



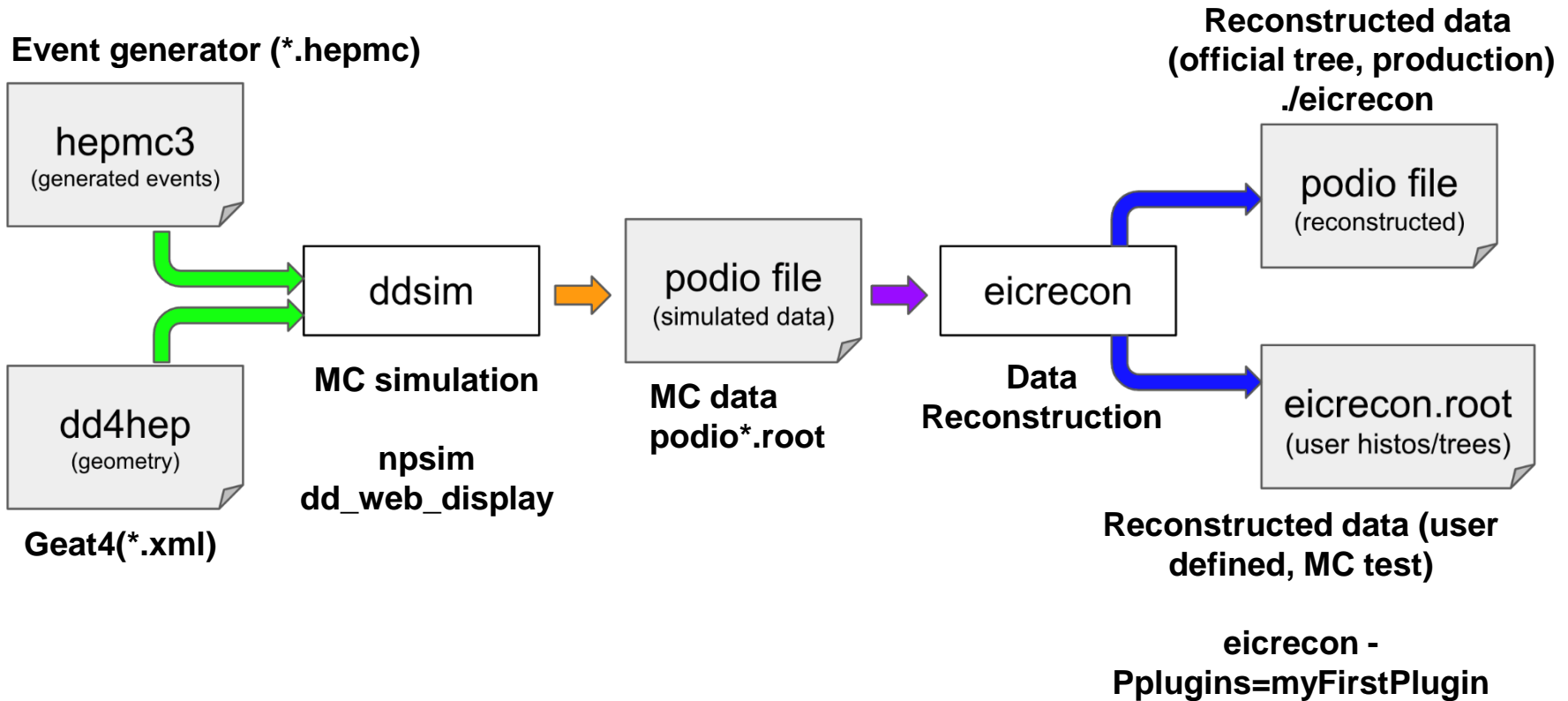
ePIC Software

ZDC ML Study @20241008

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ePIC Software



- Install and run : ddsim, npsim, dd_web_display and eicrecon.

