

Some unfinished stuff in calibration area

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L1Calo Joint Meeting, Cambridge
23rd March 2011

- Introduction
- Conclusion
- Pulser calibration
- Pulser to physics correction
- Dead material corrections

Conclusions

Work on calibration progressing well! :-)
Still some way to go :-)

There are several interesting areas
that may need additional effort...

Current Scheme at the CAF I

- ◆ Calibration runs (for example energy ramps) are taken by shifters in Atlas Control room
- ◆ Raw data are stored and analysed offline on CAF
- ◆ Resulting gains plotted for each tower
- ◆ Also comparisons with nominal gains

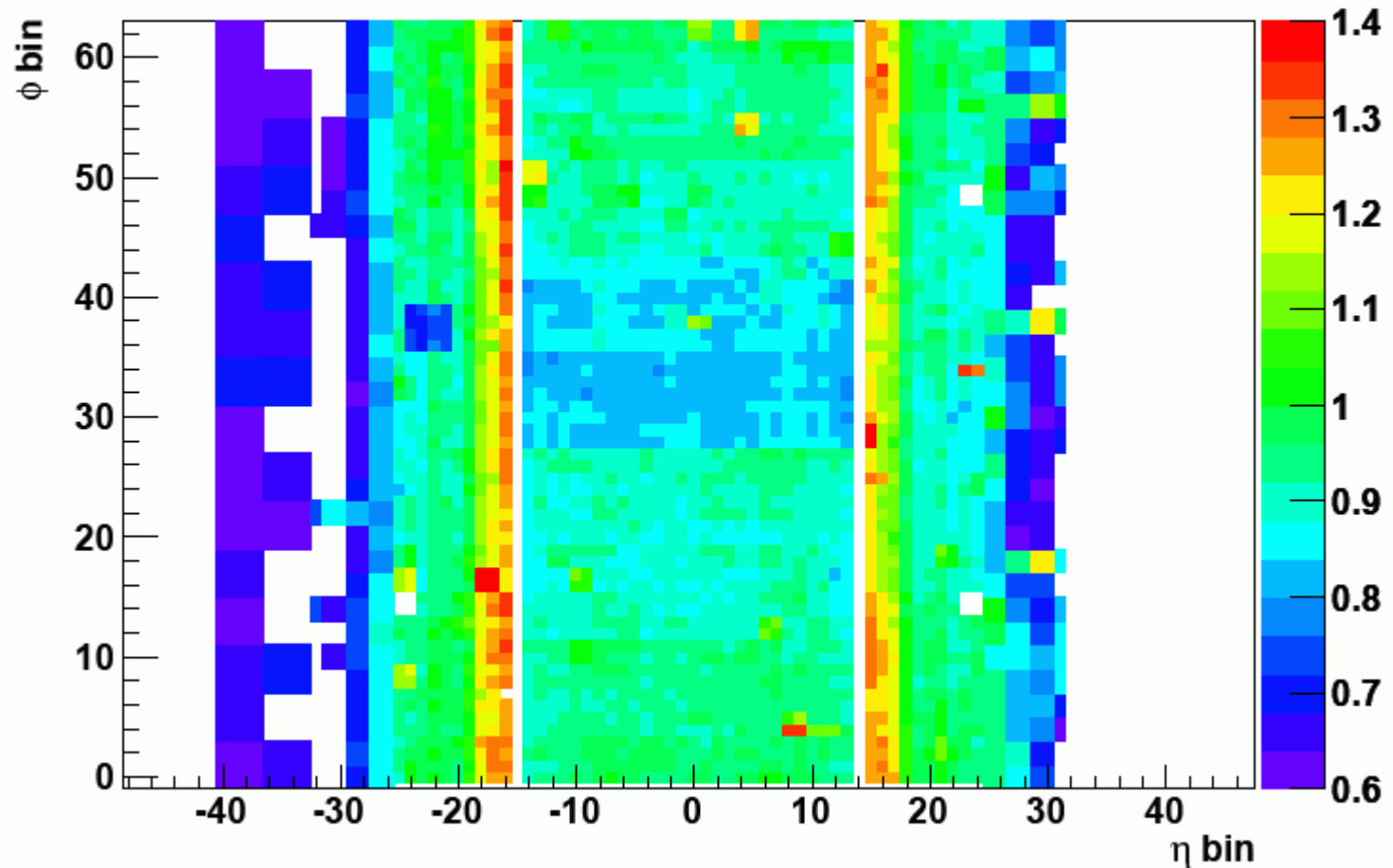
This whole procedure now runs automatically, resulting gains are available within on-two hours
That is OK if everything works as expected ...

