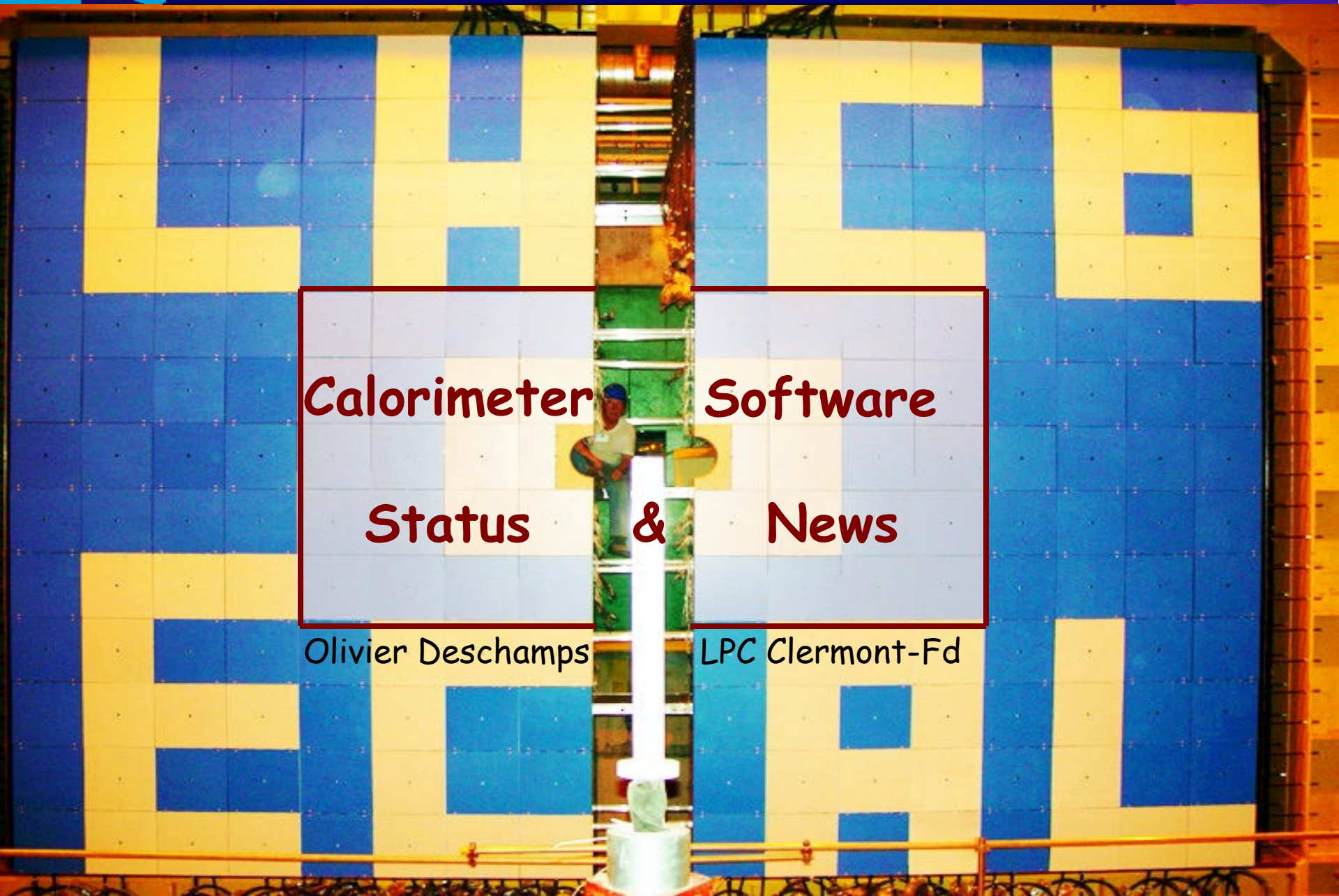


Calorimeter Software Status & News

Olivier Deschamps LPC Clermont-Fd

Calibration Farm automatic analysis

- Reminder :
  - LED data histogramed in Calibration Farm
    - Pedestal and LED-signal mean and RMS per channel (+ possibly the detailed distributions)
    - DataSet stored every 10-15 mn containing O(6k) LED flashes per channels
  - Automatic analysis based on OMAlib
    - Configure 'CaloMonitor' object
      - mean pedestal follower, noise level, gain variation, …
      - provides warning and alarms
      - provides summary histograms (alarm levels, location of problematic channels, …)
    - see talk in 29 april 2009 meeting for details
  - Automatic analysis can be easily configured for other purpose. E.g. :
    - validate dead channels on physics data in Monitoring Farm (useful for Prs/Spd)
    - Identify channel with timing asymmetry and kernel out of expected range
- Automatic procedure succesfully commissionned during summer with Sergey :
  - During LED run taken by Irina on 07/30
    - Orwell histogram redirected on Monitoring Farm during the test
    - After fixing several configuration problems the automatic analysis nicely provided Ecal status for pedestal and LED every time a new DataSet was saved (every 10mn)
    - Configuration options ready to set the actual Calibration Farm in operation

Calibration Farm : next to do

- Tune histo production (pedestal/led range, …) and fill condDB with initial values (OD)
  - would be useful to have 'reference' LED data with nominal conditions
  - including empty LED flashing in the calibration sequence (for Xtalk free analysis of pedestal)
  - Need help from Irina/Anatoly to setup the nominal LED sequence for XCal
  - Stephane kindly provides such file for Prs (but not perfect – many channels saturating)

- Refine 'CaloMonitor's for EHcal and Prs (Sergey)

- Define default presenter page with analysis summary histo (OD)

- Develop code to analyze consecutive data set (volunteer)
  - time evolution for many variables
  - useful to define stability range for each parameter

- Develop script to fastly retrieve information from log and summary (volunteer)
  - tools for piquets to digest summary info and help to decision taking
  - retrieve problematic channels - follow problems evolution - …

- Link to Condition DataBase (volunteer)
  - produced new condition table ready for condDB update from caloMonitor (OD)
  - déjà vu condDB update procedure
  - to be transmitted via DIM to a PVSS DataPoint.
  - need PVSS expert to built a panel to manage these information.

