

ProtoDUNE Dual-Phase analysis APC group

by Etienne Chardonnet



Dual-Phase @ APC

4 permanents

Jaime Dawson

Sabrina Sacerdoti

Thomas Patzak

Alessandra Tonazzo

2 PhD students

Raphael Bajou (2019/2022)

Etienne Chardonnet (2018/2021)

What has been done

Andrea Scarpelli (PhD student 2016/2019)

- implemented the DP simulation in LArSoft

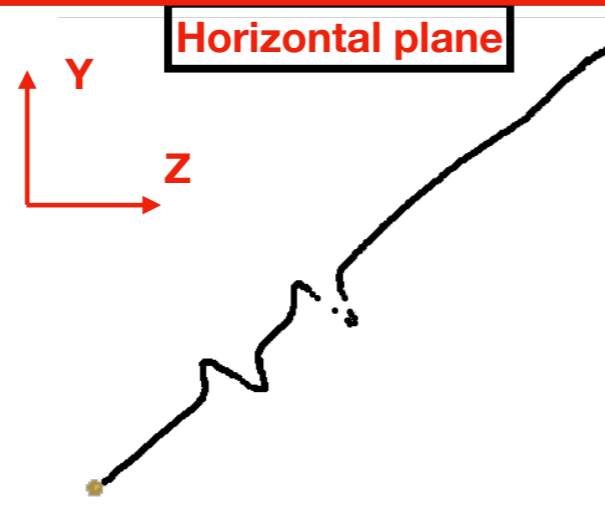
It is functioning and ready for use however needs some adjustment to match current data

- Estimated efficiency and resolution of DP on tracks in simulated beam neutrino events

Etienne Chardonnet

- Integrated DP-case in Pandora reconstruction
- Tested the performances with muons, two problematic cases :

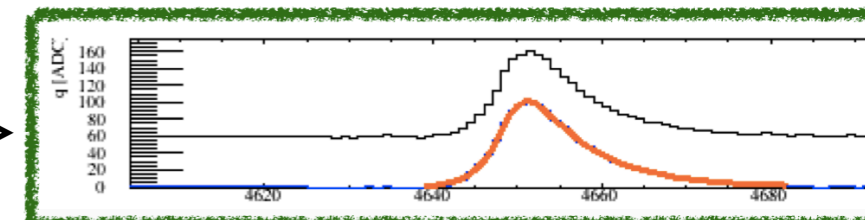
Horizontal tracks



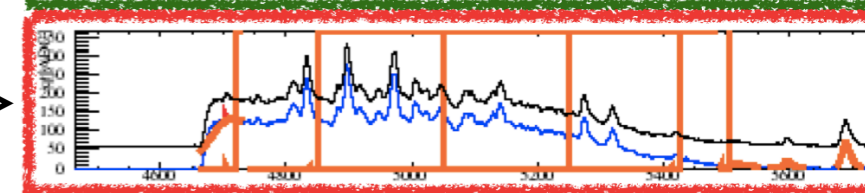
Tracks parallel to one view

Waveforms :

Normal →



Parallel →



Current work

Raphael Bajou

- Implementing a LEM by LEM gain analysis module to be applied on Pandora's reconstructed data, following Slavic's work

Etienne Chardonnet

- Integration **(with John Marshall)** of DP-Pandora into official LArSoft release(detailed presentation in next week Sim/Reco meeting on how to use it)
- Setting up all simulations (particle gun, cosmic flux, (anti-)neutrino fluxes) so that anyone can perform them easily **(with the help of Dom Brailsford)**

Sabrina Sacerdoti

- Getting up to speed with DUNE and LArSoft

Following weeks

Raphael Bajou

- dEdx analysis module that includes lifetime, SCE and Drift field distortions

Etienne Chardonnet

- Implementing the use of charge information in Pandora (view matching, particle hierarchy) **(help of a small Pandora team)**
- Implementing deconvolution for waveform reconstruction **(help of Christoph Alt)**

Sabrina Sacerdoti

- Interested in looking at LM/temp data to help in operations

Task interest

Software

Simulation

- New waveform pedestal
- LEM by LEM gain

Etienne

Development

- Analyzer (EASY LARSOFT)
- Michel selection

Etienne, Raphael

Reconstruction

- Test cosmic reco with dead areas
- Compare Hit charge content and ROI charge content

Etienne, Jaime, Sabrina

Task interest

Calibration/Data analysis

Gain

- dQdx LEM by LEM

Etienne, Raphaël, Sabrina

Purity

- Measurement with muons

Etienne, Raphael, Jaime

Space Charge/E field*

- Study of track bending
- Distantangle Edrift variations and lifetime effect on « dQdx vs depth »

Alessandra, Raphael, Jaime

Analysis*

- Michel selection + energy reco
- Angular distribution
- Track/Hit reconstruction performance

Alessandra, Raphael, Etienne, Sabrina

Questions

- What do we do with the geometry ?
- Do we spend time on simulating the Efield as it is now ?