EM validation results for release 10.7ref02

V. Ivanchenko
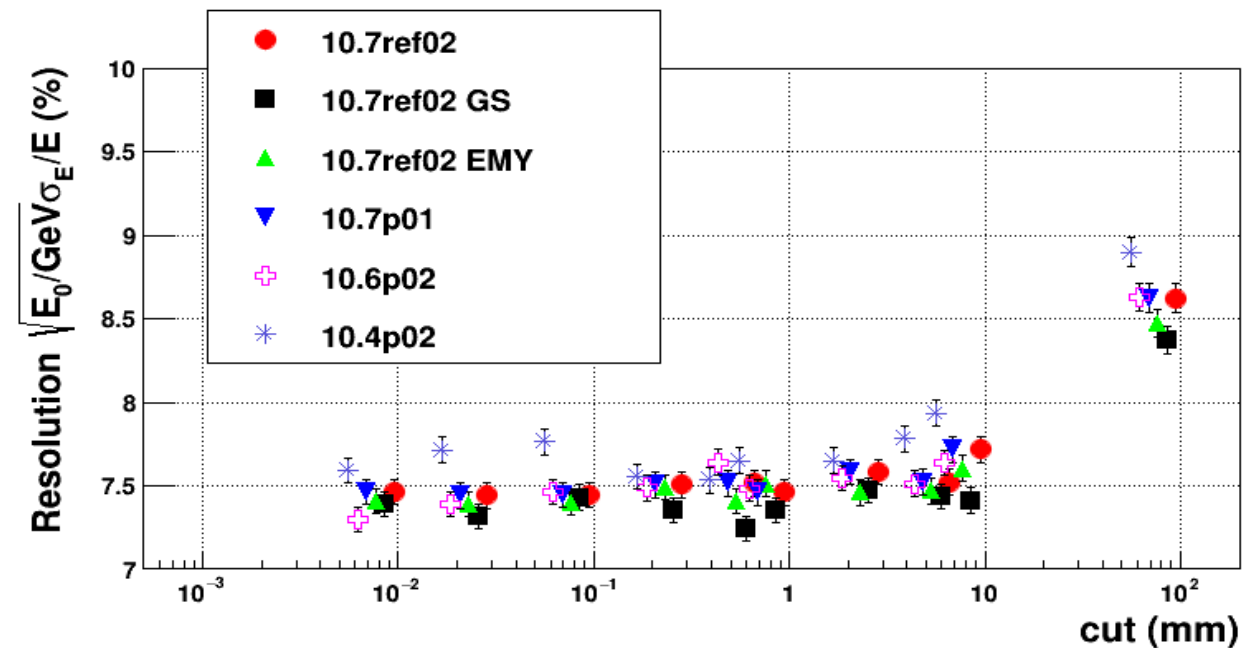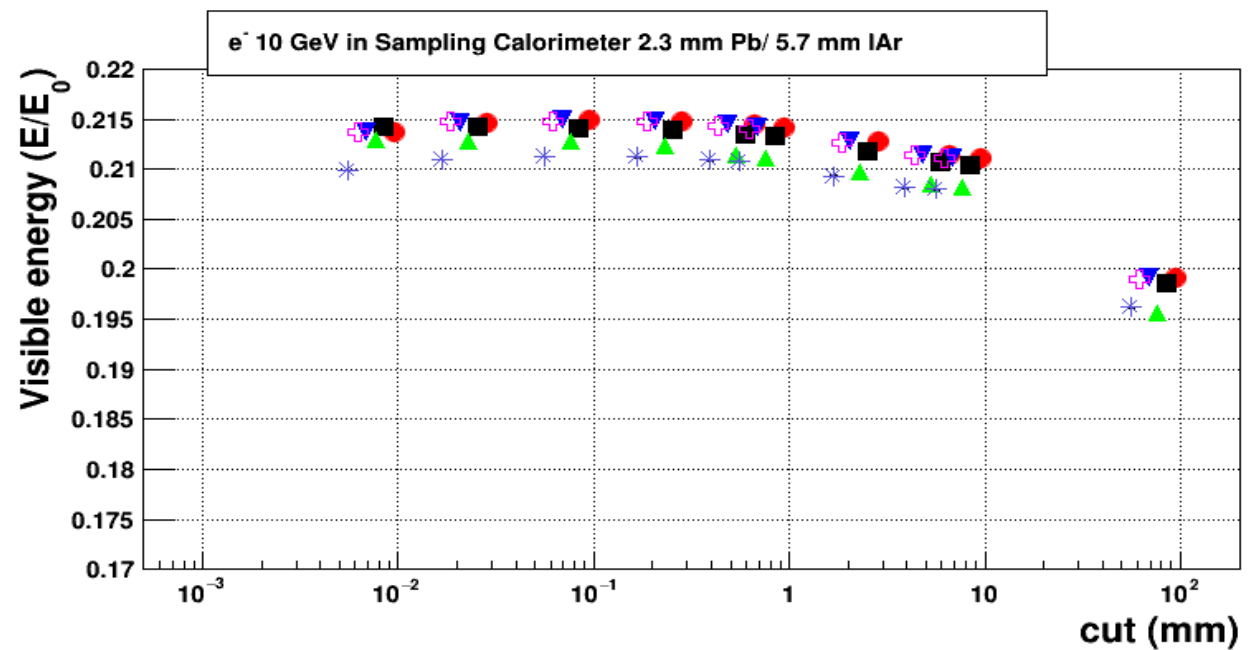
CERN & Tomsk State University

