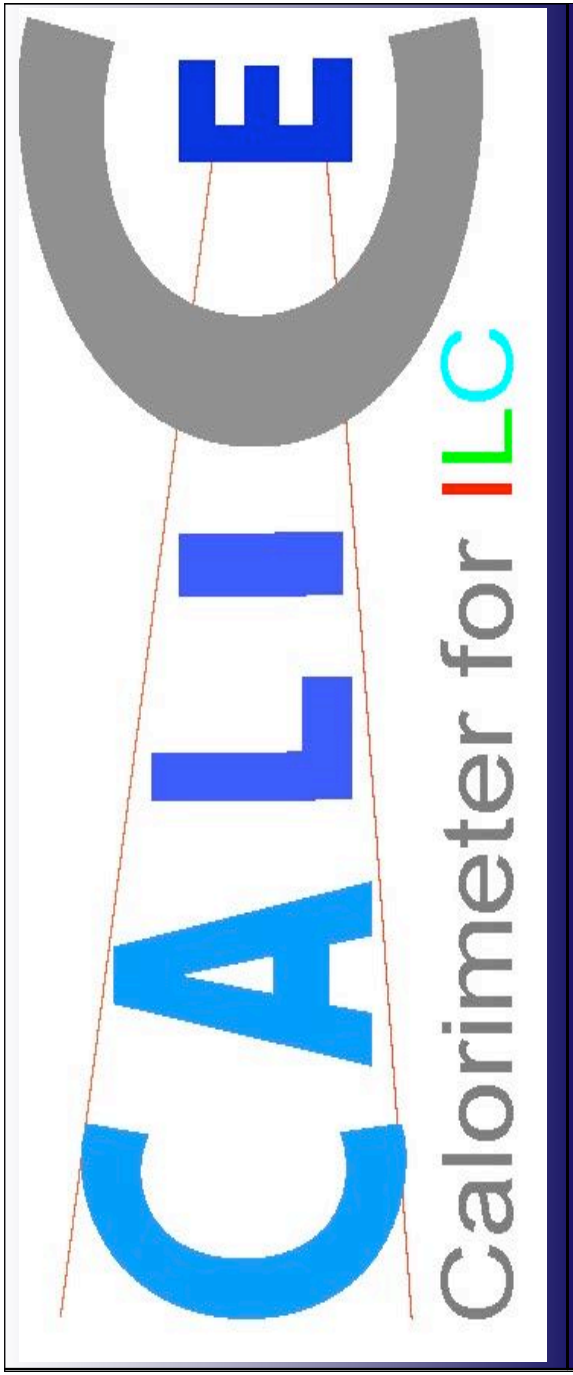


ECAL analyis
User Experience

Cristina Cârloganu

Clermont Ferrand

We started end of 2006 to work on testbeam data analysis

Planned roadmap :

