

GlastRelease v6r3p1

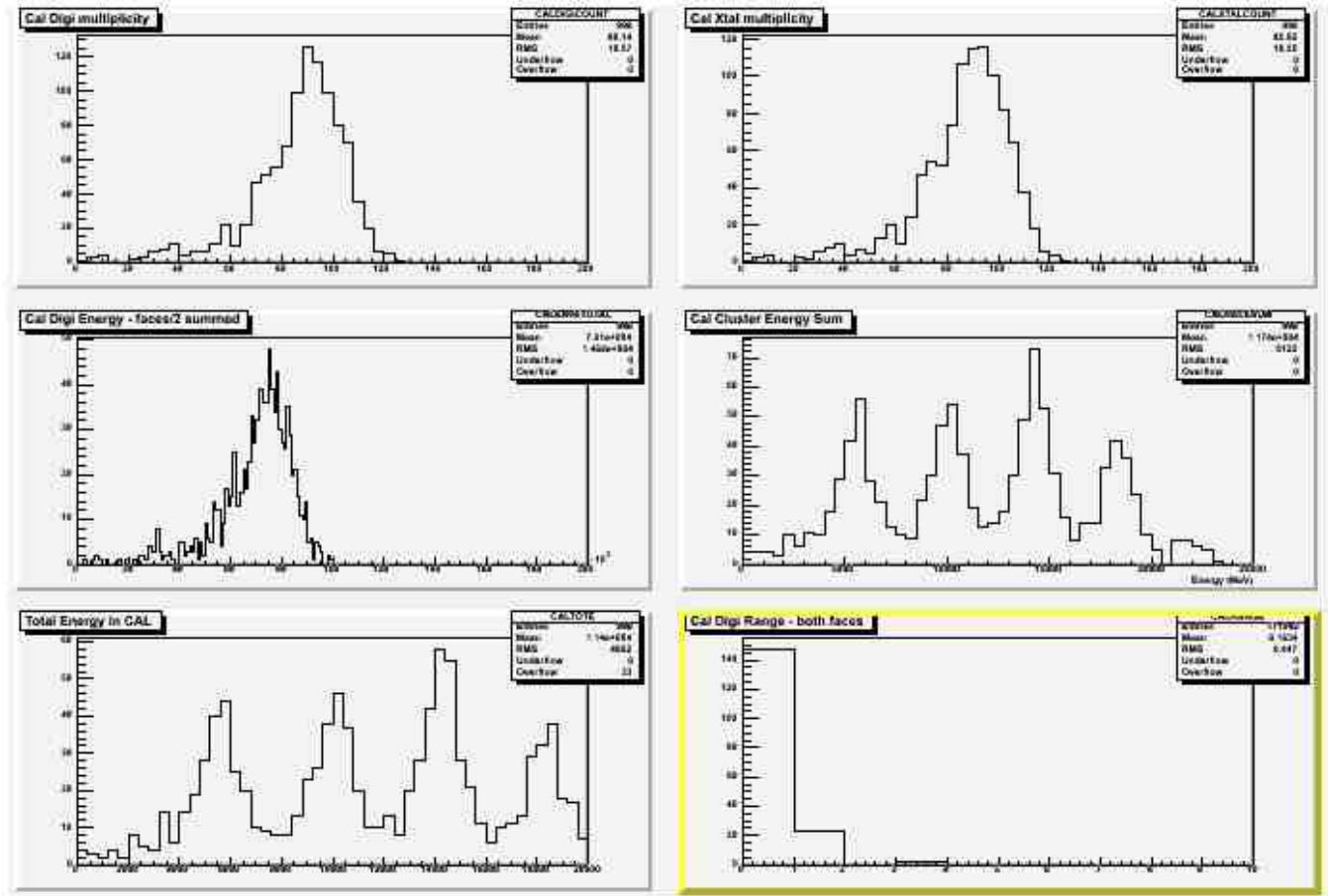
This is the report for GlastRelease v6r3p1.

The CAL Report (RXD)

The CAL was the major upgrade for this tag of GR. A bug was found by Zach and Sasha in the recon thresholding:

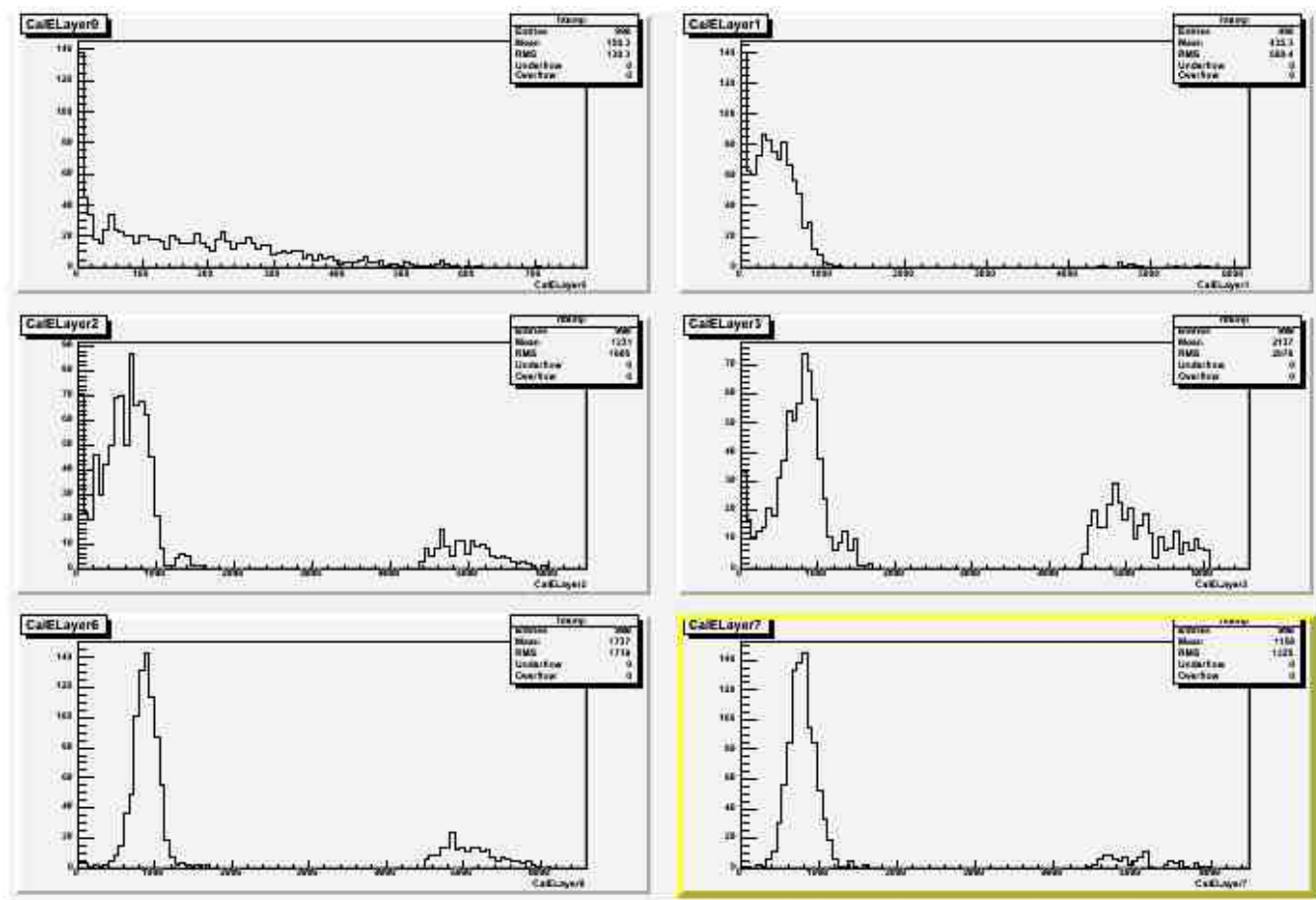
<http://www-glast.stanford.edu/protected/mail/calsoft/0481.html>

I've run GR v6r3p1 plus Zach's latest CalXtalResponse tag, putting 10 GeV gammas vertically into tower 10 for a better control sample. Almost all trigger. I've attached some plots. I've taken the calibrations as specified in the Glean basicOptions file.

