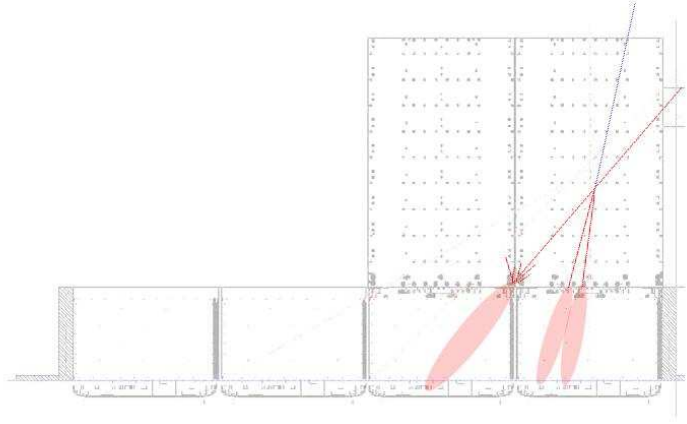
GLAST CERN 2006 Beamtest



DRAFT - Status Report

J. Bregeon for the Beamtest Team

GLAST Collaboration Meeting
November 15^{th}, 2007

Instrument

Understood

- Angular resolution
- Energy resolution
- Backsplash
- Trigger efficiency: TKR, CAL, ACD
- CAL calibration (pedestals, xtalk, non-linearities)
- Ions : Quenching, CNO, Cluster width

Not Understood

- Absolute energy scale
- Number of TKR hits and Clusters
- TKR Cluster size
- Number of CAL CsI log hits

MC Simulation

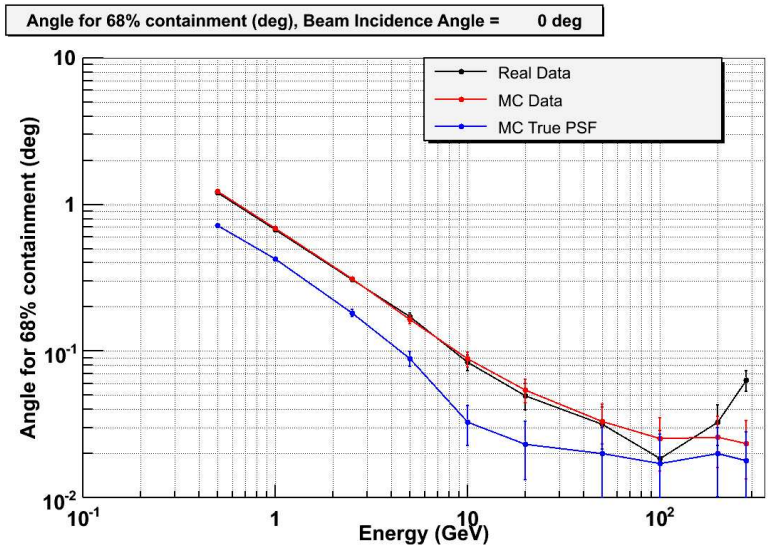
Understood

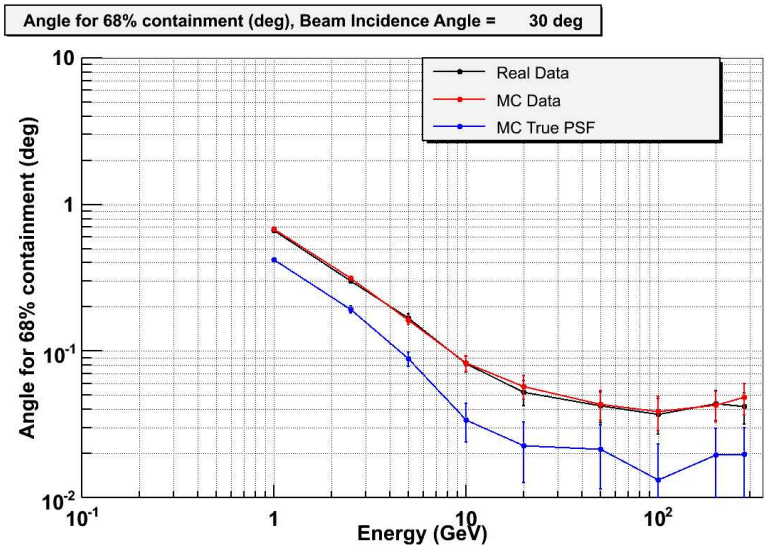
- Material audit: TKR and CAL
- Beam line geometry
- Hadronic physics list
- LowEnergy physics list and range cuts
- GEANT4 compared to other codes

