DEEP UNDERGROUND NEUTRINO EXPERIMENT

The University Of Sheffield.

Event display improvements, Fix to photon detector flash width

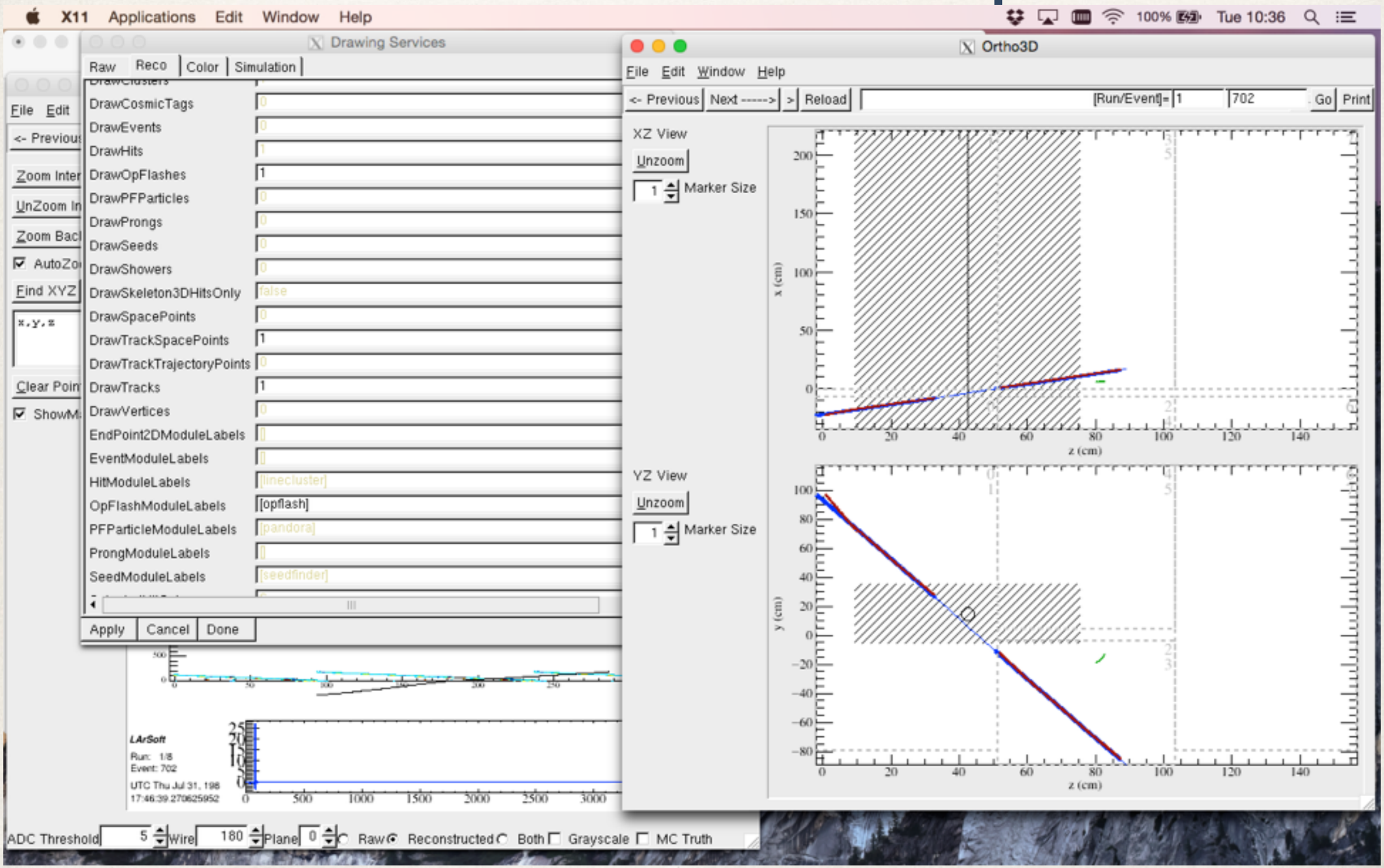
Karl Warburton, Gleb Sinev with guidance from Tingjun Yang and Alex Himmel