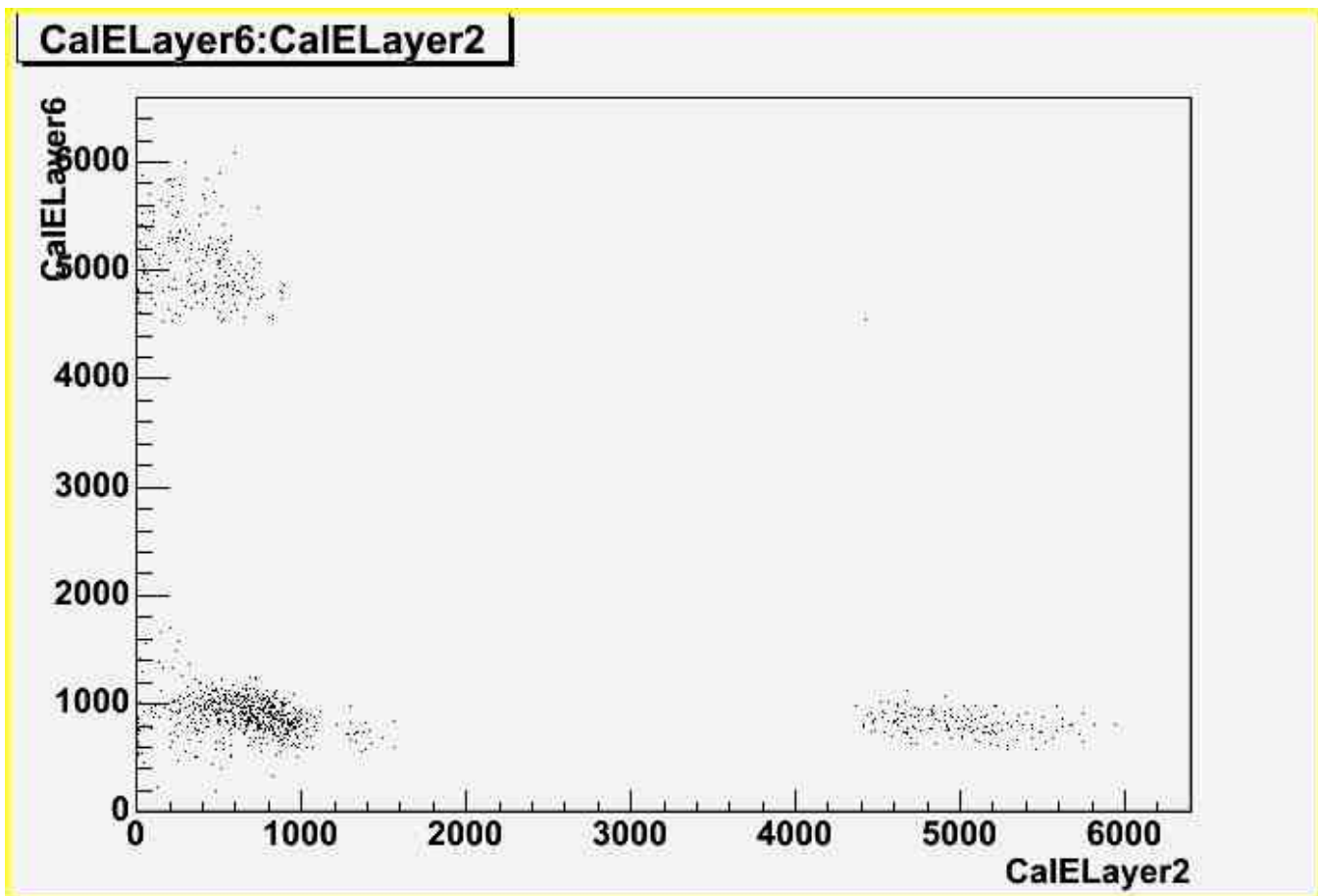


The top two show the hit multiplicity from digi and recon (CalXtalRecData) are consistent. The middle left shows the summed ADC counts for all readouts. Middle right and lower left show energy sums from CalRecon - illustrating the problem. Bottom right shows the range from digi - mostly zero = LEX8. Sure I **ooks** like a recon problem.

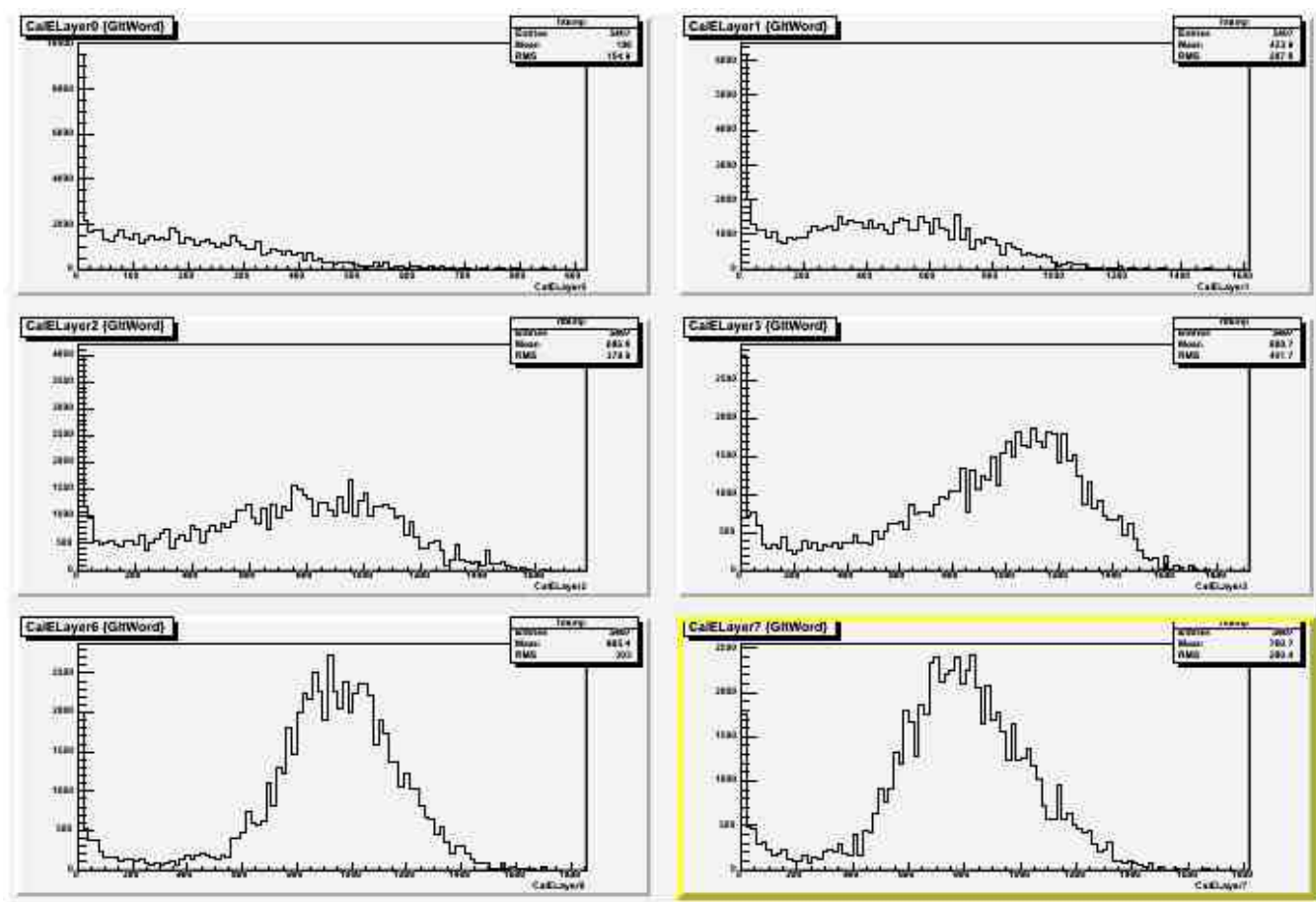
The energy peaks come at around 5, 10, 14 and 18.5 GeV. I'm trying to sort through what the gain ranges are in the new code arrangement.