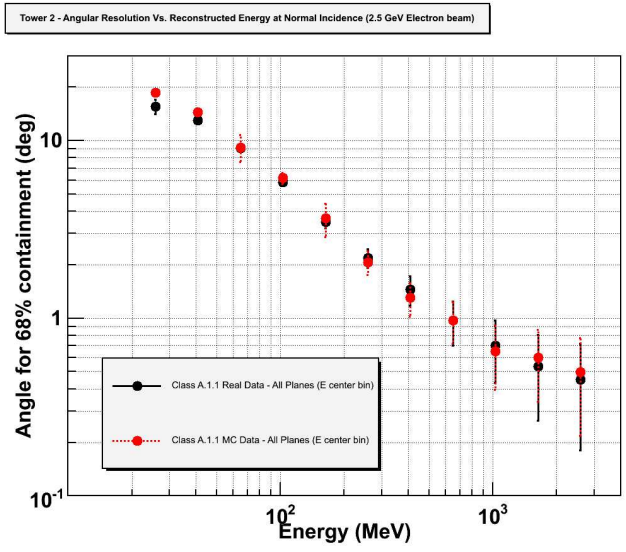
Not Understood

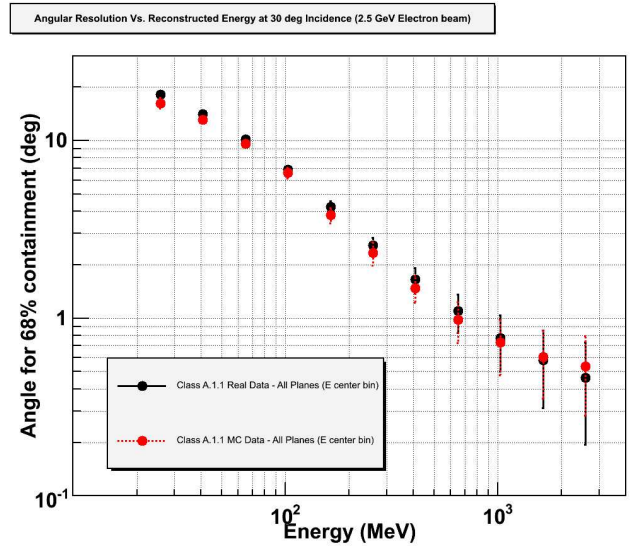
- Possible extra material along beam line
- EM shower profile

