



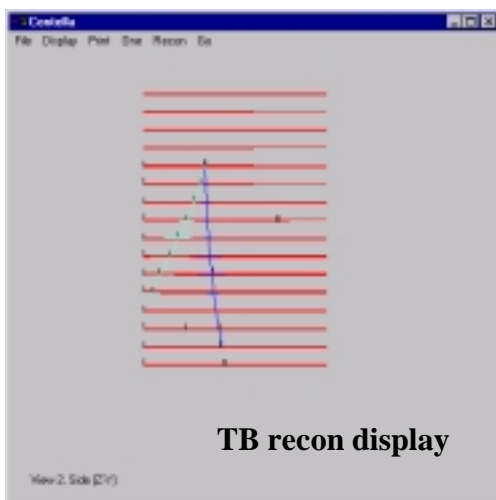
# Tb Recon - Centella

Software workshop, May 15-17th, 2000

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## tb recon - Centella

### A Reconstruction Program for the 99/00 GLAST Test Beam



TB recon display

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U. California, Santa Cruz

#### TB RECON

- Analysis flow Data of the test Beam
- TB Recon - Structure
- TB Recon - Flow
- TB Recon - Documentation
- TB Recon - Status
- TB Algorithm - Calorimeter  
- Tracker

#### Quick look at the Data

- electrons 2-5 GeV
  - tracker and calorimeter rec
- gamma 2-15 GeV

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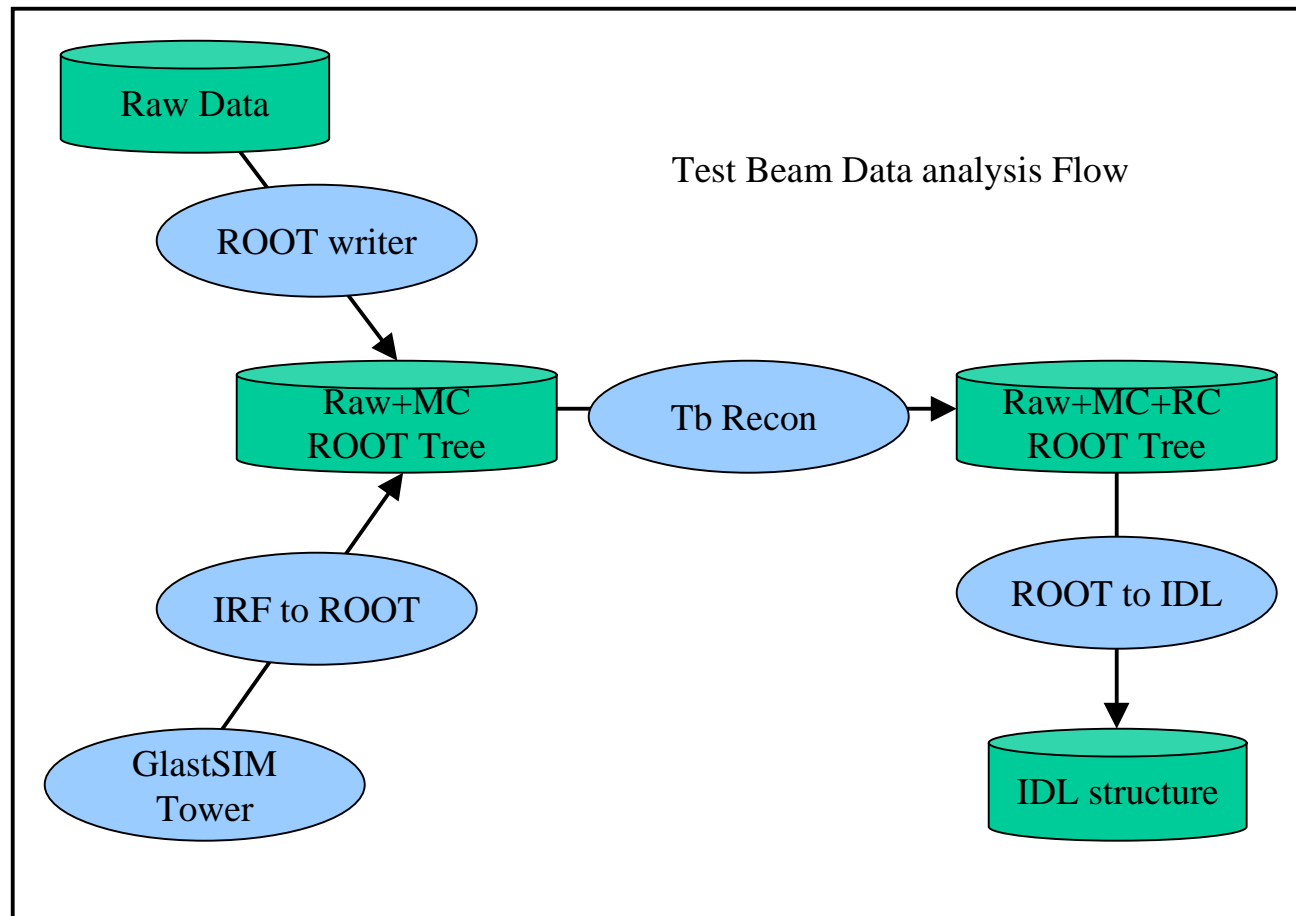


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## TB data analysis flow

### Main Points:

- Use of GLASTsim - tower to generate MC
- Convert Raw data to ROOT Trees
- Common MC, and Data Raw format
- Reconstruction runs on both MC/Data
- Persistent data: ROOT Tree Raw-MC-Rec branches





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## Tb\_recon - Centella

- **TBRecon - Purposes:**

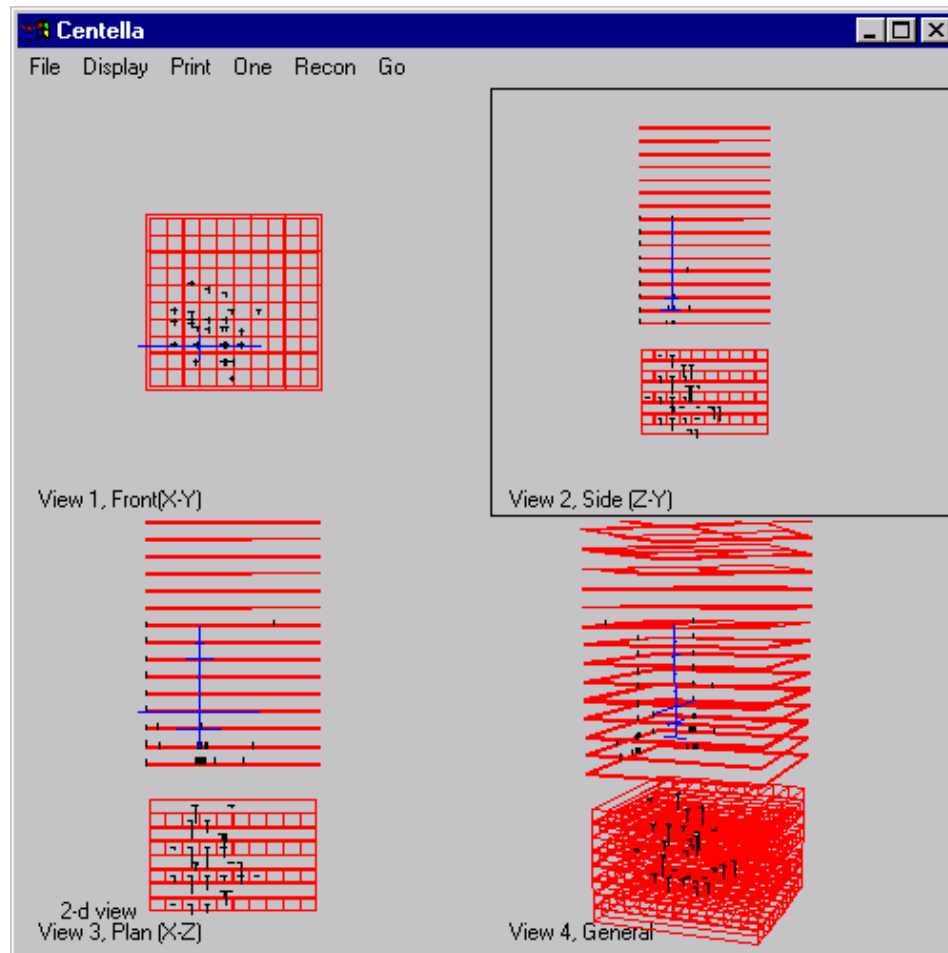
- Perform a full reconstruction
- Can be use to particular detector studies

