

Check of Calibration Hits in the ATLAS calorimeter MC

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Outline:

- Introduction
- Status and problems
- Future plans

Calibration hits

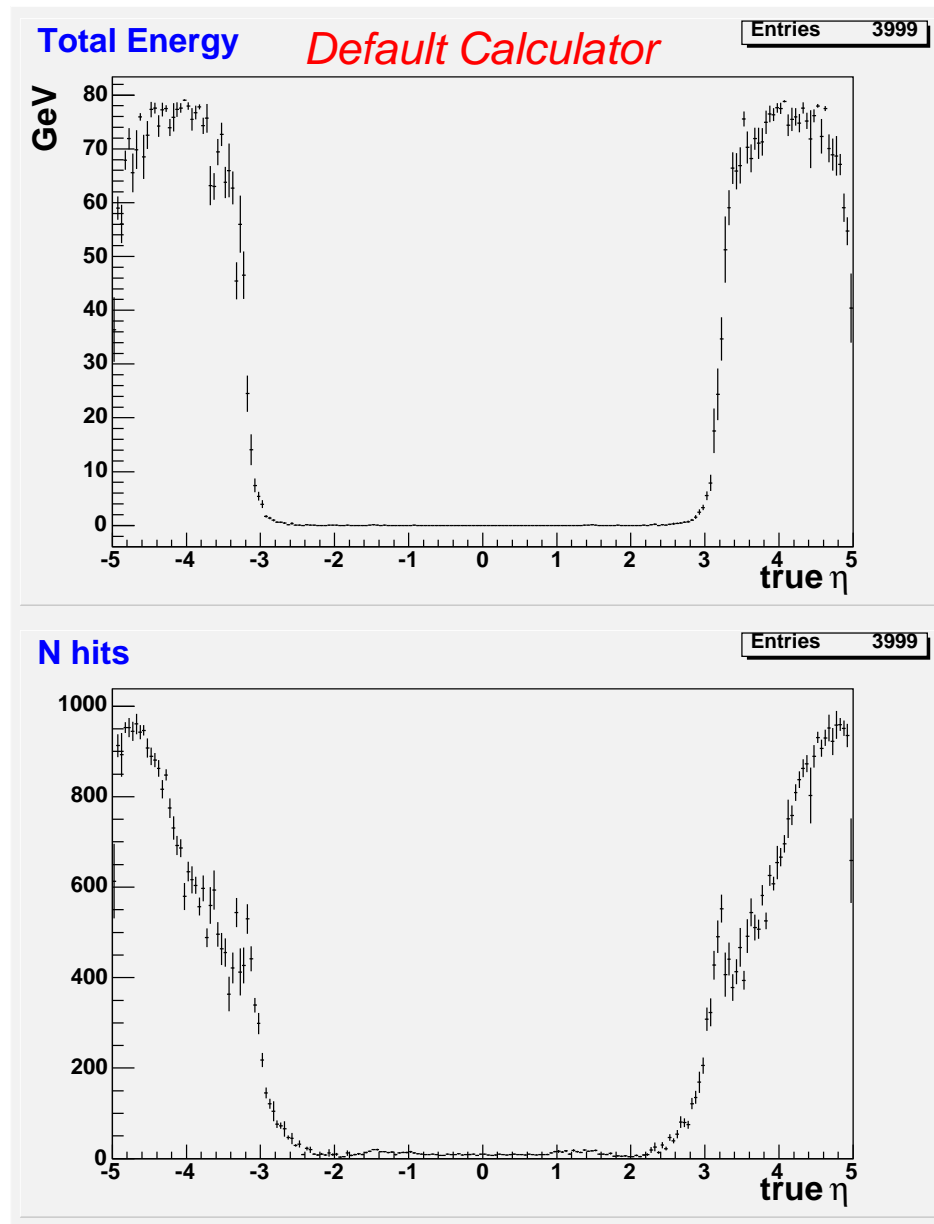
- LArHit
 - Identifier
 - Energy deposited in active region (with charge correction)
 - Time
- LArCalibrationHit
 - Identifier
 - Active regions in cells: use standard Identifier.
 - Inactive regions in cells (e.g., absorbers, electrodes): use same cell Identifier (but store in a separate hit collection)
 - “Dead” regions (e.g., cryostat walls): use special Dead-Material Identifier
 - A separate energy field for each of:
 - e-m processes (e^\pm, γ)
 - non e-m processes (π^\pm, μ^\pm)
 - "invisible" processes (stopped particles)
 - escaped energy (ν, μ)

