LAMPS TPC Simulation

KUNPL Group meeting

정우

MC Simulation FOPI

- Parameter
  “tpc.TBtestChamber.par” file is used (in runMCFOPI.C) for parameter input, which specify information of gas, pad plane, noise, threshold etc.

- Detector
  TPC geometry (root) file “tpc_prototype.root” is used.
  “TGeoVolume” root file needs more study for detail structure
  Ascii geometry file(.geo) can also be used but problem occurs when digitization simulation is done.

- Primary Generator
  FairBoxGenerator is used for random angle distribution. Other classes are available.

Detector Geometry File

Geometry file can be made in 2 ways.

1. Ascii file with FAIR BASE geometry format.
   : Easy to write, but don't work with digitization for now. Trying to find the reason. Planning to ask Felix for this problem.

2. Root file with TGeoVolume class.
   : Works with digitization. Hard to write, but well arranged.

We will get to TGeoVolume root file at some point, but will stick with ascii format for now.

FairGenerator Class

Generates event for (GENAT) simulation.

- FairBoxGenerator
  : Generates particle within given range of angle with fixed multiplicity per event.

- FairEvtGenGenerator
  : Reads AsciiFile within fixed format.

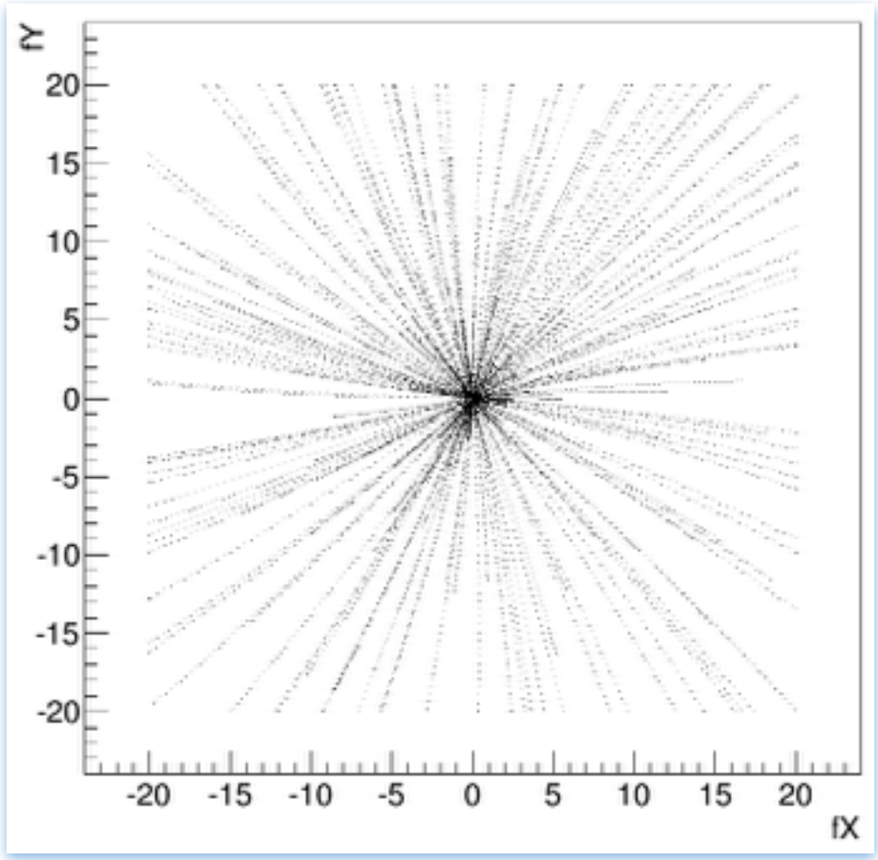
- FairUrqmdGenerator
  : Use UrQMD output file.