- **It inheretes from GLASTSIM**

- Win display 3D
- We use the GLASTsim Tracking Reconstruction

- **It Follows Gaudi's philosophy**

- It Separate Data/Algorithm
- It Separate Data in persistent (ROOT)-transient.
- It provides servises: Option, message, and selection



Event Display: a high energy  
Gamma conversion, run 300



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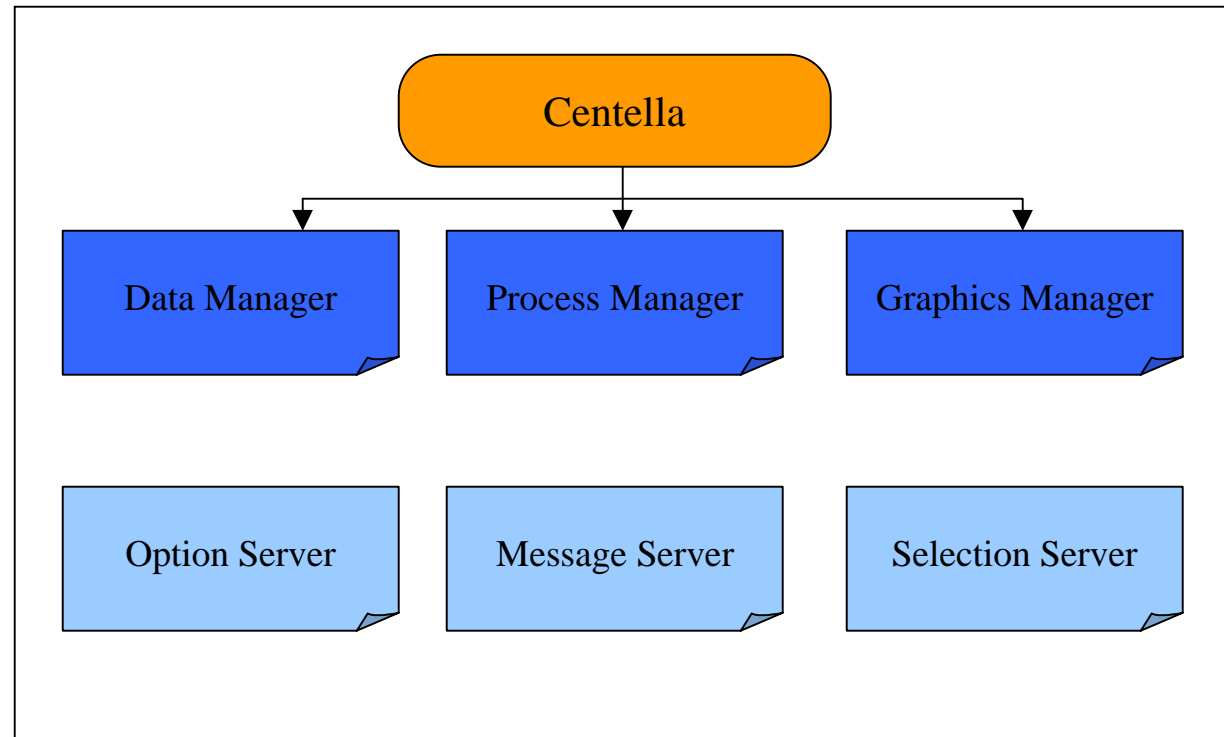
## Tb\_recon - structure

### Application: **Centella**

- Data Manager
- Process Manager
  - List of Algorithms
- Graphics Manager
  - Optional

#### Services available

- Option Server
  - (set option by the user)
- Message Server
  - (print debug, info, etc)
- Selection Server
  - (apply selection criteria)





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## Tb\_recon - Data Manager

### Data Manager

- **Persistent Data**

- Root Trees (I/O)
- histograms (0)

- **Transient Data**

- **Run Data**

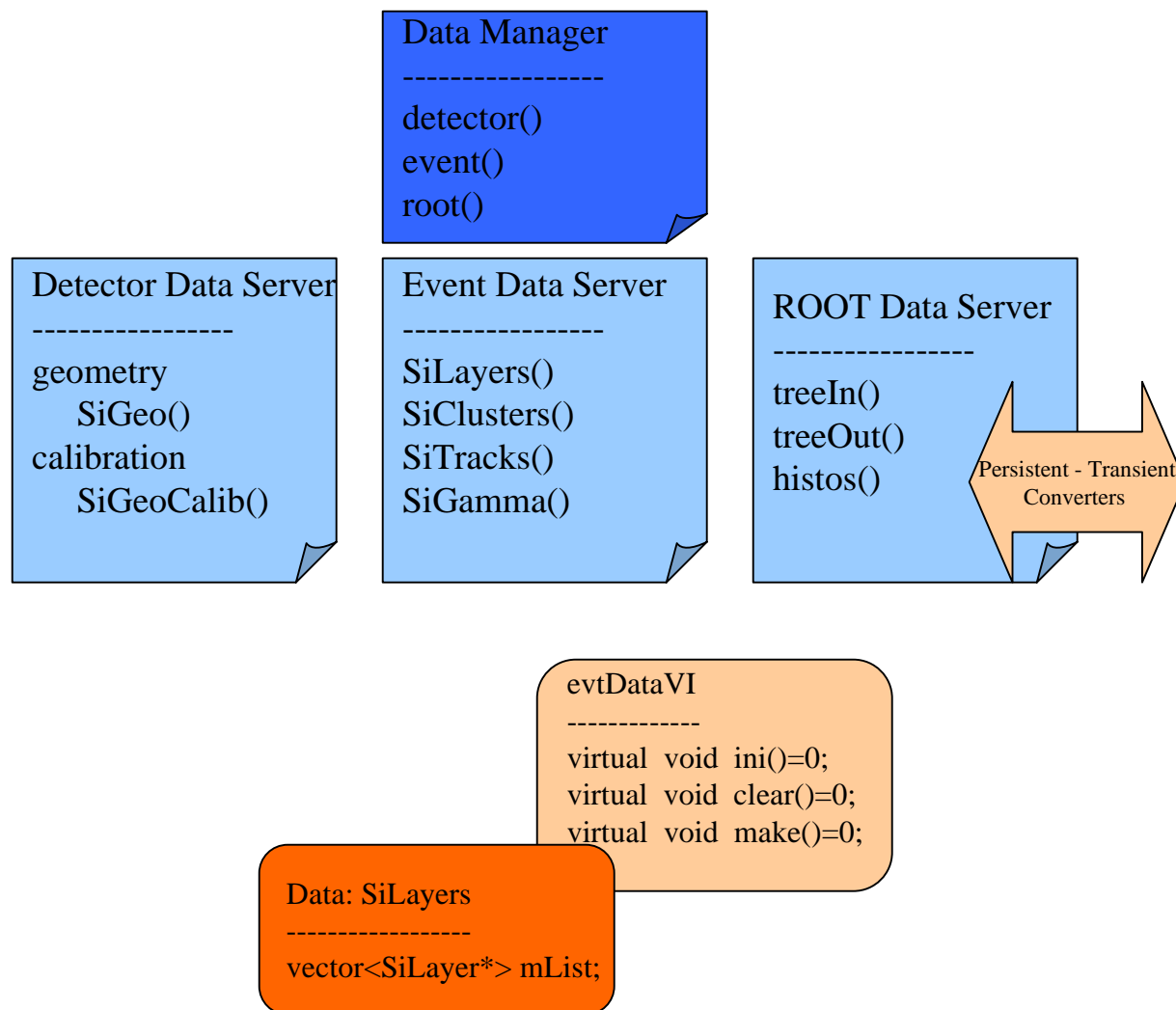
- geometry
- calibration

- **Event Data**

- generation
- reconstruction
- analysis

- Transient Data inherits from

- **evtDataVI** (virtual)