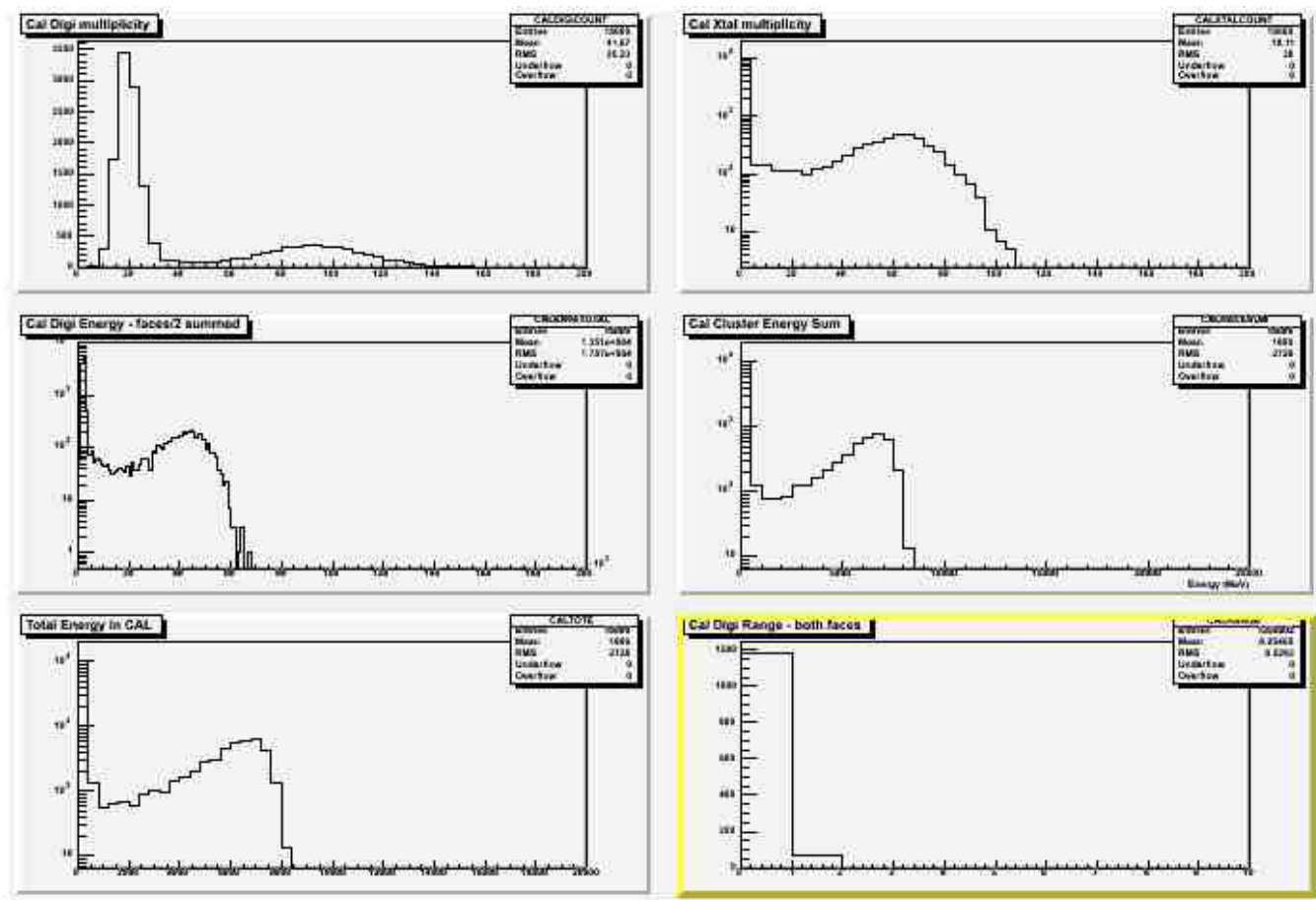
shows layer energies from the Merit tuple - I left off layers 4 & 5; they follow the trend. Note the satellite peaks at 5 GeV.



