EM physics validation results for geant4-11-02-cand-01

V. Ivantchenko

CERN & Tomsk State University

26 November 2024

Fixes at last minute

- ## 2024-11-08 V.Ivanchenko (emstand-V11-02-21)
  - G4BraggModel - fixed problem of 4.12 MeV mu+ range reported in the Forum #12312.
- ## 2024-11-07 V.Ivanchenko (emstand-V11-02-20)
  - G4WentzelOKandVIxSection - Fixed rejection factor for sampling of single scattering with nuclear formfactor (Bugzilla problem report #2627) Fixed ion ionisation problem reported in the Forum #12885 and #13018
  - G4BetheBlochModel - set flags isIon and isAlpha at initialisation and not change in run time
  - G4ionIonisation - use G4BraggIonModel only for alpha and G4BraggModel for other ions in the default EM physics
- ## 2024-11-19 V.Ivanchenko (emstand-V11-02-22) -pending
  - G4eBremsstrahlungRelModel - reverted modifications introduced for handling of static data due to crash in CMS tests

FNAL Geant4 Profiling (J. Yarba)

Ratio - SimplifiedCalo higgs.FTFP_BERT.1400.4
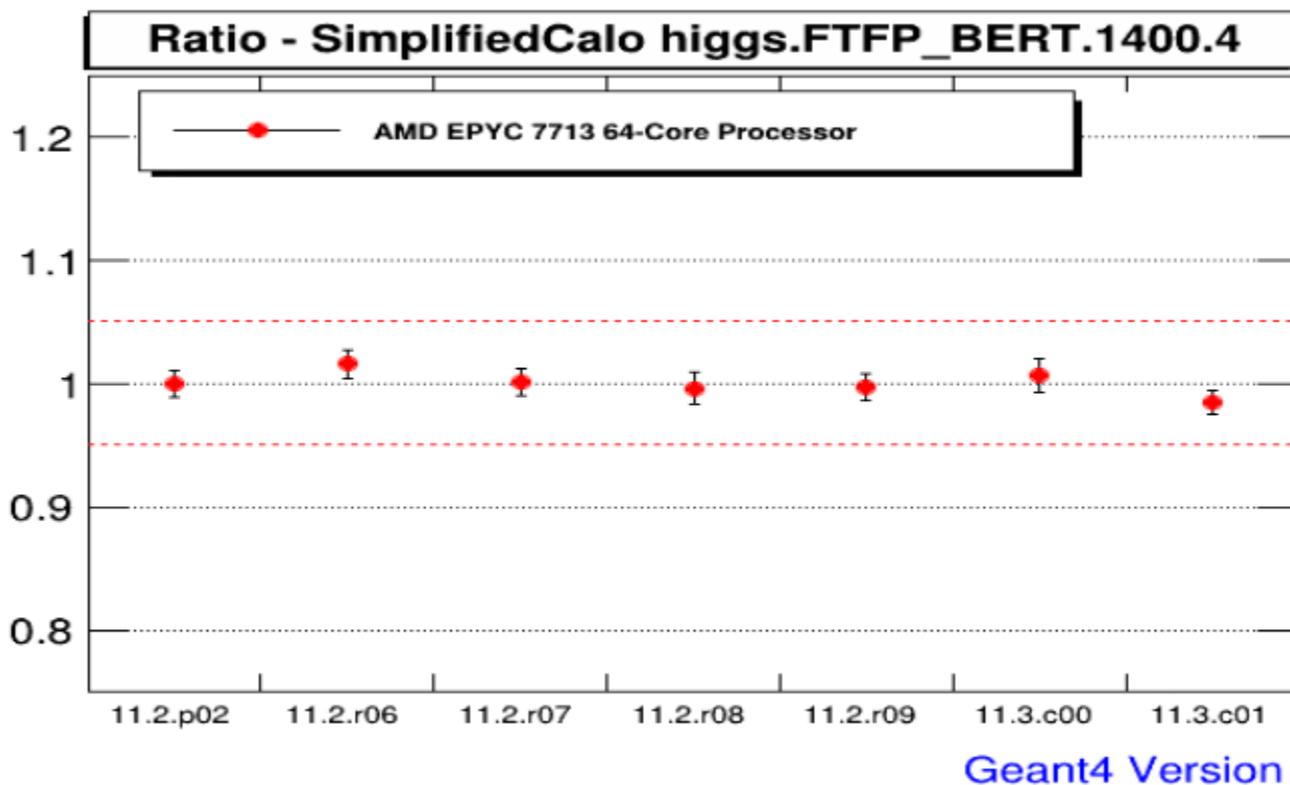
FNAL Geant4 Profiling (J. Yarba)
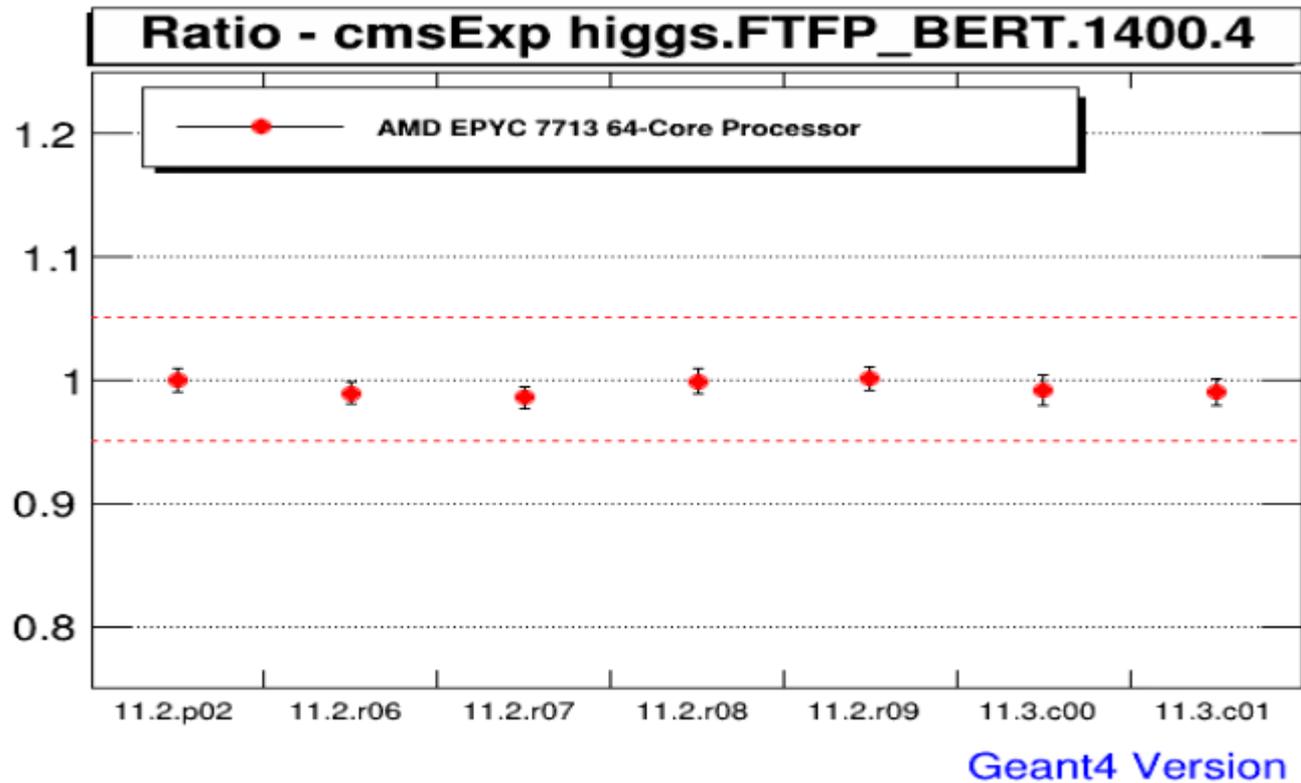
Simplified ATLAS barrel

e⁻ 10 GeV in Sampling Calorimeter 2.3 mm Pb/ 5.7 mm lAr

Legend:
- 11.3
- 11.3 EMY
- 11.2
- 11.1.2
- 10.7.4
- 10.6.3
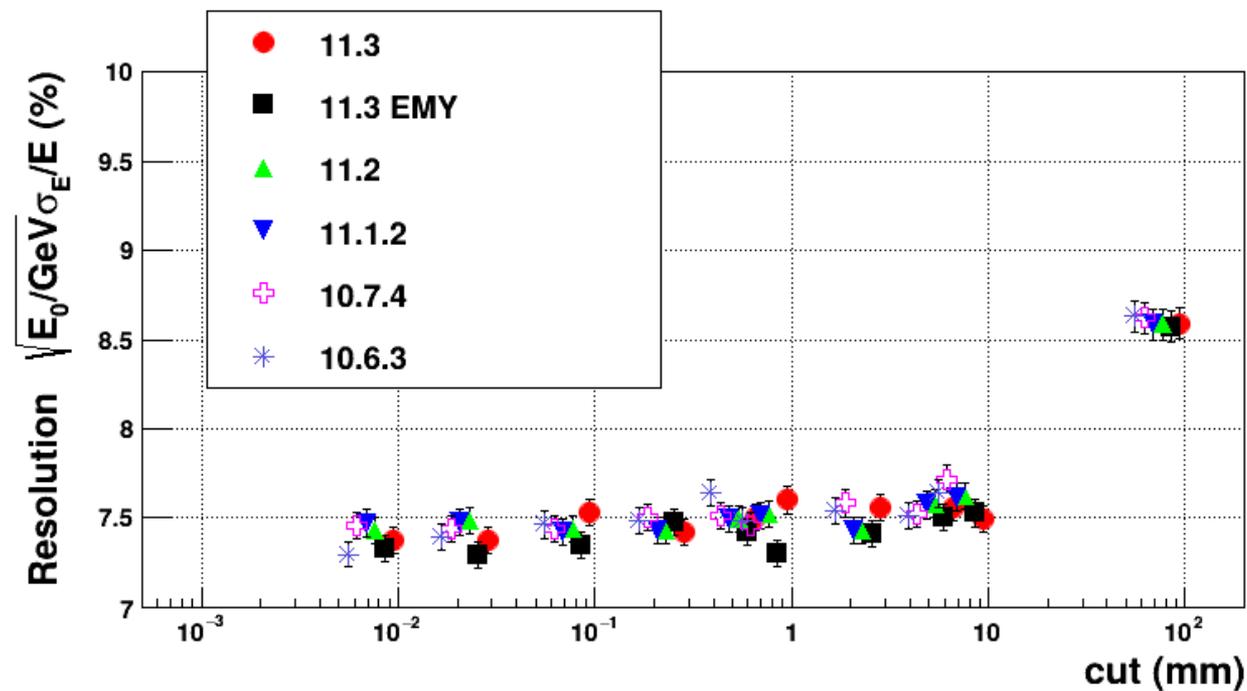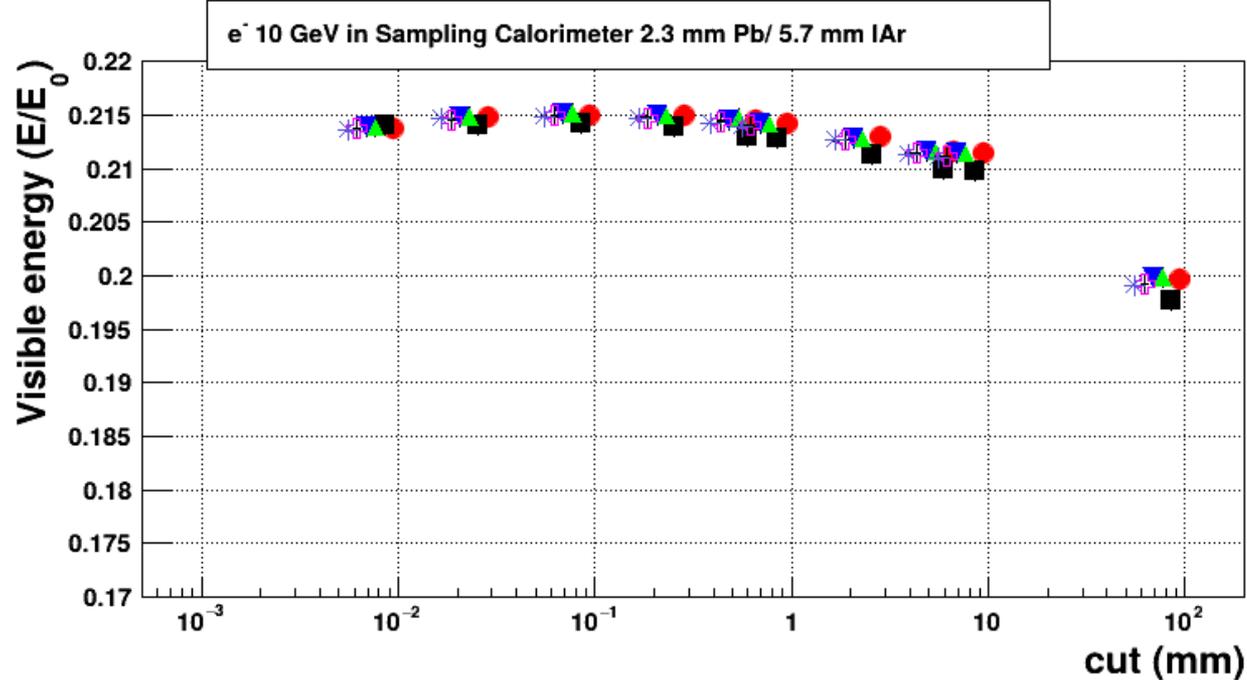
