



# EM VALIDATION RESULTS FOR GEANT4 10.6REF05

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# List of EM modifications for 10.7beta

## ■ General infrastructure

- *G4Track, G4DynamicalParticle clean-up*
- *G4PhysicsVector clean-up for linear and free vectors*

## ■ Standard models

- *Optimisation of 4UrbanMscModel*
  - Internal data structure
  - Tuning parameterisations
- *Optimisation of G4UniversalFluctuations*
  - Tuning of internal parameters

## ■ Physics Lists

- *Make common with hadronics activation of b- and c- baryons and mesons*
- *Removed duplicate code in Physics Lists*
- *Introduction of step function for light ions and generic ions*

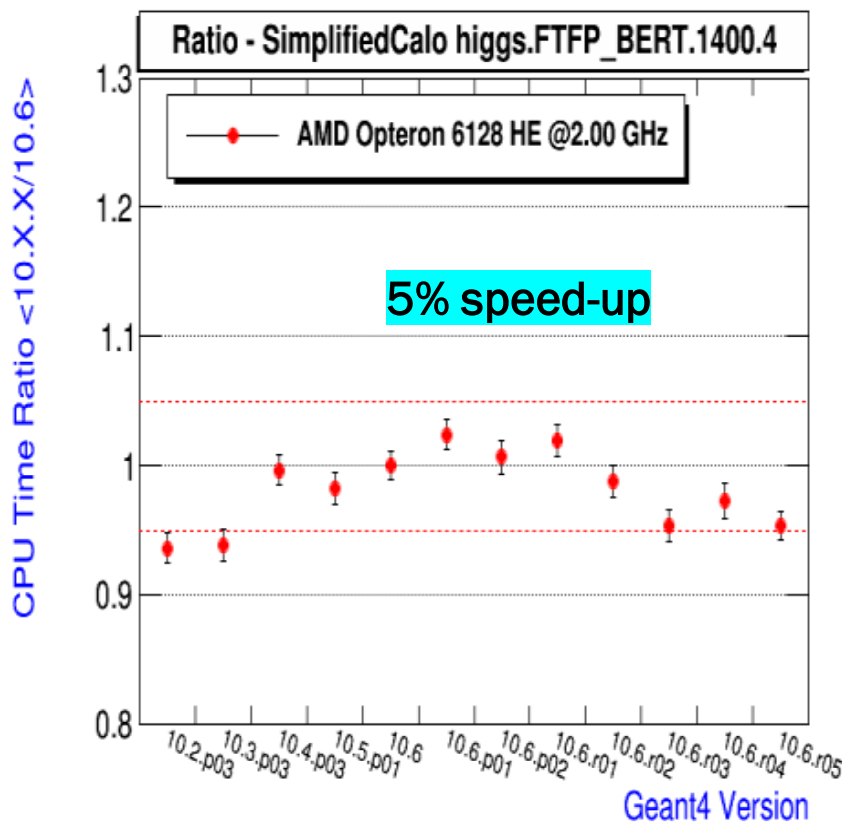
## ■ Low-energy models and Physics Lists including DNA

- *Polarized gamma elastic scattering*
- *EPDL2017 gamma conversion*
- *Extension of DNA variants of physics on top of standard physics*