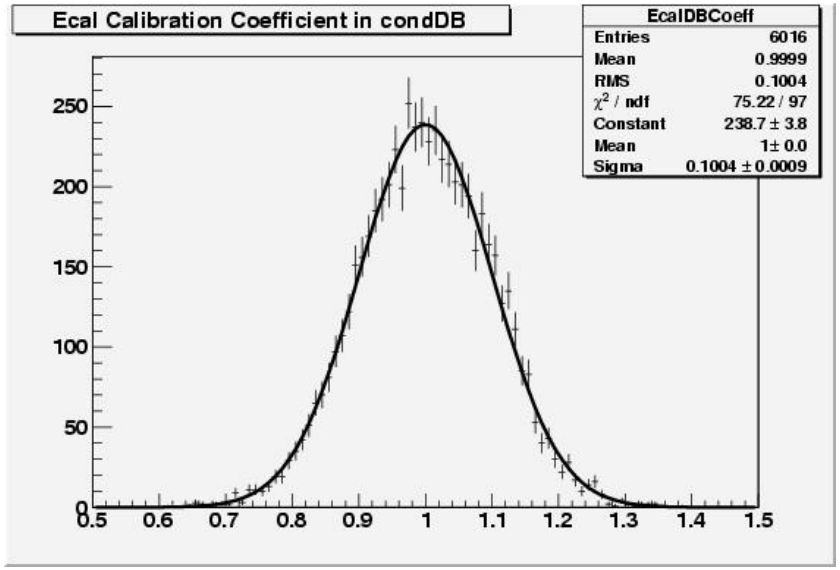
- Documentation/tutorial (all)

Miscalibration exercise

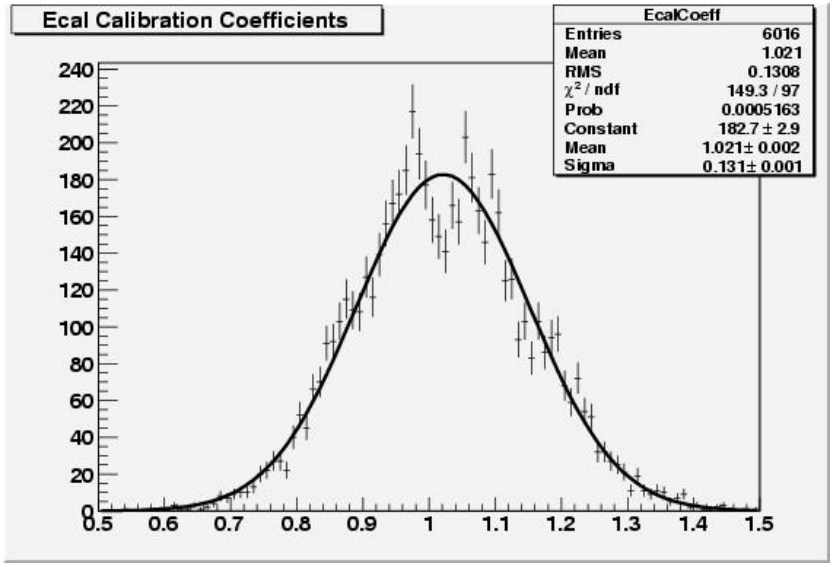
- Miscalibrated data production
  - Full production of miscalibrated data
    - software in place + options configuration ready
    - See Albert' talk
  - Reprocessing existing data
    - Fast procedure but reprocessing already digitized data gives approximate miscalibration
    - no miscalibration for the 1bit Spd
    - 0-suppression/saturation effect for Prs/Xcal
    - Available sample :
      - 10M Fest09 minibias events (run 4834 - 654k L0-filtered)
      - 170k $B \rightarrow K^* \gamma$ events (run 8426 - 85k L0-filtered)
      - 10% RMS miscalibration in Ecal, Hcal and Prs + 11 dead channels in each.
      - files on Castor at /castor/cern.ch/user/o/odescham/data/2009/Fest09-CaloMisCalib-v0
    - Aurélien ran the Eflow method on the 10M 'miscalibrated' minibias
      - Blind test : compare re-calibration coefficients (Aurélien) to initial miscalibration (OD)
      - Results on next slides
      - See Aurélien talk for details about the procedure