Problems

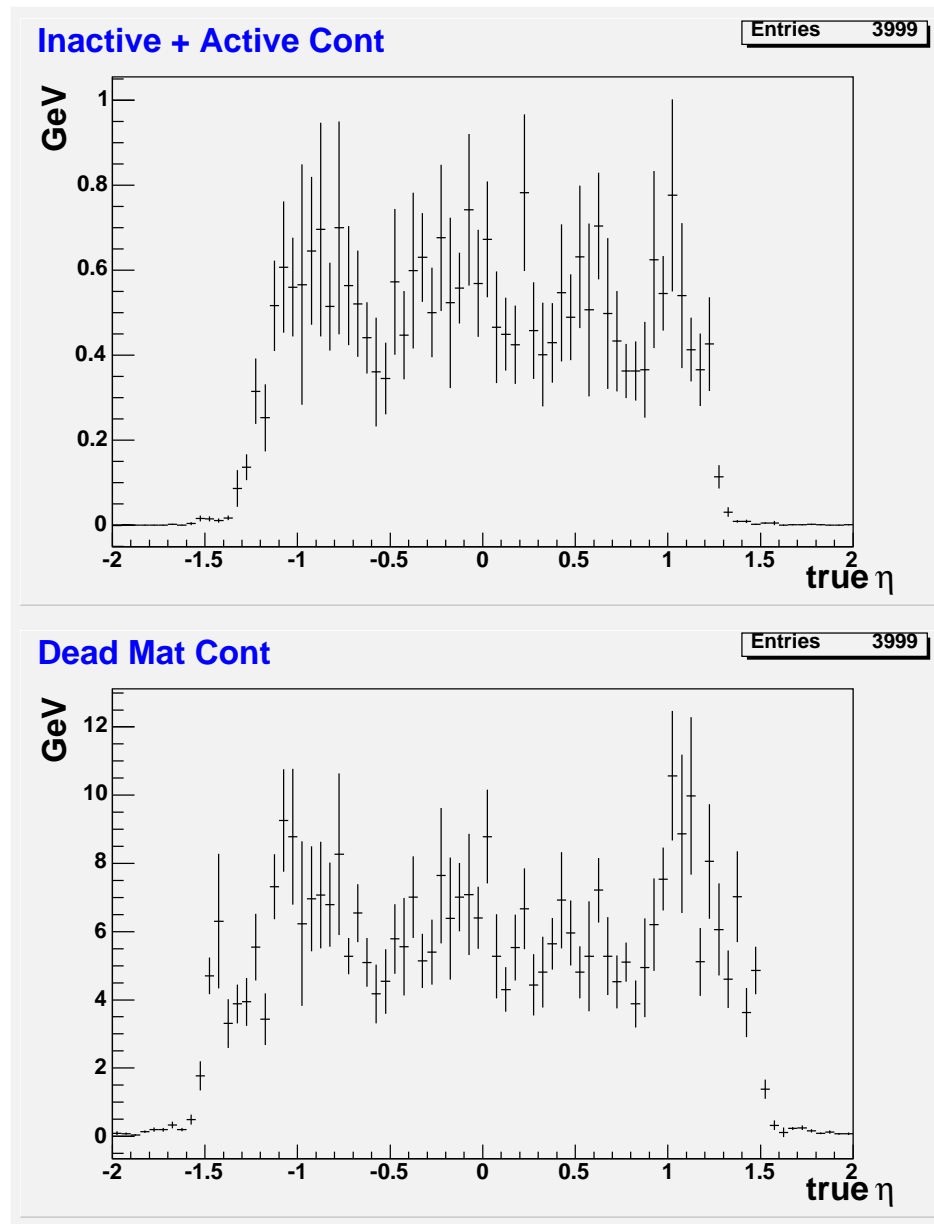
- Identification scheme for Calibration and DM hits in FCAL is only recently implemented by Mohsen Khakzad, now under debugging
⇒ so far all FCAL energy is assigned to Default Calculator
(> 95 % for $|\eta| > 3.2$)
- Some LAr DM hits ID are repeated
(is it normal ?)
- Some hits are put into wrong container
(most often two particular DM ID patterns assigned to “materials behind the active layer of accordion” are present also in other containers)
- There are completely wrong ID's
(one pattern in Inactive Hit Container and another one in DM Hit Container)
- There is a drop in total energy in the region $1.0 < |\eta| < 1.5$, much more pronounced with pions than with photons ⇒ (extended) Tile problem ?

