

EM scale: from TB to ATLAS (1)

- EM scale settings:

- LAr calorimeters:

$$E = F \sum_{i=1}^5 a_i (S_i - p), \quad F = (ADC \rightarrow DAC) \cdot (DAC \rightarrow \mu A) \cdot (\mu A \rightarrow MeV) \cdot \left(\frac{M_{phys}}{M_{cali}} \right)^{-1}$$

- individual factors calculated from ramps, injected current calibration and TB.

- Tilecal:

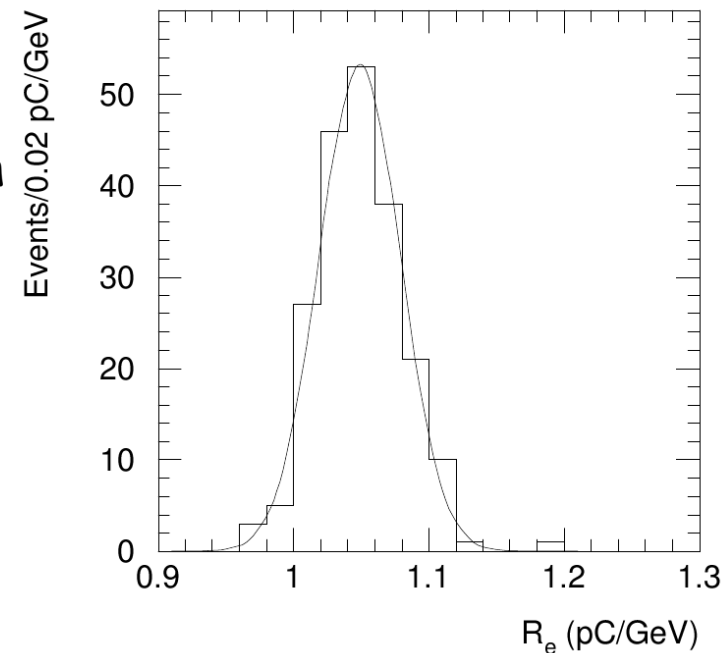
- energy calculated also with OFC, but 7 samples used

$$F = (ADC \rightarrow pC) / f(pC/GeV) * Corr(laser) * Corr(Cs)$$

- absolute gain set with Cs-source, conversion factor obtained from TB (electrons @ 20 deg): $f(pC/GeV) = 1.05 pC/GeV$
 - for cosmics data June 2008 - May 2009 the gain was higher by 18%, consequently f higher by the same factor

