Documentation For 10.2 Release

Michael H. Kelsey
Documentation Working Group

GEANT4 Collaboration Meeting
28 Sep 2015

Outline

- Documentation Release Deadlines
- Updating the Toolkit Developer's Guide
- User Requests for Documentation
- Automating Physics List Documentation

Deadlines

Deadline for documentation updates is 27 November 2015

NOTE: 26 Nov is Thanksgiving holiday weekend in U.S.

Final versions will be built and released 4 December 2015

Toolkit Guide Situation

Last year, Dennis requested that WG coordinators look at their sections of Toolkit Guide, updating diagrams, removing obsolete info

Updates provided for the following

- Biasing (new section on generic biasing classes)
- Hadronic Models (new)
- Multithreading (new)
- Electromagnetics
- Particles
- Geometry

A. Dotti has offered to update other kernel chapters (Run, etc.); *Thank you!*

Remaining Steering Board action items closed

User-Related Documentation Requests

HN Optics #612: Optical photon refraction through a lens

> *Would it be possible to define a geometry solid/volume with a surface curvature defined analytically? I see that a sphere can be defined, but how difficult would it be to define an aspheric surface - such as those used in optical components and commercial packages, e.g. ZEMAX.*

It would be very useful to have a section in Geometry/Solids on exactly (detailed!) how to write a new `G4VSolid` subclass

- What intermediate base classes are available? How to choose?
- Which member functions must be defined locally?
- Conventions for return values (in *vs.* out, rotation sense)
- What utilities are available for solids to use?

User-Related Documentation Requests

HN Hadronics #1471/1/2: How to add new thermal neutron scattering data files?

> *While we're at it (I could try to figure it out on my own, although I don't know how complicated it is at this point in time), how hard is it to add new thermal scattering elements?*
>
> Tatsumi Koi: *The format of data file for the thermal scattering is given in physics reference manual, so expert user may use own data file. In this case, the user must let the model know the pairing names between data file and targeting element by the method.*

It would be useful to document procedure

User-Related Documentation Requests

My own problem: Understanding transportation in fields

> *Encountered problems tracking charged particles near boundaries, small step lengths, with electric fields. Tracks would get "stuck" many times; sometimes would "jump" through boundaries into different volumes (with a reflection process active); would pass back and forth across boundaries.*

It would be very helpful to have a series of flow charts or "bulleted" descriptions of how `G4Transportation` is called amongst other processes, and what goes on inside it, in Section 5.2.7 in the Application Guide.

Automatic Physics List Info

Proposal last year to hadronic models/process interface for dumping text descriptions up to physics-list level

Documentation group (me) could then generate release-specific descriptions of what is contained in each of our reference physics lists

Users could also generate a description of what is included in the "local" physics list they have in their application

Some work done on this during 2015, not completed

Automatic Physics List Info

A. Dotti and I have discussed what is missing, and some ideas for how to move forward

- Don't want duplication of particle/process/model info, need to collect, maybe hash, shared configurations
- Leverage physics table dumps for energy range/cross-section info
- EM models don't have `ModelDescription` interface
- EM doesn't use "registry" like hadronics (`G4EmManager`?)
- Physics list class doesn't have memory of what it constructs
- Physics list class doesn't know its own name (for output)

Likely to be fairly large project, touching lots of classes

If you are interested, Parallel 5A will include discussion of this!