9 March 2021

Updates included into 10.7ref02

- General clean-up of EM libraries and examples for 11.0
  - Removal of obsolete classes and interfaces
  - Use C++11 keyword uniformly over EM sub-libraries
    - C++17 manual was not provided in time, so postponed
  - Use common formatting of all classes
  - The full list: https://docs.google.com/document/d/1-NAXYVI2SDfy_Gk9XldcFR-AGQpmi2C2O0JlXhE1f1s/edit

- Work started Feb,8
  - Soon we have realized that many examples/tests are using obsolete EM physics interfaces
  - When examples/tests were updated, we also include G4RunManagerFactory
  - We also use G4FreePhysicsVector instead of other free vectors and updated constructors of G4PhysicsVector with the spline flag defined in the class constructor
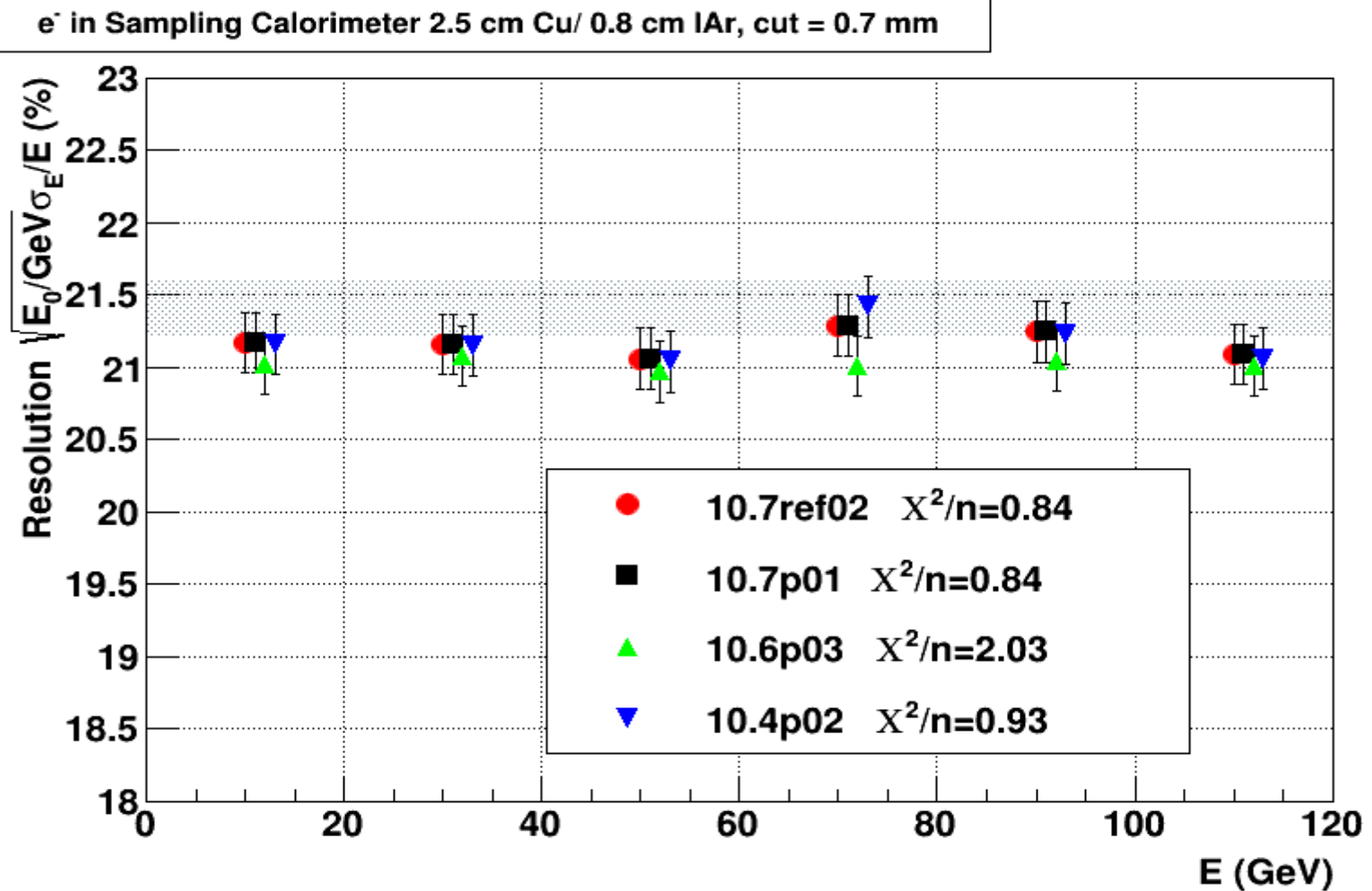
Test Results