indicates that the satellite peaks are uncorrelated. These plots look like the biggest clue. The layer energies, aside from zero, are all wrong, as seen from the last pre-new-CAL release (v6r2p8) (Merit tuple from systests 10 GeV gammas; GltWord>0):



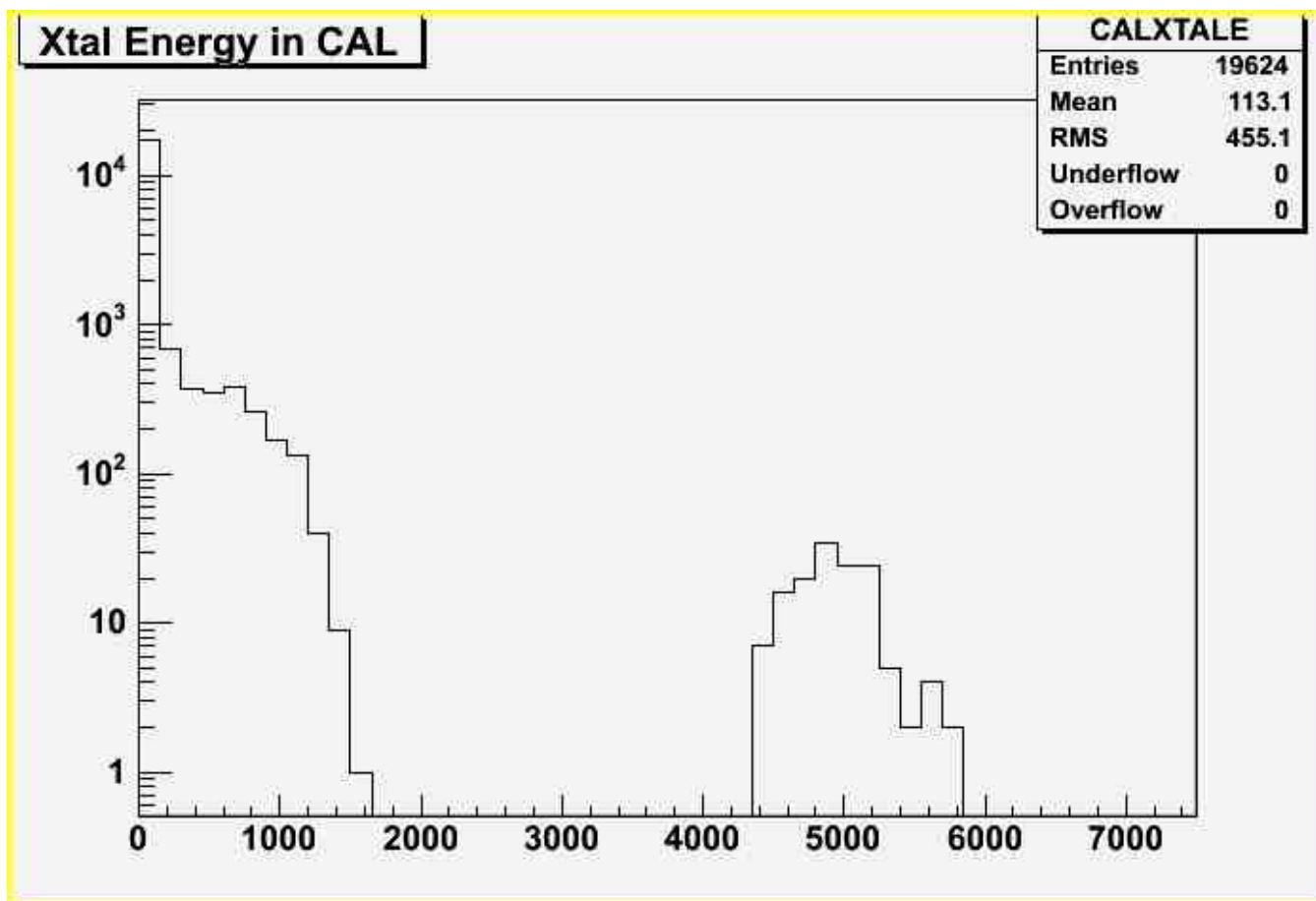
For comparison, here are more plots from v6r2p8:



I did not filter out non-triggered events, so you'll need to eyeball log plots. Note the ranges are a little different. No gap between 1 and 3. Actually on a log plot there are a few instances of 2.

