NE697: Introduction to Geant4

C++ Geant4 Examples

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Today's Agenda

- Administrative items?

- Assignment 4 demo
  - Adding warnings to CMakeLists.txt
  - Debugging with command-line args in VSCode
  - Jupyter notebook in VSCode!

- Geant4 examples

Assignment 4

- Command-line demo

- VSCode demo
  - Adding more warnings
  - Debugging with command-line args
  - Checking the output with jupyter notebook

Lab Time

- Work on assignment 4 if you haven't finished it
- Geant4 examples
  - B1: dose calculations
    - Modify B1 to output periodic updates of the event number being processed
      - BeginOfEventAction() or EndOfEventAction()
        1. Get the G4RunManager, 2. Get the current Run object, 3. Get the total # of events
    - Create .mac files that run with 100,000 particles for these source configurations
      - Gamma, 511 keV
      - Neutron, 2 MeV
      - e-, 1 MeV
    - Modify the geometry to use a G4Sphere instead of a G4Cons (use a similar size)

Lab Time

- Geant4 examples
  - B3b: PET scanner system
    - Uses a hook we haven't discussed: Stacking Action
      - Check out B3StackingAction
      - ClassifyNewTrack() triggered when a G4Track is created
      - Gives the opportunity to kill particles we don't care about (secondaries)
    - Run with 100,000 particles, and count the "Nb of good e+ annihilations"
    - Change the material to NaI instead of Lu2SiO5
    - Run again with 100,000 particles – how does it compare?
    - Check out B3bRun::RecordEvent
      - What is the energy threshold?
    - Change the source to N-13 with the /gun/particle command (see run2.mac for help) and run again with 100,000 particles