E42 tracking program

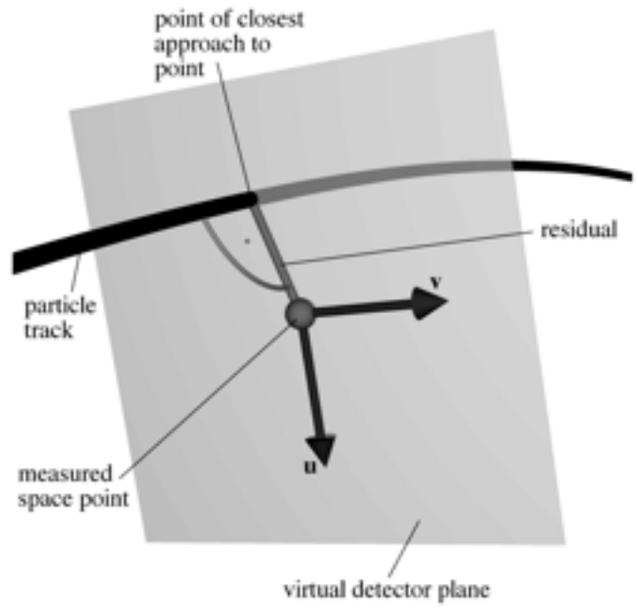
Concept

- Using GenFit tracking algorithm(Kalman filter).
- E42 has 2 tracking system : hypTPC, Kurama spectrometer
- -> Get momentum from TPC data and attempt to fitting for Kurama spectrometer data.
- Currently, I’m working on the developing TPC data analysis.
- Track finding, initial momentum calculation : Kim Shin-hyung

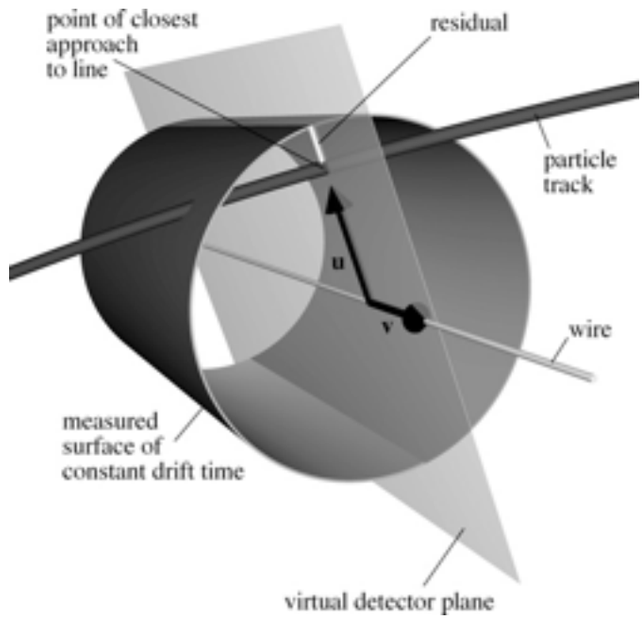
GenFit ?

- General framework for track fitting :
  - http://sourceforge.net/projects/genfit
  - Include fitting algorithms(Kalman filter, Gaussian sum, using geometric information and B-field information)
- Track representation & extrapolation : Runge-Kutta
- Detector Hit : classified by type strip, and wire(1D), pixel(2D), TPC(3D) - effects on displacement calculation

