

GLAST LAT project

Results from the GLAST CERN 2003 experiment

Study of hadronic interactions

"Geant4 special hadronic lists"

+ preliminary GSI results

Special Hadronic Lists

Geant4 people recommend the use of some "Special Hadronic Lists" for "various major use-cases of geant4 hadronic physics", on this page :

<http://cmsdoc.cern.ch/hpw/GHAD/HomePage/>

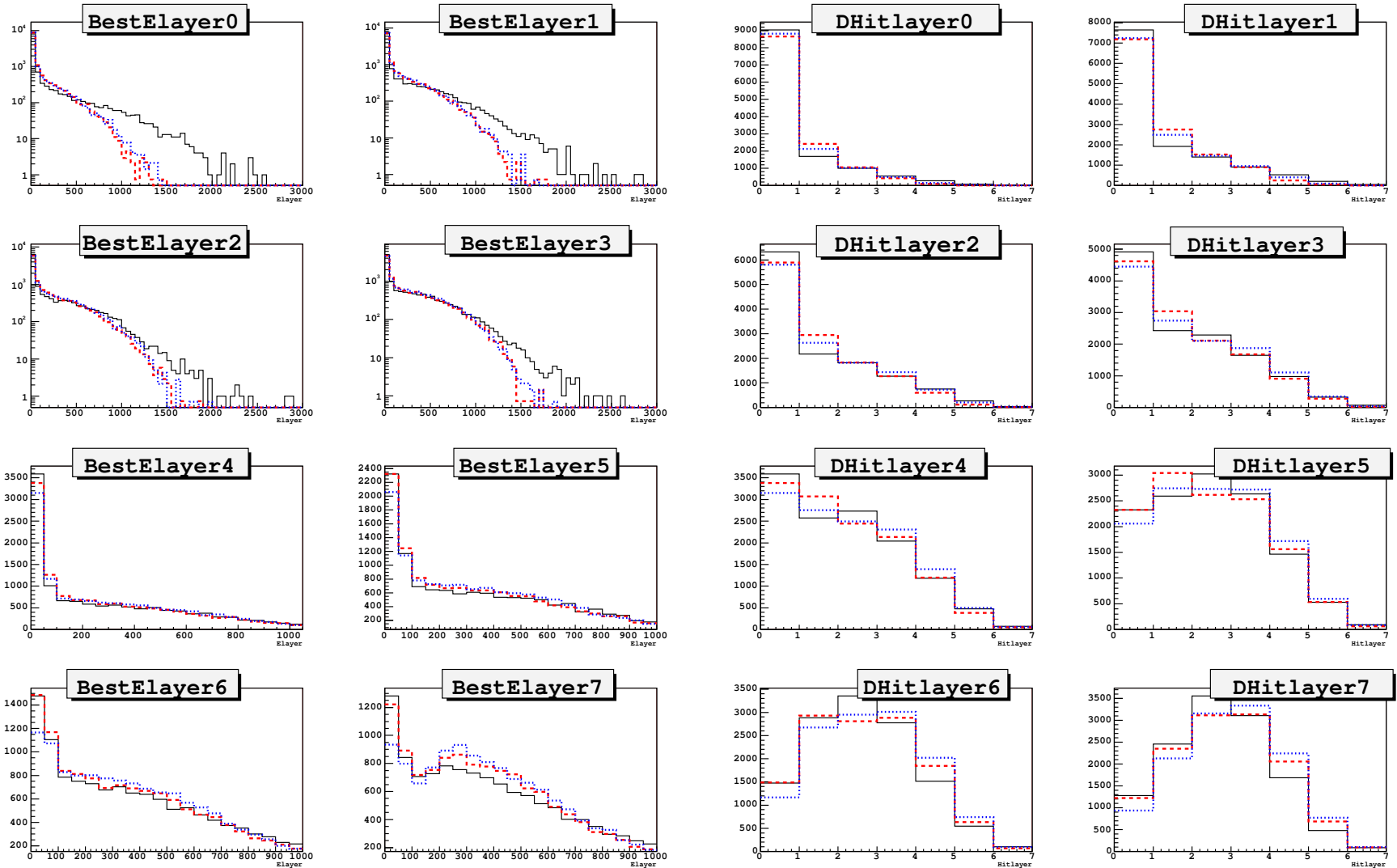
We are interested in hadronic physics calorimetry $\Rightarrow$