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## Tb\_recon - Data Manager

### Process Manager

- **Event Processes**

A event Process has

- generation
- reconstruction
- analysis

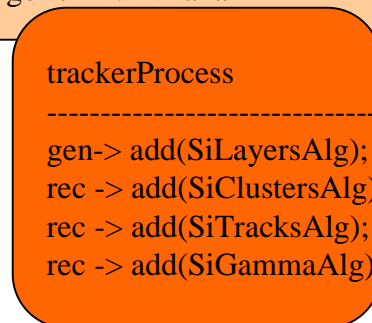
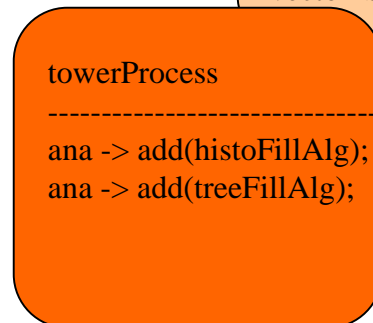
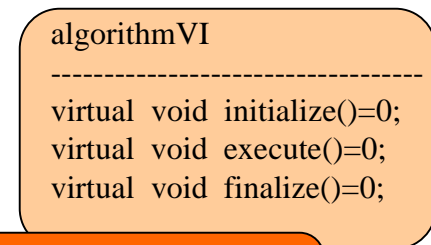
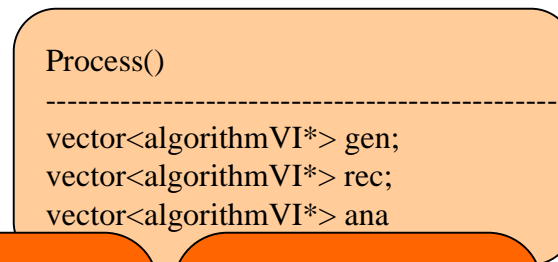
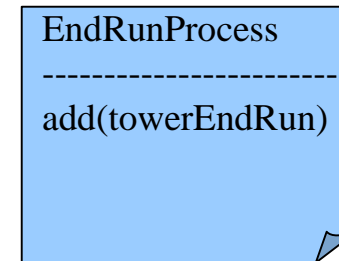
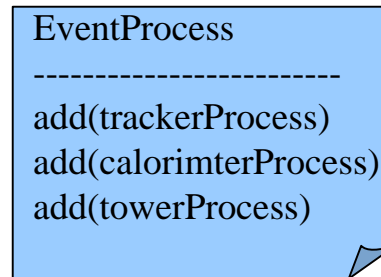
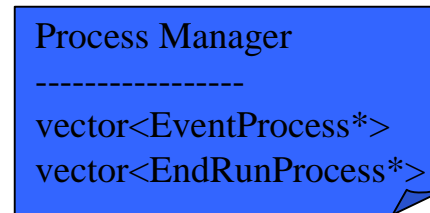
algorithms

- **End of Run Process**

A list of algorithms

- All algorithm inherits from

- **algorithmVI**





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## Tb\_recon - Data Manager

### Option Server

- Classes inherit from
  - optionVI
- Input file **centella.in**

```
centella.in - WordPad
File Edit View Insert Format Help
-----
// Centella.in  Input file for TBrecon (centella)
//
// It should be in the same directory ad centella.dsw
// If problems look in Event/optionServer class
//
// for set option use "class varname vartype(I,D,S) varcontent"
// for comment use :"/ comment"
// -----
//
// input root tree
//
rootDataServer treeInFile S C:/TBData/dataRootV1.2/run300.root
//
// output histos/ntuples root
//
rootDataServer histoFile S D:/Centella2/data/historun300.root
//
// Recon tree file output
//
rootDataServer treeOutFile S D:/Centella2/data/reconrun300.root
For Help, press F1
```

```
Option Server
-----
apply()
-----
vector<optionVI*> m_list
```

```
optionVI
-----
virtual void setOption();

RootDataServer
-----
string m_treeInName;
```



# Tb Recon - Centella

## Tb\_recon - Data Manager

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### Message Server

- Classes inherit from
  - **optionVI**
- Input file **centella.in**

Message Server

```
-----  
out()  
message();  
-----  
ostream& out
```

### Selection Server

- classes inherit from
  - **cutVI**

Selection Server

```
-----  
selectionReadEvents()  
selectionAnaEvents();
```

cutVI

```
-----  
virtual bool apply();
```

cutEvtScan

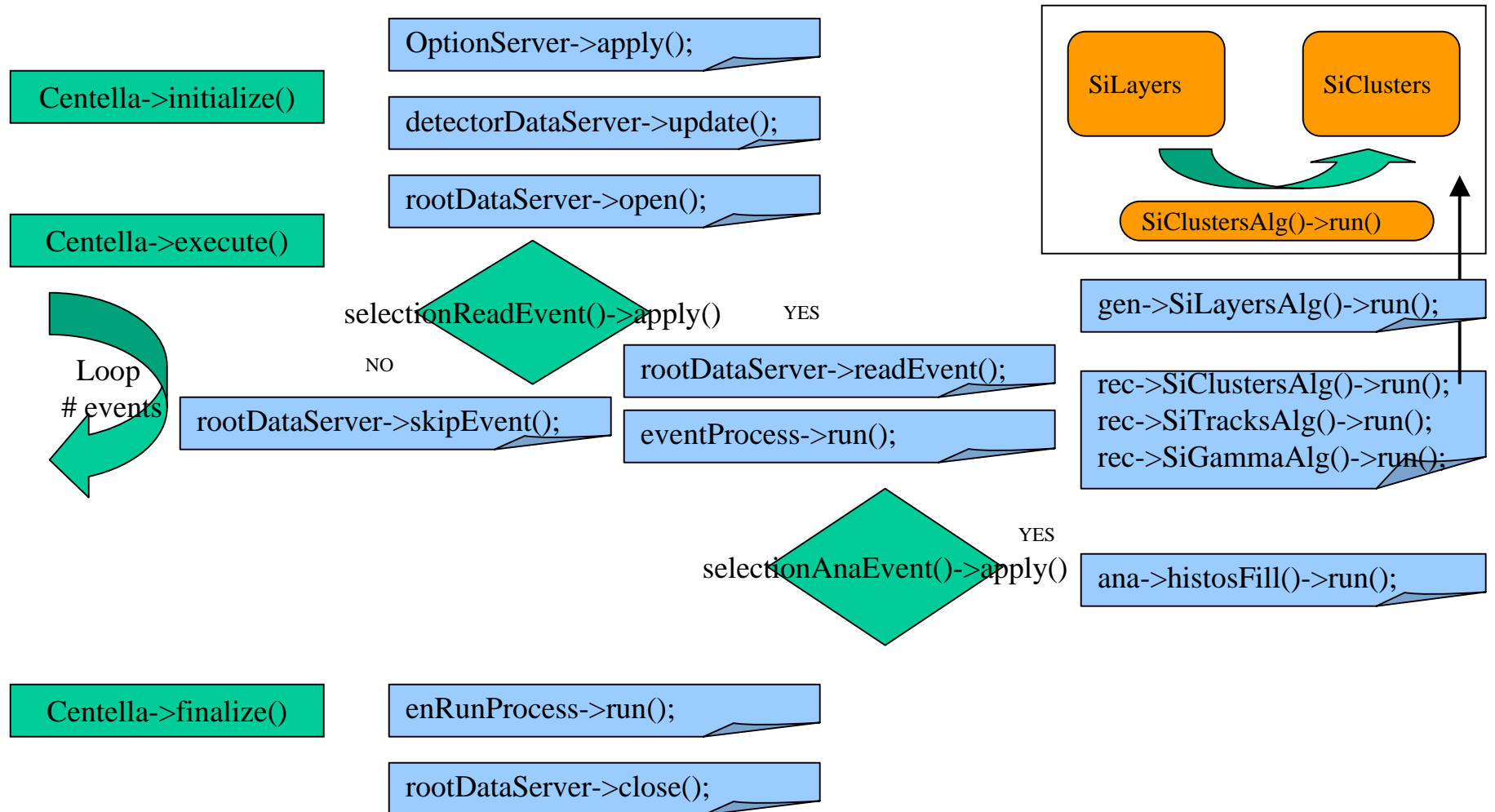
```
-----  
vector<int> m_evtIDList;
```





