

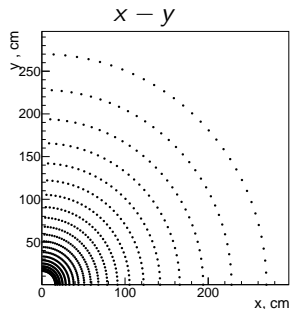
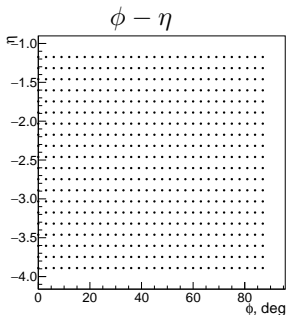
nHcal update

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May 8, 2024

Reminder $\phi - \theta$ scan points



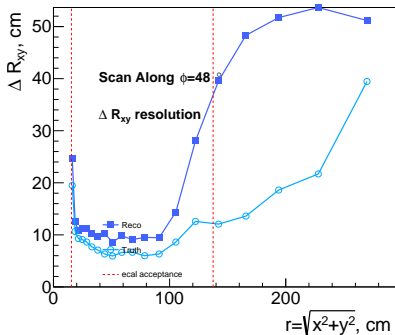
600 points for a quarter in azimuthal angle ϕ with equal distance
 $\Delta\phi = 3^\circ$ and $\Delta\eta \approx 0.14$

- Neutrons
- $p = 0.5, 1, 2$ and 5 GeV
- full EPIC geometry + hcal only
- 50k events

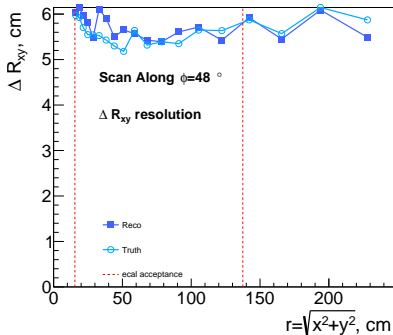
The maximum energy cluster is taken from the category as a reconstructed cluster

Hcal only vs full epic 5 GeV

Exploiting ϕ symmetry (see details), make a scan along single ϕ angle
hcal only #Rxy