All problems were reported to the atlas-calo-perf list

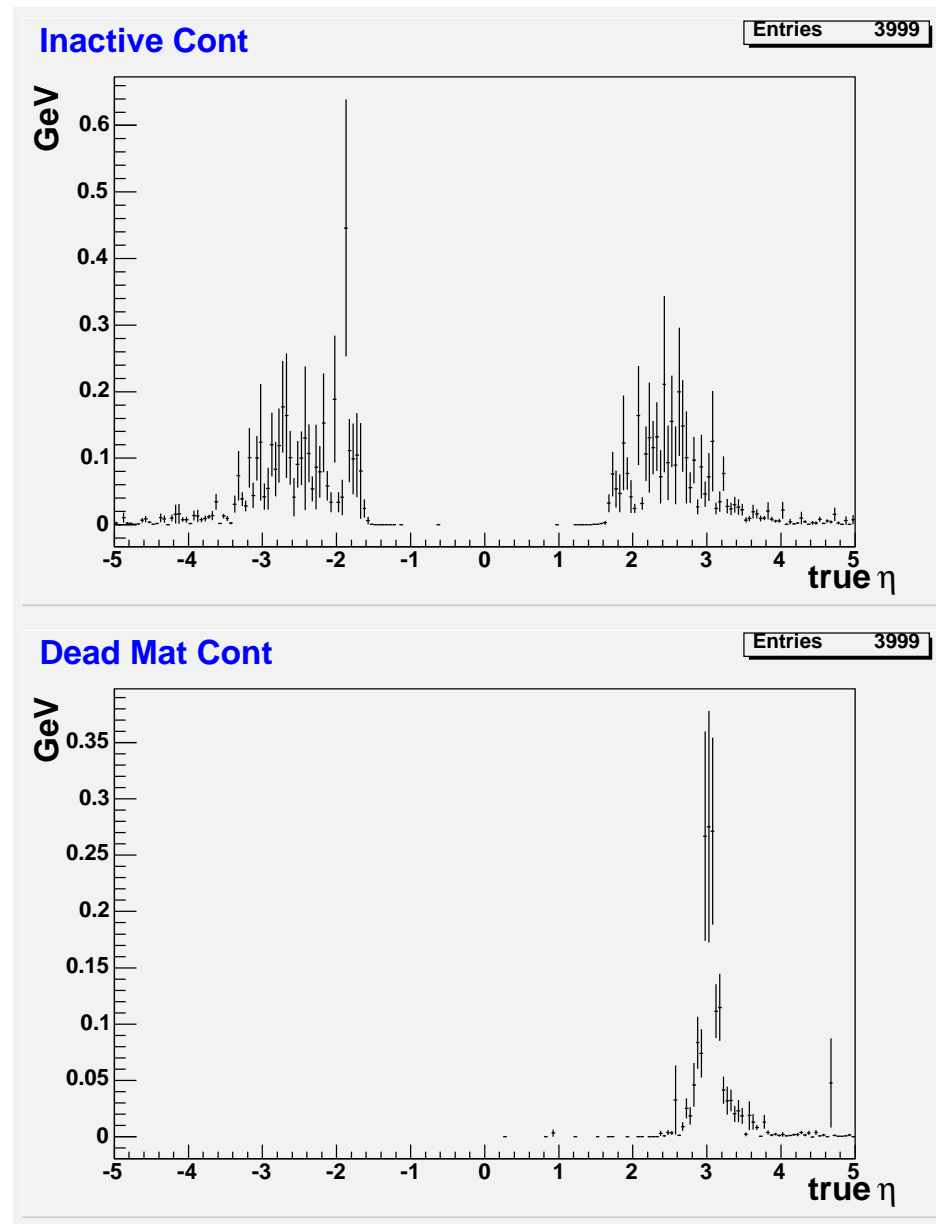
$$\pi^- \quad E_{true} = 80 \text{ GeV}$$