Simplified CMS barrel
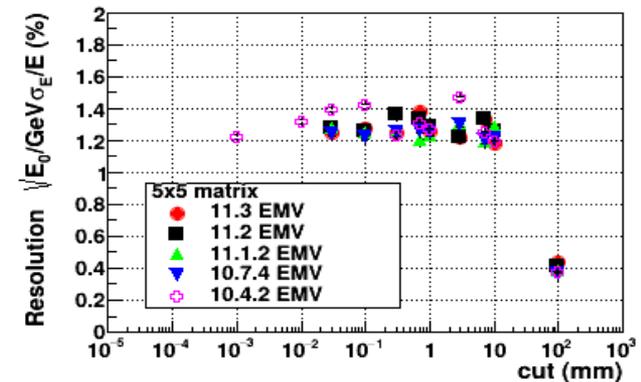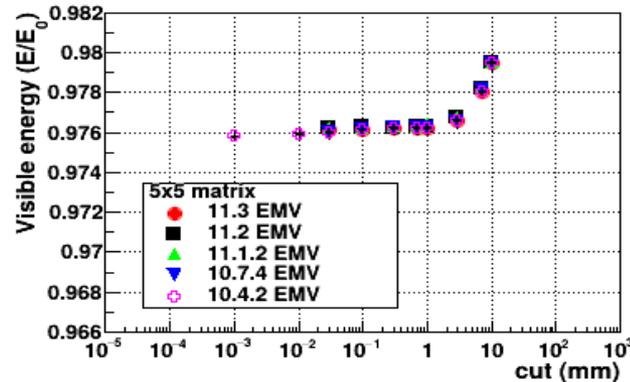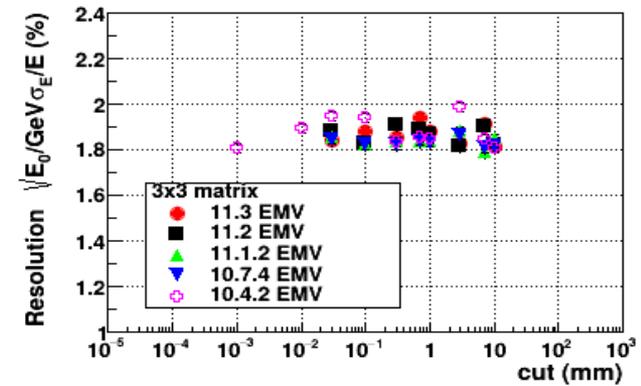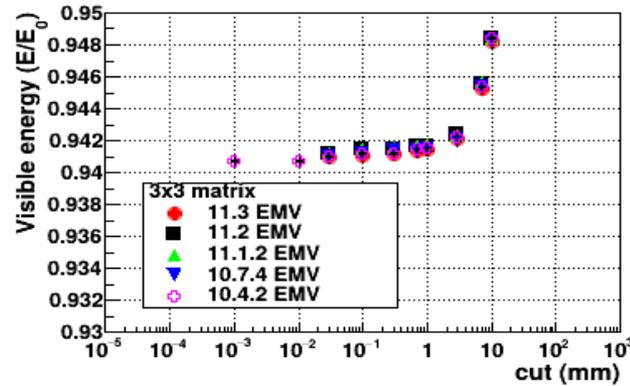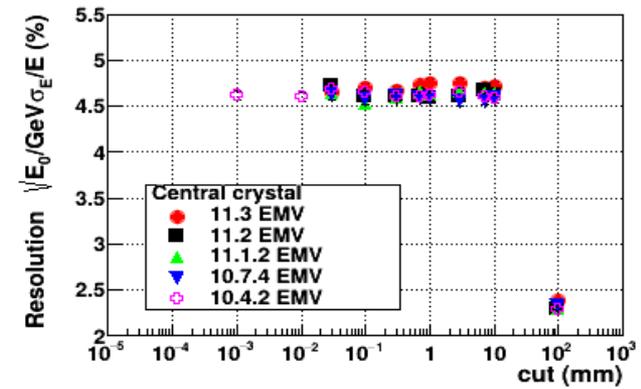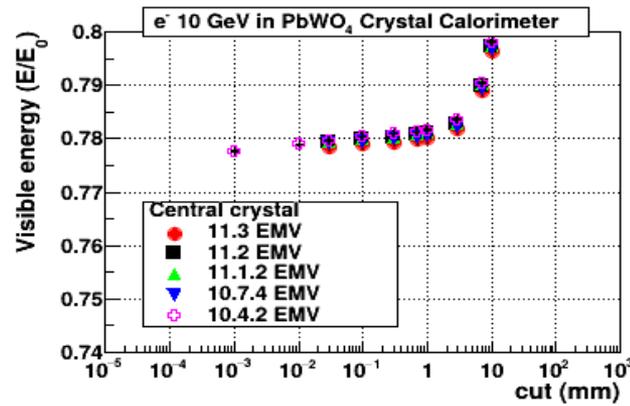