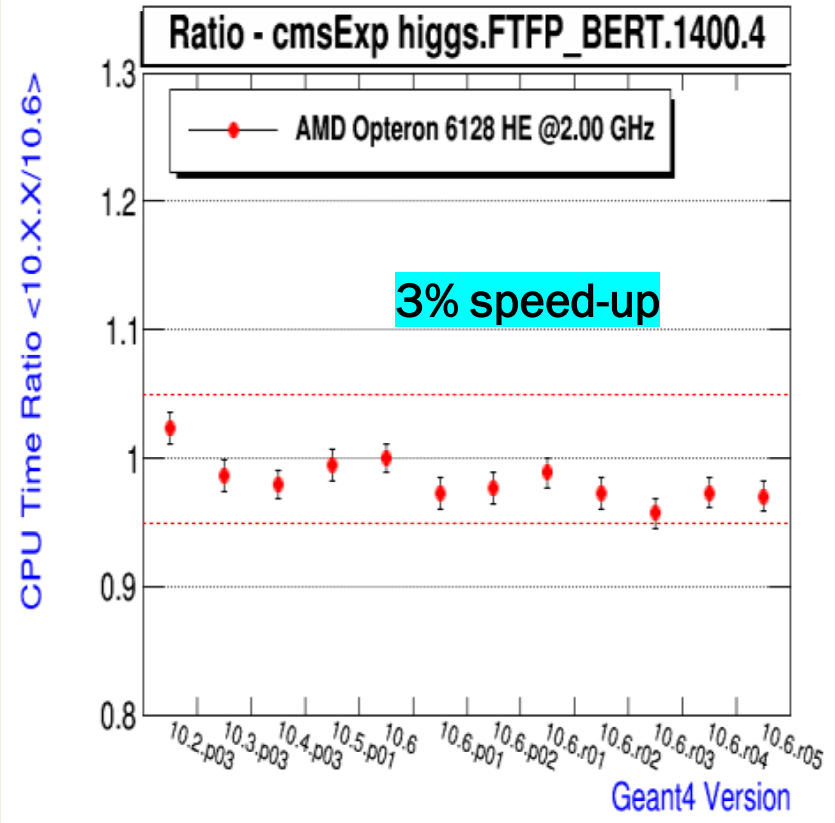
# Results of EM tests

- <https://test-geant4-tools.web.cern.ch/test-geant4-tools/emtesting/>