Tutorial

- Tutorial YouTube :
<https://www.youtube.com/watch?v=Y0Mg24XLomY&list=PLui8F4uNCFWm3M3g3LG2cOledhI7lvTAJ>
- Two tutorials done on September, 2022 and April, 2024
- Some command lines/conditions introduced at 2022 might not work anymore. One should dig in the tutorial at 2024.
- Memo of the workshop on April, 2024 :
<https://eic.github.io/tutorial-analysis/01-introduction/index.html>.
One could copy the command lines directly.
- Note. Tutorial web :
<https://eic.github.io/documentation/tutorials.html>
- Note. ePIC MC git : <https://github.com/eic>

eic-shell



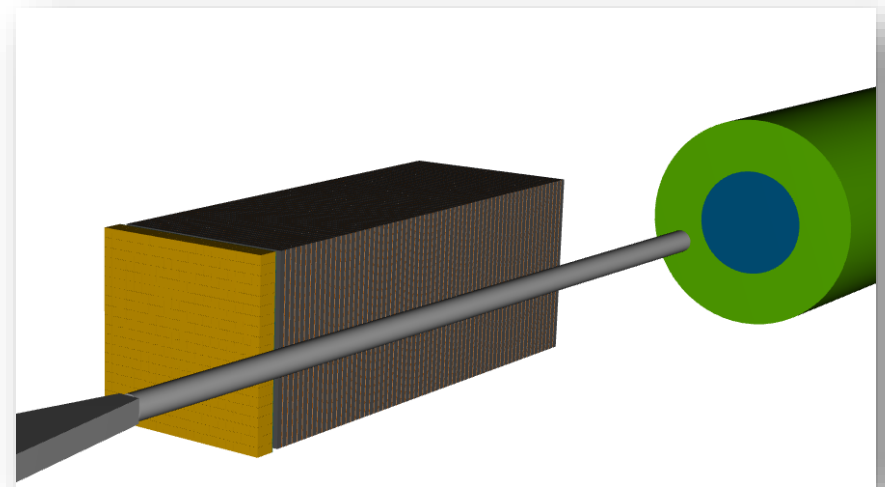
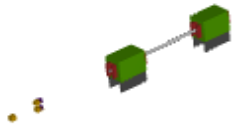
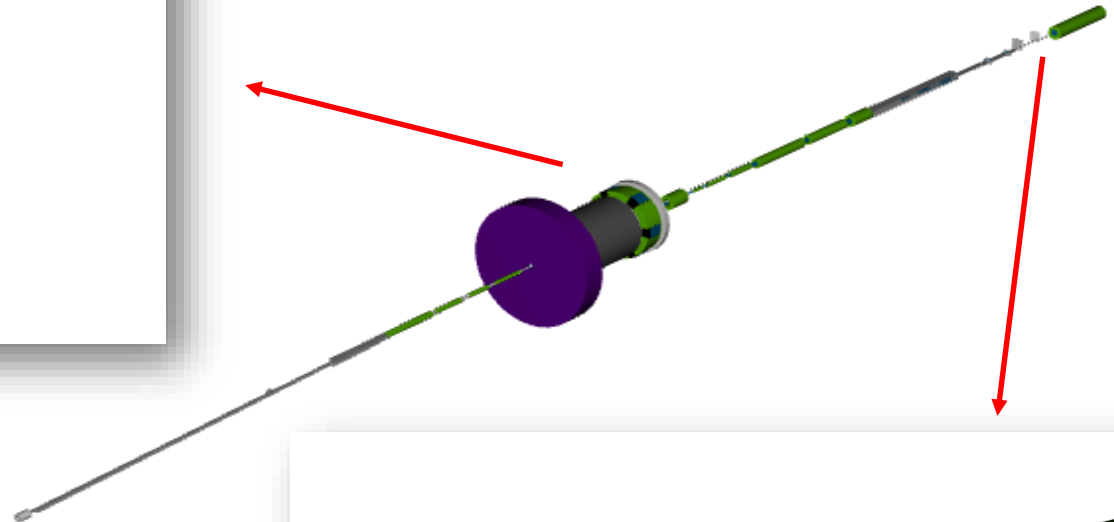
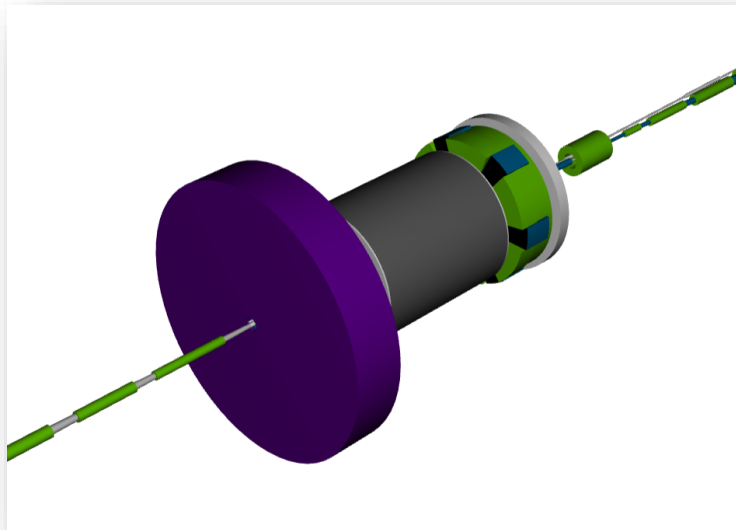
- ssh dyparton
- curl --location https://get.epic-eic.org | bash
- ./eic-shell
- #----- under eic-shell -----
- ls /usr/local/bin/singularity
- ls /opt/local/bin/ddsim
- ddsim #make sure to run ddsim
- root #make sure to run root

