Problems in Geant4 EM physics

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Outline

❖ List of Bugzilla opened bug reports

❖ List of issues and problems

❖ Incomplete developments for 11.3

Pending Bugzilla bug reports for EM physics

❖ **2627** Wrong formula for single scattering rejection coefficient?

❖ **2605** Urban multiple scattering model of ions forms a ring structure

❖ **2585** Incorrect ATIMA energy loss in compound materials

❖ **2580** Ion fluctuation model abruptly changes above 10*Z*A MeV

❖ **2524** Ionization cross section disappeared

❖ **2368** Issue with reproducibility

Pending issues in examples tests

❖ **Git Issue 196** zmumu test failed from time to time at Windows with MTmax

  ❖ *may be test itself or Geant4e propagator problem*

❖ **TestEmX** to check if UI commands are consistent with README and common-sense considerations

  ❖ *There was bug report 2626 on TestEm3 which raise a long discussion*

  ❖ *It is needed to verify update of geometry in interactive sessions*

  ❖*There is a problem in TestEm5 – model ID for fluorescence and Auger production is lost (?!) in recent releases*

  ❖*Address code guidelines to EM examples*

Pending issues in the Forum

❖ **12562** Different energy deposition for Opt0/Opt4/SS

❖ **13018** A large difference in energy loss of heavy ions between 10.7 and 11.2

Urban multiple scattering model problems

❖ The problem was identified in medical benchmark tests with EMY (Opt3) EM physics

   ❖ *Multiple scattering benchmark*

   ❖ *eFLASH* advanced example

❖ The problem was introduced in 11.0 and fixed in 11.2.1 – msc parameters rolled back to previous values in 11.0

   ❖*RangeFactor* from *0.03* to *0.04*

   ❖*Step limit option changed from* *UseSafetyPlus* *to* *UseDistanceToBoundary*

❖ Bugzilla problem report #2605 for ion multiple scattering at the first step of an ion inside the target

   ❖*Laszlo propose the fix /process/msc/MuHadLateralDisplacement true*

   ❖*Can somebody to take time and study bug report?*

❖ Laszlo proposed improved version of the Urban msc model mainly improving backscattering