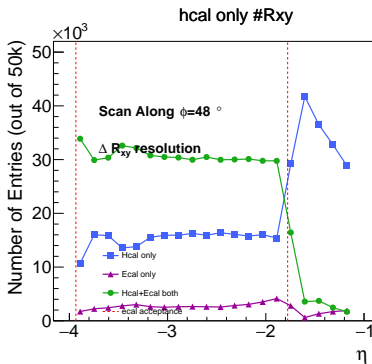


full epic

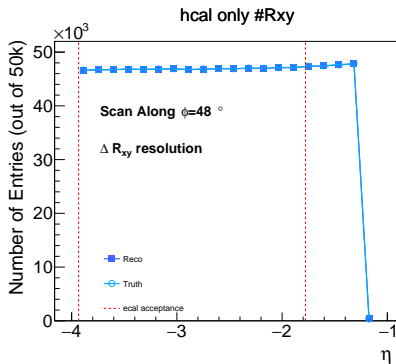


hcal only

Hcal only vs full epic 5 GeV interactions

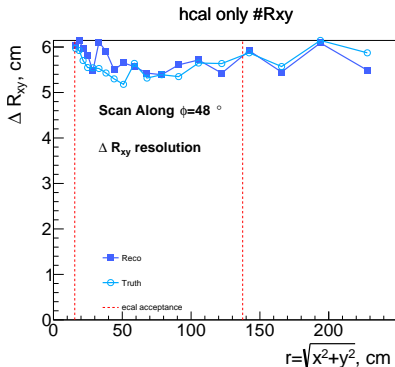


full epic

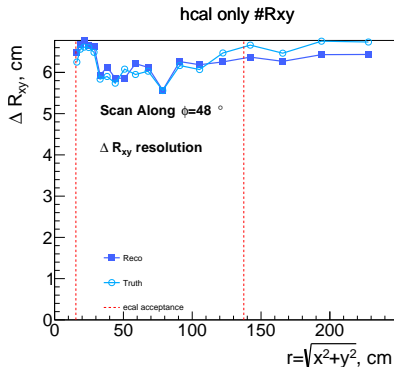


hcal only

Hcal only 5 GeV 10x10 vs 20x20

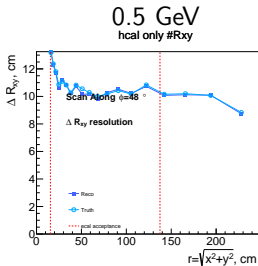
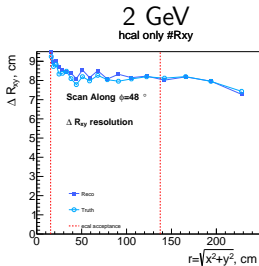
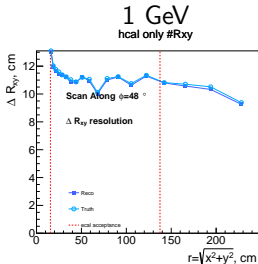
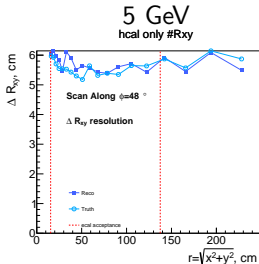


10x10



20x20

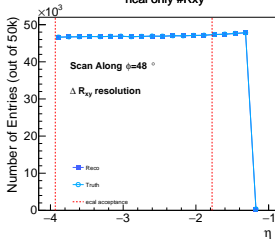
Hcal only 10x10 energy scan



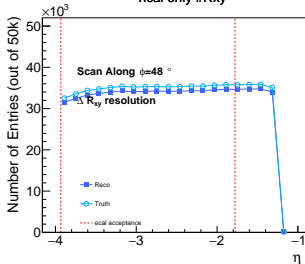
Small dependence on r ($or\theta$)

Hcal only 10x10 energy scan interactions

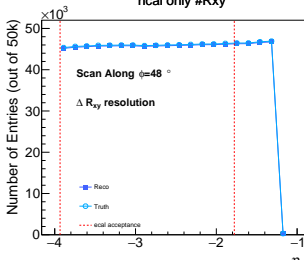
5 GeV
hcal only #Rxy



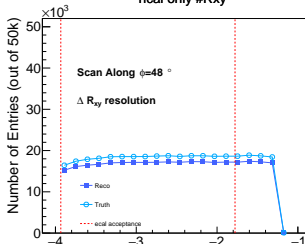
1 GeV
hcal only #Rxy



2 GeV
hcal only #Rxy



0.5 GeV
hcal only #Rxy



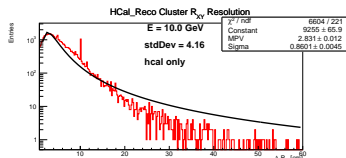
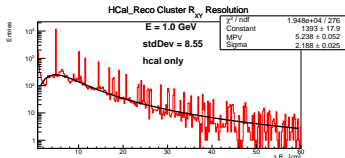
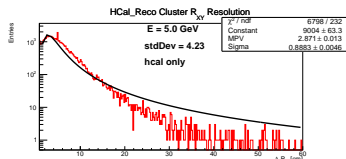
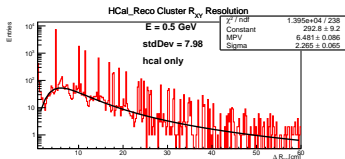
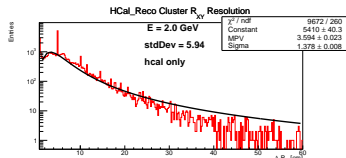
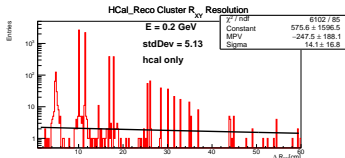
Tile size and energy

