# Pandora in a surface LArTPC: two-pass reconstruction (cosmic → neutrino)



**TPC front-end**

Raw TPC waveforms (U, V, Y)

Signal processing (deconvolution, noise filtering)

Hit finding (ROIs → hits)

TPC hits (per plane)

**Pass 1: PandoraCosmic**

PandoraCosmic (track-centric PR)

**Goal:** suppress dominant confusion from long through-going cosmics before any neutrino hypothesis is introduced.

Cosmic PFParticles + cosmic-tagged hits

Cosmic-hit removal (produce 'cosmic-removed' hits)

Cosmic-removed hits

**Pass 2: PandoraNu**

Slicing (partition hits into interaction-like sub-events)

**Slicing:** localises PR to reduce combinatorics, yielding a small set of neutrino-candidate slices.

Candidate slices (per-slice hit collections)

Per-slice pattern recognition (2D→3D, vertexing, PFO assembly)

Slice-level PFParticles + associations

**Optical front-end**

PMT waveforms

Flash finding (beam-window candidates)

Candidate flashes (time, PE pattern)

**Charge-light consistency**

Flash matching / t0 assignment (match slice to in-beam flash)

**Flash matching:** tests the charge-based hypothesis against optical information and provides an absolute **t0** handle for x(drift) and cosmic rejection.

Selected neutrino slice + t0 + cosmic-rejection score