- get the data files on local machines (reconstructed data)
- analyse them

since

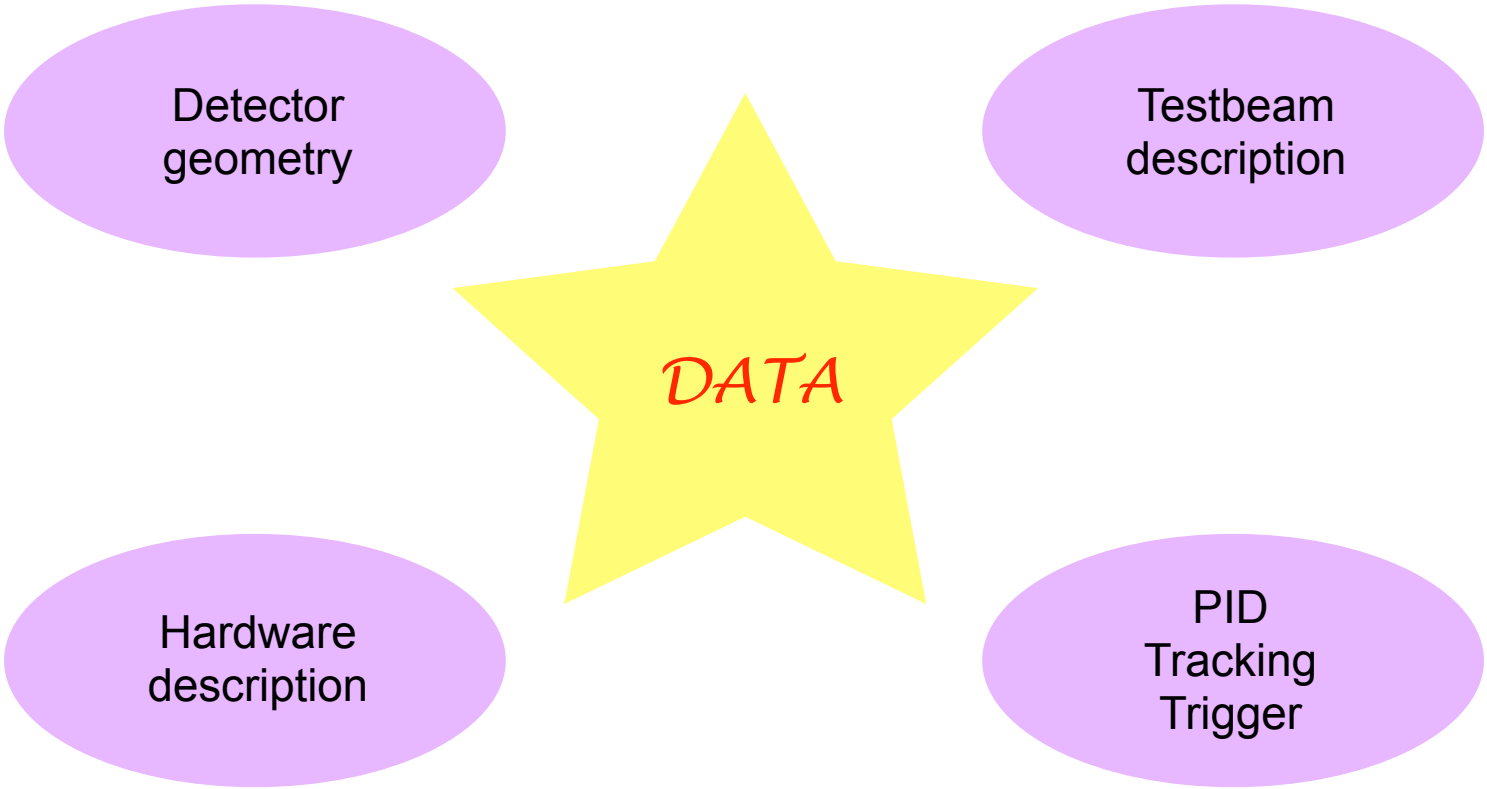
- no grid experience
- new in the collaboration
- marlin environment available locally
- the reconstruction code seemed quite complicated
  - *mostly our fault - lack of time or experience*
  - *partly lack of documentation*

According to answers to Paul's questionnaire:

- only ONE analyser out of EIGHT uses the grid for job submission ... and with mitigated results.

- people work mainly on reconstructed files and in some cases eventually plan to move towards raw files

What's needed in order to use the data



two analysis working
&
some interesting results in a relatively short time

WORKING ENVIRONMENT

SLCIO → CalorimeterHit (*x, energy)

fine for MC, for data I eventually want to link it to the detection cell.

Our solution: a new object :(

CaloHit : public HepLorentzVector : public CaloCell
CaloCell:: public CALICE::CellIndex

CaloCell (protected:

```
unsigned int _chip;
unsigned int _rocable;
double       _calibct;
bool         _noisy;
bool         _dead;
```

)

SLCIO → CalorimeterHit (*x, energy)

fine for MC, for data I eventually want to link it to the detection cell.