# Tb Recon - Centella

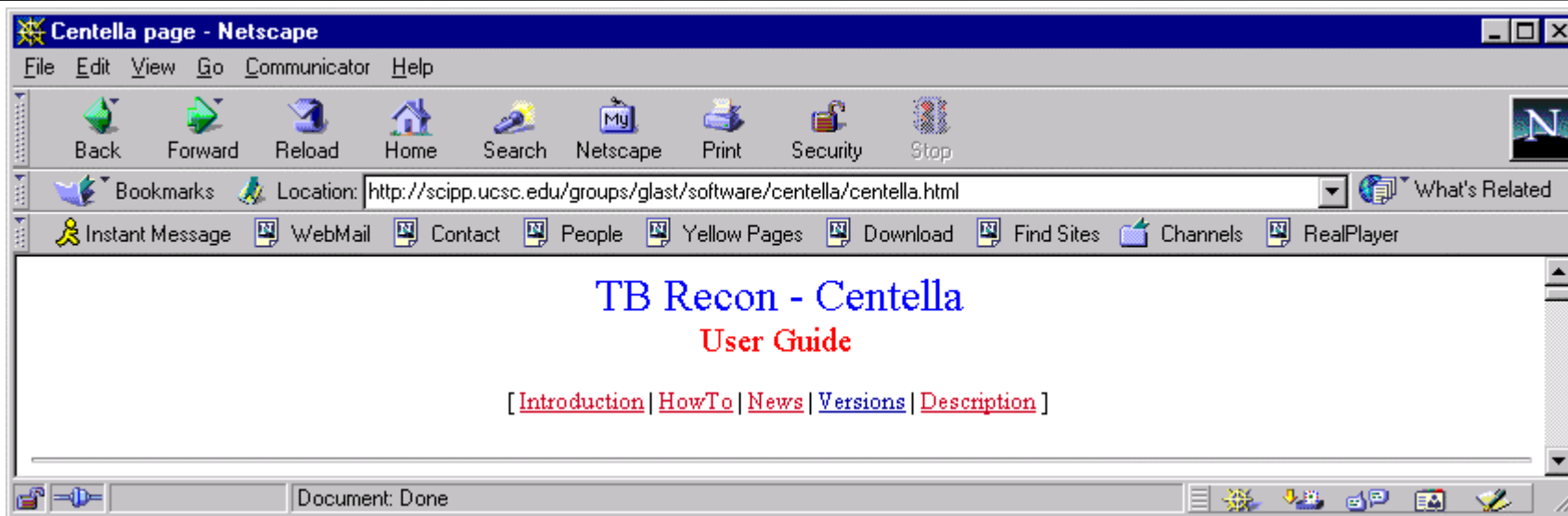
## Tb\_recon - Flaw





# Tb Recon - Centella

## Tb\_recon - Documentation



**tb\_recon** is under CVS : checkout “ib\_recon”

**documentaion:** [centella.html](#) file in

where?

- CVS: under /tb\_recon/documents
- or <http://scipp.ucsc.edu/groups/glast/software/centella.html>

who?

- Everyone can enter information in the [centella.html](#) file and commit to CVS



# Tb Recon - Centella

## Tb\_recon - Status 05/16/00

### Reconstruction code

- Tracking reconstruction working
  - Final validation needed
  - code extrapolator class?
- Naïve implementation of the calorimeter reconstruction
  - Ecole de France is taking the responsibility
- No interaction tracker/calorimeter implemented

### ROOT I/O

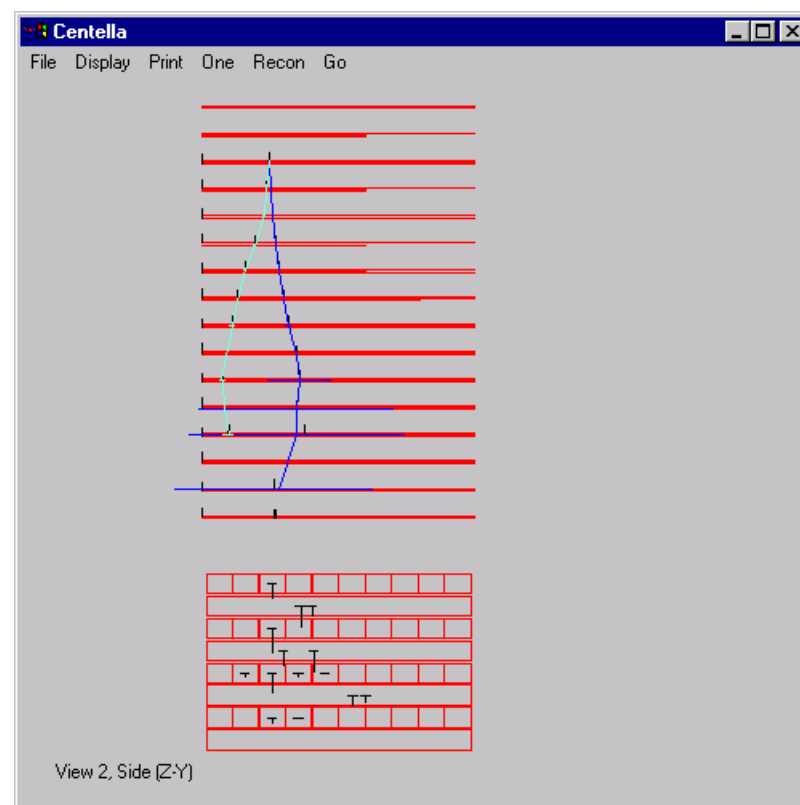
- Reading V1.2 root-tree version
- writing the output of the Recon Tree (Heather-Jose)

### Portability

- Built tagged B110500 - compiles and runs in winNT
- Regis is trying to compile tb\_recon under Unix/Linux

### Graphics

- Simple winGUI to debug events





# Tb Recon - Centella

## Tb\_recon - Algorithms

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### Tracker Reconstruction

#### GLASTsim tracker reconstruction

##### Pattern Recognition

- Search for
  - a) gamma V-signa
  - b) 5 More tracks
- Method:
  - Use Cal info: centroid and energy
  - Loop in all hits
  - Select X-Y candidates
  - Select 3D candidates

##### Track Fitting: Kalman Filter

#### Further Work

- Final validation
- Extrapolate tracks to cal

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### Calorimeter Reconstruction

#### Naïve reconstruction

- Berrie's pedestals for calibration
- Selection of the lowest range not saturated
  - $EneLog = gain * (ADC - ped)$ ;
- Linear asymmetry to compute the position

#### Further Work

- Include linear coefficients for range-log (HEX)
- Include table of position for the asymmetry.
- Complications due:
  - LEX range - elec crosstalk
  - light lost in 32 diodes Simple.

