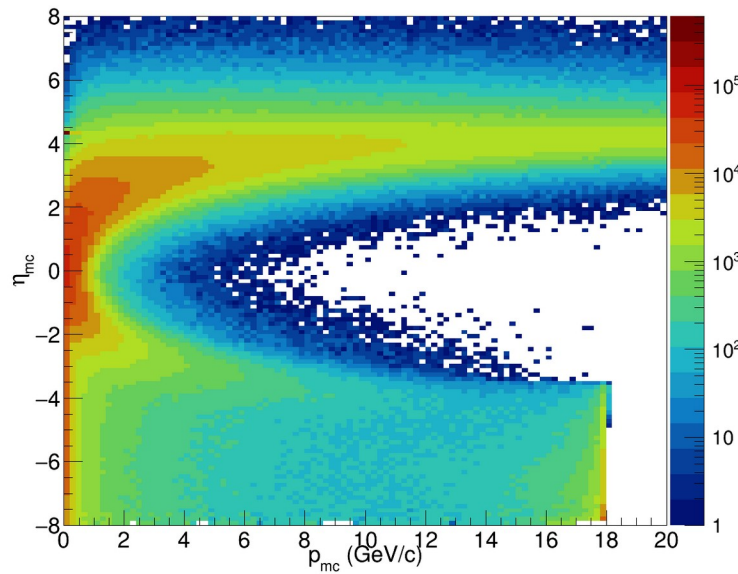
ep_noradcor.18x275_q2_0_1_run001_0_739.eicrecon.tree.edm4eic.root

**Nhits/Event is Nhits/2μs in case of with background**

**Nhits/Event is Nhits/e-p Event in case of Campaign**
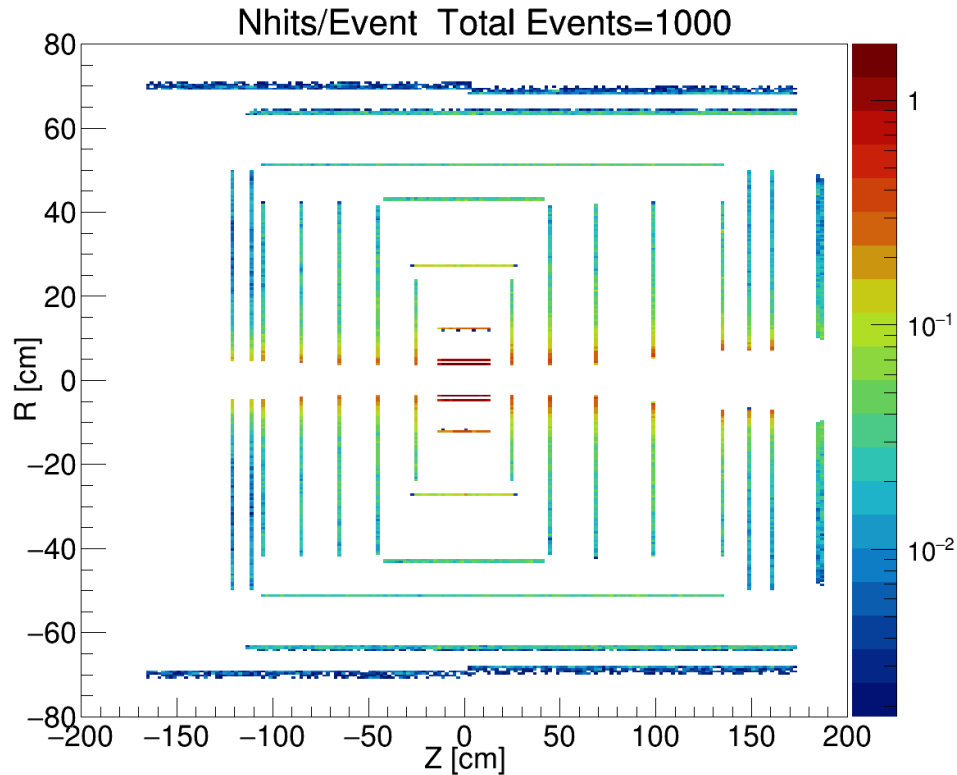
With Background

Without Background (Simulation Campaign)



