Status of CEPCSW for tracking performance study

Next Step

・ Check recent updates on the detector configuration, especially the FTD part, prepared in CEPCSW master. For the barrel, it does not affect so much, but a good timing to check the geometry.

・ Since the crash happened (like below), try to point where it comes from. along with checking the geometry settings. (not sure how easy it is, from recent checks by myself...)

```
The lines below might hint at the cause of the crash.
You may get help by asking at the ROOT forum http://root.cern.ch/forum
Only if you are really convinced it is a bug in ROOT then please submit a
report at http://root.cern.ch/bugs Please post the ENTIRE stack trace
from above as an attachment in addition to anything else
that might help us fixing this issue.
===========================================================
#5  0x00002b88663d4ba0 in G4PhysicsVector::LogVectorValue(double, double) const () from /cvmfs/sft.cern.ch/lcg/releases/Geant4/10.06.p02-4eb2a/x86_64
#6  0x00002b88678387a4 in G4VEnergyLossProcess::AlongStepGetPhysicalInteractionLength(G4Track const&, double, double, double&, G4GPILSelection*) () f
.06.p02-4eb2a/x86_64-centos7-gcc8-opt/lib64/libG4processes.so
#7  0x00002b8866ba1e4f in G4SteppingManager::DefinePhysicalStepLength() () from /cvmfs/sft.cern.ch/lcg/releases/Geant4/10.06.p02-4eb2a/x86_64-centos7
#8  0x00002b8866ba00e8 in G4SteppingManager::Stepping() () from /cvmfs/sft.cern.ch/lcg/releases/Geant4/10.06.p02-4eb2a/x86_64-centos7-gcc8-opt/lib64/
#9  0x00002b8866babb12 in G4TrackingManager::ProcessOneTrack(G4Track*) () from /cvmfs/sft.cern.ch/lcg/releases/Geant4/10.06.p02-4eb2a/x86_64-centos7-
#10 0x00002b88669203b4 in G4EventManager::DoProcessing(G4Event*) () from /cvmfs/sft.cern.ch/lcg/releases/Geant4/10.06.p02-4eb2a/x86_64-centos7-gcc8-o
#11 0x00002b88666b3625 in G4RunManager::ProcessOneEvent(int) () from /cvmfs/sft.cern.ch/lcg/releases/Geant4/10.06.p02-4eb2a/x86_64-centos7-gcc8-opt/l
#12 0x00002b8879093dd1 in DetSimSvc::simulateEvent (this=<optimized out>, i_event=<optimized out>) at /cefs/higgs/kiuchi/CEPCSW.sdt/CEPCSW/Simulation
#13 0x00002b887907079a in DetSimAlg::execute (this=<optimized out>) at /cefs/higgs/kiuchi/CEPCSW.sdt/CEPCSW/Simulation/DetSimCore/src/DetSimAlg.cpp:1
#14 0x00002b884775b4e2 in Gaudi::details::LegacyAlgorithmAdapter::execute(EventContext const&) const () from /cvmfs/cepcsw.ihep.ac.cn/prototype/relea
c.so
#15 0x00002b88440e504a in Gaudi::Algorithm::sysExecute(EventContext const&) () from /cvmfs/cepcsw.ihep.ac.cn/prototype/releases/externals/98.0.0/Gaud
#16 0x00002b88441f72ca in MinimalEventLoopMgr::executeEvent(EventContext&&) () from /cvmfs/cepcsw.ihep.ac.cn/prototype/releases/externals/98.0.0/Gaud
#17 0x00002b88476bc487 in EventLoopMgr::executeEvent(EventContext&&) () from /cvmfs/cepcsw.ihep.ac.cn/prototype/releases/externals/98.0.0/Gaudi/lib/l
#18 0x00002b88476bcca5 in EventLoopMgr::nextEvent(int) () from /cvmfs/cepcsw.ihep.ac.cn/prototype/releases/externals/98.0.0/Gaudi/lib/libGaudiCoreSvc
#19 0x00002b88441f6f47 in MinimalEventLoopMgr::executeRun(int) () from /cvmfs/cepcsw.ihep.ac.cn/prototype/releases/externals/98.0.0/Gaudi/lib/libGaud
```

Debug work ...

· Try to print-out information at user actions (step/pre-tracking/post-tracking)

· Try to add a cut value on track length (=1mm)
(in Simulation /DetSimCore/src/DesSimAlg.cpp)

· the run (with max=300events setting) finished without the crash, but need further checks, to see the effect. i.e. much more number of events, different geometry etc.
If it is still there, I might stop once further on this particular issue.

```
energyDeposit/MeV = 0.00115721, deltaEnergy/MeV = -0.00115721, stepLength/mm = 0.154876
preStep is on boundary : false    postStep is on boundary : false
Pre-Position (x, y, z) = (-850.57, 615.811, 73.5667)    Post-Position (x, y, z) = (-850.536, 615.776, 73.503)
PostUserTracking: particle name = e-, kinetic Energy/MeV = 0

PreUserTracking: particle name = e-, kinetic Energy/MeV = 0.00312412
energyDeposit/MeV = 0.000611063, deltaEnergy/MeV = -0.000611063, stepLength/mm = 0.5
preStep is on boundary : false    postStep is on boundary : false
Pre-Position (x, y, z) = (-649.74, 476.802, 70.7313)    Post-Position (x, y, z) = (-649.744, 476.796, 70.5349)
energyDeposit/MeV = 0.00110381, deltaEnergy/MeV = -0.00110381, stepLength/mm = 0.438243
preStep is on boundary : false    postStep is on boundary : false
Pre-Position (x, y, z) = (-649.744, 476.796, 70.5349)    Post-Position (x, y, z) = (-649.733, 476.749, 70.5111)
energyDeposit/MeV = 0.00140925, deltaEnergy/MeV = -0.00140925, stepLength/mm = 0.210229
preStep is on boundary : false    postStep is on boundary : false
Pre-Position (x, y, z) = (-649.733, 476.749, 70.5111)    Post-Position (x, y, z) = (-649.757, 476.762, 70.3958)
PostUserTracking: particle name = e-, kinetic Energy/MeV = 0

PreUserTracking: particle name = e-, kinetic Energy/MeV = 0.00105174
energyDeposit/MeV = 0.00105174, deltaEnergy/MeV = -0.00105174, stepLength/mm = 0.0653625
preStep is on boundary : false    postStep is on boundary : false
Pre-Position (x, y, z) = (-637.674, 468.296, 69.3703)    Post-Position (x, y, z) = (-637.676, 468.299, 69.3472)
PostUserTracking: particle name = e-, kinetic Energy/MeV = 0

PreUserTracking: particle name = Si28, kinetic Energy/MeV = 0.17263          ?

*** Break *** segmentation violation



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There was a crash.
(:
-centos7-gcc8-opt/include/Geant4/G4SteppingManager.hh
opt/include/Geant4/G4SteppingManager.hh
```

(found a good example, the crash happens ~200 events)