GEANT4 10.2.p01
& last patches highlights

kernel modules

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for the Geant4 Collaboration

Outline

- Fixes introduced in release 10.2.p01
  - Kernel modules
  - Physics (see talk by V.Ivantchenko)
- Overview of back-ported fixes
  - To release 10.1 (10.1.p03)
  - Kernel modules

➢ *Detailed patch release notes:*

- **http://cern.ch/geant4/support/Patch4.10.2-1.txt**
- **http://cern.ch/geant4/support/Patch4.10.1-3.txt**

➢ *All planned features for 2016:*

- **http://geant4.cern.ch/support/planned_features.shtml**

Bugzilla problem reports addressed

10.1.p03:

#1432, #1634, #1719, #1743, #1758, #1773, #1786, #1802, #1811, #1820, #1821

10.2.p01:

#1432, #1634, #1766, #1773, #1777, #1786, #1802, #1805, #1806, #1807, #1808, #1809, #1811, #1816, #1820, #1823, #1826, #1831

Geometry

Geometrical primitives & volumes

- Fixed cases of potential never-ending loops in G4IntersectionSolid — 10.1.p03
  - Problem report #1821
- Fixed behavior of G4Sphere::DistanceToIn(p,v) for concave Theta and point located on the origin. Also make proper use of radial tolerance in DistanceToOut(p,v) — 10.1.p03
- Fixed use of rotation matrix in G4VDivisionParameterisation, allowing for use of divisions in MT-mode — 10.1.p03
  - Problem reports #1743 and #1758 — 10.1.p03
- Enabled parameterisation by solid type in MT-mode

Geometry

Navigation & Transportation

10.1.p03, 10.2.p01

- Fixes in G4MultiLevelLocator::EstimateIntersectionPoint() for logic error in keeping consistent candidate intersections.
  - Addresses issue reported by ALICE (non-finishing of step due to poor advances) and ATLAS ("hyperspace bug")
- Relaxed condition for zero or almost-zero steps in G4ReplicaNavigation and G4Navigator, to allow for faster progression in case of stuck tracks in 3D scoring meshes

10.1.p03, 10.2.p01

  - Problem report #1432
- Fix in G4ReplicaNavigation::ComputeStep() for correct setting of copyNo for entering particles. Fixes issue of negative copyNo observed in nested replica setups

10.1.p03, 10.2.p01

  - Problem report #1634

Analysis & Persistency

- Analysis: 10.1.p03
  - Fixed G4Analysis::Tokenize() which sometimes was failing when processing a string
  - Fixed handling ntuples created in MT mode
- GDML: 10.1.p03
  - Use relaxed precision constant for matrix to angle formula evaluation in G4GDMLWriteDefine, to allow for proper treatment of singularities
    - Fixes issues of misplaced volumes in exported geometries of complex detectors

Materials & Particles

- Materials:
  - Fixed rare data-race in G4MaterialPropertiesTable for optical physics

10.2.p01

- Particles:
  - Fixed wrong argument order for A and Z in CreateIon() of G4IonTable
  - Fixed setting of mass in decay parent particle
    - Problem report #1820

10.1.p03, 10.2.p01

  - Fixed G4DecayTable::SelectADecayChannel() for decay channels all kinematically forbidden

10.1.p03, 10.2.p01

10.2.p01

More …

- Global:
  - Tune radial tolerance to same value as for Cartesian tolerance in G4GeometryTolerance

10.1.p03

- Run:
  - Fixed process order index of G4ParallelWorldProcess to make sure it is registered prior to G4OpBoundaryProcess

10.1.p03, 10.2.p01

- Parameterisations:
  - Fix for Zeff wrongly computed in Gflash

10.1.p03

- Data sets:
  - nuclides properties (G4ENSDFSTATE-1.2.1): added missing data for RA228, SI24, SI25 and 193RN
  - radioactive-decay (G4RadioactiveDecay-4.3.1): removed spurious NaNs

10.2.p01

Configuration

- Fixed configuration error occurring when using CLHEP-2.3.1.1 external installation (10.2.p01)
  - Problem report #1805 (10.2.p01)
- Fixed compilation warnings on clang-3.7
- Updated Apple Clang detection to work on Xcode-7 (10.1.p03)
- Corrected conditions for proper treatment of gcc-5 (10.1.p03)

Platforms for 10.2

- Linux, gcc-4.8.3, 4.9.X, 5.2.X, 64 bits
- MacOSX 10.11, clang-3.7, 64 bits
- Windows 7, Visual C++ 14.0 (Visual Studio 2015)
- Also tested:
  - Linux SLC6/CentOS7, icc-15, icc-16
  - Linux Ubuntu 14, gcc-4.8
  - Linux for Intel Xeon Phi with Intel-icc 15.0, 16.0 (gcc-4.9 compatibility layer)
  - MacOSX 10.9/10.10, clang-3.5/3.6
  - Windows 7, VC++12.0

Thanks!