

Double Phase LAr LEM-TPC Detector

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Concept

- Liquid Argon
 - Cheap
 - Dense
 - Scintillation properties
 - Electrons are not reabsorbed after ionization
- Double Phase
 - Electric field causes electrons to drift through liquid to gas
 - Multiplied and extracted through Large Electron Multipliers

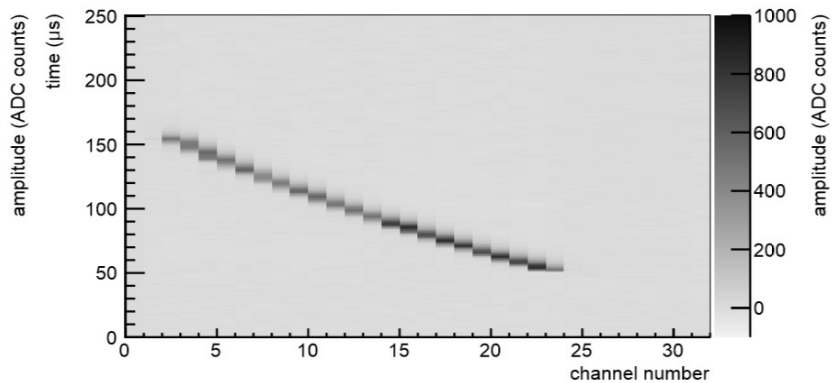
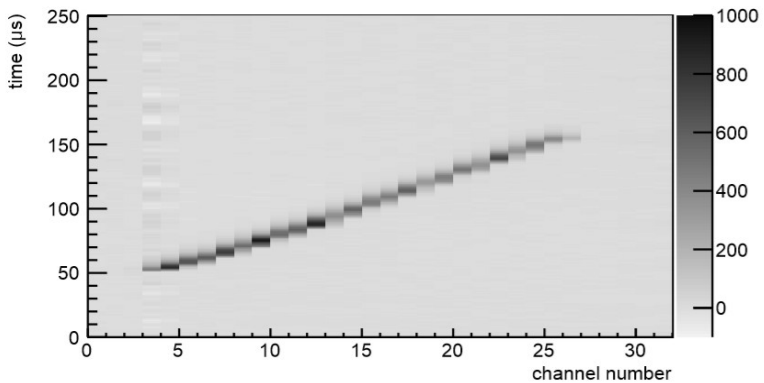
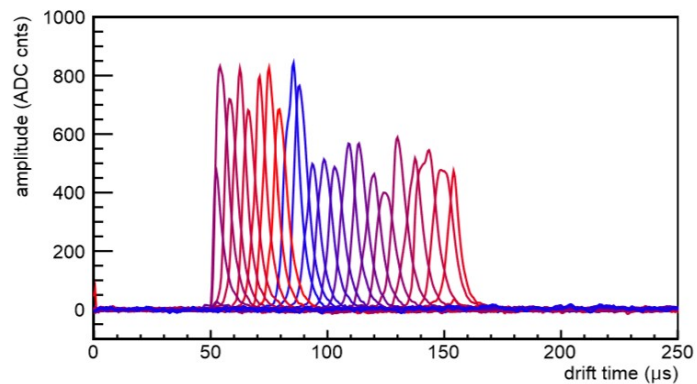
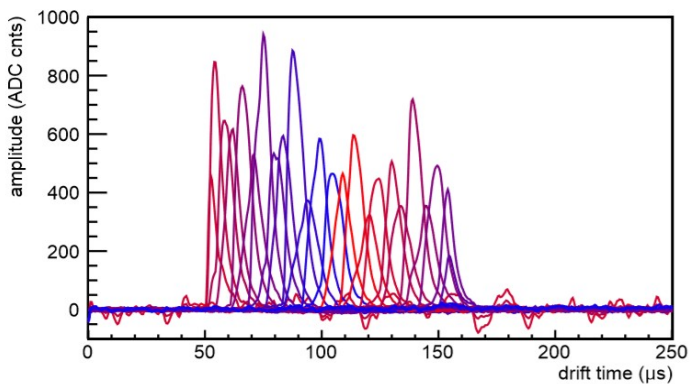
Time Projection Chamber