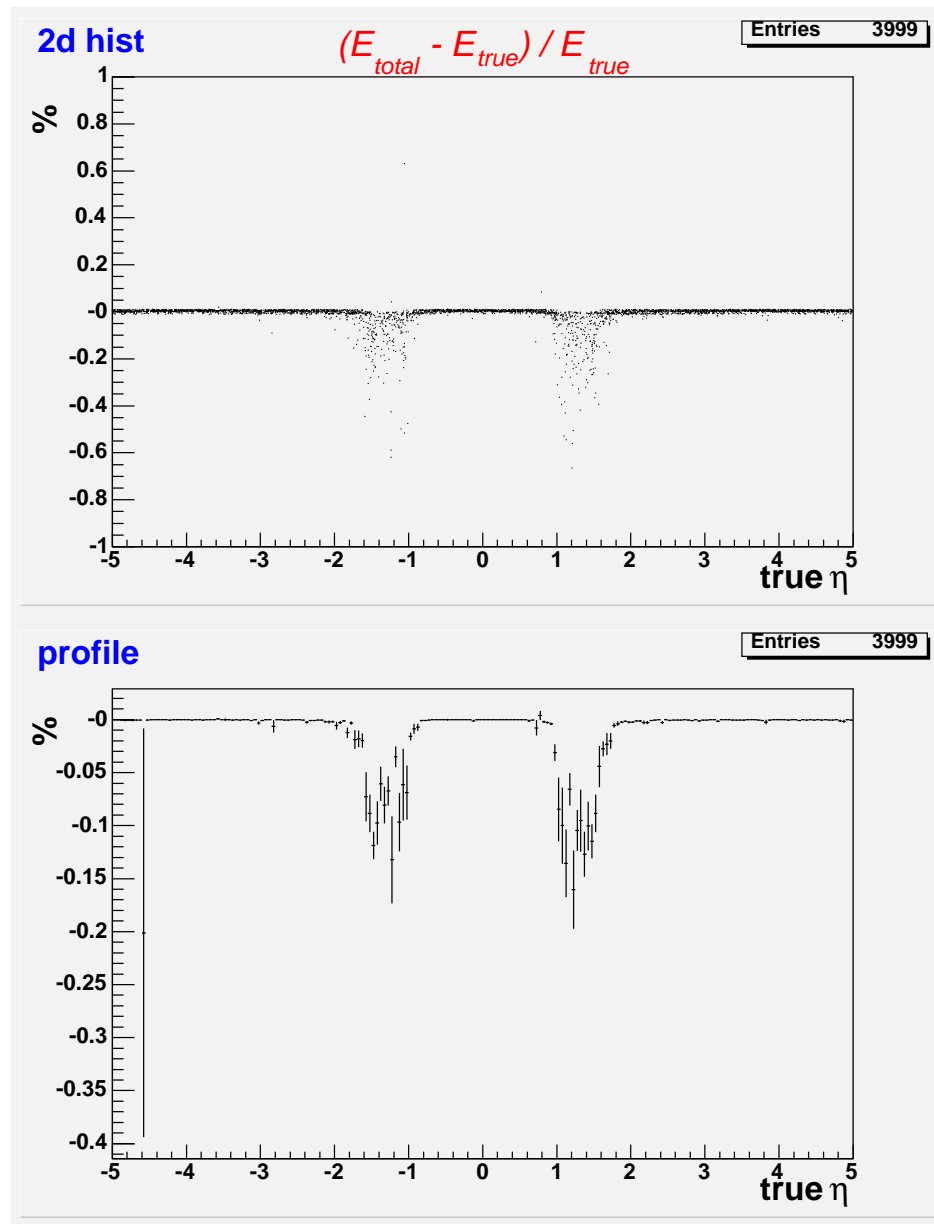
Hits with ID/4000000 = 4120 or 4122 (octal numbers)
 (“materials behind the active layer of accordion”)