# Simplified HEC-ATLAS and LHCb
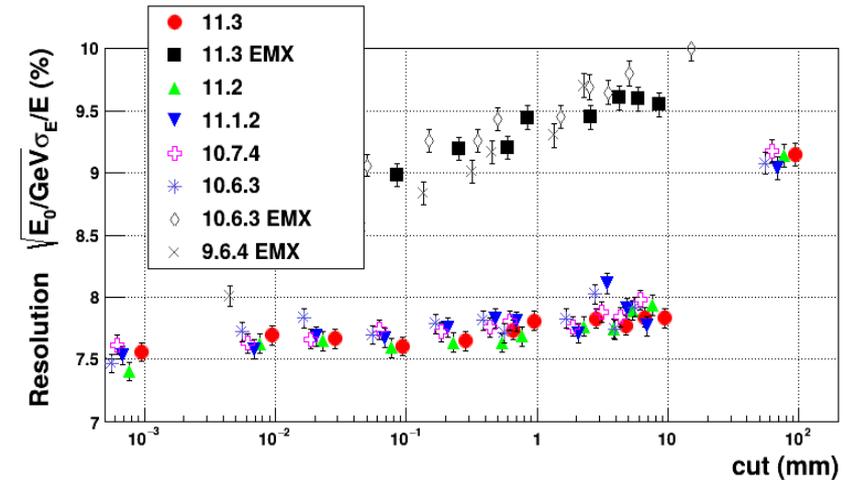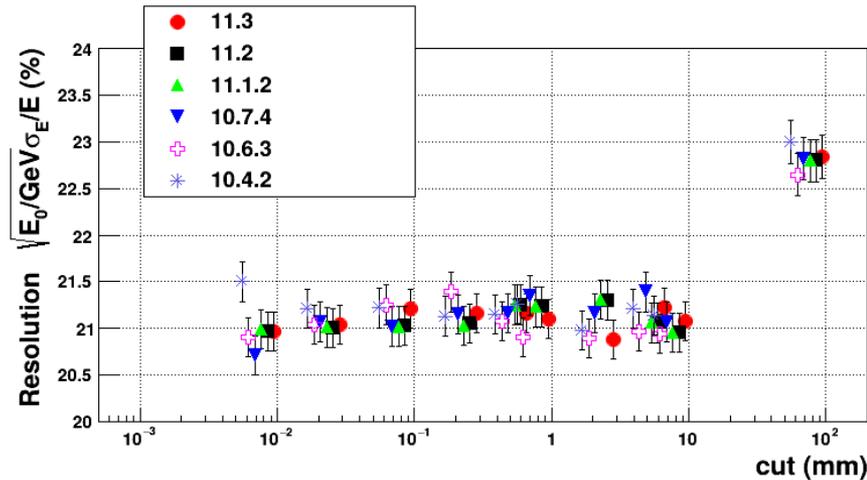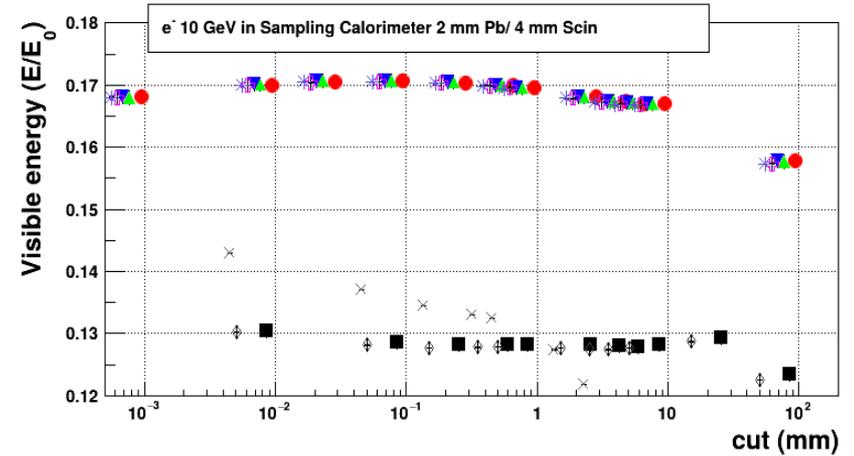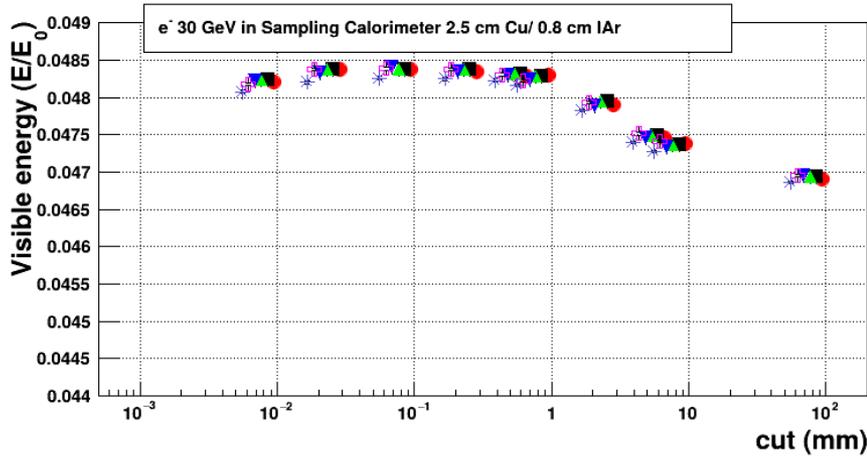
# Simplified ATLAS HEC calorimeter
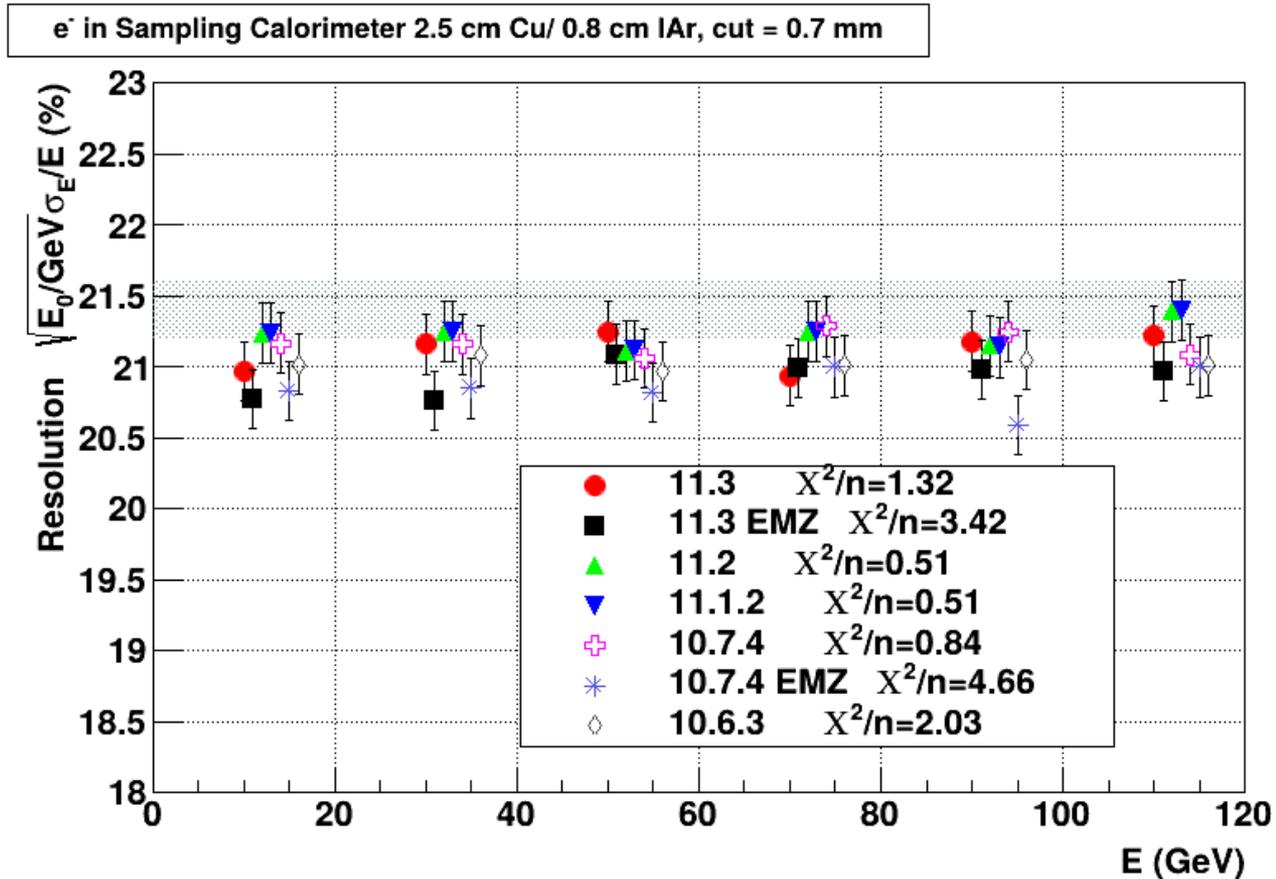
Energy profiles in various targets
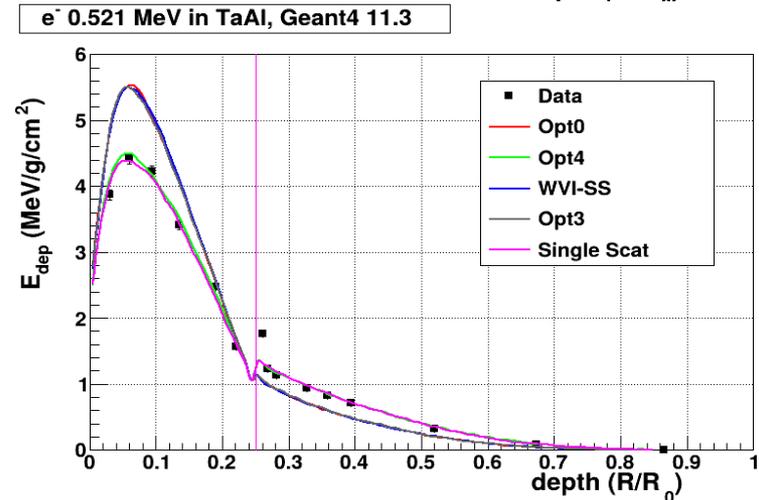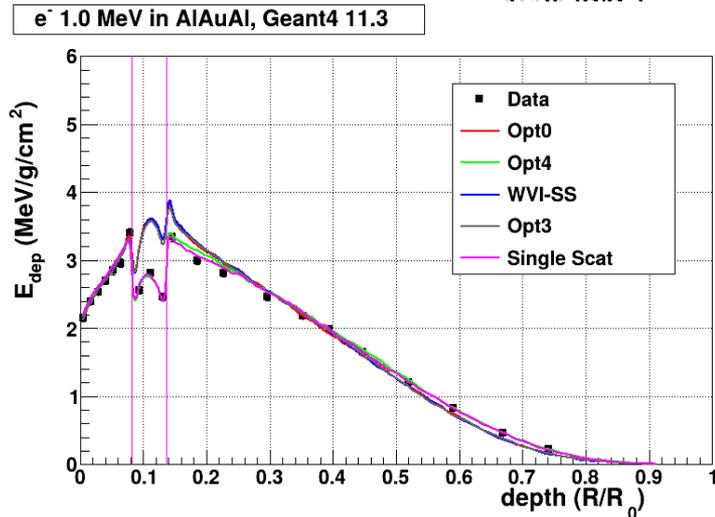