14/07/2015

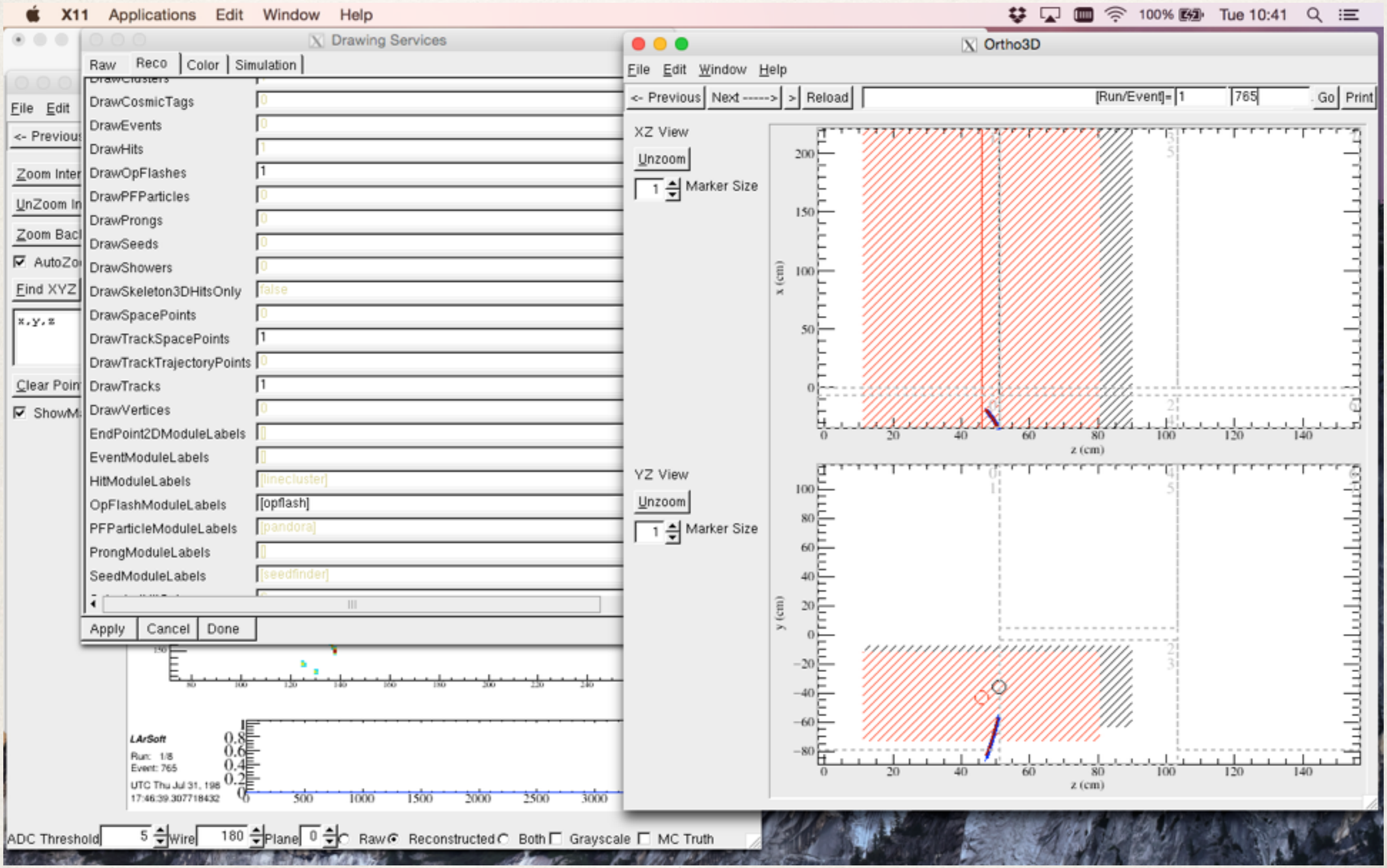
Adding Flashes to event display

- Can already see Flash information on 2D wire plane view of event display, but not on Ortho3D.
  - Clear benefit of being able to see location of flashes in Y, Z planes.
- Added a function to RecoBaseDrawer.cxx - OpFlashOrtho
  - Takes art::event, eve::OrthoProj_t and evdb::View2D as arguments.
  - Accesses OpFlash information (Centres and widths of flashes in Y and Z) and adds them to the Ortho3D event display if DrawOpFlash == 1.

Ortho3D w MC, Track, OpFlash



Ortho3D with 2 flashes



Fix to width of OpFlash

- From above can see that the width of flashes is very large.