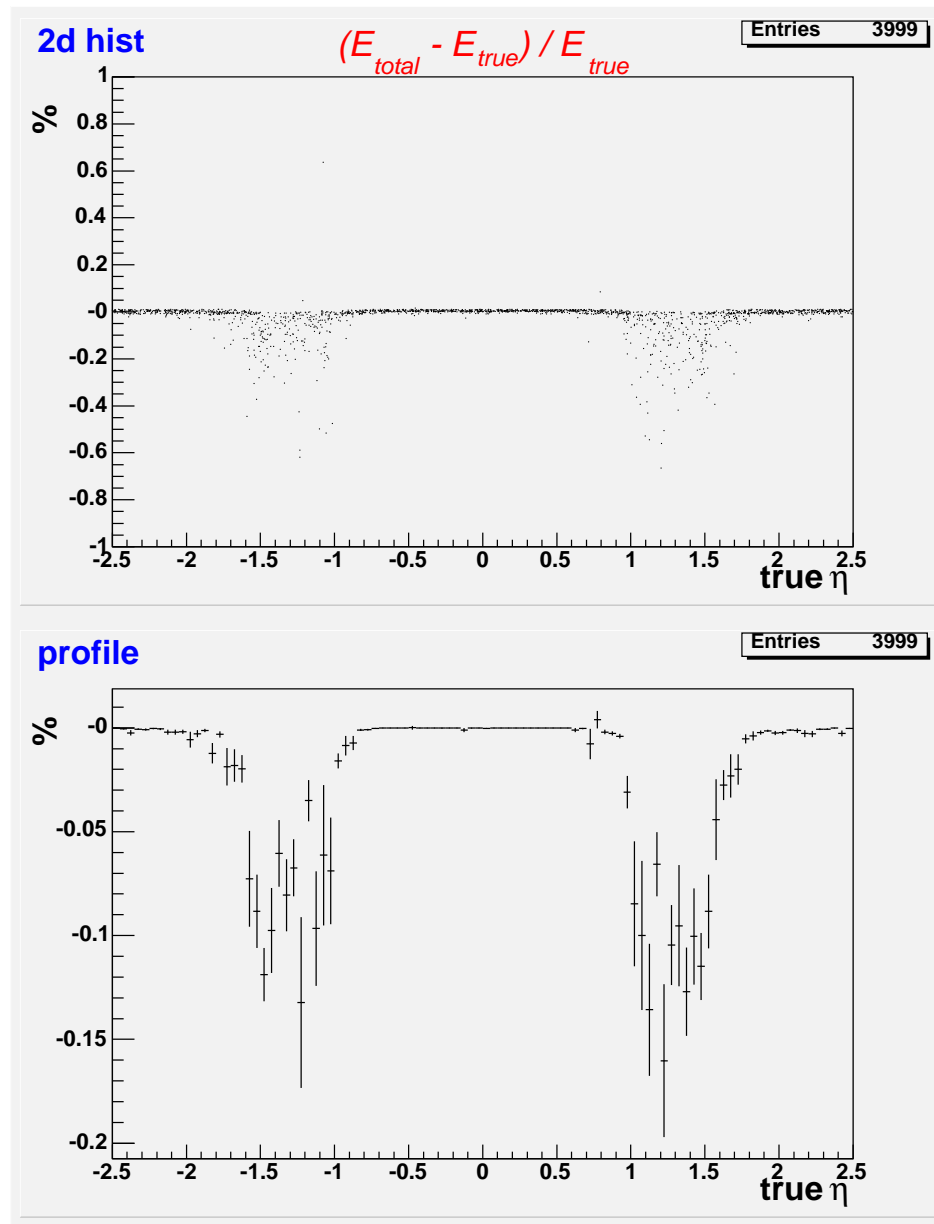
Hits with ID/4000000 = 7774 or 7777 (octal numbers)
(really wrong identifiers)