bgmerged_ep_noradcor.10x100_q2_10_100_run001_n_10000.hepmc
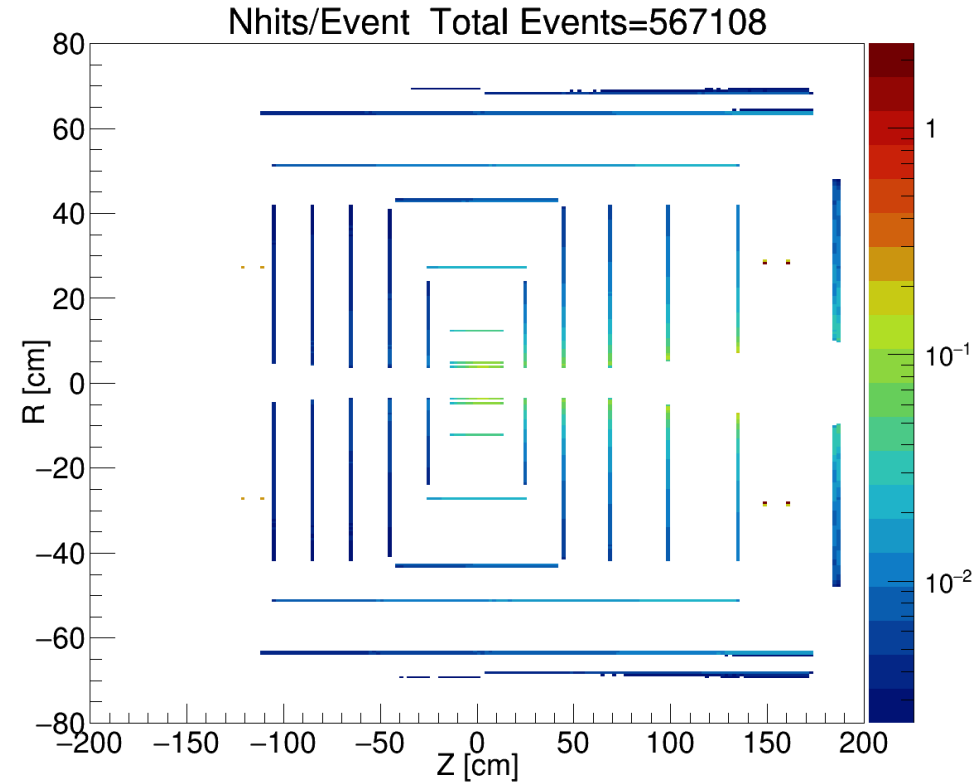
After using the correct threshold in the EICRecon

**Nhits/Event is Nhits/2μs in case of with background**

**Nhits/Event is Nhits/e-p Event in case of Campaign**

<u>With Background</u>

<u>Without Background (Simulation Campaign)</u>



Nhits/Event  Total Events=1000



Nhits/Event  Total Events=567108
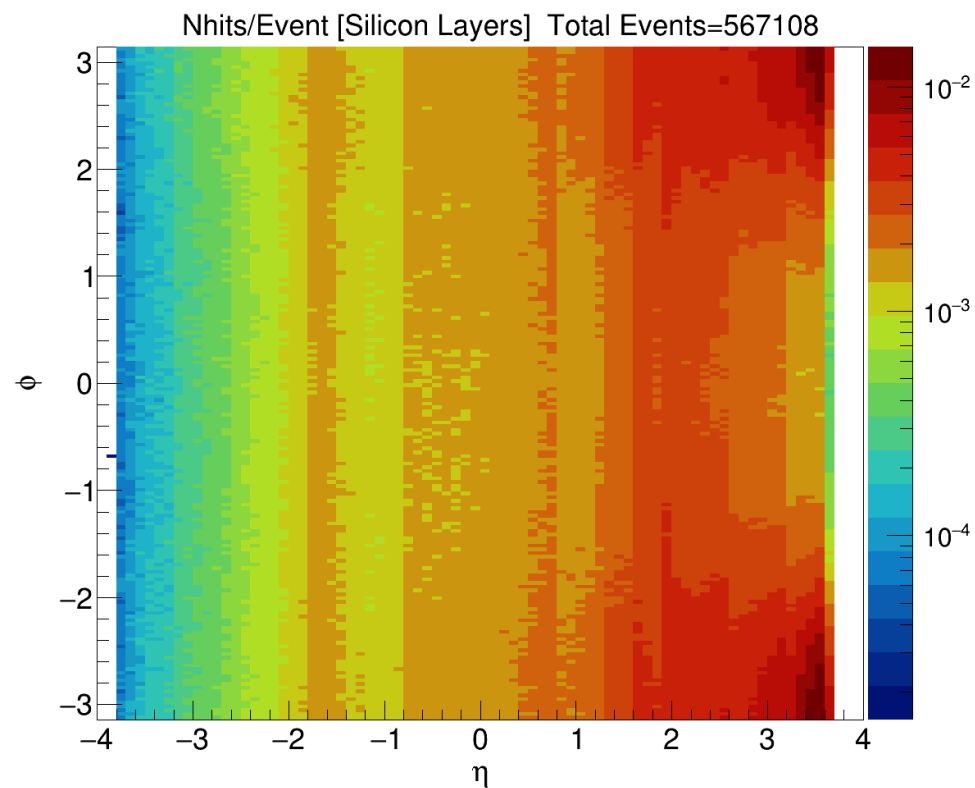
Issue with Forward/Backward MPGD hits