Calibration blind test : Ecal

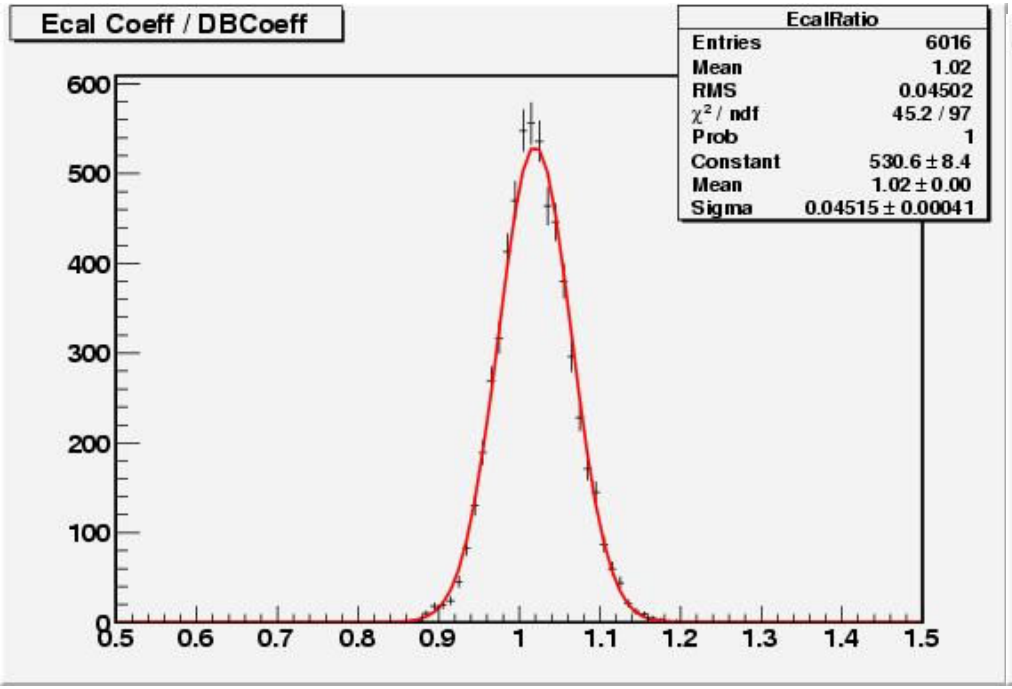
Distribution of miscalibation coefficients (10% RMS gaussian)

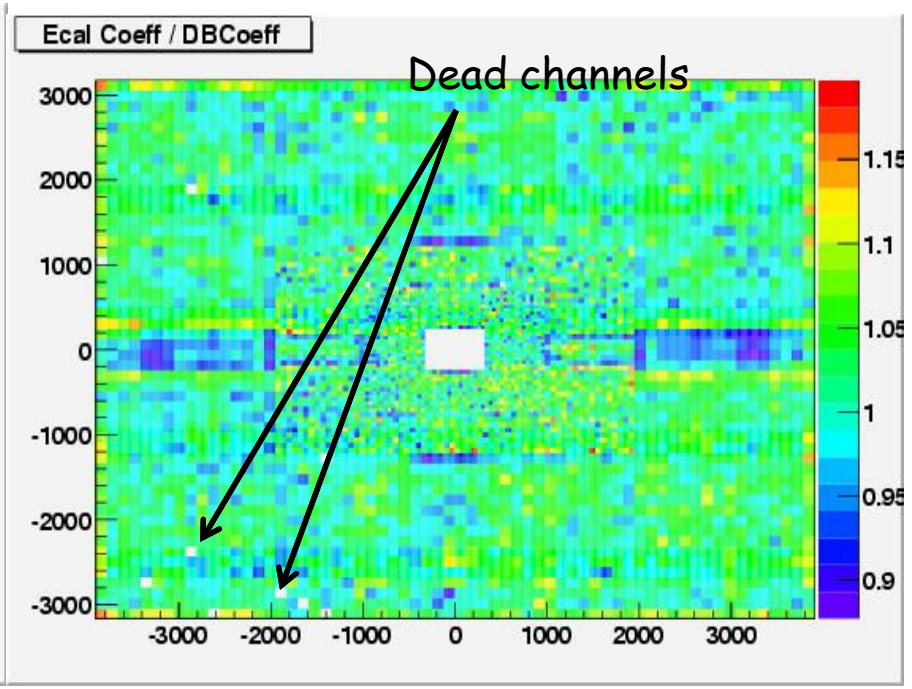


Re-calibration coefficients with Eflow method from Aurelien

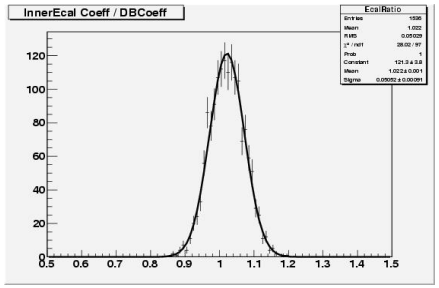


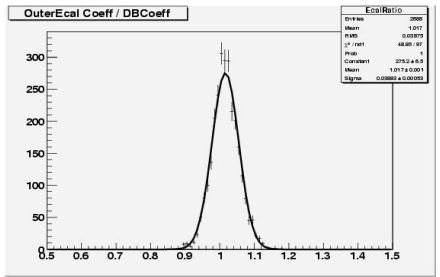
Calibration blind test : Ecal

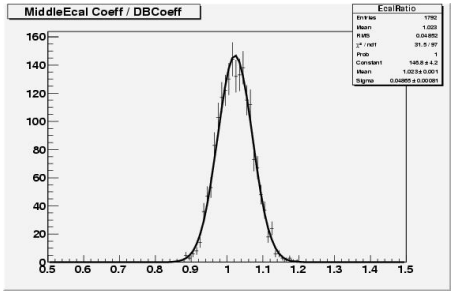




Region	Bias	Sigma	ℳ²/Ndof
Inner	+2.2%	5.0%	28/97
Middle	+2.3%	4.8%	31/97
Outer	+1.7%	3.9%	49/97
All	+2.0%	4.5%	45/97