Current Scheme at CAF II

February 2011:

- ◆ Big change in gains in EMEC (mainly inner wheel)
- ◆ Analysis failed in HEC and whole FCAL
- ◆ Long (and painful) investigation - problem with Lar timing
- ◆ Fixed rather fast, as soon as the reason was found...

Eta-phi map of EM gains

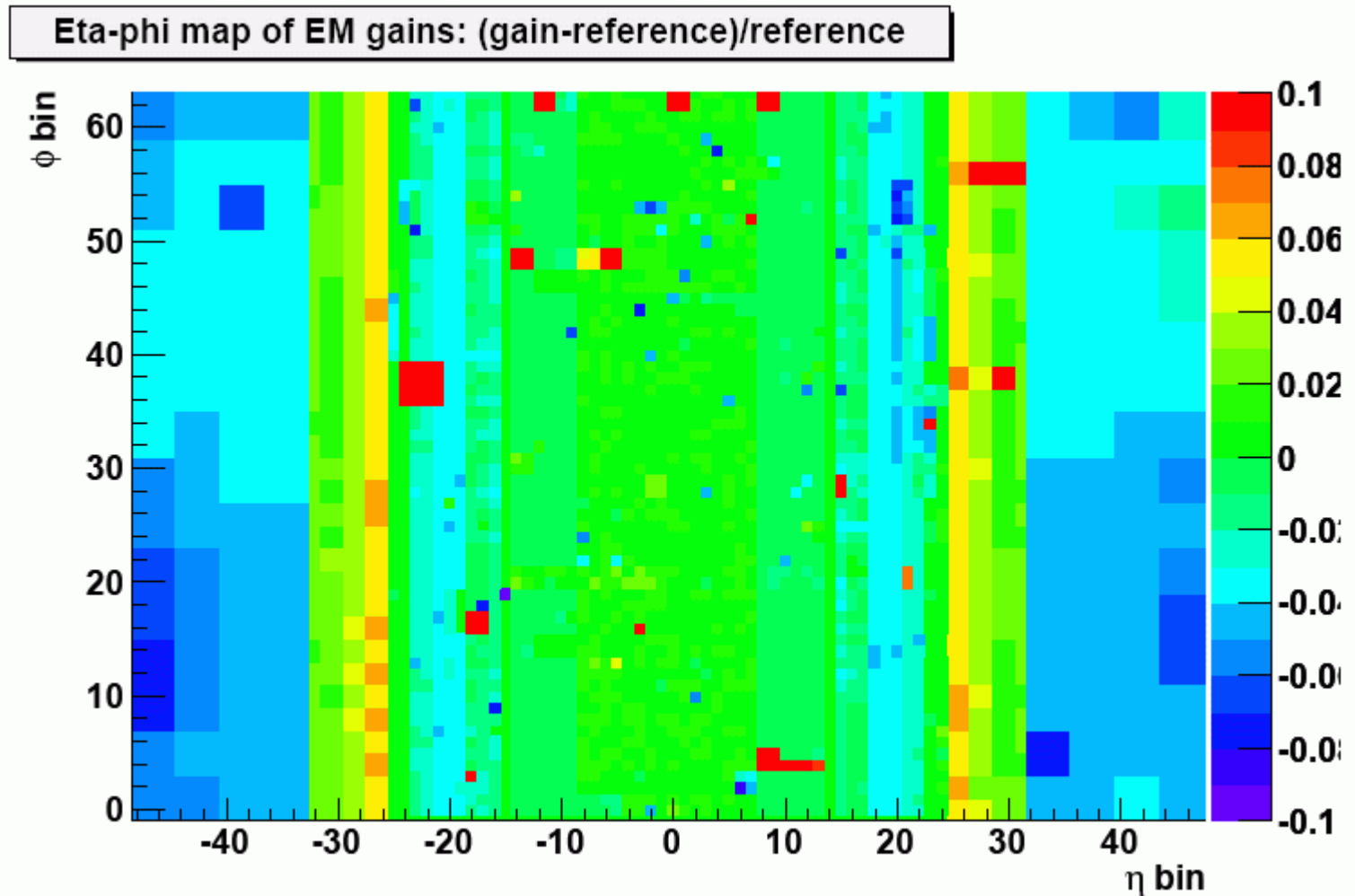


Need "monitoring of pulser runs"

Current Scheme at CAF III

2011 gains compared with end of 2010:

- ▶ We are taking pulser runs each week now (since 2011)
- ▶ Good chance to get an idea about stability of energy calibration
- ▶ We don't have tools for that!