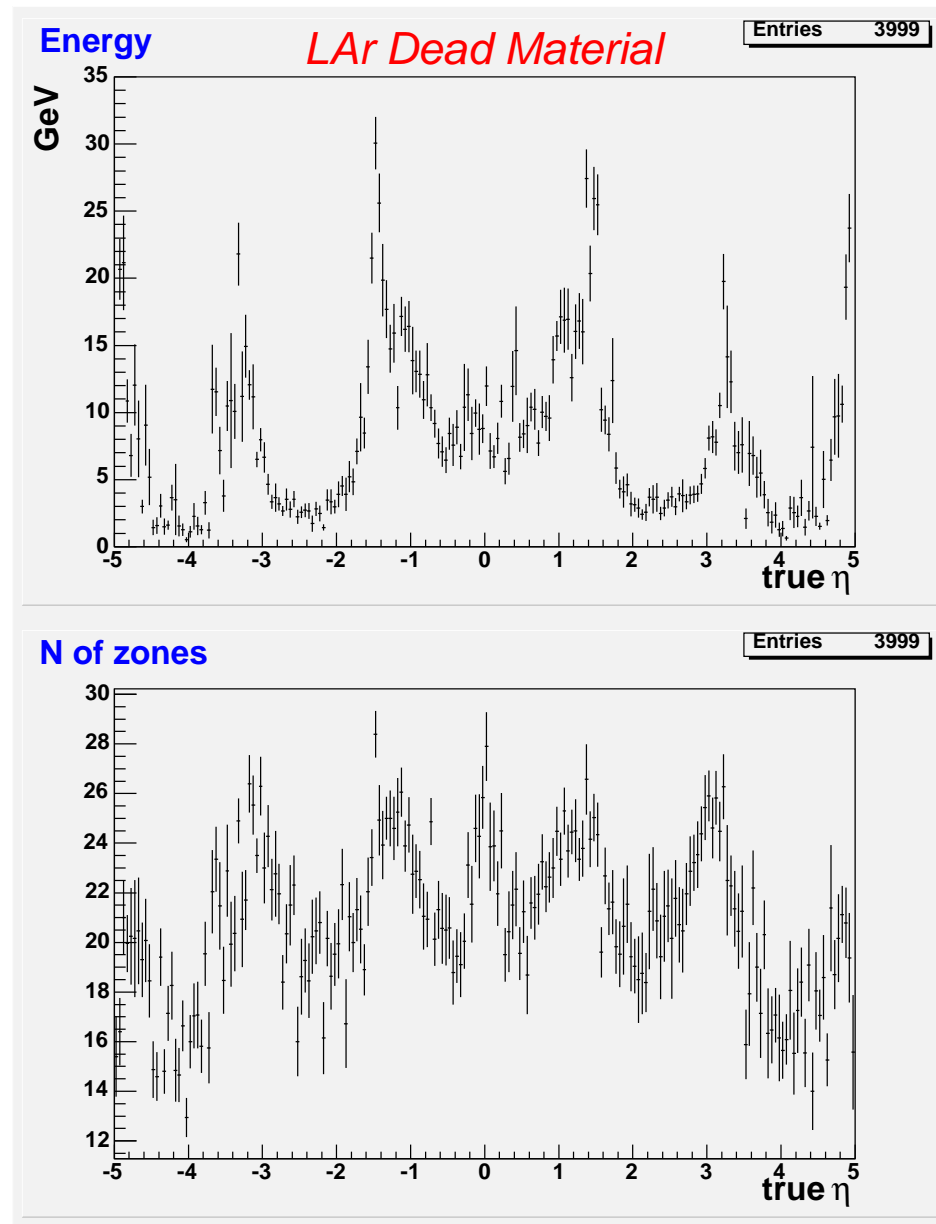
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Future Plans

- Perform more detailed checks, including comparison with standard hits
⇒ the monitor for Calibration hits should be ready soon (J. Boudreau)
- taking into account the available detailed information about the structure of energy deposition, try to develop the correction procedure to compensate the energy lost in dead material
⇒ at cluster or at cell level?