<http://cmsdoc.cern.ch/hpw/GHAD/HomePage/geant4.6.1/calorimetry/index.html>

- Francesco Longo's proposition to test some of these hadronic lists.
- How ? ...it's easy : Compile G4 "hadronic list" subpackage and say you want to use it
- I will present here : QGSP and QGSC ... I have tested more...QGSP-GN, QGSP-BERT, LHEP, FTFP

Results 20GeV - QGSP

Black = DATA + Red = Std G4 + Blue = G4-QGSP

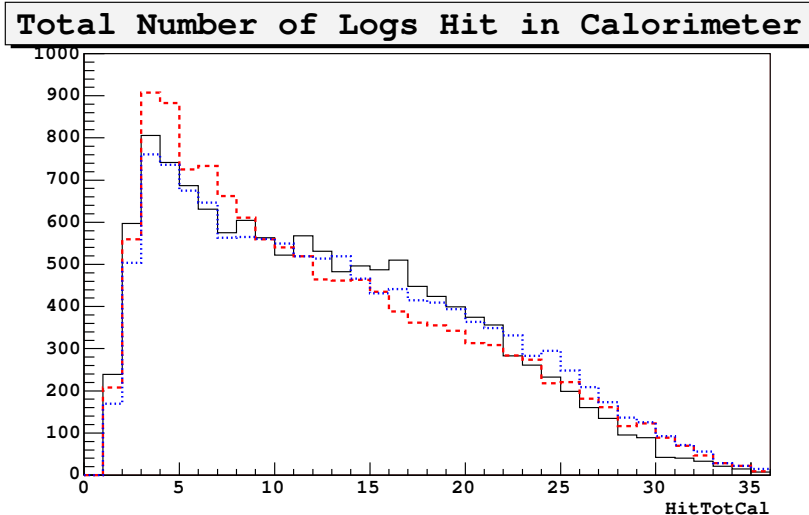
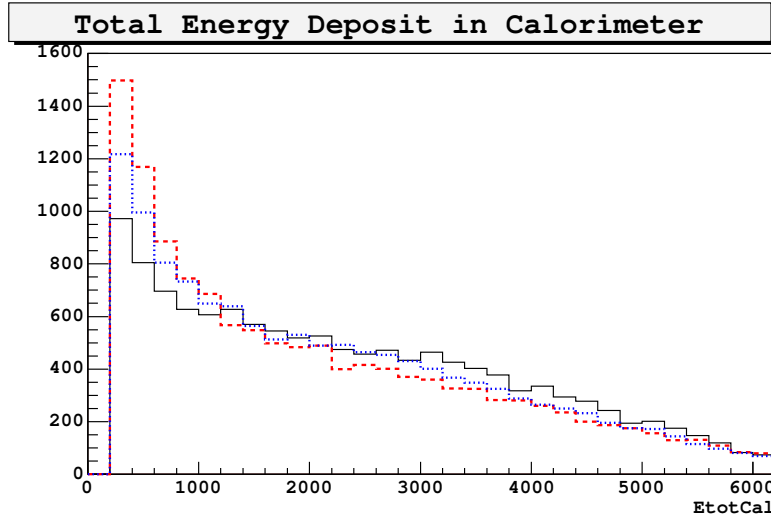


