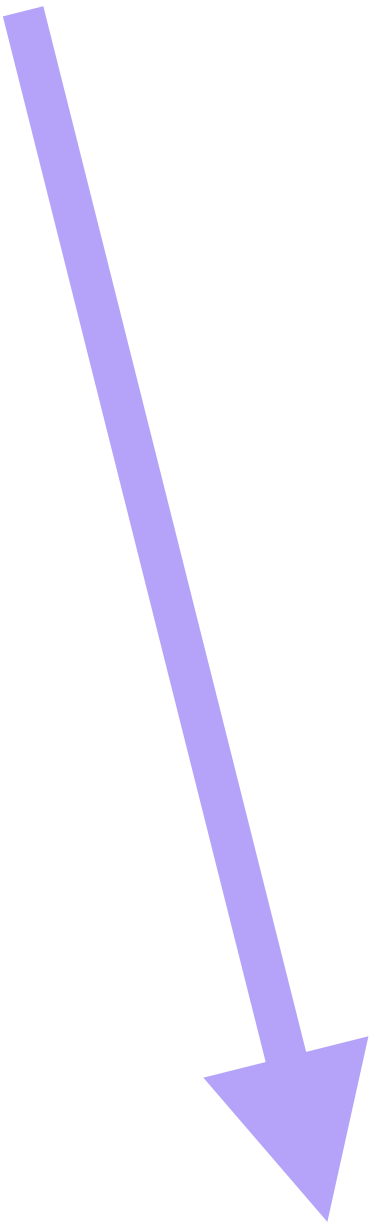
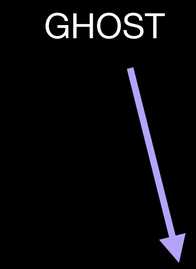
Sparse 3D data



The Data Challenge

Sparse 3D data

- **Three-Plane Readout**
  - Light collected from fibers along **X, Y, Z axes**
  - Produces three independent 2D projections of the event
- **Creating a 3D Image**
  - Combine 2D views → *Sparse* 3D event
  - Pinpoints **energy deposits** with fine resolution
- **Challenges:**
  - Energy reconstruction from 2D views is not unique
  - Ambiguity Creates "Ghosts"



Simple Simulation

Event Display

FASERCal

- **Event Hits**
  - Each plot point is a reconstructed voxel
  - Detector volume is massive, but ~99% of voxels are empty
  - Energy patterns: boosted forward, with complex and overlapping particle showers
- **Goal**
  - Achieve full event reconstruction → classification and kinematics from this sparse data