

# update of IDEA to EDM4Hep

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# from EDM meeting (1)

There are some variables in the GMCG4TrackerHit which are not foreseen in SimTrackerHit

## GMCG4TrackerHit *original GEANT4 hit*

```
G4int      fTrackID;  
G4int      fChamberNb;  
G4int      fChannelNb;  
G4double   fEdep;  
G4double   fNoIEdep;  
G4double   fGlobalTime;  
G4double   fProperTime;  
G4ThreeVector fPos;  
G4ThreeVector fPosEnding;  
G4ThreeVector fMomentum;  
G4double   fStepLength;  
G4String   fProcessCode;
```

- fGlobalTime: Creation time of the particle that caused the hit
  - Not clear if MCParticle information suitable to obtain this information
  - Might be possible to create a temporary hit with the pile-up time
- fProcessCode: use `int quality` to store bitflag for processID
- cellID is unsigned long long →
  - DCH = chamber ID
  - SVX, PSHW = chamber ID & channel ID
    - call function: `ROGeometryHandle::computeDet(int chambID, int channelID)`
    - for now I hardcoded the line in `convertHits`

# from EDM meeting (2)

## Track ROME-based reco

Int_t	TrkID	Track ID
Double_t	x0,y0,z0	Track Vertex x,y,z coord
Double_t	err_x0, err_y0,err_z0	Error On the Track Vertex x,y,z coord
Double_t	theta	polar angle w.r.t. the beam direction
Double_t	err_theta	Error on the polar angle w.r.t. the beam direction
Double_t	phi	azimuthal angle in the X-Y plane
Double_t	err_phi	Error on the azimuthal angle in the X-Y plane
Double_t	Momentum	Track Momentum
Double_t	Err_Momentum	Error on Track Momentum
TVector3	mom	Fitted Track Momentum
TMatrixDSym	cov	Covariant Matrix of fitted Tracks
Int_t	hitindex	Index of the hit in DCHHitRecResult folder
Int_t	detid	detector id of hit: 0 - DCH, 1 - SVX
Bool_t	Skipped	Flag for hits removed from the fit
TVector3	StateVector	State vector of the track
Int_t	nhits	• Reconstructed Hit Information for the tracks?
Int_t	ngoodhits	◦ Store in SubDetectorHitNumbers, vector of 2*(Number of Detectors), all hits in detector,
Int_t	nhitsdch	Good hits in Detector
Int_t	ngoodhitsdch	
Int_t	nhitssvx	◦ E.g: <a href="https://github.com/iLCSoft/MarlinTrkProcessors/blob/363e01c9c1f4f98fd62d3c81f648abe72c00756a/source/Refitting/src/SiliconTracking_MarlinTrk.cc#L3323-L3325">https://github.com/iLCSoft/MarlinTrkProcessors</a>
Int_t	ngoodhitssvx	<a href="https://github.com/iLCSoft/MarlinTrkProcessors/blob/363e01c9c1f4f98fd62d3c81f648abe72c00756a/source/Refitting/src/SiliconTracking_MarlinTrk.cc#L3323-L3325">/blob/363e01c9c1f4f98fd62d3c81f648abe72c00756a/source/Refitting</a>
Int_t	nhitspshw	<a href="https://github.com/iLCSoft/MarlinTrkProcessors/blob/363e01c9c1f4f98fd62d3c81f648abe72c00756a/source/Refitting/src/SiliconTracking_MarlinTrk.cc#L3323-L3325">/src/SiliconTracking_MarlinTrk.cc#L3323-L3325</a>
Int_t	ngoodhitspshw	
Double_t	chi2	chi2 of the track
Int_t	dof	Degrees of freedom
Bool_t	IsFitted	Flag indicating if the track has been already fitted

- dN/dX measurement, how to store?
  - Stored in addition or instead of dE/dX?

# Track conversion

- Starting point
  - **Simulation:**
    - set environment with FCC stack @ lxpplus
    - compile with cmake
  - **Analyzer:**
    - set environment to find ROME, GENFIT2, by default in /afs/cern.ch/work/w/welmeten/public/IDEA-sw
    - compile by ROME builder: **\$ROMESYS/bin/romebuilder.exe -i GMC.xml**

```
[llavezzi@lxplus722 GMC]$ $ROMESYS/bin/romebuilder.exe -i GMC.xml
Warning in <TFile::Init>: no StreamerInfo found in /afs/cern.ch/work/w/welmeten/public/IDEA-sw/ROME/rome3-master20191106/bin/ROMEBuilderDict_rdict.pcm therefore preventing schema evolution when reading this file.
The file was produced with version 6.14/06 of ROOT.
Inputfile 'GMC.xml' not found.
```

- Copied both from Walaa to my area → recompiled with env from the stack
- Re-compile the **Analyzer** with ROME builder:
  - Some include files not found: *for now I made links, how can I tell ROME where to search?*
  - Still get an error:

```
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp: In member function 'void XMLToFormWindow::PlaceWindow(const TGWindow*)':
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp:668:7: error: 'gVirtualX' was not declared in this scope
gVirtualX->TranslateCoordinates(main->GetId(), GetParent()->GetId(),
^
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp:668:7: note: suggested alternative: 'TVirtualPad'
gVirtualX->TranslateCoordinates(main->GetId(), GetParent()->GetId(),
^
TVirtualPad
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp:675:7: error: 'gVirtualX' was not declared in this scope
gVirtualX->GetWindowSize(fClient->GetRoot()->GetId(), ax, ay, root_w, root_h);
^
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp:675:7: note: suggested alternative: 'TVirtualPad'
gVirtualX->GetWindowSize(fClient->GetRoot()->GetId(), ax, ay, root_w, root_h);
^
TVirtualPad
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp: In member function 'virtual Bool_t XMLToFormWindow::ProcessMessage(Long_t, Long_t, Long_t)':
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp:799:10: error: 'gVirtualX' was not declared in this scope
gVirtualX->SetInputFocus(gVirtualX->GetInputFocus()+1);
^
/afs/cern.ch/work/l/llavezzi/IDEA/ROME/rome3-master20191106/src/XMLToFormWindow.cpp:799:10: note: suggested alternative: 'TVirtualPad'
gVirtualX->SetInputFocus(gVirtualX->GetInputFocus()+1);
^
TVirtualPad
make: *** [obj/XMLToFormWindow.o] Error 1
```