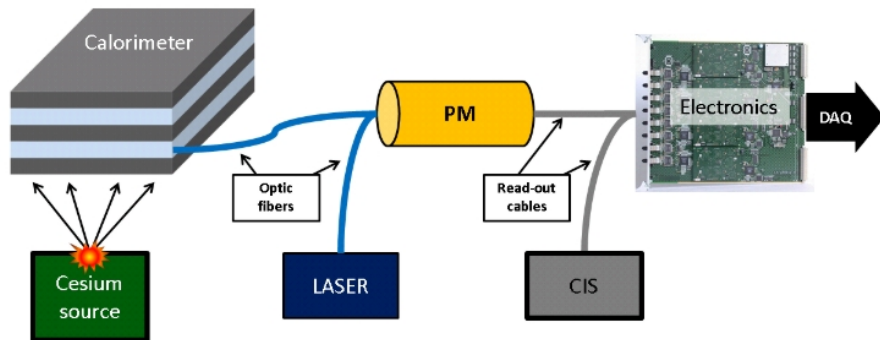


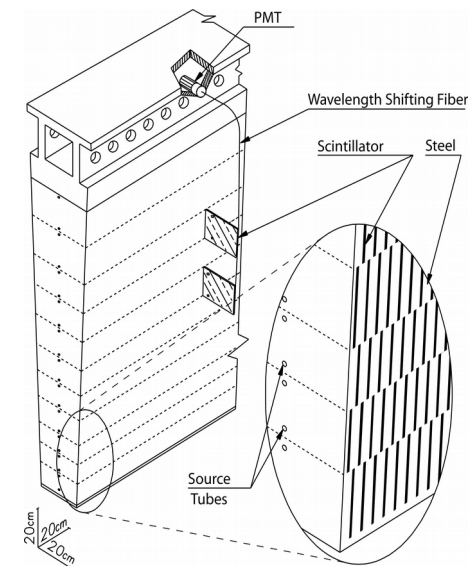
# Calibration and Data Quality systems of the ATLAS Tile Calorimeter during the LHC Run-I operations

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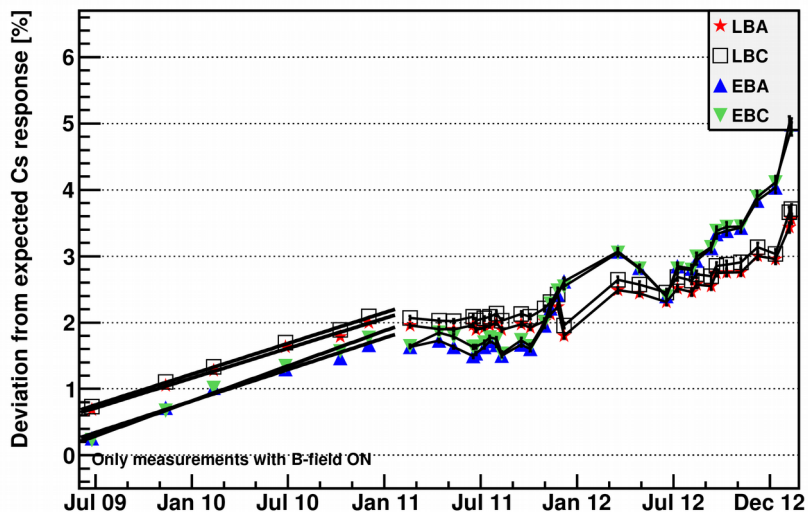
- The Tile Calorimeter is the hadronic calorimeter covering the central region of the ATLAS detector at the LHC. It consists of thin steel plates and scintillating tiles. Wavelength shifting fibres coupled to the tiles collect the produced light and are read out by photomultiplier tubes



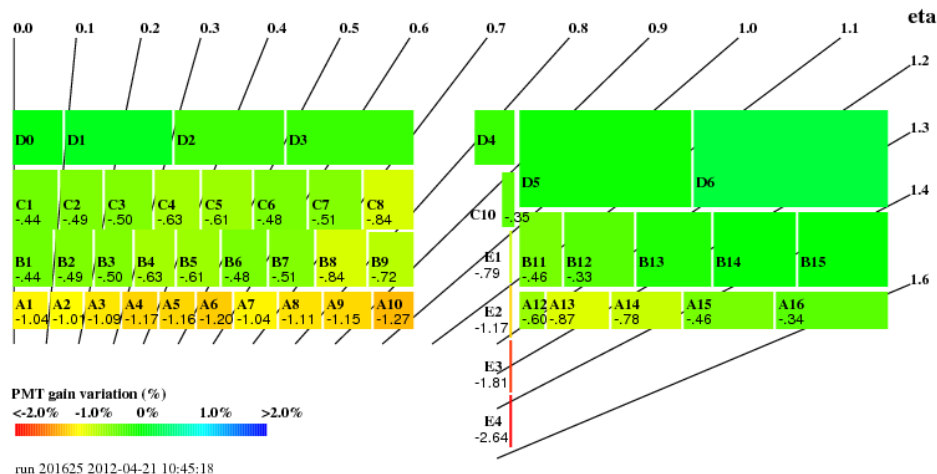
- The calibration scheme of the Tile Calorimeter comprises Cs radioactive source, laser and charge injection systems