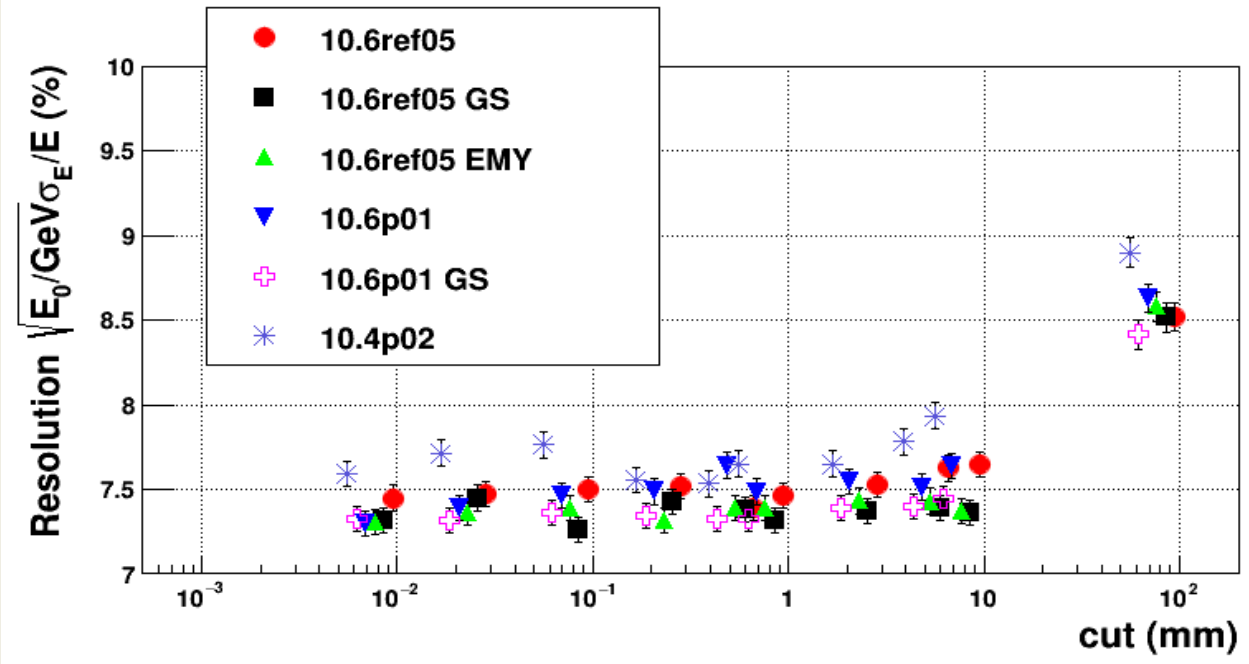
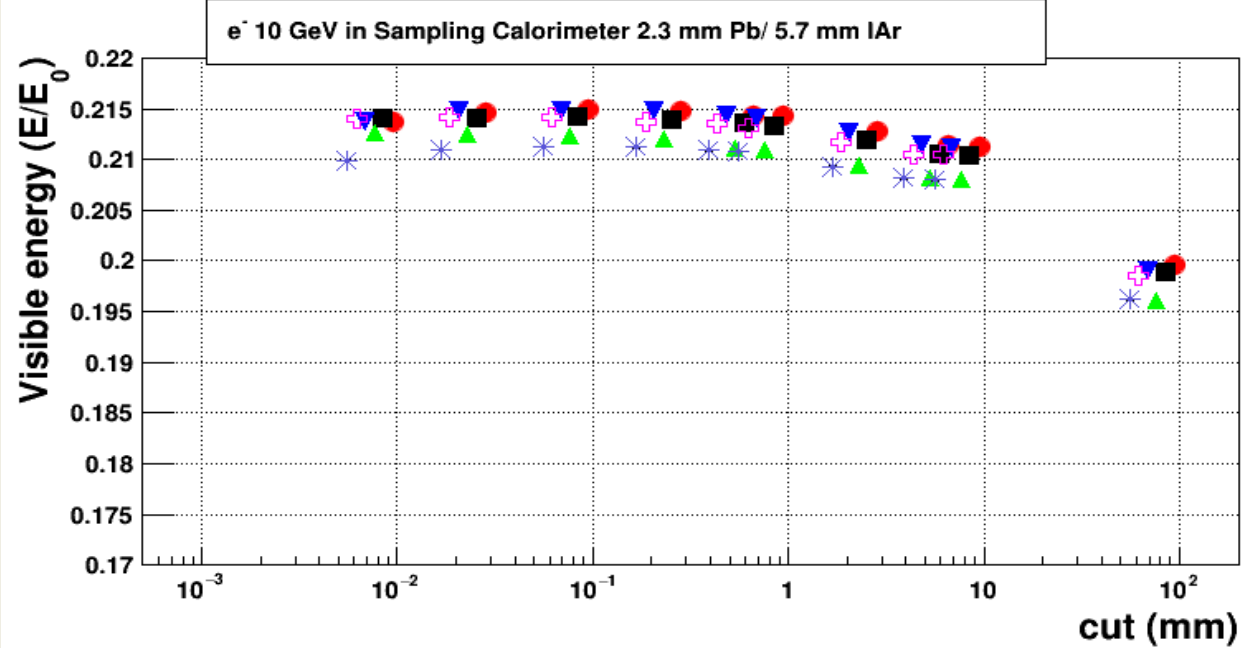
## SimplifiedCalo



