G4Beamline Acceptance Tests

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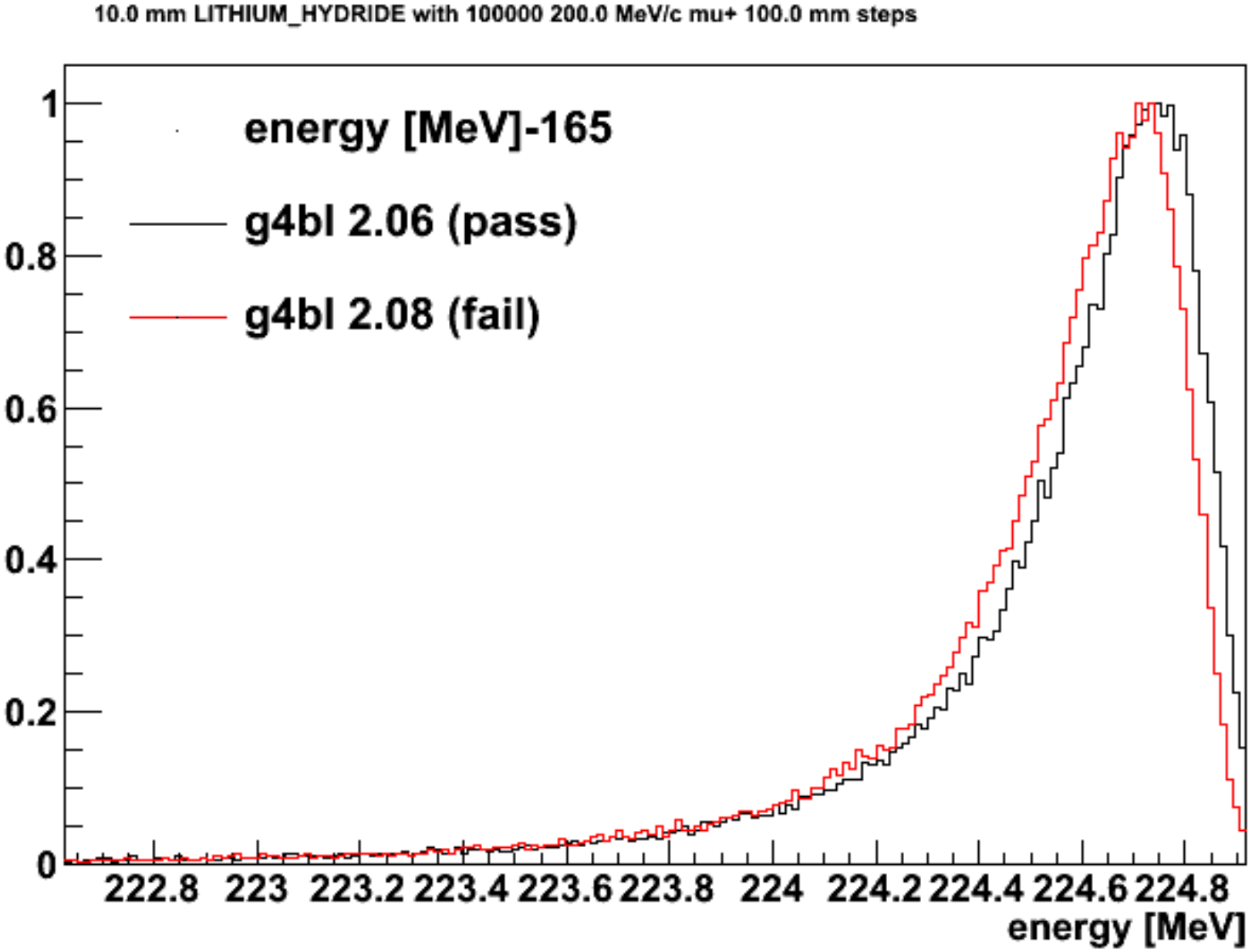
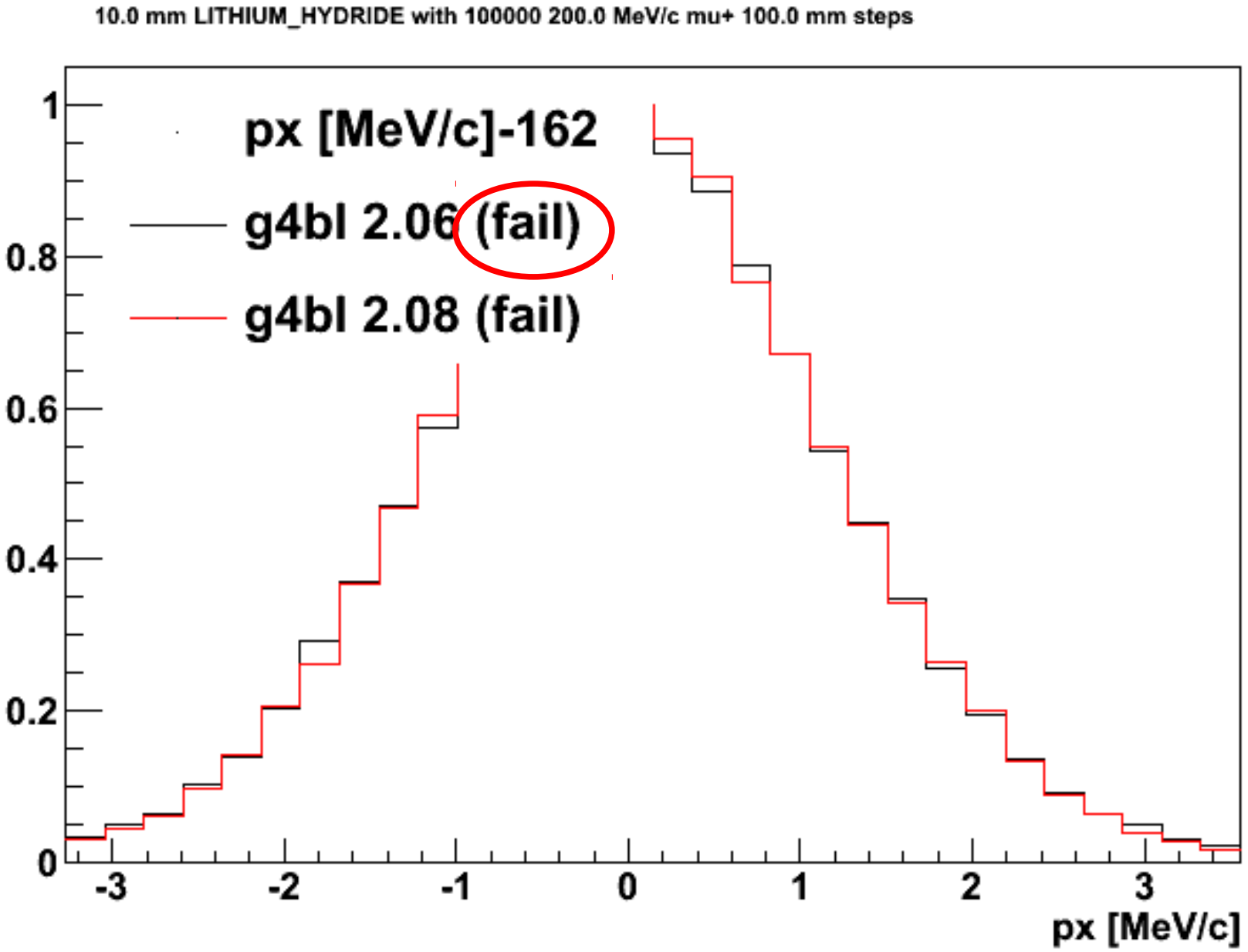