Angular resolution



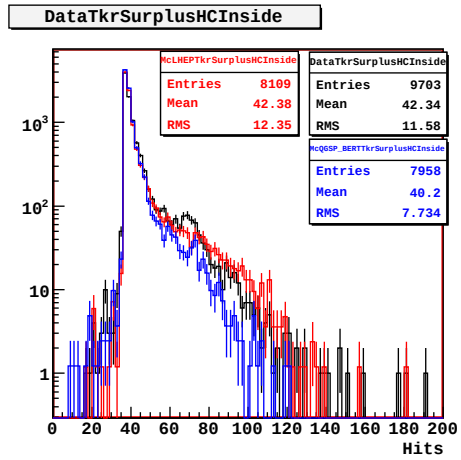


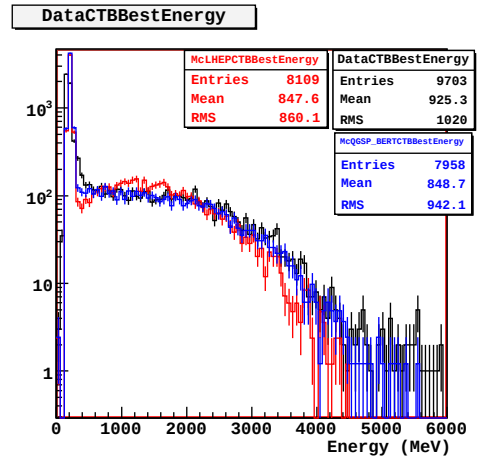


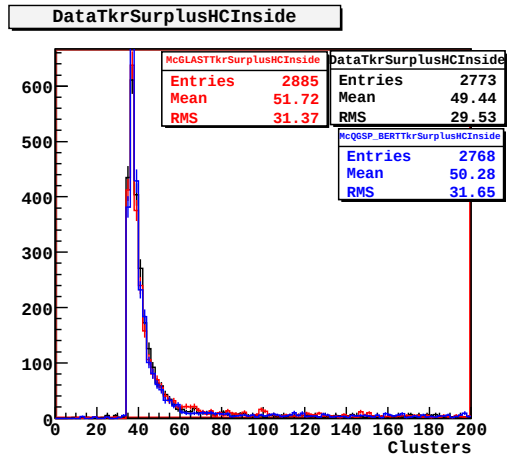


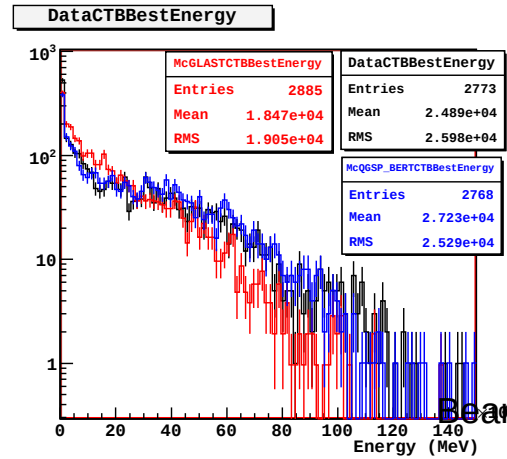
Hadronic physics list

- Bertini $(E < 10GeV)$ and QGSP $(E < 10GeV)$ models validated with beamtest data and tested to simulate a background run : no significant effect on the background rejection