Pulser to physics corrections I

Current calibration strategy:

- Calibrate peak ADC value to EM energy coming from pulser
- Adjust FIR filter coefficients to physics pulses
- LUT slope is ensuring that LUT output gives the same energy as peak ADC value

Enables to decouple individual steps (energy calibration is independent on FIR filter setting)

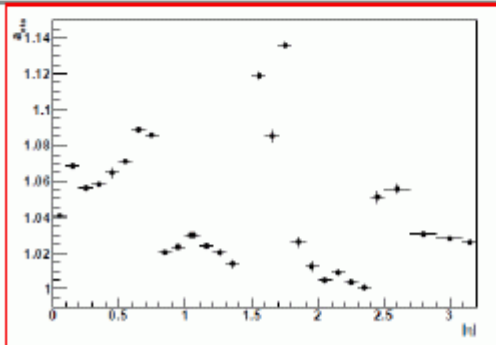
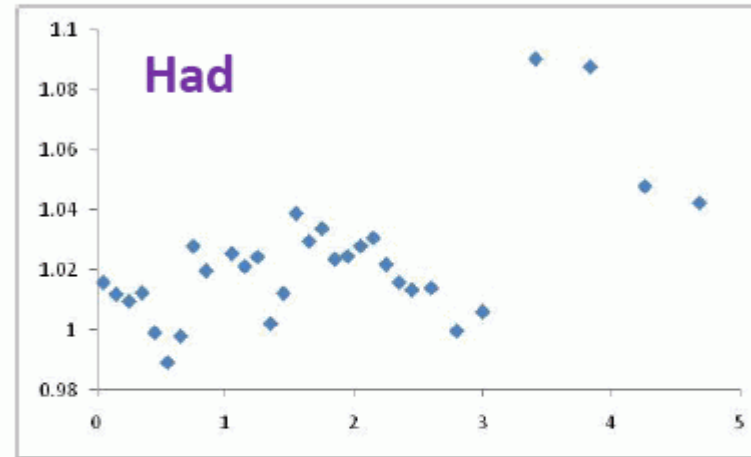
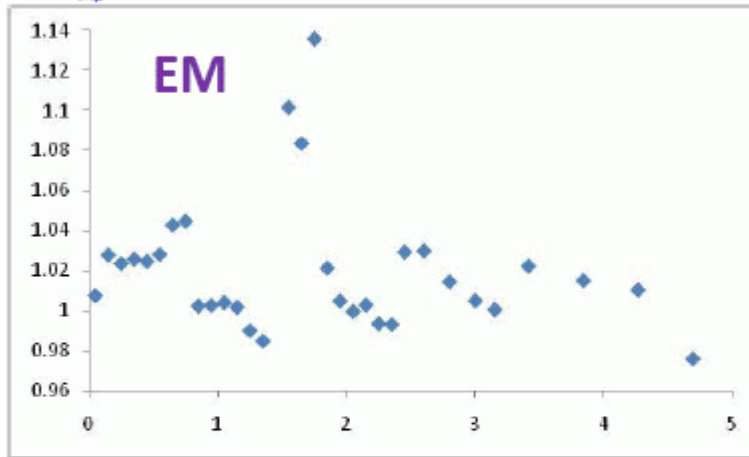
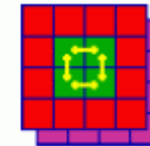
But:

- ◆ Calorimeters use their optimal filters (measure area of the pulse)
- ◆ We use pulse maximum
 - Need to correct for different pulse shapes in physics and electronics calibration

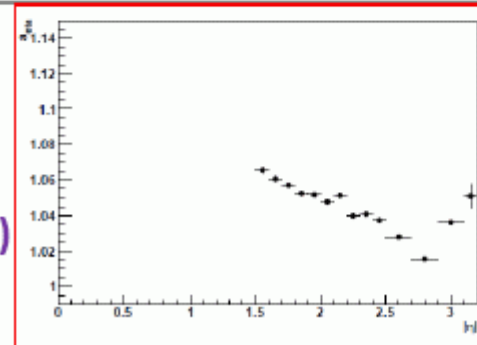
Pulsar to physics corrections II



Comparison



Jean-Baptiste's
Version
(OTX correction)