Baseline conditions:

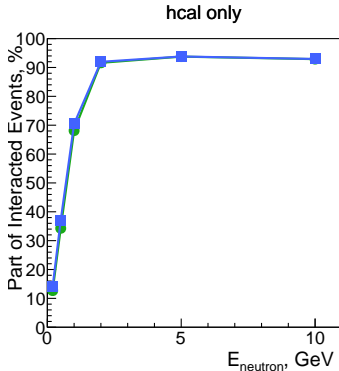
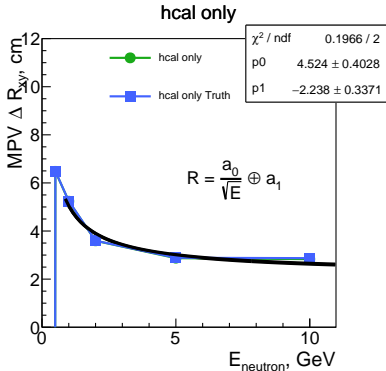
- 10x10 cm tile size
- neutrons at 5 GeV energy
- HCAL only epic setup
- fixed angle $\phi = 48^\circ$, $\theta = 174.482^\circ$ due to little dependence on θ and symmetry on ϕ
- fixed eicrecon config parameters (upcoming fix on .localDistXY)
- 50k events



Energy scan 10x10 cm tiles



Energy scan summary 10x10 cm tiles



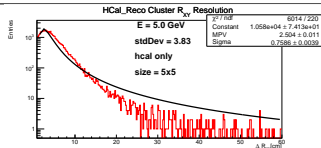
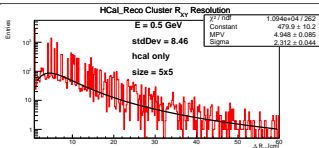
Different epic setups

Energy
Size

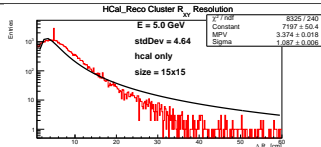
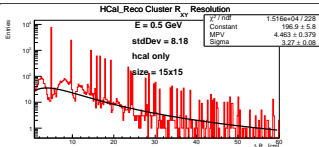
0.5 GeV

5 GeV

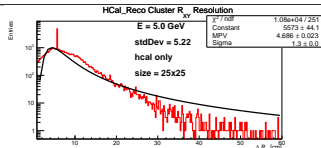
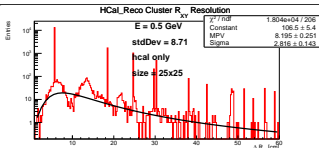
5x5 cm



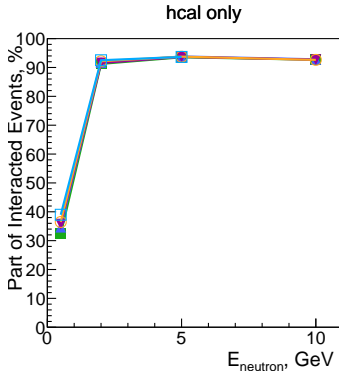
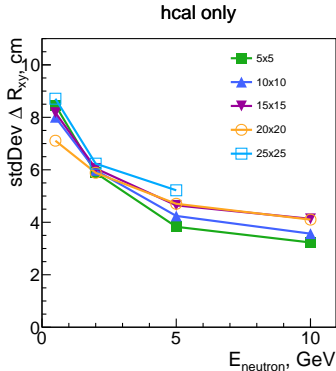
15x15 cm



25x25 cm



Tile size and energy summary



Summary

- Criteria for tile size optimization?
- Scan across variable tile size - clustering algorithm performs good