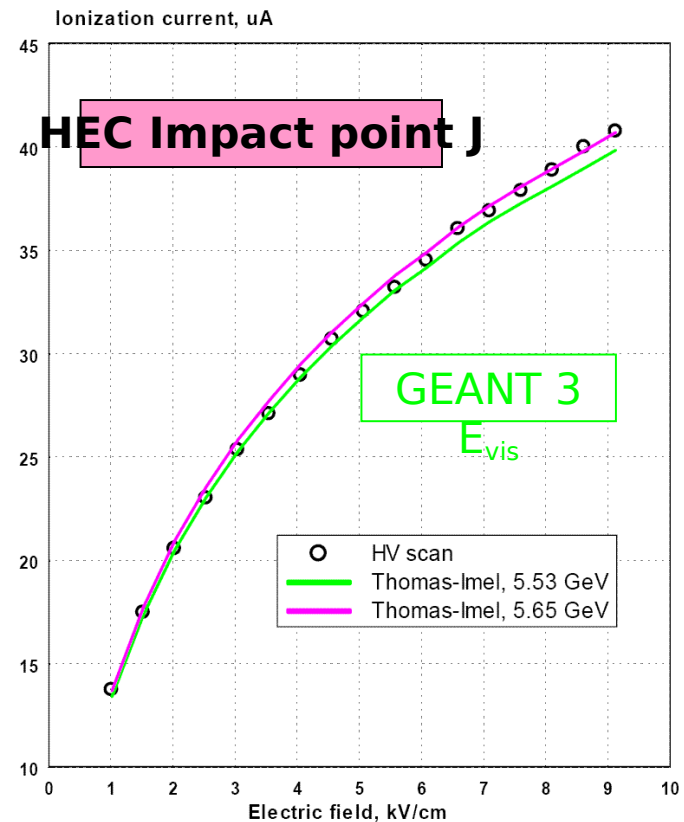
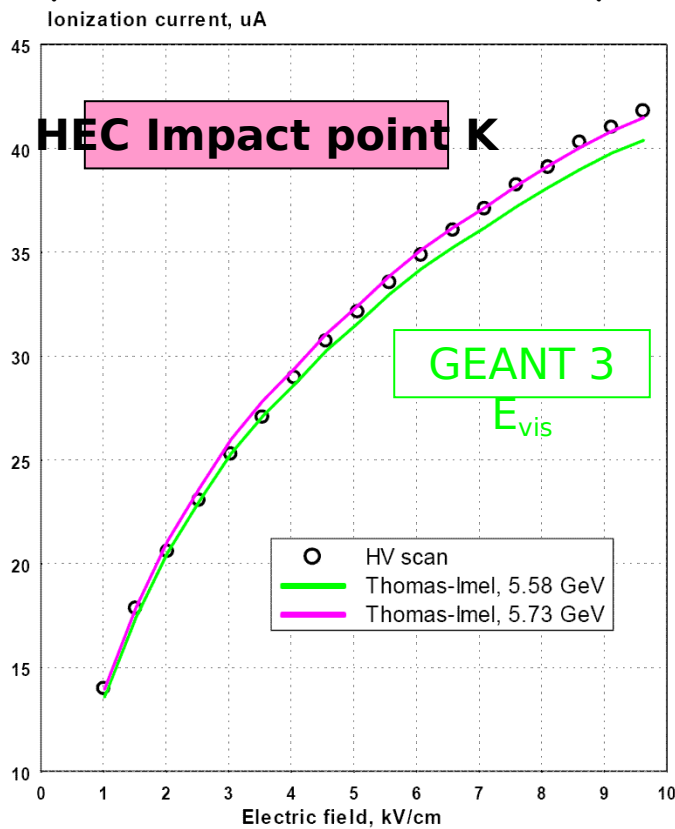
EM scale: from TB to ATLAS (2)

- Uncertainties of the EM scale:
 - EMB + EMEC: typically 2-3% from TB
 - taking into account the T-dependence for transfer TB to ATLAS; testbeam internally only 0.7%
 - using in-situ events $Z \rightarrow ee$ the precision will improve; however no track reconstruction in the inner EMEC wheel region, so impact for $Z \rightarrow ee$ reco
 - inner EMEC wheel; in terms of gap/HV/absorber thickness variation the most difficult LAr detector...
 - Tilecal:
 - 2.4% from TB with electrons, but better with pions (1.5% with 180 GeV pions)
 - validation with single muons:
 - ~1% precision on samples or cell-type (integrated over phi) with beam scraping events (40 hours running)



EM scale: from TB to ATLAS (3)

- HEC: typically 1% error from TB
 - for channels with HV problems (few % only): HV curves well understood, but largest uncertainty results from not knowing the position of the short on the electrode (covering the full η range of a given ϕ wedge!) coupled with the uncertainty on the resistivity of the HV electrode foil



- no fast improvent in-situ expected

EM scale: from TB to ATLAS (4)

- FCAL: 1-5% from TB and comparison to MC
 - $Z \rightarrow ee$ reconstruction in FCAL possible even if electron tracks cannot be reconstructed for $\eta > 2.4$ (see next talk by Mohamed)
- General remarks:
 - validation with muons possible in hadronic calorimeters, but it will take some time. More news once combined cosmic performance studies are finished.
 - E/p studies with single hadrons (in comparison with TB at EM scale)
 - validation from hadronic weights could be an alternative, but not at all straightforward