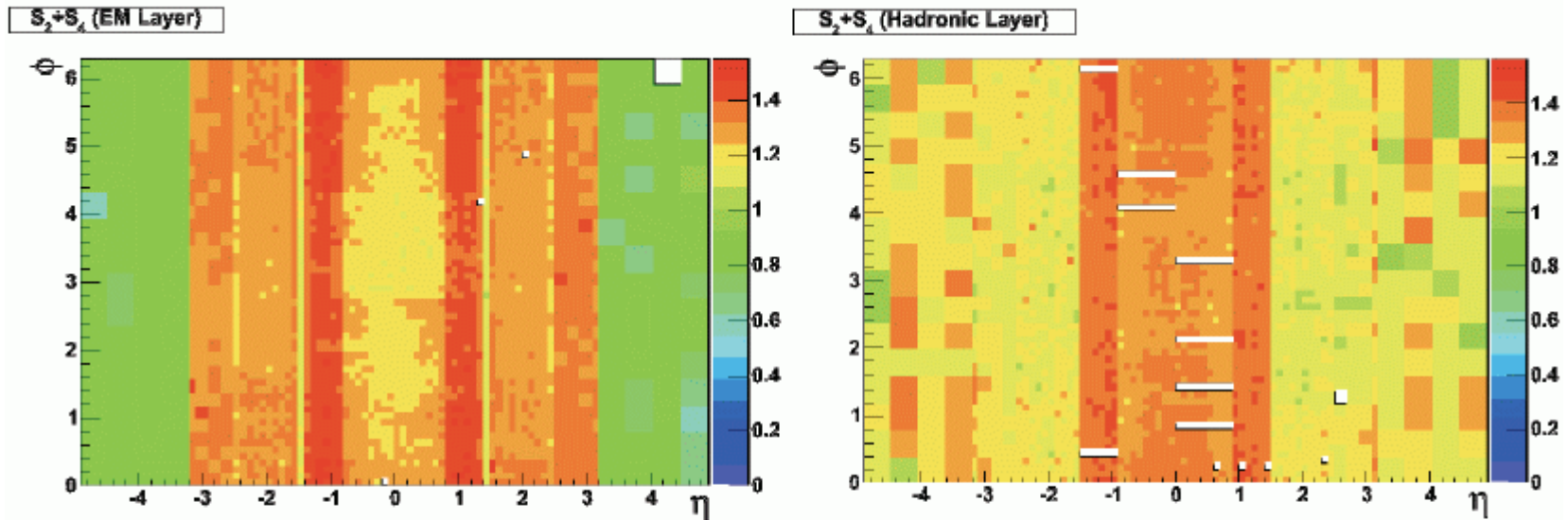


<http://cdsweb.cern.ch/record/1293102>

➔ At the moment we apply eta dependent (phi averaged) pulsar to physics corrections