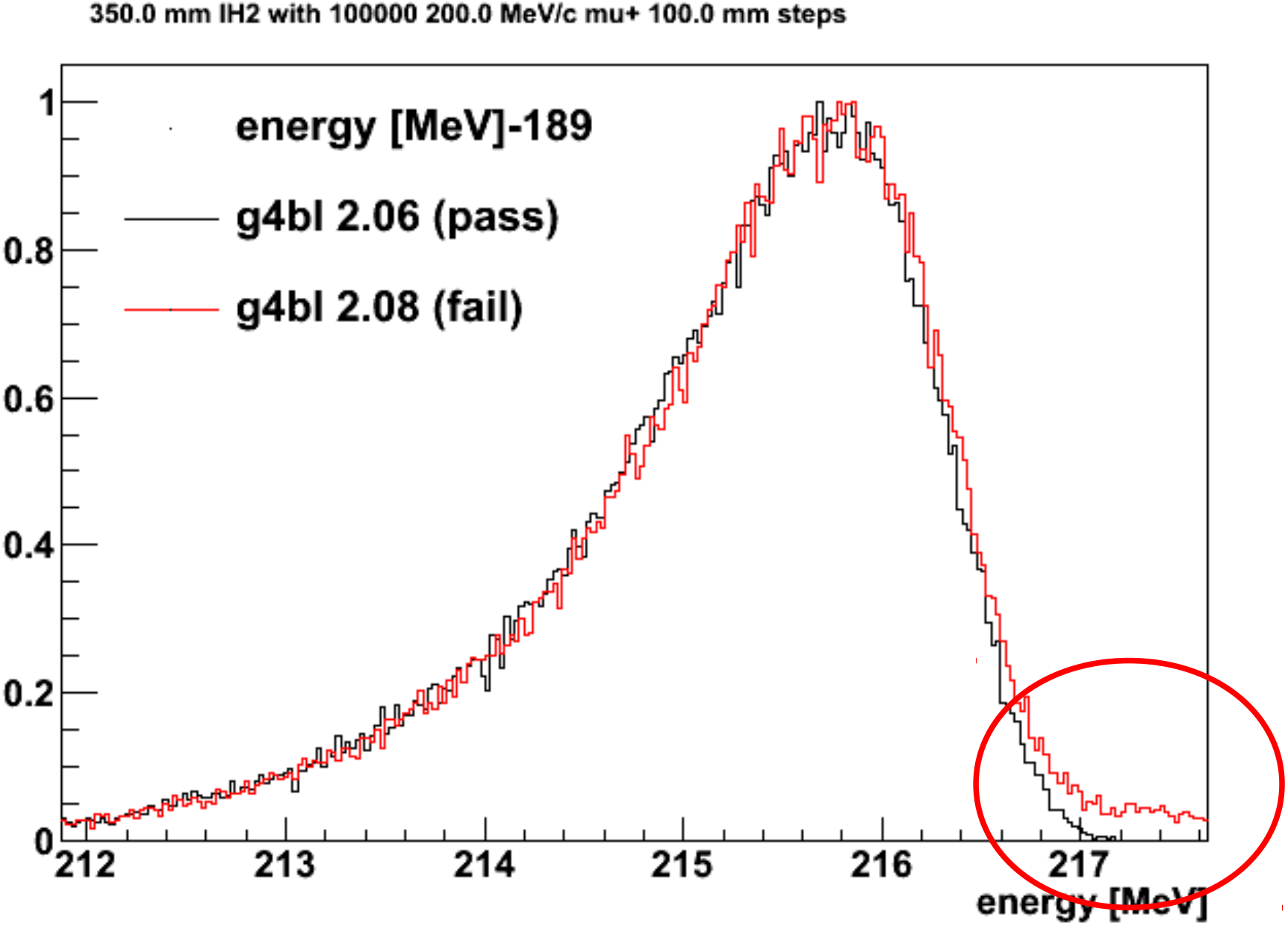
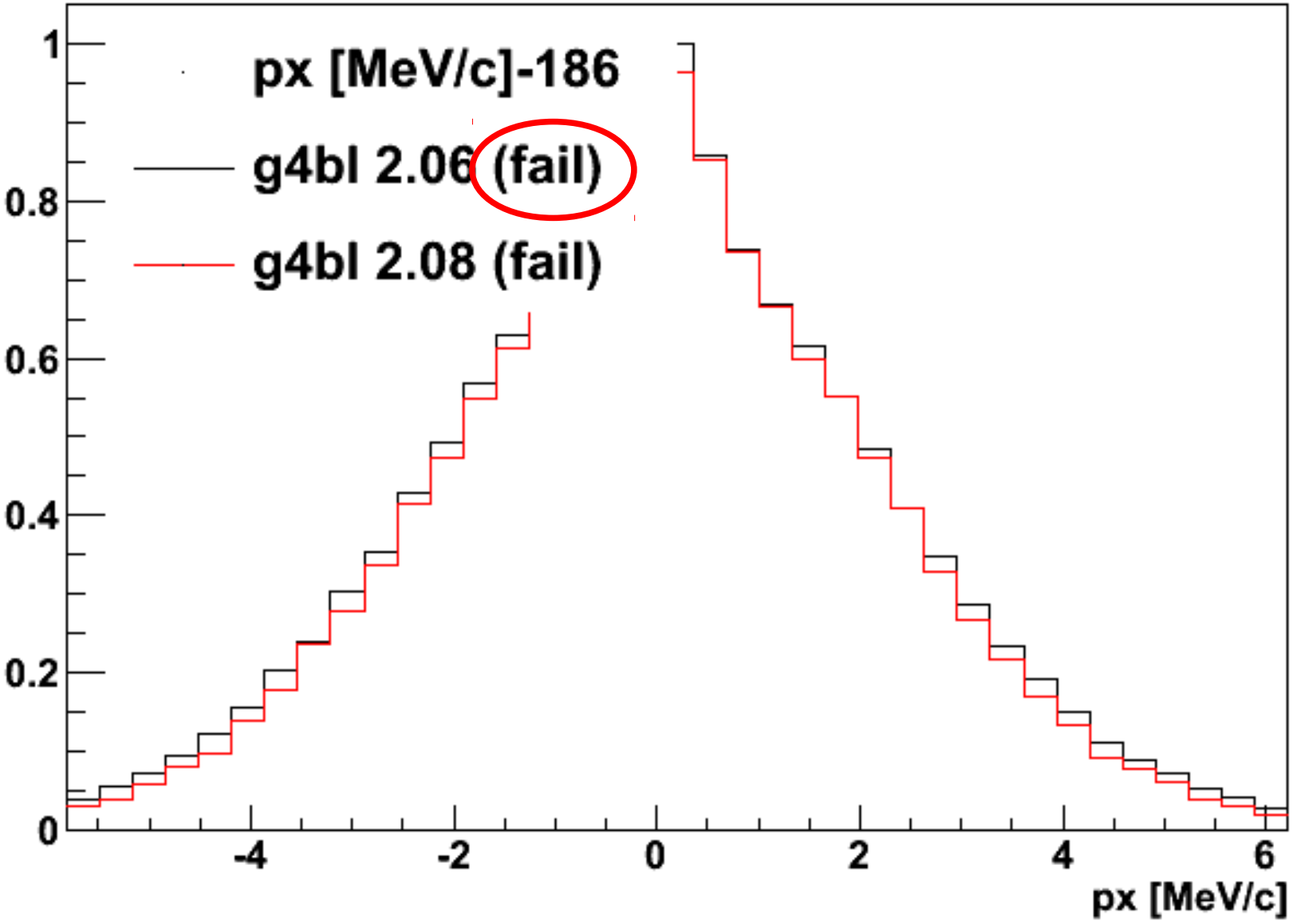