Energy deposit per layer

Number of Logs Hit per layer

Results 20GeV - QGSP

Black = DATA + Red = Std G4 + Blue = G4-QGSP

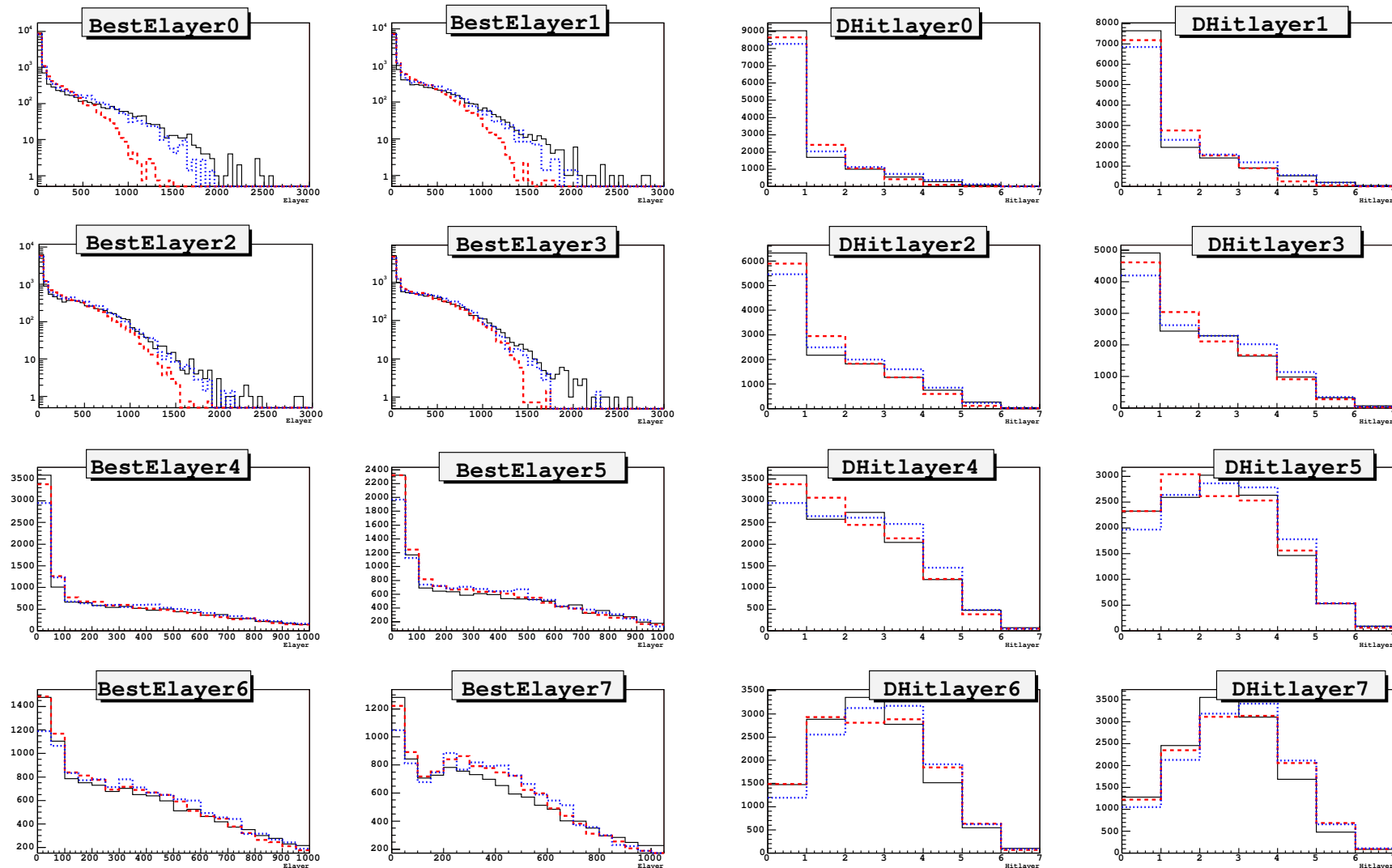


Total Distributions

- only small differences
- looks worse for Energy per layer but better for sums over the calorimeter
- QGSP is a theory driven model...Quark-String-Gluon-Plasma

Results 20GeV - QGSC

Black = DATA + Red = Std G4 + Blue = G4-QGSC

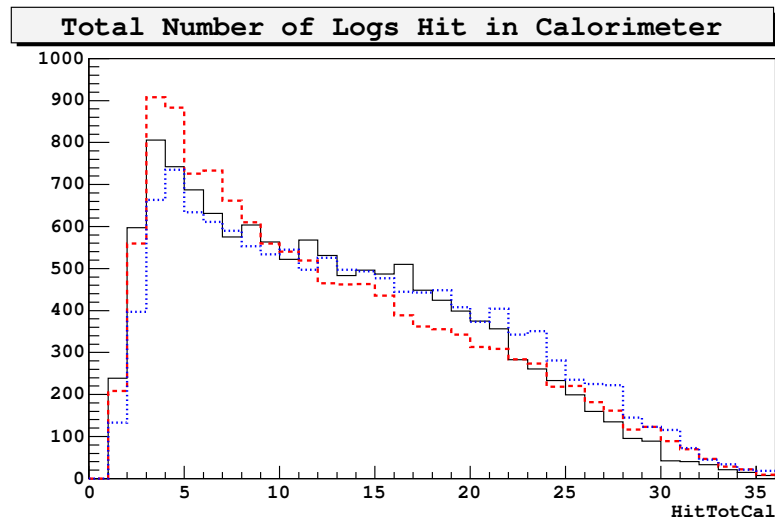
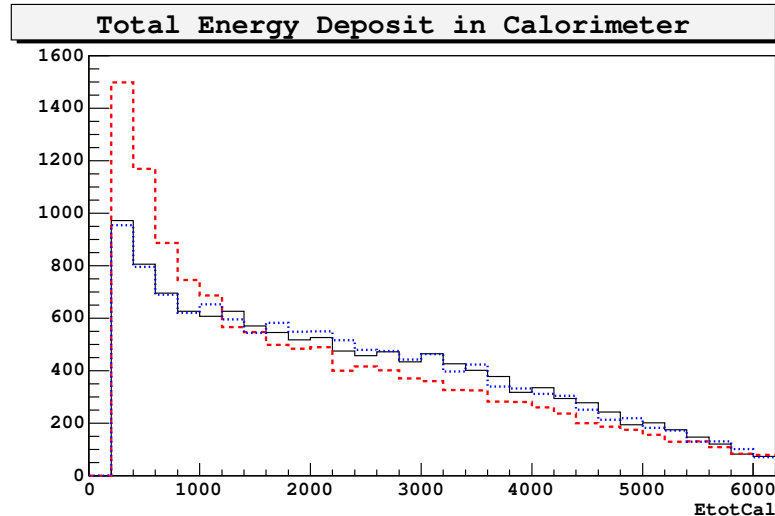