dd_web_display



- #----- under dyparton -----
- #----- under eic-shell -----
- #- install epic master branch
- git clone <https://github.com/eic/epic.git>
- cd epic
- cmake -B build -S . -DCMAKE_INSTALL_PREFIX=install
- cmake --build build
- cmake --install build
- source install/bin/thisepic.sh
- env | grep \$DETECTOR
- ls \${DETECTOR_PATH}
- cat \${DETECTOR_PATH}/epic.xml | grep
- cat \${DETECTOR_PATH}/compact/far_forward/ZDC_SiPMonTile.xml
- cat \${DETECTOR_PATH}/compact/far_forward/ZDC_Crystal_LYSO.xml
- dd_web_display --export -o geom_epic.root \${DETECTOR_PATH}/epic.xml
- dd_web_display --export -o geom_epic_ZDC.root \${DETECTOR_PATH}/epic_zdc_lyso_sipm.xml #show ZDC only
- # go to <https://eic.phy.anl.gov/geoviewer/index.htm?>
- # upload geom_epic.root and check the geometry of detector setting

dd_web_display



ddsim



- #----- under dyparton -----
- #----- under eic-shell -----
- ddsim --help
- ddsim --dumpSteeringFile > [steering.py](#) # pipe out the setting file to [steering.py](#)
- ddsim --steeringFile steering_min.py --compactFile \$DETECTOR_PATH/\$DETECTOR_CONFIG.xml -G -N 10 --gun.thetaMin "3*deg" --gun.thetaMax "45*deg" --gun.distribution "cos(theta)" --gun.momentumMin "1*GeV" --gun.momentumMax "10*GeV" --gun.particle "pi+"
- ddsim -N 100 \
--compactFile \$DETECTOR_PATH/\$DETECTOR_CONFIG.xml \
--outputFile out.root \
--inputFile **root://dtn-eic.jlab.org/work/eic2/EPIC/Tutorials/pythia8NCDIS_10x100_minQ2=1_beamEffects_xAngle=-0.025_hiDiv.hepmc3.tree.root**
- npsim #include default steering setting

