

PSTAR

<http://physics.nist.gov/PhysRefData/Star/Text/PSTAR.html> [↗](#)

ROOT integration using cmake

Download the file FindROOT.cmake file available at the bottom of this page (wget it for instance). In the CMakeLists.txt! file related to a particular project include these lines right after the project name

```
include(FindROOT.cmake)

set(INCLUDE_DIRECTORIES
  ${ROOT_INCLUDE_DIR}
)
include_directories( ${INCLUDE_DIRECTORIES})

set(LINK_DIRECTORIES
  ${ROOT_LIBRARY_DIR}
)
link_directories( ${LINK_DIRECTORIES} )
```

Then change the following line (a few lines down). Include the `${ROOT_LIBRARIES}` part

```
target_link_libraries(exampleXX ${Geant4_LIBRARIES} ${ROOT_LIBRARIES})
```

If you are using a library needing C++0x (like ROOT6) you need to add this

```
include(CheckCXXCompilerFlag)
CHECK_CXX_COMPILER_FLAG("-std=c++11" COMPILER_SUPPORTS_CXX11)
CHECK_CXX_COMPILER_FLAG("-std=c++0x" COMPILER_SUPPORTS_CXX0X)
if(COMPILER_SUPPORTS_CXX11)
    set(CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS} -std=c++11")
elseif(COMPILER_SUPPORTS_CXX0X)
    set(CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS} -std=c++0x")
else()
    message(STATUS "The compiler ${CMAKE_CXX_COMPILER} has no C++11 support. Please use a different compiler.")
endif()
```

Cmake line

```
$cmake -G"Eclipse CDT4 - Unix Makefiles" -DGeant4_DIR=/media/geant4/sw/geant4.10.00.p02-install/1
```

Save Hits data

We will do it by creating a ROOT file. In the ROOT file we will store a n-tuple using a TTree object. A suitable place is the ExN02TrackerSD.

ExN02TrackerSD.hh

```
1 class ExN02TrackerSD : public G4VSensitiveDetector {
2
3   public:
4     ExN02TrackerSD(G4String);
5     ~ExN02TrackerSD();
```

```

6
7     void Initialize(G4HCofThisEvent*);
8     G4bool ProcessHits(G4Step*, G4TouchableHistory*);
9     void EndOfEvent(G4HCofThisEvent*);
10
11 private:
12     ExN02TrackerHitsCollection* trackerCollection;
13
14     // ROOT
15     TFile * m_HitsFile;
16     TTree * m_HitsTree;
17
18     G4double m_edep;
19     vector<G4int> m_trackId;
20
21};

```

ExN02TrackerSD. cc

```

1 ExN02TrackerSD::ExN02TrackerSD(G4String name)
2 :G4VSensitiveDetector(name)
3 {
4
5     G4String HCname = "hitsCollection";
6     collectionName.insert(HCname);
7
8     // ROOT
9     m_HitsFile = new TFile("hitsOutput.root", "RECREATE");
10    m_HitsTree = new TTree("T","Hits Tree");
11
12    m_HitsTree->Branch("edep", &m_edep, "edep/D");
13    m_HitsTree->Branch("trackId", &m_trackId);
14
15    m_edep = 0.;
16    m_trackId.clear();
17
18}

1 ExN02TrackerSD::~ExN02TrackerSD(){
2
3     m_HitsFile->cd();
4     m_HitsTree->Write();
5     m_HitsFile->Close();
6
7}

1 G4bool ExN02TrackerSD::ProcessHits(G4Step* aStep,G4TouchableHistory*)
2 {
3     G4double edep = aStep->GetTotalEnergyDeposit();
4
5     if(edep==0.) return false;
6
7     ExN02TrackerHit* newHit = new ExN02TrackerHit();
8     newHit->SetTrackID (aStep->GetTrack()->GetTrackID());
9     newHit->SetChamberNb(aStep->GetPreStepPoint()->GetTouchableHandle()
10                        ->GetCopyNumber());
11     newHit->SetEdep      (edep);
12     newHit->SetPos      (aStep->GetPostStepPoint()->GetPosition());
13     trackerCollection->insert( newHit );
14
15     newHit->Print();
16     //newHit->Draw();
17
18     // Send to ntuple
19     m_edep += edep/keV;

```

```

20 m_trackId.push_back( aStep->GetTrack()->GetTrackID() );
21
22 return true;
23}

1void ExN02TrackerSD::EndOfEvent(G4HCofThisEvent*)
2{
3  if (verboseLevel>0) {
4    G4int NbHits = trackerCollection->entries();
5    G4cout << "\n----->Hits Collection: in this event they are " << NbHits
6      << " hits in the tracker chambers: " << G4endl;
7    for (G4int i=0;i<NbHits;i++) (*trackerCollection)[i]->Print();
8  }
9
10 // Fill the Tree
11 m_HitsFile->cd();
12 m_HitsTree->Fill();
13 // Clean up
14 m_edep = 0.;
15 m_trackId.clear();
16
17}

```

New materials. G4NistManager and G4Material.

```

1// NIST
2 G4NistManager * nistman = G4NistManager::Instance();
3// Si
4 G4Material * Silicon = nistman->FindOrBuildMaterial("G4_Si");
5
6// Vacuum
7 G4double atomicNumber = 1.;
8 G4double massOfMole = 1.008*g/mole;
9 G4double density_v = 1.e-25*g/cm3;
10 G4double temperature_v = 2.73*kelvin;
11 G4double pressure_v = 3.e-18*pascal;
12 G4Material * vacuum = new G4Material("interGalactic", atomicNumber,
13   massOfMole, density_v, kStateGas,
14   temperature_v, pressure_v);

```

Digitalization

Digitalizer.h

```
1
```

Digitalizer.cc

```
1
```

Digital.h

```
1
```

Digital.cc

```
1
```

-- John Idarraga - 28 Nov 2013

- FindROOT.cmake: FindROOT.cmake
 - CMakeLists.txt: CMakeLists.txt
-

This topic: Main > Geant4Tutorial

Topic revision: r6 - 2015-07-09 - JohnIdarraga



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