   ❖*It would be good to test eFlash and other tests related to multiple scattering*
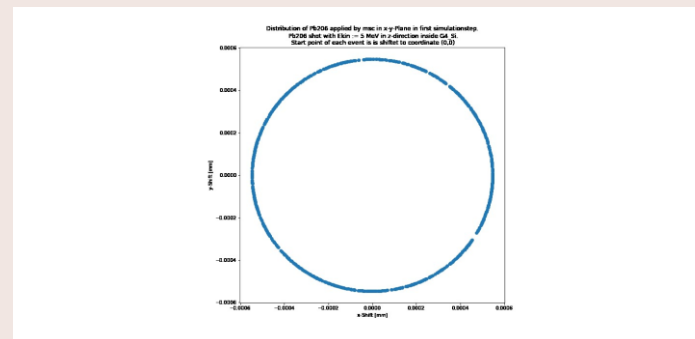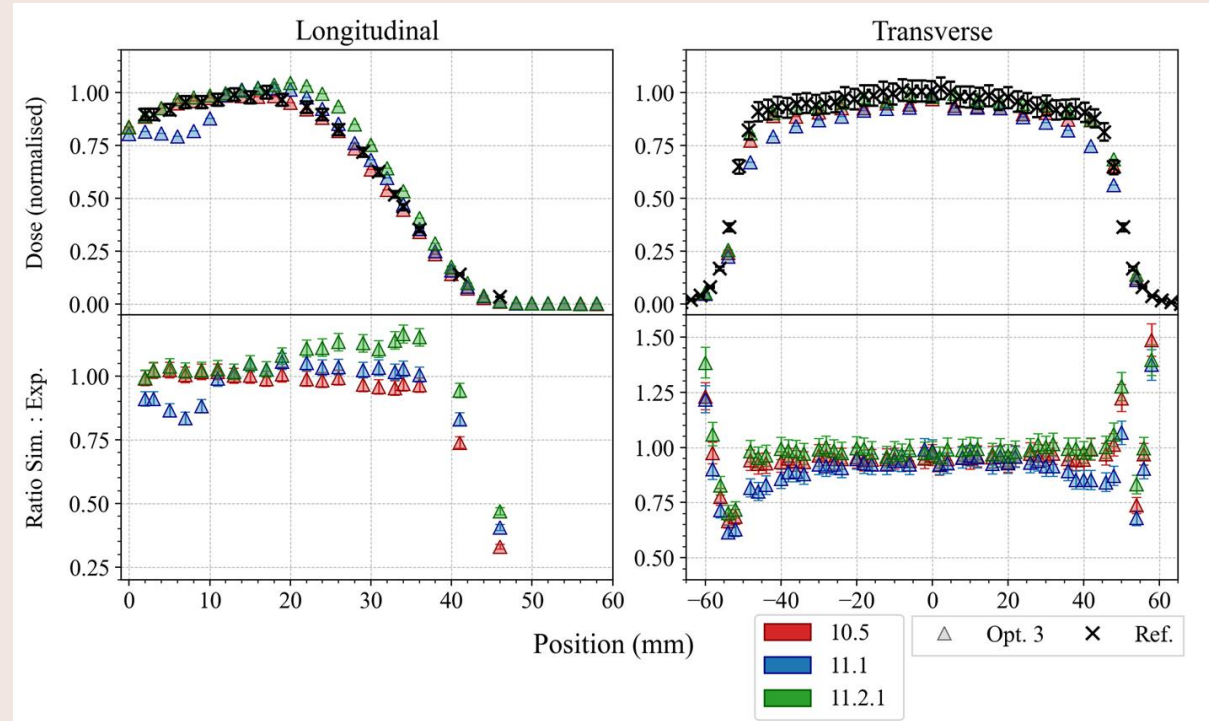
Penelope bremsstrahlung problem

