ProtoDUNE data for the MasterClass (Update)

Andriaseta Sitraka
Jairo Rodriguez
(South Dakota School Mines & Technology)

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Goal

- Getting some display sample of cosmic run from ProtoDUNE data
- We expect to plot some cosmic tracks that the students will be able to see on the website

Status

- We found some ProtoDune data with only cosmic run. Those files are raw data.
- We used predefined Larsoft module to get reconstructed Larsoft files.
- After the reconstruction we can see the following information inside the Larsoft file

https://twiki.cern.ch/twiki/pub/CENF/DUNEProtSPPhotonDetectors/lhw_CERNLArSoft.pdf

Open | output.txt ~/ | Save

```
RunRawDecoder | ssprawdecoder... | external..... | std::vector<recob::OpHit>..... | ..275
RunRawDecoder | ssprawdecoder... | external..... | std::vector<raw::OpDetWaveform>..... | ..275
RunRawDecoder | timingrawdecoder | daq..... | std::vector<raw::RDTimeStamp>..... | ....1
Reco..... | TriggerResults.. | ..... | art::TriggerResults..... | ....-
Reco..... | pmtrack..... | ..... | std::vector<recob::Vertex>..... | ...44
Reco..... | pandoracalo..... | ..... | art::Assns<recob::Track,anab::Calorimetry,void>..... | ..273
Reco..... | pandora..... | ..... | art::Assns<recob::PFParticle,recob::SpacePoint,void>..... | 22830
Reco..... | pmtrackpid..... | ..... | art::Assns<recob::Track,anab::ParticleID,void>..... | ..147
Reco..... | reco3d..... | noreg..... | std::vector<recob::SpacePoint>..... | 15754
Reco..... | pandora..... | ..... | std::vector<recob::Vertex>..... | ..249
Reco..... | pandoraShower... | ..... | art::Assns<recob::Shower,recob::Hit,void>..... | .3545
Reco..... | pmtrack..... | ..... | art::Assns<recob::PFParticle,recob::Vertex,void>..... | ...88
Reco..... | pandoracalo..... | ..... | std::vector<anab::Calorimetry>..... | ..273
Reco..... | hitpdune..... | ..... | art::Assns<recob::Wire,recob::Hit,void>..... | 38605
Reco..... | ophitExternal... | ..... | std::vector<recob::OpHit>..... | ..336
Reco..... | pmtrack..... | kink..... | art::Assns<recob::Track,recob::Vertex,void>..... | ....0
Reco..... | pandora..... | ..... | art::Assns<recob::PFParticle,recob::Vertex,void>..... | ..249
Reco..... | pandora..... | ..... | std::vector<larpandoraobj::PFParticleMetadata>..... | ..249
Reco..... | pmtrack..... | kink..... | std::vector<recob::Vertex>..... | ....0
Reco..... | linecluster..... | ..... | art::Assns<recob::Wire,recob::Hit,void>..... | 37985
Reco..... | pmtrack..... | ..... | std::vector<anab::CosmicTag>..... | ...22
Reco..... | pandoraShower... | ..... | std::vector<recob::Shower>..... | ..158
Reco..... | linecluster..... | ..... | std::vector<recob::Hit>..... | 37985
Reco..... | caldata..... | ..... | art::Assns<raw::RawDigit,recob::Wire,void>..... | .6207
Reco..... | linecluster..... | ..... | std::vector<recob::Vertex>..... | ....1
Reco..... | pmtrack..... | ..... | std::vector<recob::PFParticle>..... | ...88
Reco..... | pandora..... | ..... | std::vector<anab::T0>..... | ....0
Reco..... | pandora..... | ..... | std::vector<recob::Cluster>..... | ..508
Reco..... | pandoraShower... | ..... | art::Assns<recob::PFParticle,recob::PCAxis,void>..... | ..158
Reco..... | pmtrack..... | ..... | std::vector<anab::T0>..... | ....0
Reco..... | pandora..... | ..... | std::vector<recob::PFParticle>..... | ..249
Reco..... | pandoraTrack.... | ..... | art::Assns<recob::PFParticle,recob::Track,void>..... | ...91
Reco..... | gaushit..... | ..... | art::Assns<raw::RawDigit,recob::Hit,void>..... | 38605
Reco..... | pmtrack..... | ..... | art::Assns<recob::Track,anab::T0,void>..... | ....0
Reco..... | reco3d..... | ..... | art::Assns<recob::SpacePoint,recob::Hit,void>..... | 39890
Reco..... | pandorapid..... | ..... | std::vector<anab::ParticleID>..... | ..273
Reco..... | pmtrack..... | node..... | std::vector<recob::Vertex>..... | ....0
Reco..... | linecluster..... | ..... | art::Assns<raw::RawDigit,recob::Hit,void>..... | 37985
Reco..... | opflashInternal. | ..... | std::vector<recob::OpFlash>..... | ..105
Reco..... | linecluster..... | ..... | art::Assns<recob::Cluster,recob::Hit,void>..... | 23759
Reco..... | opflashInternal. | ..... | art::Assns<recob::OpFlash,recob::OpHit,void>..... | ..697
Reco..... | pandora..... | ..... | art::Assns<recob::Cluster,recob::Hit,void>..... | 26408
Reco..... | pmtrack..... | ..... | art::Assns<recob::Track,recob::Hit,recob::TrackHitMeta>..... | 14703
Reco..... | hitpdune..... | ..... | art::Assns<recob::Hit,recob::SpacePoint,void>..... | 39890
Reco..... | pmtrack..... | ..... | art::Assns<recob::Track,recob::Hit,void>..... | 14703
Reco..... | pandorapid..... | ..... | art::Assns<recob::Track,anab::ParticleID,void>..... | ..273
Reco..... | pmtrack..... | ..... | art::Assns<recob::Track,anab::CosmicTag,void>..... | ...22
Reco..... | opflashExternal. | ..... | std::vector<recob::OpFlash>..... | ....2
Reco..... | opflashExternal. | ..... | art::Assns<recob::OpFlash,recob::OpHit,void>..... | ..244
Reco..... | linecluster..... | ..... | std::vector<recob::EndPoint2D>..... | ...58
Reco..... | pandoraShower... | ..... | art::Assns<recob::PFParticle,recob::Shower,void>..... | ..158
Reco..... | gaushit..... | ..... | std::vector<recob::Hit>..... | 38605
Reco..... | pandora..... | ..... | art::Assns<recob::PFParticle,larpandoraobj::PFParticleMetadata,void> | ..249
Reco..... | pmtrackcalo..... | ..... | art::Assns<recob::Track,anab::Calorimetry,void>..... | ..147
```