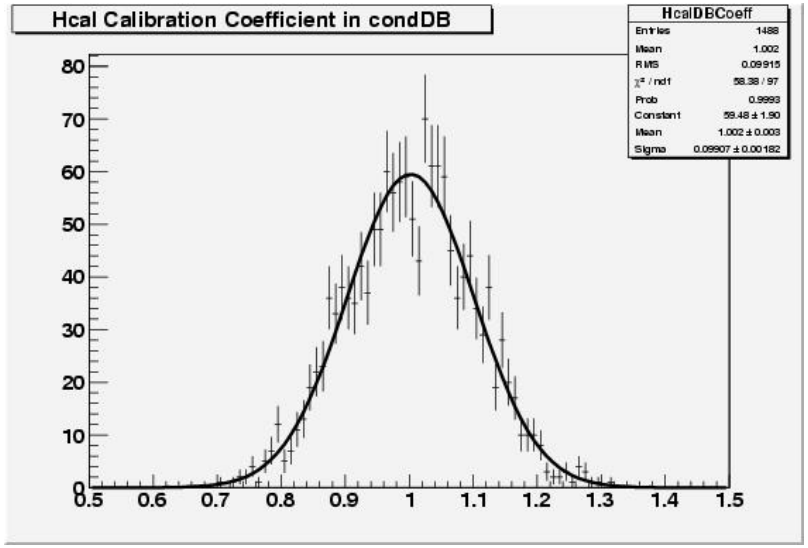




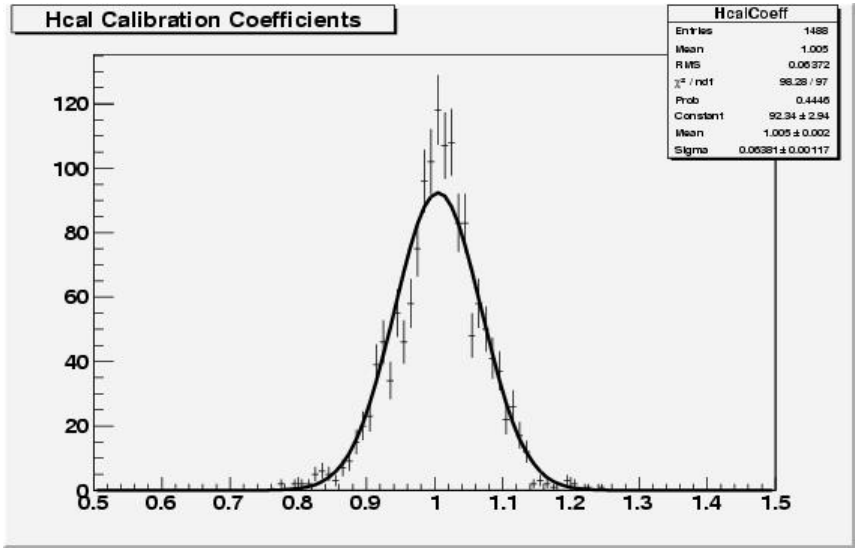


Calibration blind test : Hcal

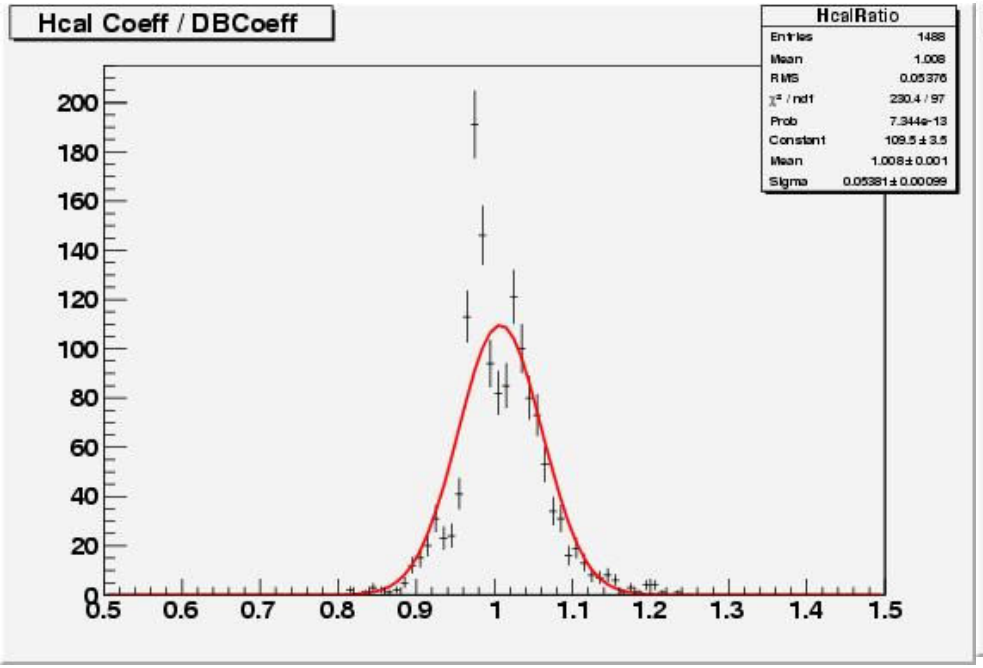
Distribution of miscalibation coefficients (10% RMS gaussian)