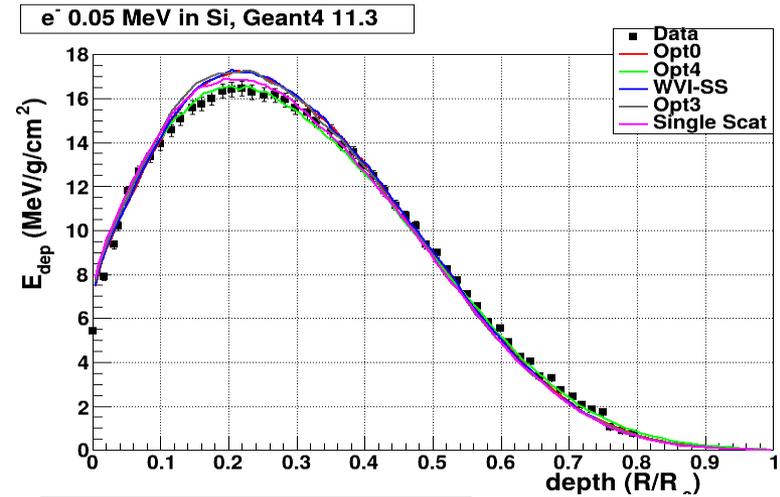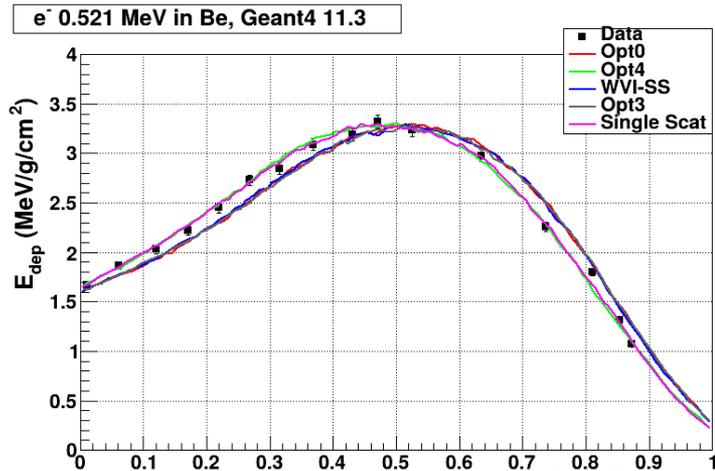
# Tests for Bragg peak and muon scattering


p 110 MeV in Water, Geant4 11.3
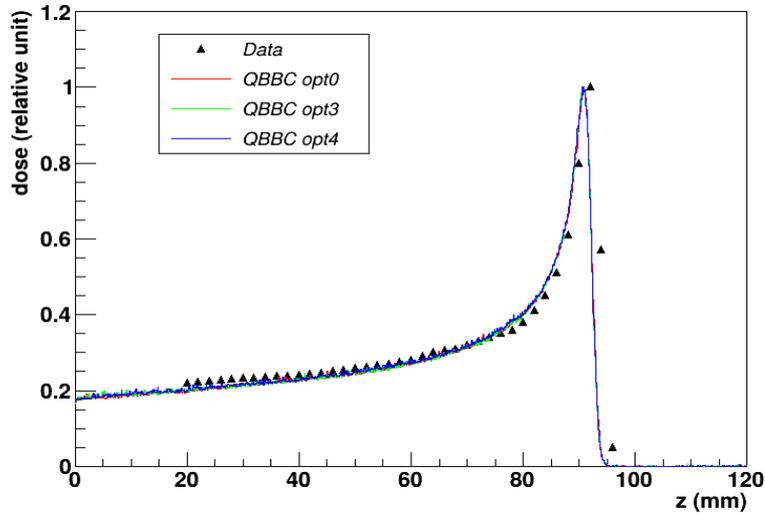
^{12}C 100 MeV/u in Water, Geant4 11.3
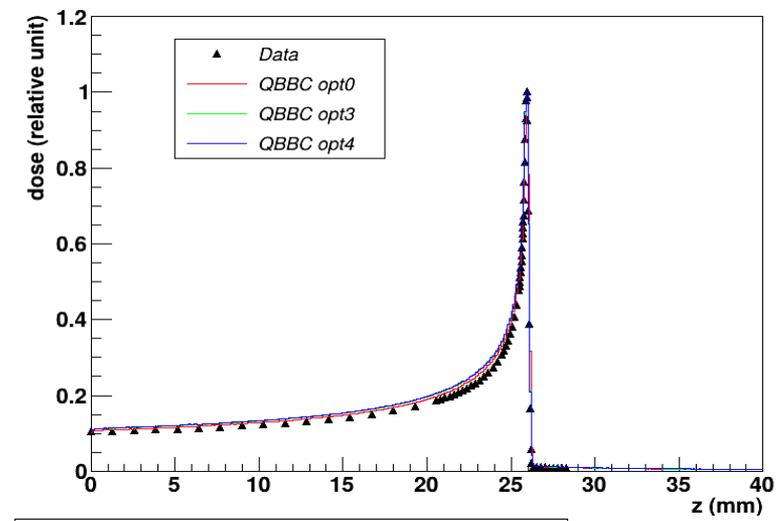
172 MeV/c muon scattering off Fe 0.24 mm, Geant4 11.3