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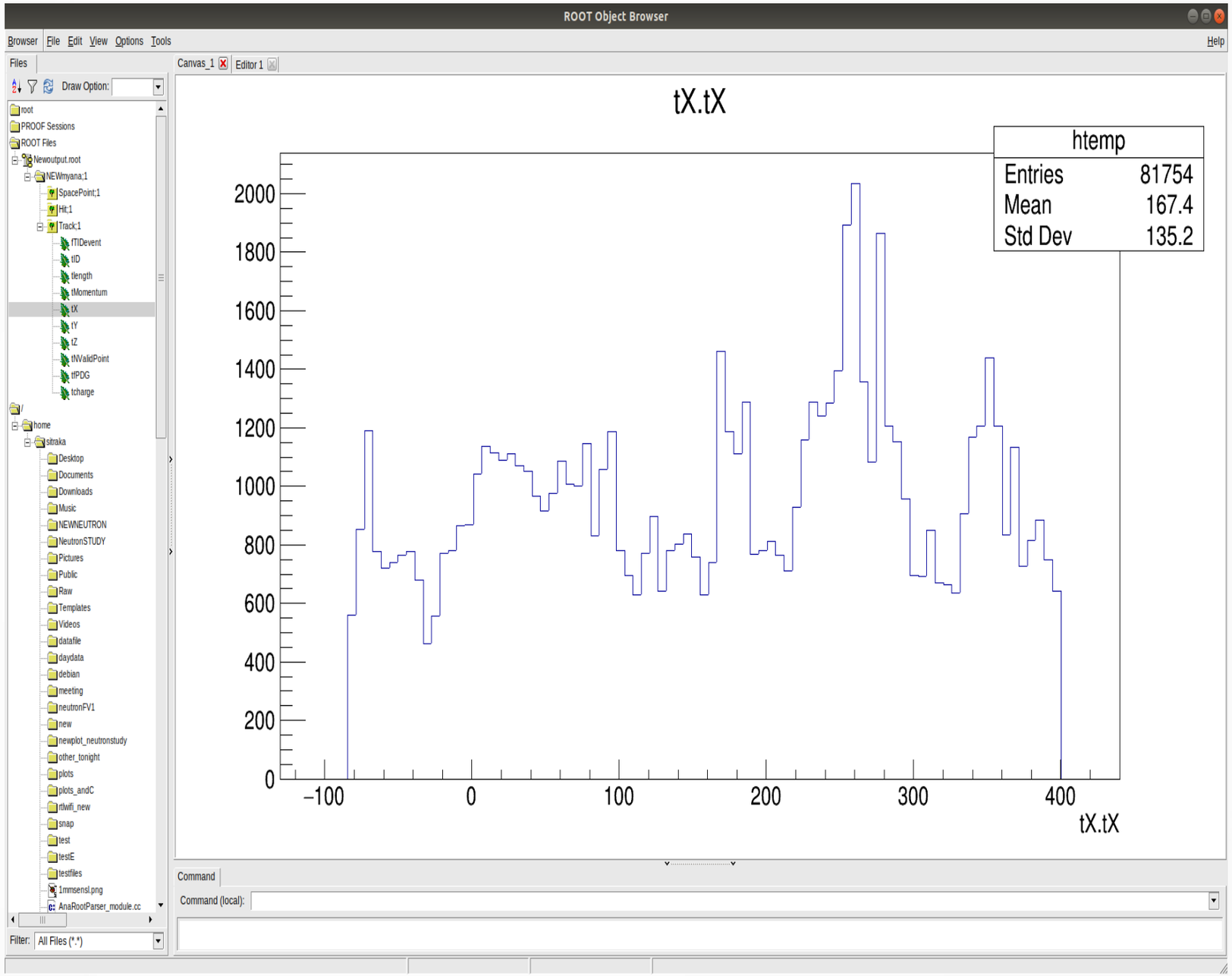
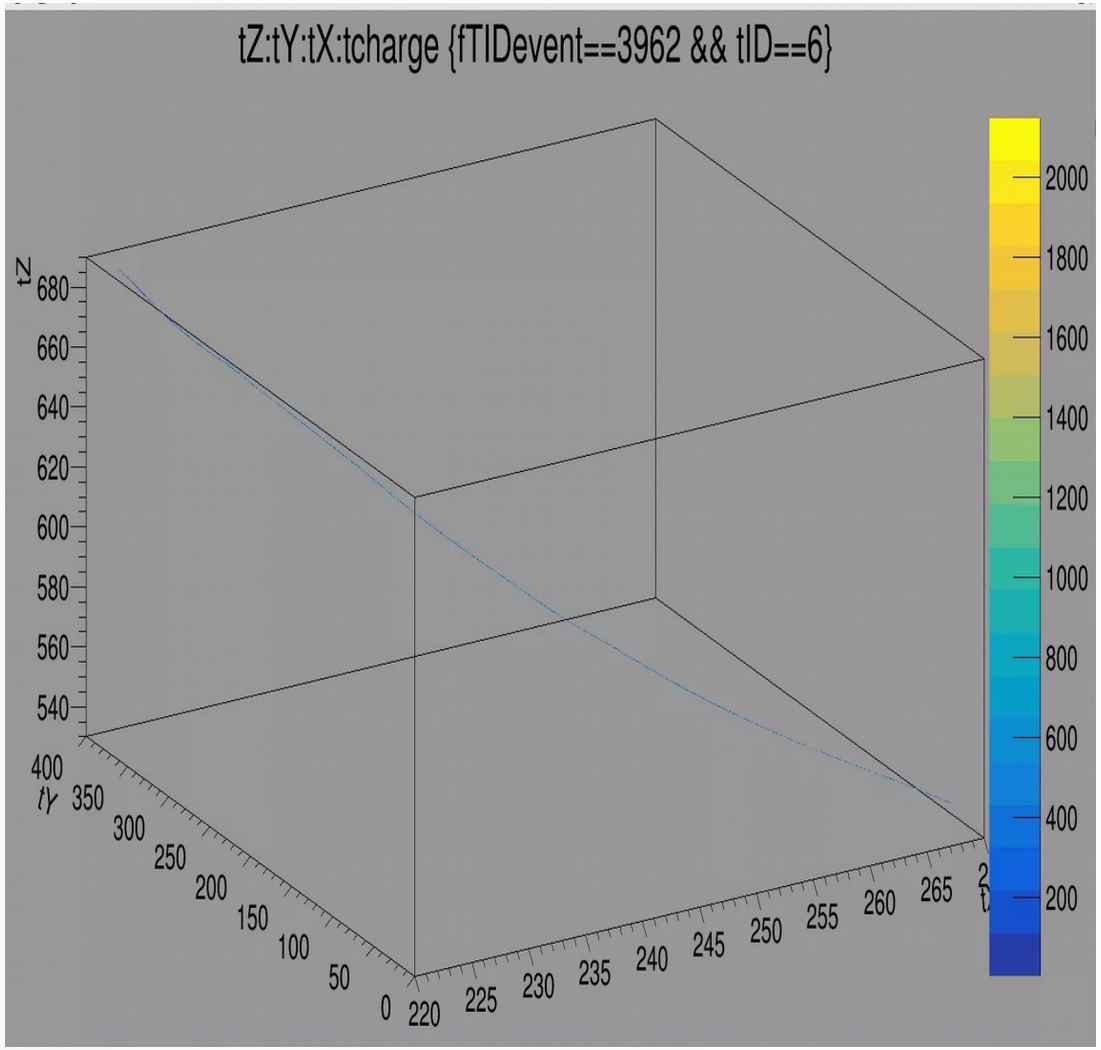
Status