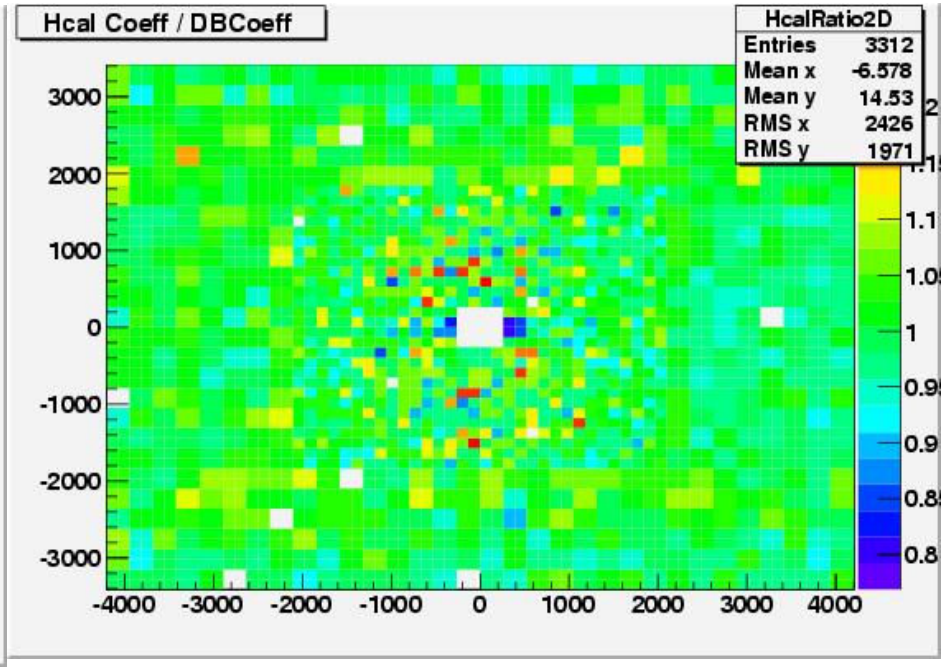


Re-calibration coefficients with Eflow method from Aurelien

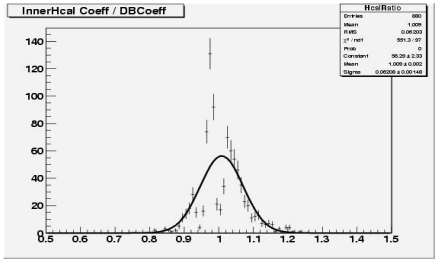


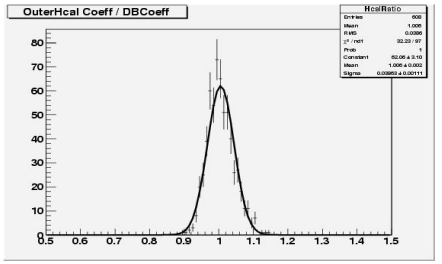
Calibration blind test : Hcal





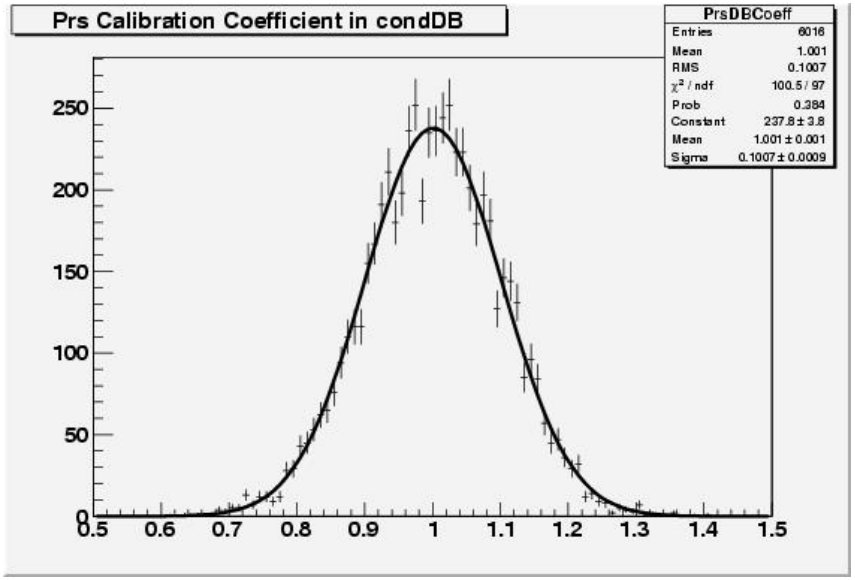
Region	Bias	Sigma	X²/Ndof
Inner	+0.9%	6.2%	555/97
Outer	+0.5%	3.9%	32/97
All	+0.8%	5.4%	230/97