Pulser to physics corrections III

- Use the metric $(S_2 + S_4)$, where S_i are the normalized pulse shape values



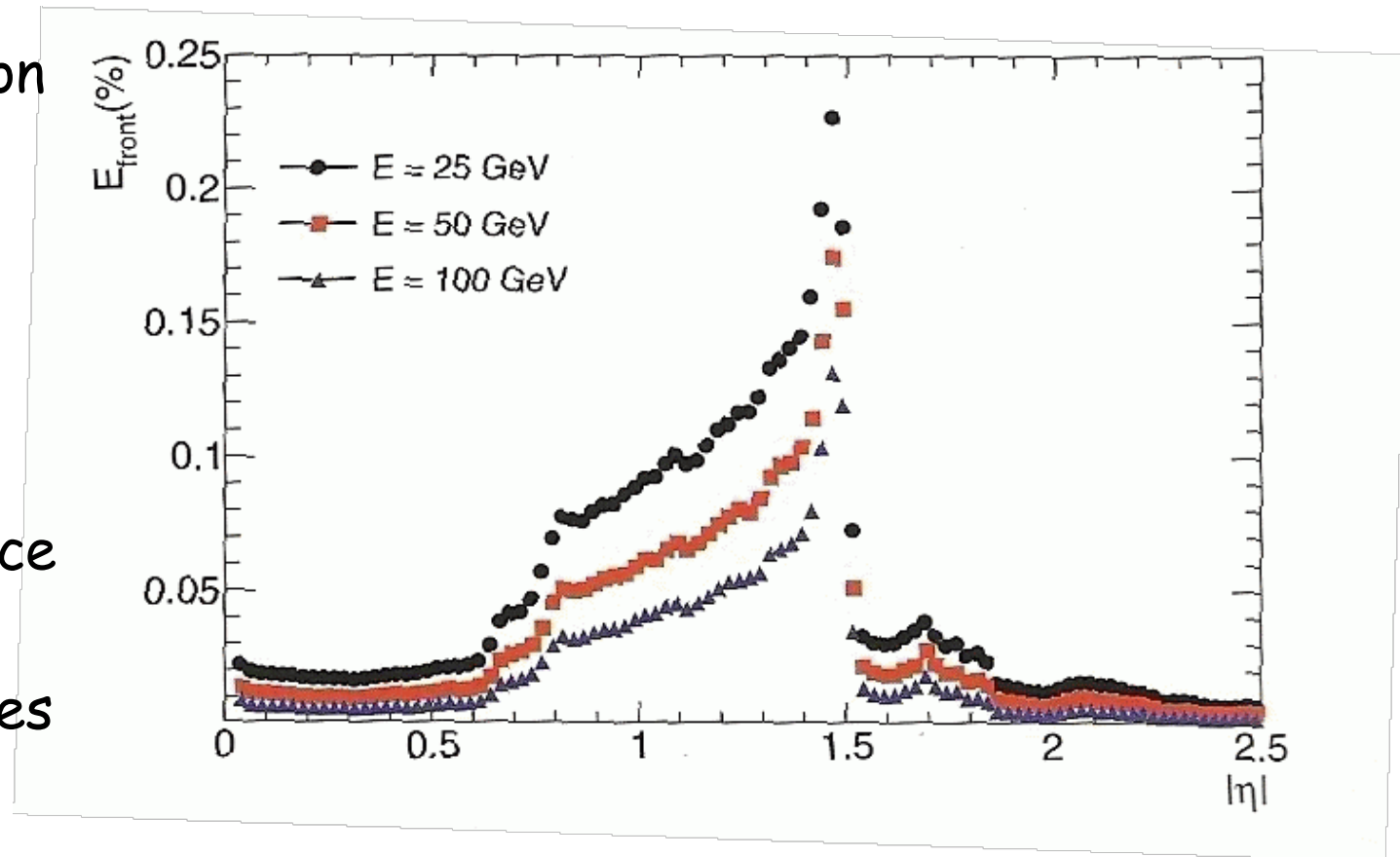
- Identified 10 regions by eye:
 - EM Layer: $|\eta| = 0 - 0.8, 0.8 - 1.4, 1.4 - 1.5, 1.5 - 3.2, 3.2 - 4.8$
 - Hadronic Layer: $|\eta| = 0 - 0.9, 0.9 - 1.5, 1.5 - 3.2, \text{FCAL2 and FCAL3}$

- Areas with different physics pulse shapes correspond to areas with different pulse to physics corrections
- What about phi dependence?
- Or individual TTs?