Energy deposit per layer

Number of Logs Hit per layer

Results 20GeV - QGSC

Black = DATA + Red = Std G4 + Blue = G4-QGSC



Total Distributions

- only small differences
- better for high energy deposits in the first layers
- but worse for low energy deposits
- better for sums over the calorimeter
- QGSC is the same as QGSP except for fragmentation

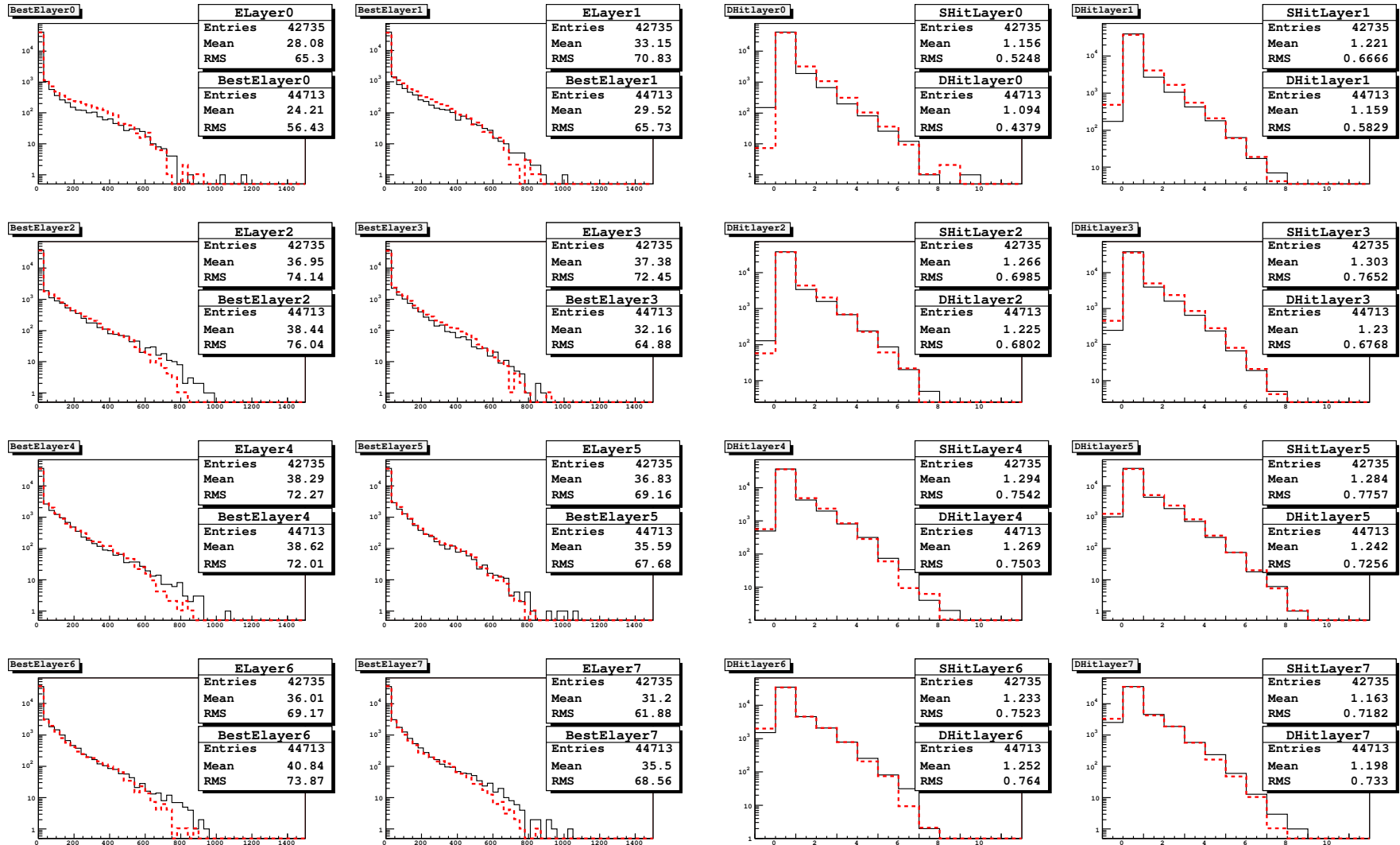
"hadronic lists" conclusion

- Using special hadronic lists is easy
- Tested : QGSP, QGSP-GN, QGSP-BERT, QGSC, LHEP, FTFP
- mainly no big differences (even for CPU time)
- QGSC is the only one (among the one I tested) that looks better but all of them give a good agreement.

