G4Beamline Acceptance Tests

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10.0 mm LITHIUM_HYDRIDE with 100000 200.0 MeV/c mu+ 100.0 mm steps

energy [MeV] -165

- g4bl 2.06 (pass)
- g4bl 2.08 (fail)
10.0 mm LITHIUM_HYDRIDE with 100000 200.0 MeV/c mu+ 100.0 mm steps

px [MeV/c] -162

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**g4bl 2.06** (fail)

**g4bl 2.08** (fail)
350.0 mm IH2 with 100000 200.0 MeV/c mu+ 100.0 mm steps

energy [MeV]-189

- g4bl 2.06 (pass)
- g4bl 2.08 (fail)
350.0 mm IH2 with 100000 200.0 MeV/c mu+ 100.0 mm steps

px [MeV/c]-186

- g4bl 2.06 (fail)
- g4bl 2.08 (fail)
Comment from TJR

- There is a significant change in the tails of multiple scattering in LH2, between 2.08 and previous versions -- more than a factor of two increase in the tails. This is probably why your consistency tests failed. I will be querying the Geant4 collaboration about it. Energy loss in LH2 is unchanged. I have not yet looked at hadronic interactions.

I'm now thinking that my current regression tests are insufficient, and that I need to perform an analysis of a few key physics processes for each release of G4beamline, so I discover such issues before releasing it. I'm considering tracking the following histograms by release, all using QGSP_BERT:
  - $P_x/P_z$ for 100 MeV/c mu+ after 300 mm LH2
  - $P_z$ for 100 MeV/c mu+ after 300 mm LH2
  - $P_z$ for pi+ produced by 8 GeV protons in a 100 mm W target
Comment from CTR

- Interesting to see what the change in lattice performance is
- For now I think we suppress use of G4BL 2.08...