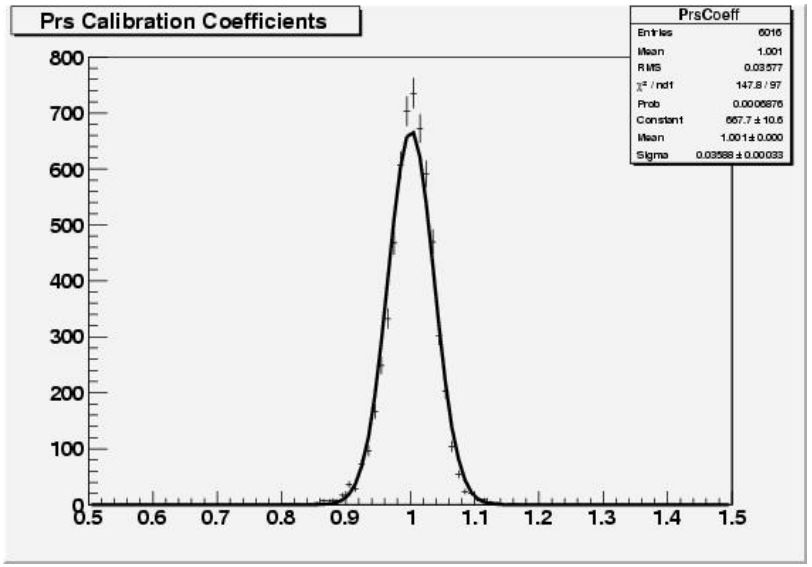


Calibration blind test : Prs

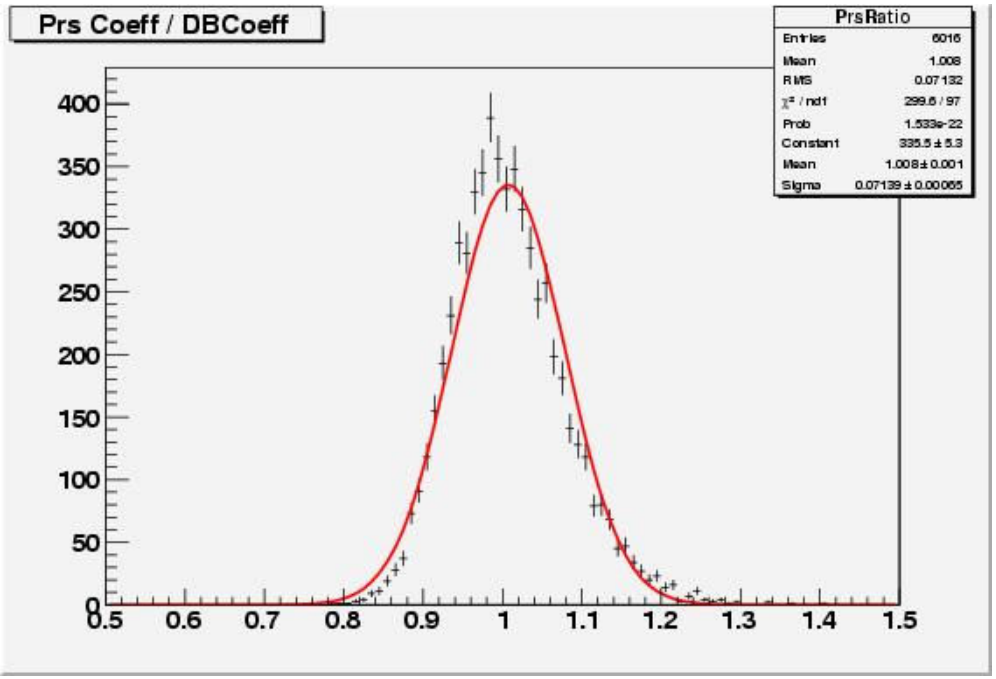
Distribution of miscalibation coefficients (10% RMS gaussian)

