Review of Open Problem Reports

Geometry WG

Parallel geometries

- [#1432](#)
  - *Stuck particles with G4ScoringManager /score/create/boxMesh*
  - Particles get stuck when lying on the plane of the scoring mesh. The problem seems to happen for tracks whose initial location is exactly on the boundary of parallel world replicas. To verify if fixes introduced in 9.6.p03, 10.0.p01 and 10.1 help!
- [#1449](#)
  - *Particle not scored when step length proposed by StepLimiter lands exactly on a geometry boundary*
  - The problem seems related to the interpretation of the flag 'fGeometryLimitedStep' in G4Transportation::PostStepDoIt(), and what is actually done by G4SteppingManager. A dirty workaround is proposed. To verify if fixes introduced in 9.6.p03, 10.0.p01 and 10.1 help!
- [#1634](#)
  - *Negative CopyNo is given to NestedParametrisation in ParallelWorld geometry*
  - Test case provided based on RE04 example, where a nested parameterisation of boxes is defined in the parallel world as layered mass geometry. The copy number returned for `ComputeTransform/ComputeMaterial()` is sometimes -1. Verified that systematically happens at the boundary of a volume including a replica. Not clear what can be the cause... Suspecting missing initialisation in some area of the geometry setup for the case of layered mass geometry (G4MultiNavigator ?)

More on navigation …

- [#1709](#)
  - *Frequent GeomNav0003 G4Exceptions*
  - Many warnings from `G4Navigator::GetGlobalExitNormal()` in release 10.1 for non unit vector for global-frame normal. User provided application reproducing the problem. Activating more checks, it is reported points outside the current volume (G4Tubs), for which no overlap is detected.
  - Similar issue reported for ticket [#1750](#) for the 'ucn' extended example, where was found that there are two calls to G4Navigator for `GetGlobalExitNormal()` in succession; first from `GetLastSurfaceNormal()` and then from G4UCNBoundaryProcess. If the gravity field is turned off in the example, the first call does not happen.

- [#1728](#)
  - *Particle erroneously propagated to the mother volume*
  - User reporting cases in which a particle is erroneously propagated to the mother volume in a current step if in the previous step particle exited from daughter. Affected releases from 9.6 included. In release 9.4 none of these issues happened as it was never the case `G4VEnergyLossProcess::PostStepGPIL()` would return 0. Suggesting fix to G4Transportation to be investigated.