GEANT4 9.4 release

and latest patches

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Outline

- Latest released patches, 9.2.p04 & 9.3.p02
  - http://geant4.cern.ch/support/Patch4.9.2-4.txt
  - http://geant4.cern.ch/support/Patch4.9.3-2.txt
- Major features expected in release 9.4
  - Geometry
  - Physics
  - Kernel & Interfaces
  - On top of 9.4-beta:
    - http://geant4.cern.ch/support/Beta4.9.4-1.txt
- All planned features for 2010:
    - http://geant4.cern.ch/support/planned_features.shtml

9.3.p02

- Released last September
  - http://geant4.cern.ch/support/Patch4.9.3-2.txt
- Problem reports addressed and closed:
  - #980, #1032, #1101, #1103, #1114, #1115, #1116, #1118, #1120, #1127, #1138, #1139
- Several Q/A fixes included in geometry modules and other classes (mostly thanks to Coverity static analysis reports)
- Bertini Cascade: fixed cases of energy non conservation in pion-nuclear reaction
- Improved Lund string fragmentation and fixed some problems of energy non-conservation in FTF
- Migrated physics-lists to use particle-based multiple-scattering in the examples, where applicable

9.2.p04

- Released last September
- Includes two fixes to hadronic models
  - Thanks to feedback from the ATLAS production team
- Bertini Cascade: fixed cases of energy non conservation in pion-nuclear reaction, in particular on very light nuclei
- CHIPS: fixed rare problem of anomalous event with high pT jet, identified in a Gamma+A -> X reaction with gamma energy of 2 GeV. In addition, also addressing problem report #1138

Features planned for 9.4

- Release 9.4-beta made available on June 25th
  - Includes some new features part of the program for release 9.4 of December 2010
  - **http://geant4.cern.ch/support/Beta4.9.4-1.txt**
- Additional features expected for the final 9.4 release

Geometry

- Review of navigation **`check-mode`** verbosity
- Implementation of precise **`ComputeSafety()`** in navigation
- Extension of divisions to allow for gaps in replicated daughters
- More Q/A review to code and addressing open issues

Materials & Particles

Materials

- Addition of extra data for ion stopping powers
- Review of atomic shell energies

Particles

- Update properties of particles to PDG 2010
- Review implementation of static tables and treatment of ions for thread-safety

Electromagnetic physics

Standard EM

- Extend capability of helper classes
- Establish more effective sampling of displacement in Urban multiple-scattering
- Updated Bremsstrahlung model for e+- for energies E < 1 GeV
- Development of Doppler broadening parameterisation

Low Energy EM

(*) TBC

- Penelope 2008 e+/- ionisation processes
- Pair production in the electron electric field (*)
- Radiative correction for pair production in the nuclear field (*)
- Reimplementation of anti-proton model of ionisation

Hadronic physics

Hadronic Physics (*) TBC

- Implementation of fast neutron capture model
- ENDL neutron database alternative models (*)
- Improved break-up method in de-excitation
- Complete migration to integer Z and A interface
- Complete interface from Bertini cascade to pre-compound and optimised fixes for energy/momentum conservation
- Interface of INCL to pre-compound & carbon ions in INCL/ABLA
- Integral elastic cross sections for coherent elastic model
- Extension of FTF model to nucleus-nucleus collisions
- Development of ion-ion model for elastic scattering
- Development of integral nucleus-nucleus cross-sections

More Features planned for 9.4

Scoring

- Full revision of scorers to accept user-defined unit
- Cylindrical meshes for command-based scoring

UI & Environments

- Support for Python 3.0 in G4Py

Visualization

- Production release for Qt visualization driver and UI: based on Qt4
- General speedup for GL graphics

9.4: more …

- Configuration
  - New optional configuration & installation system based on CMake
- First prototype thread-safe/multi-core kernel
  - Alternative code tree to be released based on release 9.4 series
- Complete list of planned developments for 2010 at:
  - http://geant4.cern.ch/support/planned_features.shtml

Planned supported platforms for 9.4

- Linux SLC5, gcc-4.1.2, gcc-4.3.X, 32/64 bits
- MacOSX 10.6, gcc-4.2.1, 64 bits
- Windows/XP and CygWin Tools
  - Compiler Visual C++ 10.0 (Visual Studio 2010)

- Also tested: gcc-4.5.X, icc-11.X, VC++-9.0

Thanks!