10.0 mm LITHIUM_HYDRIDE with 100000 200.0 MeV/c mu+ 100.0 mm steps
energy [MeV]-165
g4bl 2.06 (pass)
g4bl 2.08 (fail)
1
0.8
0.6
0.4
0.2
0
222.8
223
223.2
223.4
223.6
223.8
224
224.2
224.4
224.6
224.8
energy [MeV]


10.0 mm LITHIUM_HYDRIDE with 100000 200.0 MeV/c mu+ 100.0 mm steps
px [MeV/c]-162
g4bl 2.06 (fail)
g4bl 2.08 (fail)
1
0.8
0.6
0.4
0.2
0
-3
-2
-1
0
1
2
3
px [MeV/c]


350.0 mm lH2 with 100000 200.0 MeV/c mu+ 100.0 mm steps
energy [MeV]-189
g4bl 2.06 (pass)
g4bl 2.08 (fail)
1
0.8
0.6
0.4
0.2
0
212
213
214
215
216
217
energy [MeV]


350.0 mm lH2 with 100000 200.0 MeV/c mu+ 100.0 mm steps
px [MeV/c]-186
g4bl 2.06 (fail)
g4bl 2.08 (fail)
1
0.8
0.6
0.4
0.2
0
-4
-2
0
2
4
6
px [MeV/c]

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:

  - Px/Pz for 100 MeV/c mu+ after 300 mm LH2
  - Pz for 100 MeV/c mu+ after 300 mm LH2
  - Pz 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...