Test inventory for automatic ctest/cdash testing

Introduction to discussion

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Parallel Session 1B – Physics Validation Tools

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Goal of this session: discussion

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- **Review current testing strategy:**
  - Last year goal: introduce routine tests to check physics performances (regression testing)
  - Verify coverage of testing
  - Introduce common tools and streamline testing
  - Leverage developers from need to develop same mechanisms for each test/example implementing common tools
- Goals only **partially reached**
  - In particular only few physics tests are running in ctest
  - Need to cover more physics
  - See Parallel 2B for additional information

Improvements for version 10

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- Create a list of processes / use cases critical to monitor
  1. Full applications that cover wide range of physics interactions (i.e. full-shower in thick targets)
     - Only regression testing with previous Geant4 versions (experimental data include detector effects difficult to simulate)
  2. "Unit test" exercising specific models/processes
     - Can compare simulation output with first principles expectations

Deliverable

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- Based on what has been done by EM and HAD WG
  - Matrix of test number / physics model coverage
- EM: https://spreadsheets.google.com/pub?key=pw2-SY7kU6F6T0bLY9OIiNw
- HAD: http://geant4.web.cern.ch/geant4/collaboration/working_groups/hadronic/testing/index.shtml

Current Status: CTest/CDash

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- SimplifiedCalorimeter (regression testing):
  - FTFP_BERT **hadron showers on light and heavy materials** (Sci, Fe, Cu, LAr)
  - Energy deposit histogram
  - Inclusive secondary spectra
- test67 : EM test (T.Vidmar et al., Appl. Rad. Iso. 66 (2008) 764-766) **full efficiency peak in Ge detector**. All EM builders. Compare with data
- test73 : MSC **internal consistency check** (initially developed by LHCb). Compare to expected predictions

Near term extensions

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- test40 : EM showers testing. Compare with predictions. Test in place add to PhysicsChecks group

- **Hadronics we need at least the following:**
  - High-Energy: FTF(P)
  - Intermediate-Energy: BERT
  - Quantities to check: secondary spectra, as regression testing
- For hadronic tests **statistics is in an issue**
  - For example: test30 is a complete test-suite (several materials), but cannot run on nightlies system
    - Proposal: extract only 1 or 2 materials, perform only regression testing for BERT
  - test12 for FTFP, can we add few histograms and perform regression testing?

Discussion time...