Our solution: a new object :(

CaloHit : public HepLorentzVector : public CaloCell
CaloCell:: public CALICE::CellIndex

Does everybody want to know about about the hits?

not really

CaloEvent

CaloEvent protected:

```
std::vector< std::vector<CaloHit> > _hits;
double                              _en_total;
std::vector<double>                 _en_layers;
 double                             _z_maxen;
 double                             _z_min;
 unsigned int                       _layer_maxen;
 unsigned int                       _nhits;

 double                             _xb;
 double                             _yb;
 double                             _zb;

 std::string                        _beam;
```

Data structure and access

```
void MyTBProcessor::processRunHeader( LCRunHeader* run) {
        RunInformation RunInfo = RunInformation(run);
        _beam_energy = RunInfo.beamEnergyMeV()*0.001;
        _date        = RunInfo.runMonth();
        std::cout << " Run info " << std::endl;
        std::cout << "          beam energy :    " << _beam_energy << std::endl;
        std::cout << "          taken at " << RunInfo.location() << " on " << _date << std::endl;
        _nRun++ ;
}

void MyTBProcessor::processEvent( LCEvent * evt ) {
  LCCollection*  ecalHitsCol= 0 ;
  try{ ecalHitsCol = evt->getCollection( _ecalMCHitsName ); }
  catch(DataNotAvailableException &e){}

   _event = CaloEvent(ecalHitsCol,  _hit_en_thresh,  _hit_calib);
    if(_verbose) std::cout << "CaloEvent filled with original hits" << std::endl;

  std::vector< std::vector<CaloHit> > Hits = _event.hits();
  for(unsigned int ilayer=0; ilayer<30; ++ilayer){
     for(unsigned int ih=0; ih<Hits[ilayer].size(); ++ih) {
       std::cout << Hits[ilayer][ih].getWaferRow() <<" "<< Hits[ilayer][ih].getWaferColumn() << " "
                 << Hits[ilayer][ih].getPadRow() <<" "<< Hits[ilayer][ih].getPadColumn()<< std::endl;
     }
    }
}
```

What about the other subsystems?

eg tracking:

- ☑ Francois needed one day to get the tracking info
- ☐ it's necessary to extract two classes describing the tracks from a full package performing the tracking

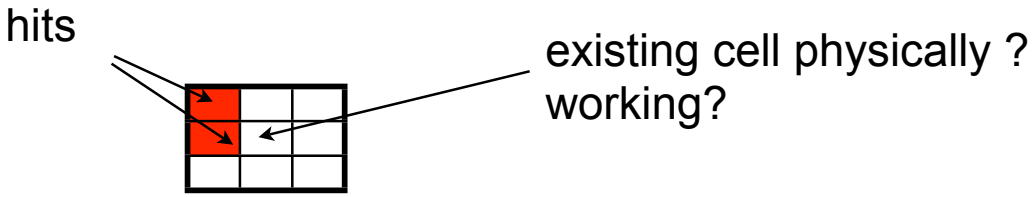
Please, try to separate in the software structure
ObjectDescription - Algorithms (processors) - Tools

(?) Would it be useful for some other peoples to have a package:
CaliceEvent -> CaloEvent(CaloHit, CaloEvent, CaloCluster, etc)
-> TrackEvent

Detector geometry description

There is/was not a lot of information around. Our most efficient way of getting it : phoning/ mailing experts. What about a common web page centralising it and where everybody can contribute?

All bare geometry information lost in the reconstructed files



We have to access the data base in order to get it. Is it mandatory?

Originally, for 2006 some scattered info about the runs (mails, some presentations).

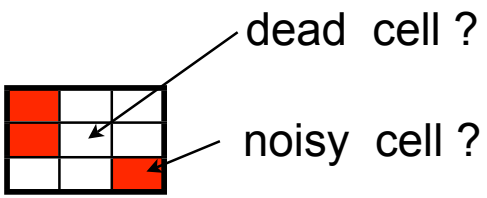
Now an extensive list of characteristics for lots of the runs, but again scattered information . What about a web page accesible to all of us (write mode)?

Excellent developement:

Run info available in the reconstructed files

still some lacking info: particles, incident angle

Do we need to access the database for all the hardware configurations?



What about some cell information in the RunHeader?

How do I know for a reconstructed file which are the set of constants used for calibration/digitisation?

the format should be the same for data and MC and I want to be able to play with them for MC

a tag in the run header less error prone than an external "user database"

What about some alignment info ? Is it already available in the database?

Some processors provided to the collaboration, which should add some info to the reco files.

David already has some proposal for the electrons.

If approved, they could be run together with the official reconstruction

Conclusion

still to come ....