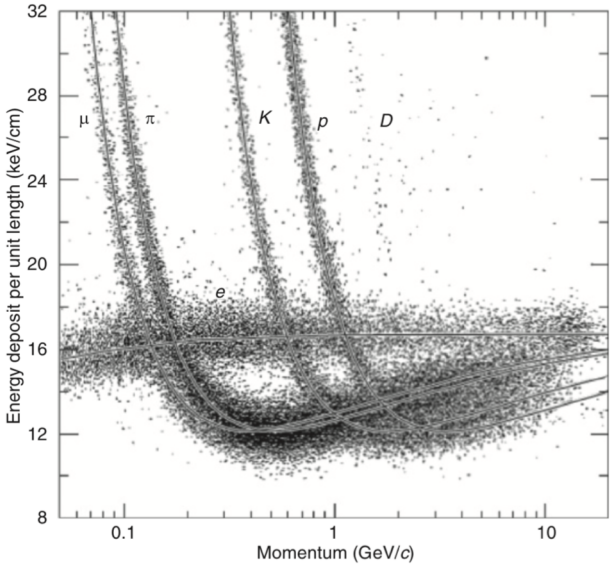
High-pressure TPCs, optical readout (or both)

E. Radicioni

why pressure

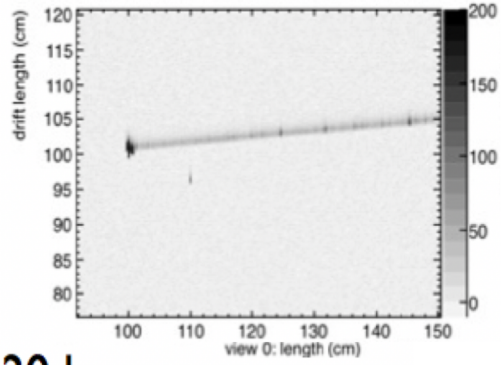
- TPC as a target
  - detailed x-sec studies - ν (and other primaries) interactions at relatively low energy
  - e.g. see the Q.E. lepton VS observe the entire recoil system
  - easily changeable target material
- TPC as a mass
  - e.g. 0νββ with tracking & energy measurement
- Excellent PID: increase effective sample length (cm bar)



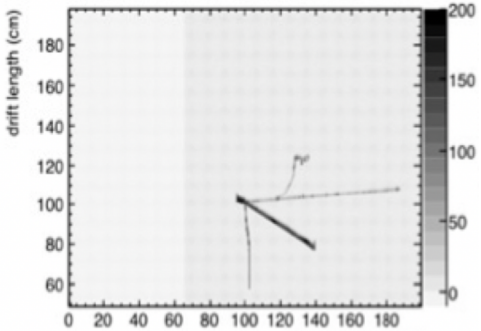
Challenges

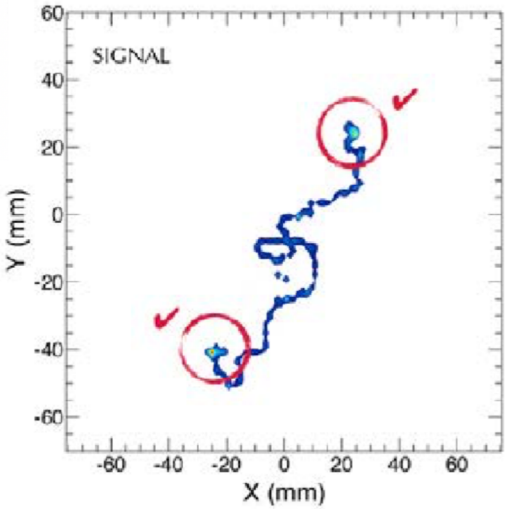
- light(-est possible) vessel (engineering)
- attachment ($\propto p^2$), v_{drift} vs. E/p, ... → optimal gas mix with different noble gasses
- Some activity already in AIDA-INNOVA (gas studies)

liquid Ar



Ar gas 20 bar





why optical

- you want to use secondary scintillation and/or no (or little) amplification
- low track density / low rate
- avoid electronics shaping time (cluster counting)

Challenges

- matching emission spectra with quantum efficiency
- light yield
- optical aperture
- compact readout
- direct 3D, continuous readout with sub-ns timing
  - e.g. MCP intensifier + TimePix