... Now, preliminary results from GSI beam test data analysis
!

GSI - E.M. - protons 1.7GeV

Black = E.M. DATA + Red = Geant4v6.2p02

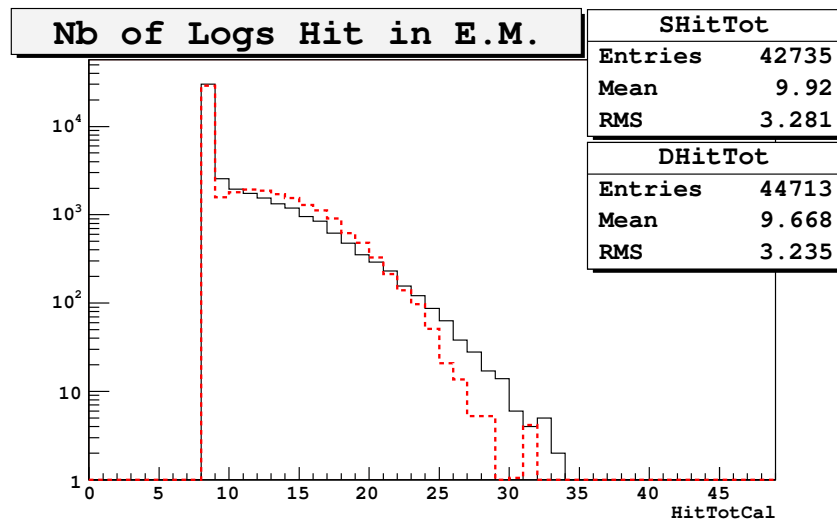
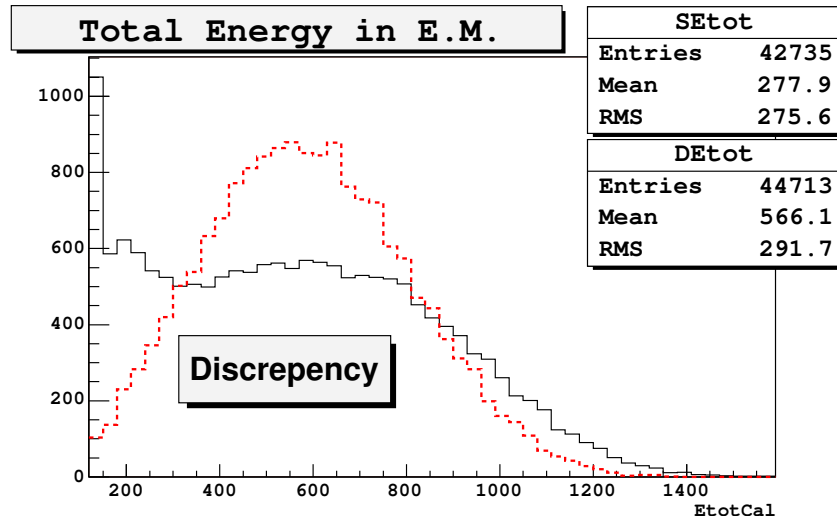


Energy deposit per layer

Number of Logs Hit per layer

GSI - E.M. - protons 1.7GeV

Black = E.M. DATA + Red = Geant4v6.2p02



Total Distributions

- Agreement (Mean and RMS) looks good for ELayer and HitLayer
- Discrepancy for the Total Energy deposit !
- this is still preliminary...
- More cuts to have a cleaner beam
- Try calibrating with non-Linearity corrections