- Anodes collect free electrons, read current pulses
 - X-Y plane
- Z coordinate obtained through electron drift velocity
- Three dimensional view of particle track

Qscan

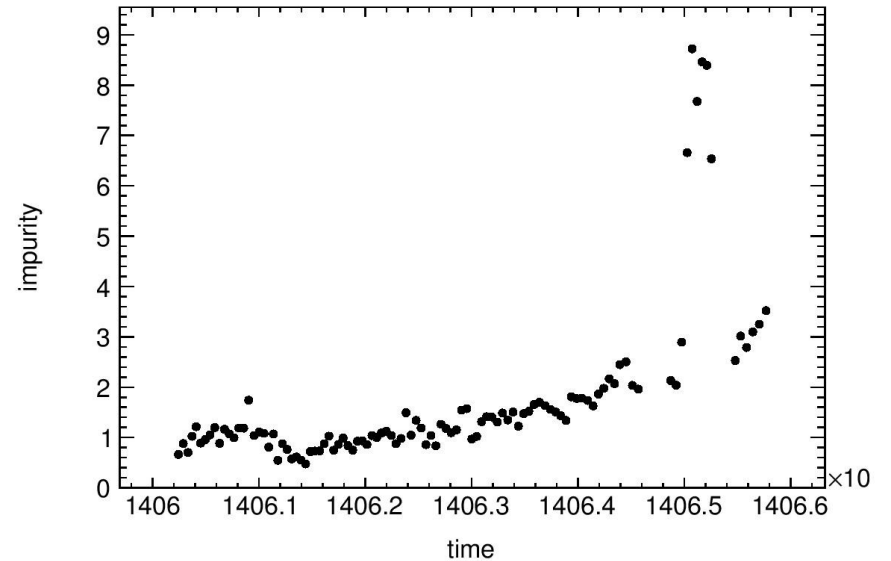
- C++/ROOT software for reconstructing and analyzing particle trajectories
- Identifies hits above specified threshold
- Groups hits into clusters
- Strings clusters into tracks

Qscan

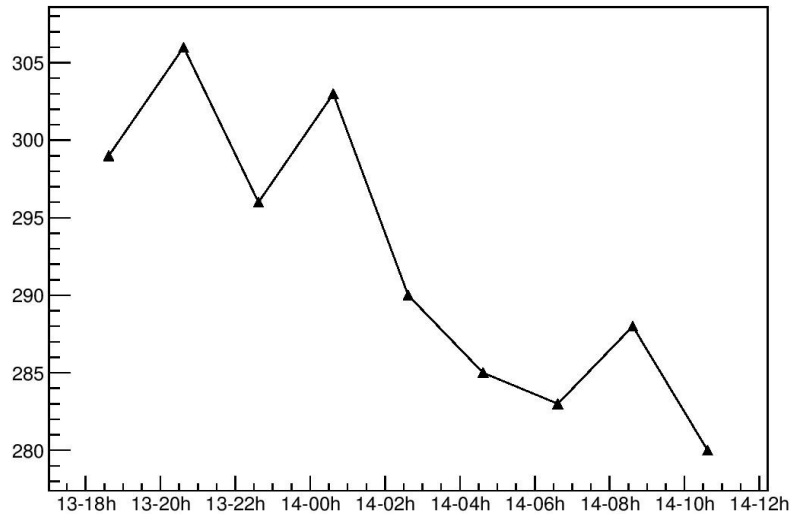


Purity Correction

- Over time, oxygen leaks into detector
- Oxygen absorbs electrons
- dE/dx decreases over time, must be corrected



LEM Sparking



- Apply high voltage to LEM
- Sparking at breakdown voltage cleans LEM
- Test for imperfections

LEM Sparking

