

Progress and Plans

Calorimeter Clustering Tasks

Clustering-related PRs

- Add a cluster visualizer script [#494](#) (Draft)
- Remove MergedClusters [#519](#)
- algorithms/calorimetry: refactor logging [#550](#)
- HcalBarrel parameters and clustering [#557](#)
- CalorimeterIslandCluster: wrap around azimuthal distance [#559](#)
- CalorimeterIslandCluster: autotune transverse shower profile parameter [#561](#)

Your reviews can help push PRs forward!

Upcoming tasks for the simulation campaign

- Check calibration constants (many were not correct in October simulation)
- Accessing cluster hits issue?

<https://eic.cloud.mattermost.com/main/pl/8zxqu5ent38rpcuxxkwescnc8a>

(Likely, won't be fixed anytime soon)

- LFHCAL with Clustering in EICrecon?
- Lumi calos with Clustering in EICrecon?
- Test new splitting for Imaging?

Splitting in IslandCluster

- Prototype code (in Python) was used for Barrel Ecal review studies of SciGlass
- Now ported to EICrecon/C++ [#561](#)
- Help in testing is needed
- Technical caveat: distance measured using the same measure as adjacency, for SciGlass now hardcoded globalDistEtaPhi, but should eventually be in cm perpendicular to shower axis
- Would be nice to understand if and how lambda changes vs eta and phi

EICrecon/src/algorithms/calorimetry/CalorimeterIslandCluster.h

Line 259 in 6dc3f87

```
259 double dist_ref = chit->getDimension().x;
```

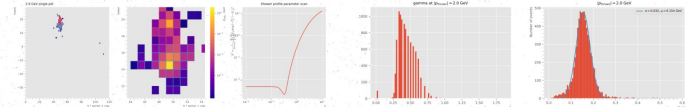
Island Clustering

- 1 Pick connected "islands" of hits
- 2 Select islands with peak energy > threshold (50 MeV here)
- 3 In each island, find hits that are local maxima w.r.t. 4 neighbours
- 4 Select local maxima above a threshold (100 MeV here – yeah, should be 50)
- 5 For hit h calculate its distance d_{hm} to each local maxima hit m , the weight is

$$\omega_{hm} \sim E_m \exp\left(-\frac{d_{hm}}{\lambda}\right)$$

- 6 Fraction proportional to ω_{hm} of energy E_h is attributed to a subcluster m .

For each island calculate $\chi^2 = \sum_h \left(\sum_m E_m \exp\left(-\frac{d_{hm}}{\lambda}\right) - E_h \right)^2$, minimize χ^2 over λ



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```

1 src/algorithms/calorimetry/CalorimeterIslandCluster.cc
@@ -65,6 +65,7 @@ void CalorimeterIslandCluster::AlgorithmIn
65 { "globalDistRPhi", {globalDistRPhi, {dd4hep::mm, dd4
66 {1., dd4hep::rad}}}
67 };
68 + hitsDist = globalDistEtaPhi; // FIXME
68
69 // set coordinate system
69
70 auto set_dist_method = [this](std::pair<std::string, std

```