

DigiSim

- Goal: improve realism of detector simulations, by including digitization effects
Smearing, crosstalk, noise, thresholds. Function parametrizations possible
- SimCalorimeterHits (cellID, energy, MC contributions, as floats)
 - ↓ ⇒ RawCalorimeterHits (channelID, ADC, timestamp, as integers)
 - ↓ ⇒ CalorimeterHits (same as SimHits, but no MC info, as floats)
- Links available from RawCalHits ⇒ SimCalHits (crosstalks, noise)
- Status: working. Some pieces missing are:
 - RawCalHits --> CalHits conversion (under tests)
 - tools for cellID <---> channelID mapping (not needed for now)
 - updated documentation / tutorial

Tools for non-projective geometry

- Projective (SDJan03, SDFeb05, sidmay05)
- Non-projective (SDNPHOct04, SDNPCalMar05, sidmay05_np)
- Same interfaces for proj/non-proj hits
hit info (energy, time, position) and hit neighborhood
- Status: working

NearestNeighborClusterer uses getNeighbourIDs(dlay, dtheta, dphi)

- getNeighbourIDs(int dl, int dt, int dp) has been tested on NP (sidmay05_np) barrel
- getNeighbourIDs(int dl, int dt, int dp) implementation is in progress for NP endcaps

Plans for Snowmass

- Plans:
 - Clustering, PFA and detector comparisons
 - Effect of DigiSim to energy resolution
- Vishnu's density-based algorithm:
 - no need to start from tracks
 - densities based on hit neighbors (maybe on energies too, if analog)
 - clustering based on neighborhoods and densities
 - studies so far (Vishnu) on non-projective geometry only (SDJan03-based)
- Things to do next:
 - port Vishnu's density-based clustering algorithm to lcsim (in progress)
 - add other tools for a PFA (track matching, photon-ID, digisim, etc.)