Update on Requirements

36th Geant4 Technical Forum
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Marc Verderi
LLR, Ecole polytechnique
On behalf of the Geant4 Collaboration

Requirements Tracking System Page:
http://jirageant4.kek.jp/secure/Dashboard.jspa

NEW REQUIREMENTS

FROM LAST TF (MARCH)

3501 : Materials with same names but different properties

- Requester: Mu2e experiment
  - A material with same name can be constructed several times, properties can even be different, but this happens silently.
- Responsible:
  - Vladimir Ivantchenko
- Proposed solution:
  - Issue a warning in case a same name material is created.
- Status:
  - Has been provided in 10.0.
    - Warning can be switched off by user.
  - Proposed to be closed.

OPEN REQUIREMENTS

2902: Displacement in thin volumes

- Originator: S. Miglioranzi (LHCb)
- Issue
  - Displacement lost for steps in thin vol. (Si layers)
  - Need to recover displacement for all charged particles (not just e-, as in EM opt 3)
  - Need to avoid extra CPU cost.
- Responsible : Vladimir Ivantchenko
- Steps in addressing issue:
  - Customized physics List based on EM Option-0, limiting all charged particles' steps was provided.
  - In 9.5 EM option2 includes WentzelVI MSC model, providing an alternative approach for scattering of hadrons.
  - Default multiple scattering for all particles (including e+- above 100 MeV) changed from Urban model to WentzelVI
  - Significant invest in LHCb geometry for better description on-going.

- Status:
  - Awaiting feed-back from LHCb with better geometry
  - Note : development in MSC this coming year might improve the situation.
  - Open.

3301 : Multithreading processing driven by experiment framework

- Requester: CMS
  - Original request at 33th TF (link)
  - Further information at G4 Collaboration meeting (link)
- Responsibles: Andrea Dotti, Makoto Asai, John Apostolakis.
- Scope:
  - To process multiple events and process multiple modules in same event (gen., sim./G4, trg., reco., ana.) simultaneously
    - Geant4 = one of the modules
  - Framework controls modules execution
    - Geant4 to be controlled with proper messages
  - “Threading Building Blocks” (Intel® TBB) task model adopted

- Status:
  - Strong communication/feed-back going on with 10.0.
  - Open.

3403 : Indicate when Geant4 does or does not take ownership of pointers

- Requester: MU2e
  - Description: The MU2e experiment is driving the Geant4 loop in its framework and needs to have clarifications on when Geant4 takes or not ownership on pointers.
- Responsible: Michael Kelsey

- Status:
  - The philosophy of ownership is documented for the most user-exposed classes, as part of the 10.0 release.
  - Users are invited to tell if the proposed documentation responds to their expectation.
  - Proposed to be closed.

3404 : Change of AtRest logic for allowing stopped tracks to be accelerated and further tracked

- Requester: Tom Roberts, Muon Inc.
  - Description: Tracks that come at rest are always killed
  - But in presence of an electric field, for example, a stopped charged track maybe accelerated.
- Responsible: Marc Verderi (was Takashi Sasaki).
- Requirement:
  - Allow for AtRest track with fStopButAlive status to be put back as fAlive status.
- Use-cases (so far):
  - Inverse cyclotron: frictional cooling to stop muons before acceleration by electric field.
  - Collective tracking: mutually interacting tracks tracked in small time steps. Some may stop at some point and be restarted: not possible with current AtRest logic.
- Status:
  - Approach considered : have an AtRest process for dealing with such cases.
  - Difficulty for this process is with time-dependent fields.
  - Open

3405 : Extensible physics list factory

- Requester: Robert W. Hatcher, for FNAL neutrino experiments
  - If a user defines a physics list, there is no way to make it known by the physics list factory
  - If a user defines a physics module (eg monopole), there is no way to combine such module with existing physics lists
- Responsible: Gunter Folger
- Requirements:
  - Allow the physics list factory to be extensible with user-made physics list
  - Allow for user physics module / extension (eg monopole) to be combined with existing physics lists
- Status:
  - A « generic physics list » mechanism has been put in place, with one example; expected to resolve the problem.
  - Open

RECENTLY CLOSED REQUIREMENTS

3401 : Allow for use of alternate set of mathematical libraries

- Requester: CMS
  - Description: CMS profiling shows that 10-15% is spent in math functions: possibility to speed up simulation by using fast math libraries.
- Responsible: Ben Morgan
- Proposed solution:
  - Investigate if it is feasible to produce a built in option allowing to enable/disable fast mathematical libraries.
  - Evaluate effects of usage of fast mathematical libraries on accuracy of Geant4 tracking and physics
- Status:
  - LD_PRELOAD flag is used to resolve the issue.
  - Closed

3402 : Allow for suppression of the NeutronHP package warning messages on user's request

- Request:
  - Allow for suppression of the NeutronHP package warning messages of the type:
    - "/Elastic/ file for Z = ..., A = ... is not found and NeutronHP will use ..."
- Responsible: Tatsumi Koi
- Proposed approach:
  - Agreed that the print should be by default, and could be switched off **on user's purpose only**.
- Status:
  - Available in 10.0.
  - Closed