Addendum 3/8/2006 (RXD)

The odd energy bumps are caused by individual hits:



and if I print out some of the 'bogus' hits from CalXtalRecData, I see

```
twr, lyr, col = 4 6 11 range 1 ph0 4770.56 E 4770.56
twr, lyr, col = 0 7 0 range 1 ph0 5170.28 E 5170.28
twr, lyr, col = 3 5 9 range 1 ph0 4888.91 E 4888.91
twr, lyr, col = 13 5 6 range 1 ph0 4576.14 E 4576.14
twr, lyr, col = 9 6 1 range 1 ph0 4438.02 E 4438.02
```

If I did this correctly all these baddies are range 1, and I assume maxed out. This may explain the deficit of range 2 crystals. And maybe some effect for getting range 3.

If I exclude hits with energies > 2 GeV, the energy sums look normal.

The plots and printout were done with:

```

CalRecon *calRec = rec->getCalRecon();

if (!calRec) return;

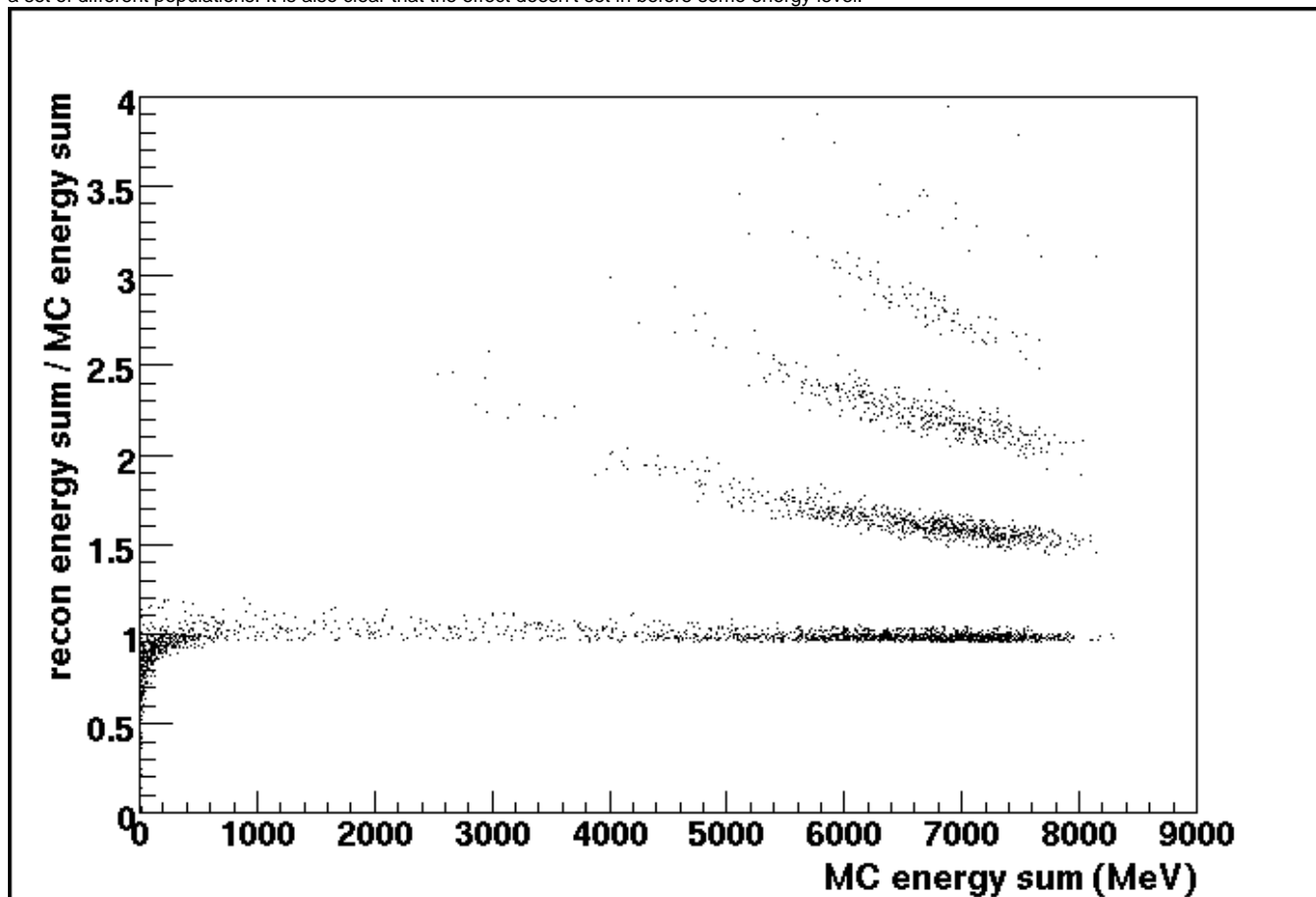
TObjArray* xtalCol = calRec->getCalXtalRecCol();
Long64_t numXtal = xtalCol->GetEntries();