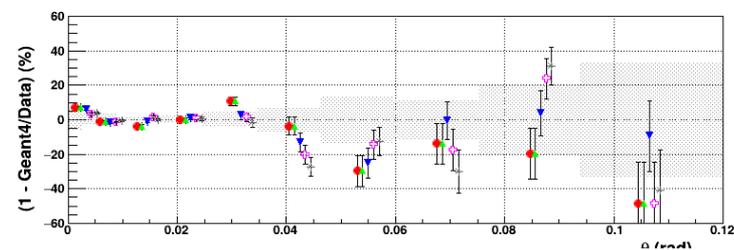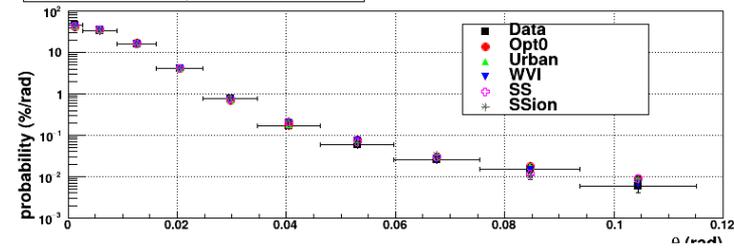
172 MeV/c muon scattering - MuScat, Geant4 11.3
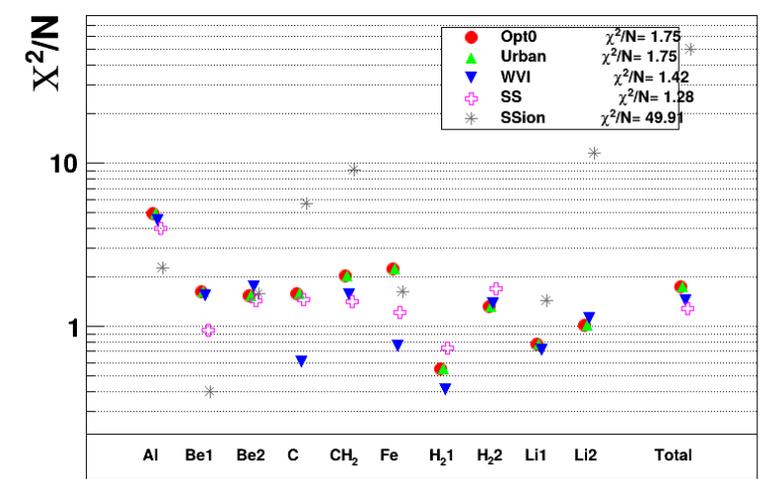
Test Results

- Testing results will be available:
  - https://ivanchenko.web.cern.ch/electromagnetic/
- EM results are stable since 11.1.X