- Each stage of the signal production of the calorimeter from scintillation light to digitization is monitored and equalized. Special calibration runs are performed for this monitoring and equalization:
  - Pedestal runs: record electronic noise which is a basic property
  - Laser runs: record laser pulses at two intensities and check both gains
  - CIS runs: check the readout electronics in full dynamic range

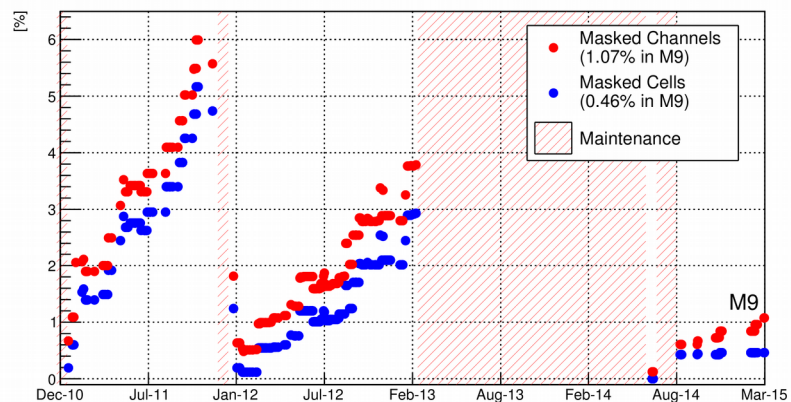


- An up-drift of detector response measured by the Cesium system
- Precision of the measurement is better than 0.3% for each channel

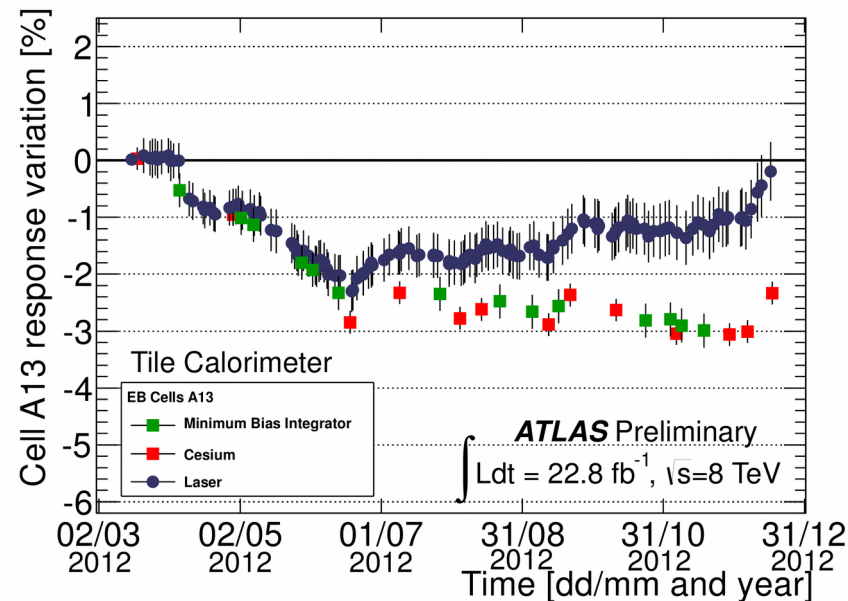


- Gain variation of detector response measured by the Laser system
- Precision of the measurement is better than 0.5% for each channel

Evolution of Masked Channels and Cells: 2015-03-10



- The time evaluation of masked Tile channels and cells
- The corrupted components are repaired during maintenance campaign
- The repair is possible only during the LHC and ATLAS shut-down



- Each of the Tile calibration systems tests a different part of the signal path, such differences indicate the source of deviation
- The difference between Laser and minimum bias (or Cesium) response is interpreted as an effect of the scintillators irradiation