- For today more than 50% of the work is done
  - month of efforts S. Guatelli, V.Ivantchenko, M. Maire, M. Novak, L.Pandola, D. Sawkey
  - About 30 MRs to EM, optical, materials, and physics_lists sub-libraries; also, to examples and tests

- Testing results are available:
  - https://test-geant4-tools.web.cern.ch/test-geant4-tools/emtesting/
  - No visible change compare to 10.7ref01
  - Some tests are not fully completed, because scripts also need some modifications
    - We cannot exclude new bugs introduced during transition

- General goal of this campain – to be better prepared for major release and future toolkit evolutions
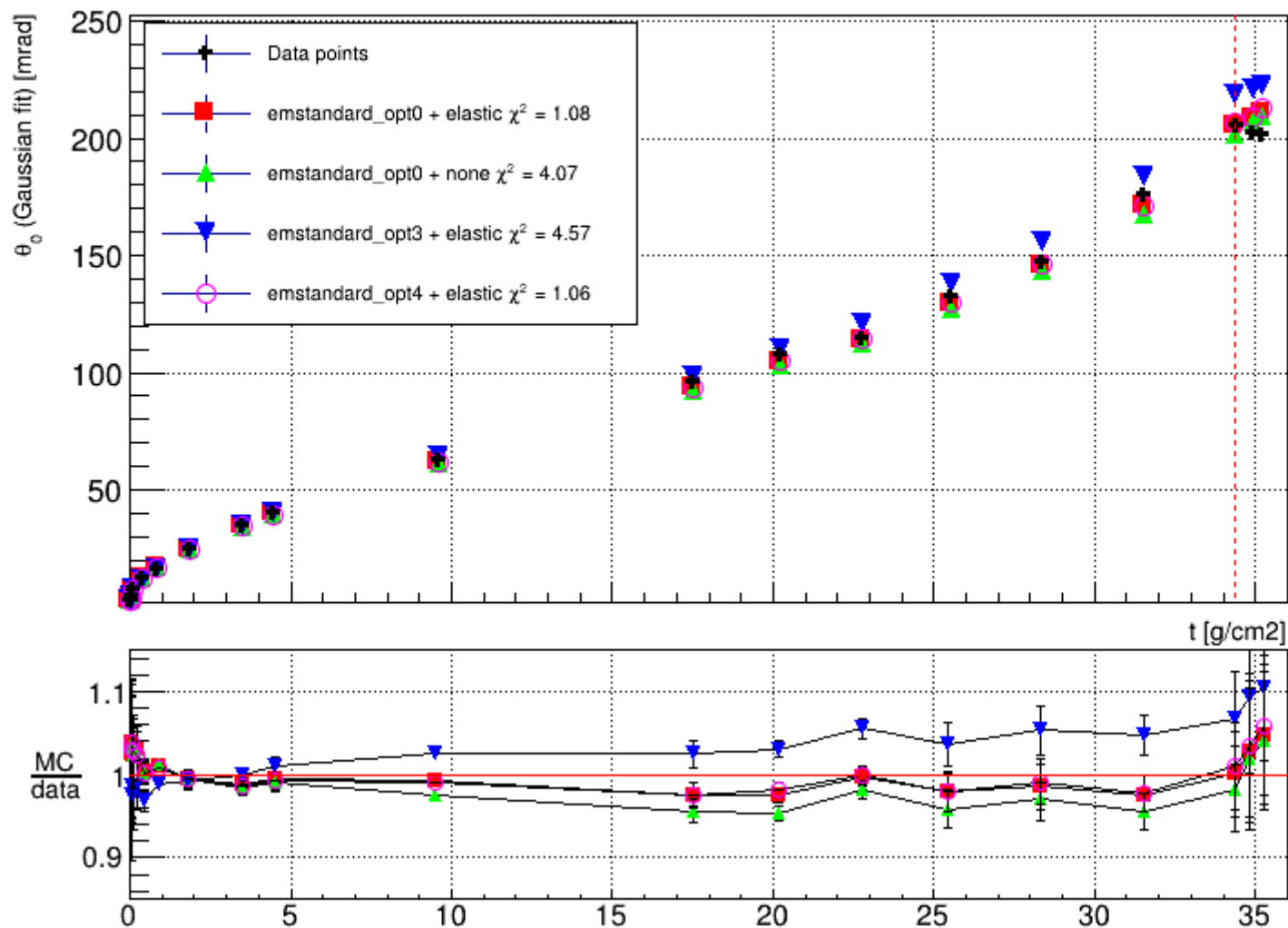
Simplified ATLAS Barrel

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

Legend:
- 10.7ref02
- 10.7ref02 GS
- 10.7ref02 EMY
- 10.7p01
- 10.6p02
- 10.4p02

Simpified ATLAS HEC

e⁻ in Sampling Calorimeter 2.5 cm Cu/ 0.8 cm IAr, cut = 0.7 mm

Proton scattering in Lead

Charachteristic Angle Distribution for Lead

Electron scattering off the Gold target

15.7 MeV e- scattering off Au 9.66 um, Geant4 10.7ref02