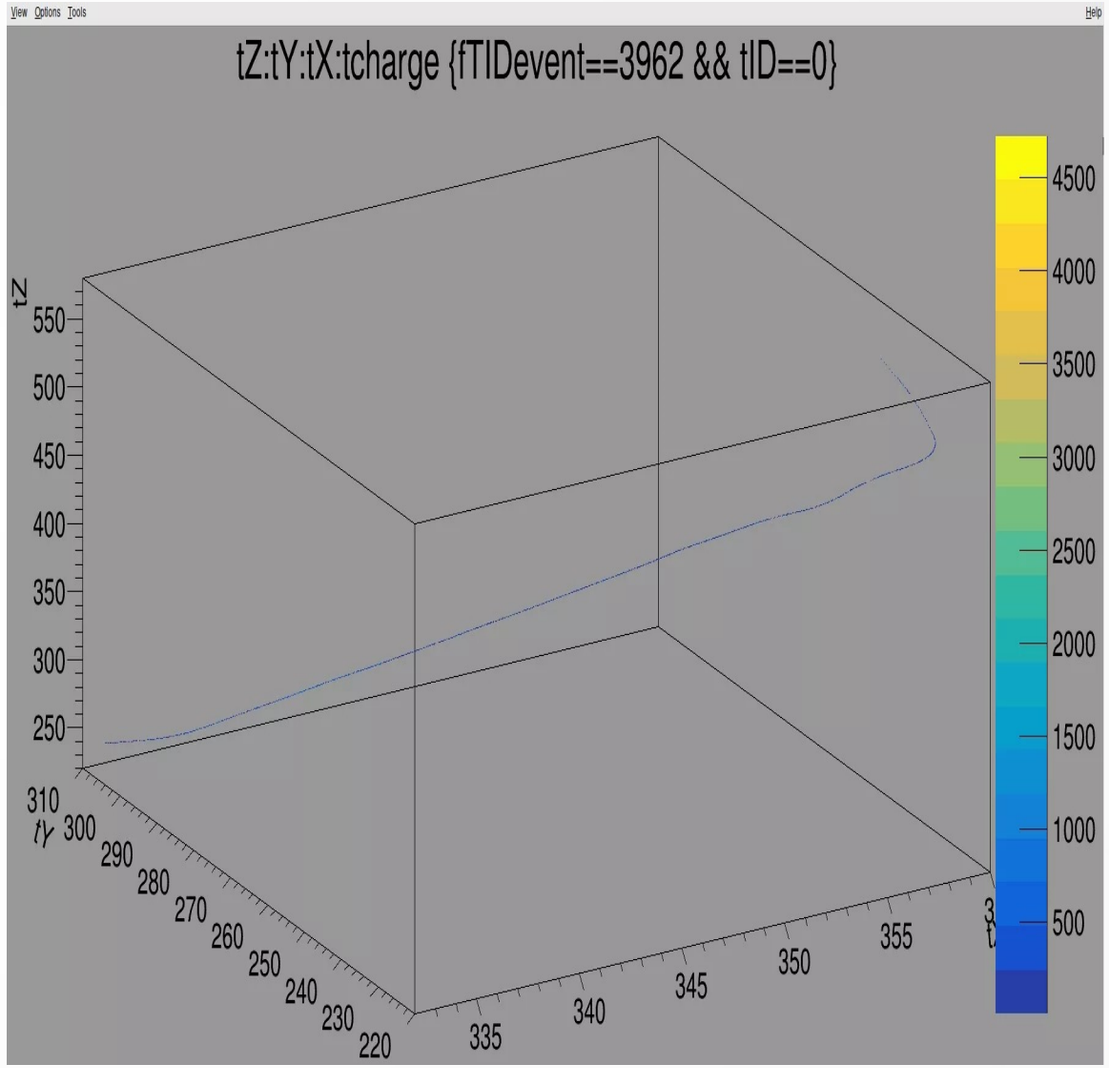
- And we changed the Larsoft format files to root format.
- We took the Track information from the reconstructed Larsoft to create the root file.



