Basic Form of My Macro

for

Neutron Gun Simulation

```
############# G4 Physics / Tracking commands ##############

/glg4debug/glg4param omit_muon_processes  1.0
/glg4debug/glg4param omit_hadronic_processes  0.0
/glg4debug/glg4param physicsList 2
/glg4debug/glg4param omit_veto_pmts 0
/glg4debug/glg4param omit_optical_surfaces 0
/glg4debug/glg4param omit_support 0
/glg4debug/glg4param omit_buffer_support 0
/glg4debug/glg4param omit_GC_support 0


/run/initialize


/process/inactivate DeferTrackProc all
/process/inactivate Cerenkov
/glg4scint/off


/grdm/verbose 0
/grdm/fBeta 1


/generator/rates 3 1e-6
/generator/gun neutron  220 220 3750  0 0 0  14.0  0 0 0
/generator/event_window 1e8
```

```
##############################################################################
############################### Generator Setting ###########################
##############################################################################

/generator/rates 3 1e-6
/generator/gun neutron  220 220 3750  0 0 0  14.0  0 0 0
/generator/event_window 1e8


##############################################################################
####################################### Output File #########################
##############################################################################

/event/output_file   ./DATA/TargetGd/Movie/1e3/run05
/output/store/particles/PDG 2112
/output/store/particles/PDG 22
/output/store/particles HADRONIC
/output/store/tracks/PDG 2112
/output/store/particles/PDG 22
/output/store/tracks HADRONIC

/feedback/drawPlots 0

/run/beamOn 1000
```

Problems in Neutron Simulation

- **Unexpected termination of an event simulation**
  (Failing to pass a new track to G4StackManager)

- **Missing a capture gamma in C13 + n process**
  (Phys. Process NeutronInelastic)

- **Missing a track of nucleus after neutron capture**
  (Maybe too low energy to be tracked?)

I will show tracking verbosity output as an example of the 1st and 3rd issue.

Example of Good Track

It has Capture Nucleus + gamma

- Unexpected termination of an event simulation
  (Failing to pass a new track to G4StackManager)

```
***********************************************************************************************
* G4Track Information:   Particle = neutron,   Track ID = 1,   Parent ID = 0
***********************************************************************************************

Step#    X(mm)     Y(mm)    Z(mm) KinE(MeV)  dE(MeV) StepLeng TrackLeng  NextVolume ProcName
  38      -232      -153    -49.2  6.13e-08        0        0       614 TargetInteriorPhys initStep
  39      -243      -160    -53.8         0        0     14.1       628 TargetInteriorPhys HadronCapture
Track (trackID 1, parentID 0) is processed with stopping code 2
### pop requested out of 0 stacked tracks.
### 0 waiting tracks are re-classified to
     0 urgent tracks and 0 waiting tracks.
NULL returned from G4StackManager.
Terminate current event processing.
```

Example of Termination

- Missing a track of nucleus after neutron capture (Maybe too low energy to be tracked?)


```
*************************************************************************************
* G4Track Information:   Particle = neutron,   Track ID = 1,   Parent ID = 0
*************************************************************************************

Step#    X(mm)    Y(mm)    Z(mm) KinE(MeV)  dE(MeV) StepLeng TrackLeng  NextVolume ProcName
  17     -31.7     24    -0.117  2.78e-08      0        0             132 TargetInteriorPhys initStep
  18     -31.7     24     1.15        0        0      1.27            133 TargetInteriorPhys HadronCapture
    :----- List of 2ndaries - #SpawnInStep=  2(Rest= 0,Along= 0,Post= 2), #SpawnTotal=  2 ---------------
    :      -31.7      24     1.15     4.95                  gamma
    :      -31.7      24     1.15     3.68                  gamma
    :------------------------------------------------------------- EndOf2ndaries Info ---------------
Track (trackID 1, parentID 0) is processed with stopping code 2
A new track 0x484ec00 (trackID 19, parentID 1) is passed to G4StackManager.
A new track 0xab63750 (trackID 20, parentID 1) is passed to G4StackManager.
### pop requested out of 2 stacked tracks.
Selected G4StackedTrack : 0xab63a18 with G4Track 0xab63750 (trackID 20, parentID 1)
Track 0xab63750 (trackID 20, parentID 1) is passed to G4TrackingManager.
```

Example of No Capture Nucleus

Questions About DCGLG4sim UI Command

• Can we set seed to generate a random number from computer clock? (seed 0 doesn't seem to do this job)

• For visualization, we have found G4PhysVolume of...
ShieldInteriorPhys
InnerVetoInteriorPhys
BufferInteriorPhys
GammaCatcherInteriorPhys
TargetInteriorPhys
Can we make the dorm/rock visualization?

• Is ConstructDoubleCHOOZ.cc right place to look
at calculation for geometry?