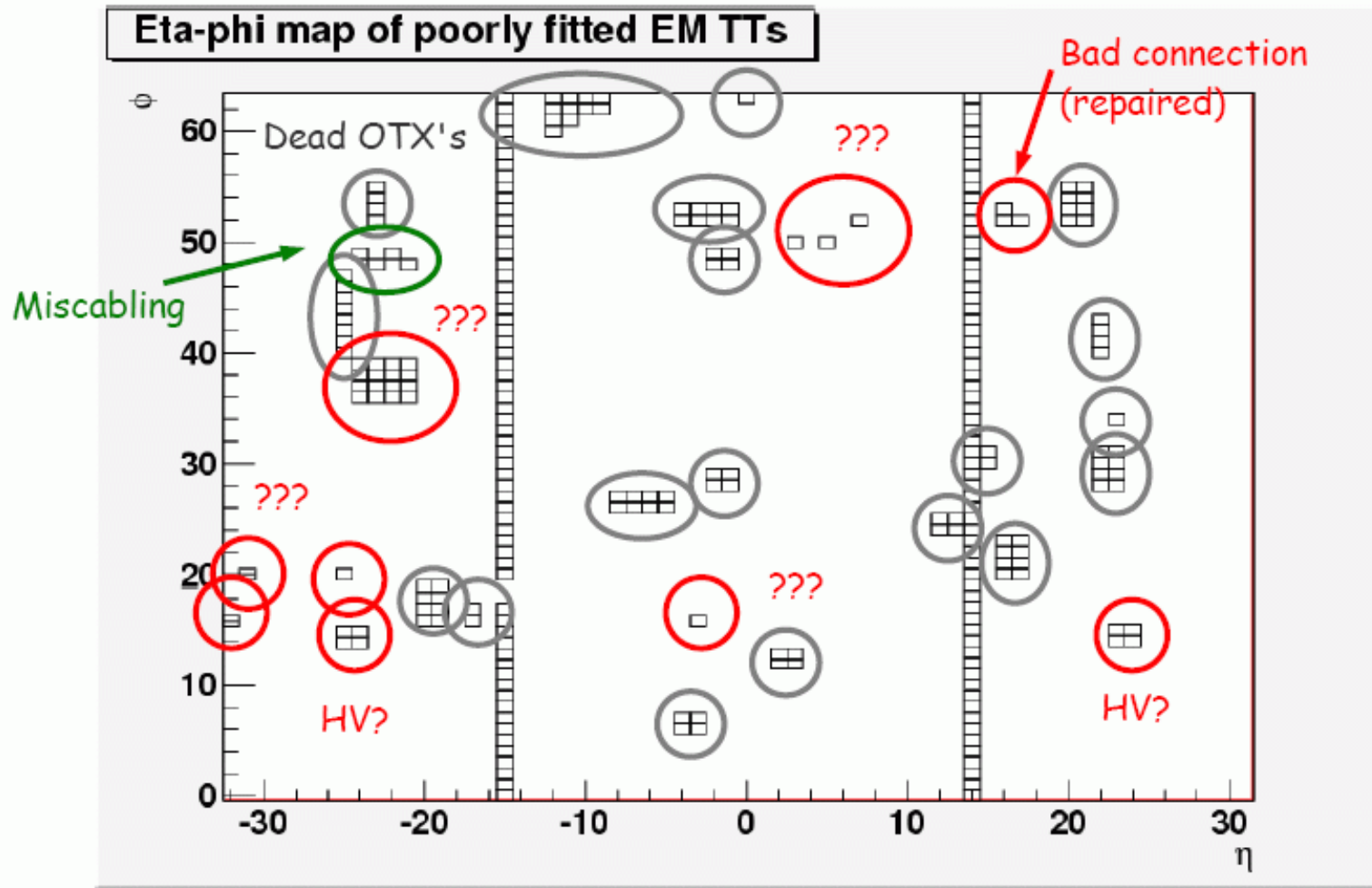
Dead material corrections

- ◆ Discussed since some time
- ◆ No clear conclusion (yet)
- ◆ Absolute energy scale is not that important
- ◆ May be useful to get eta dependence right ...
- ◆ Several open issues ...

Fraction of energy lost by electron before it enters LAr:



Checks, checks, checks ...



Things are going to be better in 2011, surely ...

More suggestions ...

Can be found in backup slides, also people working on calibrations may have some ideas

Most topics are technically involved, need good communication (especially if you are not based at CERN)

- ➔ Regular L1Calo meetings on Mondays
- ➔ Technical brainstormings on Wednesdays
- ➔ ...

Backup slides

Useful tools:

- ◆ analysis of pulser runs, make sure that everything went well ("monitoring of pulser runs")
- ◆ tools for looking at calibration development over time and for validation of calibrations. How to decide when we are happy with existing calibration and when we need to update it?
- ◆ monitoring of pedestal shifts
- ◆ ...

Analysis of special runs:

- ◆ FCAL2/3 mapping runs
- ◆ gains for individual calo layers
- ◆ timing checks for individual layers
- ◆ ...

Studies with collision data:

- ◆ new physics timing
- ◆ pulser to physics corrections
- ◆ pulse shape analysis, look at differences between pulser and physics shapes, impact on BCID and energy calibration
- ◆ automatization of calibration checks with the data (something running automatically on Tier0), extension of existing tools
- ◆ Trigger efficiencies in monitoring. EM efficiencies are on the way, would be nice to get something similar for jets, (Et Emiss Emissig if possible...)
- ◆ em energy scale with Z's, look at dead material corrections
- ◆ something with jets and Et, can we still get something more from hadronic scale?
- ◆ ...