Software status and plans

- Outline:
  - DirectedTree clustering algorithm
  - Justify the need for a tail catcher
  - Plans for the next months

DirectedTree algorithm status

- Goals:
  - Optimization within the LCSim reconstruction framework
  - Make the DTree clustering algorithm available to others
  - Optimize the physics performance

- Since last meeting:
  - Use and certify HitWeightingClusterPropertyCalculator
  - Deprecate Cluster class (for reconstructed clusters)

Summary of classes

- Classes currently used by the DirectedTree algorithm
  - Pflow (main driver)
  - DirectedTree (subdriver with clustering algorithm + histogramming, ntuple-filling)
  - LoadMyCalorimeterHit (hit selection + hit density info)
  - ClusterBuilder (builds a List<Cluster> from a Vector<Vector<CalorimeterHit>>)
  - Cluster (reconstructed clusters, DEPRECATED)
  - HitWeightingClusterPropertyCalculator (defines density- and energy-weighting)
  - RunControlParameters (algorithm parameters)
  - CalculateDistance (between two points)
  - Kinem (theta,phi of a point)
  - MyTools (utility class for debugging)

Justifying the Tail Catcher

- Suggested by Sasha+Vishnu
- Look at hadronic shower containment in HCal, how much energy survives coil and reaches first layers of Muon System
- Effects on energy resolution of single-particles and single-jets
- Plan of action:
  - Look at single-jets from physics events: "single-jet events"
    event filtering: filter out everything but a single-jet from real events
  - Detector simulation: replace muon system with a fine tail catcher

Next steps

- TCMT justification:
  - Event filtering tests
  - Detector Simulation (SLIC)
  - Analysis
- DirectedTree:
  - Test appending DirectedTree clusters to LCIO event for downstream analysis
  - Split DirectedTree into an algorithm proper class (no MC handling) and an analysis class (histo+ntuple filling)
  - Closer look at DirectedTree reconstruction algorithm

Plans for next (6?) months (software)

- LCWS'06, CALICE commitments and funding proposals
- LC-Notes: DigiSim, Clustering, PFA, detector optimization
- Steps:
  - Optimizations for jet-energy and Z-mass resolutions
  - Update resolution vs. granularity + similar plots for newer geometries
  - Sampling fraction analysis: n, n-bar, K_L and EM vs. hadronic
  - Reproduce / update the Cluster-ID matrix
  - Investigate multivariate techniques: NN, SVM, BDT
  - HCal: strips vs. square-cells (simulation and algorithm development)