((TH1F*)GetObjectPtr("CALXTALCOUNT"))->Fill((Float_t)numXtal);
float totXE = 0.;
for (int xc=0;xc<numXtal; xc++) {
    CalXtalRecData* xtal = (CalXtalRecData*)xtalCol->At(xc);
    float xtalEnergy = xtal->getEnergy();
    ((TH1F*)GetObjectPtr("CALXTALE"))->Fill(xtalEnergy);
    if (xtalEnergy > 2000) {
        CalXtalId id = xtal->getPackedId();
        int lyr = id.getLayer();
        int twr = id.getTower();
        int col = id.getColumn();
        CalRangeRecData* rData = xtal->getRangeRecData(0);
        int range = rData->getRange(0);
        double ph0 = xtal->getEnergySelectedRange(range,0);
        std::cout << "twr, lyr, col = " << twr << " " << lyr << " " << col <<
            " range " << range << " ph0 " << ph0 << " E " << xtalEnergy << std::endl;

        continue;
    }
    totXE += xtalEnergy;
}
((TH1F*)GetObjectPtr("CALXTALTOTE"))->Fill(totXE);

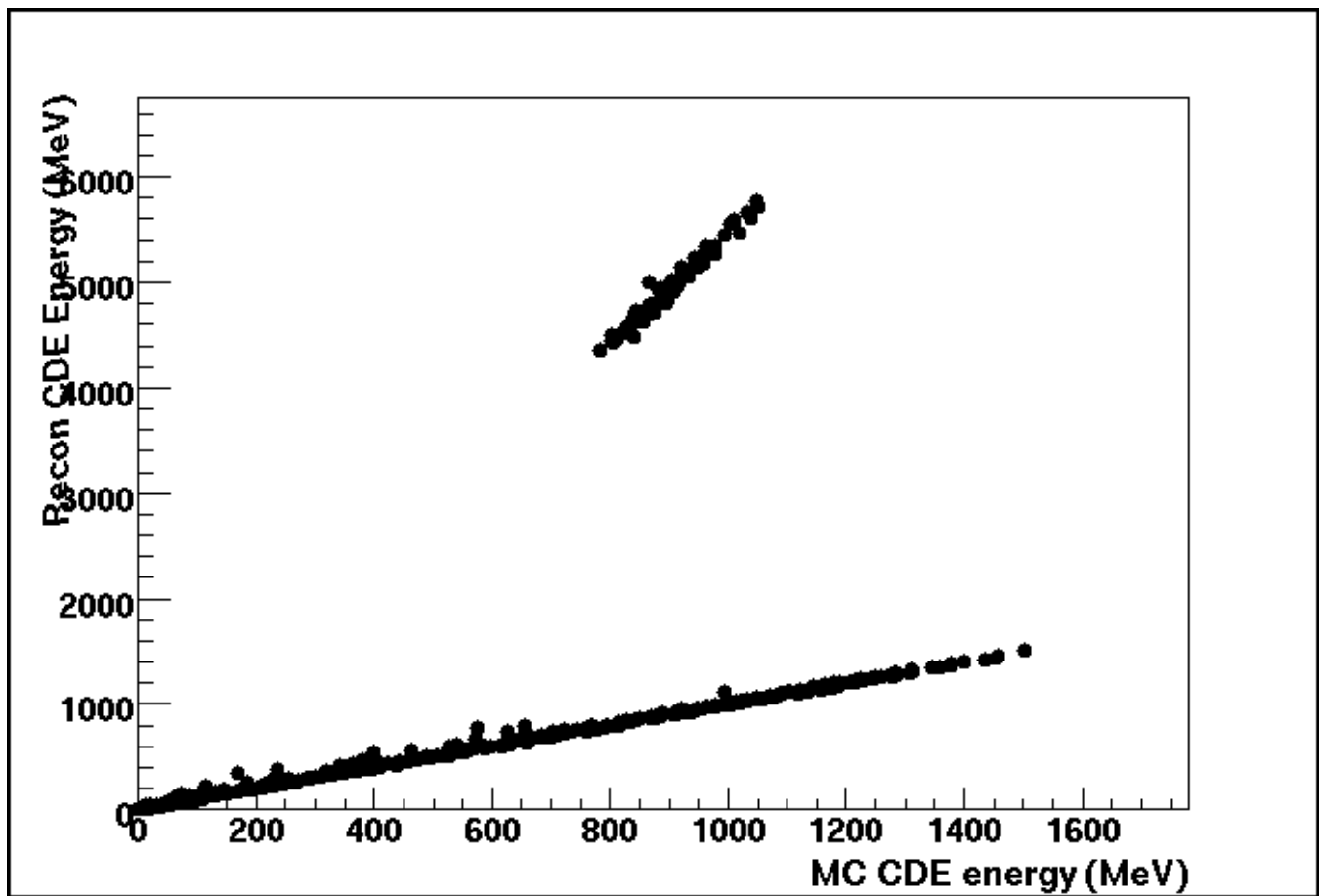
```