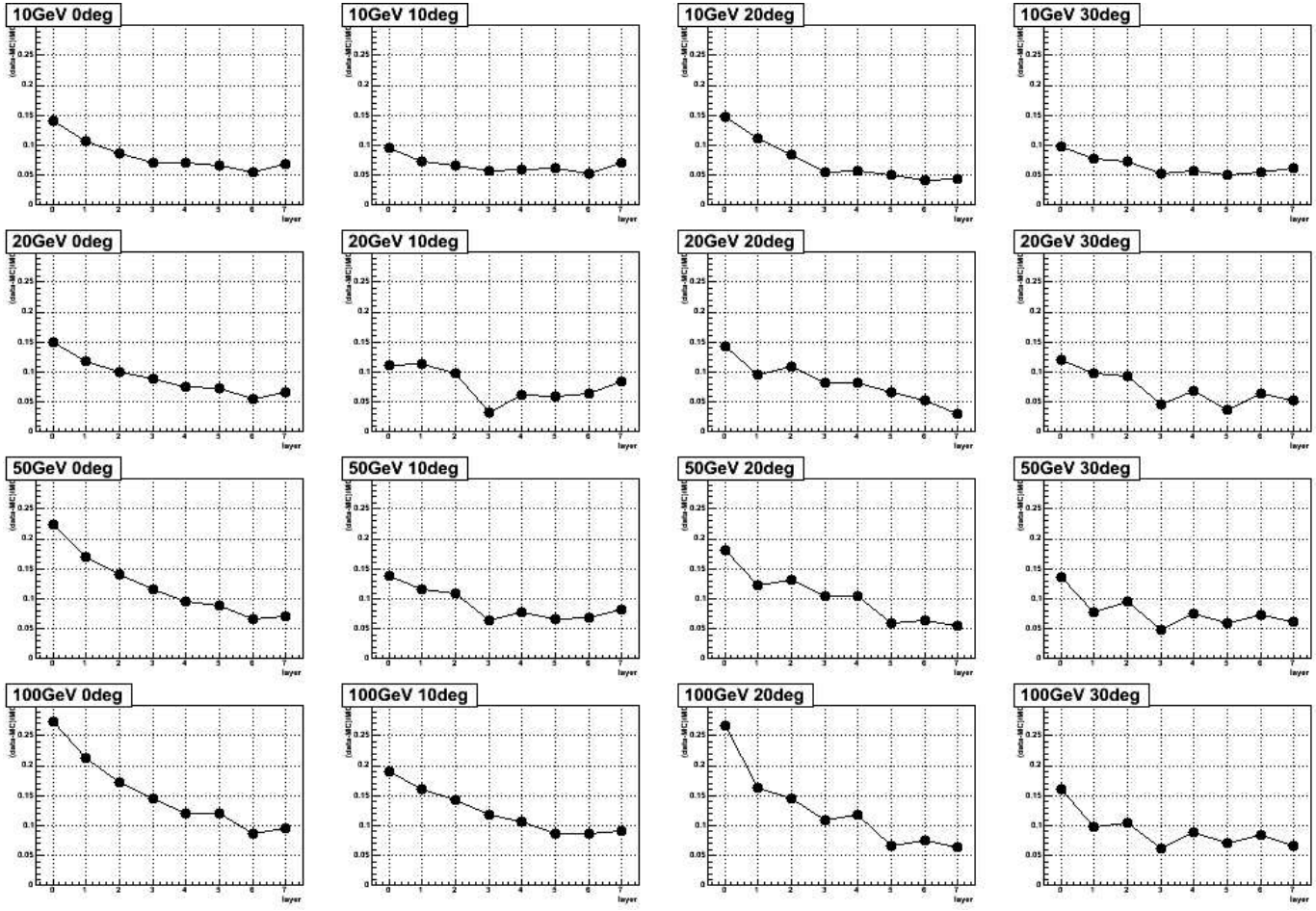




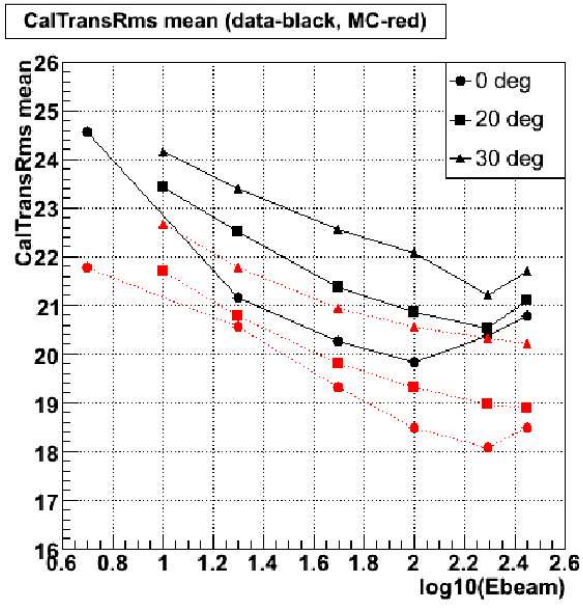


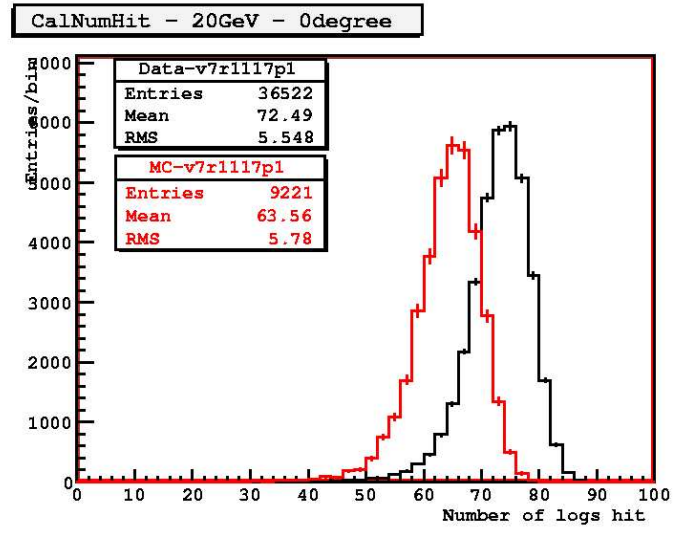
Absolute energy scale

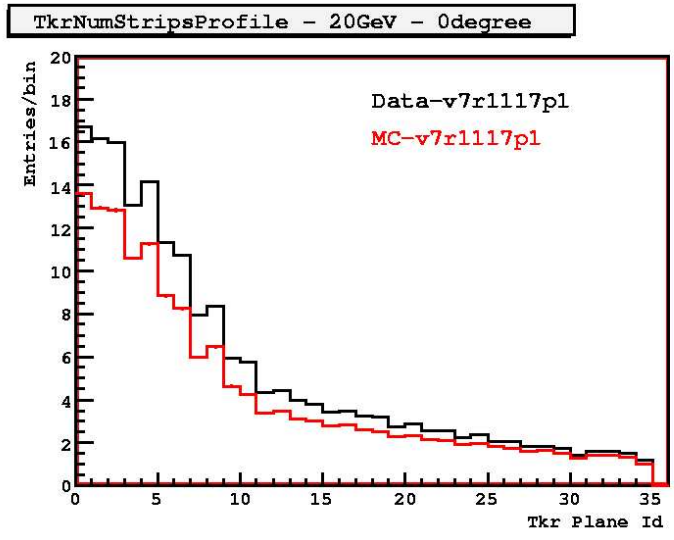
- $< 5\%$: Acceptable for $E < 2.5GeV$, but $> 5\%$: an issue for $E > 2.5GeV$



EM Shower profile







- The simulated EM shower profile is different from the one measured in both the TKR and CAL.
- The difference is really significant for the transverse profile.

HE Electron and BT systematics

Quantify the effects of the residual differences on the *final science products*

- Working on the merit tuple backgroundv11r2
- Apply basic cuts to select a reasonnable set of electrons
  → 10% p, 90% e^- and 20% efficiency for e^-
- *Scale* tuple according to beamtest data knowledge
  - Simple $\sim 10\%$ shift on the variables used for the cut : CalTransRms, CalXtalMaxEne, CalXtalsTrunc, CalEnergyRaw, CalLRmsAsym, CalCfpEnergy
- Apply the same cuts on the *scaled* tuple
  → 20% p, 80% e^- and 10% efficiency for e^-

⇒ Selection efficiency and contamination are worse by a factor of 2 on the *scaled* tuple

⇒ In this simple case, Data-Mc discrepancies do have a **significant** impact on the analysis

