



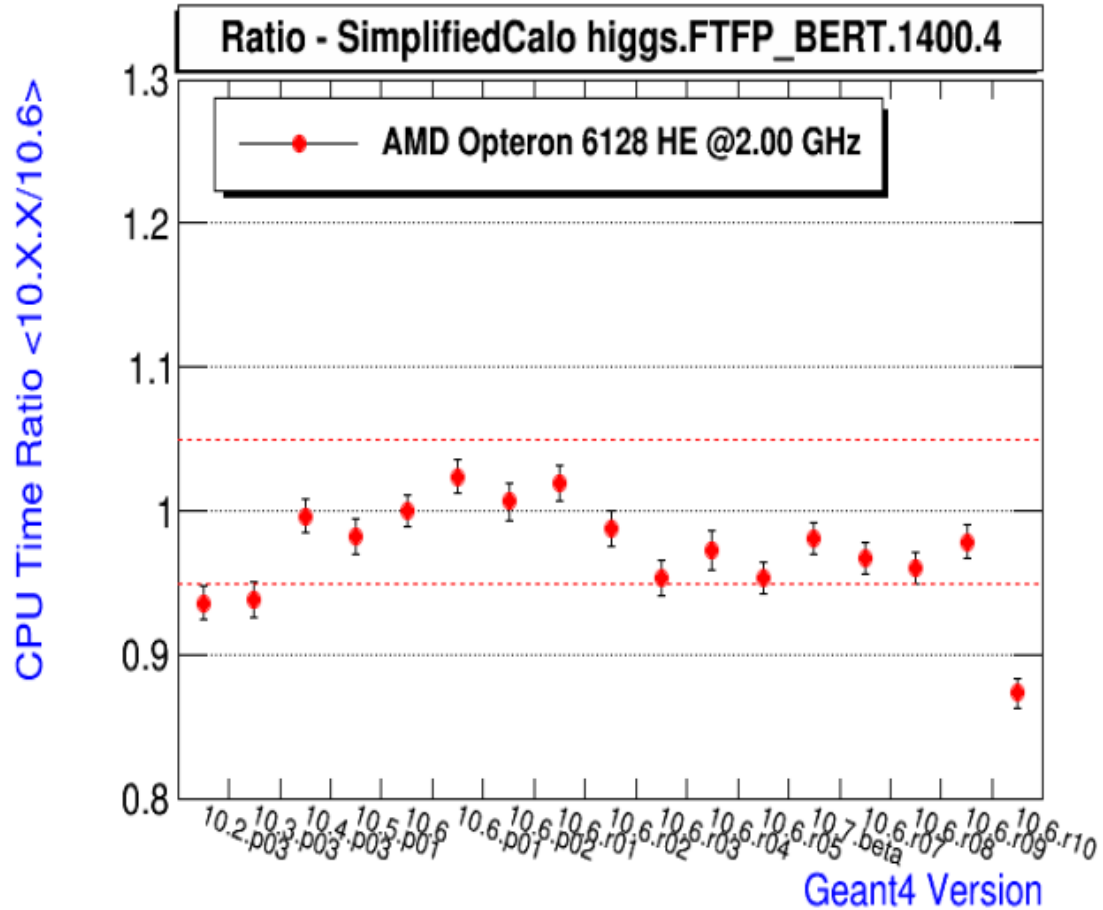
# EM VALIDATION RESULTS FOR GEANT4 10.6P03, 10.6REF10, 10.7CAND00

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# Modifications for 10.6ref10