Addendum 3/9/2005 (BG)

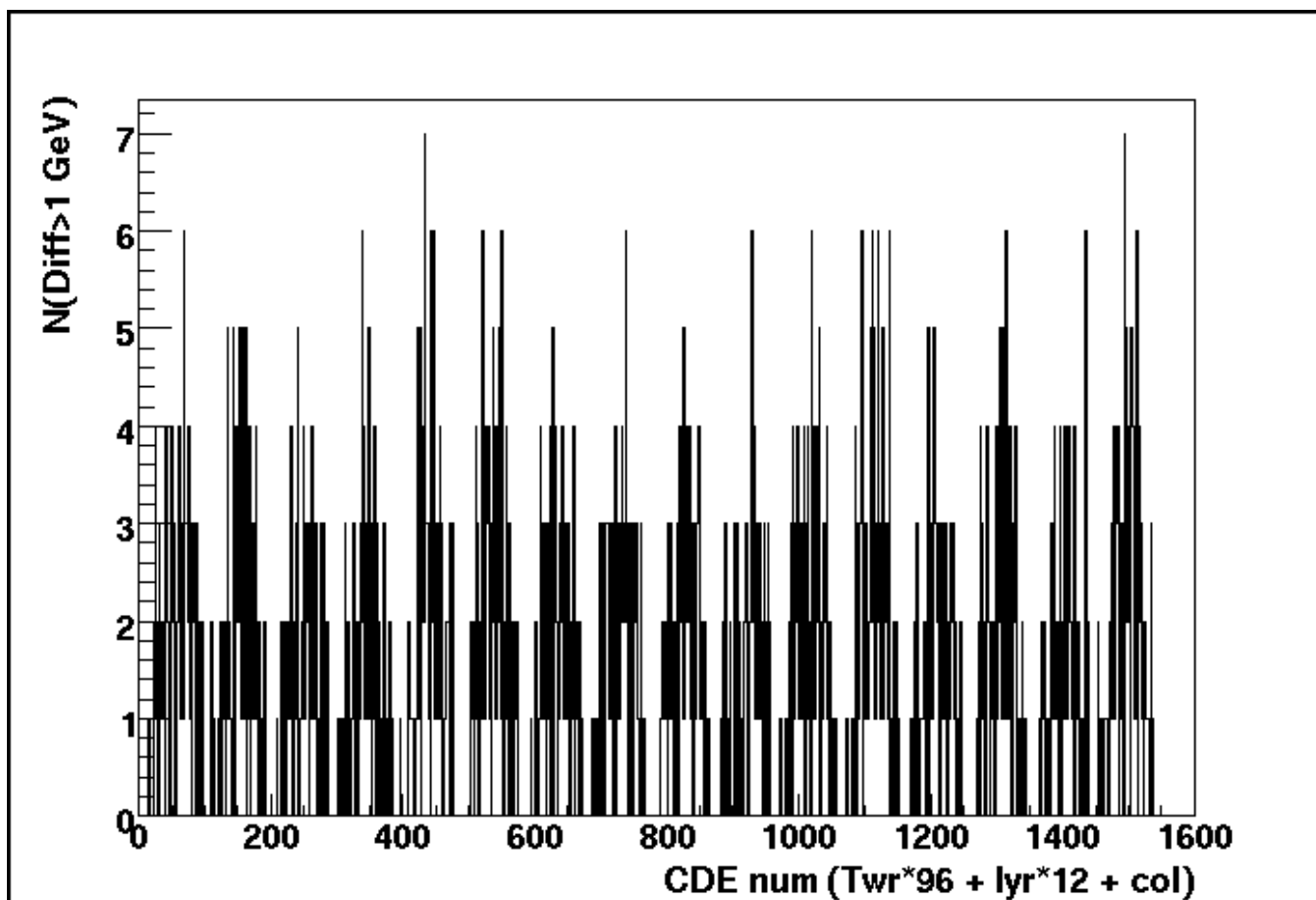
Looking at the sum of the reconstructed deposited energy in the CAL divided by the sum of the MC deposited energy, vs the sum of the MC deposited energy, there are a set of different populations. It is also clear that the effect doesn't set in before some energy level.



Now the same plot but showing the individual CDE Recon energy versus its MC energy. There is indeed a population of CDEs contributing in a strange but linear way. This can happen for more than 1 CDE per event.



To see if there is a particular set of CDEs that are the cause of this, this is a histogram with the number of occurrences where CDE $\#(96 \cdot \text{twr} + 12 \cdot \text{lyr} + \text{col})$ has $E(\text{recon}) - E(\text{MC}) > 1 \text{ GeV}$. All CDEs can be triggered by this effect, it seems to be only a function of MC energy.



Now cutting on those weird events it is visible that $E(\text{recon}) - E(\text{MC}) = 4 \cdot E(\text{MC})$ when it happens.