### Calorimeter+Tracking :

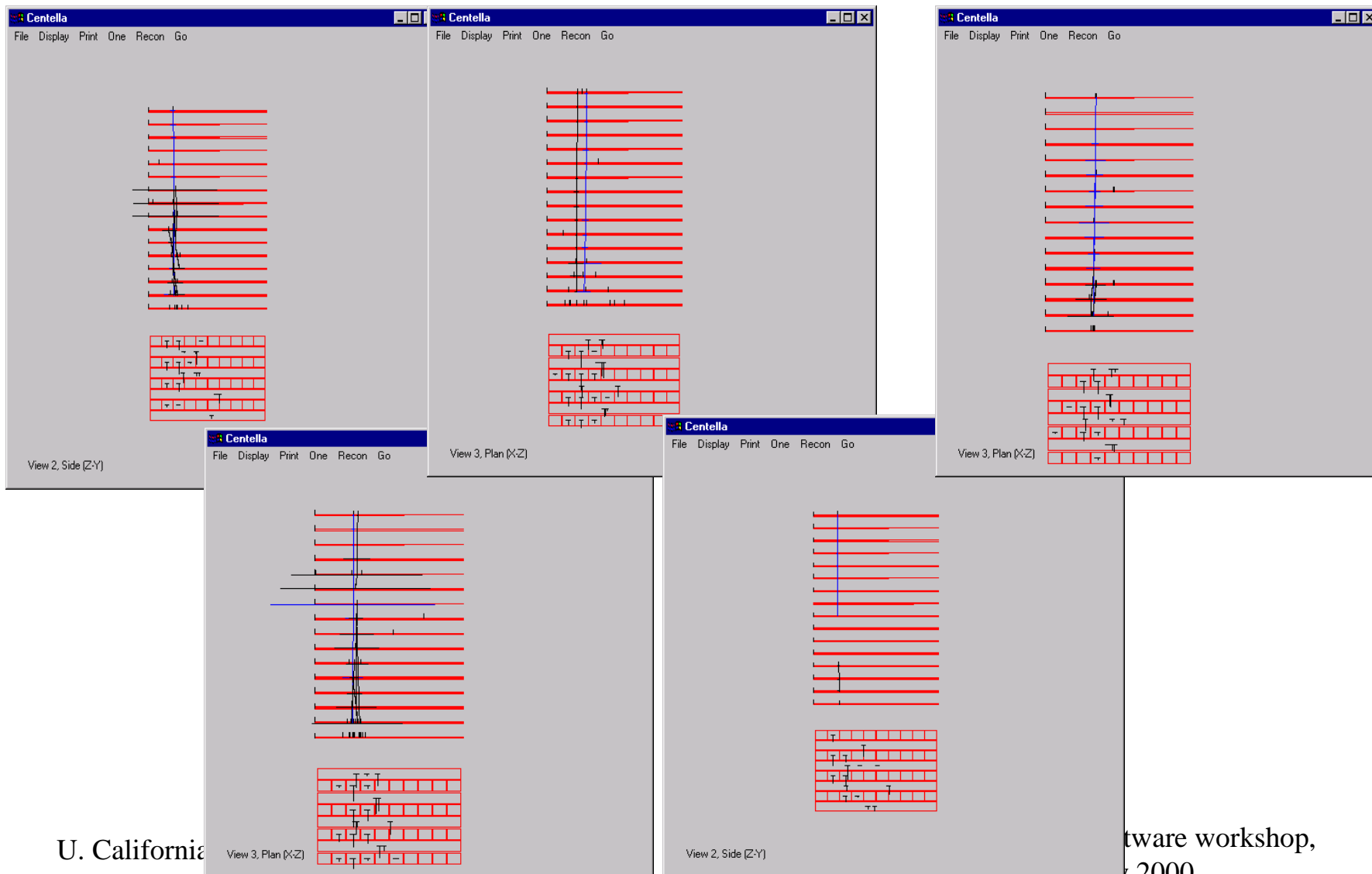
#### Further Work

- Better definition of energy to starts tracks

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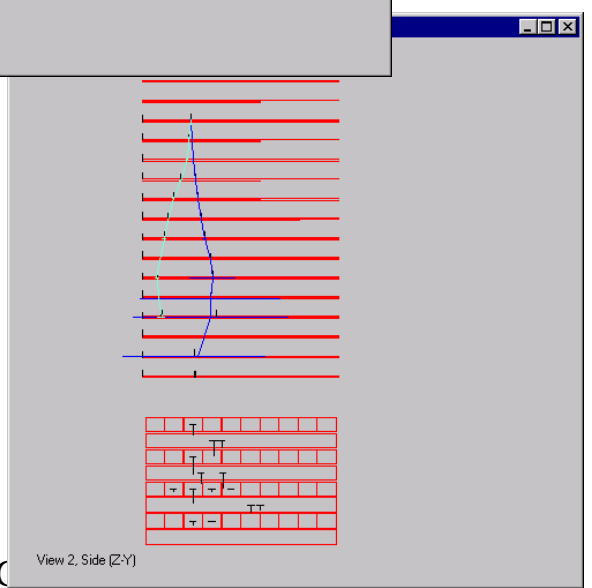
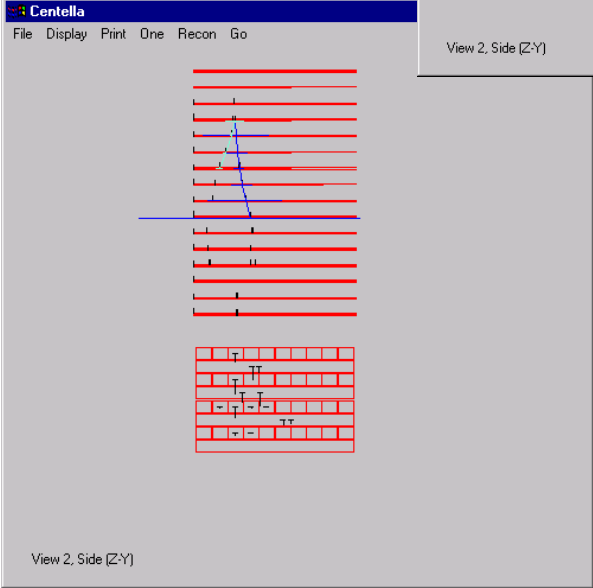
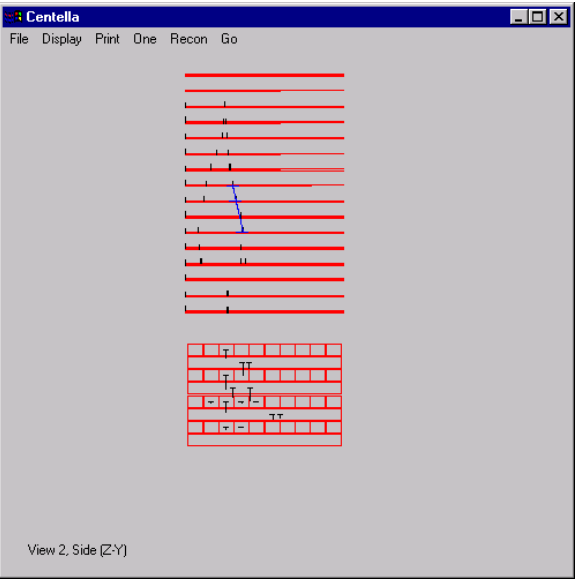
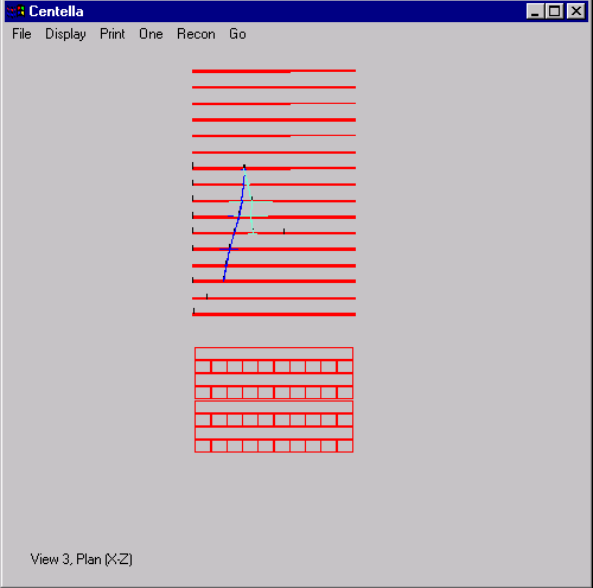
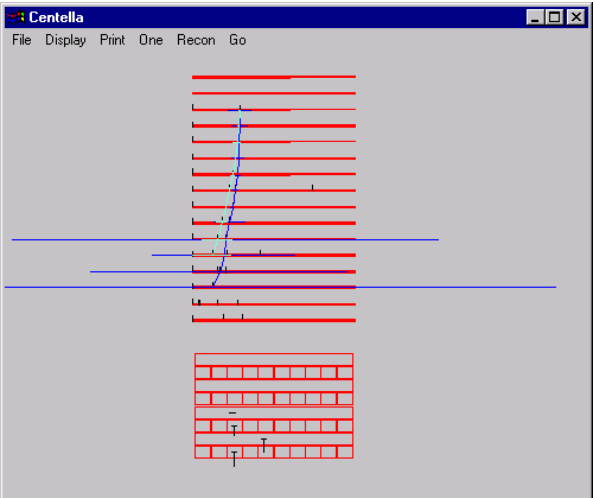