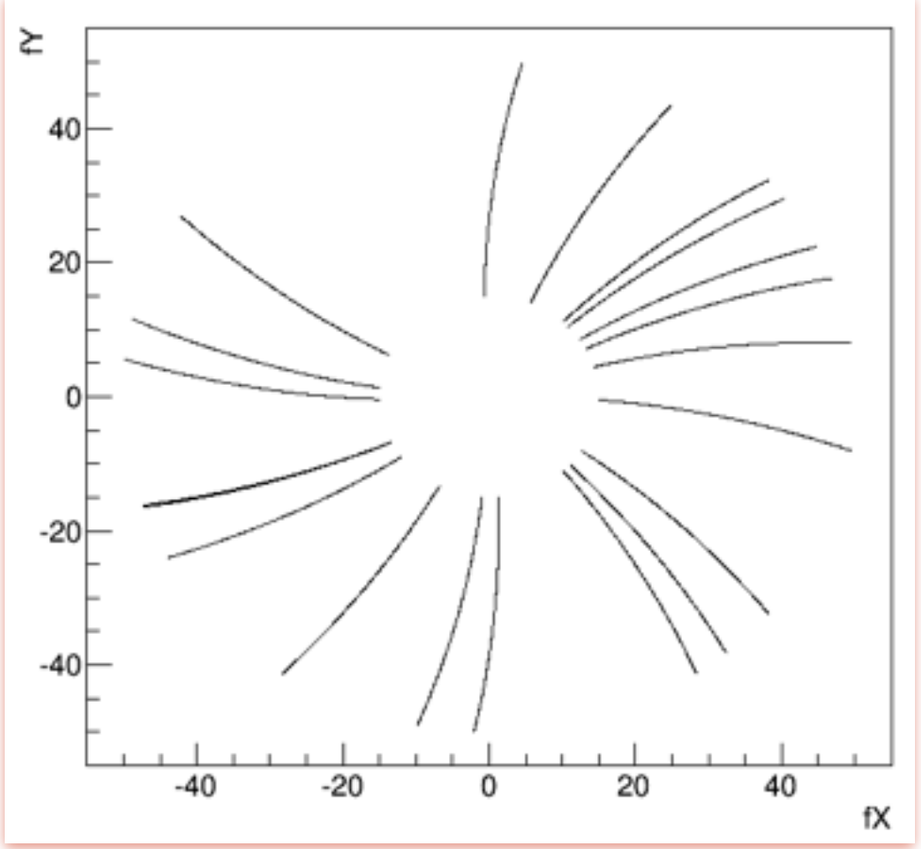
No event generator that reads root file

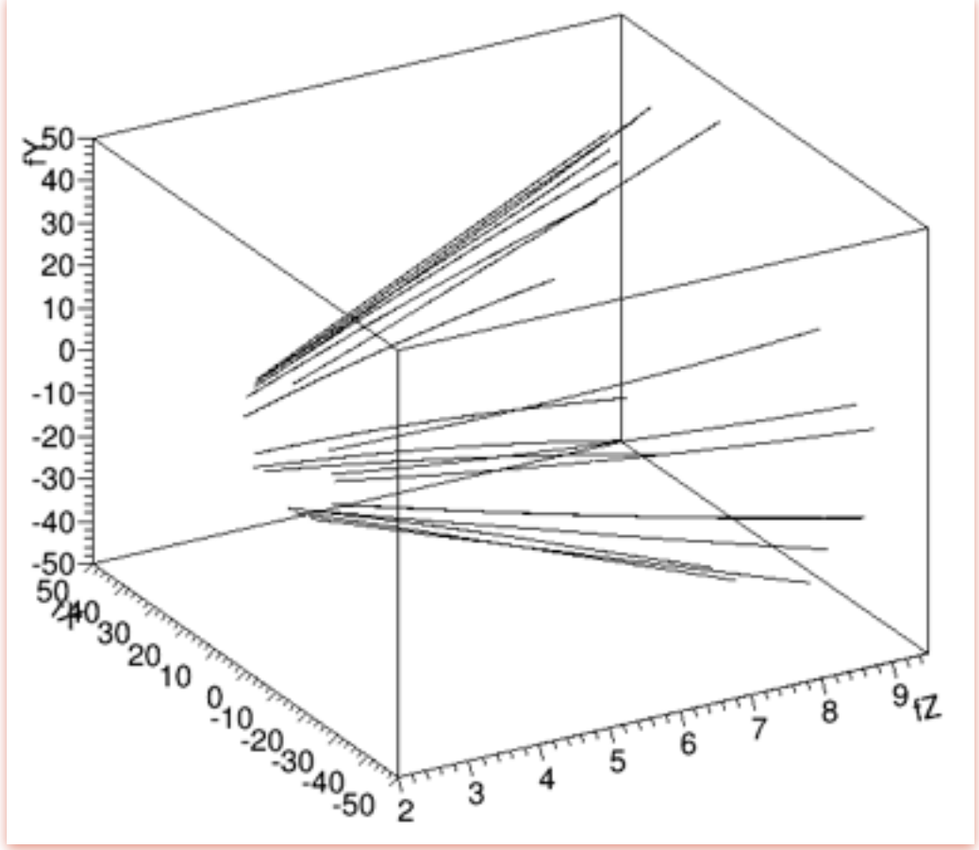
➔ Will try to make one, so that we can use IQMD or any other event file essentially.

MC Simulation

- Cylindrical and rectangular detector geometry input.
- Random angle distribution primary generator.
- Magnetic Field.







