Subject: Units for geometry in .geo files and in root. And FairDetectorPoint questions

Posted by Raghav Kunnawalkam on Wed, 11 Jul 2012 20:12:09 GMT

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Hi All

I am having some weird issues (no that it is a problem just a inconvenience) with the units for geometry in the .geo files and in my root macros and event display.
I am finding that they are not the same units in both places. It looks like the geometry file needs 10 times scaled values.

for example, say that i create a box with the dimentions 10,10,10. in the .geo file and place it in the middle of my space. Now i create an electron with random angle and momentum but i give the starting vertex as 0,0,0. So when i get the FairDetectorPoint.GetPosition() of that object, it is off by a factor of 10. I have no idea why this is happening. I wanted to ask about this earlier actually.

Now for the questions on the FairDetectorPoint. I want to both the position_in (position the track enters the detector volume) and the position_out (position the track leaves or dies or exits the volume) to do digitization for that particular track.

So i changed my processes hit function and all the constructors of my detector so that they look like this:

```
Bool_t  FairEmca::ProcessHits(FairVolume* vol)
{
    /** This method is called from the MC stepping */

    //Set parameters at entrance of volume. Reset ELoss.
    if ( gMC->IsTrackEntering() ) {
        fELoss  = 0.;
        fTime   = gMC->TrackTime() * 1.0e09;
        fLength = gMC->TrackLength();
        //checking to see if it will record my end positin at exit as position
        gMC->TrackPosition(fPos);
        gMC->TrackMomentum(fMom);
    }

//  if (gMC->IsTrackExiting()) {
//      gMC->TrackPosition(fPosOut);
//  }

    // Sum energy loss for all steps in the active volume
    fELoss += gMC->Edep();

    // Create FairEmcaPoint at exit of active volume
    if ( gMC->IsTrackExiting()    ||
        gMC->IsTrackStop()      ||
        gMC->IsTrackDisappeared()   ) {
        gMC->TrackPosition(fPosOut);
        fTrackID  = gMC->GetStack()->GetCurrentTrackNumber();
```

```cpp
    fVolumeID = vol->getMCid();
    //gMC->TrackPosition(fPos);
    //if (fELoss == 0. ) { return kFALSE; }
    AddHit(fTrackID, fVolumeID, TVector3(fPos.X (),  fPos.Y(),  fPos.Z())),
         TVector3(fMom.Px(), fMom.Py(), fMom.Pz()), fTime, fLength,
         fELoss, TVector3(fPosOut.X (),fPosOut.Y(),fPosOut.Z()));

    // Increment number of FairEmca points in TParticle
    FairStack* stack = (FairStack*) gMC->GetStack();
    stack->AddPoint(kFairEmca);
  }

  return kTRUE;
}

FairEmcaPoint* FairEmca::AddHit(Int_t trackID, Int_t detID,
                          TVector3 pos, TVector3 mom,
                          Double_t time, Double_t length,
                          Double_t eLoss, TVector3 posOut)
{
   TClonesArray& clref = *fFairEmcaPointCollection;
   Int_t size = clref.GetEntriesFast();
   return new(clref[size]) FairEmcaPoint(trackID, detID, pos, mom,
                            time, length, eLoss, posOut, pos.Mag(), pos.Phi(), pos.Theta());
}

// -----   Standard constructor
FairEmcaPoint::FairEmcaPoint(Int_t trackID, Int_t detID,
                 TVector3 pos, TVector3 mom,
                 Double_t tof, Double_t length, Double_t eLoss, TVector3 posOut, Double_t
radius,
                 Double_t phi, Double_t theta)
: FairMCPoint(trackID, detID, pos, mom, tof, length, eLoss), fRadius(radius),
fPhi(phi),fTheta(theta)
{   fXfOut = posOut.X ();
   fYfOut = posOut.Y();
   fZfOut = posOut.Z();
   SetLink(FairLink("MCTrack", trackID));
}
```

Even after doing these changes, i am still getting 0,0,0 for the position_out which means that it is not taking any value. Is there something that i am missing to change or update in one of the classes.

I also have another question regarding

```cpp
   ClassDef(FairEmcaPoint,2)
```

i had it initially as 1 and root asked me to change it when i included position_out. Can anyone please tell me what does it mean, why is it 5 for some detectors in panda etc..

As always i appreciate the help a lot.

Cheers
Raghav