lcsim-cal-calib

Quick overview over how to create the calibration for a new detector using the lcsim-cal-calib package

1. define compact.xml and create lcdd file
2. simulate samples for obtaining neutral hadronic and em sampling fractions:
   i.e. K0L @ 1, 2, 5, 10, 20 GeV and Gamma @ 1, 2, 5, 10, 20, 50 GeV for central events i.e. theta=90deg and endcap theta=160deg
3. put the files into 4 lists hadronic central, hadronic endcap, em central and em endcap
4. run each list with the attached initialSamplingFractions.xml (modify input file name if needed)
   the corresponding sampling fractions are given as a printout in the console. This step does a simple cone clustering to calculate the visible energy sum and then tries to calculate the sampling fractions by comparing it with the true particle energy
5. replace in the CalorimeterCalibration.properties: EMBarrel_SF, EMEndcap_SF, HadBarrel_SF, HadEndcap_SF
   also set correct layering and MIP_cuts and timeCuts to desired values. MIPcut should come from approx 50% of most probable value of the muon Landau distribution in the active material. These numbers are direct input to creating the SlicPandora geometry.
6. use GeomConverter to create Pandora geometry xml file
7. run slicPandora on the K0L and photon samples, e.g. `PandoraFrontend -g sidloi3_scint${TILESIZE}_pandora.xml -i ${slcio} -c PandoraSettings_sidloi3.xml`
8. create 4 file lists of the output files like in 3
9. run each list through the pfoSamplingFractions.xml, this time the pandora clusters are used to calculate the sum of the visible energy. The sampling fractions are calculated again by matching
   this with the true energy
10. replace the sampling fractions in the CalorimeterCalibration.properties and recreate the Pandora geometry file

The following snippet creates some single particles in SLIC.

Slic_single_K0L.mac

```
/run/initialize
/generator/select gps
/gps/pos/type Point
/gps/pos/centre 0. 0. 0.
/gps/ang/type iso
/gps/ang/mintheta 5 deg
/gps/ang/maxtheta 175 deg
/gps/ang/minphi 0 deg
/gps/ang/maxphi 360 deg
/gps/ene/type Mono
/gps/ene/mono 10 GeV
/gps/ene/gradient 0
/gps/ene/intercept 1
/gps/particle kaon0L
/random/seed
/run/beamOn 1
```