eicrecon

- #----- under dyparton -----
- #----- under eic-shell -----
- git clone <https://github.com/eic/EICrecon.git>
- ./eic-shell
- cd ../EICrecon/
- cmake -B build -S . -
DCMAKE_INSTALL_PREFIX=install
- cmake --build build
- cmake --install build
- source install/bin/eicrecon-this.sh
- eicrecon -
Ppodio:output_collections=ReconstructedParticles,Mcparticles MCdata.root #assign the reconstruction algorithm one

```
nightly> davidl@ifarm1801:/w/eic-scsshelf2104/users/davidl/2022.09.26.tutorial/EICrecon$ eicrecon -L

List all the factories:

-----
Plugin                               Object name                               Tag
-----
tracking.so                           ParticlesFromTrackFitResult              CentralTrackingParticles
tracking.so                             Jug::Trajectories                        CentralCKFTrajectories
tracking.so                           Acts::SingleBoundTrackParameters<Acts::SinglyCharged>  InitTrackParams
BTRK.so                                edm4eic::TrackerHit                       BarrelTrackerHit
BVTX.so                                edm4eic::TrackerHit                       BarrelVertexHit
ECTRK.so                               edm4eic::TrackerHit                       EndcapTrackerHit
MPGD.so                                edm4eic::TrackerHit                       MIPGDTrackerHit
BEMC.so                                edm4eic::ProtoCluster                     EcalBarrelIslandProtoClusters
BEMC.so                                edm4eic::ProtoCluster                     EcalBarrelTruthProtoClusters
EEMC.so                                edm4eic::ProtoCluster                     EcalEndcapNIslandProtoClusters
EEMC.so                                edm4eic::ProtoCluster                     EcalEndcapNTruthProtoClusters
BTRK.so                                edm4eic::RawTrackerHit                    BarrelTrackerRawHit
BVTX.so                                edm4eic::RawTrackerHit                    BarrelVertexRawHit
ECTRK.so                               edm4eic::RawTrackerHit                    EndcapTrackerRawHit
MPGD.so                                edm4eic::RawTrackerHit                    MIPGDTrackerRawHit
BEMC.so                                edm4eic::CalorimeterHit                   EcalBarrelRecHits
EEMC.so                                edm4eic::CalorimeterHit                   EcalEndcapNRecHits
tracking.so                             edm4eic::TrackParameters                  TrackParameters
tracking.so                             edm4eic::ReconstructedParticle            ReconstructedParticles
BEMC.so                                edm4eic::Cluster                          EcalBarrelClusters
BEMC.so                                edm4eic::Cluster                          EcalBarrelMergedClusters
EEMC.so                                edm4eic::Cluster                          EcalEndcapNClusters
EEMC.so                                edm4eic::Cluster                          EcalEndcapNMergedClusters
BEMC.so                                edm4hep::RawCalorimeterHit                EcalBarrelRawHits
EEMC.so                                edm4hep::RawCalorimeterHit                EcalEndcapNRawHits
tracking.so                             eicrecon::TrackerSourceLinkerResult       CentralTrackerSourceLinker
-----
```


eicrecon + eicmkplugin



- #----- under dyparton -----
- #----- under eic-shell -----
- eicmkplugin.py myFirstPlugin
- cd myFirstPlugin
- cmake -B build -S . -DCMAKE_INSTALL_PREFIX=install
- cmake --build build
- cmake --install build
- export
JANA_PLUGIN_PATH="/usrX/cyhsieh/2024ZDC/eic/EICrecon/myFirstPlugin/install/lib:\$JANA_PLUGIN_PATH"
- eicrecon --help
- emacs myFirstPlugin/myFirstPluginProcessor.h myFirstPlugin/[myFirstPluginProcessor.cc](#)
- cmake --build build
- cmake --install build
- eicrecon -Pplugins=myFirstPlugin MCdata.root

Status

- I have practiced full MC chain from Geant4 to reconstruction with official ePIC MC setting.
- Next step, I will try to include only ZDC and produced MCdata.root. Do we need reconstructed data?
- What kind of input file/beam condition should I assign?
- How do we share tasks?