⇒ This issue needs to be studied carefully

Plans

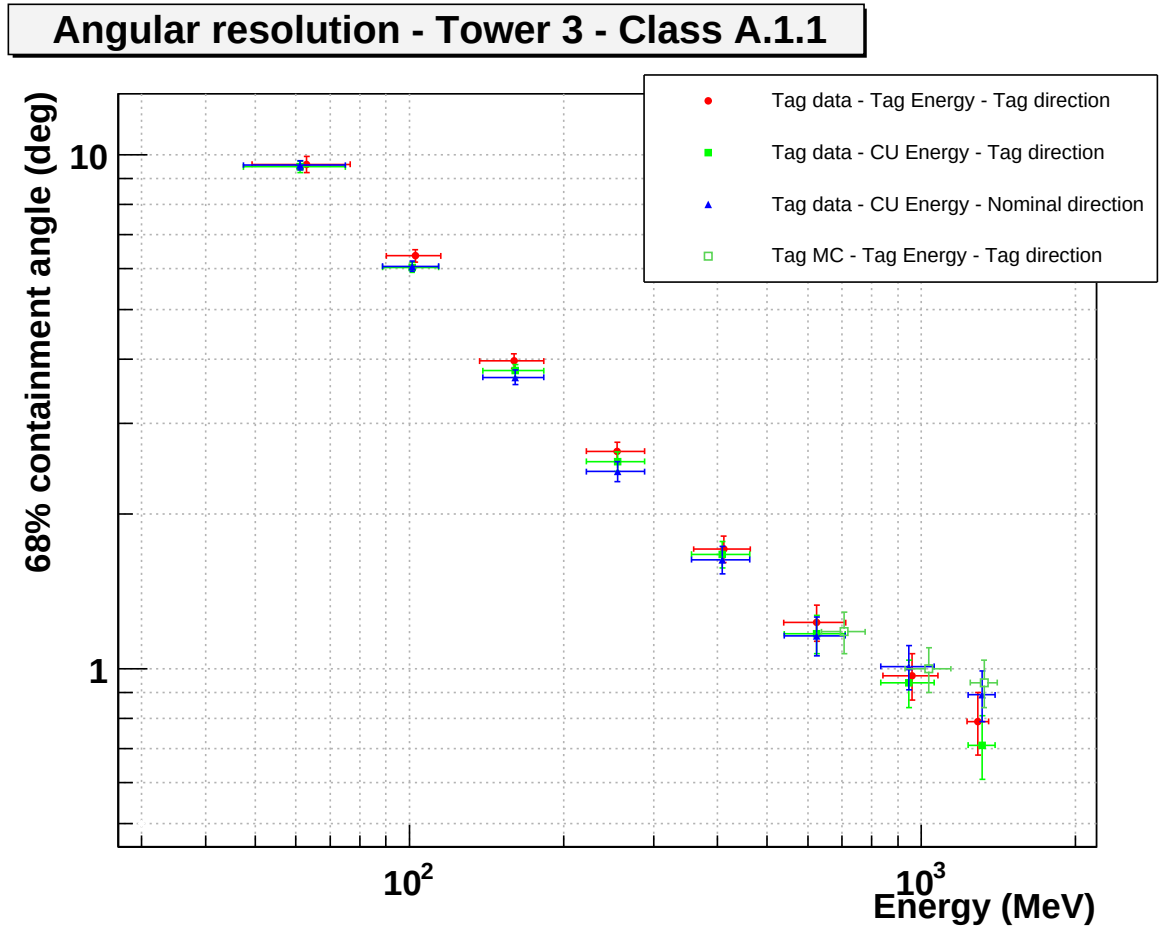
- effects of discrepancies on background rejection (data-like simulations, we MUST devise and show a plan here, we have been talking about this for too long now)
- how do we play with shower shape in g4?
- It would be interesting to do the same in other contexts (background rejection, energy spectra reconsrtuction)
- Develop procedures to cross check the discrepancies with on-orbit data (long term action item).