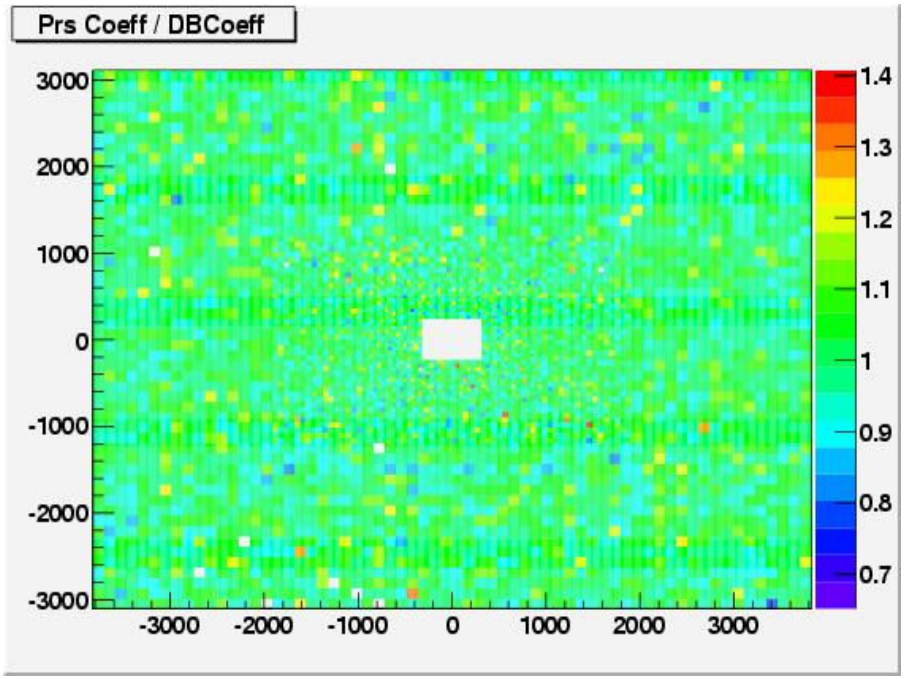


Re-calibration coefficients with Eflow method from Aurelien

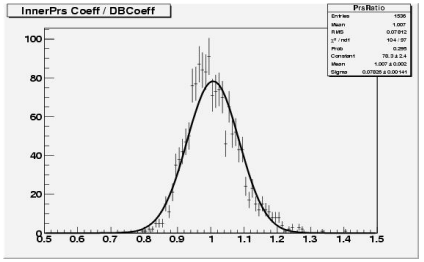


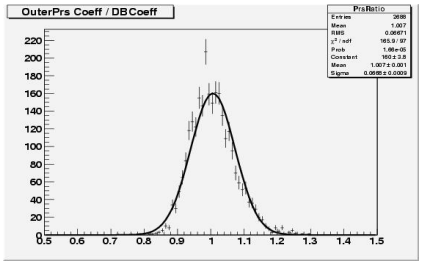
Calibration blind test : Prs

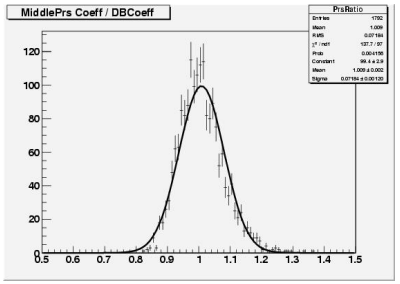




Region	Bias	Sigma	ℳ²/Ndof
Inner	+0.7%	7.8%	104/97
Middle	+0.9%	7.2%	138/97
Outer	+0.7%	6.7%	166/97
All	+0.8%	7.1%	300/97







Miscalibration exercise : what next

- Eflow method provides ~O(5%) calibration as expected (incl. some bias)

- Huge sample of 'correctly) miscalibrated data is about to be produced
  - To be used to setup/exercise 'fine calibration' procedure (pi0, e/p)
  - Applying same miscalibration coefficients in Boole as used for MDF reprocessing and used by Eflow tests
  - No re-calibration applied in Brunel

- Will add Aurélien calibration coefficients in condition DataBase
  - can be used to start 'fine calibration' from Eflow-pre-calibrated data
  - just need to re-run Brunel step with the wanted re-calibration condDB tag
    - default tag : no re-calibration → start from 10% gaussian miscalibration
    - recalib tag : Eflow calibration applied → start from O(5%) miscalibration

- software for Eflow histo. production+ automatic analysis available in Orwell v1r8
  - Could run in the monitoring farm or Data Quality stream
  - Sergey' proposal for 'sliding analysis' : continuously run over the N previous datasets to have enough statistics (e.g. over the last 24h -> 4M evts if 50Hz data in MF)
  - Scripts and code configuration to be setup

Other issues

- Orwell v1r8 available in LHCbRelease
  - development version Orwell v1r9 about to be activated at pit

- Implementing python configurable in Calo reco software (thanks to Vanya)
  - in CaloReco, CaloPIDs, CaloMoniDst and CaloAssociators packages
  - Easier to configure multi-purpose reco sequences (offline, Hlt, Hlt-topo, …)
  - Manage the configuration of the dataOnDemand for all calo object (used in DaVinci)
  - being validated – should be used for next Brunel version
  - Brief introduction of calo configurable concept during next software week
  - Vanya is developping calibration tools based on this configurables (see Victor talk)

- Integrate software to perform Photon/Electron correction (E/S/L-corrections)
  - Provide correction parameters (to be included in condition DataBase)
  - Using MC truth or tracked electron
  - include some monitoring (S-shaping, …)
  - More news in next meeting

- New tools in preparation to manage MC association calo reconstructed object
  - generic DaVinci association tools have some problems with calo particles
  - specific use-case-dependent patches exist here and there
  - the new generic tool should help

Conclusion

- Automatic analysis of Calibration Farm histograms commissioned
  - ready to have a first version in operation at pit

    Still a lot to do /
    to complete the procedur'. /
    Volunteers needed. /

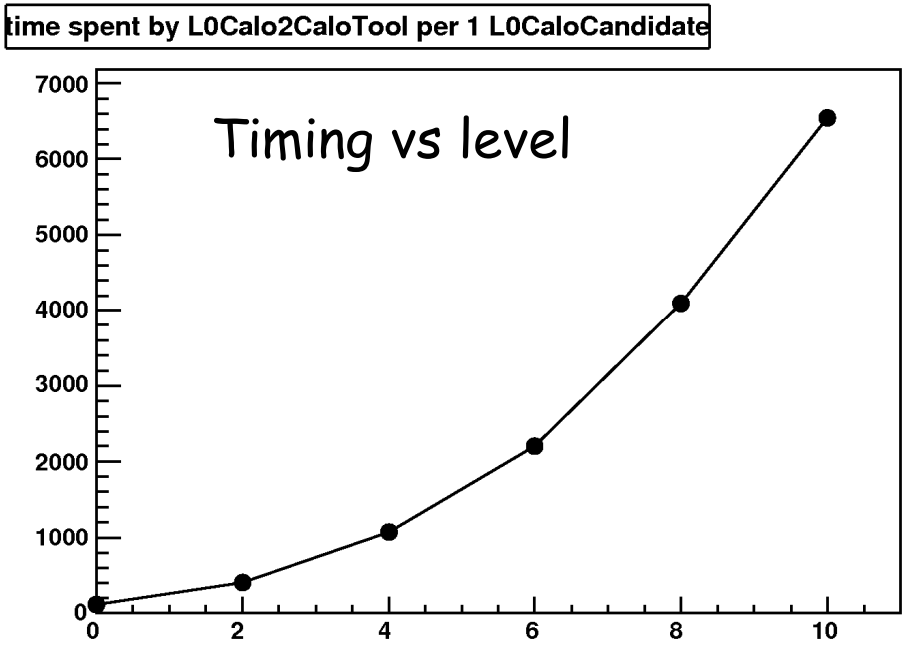
- Absolute calibration from physics data
  - Blind test of the Eflow method -> O(5%) calibration
  - large miscalibrated sample about to be produced to check fine calibration methods