With Background

Without Background (Simulation Campaign)



Nhits/Event [Silicon Layers]  Total Events=1000

Nhits/Event [Silicon Layers]  Total Events=567108

Missing η asymmetry

ep_noradcor.18x275_q2_0_1_run001_0_739.eicrecon.tree.edm4eic.root

# Summary and Future Studies

➢ Nhits/Event was presented for the simulation campaign and the background file by Kolija

➢ Performance Plot (XY) and RZ can be helpful to estimate the background

- Further studies can be done by varying the contributions for each source of background

- We need three hepmc files separately to get a better understanding

- Physics event (ep)

- Synchrotron radiation

- Beam-gas interactions

## Simulated using NIST Database
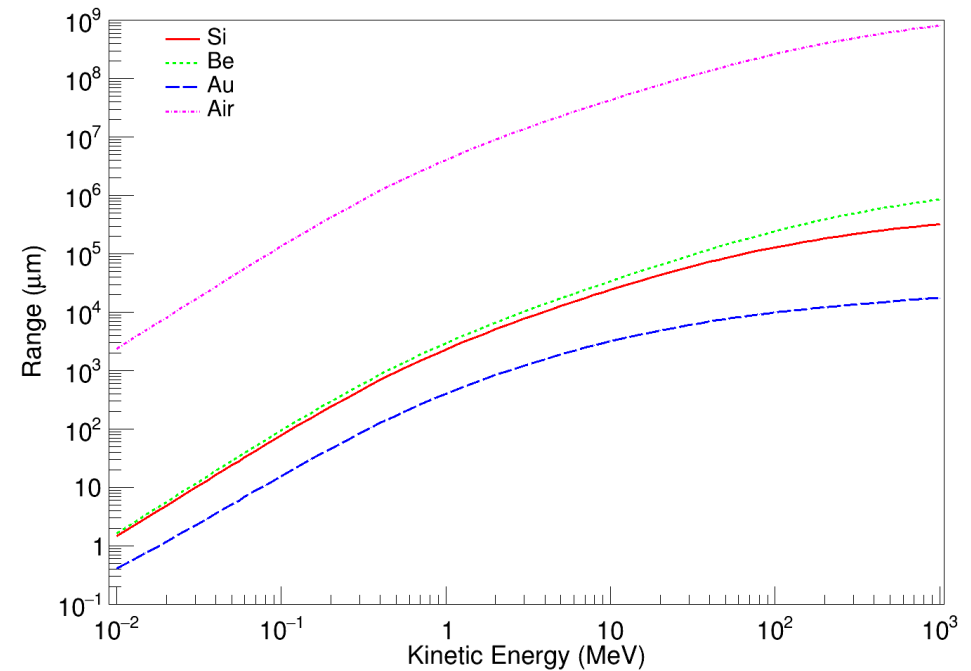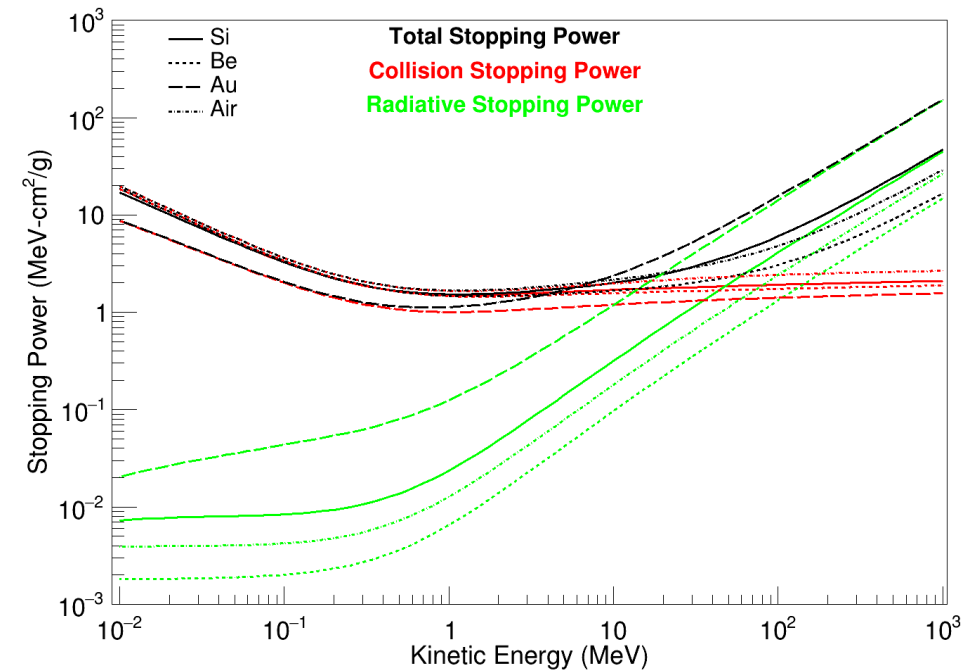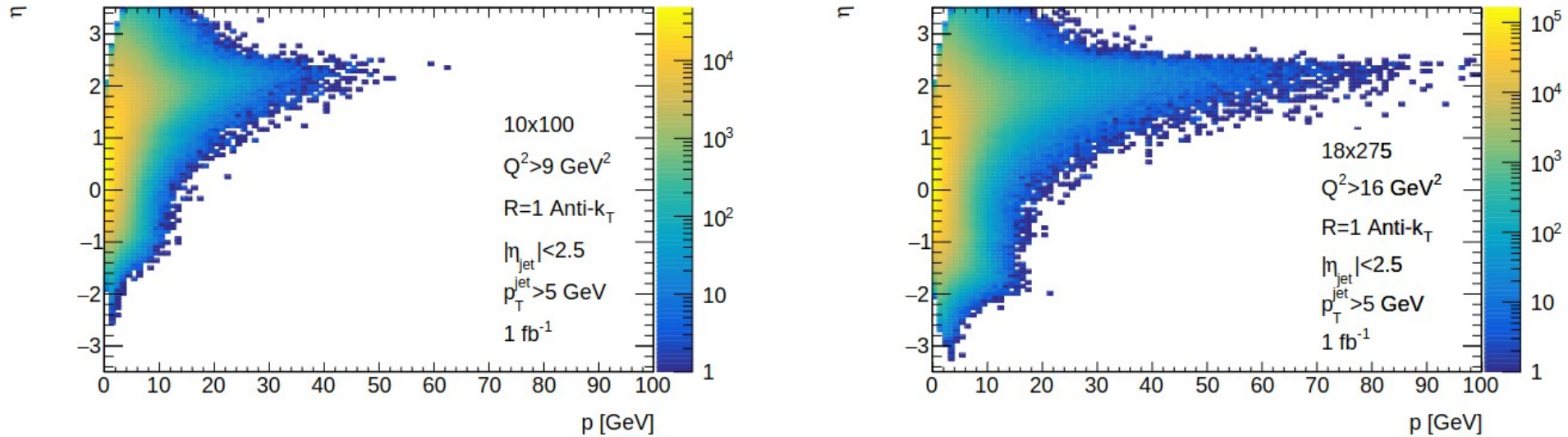
## Yellow Report



**Figure 8.48:** Pseudorapidity vs momentum for charged hadrons found inside jets with a radius 1.0 at beam energies of 10x100 GeV (left) and 18x275 GeV (right). Counts have been scaled to correspond to an integrated luminosity of 10 fb$^{-1}$.