GEANT4 9.5.p01 release

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Outline

- Overview of fixes included in release 9.5.p01

- *Release notes for 9.5:*
  - ***http://cern.ch/geant4/support/ReleaseNotes4.9.5.html***
- *Release notes for patch 9.5.p01:*
  - ***http://cern.ch/geant4/support/Patch4.9.5-1.txt***

Geometry

- Added protections to avoid cases of division by zero in standard field equation of motion
- Corrected threshold in **`G4PropagatorInField`** for zero steps in field
- Fix for clashing computation of normals when using parallel navigation
- Fix to **`G4EllipticalCone`** in **`DistanceToIn(p,v)`** to exclude imaginary solution when distance is calculated

Persistency

ASCII

- Correction for treatment of **`G4TessellatedSolid`** vertex type
  - Problem report #1270

GDML

- Corrected initialization of material properties in reader

Electromagnetic physics

- Protection against big scattering angles for e+- (E > 20 MeV) in **`G4UrbanMscModel92/93/95`** (ATLAS report)
  - Cuts the tail of scattering angles to avoid artificial scattering of high energy e+-
  - In the case of E > 1 GeV and cosTheta<0 a warning is now printed out
- Fixed sampling at small steps (below 10 um) in heavy media about shift in range of 3 MeV muons in **`G4UniversalFluctuation`**
  - Improved parameterisation for thin gas layers
- Corrected computation of lateral displacement in **`G4WentzeVIModel`**
  - Following report #1114 in HyperNews forum (IceCube).
  - Improved algorithm of sampling of scattering angle and displacement
  - Added G4Exception to identify misuse of transport cross-section computation
- Fixed incorrect selection of limit on minimal angle in **`G4WentzelOKandVIxSection`**
  - Affecting large angle scattering of muons
  - Different screening functions for e+- and heavy particles
- Fixed numerical problem in **`G4IonCoulombScatteringModel`** for small scattering angles
- Fixed cases of crashes in **`G4VEnergyLossProcess`** when applying **`G4hIonisation`** for ions
  - Fixed computation of delta-electron cross section for ions and very small cuts (about 1 um)

Hadronic physics

- CHIPS model (ATLAS report):
  - Added check to **`G4QCaptureAtRest`** to avoid cases of major 4-momentum balance violations (> 2 GeV)
  - Repeat sampling if happening; check baryon number of final state and take into account nuclear recoil at rest which is not produced as a final particle
- neutron_hp model:
  - Added protection against emission of unphysical ultra-low energy photons in **`G4NeutronHPCaptureFS`**
- Elastic processes:
  - Fixes in **`G4WHadronElasticProcess`** to remove unnecessary calls responsible for run-time memory growth
  - Problem report #1286

More Fixes

Optical Processes

- Fix in **`G4OpBoundaryProcess`**: for the computation of velocity
  - Call **`ProposeVelocity()`** for particle-change
  - For Fresnel refraction calculate final velocity locally
  - Problem report #1275

Scoring Processes

- Fix in **`G4ParallelWorldProcess`** for incorrect initialization for secondary tracks

Track

- Fix for association of secondary weight by processes
  - Problem report #1273

Visualization

- Fix to avoid redrawing twice of geometry
- Fix for “up-vector” in Raytracer
  - Problem report #1274

More fixes - 2

Configuration

- CMake:
  - Corrected settings for expansion variable for prepending path to **`G4WORKDIR`**. Problem report #1265
  - Corrected setup and compilation options for Intel/icc compiler

Detailed notes: ***http://cern.ch/geant4/support/Patch4.9.5-1.txt***

Supported platforms for 9.5 series

- Linux SLC5, gcc-4.1.2, gcc-4.3.X, 32/64 bits
- MacOSX 10.6, 10.7, gcc-4.2.1, 64 bits
- Windows/XP and CygWin Tools
  - Compiler Visual C++ 10.0 (Visual Studio 2010)
- Also tested: gcc-4.6.X, icc-12.X, VC++-9.0

- *CLHEP version: 2.1.1.0*

Releases in 2012

- Release 9.6-Beta in June (29 June)
- Final release 9.6 in November (30 November)
  - First candidate release available for testing to LHC experiments towards end October

Thanks!