L0Calo2CaloTool (1/2)

(D. Golubkov)

IL0Calo2Calo: a simple tool to get a list of CaloClusters (owned by TES) in the vicinity of the input *L0CaloCandidate(s)* or *CaloCellID(s).*

Basically, just invokes decoding of the corresponding Tell1s and clusterization with help of *CaloDataProvider* and *CaloClusterizationTool* (recently adapted for that purpose by Olivier and Victor).



Level ("neighbour level"): the size of the clusterized region in Calo cells.

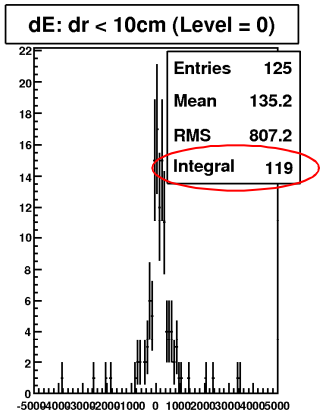
For an *L0CaloCandidate* (2x2 region)
Level = 0 => 2x2 cells,
Level = 1 => 3x3 cells, etc.

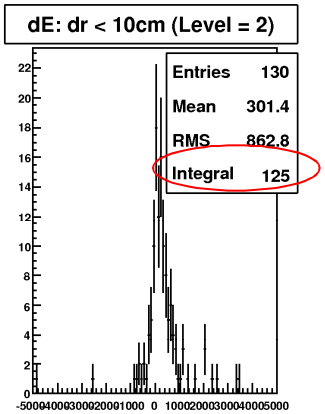
A good value for the Level parameter might be ~2 (see next slide).

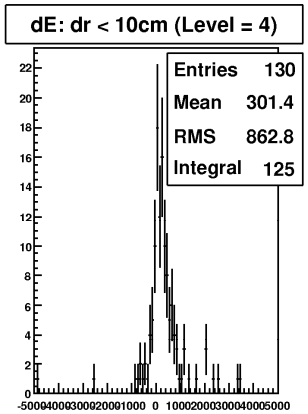
(plots done on 100 minbias DIGI events)

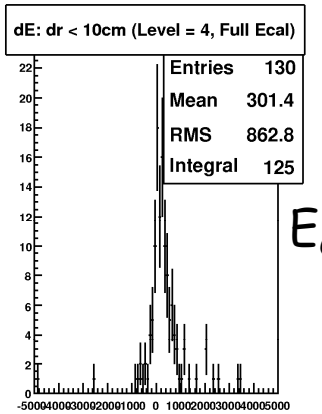
L0Calo2CaloTool (2/2)

Selection: E>100 MeV, Et>100MeV (suppress "zeroes"),
XY distance between the *CaloCluster* and center of the *L0CaloCandidate* dR<10cm.

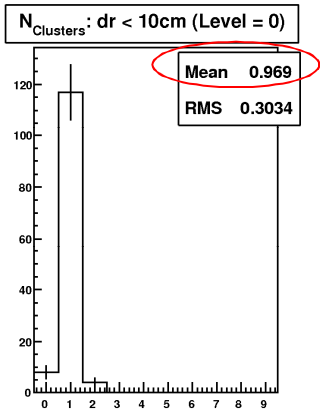


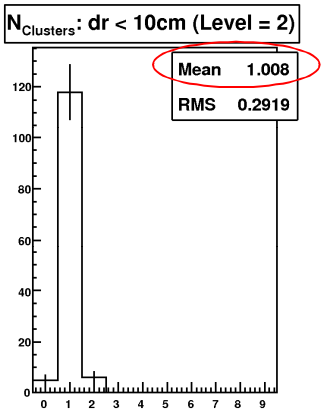


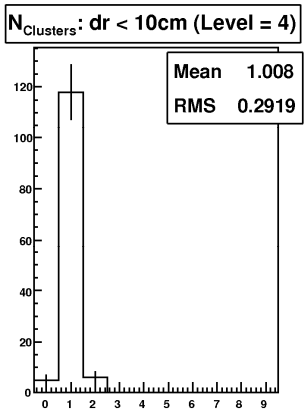


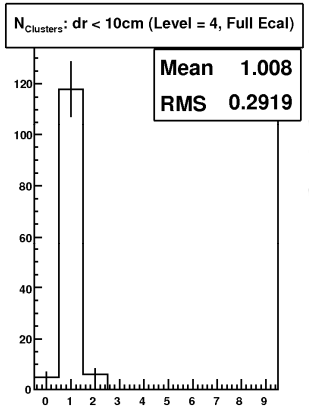


$E_{CaloCluster} - E_{L0CaloCandidate}$









Number of *CaloClusters* per *L0CaloCandidate*

Level = 0

Level = 2

Level = 4

Level = 4
+ decode full Ecal

=> The full efficiency for finding the cluster seems to be achieved at Level=~2