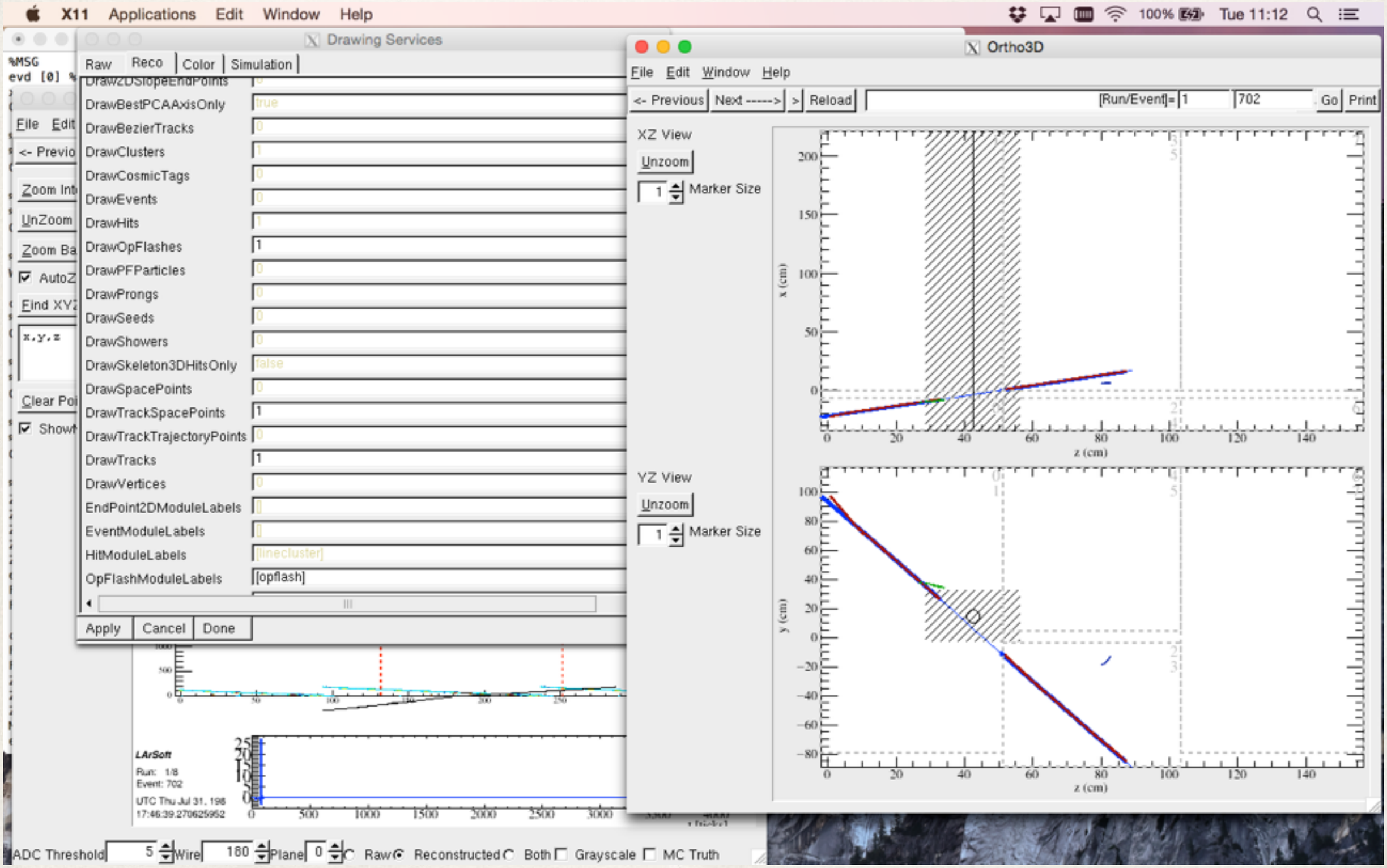
- Gleb noticed that calculation of width is incorrect.

