GARLIC photon identification : code status

Daniel Jeans, LLR Ecole polytechnique

GARLIC designed to identify pointing photons
Algorithm developed from ALEPH -> TESLA studies -> ILD/CALICE

* seed finding in first section of ECAL
* building up of cluster core
* clustering around core
* photon identification by Neural Network

For more details of algorithm and performance see J-C Brient's talk at last
ILD SW workshop (Paris Jan 2010)

Marcel Reinhard implemented GARLIC algorithm in ilcsoft/Marlin

two Marlin processors:
a) ECALPreClustering (simple clustering into regions of interest)
b) ECALGarlic - main algorithm (1 class of 11,000 lines of code (!))

The code grew with his thesis...tau reconstruction, higgs analysis, MC
studies... all made their way into the main GARLIC processor

I have:

  - pruned away the non-GARLIC related pieces

  - modularised the code into several classes:
      * Preclustering processor unchanged
      * main processor split into ECALGarlic processor plus a number of
          static helper classes (GeometryParameters, AlgorithmParameters,
          Cluster, ClusterHelpers, EnergyEstimator)

 - a few efficiency improvements to the code

 - (in principle) no change to the algorithm.
      [Identical performance to previous version not yet fully tested (OK for
          10 events)]

 - still scope for coding improvements in several areas...
      ...but ready to be released as beta version.

mid term plans:

 - investigate integrating algorithm into Pandora framework
 - revisit neural network trainings (reduce # variables)