평면:자유도 2



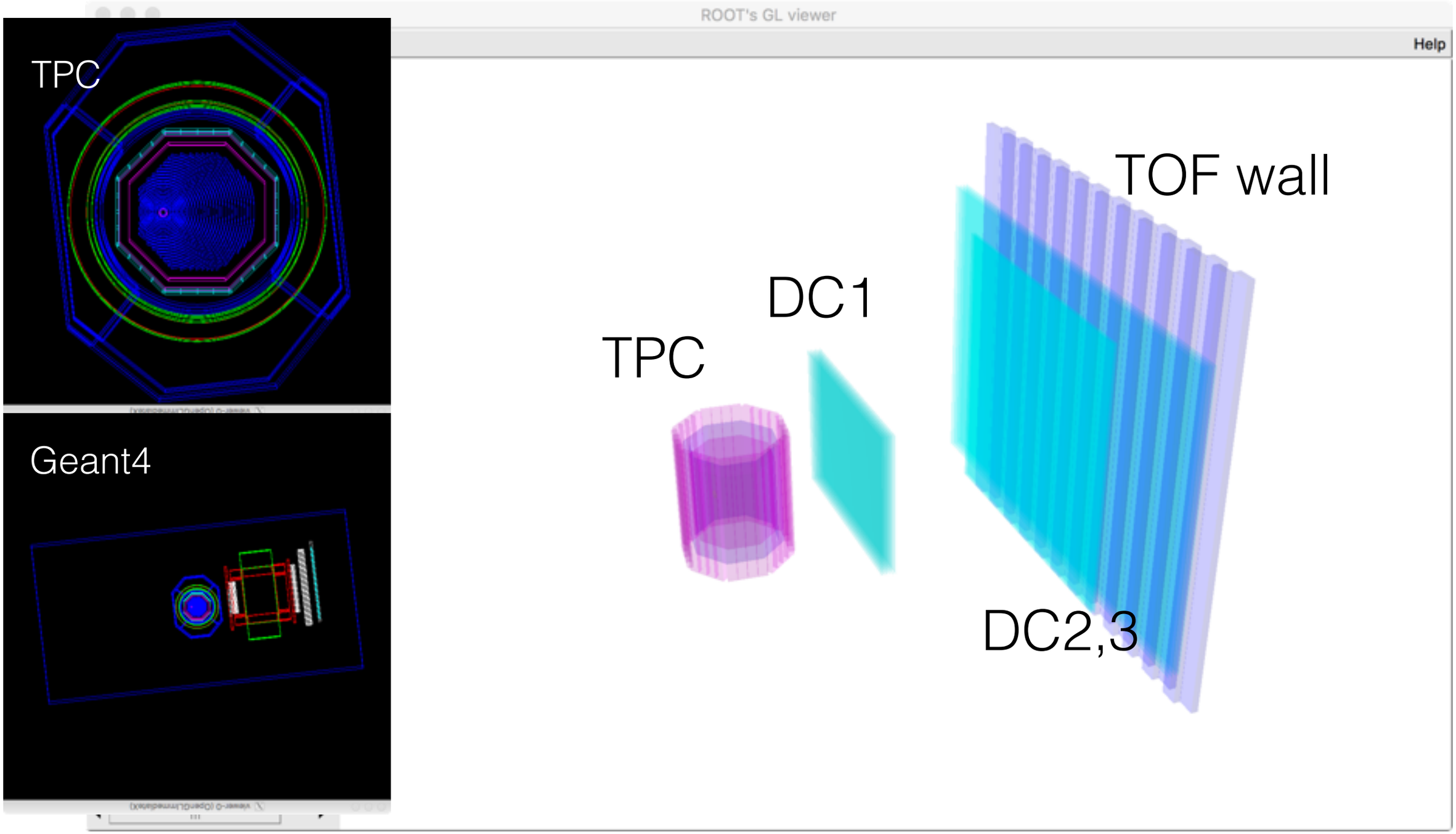
선:자유도 1



To fitting tracks using Genfit

- Initial track finding algorithm (clustering, simple momentum calculation) should be developed.
  - Calculate initial track position, initial momentum -> required parameters for track fitting.
- Detector dimensions and material definition must be loaded as ROOT TGeometry form.
- Field manager should be edited to handle variable field by position. (Only constant field was defined)
- Convert Gsim Data to genfit data structure.

E42 Detector definition in ROOT Geometry



Magnet definition is omitted.

Job list and Current Status in fitting algorithm development

1. Detector definition / Field definition - done
2. Clustering / Initial parameter finding -under going (Shin-hyung)
3. Track reconstruction - undergoing

1. Implant Gsim data to genfit data structure - undergoing
2. Initial particle information : Get from MC GenParticleData (PID, position, momentum) and smeared. - done
3. Convert hit data (geant4 hit) to hit point in the TPC. - done
4. Checking methods/functions using tracking program - done