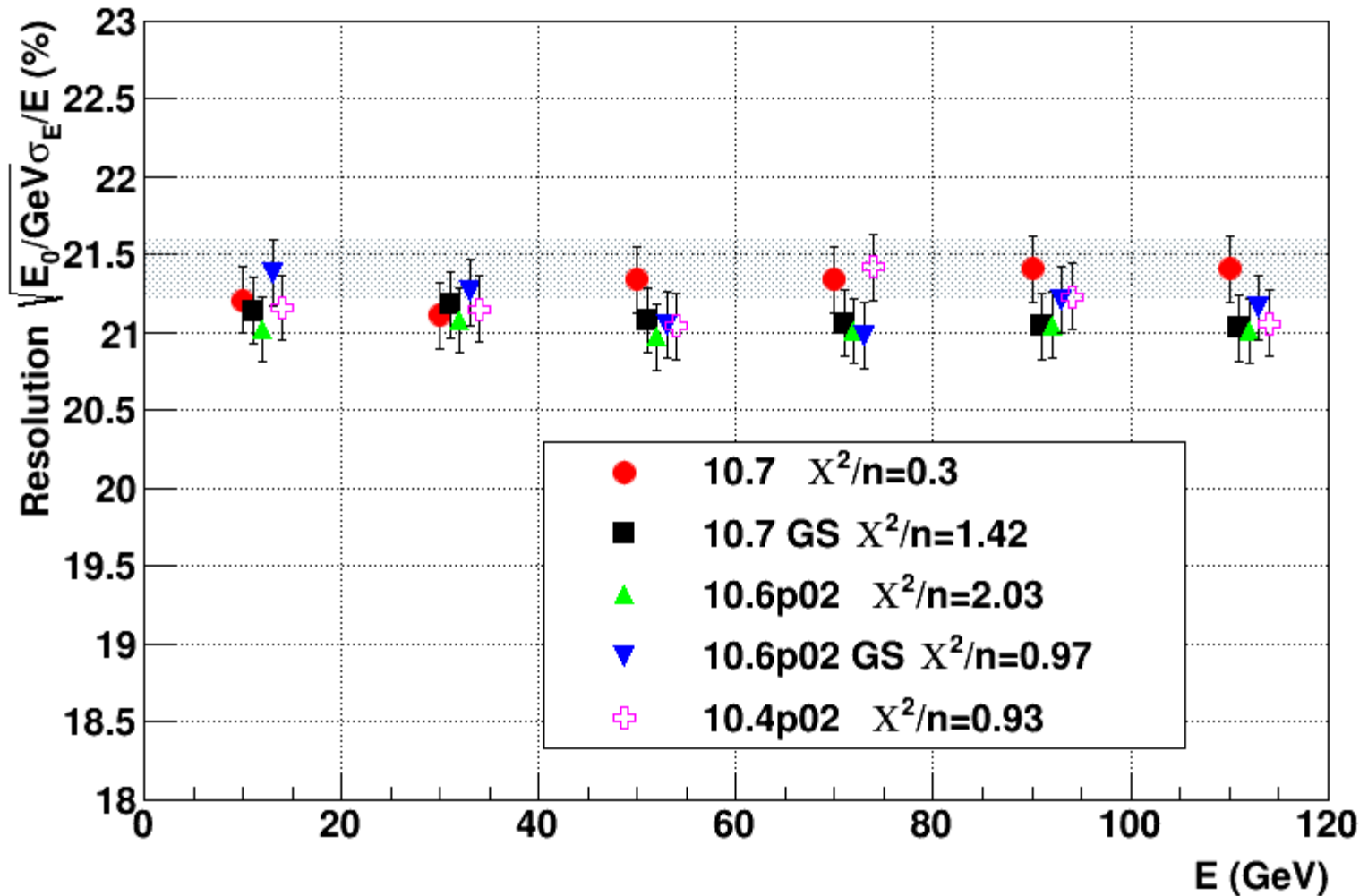
- **G4UrbanMscModel** – L. Urban tuned parameterization of limit on step size
- In 10.6ref10 there is a significant improvement of CPU, which is due to several independent contributions:
  - See <https://g4cpt.fnal.gov/>
  - *Polycone, Polyhedra, Atan2* ~5%
  - *Tracking in field/transportation* – 3 %
  - *Cross sections (G4NeutronCaptureXS, G4NeutronElasticXS)* – 4%
  - *No clear effect from Urban msc*
- Results of EM tests are available for 10.6p03, 10.6ref10, 10.7cand00
- <https://test-geant4-tools.web.cern.ch/test-geant4-tools/emtesting/>