(cm)

Digitization FOPI

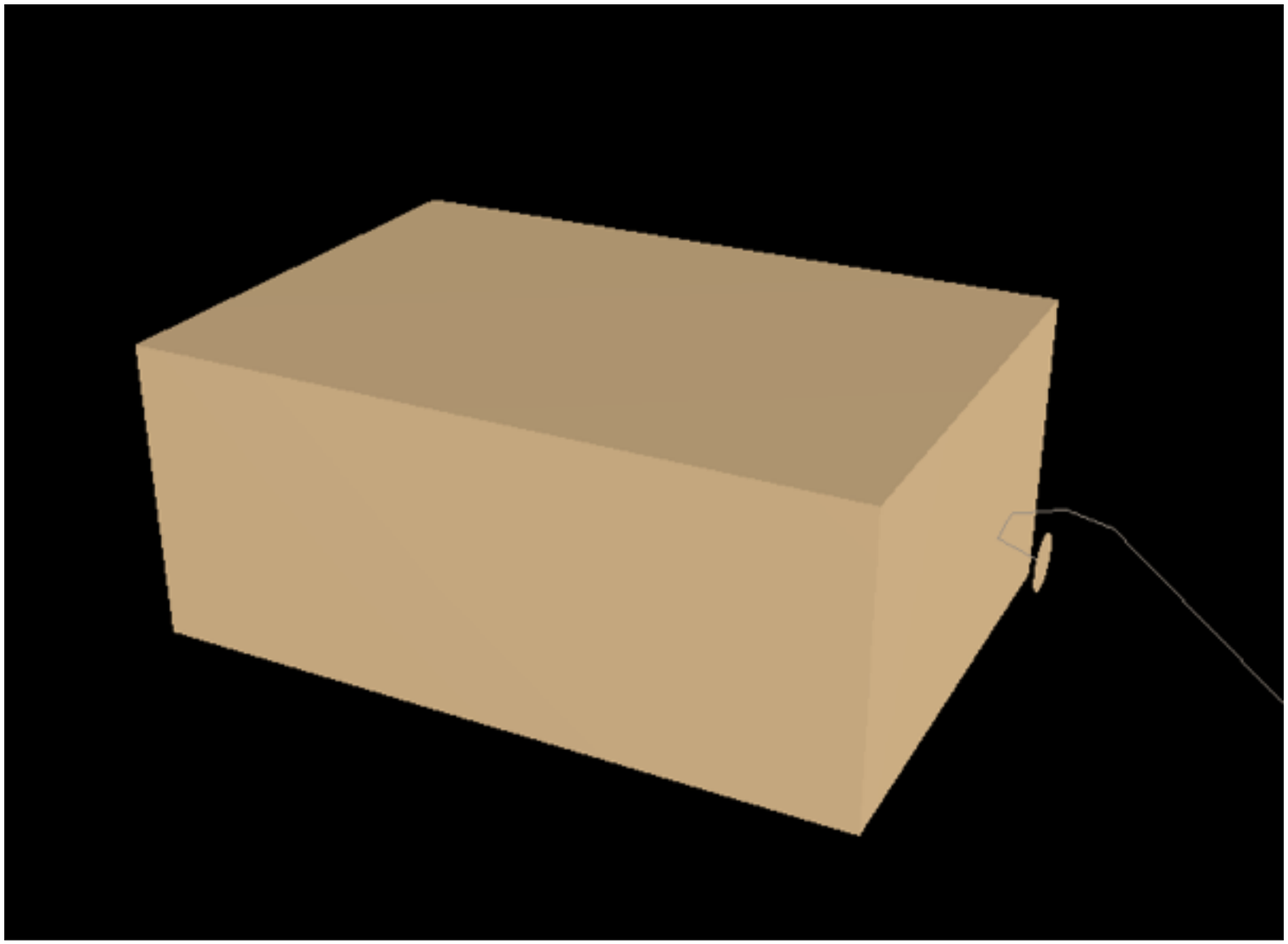
- Parameter
  “tpc.TBtestChamber.par” file is used again.
  One more parameter file from MC simulation is used as second input of second input file.
  (not sure what this does)

- Digitization Tasks
  1. TpcClusterizerTask : clusterization
  2. TpcDriftTask : drift simulation of electron inside the TPC
  3. TpcGemTask : gem response
  4. TpcPadResponseTask : pad response
  5. TpcElectronicsTask : -

I’ll go through each tasks to find out where ascii geometry file makes problem.

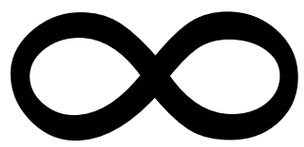
SPiRIT ROOT FAIR BASE

MC event display of single proton event. Not using FOPI ROOT.



LAMPS ROOT FAIR BASE

- Study FOPI ROOT and Tutorials to be familiar with FAIR BASE.
- Follow SPiRIT ROOT developing steps for LAMPS Simulation.
- FOPI ROOT seems to be using old version of FAIR BASE.
  Developing in latest version of FAIR BASE will be easier for developing LAMPS simulation and also having advantage of being updated.



Reconstruction FOPI

- Parameter
  “tpc.TBtestChamber.par” file is used again.
  One more parameter file from digitization is used as second input file.

- Reconstruction Tasks
  1. TpcClusterFinderTask
  2. TpcRiemannTracking
  3. TpcTrackInitTask
  4. KalmanTask
  5. TpcResidualTask

* Problem in running FOPI reconstruction code