# Tb Recon - Centella



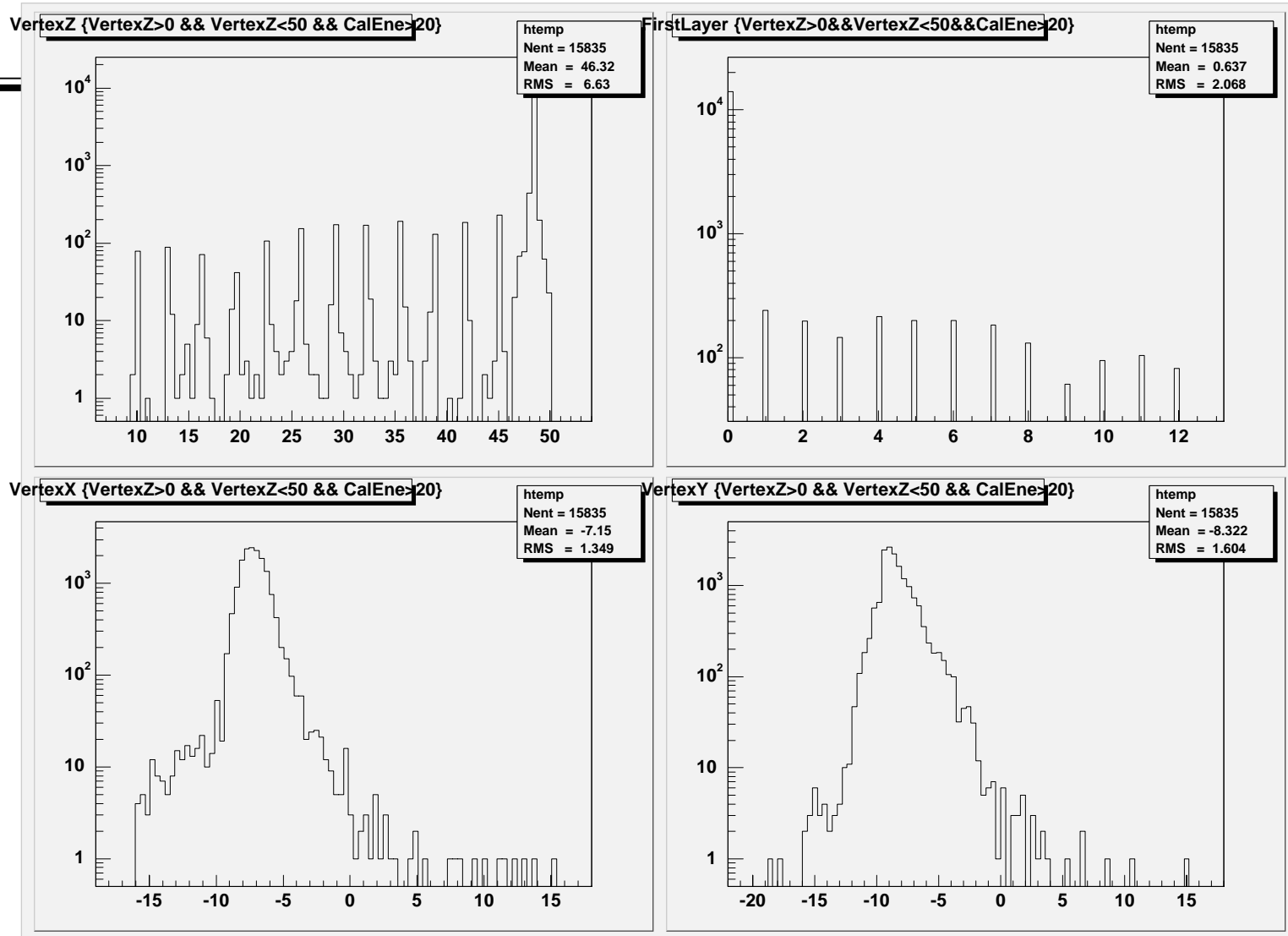


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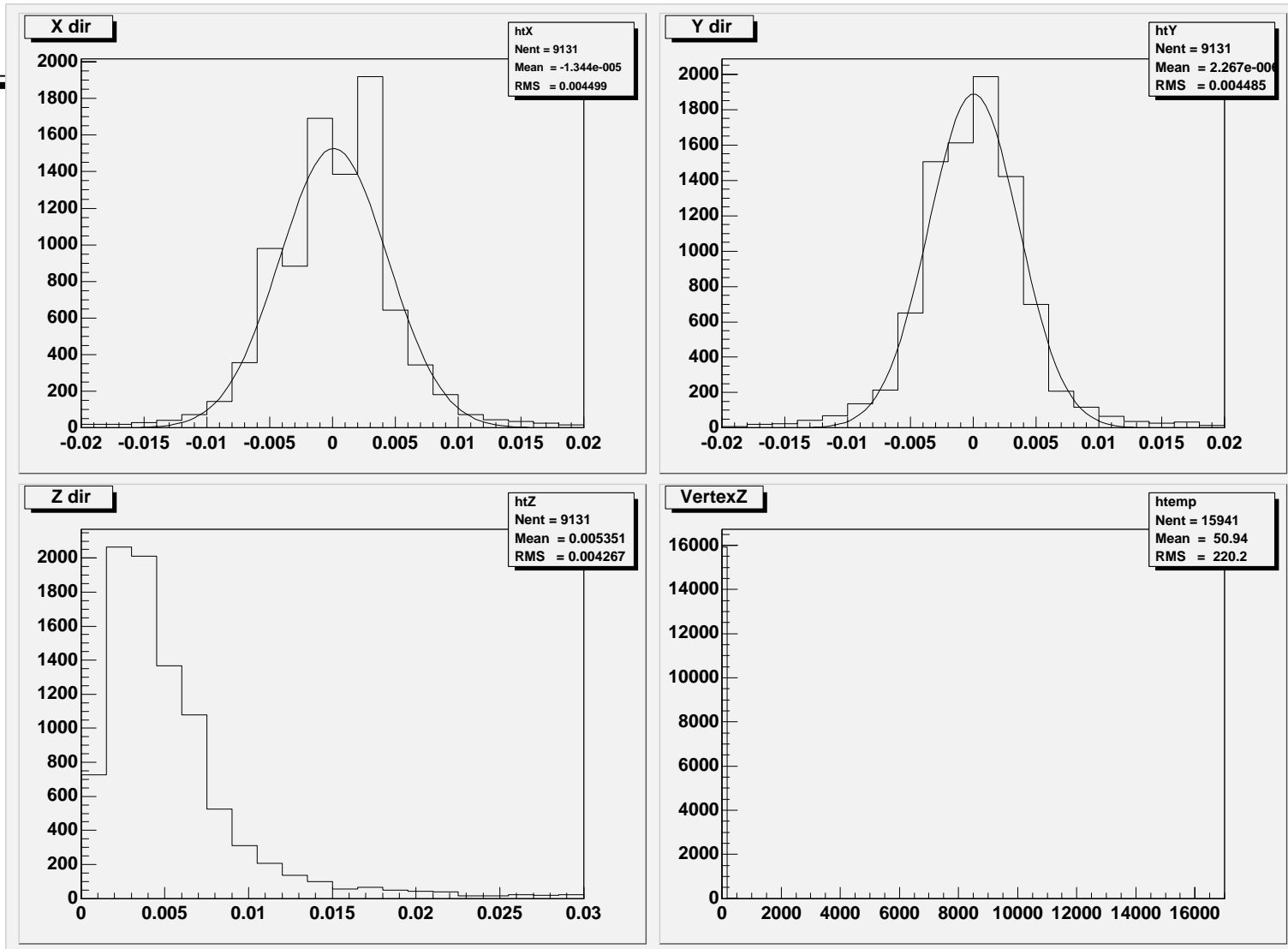