❖ X-Ray radiotherapy test indicate problem in Penelope bremsstrahlung
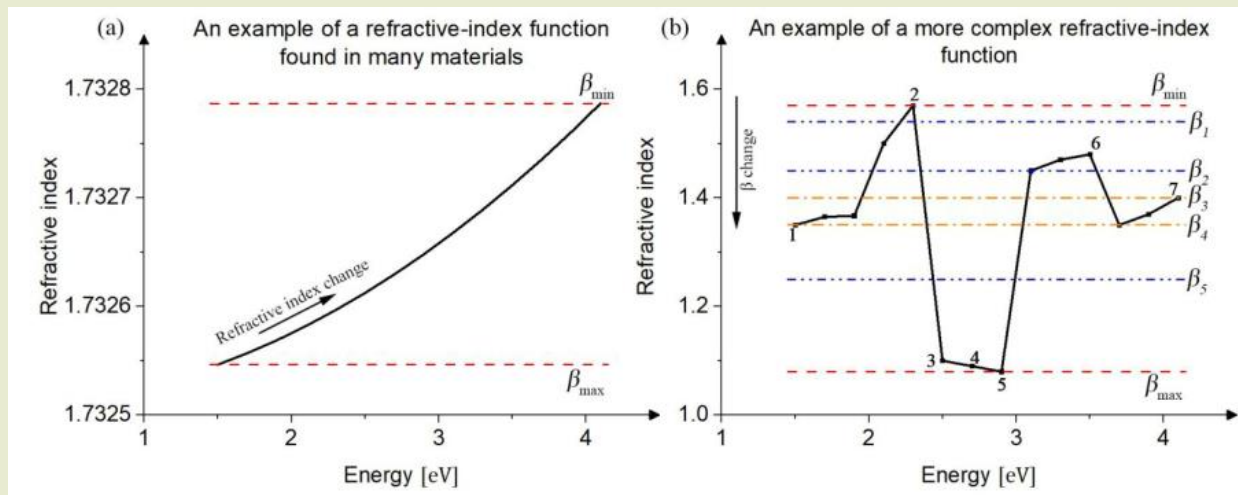
❖*Needs to be investigated*
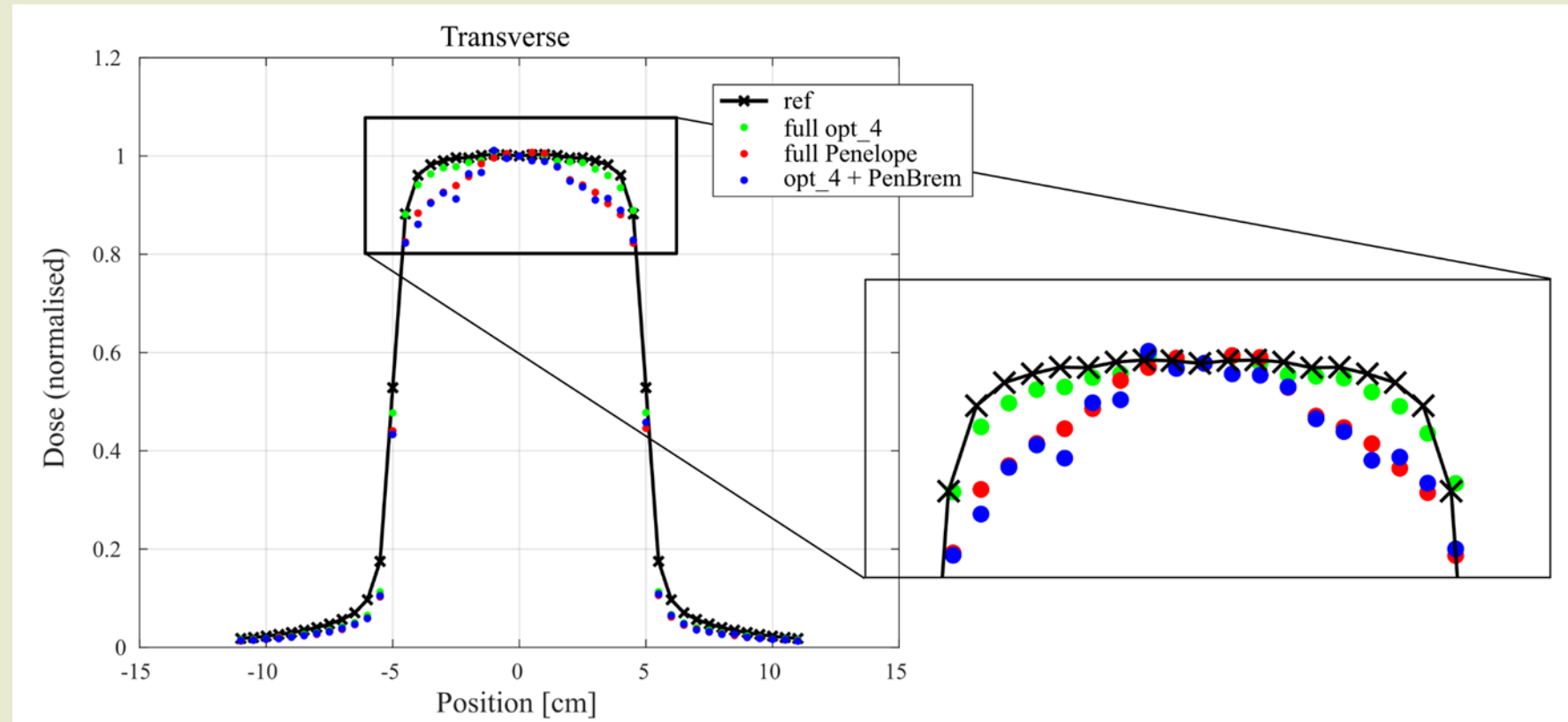
A new Cerenkov process

On the rework and development of new Geant4 Cherenkov models

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* A new publication on Cerenkov process in NIM A

* Demonstrated that in some circumstances Geant4 default is inaccurate

* Proposal of an alternative process ~10 c++ files

* We should integrate this process to Geant4

  ❖ *request was made by user in summer*