

# Review of Open Problem Reports

*Geometry WG*

# Transportation & Navigation

- [#2047](#)

- *The particles stop in world volume by G4UserSpecialCuts process without depositing their kinetic energy*
- Particles by a special cuts process are stopped, when a particle kinetic energy goes beyond the energy limit (as in G4UserLimits), without depositing the remaining kinetic energy. This happens when the special cuts process is invoked in the world volume. A patch is provided reproducing the problem with the basic B4a example

- [#2192](#)

- *Regular Parameterised Navigation Malfunctioning since 10.2.p03*
- Reporting strange behavior in the dose distribution on a voxelized patient geometry after upgrading from 10.2.p02 when using regular navigation. Seems to be due to the changes introduced in p03 in G4PhantomParameterisation class. By restoring the version in 10.2.p02 values gets back to normal. The problem persists also in current version 10.5.p01!

# Magnetic field

- [#2137](#)

- *hstep=0 Error in G4MagInt\_Driver::AccurateAdvance*
- When generating particle gun of 1GeV muons in Belle II software framework, these errors are being produced:

```
[ERROR] In G4MagInt_Driver::AccurateAdvance(),  
      GeomField1001: Proposed step is zero; hstep = 0
```

The problem is reported to happen with release 10.1

- [#2186](#)

- *Abort Trap 6 in G4MultiLevelLocator*
- User reports a crash in their code (BDSIM) with 10.5.p01, originated from G4MultiLevelLocator::EstimateIntersectionPoint(). Likely due to invalid array access. Asked more information, but user not responding. User code problem?

- [#2188](#)

- *Events not independent due to magnetic field + looper thresholds kill primary particle in all subsequent events*
- User reports that in their code (BDSIM), since release 10.5 (including p01), if a particle gets stuck and an event safely aborted, the navigation can remain in a bad 'state' and every subsequent event has severe problems. This behaviour can include (shockingly) killing the primary particle on the first step (?). Again, asked for more information and no feedback received yet (same user as #2186)

# Items for Discussion

# Hook for external sub-navigation

- New abstract class **G4VExternalNavigation**
  - Pure interface class with just pure virtual methods
  - Modifications to `G4Navigator`
    - Addition of pointer to `G4VExternalNavigation`
    - Addition of a setter method
      - `SetCustomNavigation(G4VExternalNavigation* pNav)`
    - Other modification in `CharacteriseDaughters()`
      - Are they necessary?
- New abstract class **G4VExternalSolid**
  - To cope with requirements from FLAIR

# Handling of looping particles

- In release 10.5, added code so that unstable particles are not killed by default
  - The user must set a flag to enable killing of unstable particles
  - Created new capability in G4PhysicsListHelper to enable 'low' or 'high' thresholds for the killing of looping particles
- Planned to provide in release 10.6 a new driver which can cope better with stuck tracks, using a different integration technique
  - See task [JIRA-763](#)
  - Types of tracks concerned have been reported to be lower energy electrons in vacuum or air, and arbitrary energy muons in air (when the physics gives very large proposed steps - e.g. 10s or 100s of meters)