# Tb Recon - Centella





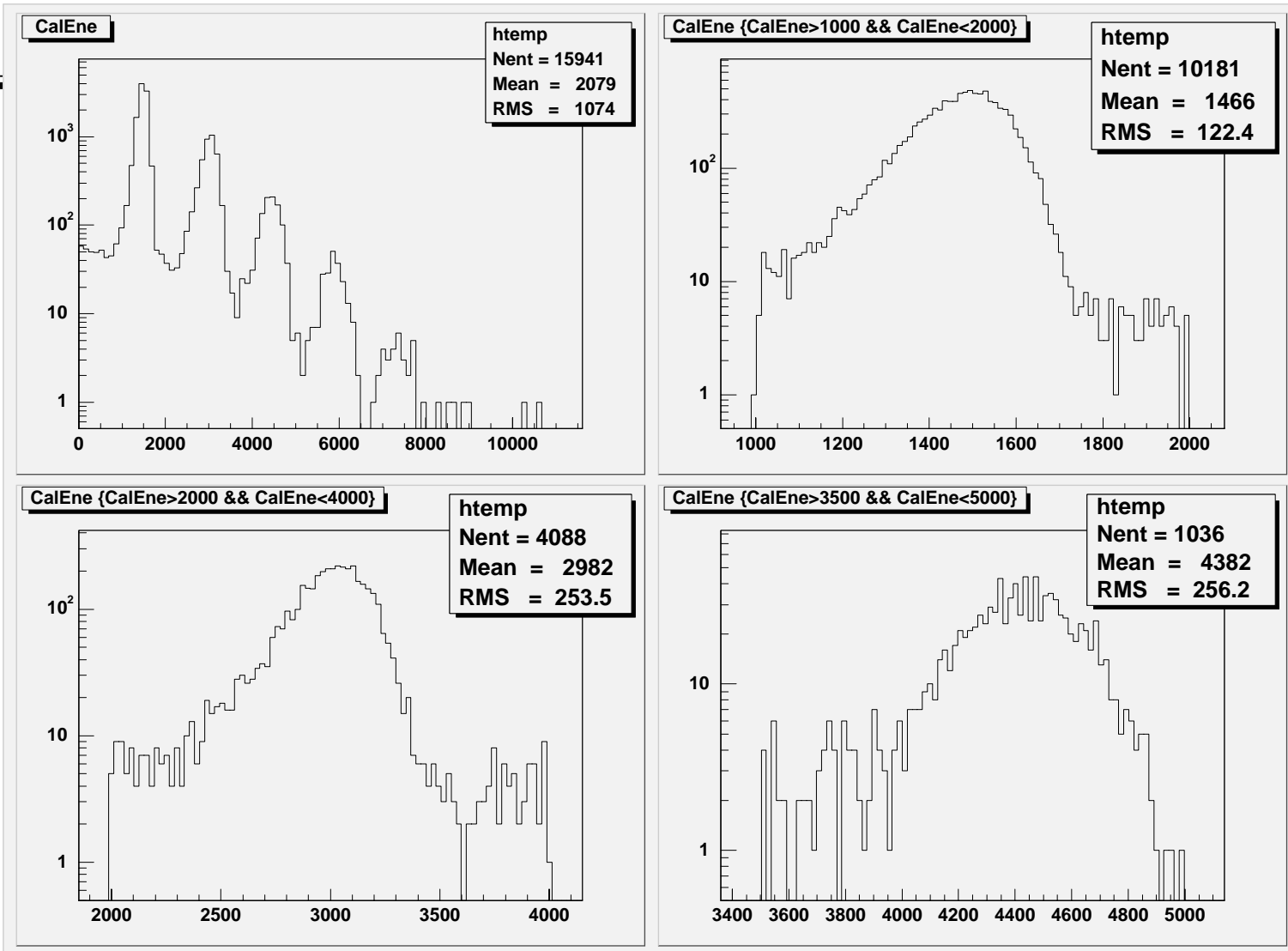
# Tb Recon - Centella





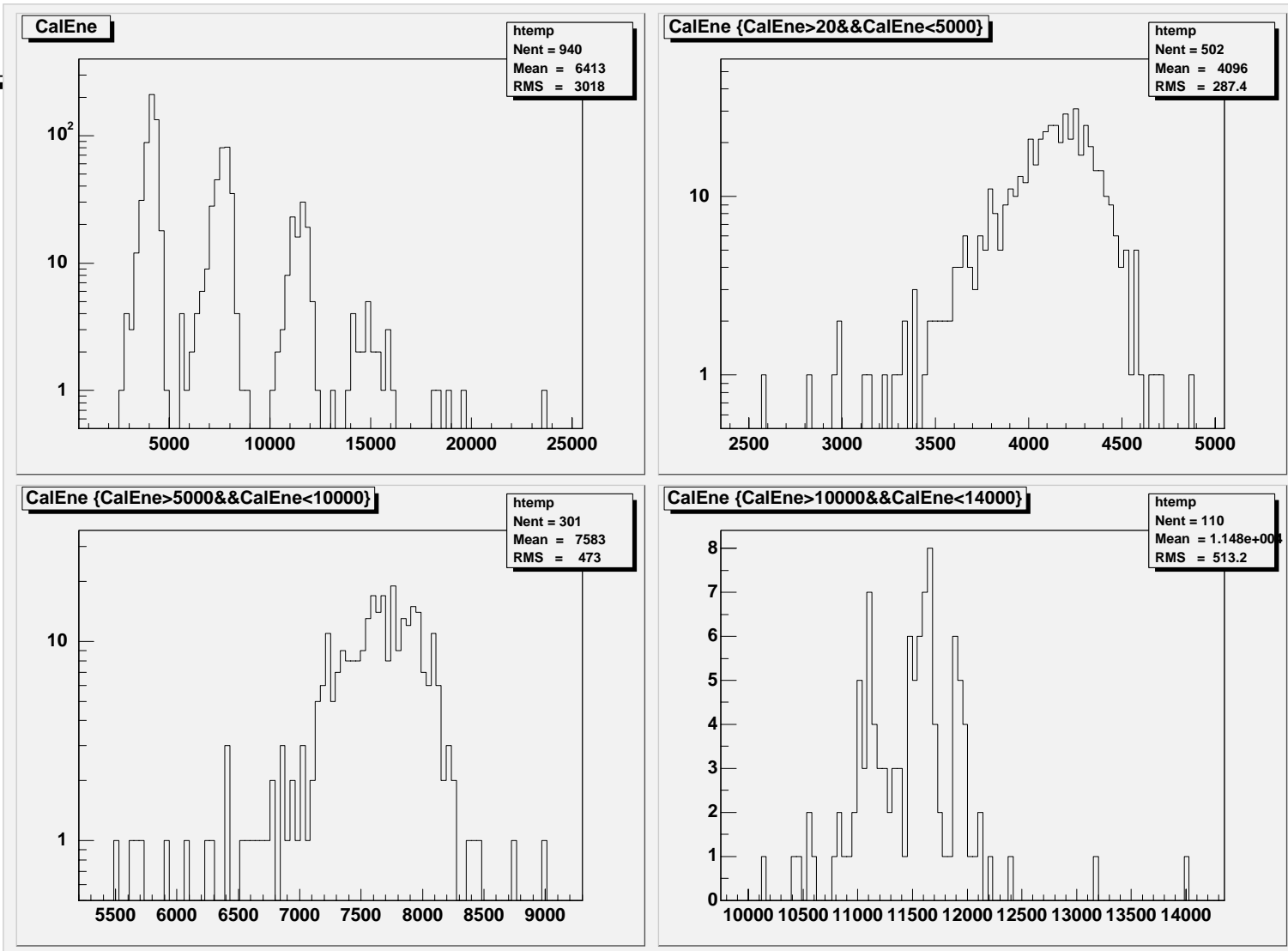


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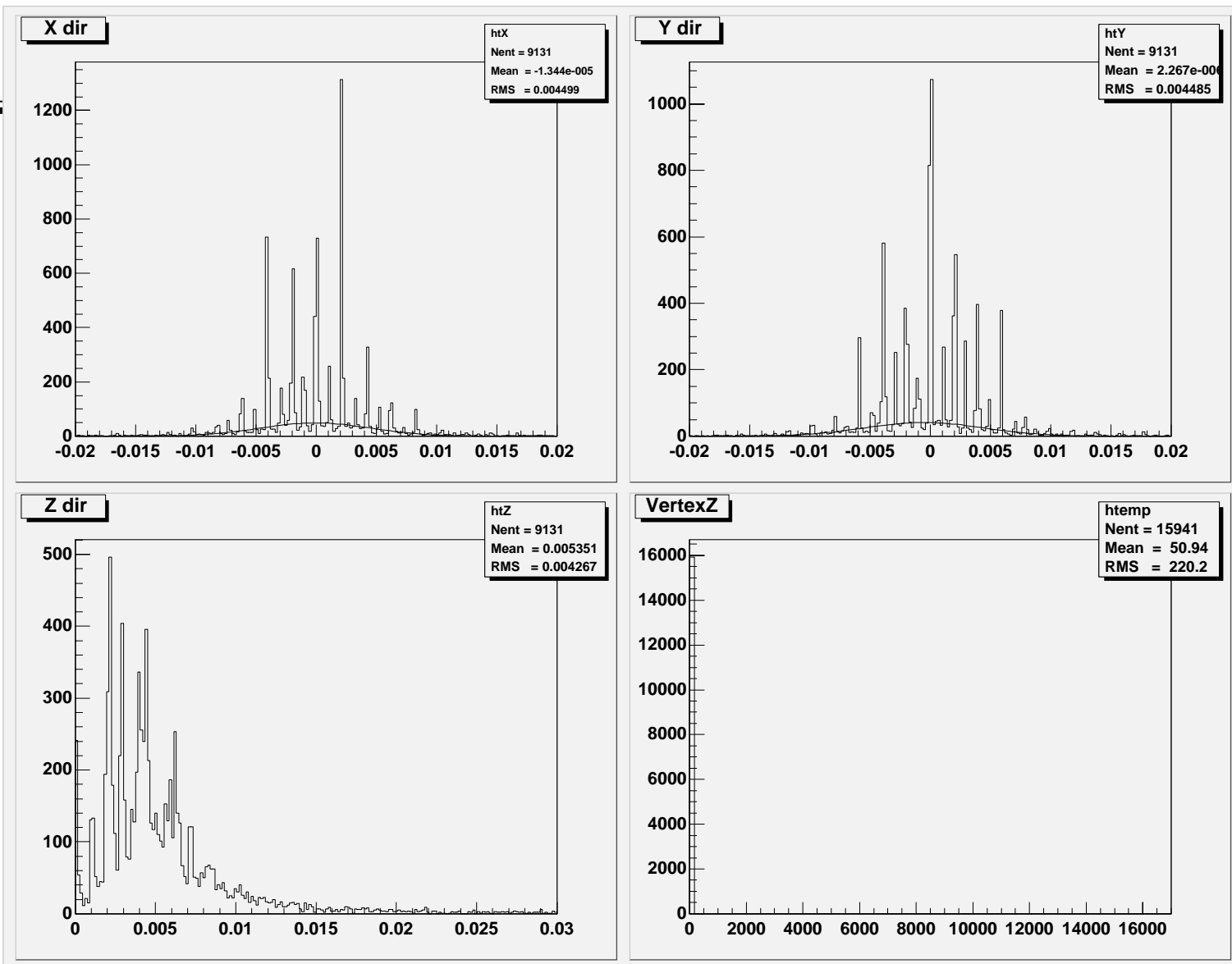