- Function is in larana/OpticalDetector/OpFlashAlg.cxx

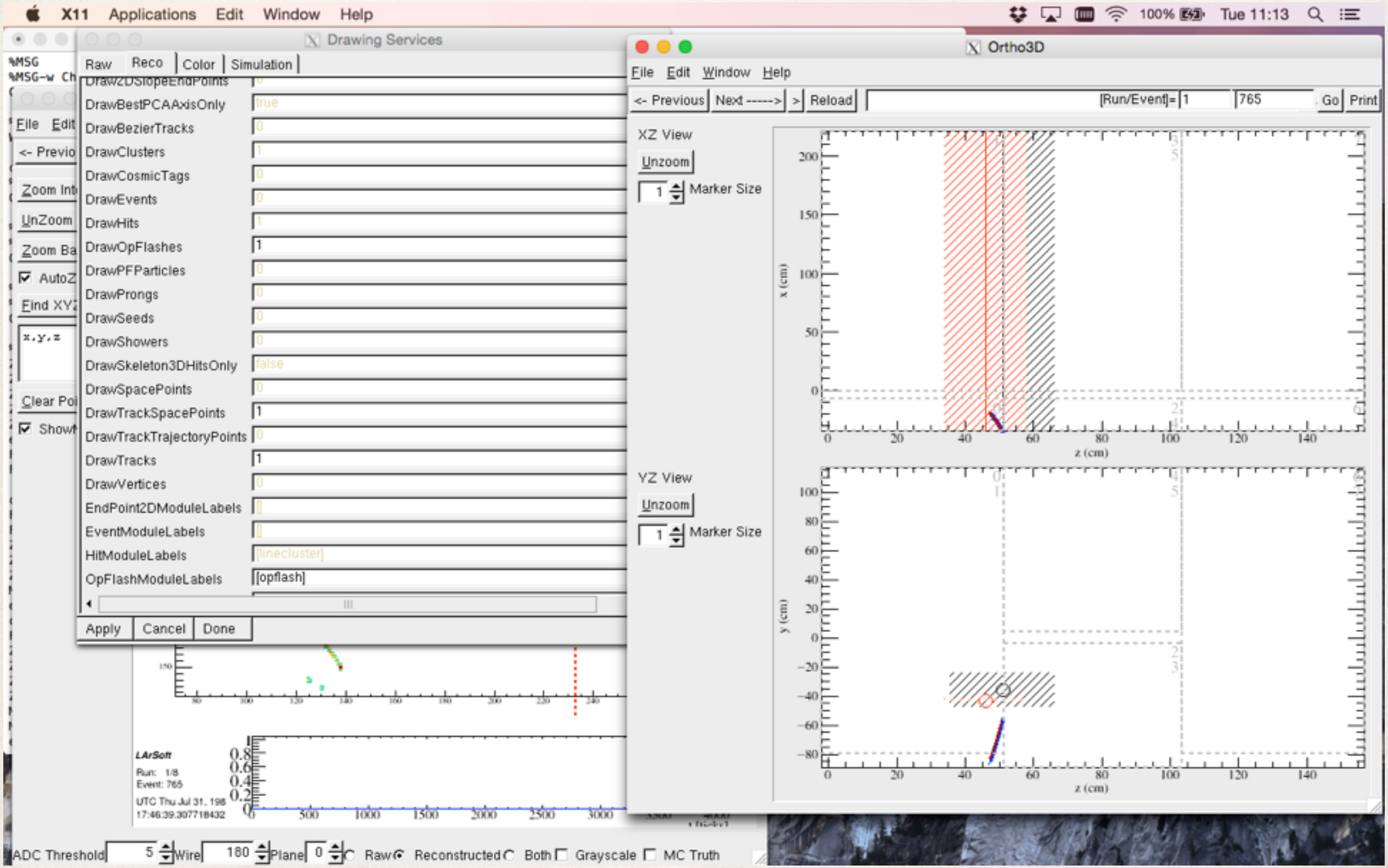
```
double CalculateWidth(double const& sum, double const& sum_squared, double const& weights_sum){
    //return std::sqrt( sum_squared*weights_sum - sum*sum )/weights_sum; // GVS bugfix
    return std::sqrt( sum_squared*weights_sum + sum*sum )/weights_sum;
  }
```

- The ‘+’ should be ‘-‘ as per RMS calculation.

Ortho3D with fixed width



Ortho 3D, fixed width, 2 flashes



Permission to push changes

- Currently both are just on my local areas in;
  - lareventdisplay - Event Display addition
  - larana - OpFlash correction
- Can I push them straight to head? Or should I make a feature branch for each? Neither are breaking changes.