# 2005-09-27

## Minutes

RC:

EM Sampling Fractions

RC: Presenting sampling fractions.

Single photons, 1-10 GeV, uniform in angle. Required conversion in first 1/2 of EM. Angle cuts in barrel, 45 deg, and endcap, away from edge. (don't remember exactly) Fit for sampling fraction.

Plotting total E in EMCal vs. Generated Energy.

Errors w/ estimate of sampling fraction. Iterate. Do a straight line fit.

Using sid00 detector.

Can do a fit. Not a bad chi-squared, assuming 20%/sqrt(E).

Repeat for endcaps w/ same procedure for 2 other EMCal calorimeters.

In cdcaug05 and sid00, compute sampling fraction doubling the energy from the last 10 layers.

RF: Standard cutoff?

RC: slic-generated with "standard" settings. Effective cutoff parameter is large.

RF: This is why 20% instead of 15%?

RC: Yes.

For sidaug05, cdcaug05, check against ZZ data. Plot the residuals.

Go through data and pick out photons. Pick out residuals. Fit with a Guassian. Mean close to 0. Sigma close to 1. Same thing for endcap. Not perfect, but close.

See slides for results.

Propose to put in as sampling fractions.

WL: Error?

RC: Error on the fit is small, in 4th or 5th decimal place.

Averages over a lot of stuff.

Should use same technique to obtain the number for all detectors.

MR: What does "corrected" mean?

RC: "Corrected" means that last 10 layers get weight x2.

Any objections get to me before tomorrow, will consider, but plan to put the numbers in for now.

RF: Did x2 with EGCS, and seemed to be the best.

RC: Seemed best to me.

MR: Working on reco cheater. Noticed that some quarks are getting through.

RC: Some generators do this – leave quarks hanging.

MR: Crashing the jet finder. Some particles have less energy than their mass – neutrons, klongs. For now, just ignore the particle.

RC: Covert cluster to energy. Maybe neutron < 1 GeV.

JS: Check so that doesn't happen?

TJ: What to do when it does happen?

RC: Suggest at least putting the particle in with some E.

MR: Not sure if MCParticles or Clusters.

TJ: Should not happen with MCParticles. In real found clusters, should add the energy if postulating that it is a neutron.

RC: If don't know the particle, then end up using the total energy as primary variable. Arguing to use kE a while ago.

TJ: Responsibility of person doing the combining.

RC: One number and count the hits. Multiply the hits by some energy = total energy.

TJ: Whoever is making the 4-vectors should check that the E and mass are correct/reasonable.

MR: Added two new detectors into LCDetectors – hd3.1 and ld3.1. Next generation large detector.

TJ: Supposed to be close to GLD/LDC?

MR: First approximation. Also put up some pictures generated by TopDrawer.

TJ: Vertexing?

JS: Hacked FastMC to treat unknowns and charge=NAN as neutrinos.

Geant4 returns NAN for charge if unknown.

Right now, treat them as neutrinos.

Had some events with neutralinos that showed up in list of tracks. This hack fixes it.

TJ: Put in PDG IDs for neutrinos. Are these standardized?

JS: Added neutralinos to list.

TJ: Have some PDG IDs in a standard list.

Could fill in correct charge even if Geant4 didn't know about it.

JS: Charge is appearing as INFINITE, not NAN.

TJ: Can compare using INFINITE but not NAN.

RC: Agreed on NAN for LCIO.

TJ: Question at the time whether could write NAN from C++ and read into Java.

JS: ZvTop. Making progress. Can now find multiple displaced vertices. Have to do a lot more checks to see if at right spot and parameters make sense.

Norman and I still have to work on the fitter. Norman worked on porting the C++ fitting code to Java.

TJ: What's wrong with code in ZvTop3?

JS: Looked at it and don't understand. Could try to understand, but just don't understand what it is doing. And not documented. Not derived from a documented algorithm. Did find the program it was based off of, used at SLD. Found page with FORTRAN comments but this is it. New fitter will be based off the BaBar algorithm.

NS: Just completed transition of full CCD simulation into org.lcsim. Debugged and had a hard time finding cm to mm bug. Completing comments to make JavaDocs. It works!

JM: Reported on TestBeam.

MR: Need new properties for a new detector?

TJ: Minimally need the compact description. Event display and browser only need compact. Need certain files for FastMC, etc.

Geometry is one parameter and others are auxiliary.

Could read separate file?

WL: Would be fragile.

Norman was thinking for sid00 to rename the readouts for more consistent names.

Hardwired into Lelaps?

WL: Should not be a problem.

Currently, Lelaps is using sampling fractions = 1.0 in all cases.

RF: SiD cal meeting on Thursday morning. Worth bringing up test beam stuff?

JM: Okay.

WL: Could add flag in LCIO run header whether sampling fractions are available or not.

RC: Could do it, but will get messy. As sampling fractions go beyond one number, will become much more complicated.

Flag if sampling fractions applied would be useful.