Update on de-excitation module

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18 October 2017

Status of de-excitation module for 10.3ref09

- Evaporation/FermiBreakUp/Photon evaporation are updated
  - Data structure for gamma levels is finelized since G4PhotonEvaporation5.0
    - Twice less memory
    - Fixed several bug reports
    - Used by all models
  - Level energy and life time are double in the internal structure
    - G4float is used only for probabilities
  - Excited energy of a fragment is taken from the DB and not computed on-fly
  - All known bug reports are closed
  - Isomere production is working
  - User data file addition is working
- Correlated gamma decay
  - Is enable by default
  - Fully controlled by G4PhotonEvaporation
- Not yet done:
  - Updated GEM model
  - Multifragmentation
  - Bertini interface has problem due to IC electrons

Problems in 10.3ref09

- Big CPU penalty for all Physics Lists using current default configuration of G4RadioactiveDecayPhysics
  - Due to sampling of correlated gamma emission for high angular momentum excited states
  - Shielding (Soon, Tatsumi) – due to large number of extra Auger electrons
  - Rdecay01 (Michel)
- Bad non-reproducibility when G4RadioactiveDecayPhysics is used
  - Due to correlated gamma sampling (Alberto)
  - G4NuclearPolarization tensor grows up with each new gamma emission in the chain

Proposal for 10.4

- Default options for the de-excitation module
  - Max life time 1000 s – very reduced isomere production
  - Enable internal conversion
  - Do not store internal conversion data per atomic level
  - Disable correlated gamma
- Configure G4RadioactiveDecayPhysics with the same options as EM Opt0
  - Atomic deexcitation de-excitation is instantiated but Auger electron production is not enabled
  - Do not read internal convertion data
  - Do not store internal conversion data per atomic level
  - Synkronized max life time with G4NuclideTable (10^{-6} s) – enabled isomere production
- Addition of UI commands allowing user for more detailed simulation
  - /process/deex/readICdata true
  - /process/deex/setIC false
  - /process/deex/correlatedGamma true
  - /process/deex/maxTwoJ 10
  - It is basically extra EM options and no hadronic UI command is proposed so far
- Main reason of this proposal is that it is very difficult to play with these optons only via C++ interface – you need edit the code