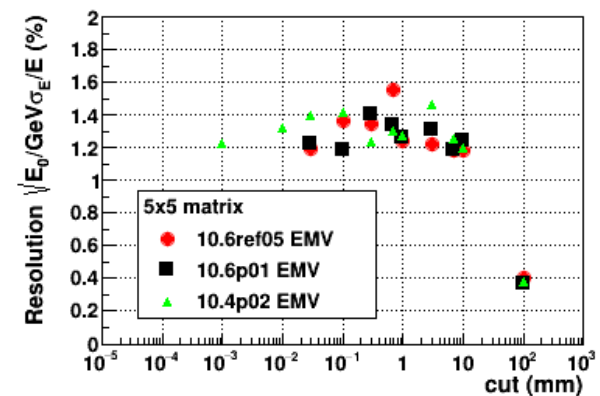
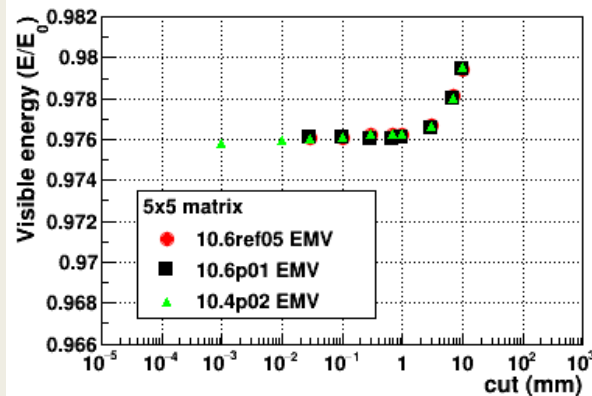
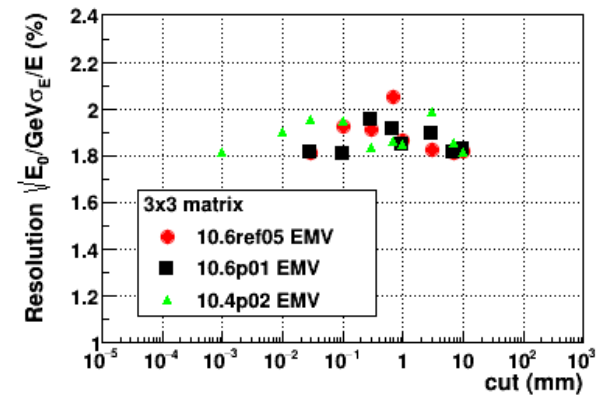
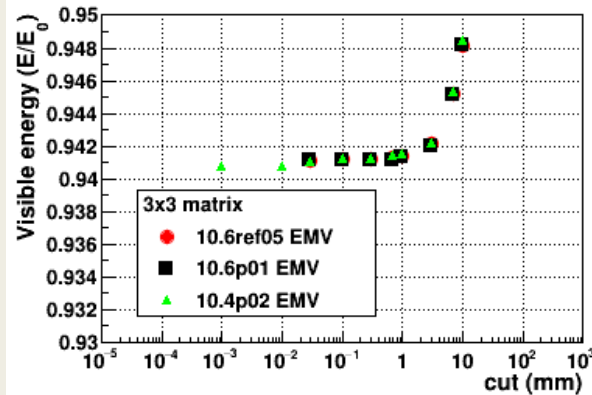
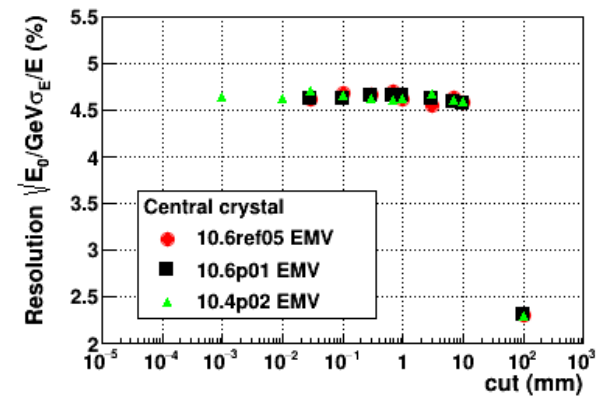
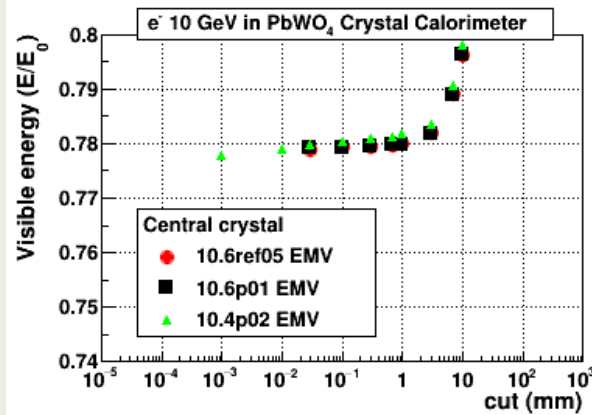
## CMS geometry