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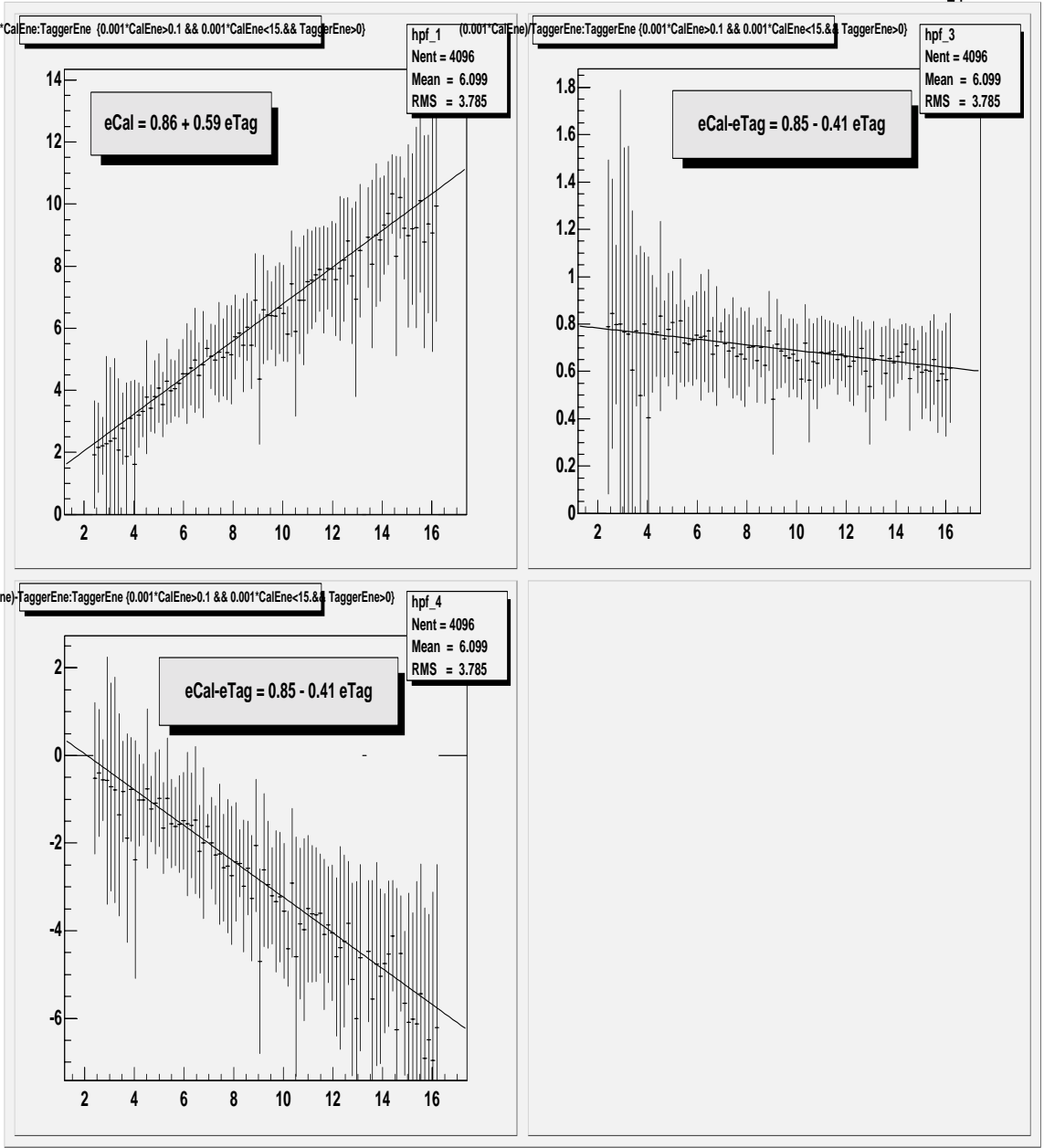


# Tb Recon - Centella





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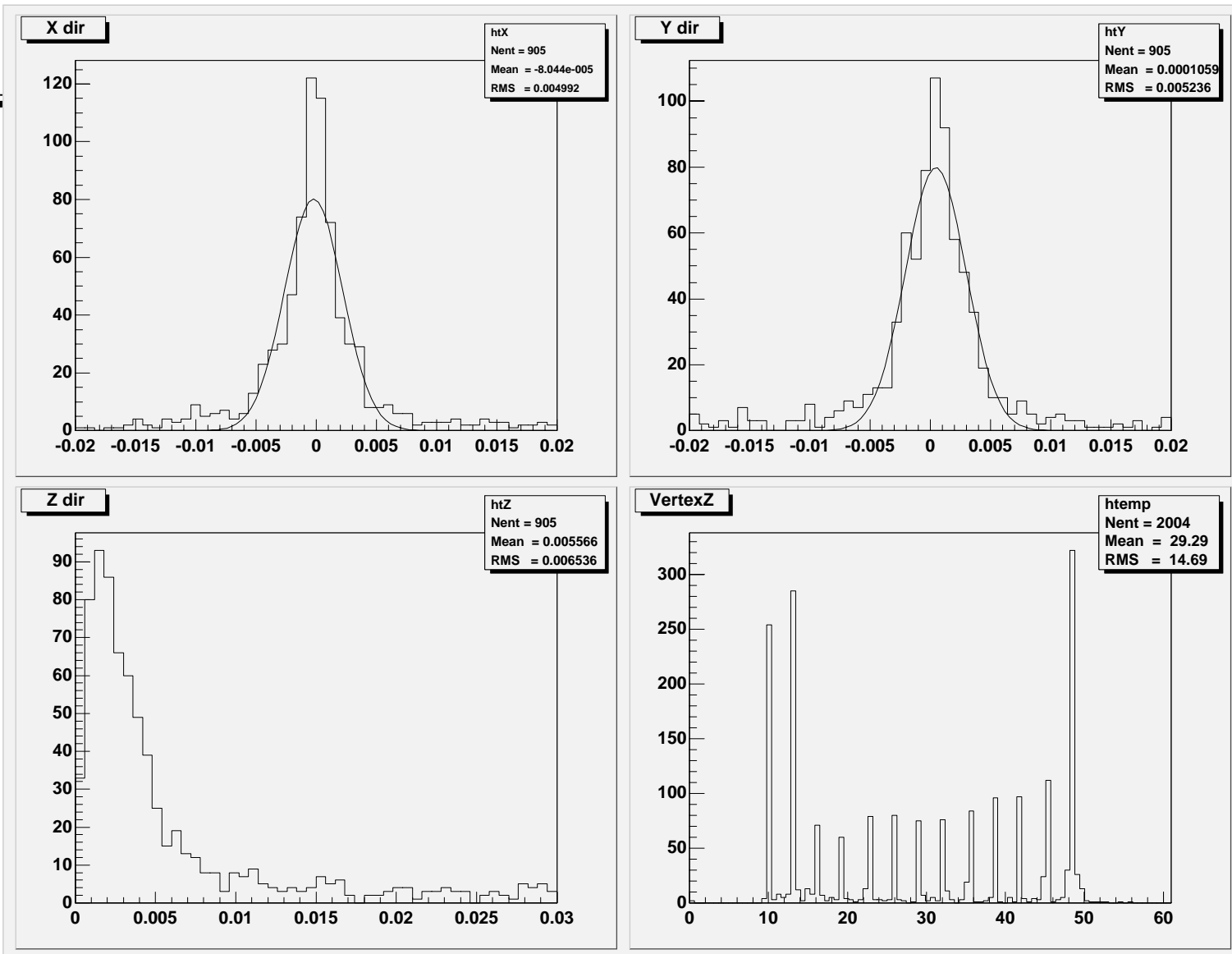


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# Tb Recon - Centella





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