Backup slides

follows

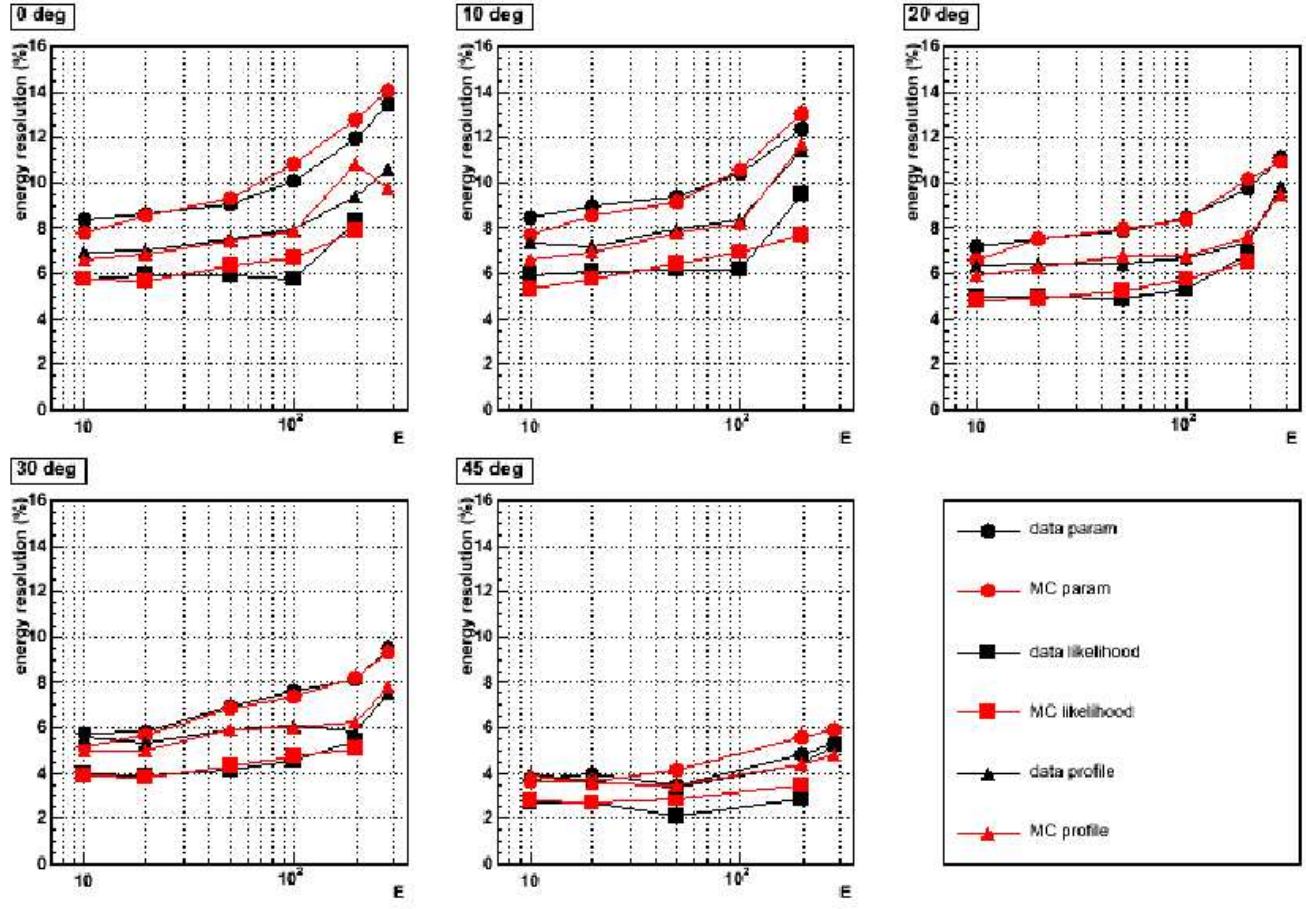
Photon Tagger

- PSF determined using Tagged photons is consistent with the one measured in FullBrehm mode.
- Tagged MC still to be understood



Energy Resolution

- Once you get rid of the systematic shift on the energy
- The energy resolution is within specs and well under controle



Trigger efficiency

- Estimate of the tracker trigger efficiency