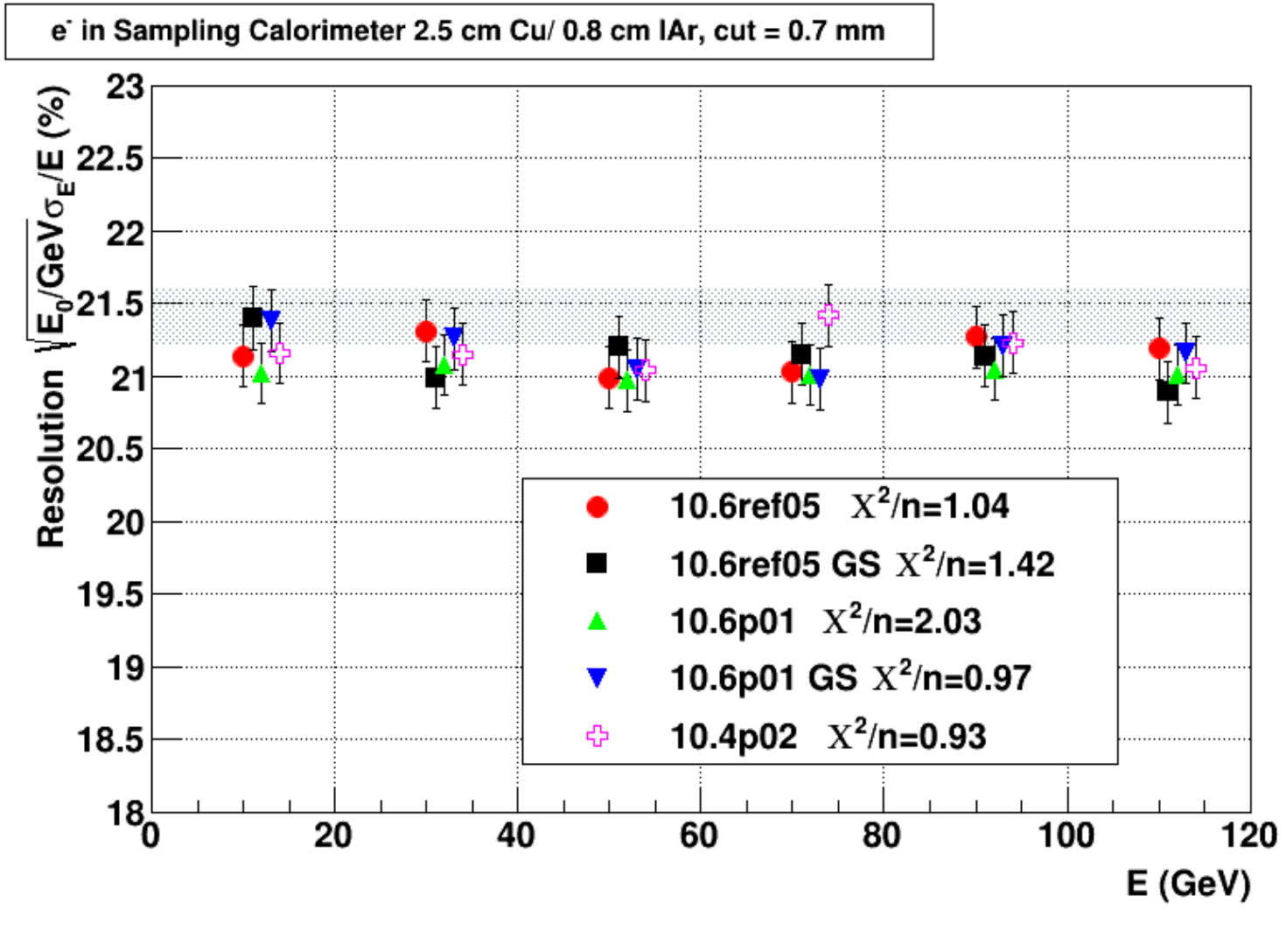
# Simplified ATLAS ECAL



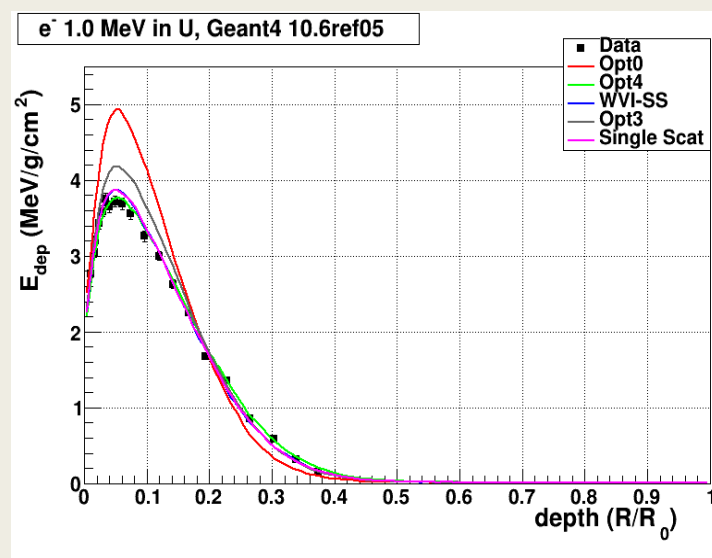
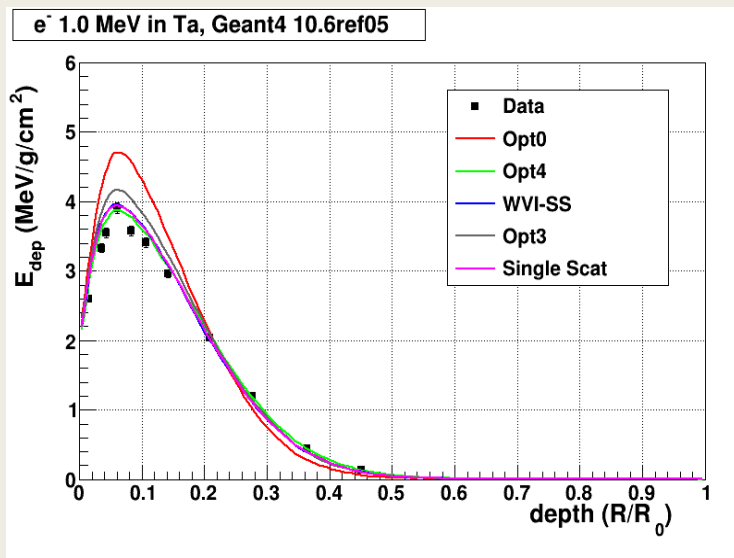
