Summary of Parallel Session 2B : Hadronic Testing

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Topics

- Summary of hadronic validation efforts
- Hadronic system tests: evolving from "run to completion" to checking the output
- Factorization of common code for the hadronic tests
- Related discussions

Status of Hadronic Validation (I)

- Goal
  - Cover and validate all aspects of hadronic physics domain as best as possible
  - Run hadronic validation suite regularly (or as needed)
  - Archive all results in the repository, in particular for the public releases
- Coverage (incl. archiving of results):
  - Models
  - Cross sections
  - Physics Lists
- Status of the Validation Repository
- Tests for MT

Status of Hadronic Validation (II)

- Core models are covered and reasonably archived
  - Precompound, Cascades, String models
  - New tests added (high energy, gamma-N)
- "Limited" or no coverage
  - Low energy neutrons, elastic scattering, radioactive decays, abrasion/ablation, ions (Binary, QMD)
- Validation of Cross Section
  - Work started, certain results archived; need to expand
- Physics Lists validation is in good shape, archived
- Good progress in the Validation Repository:
  - Several important features added
  - Collection of results has grow tremendously

Introducing Physics Observables into Hadronic System Tests (I):

- Discussion started last year
- Automatic testing via ctest/cdash although…
- … "run to completion" is somewhat limited when it comes to flagging significant changes and alerting developers but…
- … NOT to replace full scale physics validation
- Only several test verify the output vs reference results
- Adding physics checks:
  - Add-hoc
    - Simple – write check results into log (G4cerr="failure")
  - Comparison vs reference (ROOT/StatTest)
    - Needs config (what histograms, what stat.tests…)
    - Produces text summary and graphical output

Introducing Physics Observables into Hadronic System Tests (II):

- StatTest can be used in ctest (STATEST_ADD_TEST)
  - Separate step
- Technical aspects:
  - Access to results (graphical)
  - Handling of reference files – lots of discussions:
    - Storage – SVN is NOT an option for ROOT binariy
    - Access - "upload" via cdash/file_upload ?
    - Update to a newer one reference
- Andrea (w/Gunter) will prototype possible solution in the next several months

Factorization of Common Code for the Hadronic System Tests

- Improve software infrastructure in the hadronic validation suite, reduce maintenance overhead
- (Re)Move code duplication into a separate package
- Initial work/prototype incl. test23, test19
- Need to minimize impact on the existing tests that also serve as system tests (CTest)
- Package build:
  - Library, link to each test
  - Compile common source code with each test (similar to examples/extended) – chosen approach as it's tested
- Further steps/exercise in the near-term plans

Summary

- Geant4 Validation is a very important domain
  - Benefits the users community
  - Drives the improvements in Geant4
- Significant progress, regular efforts, documented
  - Model level, full scale applications
  - New developments
- Certain physics aspects need more more validation work
- Extend a group of physics tests to produce physics output
- Software can be refined/restructured
- Work plans have been updated, more progress soon