# CPU effect for 10.6ref10

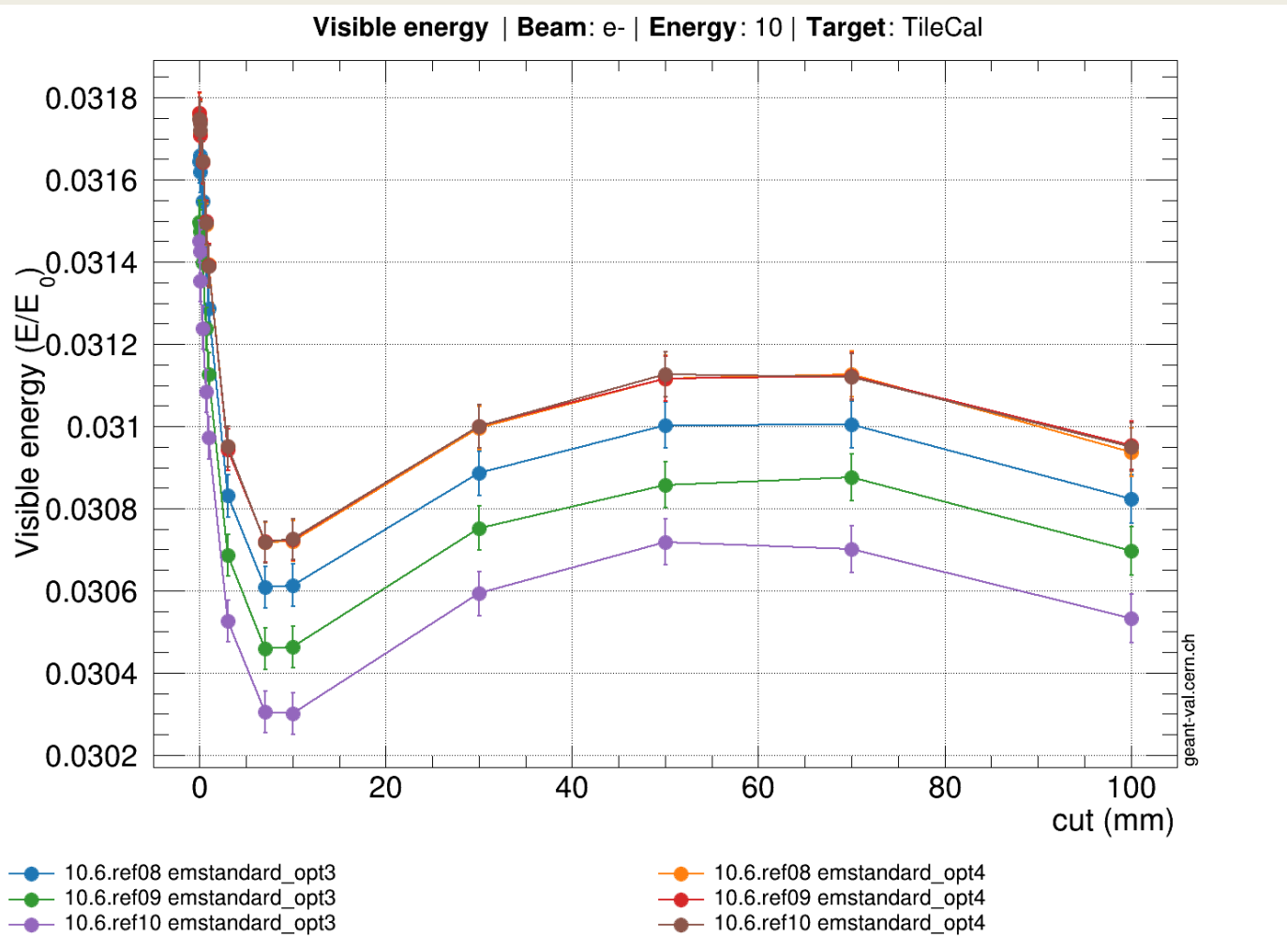


# Simplified ATLAS HEC

$e^-$  in Sampling Calorimeter 2.5 cm Cu/ 0.8 cm IAr, cut = 0.7 mm



# Geant-val result for simplified ATLAS - TileCal



# Summary

- CPU improvement in Geant4 10.7 is real
  - *Tracking in field*
  - *Geometry*
  - *Hadron cross section*
- UrbanMscModel parameterization update increase relative RMS/Mean for sampling calorimeters
  - *In calorimeters with low sampling fraction Mean is reduced*
- **Remaining question:** should we use Urban model from ref-08 or from ref-10