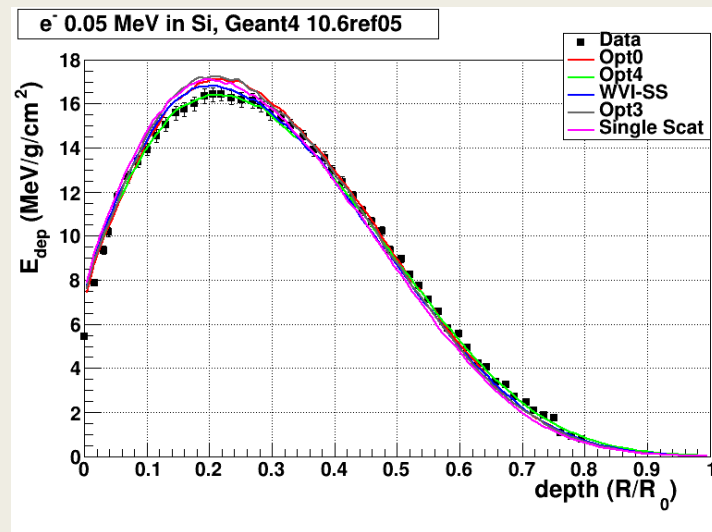
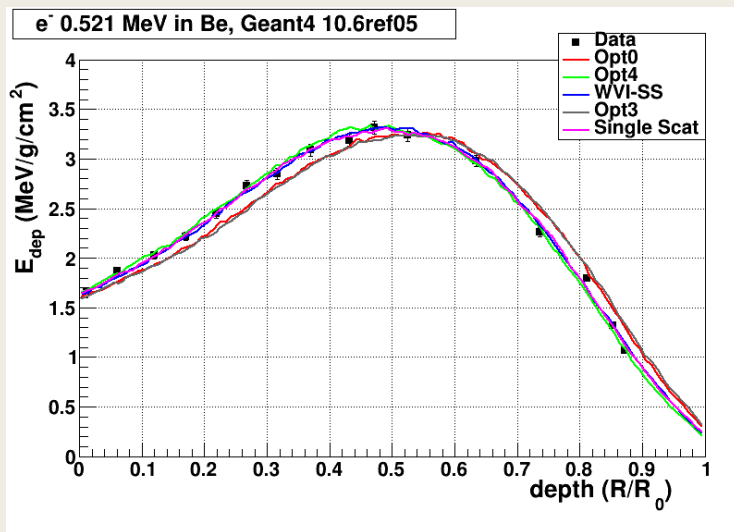
# Simplified CMS ECAL EMV EM Physics