Status

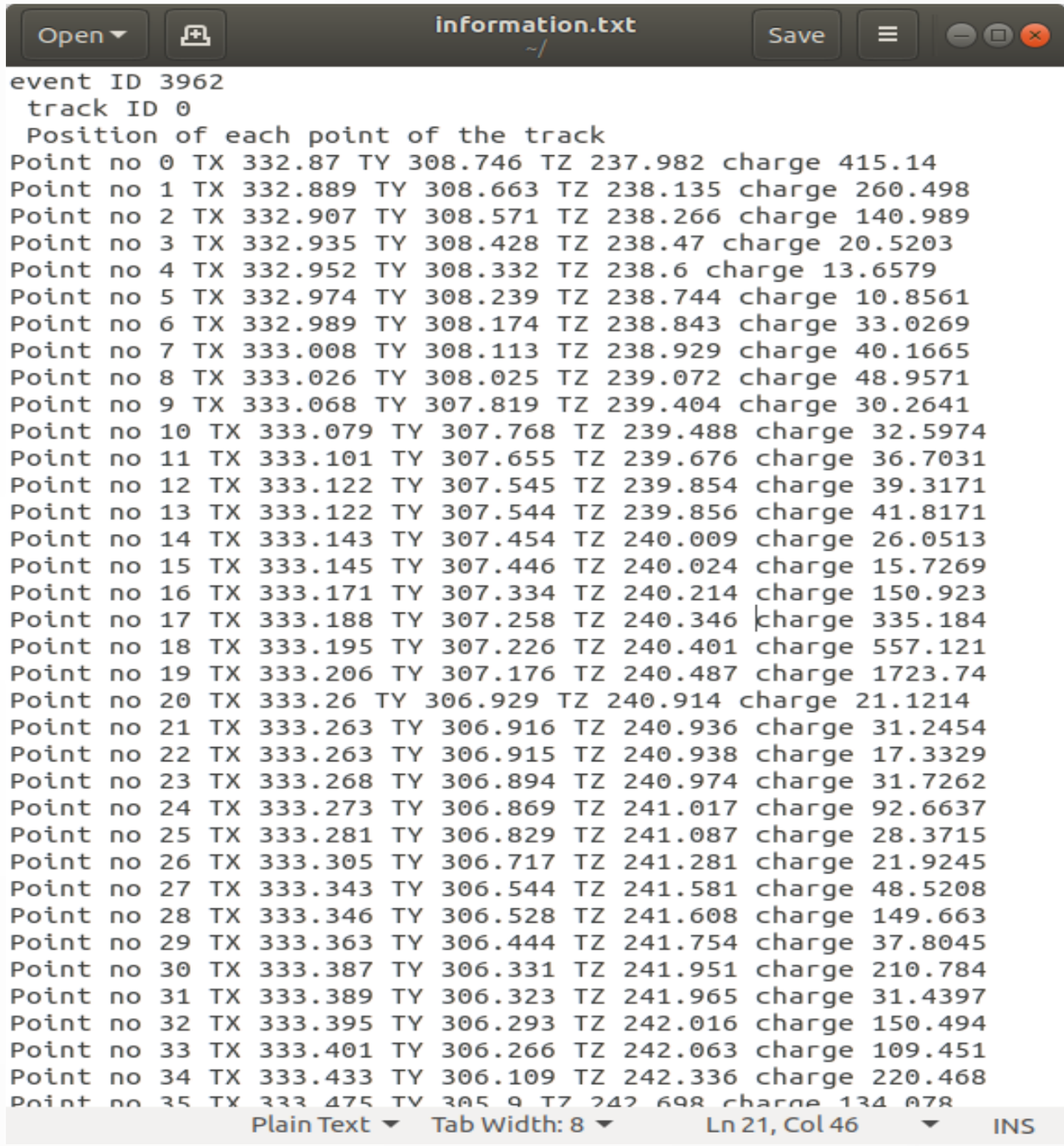
- Here are some tracks we got (the color scale is charge)





File with informations

- We created a file with the following information:
- Event ID
- Then tracj



Next steps

- We want to get more data.