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# ECAL Hybrid Superclusters

# About

Superclusters are an important part of several physics objects, especially electrons and photons. How deposits of energy in the ECAL are arranged and stored in "Superclusters" will be described here.

## Step by step

The paramaters that control supercluster creation are in the file: RecoEcal/EgammaClusterProducers/python/hybridSuperClusters_cfi.py⧉

Here is an outline of how superclusters are created:

1. An ordered list of crystals with ET > 1 GeV is created, these become the "seeds". (Threshold controlled by parameter "HybridBarrelSeedThr")
2. Starting with a seed, a process of stepping along is begun. "Dominos" of either 1x3 or 1x5 crystals are added to the supercluster if their energy is > 0.1 GeV (set by "ethresh"). A 1x5 domino is used if 1x3 has an energy > 0.
3. This process stepping along and adding dominos continues until one has stepped 17 crystals in phi. The stepping happens in both positive and negative in so, at max, a supercluster can be made of 35 crystals in and 5 crystals in .
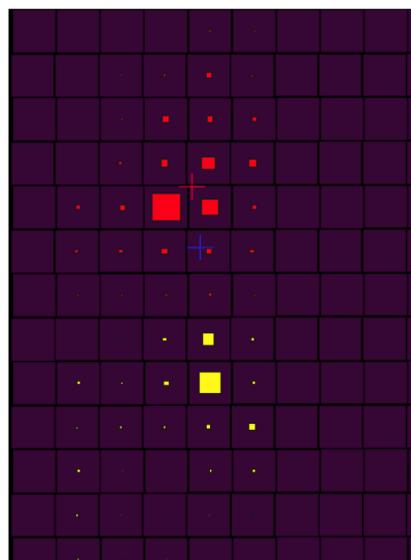
# Example Hybrid Superclusters

## Electron

### Isolated Photon

A high-energy isolated photon can result in a fairly narrow deposit of energy, with most of the energy deposited in 3x3 crystals.
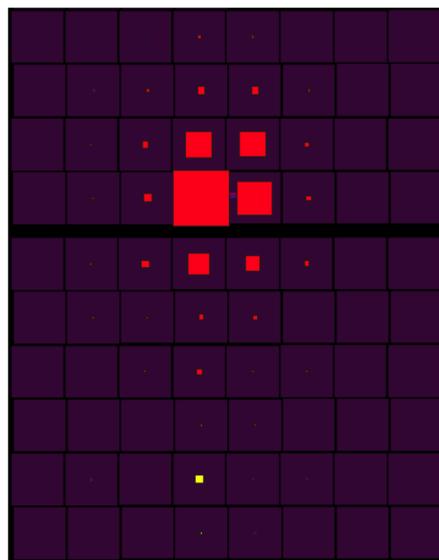
## Pizero decay to two photons

Two photons from a pizero decay can deposit their energy close enough to each other to result in them being merged into one hybrid supercluster.

# Revision Info

| Reviewer/Editor and Date (copy from screen) | Comments |
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