# Simplified ATLAS HEC

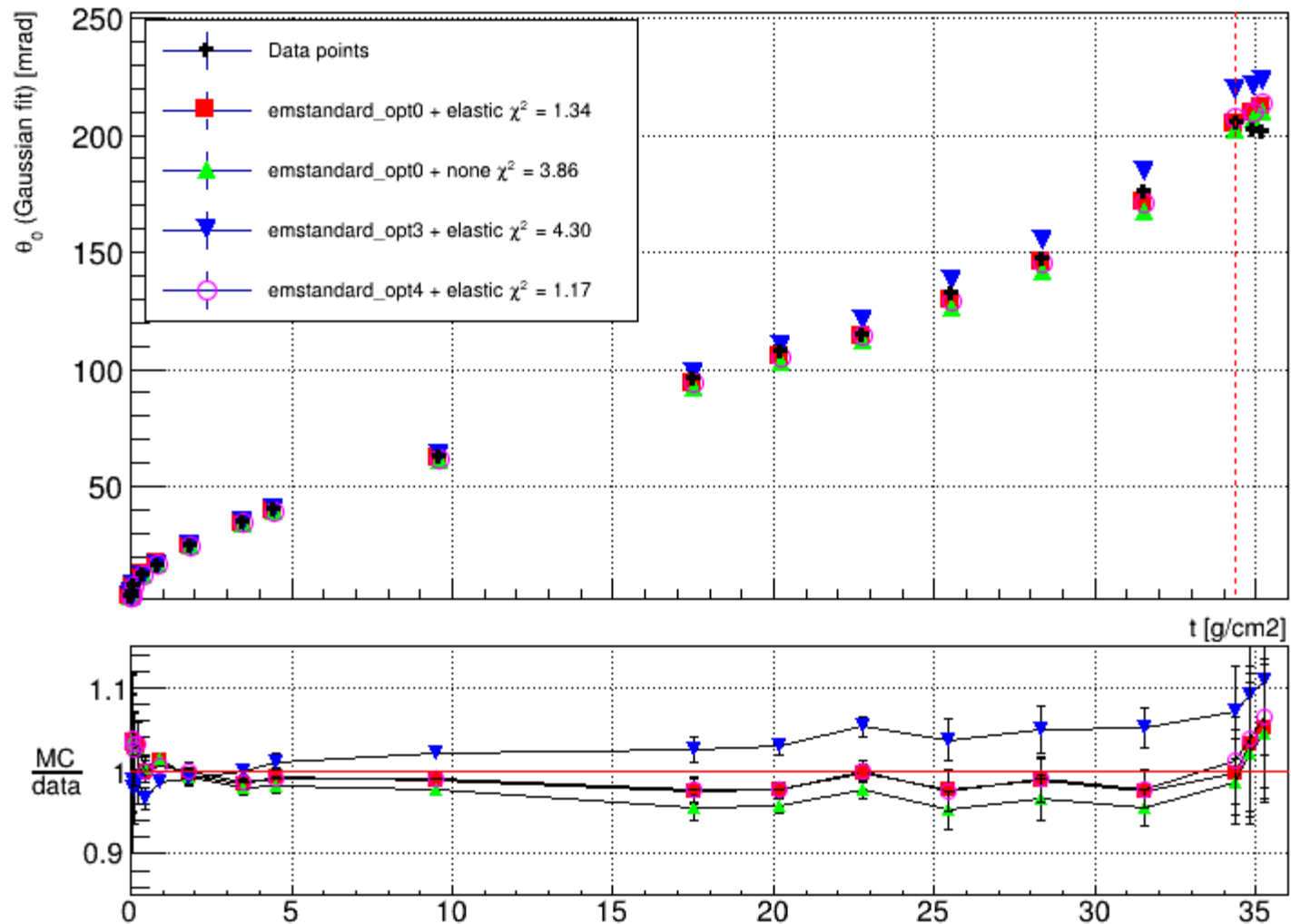


# Energy profile in semi-infinite media



# Proton scattering benchmark

## Charachteristic Angle Distribution for Lead





# Summary

- EM results for calorimeters similar 10.6
- Small CPU speed-up 3-5 % is due to code update
  - *Many classes cleaned-up*
  - *CPU is sensitive to Urban models parameterisations*
- Physics List update provoke MT non-reproducibility
  - *Let us continue investigation*